



1st International Congress on Coastal Research

Book of abstracts

Edited by:

El Tolib, H., Cherkaoui Dekkaki, H., El Moussaoui, S.,
Etebaei, I., Benabidate, L., & El Kaddouri, N.



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Preface

It is a great pleasure to welcome you to the 1st International Congress on Coastal Research (1stICCR 2020), held in Al Hoceima, Morocco (06-09 July 2021). This volume includes the 93 abstracts accepted for oral (75) and poster (18) presentations. These were dispatched within six sessions covering the majority of Coastal topics. The 28 co-chairs of the sessions have reviewed all abstracts. In addition, plenary conferences have been organized by researchers who have long devoted themselves to Coastal Research in Africa.

This Abstracts volume, which provides an excellent overview of current coastal research, including but not limited to relevant aspects of geological sciences, biology (ecology and coastal marine ecosystems), geomorphology (physical geography), climate, littoral oceanography, coastal hydrogeology, environmental (resource) management, engineering, and remote sensing, is a reference platform for researchers, practitioners, and educators. It presents and discusses the most recent innovations, trends, concerns, and practical challenges encountered and solutions adopted in coastal environment sciences.

I want to express my deep gratitude to the Organizing Committee members for dedicating so much of their time to the organization of the conference. On behalf of the Organizing Committee, I wish to thank Moroccan academic institutions warmly for their support. Collectively, we are all very grateful to Abdelmalek Essaadi University, the "Centre National de la Recherche Scientifique et Technique (CNRST, the Hassan II Academy of Sciences and Technologies, And the local authorities and representatives for the crucial help and to all sponsors that have kindly provided financial and logistical support in a challenging economic period

Hajar EL TALIBI

Faculty of Sciences and Techniques of Al Hoceima

General Co-chair of

1st International Congress on Coastal Research

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C.01: INTEGRATED COASTAL ZONE MANAGEMENT (ICZM): A FRAMEWORK TO TACKLE CURRENT AND FUTURE COASTAL ISSUES

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Abstract

Increasing urbanization and the concentration of many important economic sectors and activities on the often-narrow strip of land, which is generally ecologically sensitive, puts pressure on resources and the landscape, causes conflicts between activities claiming the same space and reduces the resilience of coastal ecosystems and populations, exposing them to various hazards and risks. In this context, ICZM is the most appropriate approach to address combined climate and non-climate-related pressures and cumulative impacts and to manage potential conflicts among various sectoral policies. A review of progress in ICZM projects and implementation in Morocco will be discussed.

Keywords: ICZM, urbanization, coastal ecosystems, Morocco

C.02: COASTAL AQUIFERS: PROBLEMATIC AND APPROACHES

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Abstract

Coastal aquifers constitute particular systems by their position in critical areas characterized by various issues and risks. Marine intrusion is the major Risk of these aquifers under global changes. They contain an important water resources used for industry, population and agriculture, but they are facing many issues since they are the receiver of all flows and transfer of materials of all kinds coming from upstream of the watersheds discharging into the sea. generally the coastal areas are the most populated areas which put an additional pressure on their water resources. The majority of studies show continued degradation of coastal waters both qualitatively and qualitatively. The overexploitation, climate change, wastes (liquid and solid) and salinization, constitute the major challenges of coastal aquifers. The mode of salinization depends on the geographical, geological (nature of the aquifer, mineralogy of the sediments) and climatic. Their study and management require multidisciplinary (chemical and isotopic tracers, geophysics, modeling, ..) and sometimes specific approaches mainly in arid areas. What tools to characterize saline intrusion and the potential impact of sea level rise and overexploitation on coastal aquifers? What's about their vulnerability and monitoring? These are the few questions that will be discussed in this presentation.

Keywords: Coastal aquifer, water resource, degradation, Vulnerability, approches.

C.03: RISKS AND ADAPTATION CAPACITY OF THE GREEK COASTAL ENVIRONMENT

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Abstract

Greece has a 13,780 km coastline and many islands, with the majority of Greek population living in the coastal zone. The coastline hosts large urban settlements, critical infrastructure (including more than 125 seaports and many coastal airports and roads), whereas coastal areas also form the pillar of tourism, a very significant Greek economic sector. Greek coastal zone faces increasing risks (amongst others) from the climate variability and change. For example, it has been projected that between 12% and 68 % of the about 3200 beaches of the Aegean archipelago will face total permanent inundation by 2100 (under a mean sea level rise of 0.7 m). At the same time, future extreme storm events are projected to severely damage coastal infrastructure and assets, requiring detailed risk assessments and innovative adaptation measures. At least 40 % (and up to 89 %) of all Greek beaches will permanently retreat by a distance at least equal to their current beach maximum widths (BMW's) under the RCP8.5 and high ice-melt scenario; these retreats will have potentially devastating impacts on the ecosystems and critical infrastructure/assets located at the coastal front, such as seaports, involving impacts from both flooding and frequency of extreme heat waves. To manage these risks and build resilience, effective integrated coastal management frameworks/plans should be developed and implemented based on various and complementary methods/tools, including e.g. remote sensed monitoring of coastal hazards, state-of-the-art projections of the future coastal exposure/vulnerability and the adaptation of appropriate regulation and governance structures. A review of the current and projected risks as well as a framework for developing appropriate management plans is presented.

Keywords: Coastal Zone, storm events, sea level rise, Greek coastal zone

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C.04: UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT (2021-2030): PRIORITIES TO AFRICA

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Abstract

The United Nations has proclaimed and launched the Decade of Ocean Science for Sustainable Development (2021-2030) to support efforts to reverse the cycle of decline in ocean health and gather ocean stakeholders worldwide behind a common framework that will ensure ocean science can fully support countries in creating improved conditions for sustainable development of the Ocean. The Ocean Decade provides a common framework to ensure that ocean science can fully support countries to achieve the 2030 Agenda for Sustainable Development. It provides a 'once in a lifetime' opportunity to create a new foundation across the science-policy interface to strengthen the management of our oceans and coasts for the benefit of humanity. It will also strengthen the international cooperation needed to develop the scientific research and innovative technologies that can connect ocean science with the needs of society, by contributing to the UN processes protecting the ocean and its resources, such as the SAMOA Pathway, the United Nations Convention for the Law of the Sea, the post-2020 framework for the Convention on Biological Diversity and the Sendai Framework for Disaster Risk Reduction. The Ocean Decade requires the engagement of many different stakeholders to create new ideas, solutions, partnerships and applications, these include: scientists, governments, policy makers, business, industry and civil society. The Decade concerns the whole planet and some orientations and priorities will be presented for the African continent.

Keywords: UN Decade, Ocean Science, Sustainable Development, Africa, 2021-2030

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C.05: SPRINGER AUTHOR ACADEMY: A STEP-BY-STEP GUIDE ON WRITING AND PUBLISHING YOUR JOURNAL MANUSCRIPT

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1-Springer, a part of Springer Nature, Heidelberg, Germany

Abstract

Scientific publication must be seen as an important, if not the most important, part of the research process. It is a central piece of the process that makes science advance. The rapid progress in the trends of scientific publication is enhanced by the availability of many tools that did not exist before. However, writing research papers for scientific journals is still not easy and is very competitive. It requires substantial effort which can be maximized by following a few simple guidelines when creating the product for submission. By following guidelines and avoiding common errors, the process can be streamlined and success realized. Here, we share advice on how to effectively write and structure your paper. After producing data and generating ideas from your research, how do you write a clear and concise paper that attracts the attention of journal editors and readers? How should you prepare a cover letter to make a first good impression about your research paper? How should you respond to reviewer reports? During this plenary, we'll provide a step-by-step guide to getting you started right away at preparing a successful publication following this plan:

1. What should be the motivation that can inspire you to accomplish a successful publication
2. What to do before you start writing and how to efficiently prepare the needed literature
3. Which kind of writing style you should learn/use
4. How to logically link your ideas throughout the manuscript
5. Which structure you should follow when preparing your manuscript
6. How to present figures and tables
7. How to shape appealing title and abstract after you finish writing
8. Which journal you should choose and how you select the most appropriate journal
9. How to prepare a cover letter to attract the attention of editors
10. How to answer editors' and reviewers' comments

Keywords: Publishing, Journals, Articles, Authors, Reviewers, Editors, Springer

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S.01C01: TSUNAMI SEDIMENTARY RECORDS ALONG SEASHORE: SETTING UP AND DELETION

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Abstract

When reaching the coast, tsunami waves can release tremendous energy responsible for erosion, transport, and deposition of clastic material. Waves leave marks of their passage by leaving clastic material collected on their path from offshore, littoral (*sensus stricto*) and ashore sources. The characteristics of these imprints vary depending on the size of the material transported, which ranges from boulders to clay. Sediments are deposited with a structure reflecting the hydrodynamics conditions of the flow prevailing during deposition. The preservation of these sedimentary recordings over time is related to the initial thickness of the deposits. At the top they undergo surface processes like wind deflation or erosion but also paedogenesis. The development of soils at the expenses of the upper part of the deposits means a significant thinning of the decipherable imprint (for example we measured a loss of 15 % on a 30 cm deposit 5 years after the 2004 tsunami on North Sumatra and of 20% for a 70 cm thick deposit on a 4220 BP tsunami deposit at the same location). Bioturbation by ants, termites, worms, rodents, crabs, shells, and plant roots constitute an efficient erasing agent of the tsunami sedimentary records. It affects deeply the sediment body and, as does seismic tremor on waterlogged sediments, it drastically modifies the primary structure. Eventually, anthropic action is the most efficient factor at the origin of a complete erasing of these high energy imprints. Locally, on the northern coast of Sumatra, almost all the 2004 tsunami sandy deposit was removed for reconstruction purpose. At Amurang, Sulawesi, a huge deposit of coral boulders, testimony of a particularly strong event, has been shaved to the ground for lime production. The best conditions for recording and preservation of tsunamis deposits over time are therefore related to the existence of a stock of sediment prone to erosion on the shoreline, the depositional context, and a variety of post-depositional controlling factors such as surface erosion, bioturbation and human activity.

Keywords: Tsunami deposit, sedimentary recordings, erasure processes

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S.01O01: ANALYSIS AND PREDICTION OF CLIMATE FORECASTS IN NORTH OF MOROCCO: APPLICATION OF MULTILEVEL LINEAR MIXED EFFECTS MODELS USING R SOFTWARE

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Abstract

In less than thirty years, climate change has become a major concern for humanity. Although climate modelling research is becoming increasingly clearer, there are still many studies and research on the possible effects of current and future climate change. In this respect, the main purpose of this article is to study the transformation of the climate regime and the consequences of this evolution on the scientific community for the "Dar Chaoui" area, located in the Mediterranean region of Tangier, northern Morocco. Several models have been developed in the literature, including the simple linear regression model. The latter is based on a fixed-effects estimation approach and ignoring random effects. In contrast, the multilevel linear mixed effect model (LME), developed in this study, is a hierarchical model based on a combination of fixed effects estimation, random effects and error modeling. Initially, annual and monthly observations of temperature and precipitation were carried out successively between 1979-2014 and 1984-2018, followed by a complete daily observation. In a second step, the joint estimation of fixed effects (β), random effects (u_i) and variance parameters (σ^2 , σ^2_u and σ^2_{ϵ}) were processed, and then a comparison with several criteria, such as (AIC), (BIC) and (KIC) was carried out. Results up to 2050 show that: The predicted values are very close to the actual values. There are three measures of standard deviation for fixed and random effects and the measure of variance, which show us a high degree of prediction. The three criteria (AIC), (BIC) and (KIC) of mixed models are lower than those of conventional models. With regard to the model fit, the classical model obtained a P-value greater than 0.05. On the other hand, the two parameters of the mixed model have P-values lower than 0.05. Therefore, we can conclude that the model developed in this study gives a decisive precision of the results.

Keywords: Climate forecast, LME, hierarchical model, R software, North of Morocco.

S.01002: CARTOGRAPHY AND SIGNIFICANCE OF PEBBLE DISTRIBUTION IN THE TANGER-ASILAH REGION

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Abstract

The Tangier-Asilah region, located on the northwest Atlantic coast of Morocco, is prone to flooding due to extreme events such as tsunamis and storms. Several works have been the subject of these studies and are being analyzed in depth in this region. On the Atlantic coast of Tangier-Asilah, pebbles of different sizes are distributed on a strip of 40km. The main objective of our work is to establish a scenario for the emplacement of these deposits in this region and develop coastal flooding models. A detailed field study and a GIS-based multi-criteria map analysis to see the distribution of these deposits along the coast were carried out to achieve this goal. A morphometric study of the pebbles followed this. This determination will enable us to calculate the various characteristic indices of the pebbles to classify them in their depositional environment. The combination of the results of these two techniques leads us to propose that these deposits are probably related to a high-energy event that could have transported several sediments, including marine pebbles, away from the coast.

Keywords: Atlantic coast, Morocco, Tangier, Asilah, Tsunami, Storms, Morphometry, Pebbles, GIS

S.01O03: SPATIAL AND TEMPORAL DISTRIBUTION OF BEACH LITTERING: MEDITERRANEAN COAST OF MOROCCO

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Abstract

This study aims to present data on the distribution, types, and beach littering sources on Morocco's Mediterranean coastline. Two surveys were carried out per year, one in autumn and the other in spring. Thus, six surveys were carried out per site. Four beaches were considered for the study, which focused on 14 sites along the Moroccan Mediterranean coast. One site per beach has been established, except for the large beaches (i.e., Tangier, Martil, Saïdia, and Nador), where two sites have been designed. Some sites covered "Rural" (04), "Village" (02), "Urban" (04), and "Resorts" (02) bathing areas. A total of 30,585 items were collected, for a combined weight of 1,231.51 kg, out of 108,051 m² of beach area covered for study. Polymeric materials were numerically the most common group, with 25,616 items or 83.7% of all items collected. The number of articles collected varied from 1237 articles/100m (Or 0.155 articles m⁻²) to 11 articles/100m (or 0.001 articles m⁻²) recorded respectively at Marina Smir (in autumn 2015) and the level of the Nador-Kariat Arekmane beach (in spring 2016); the average value recorded for all ranges is 364.1 ± 190.9 items/100 m or 0.050 ± 0.029 items m⁻². In terms of weight, collected items increased from 97.62 kg to 0.67 kg / 100m, at the level of the beaches of Tanger-Sania and Quemado (Al Hoceima) respectively (both in autumn 2016), with an overall average for all ranges of 14.66 ± 9.7 kg/100m. The waste density levels varied from 12.24 to 0.1 gr m⁻², noted at the beaches of Tangier-Sania and Nador-Boqueronesa, respectively. In autumn 2016, the average density for all the beaches being 1.99 ± 1.3 gr m⁻². Local waste management is the responsibility of the Municipalities. In addition to the clean-up efforts made by local administrations and NGOs, there is an urgent need to sensitize bathers because high concentrations of debris, mainly recorded on urban beaches, were linked to bathers' activities.

Keywords: Waste, beaches, distribution, types, sources, management, Mediterranean coast, Morocco.

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S.01004: RECONSTRUCTION OF MARINE SUBMERSION EVENTS ALONG THE NORTH ATLANTIC COAST OF MOROCCO OVER THE LAST MILLENNIA: NEW EVIDENCE FROM THE TAHADDART ESTUARY

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Abstract

The Atlantic coast of Morocco has been exposed to marine submersion events from storm surges and tsunamis, resulting in human and economic losses. The development of proactive adaptation strategies requires the study of these events over centennial to millennial timescales. This work presents new geological traces of Holocene marine submersion events along this coast using a sedimentary core collected from the Tahaddart Estuary (NW of Morocco). Sedimentological and geochemical analyses carried out on this archive show a sedimentary sequence dominated by fine estuarine sediments with 14 allochthonous sandy layers (E1-E14) probably deposited by high-energy marine events. The age of deposition of three layers E1, E13 and E14 were determined using conventional dating methods (^{210}Pb ex, ^{137}Cs and ^{14}C). The first layer, introduced as E1, appears to correspond to the great Lisbon tsunami of 1755 CE (Common Era), an event dated for the first time along the Moroccan Atlantic coast. The other two layers, named E13 and E14, were dated between 3464 and 2837 cal BP (Calibrated before Present) and are chronologically correlated with high-energy marine deposits found on the Spanish Atlantic coast. This correlation confirms the existence of another regional event around 3200 BP.

Keywords: Storm surges, Tsunamis, Late Holocene, Atlantic coast of Morocco, Tahaddart Estuary

S.01O05: THE INFLUENCE OF THE VARIATION OF THE REAR SLOPE ON THE STABILITY OF THE RUBBLE MOUND BREAK WATER SUBJECTED TO EARTHQUAKES

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Abstract

One of the key issues in maritime construction is the effect of the earthquake on the stability of maritime structures. This work aims to show the influence of the variation of the rear slope of the rubble mound breakwater subjected to earthquakes in terms of different values of amplitudes and frequencies characterizing the seismic wave. First, we will model the representative shema of the rubble mound breakwater on Plaxis 2D, which is based on finite element method. Then, we will consider three angles of inclination of the rear slope and for each case, we will treat the structure's seismic response according to different values of amplitudes and frequencies. Subsequently, the results of each variant will allow us to see the effect of the value of the slope of the rear slope of the rubble mound breakwater on the resistance to seismic effects.

Keywords: Rubble mound break water, Earthquake, Stability, Amplitudes, Frequencies, Rear slope, Plaxis 2d, Finite element method

S.01O06: THE ASSESSMENT OF RADIOLOGICAL RISKS ASSOCIATED WITH THE INGESTION OF ^{210}Po , ^{210}Pb , AND ^{137}Cs IN MARINE ORGANISMS COLLECTED FROM THE LOCAL FISH MARKET OF KENITRA, MOROCCO

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Abstract

^{210}Po , ^{210}Pb , and ^{137}Cs activities were measured using gamma and alpha spectrometry in commonly consumed seafood collected from the local fish market of Kenitra, Morocco. ^{210}Po activity ranged from 0.76 to 182.5 Bq kg⁻¹ w.w, while ^{210}Pb and ^{137}Cs activities were 1 and 4 Bq kg⁻¹ w.w, respectively. The potential health risks associated with the consumption of seafood were assessed by calculating the committed effective dose, the daily intake, and the lifetime cancer risk. The obtained results of the committed effective dose were below the limit (1 mSv year⁻¹), while the lifetime cancer risk exceeded the range of acceptable values.

Keywords: Committed effective dose, Daily intake, Lifetime cancer risk

S.01O07: EARTHQUAKE-INDUCED LIQUEFACTION IN THE COASTAL ZONE, CASE OF MARTIL CITY, MOROCCO

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Abstract

Morocco, with both Atlantic and Mediterranean coastlines, is considered the most threatened by the tectonic earthquakes. According to historical documents and Moroccan earthquakes catalogs, the coastal zone has suffered in the past from several earthquakes. Therefore, understanding how sedimentary basins respond to seismic-wave energy generated by earthquake events is a significant concern for seismic-hazard estimation and risk analysis. The main goal of this study is to determine the distribution of the natural frequency value (F_0), the amplification factor value (A_0), assessing the soil vulnerability index (K_g) and ground shear strain (γ) was carried out as an indicator for liquefaction potential sites in the Martil city based on the microtremor measurements. This last one is a fast applicable, and cost-effective method with extensive applications. Liquefaction assessment was done at 96 stations using the HVSR approach provided by Nakamura (1989). HVSR analysis was carried out using the Grilla software. According to the analysis results, the predominant frequency values range from about 0.31 to 5.63 Hz, and the amplification factor values range from 3 to 15. Based on these parameters, the vulnerability index K_g and ground shear strain (γ) are determined, which can be used as a parameter in calculating the liquefaction potential of an area. This study shows supporting evidence for the first time that the HVSR of microtremors can be a good alternative indicator for an area's potential for liquefaction.

Keywords: Earthquakes, Shear strain, Liquefaction potential.

S.01008: GEOLOGICAL AND GEOMORPHIC INVESTIGATIONS ON PALAEO-LANDSLIDE DAMMED THE TAMOURGHOUT RIVER, (SEPTENTRIONAL MIDDLE ATLAS, MOROCCO)

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Abstract

The Moroccan Middle Atlas Mountains are best known for their slope active movements, where lithology, hypsometry, and seismicity are likely to cause slope instability problems. In this study, we have focused on geomorphological and geological investigations on a palaeo-landslide that blocked and dammed the Tamourghout river main bed (Taza, Morocco) to understand their consequences and hydraulic risks mitigation. The importance of this work lies not only in the enormous proportions of the landslide or the vast watershed locked up by the dam (Tamda lake) but also in its contribution to the understanding of the geological and geomorphological mechanisms responsible of these huge landslides. Based on GIS analysis and geomorphic evidence, the landslide location and volume can be estimated. The length of the rock movement from the surface to the riverbed is 750 m with a width up to 1 km. The volume of the landslide displaced on the river would then be at least a few hundred million m³. Given the slide oldness, it is hard to know the slide depth from the topography and therefore, any estimation of the slide mass is provisional. However, studies of many of the major landslides recommended an expected average depth of 200 m is realistic. The recognition of the different forms of sliding surface, allows us to classify it in Rock/debris slide complex. Field data shows that the slide structure, lacustrine sediments and outburst deposits are well preserved. This conservation offers a chance to appreciate this huge landslide dammed lake's creation, development, and durability.

Keywords: Landslide, Tectonics, Tamda, Middle Atlas, Morocco

S.01O09: MODELING THE RISKS OF MARINE SUBMERSION ON THE SAIDIA COASTAL - CAP DE L'EAU (NORTH EAST MOROCCO)

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Abstract

The coastline is an area of ecological and environmental balance between the continent and the sea. Therefore, the coastline from Saidia to Cap de l'Eau located on the Mediterranean coast of Morocco is the subject of this study. The goal of this work is to produce maps of the risk of marine submersion. The methodology followed consists of entering storm meteorological data and land use data into the Iber 2D software. In addition, we mapped the hazard as well as the vulnerability of this submersion. The results of this 2D modeling of the hazard have shown that the coastline of Saidia - Cap de l' Eau presents a high risk of marine submersion and this by the water levels which rise to more than 4 meters and overflow on a width of more than 20 meters towards the mainland. In addition, the coastal strip constitutes the zone of high vulnerability compared to the continent.

Keywords: marine submersion, hazard, vulnerability, risk, modelling, Iber 2D.

S.01010: FLOOD RISK MODELING IN THE WATERSHED OF CHARÃÇA STREAM. PROVINCE OF BERKANE (NORTH EASTERN MOROCCO).

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Abstract

The present study aims to model the floods at the level of the two banks of the CharÃça stream (the Berkane bank and the Sidi Slimane bank). The methodology followed in this modeling consists of determining the geomorphology of the watershed and studying its hydrology. 2D hydraulic modeling by Iber software makes it possible to follow the Spatio-temporal evolution of the characteristics of a flood. In addition, it allows us to map the hazard. Furthermore, to assess vulnerability to flooding, we referred to land use (physical vulnerability) to study the behavior of runoff water in the face of socioeconomic issues such as: buildings, facilities, and the road network. The results showed that: (1) - A predominance of high-intensity flood hazard in the floodplain; (2) - Land with medium and high vulnerability successively constitutes 46.50% and 31.10% of the total area of the watershed studied.

Keywords: Flood, risk, CharÃça Stream, hydrology, 2D hydraulic modeling.

S.01O11: IMPLEMENTATION OF AEROMAGNETIC METHOD TO DELINEATE THE STRUCTURAL FEATURES OF NORTHERN MARGIN OF MOROCCO

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Abstract

Airborne magnetic data over the Northern Margin of Morocco were analyzed and interpreted in this study. The residual total magnetic field has been reduced to the pole (RTP) to move the observed magnetic anomalies to the top of the bodies of their source, assuming an induced magnetization parallel to the present field. The magnetic anomaly of North-eastern margin of Morocco shows the individualization of two picks: The eastern one is well correlated to the outcropping of Chaffarines Islands; moreover, the anomaly's pick in the west still shifted forward the South direction with respect to the volcanic complex of Gourougou. To extract structural detail from magnetic data, it is often helpful to treat the data using derivatives or filtering such as horizontal gradient, upward continuation, Euler deconvolution and power spectrum analysis. i) Horizontal derivative used to highlight structural trends and fault locations. This derivative produces maxima where the magnetic gradients are strongest; highlighting the locations of major susceptibility contrasts and gives information about their dip. This can include faults, the edges of bodies or lateral compositional changes. ii) 3D Euler deconvolution method has been applied to the potential fields to enhance the location of shallow and deep sources. The Euler solutions delineate boundaries of an ENE-WSW intrusive wide (8 km) magnetic body with a length of 40 km, this body is most probably representing an intrusion that is associated with increase of the magnetic basement in the Mediterranean sea and highlighted a transverse accidents NW-SE crossing this intrusion. iii) Fourier spectral analysis was applied to the residual data to estimating the depth to the bottom of magnetic sources, the layer depth ranges from 350 m to 636 m. The calculations carried out on profile data for the study area yielded good agreement with known basement depths. The current study shows the contribution of magnetic data filtering to build an understanding of the structural framework of Northern Margin of Morocco. This can be an especially powerful tool when integrated with other data such as seismic, to enable the interpreter to develop a geological model.

Keywords: Northern Margin of Morocco, Airborne magnetic, Filtering, structural framework.

S.01P01: ASSESSMENT OF THE IMPACTS OF CLIMATE CHANGE AND SEA LEVEL RISE ON THE BAY AND THE AL HOCEIMA NATIONAL PARK: VULNERABILITY AND ADAPTATION.

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Abstract

This subject research aims to use a comprehensive method to assess the risks of climate change, in particular the impact of sea level rise on the bay and the Al-Hoceima National Park. The assessment of biogeophysical and socioeconomic impacts will be based on risk scenarios representing the rise in sea level, multi-scalar, combining digital modeling of climatic hazards, a spatiotemporal assessment of the issues, and criteria of physical and human vulnerability. The study will be structured in two parts. The first part consists in evaluating the exposure of Al-Hoceima bay and national park to sea level rise, by developing a methodological measurement approach based on a cartography integrating the parameters of climatic hazards and the regional land use databases. The result is a set of geographic risk indicators aggregated along of Al-Hoceima bay and national park. The second part involves the development of an adaptation and / or mitigation strategy to cope with rising sea levels, to avoid the risk of human loss.

Keywords: climate change, Sea level rise, Impacts, Vulnérabilité et adaptation, Al hoceima bay, al hoceima national park

S.01Po2: IMPACT OF THE OPERATION OF SANDPIT ON THE COASTAL MORPHODYNAMIC OF THE ESSAOUIRA SHORELINE (ATLANTIC MOROCCO)

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Abstract

The dune massif of Essaouira participates in the natural movement of particles combining marine and wind dynamics. However, the anthropic exploitation of a sandpit has strongly modified its balance. The present work aims at highlighting the hydrodynamic functioning and the morphosedimentary evolution of the Essaouira coast in relation to the extraction of dune sand. Two complementary approaches were undertaken in this study; the diachronic analysis of the coastline and the sedimentological study of the sand grains. Two different morphosedimentary sectors are distinguished on the studied coastline. Their morphodynamic evolution is in direct relation with natural factors and the exploitation of sandpits. The first sector is located in the eastern part of the beach of Bhibah. It is characterized by a strong amplification and convergence of the waves and corresponds to a zone of strong to very strong agitation. The second sector in fattening is located in the western part of Bhibah beach. The westernmost part, protected from the direct action of the waves by the pier of the small fishing port, receives refracted vessels and corresponds to an area of low agitation. The combined effect of hydrodynamic conditions and anthropogenic interventions has considerably impacted the balance established between the marine inputs of sediments and the regeneration of the dune barrier, which is in the process of degradation.

Keywords: Coast of Essaouira, Sandpit, Dune cord, Morphosedimentary dynamics, Diachronic analysis, Sedimentological study

S.01P03: INFLUENCE OF THE TYPE OF SOIL ON THE RESPONSE OF THE STRUCTURE

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Abstract

The objective of this contribution is to study the effect of the soil-structure intersection (ssi) on the seismic response of a structure, in order to be able to take it into account during seismic design. Indeed, taking into account the ssi in the modeling of a structure can have expressive effects on the seismic forces applied to the structure. This consideration of the interaction (soil-foundation) is translated from the impedance functions associated with a spring-shock absorber system, thus integrating the flexibility of the soil. Using the EUROCODE 8 response spectrum. A parametric study made it possible to quantify the effects of the ISS on: the fundamental period of the structure, the effect of the foundation anchoring depth, the shear force at the base as well as the displacements.

Keywords: the intersection of soil and structure, the fundamental period of the structure, the seismic response

S.02C01: TERRITORIAL INTELLIGENCE AND COASTAL RISKS

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Abstract

Places of interaction of different land areas (hydrosphere, atmosphere, lithosphere, biosphere and anthroposphere), the complexity and diversity of coastal areas imply a polydisciplinary scientific study approach, fully in line with territorial intelligence, to implement all facets of knowledge of geophysics of the coastal environment, ecology and human sciences. Currently, coastal areas must face strong hazards accentuated by climate change, while the population in these territories is growing and their seasonal attraction is well beyond their population. Earthquakes, tsunamis, coastal erosion and storm-related flooding make these areas vulnerable. Territorial intelligence is based on two major scientific developments in recent decades. On the one hand, the awareness of the epigenetic dimension of intelligence, powerfully supported by the exponential development of computerized data processing. On the other hand, a new perception of the territories is the result of the co-construction of actors within the human community that inhabits them. Intelligence must help the human species to face the risks it is confronted with. For this, it must no longer be guided by the selfish search for a competitive advantage, but by the search for progress for all, for territorial and social justice, in a socio-ecological transition towards sustainable development. Since 1974, we have coordinated international action and research projects to identify the risks that want to fight against the human impact on the global climate and ecosystems. Faced with the risks associated with the profound changes in the oceans' ecosystems, which are causing a mutation of marine species and increasing coastal risks, Europe has established in 2002 the Integrated Maritime Policy (IMP) promoting an approach to integrated planning and management of coastal areas (GIGZ). Confirmed by a Green Paper in 2006, it aims to "protect fragile and vital common heritage" and to safeguard their marine and terrestrial biodiversity, the attractiveness of their landscapes, their ecological balance, their capacity to maintain the quality of life of their inhabitants, as well as their seasonal attraction for national and European populations. The rapidity of the observed changes requires a sophisticated territorial observation that the Catalyse© territorial intelligence method proposes to anticipate the hazards, the vulnerability trajectories and the resilience of these areas in order to help decision making and adaptation, by implementing a governance based on territorial intelligence.

Keywords: Intelligence, Territories, Territorial observation, Governance, Coastal Risks

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S.01001: SUSTAINABLE MANAGEMENT OF THERMAL SOURCES IN THE MEDITERRANEAN COASTAL ZONE CASE OF THE SITE OF HAMMAM CHAABI EL BALI PROVINCE OF DRIOUCH - NORTH EAST OF MOROCCO

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Abstract

In the heart of the Rifian geological domain, not far from douar Sidi Chaabi (Province of Driouch), emerge two thermal springs called Hammam Chaabi Jdid with number IRE 1599/6 and Hammam Chaabi El Bali with number IRE 1598/6, at the foot of a dead cliff 50 m high and at a temperature of 34 ° C and with a flow 0.4 l / s, to throw itself into the sea. These sources have been identified in various previous geological studies but have never aroused the interest of developers in the region. Indeed, the sites of these two sources are more and more coveted by several visitors - tourists from all over the region or even the country. However, the conditions for their local management remain precarious. Also, a study of sustainable management of these sites is necessary, it is in this perspective that our present work is part of. It aims first to establish a local environmental and socio-economic diagnosis, then identify the different sources or forms of local environmental alteration and to propose solutions, strategic and technical measures that are sustainable and local. By this, we aim to protect public health, secure access to sites, improve the tourist heritage in place and promote spa tourism in the region. We were primarily interested in the Hammam Chaabi El Bali site. Thus, according to the results of our first investigations, the spring waters are used for various therapeutic uses recognized for several years by the local population. The results of analyzes carried out on water samples from this source attest to its thermal nature and to bacteriological contamination in the griffin. Also, extensive analyzes will have to be carried out in order to confirm the total mineralogy of this source and to decide on its therapeutic properties. In view of the current state of the site, we can conclude that it requires eco-sustainable and intelligent development since the source would have all the potential necessary for it to be recognized as a thermal source. Similarly, the site of Hammam Chaabi El Bali should be recognized by regulation as a thermal touristsite.

Keywords: Environmental diagnosis, Thermal water, Eco, sustainable management, Territorial intelligence, Source.

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S.01O02: IMPACT OF URBANIZATION ON THE SURFACE CLIMATE IN COASTAL AREAS APPLICATION IN THE NORTH AFRICAN BAND

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Abstract

The population is growing and with it the use of the land. This transformation due to urbanization affects the climate through several physical processes: (1) The reduction in the fraction of vegetation and the subsequent reduction in photosynthesis and diffusion of water into the atmosphere, (2) The introduction of an impermeable surface into the landscape that alters the separation of runoff and water infiltration, thereby changing the moisture content of the soil and subsoil, (3) The change in albedo and its effect on the distribution of surface energy, and (4) The change in surface roughness and its involvement in turbulent surface flows. The combination of these mechanisms has an impact on the surface climate and can inform decision-makers and builders of the future typology of cities. Thus, within the framework of the present work, we propose to assess these impacts and their intensity on the North African region. We intend to identify the uneven impact on surface climate that should inform policy options to guide urban growth in the context of sustainable development objectives.

Keywords: Carbon lost, Surface climate, Surface runoff, Urbanization, Urban development, Urban heat island.

S.01003: THE VALUE OF CARBON SEQUESTRATION AND STORAGE IN COASTAL HABITATS AREAS IN NORTH WEST OF MOROCCO

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Abstract

Morocco, like the rest of the world, is experiencing climate change threatening a number of wetlands. Marine ecosystems help regulate the Earth's climate. But, the degradation of these releases large amounts of greenhouse gases (GHG) such as carbon dioxide (CO₂) in the atmosphere. This paper aims at mapping and modeling changes in carbon storage and sequestration for coastal habitats, with the INVEST model, using the lagoon complex of Sidi Moussa-Qualidia as a case study. To achieve this objective, several data were used, namely land use and cover maps in 2003 and 2020, as well as data on the amount of carbon stored in the three basins; biomass, sediment carbon (soil) and dead carbon (litter), and the annual rate of carbon accumulation in biomass and sediment. The results obtained in this work allowed us to compare the two old and current carbon stock scenarios, net sequestration and to assess the social cost of carbon in the study area. This study can facilitate the development of a coastal rehabilitation strategy to take advantage of the benefits of these wetlands and in parallel conserve the ecosystem services provided by these environments including the CBCS.

Keywords: Coastal blue carbon storage, Invest model, Carbon sequestration, LULC changes.

**S.01O04: CLIMATE CHANGE AND WATER RESOURCES
MANAGEMENT IN THE COASTAL SUB BASIN OF EL JADIDA SAFI
- MOROCCO**

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Abstract

According to the 5th assessment report of the Intergovernmental Panel on Climate Change (IPCC), temperature is projected to rise over the 21st century under all assessed emissions scenarios while precipitation will likely decrease, thus reducing renewable surface water and groundwater resources in most dry subtropical regions such as Morocco. Moreover, most projections of global circulation models predict a dryer future for North African countries. The objective of this work is to assess the impact of climate variability on water resources in the coastal sub basin of El Jadida Safi which is located in the Oum Er Rbia basin. In order to determine future climate projections in the coastal sub basin by the year 2099, we are using SDSM, which is a statistical downscaling tool based on both observed and anthropogenic emission scenario data for the pessimistic scenario RCP 8.5 and the optimistic scenario RCP 4.5. Results will help decision makers and stakeholders to better manage their water resources, to prepare for extreme hydrological hazards and to enhance development planning in the river basin.

Keywords: climate, basin, projection, downscaling, water

S.01005: REMOTE SENSING AND GIS FOR SUSTAINABLE SPATIAL PLANNING IN COASTAL CITIES ,CASE STUDY :MARTIL MDIQ FNIDEQ

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Abstract

Urban planning has become more and more critical due to the urban pressure induced on the coast, the risks it generates, and the effects it has on the environment and the urban landscape quality. This paper aims to monitor the urban dynamics of the coastal system, based on the observation of urban expansion. Data sources used are mainly Landsat satellite images, processed and analyzed to evaluate the impact of fast urbanization from 1969 to 2021 in the cities of Martil, Mdiq, and Fnideq. A field study was conducted based on four indicators to evaluate the impact of coastal urbanization: environmental characteristics, socio-economical, urban/physical features, and planning laws/urban documents in the Moroccan context. In order to predict the direction and scale of land expansion and offer sustainable alternatives related to spatial planning.

Keywords: Sustainability, spatial planning, territorial intelligence, remote sensing, GIS, land use, coastal area management

S.01O06: ENVIRONMENTAL MANAGEMENT OF COASTAL CAREERS ALONG THE DOUKKALA-ABDA LINEAR

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Abstract

The exploitation of geomaterials quarries constitutes one of the vectors of economic and social development of the country. Nevertheless it raises the issue of reconciling the economic necessity of the supply of materials with the environmental approach, in accordance with the principle of sustainable development. The purpose of this study is to propose a model for the environmental management of sand and gravel along the Doukkala - Abda coastline. On the one hand, it aims; the constitution of a regional database gathering all the quarries to identify and characterize the materials used as well as the major impacts and risks linked to subsequent physiographic modifications; and on the other hand to develop intervention mechanisms to prevent, reduce or even eliminate the harmful effects of abusive exploitation on the environment and public security, while taking into account the specificities of the region. At the end of this study, a specification is proposed in preparation for the texts implementing the quarry law. It is structured around regulatory provisions likely to improve the management method, particularly the operating monitoring and control mode by the carrier itself and by the administrative authorities. It is also a guide to help define the sites that best meet the criteria of sustainable development. In addition, a data archiving system is developed; from the start of the quarry until its closure after rehabilitation. The information collected will allow an assessment of management at the quarry level, to better prepare the action plan for the exploitation of materials at regional level, which must be associated with a more global policy of territory planning.

Keywords: Quarries, Coastline, Doukkala, Abda, Management, Specifications

S.01P01: IMPACT OF THE URBANIZATION OF THE MEDITERRANEAN COAST OF MOROCCO ON THE QUALITY OF MARINE WATERS-APPLICATION TO THE BAY OF AL HOCEIMA NATIONAL PARK

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Abstract

Morocco is a maritime country whose coastline is a major strategic asset for socio-economic and human development. This development could not be achieved without decision-makers paying particular attention to the sustainable management of the coastal zone in view of the fragility of this ecosystem and its potential. Indeed, coastal urbanization contributes to the process known as littoralization which, if uncontrolled, would have the following consequences: degradation of coastal and marine ecosystems through habitat destruction, the discharge of plastic and toxic materials and waste of all kinds, pollution by direct dumping, etc., to which must be added, in areas where water scarcity is marked, the impact of desalination plants. In this context, we propose to assess the Impact of urbanization of the Moroccan Mediterranean coast on the quality of marine waters. More specifically, our study concerns the National Park area and the Bay of Al Hoceima. An integrated management approach will be proposed to describe the current pressures, their impacts and measures to be proposed. A programme for the control and monitoring of marine water quality will be developed. An action and resilience plan should be developed at the end of this study.

Keywords: Marine water, Coastalization, National Park, Pollution, Resilience.

S.01P02: AN ANALYTICAL APPROACH FOR DEFINING COASTAL ZONE BOUNDARIES IN THE CONTEXT OF INTEGRATED COASTAL ZONE MANAGEMENT

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Abstract

The coast is one of the important environmental and economic resources of northern Morocco, however it is a fragile environment, a vulnerable space subjected to multiple forms of pressure, highly coveted on which many factors of evolution interact so much, both anthropogenic and natural. The law n° 81-12 relating to the coast was adopted with the objective of protecting coastal landscapes against degradation and coastal risks, controlling urbanization and enhancing the natural heritage from the coastal zone. Nevertheless, the socio-economic, legal and environmental issues of the coast require very high resolution mapping, a diagnosis of its current state and a proactive analysis for the adequacy of planning documents to the law of coast. On the basis of a comparative analysis of the methods adapted for the governance of the coastal zone in the literature, the objective is to propose an approach to define the limits of the coastal zone, with the aim of acquiring the coastal strip defined by law 81.12 as not constructible area, which will allow us to establish a proactive analysis of the coastal zone necessary for its sustainable management.

Keywords: Coastal zone, Law of coast, non constructible area, urban planning, ICZM.

S.03C01: THE PAST, PRESENT AND FUTURE OF CLIMATE CHANGE. IMPACT ON THE COAST

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Abstract

Geological witnesses attest to climate change since the dawn of Earth's history and life. Climatic cycles of varying frequencies and intensities have followed one another throughout prehistory as well as throughout human history. This climatic variability is controlled by astronomical parameters, internal factors of our planet to which have been added anthropogenic disturbances. These are often the subject of in-depth discussions between teams from the scientific community and those from political currents. If the natural greenhouse effect is essential for life on Earth, the additional one has been very formidable in recent decades. The conference highlights the multitude and diversity of factors involved in the complex functioning of the climate machine and their interferences. It calls for great caution with regard to opinions relating to current climatic disturbances. It also encourages us to discern, with regard to future climate forecasts, between reasoned conclusions and attractive hypotheses. The climate of the past, on a geological and human scale, must be taken into account in order to understand the vagaries of current climate change and to support the projections that are predicted on the future of the Earth's climate. We cannot claim to know where the climate is going if we do not know enough where it comes from. This plenary conference makes a diagnosis of a diversity of data on the Earth's climate through the ages and analyzes the different interpretations and opinions relating to this subject. A reasoned assessment is reserved for the reliability of the alarming predictions of the future climate and its frightening impact, in particular on coastal areas.

Keywords: Climate, history, witnesses, astronomy, greenhouse effect, impacts, forecasts, coastline.

S.03C02: STATISTICS & SEDIMENTOLOGY: 80 YEARS OF AMBIGUITY

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Abstract

In practice, grain-size analysis uses the Laplace-Gauss distribution. However, from the sedimentological point of view, there are few arguments to use and abuse this symmetric law. R.A. Bagnold (1937) showed the interest of an asymmetric law, this demonstration was extended to hyperbolic law and Log hyperbolic by Barndorff-Nielsen (1977). Unfortunately “... so strong is the inertia of tradition that the implications aroused but little interest until recently” (Bagnold et al. 1980). Then Fieller (1984) completed with the Log Laplace, and Log-skew Laplace (LsL) approach. Here we try to show that the asymmetric laws are useful for sedimentologists. This tool has been used on many sediments including beach (Algarve, Morocco) and paleo-tsunami (Lisbon 1755, Lampuuk 4220±40 years BP), or more recent (Banda Aceh 2004, Tohoku 2011). For a unimodal sample, the LsL tool is able to differentiate between ebb from flood deposits, uprush from tsunami backwash. Bagnold (1962) introduced a new word “Auto-suspension” this word seems to be more seminal, many researchers are developing this approach for submarine canyons and turbidites. In the Tohoku tsunami deposit, a new type of settle was unveiled on the continent: deposition in wetland (pond, lake ...); these multi modal samples mimics the turbidite deposits with an association of erosion and accumulation in the same sample. This paper is a tribute to R.A. Bagnold.

Keywords: Sedimentology, Log-skew Laplace law, beach, Ebb-flood, Tsunami uprush-backwash, Auto-suspension, erosion.

S.03001: PEDOLOGICAL CHARACTERISTICS OF SOILS IN THE WATERSHEDS OF OUEDS NEKOR AND GHISS (CENTRAL RIF; MOROCCO)

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Abstract

The growing importance of environmental issues is leading to renewed interest in the soil heritage. The many hazards to which soils are subject weaken their structure and affect their physicochemical and biological properties. This work aims to describe soil's pedological characteristics in the watersheds of the Oueds Nekor and Ghiss. Several profiles were identified and sampled for physicochemical and sedimentological analyses (color index, magnetic susceptibility, pH, grain size, water, organic matter, and carbonate content). The watersheds in question are roughly characterized by a soft and diverse lithology, a sparse vegetation cover, and a semi-arid Mediterranean climate. The soils at the Oued Nekor watershed are of the silty kind, little evolved and relatively drained, and become stony, well-drained in the abrupt and eroded areas. Analysis of the color index by horizon shows that the surface colors are darker, thanks to the organic matter content. The magnetic susceptibility values decrease from upstream to downstream following the slope and reddening of the soil. The soil pH varies between 7 and 8, reflecting low alkaline to alkaline soils. The results of particle size analysis reveal relatively high percentages of silt (> 50%). At the Oued Ghiss watershed, sandstone-limestone or siltstone-schist soils are poorly differentiated in the steep flanks. Well-drained soils are stony, relatively alkaline, and having an early rubefaction. Very locally, at the level of wooded areas, the soil profiles can become deep and well-differentiated due to colluvial accumulation. The eluvial horizon eluvial dark brown is relatively rich in organic matter (3.6%). The dark brown A horizon is relatively rich in organic matter (3.6%). The well-individualized illuvial B horizon shows rubefied concretions strongly and more affluent in organic matter (4.6%). In contrast, the light beige C horizon corresponds to the strongly altered marl-limestone bedrock poor in organic matter (1.3%) and very low magnetic susceptibility values.

Keywords: Soil, Watershed, Oued Nekor, Oued Ghiss, Rif Central, pedological characteristics

S.03002: MORPHOSEDIMENTARY EVOLUTION OF GUEDEAWAYE ET MALIKA BEACHES (DAKAR, SENEGAL)

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Abstract

Today, coastal areas management faces major challenges such as coastal erosion. The slow or sudden changes its causes constitute a major constraint on their development. The prerequisite for a good management of these environments implies an in-depth knowledge of their functioning. Thus, this study proposes, through topographic and sedimentological methods, to know the morphological and sedimentological dynamics of the northern coast of Dakar which is currently under strong human pressure due to the extension of the northern clearance way which facilitates people and good movements. Topographic methods measure the morphology of the beaches by a series of beach profiles perpendicular to the shoreline, from the dunes to the surf zone. They allowed to highlight relatively narrow beaches with a certain variability in morphological characteristics depending on the wave regime. The average width is 48.31 m and the average slope is 5.03%. The dominant shape of the profiles is concavo-convex. However, these aerial beaches on the north coast of Dakar are slightly wider than those in the west and south, no doubt because of the dunes that border them and whose evolution according to the swells leads to their extension. These methods have also made it possible to identify a negative annual balance sheet of vertical movements indicating an erosive tendency. In addition, a seasonal cycle of vertical movements was highlighted with a predominance of erosion movements during the dry season and accumulation movements during the rainy season. The variability of morphological characteristics and vertical movements indicates a response of the north coast of Dakar to fluctuations in wave energy which are the main factors responsible for its morphological dynamics. Sedimentological methods consist of taking sedimentological samples from different morphological units of the beaches. Their treatment has shown fine to medium sands very well to moderately well classified. The scatter diagram shows a certain heterogeneity which, combined with the bimodal sediments sometimes found, confirms the high variability of hydrodynamic conditions and/or different sediment sources.

Keywords: Morphological, sediments, beach profile, seasonal process, vertical movements

S.03003: PHYSICAL IMPACTS OF EXCEPTIONAL SWELLS ON THE NORTHERN COAST OF DAKAR (SENEGAL)

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Abstract

In Senegal, the methods of studying the dynamics of the coastal spaces are often based on a diachronic analysis of satellite images or aerial photographs over several decades. These methods, which allow to get an idea of the evolution rates of shorelines, often do not take into account the impact of instantaneous events such as storm surges which can cause sudden and irreversible changes in coastlines. The cumulative impact can affect the long-term evolution of the shore. In order to assess the morphological impacts of the exceptional swells of November 2018 on the northern part of the Dakar coast, beach profiles perpendicular to the shoreline were collected before and just after their passage at the beaches of Malibu, Gadaye and Malika. This allows to know the induced morphological variations as well as the volumes of mobilized sediments. The results of this monitoring show that these swells have a significant erosive impact with a higher amplitude in Malibu where the entire beach profile has been affected. At the beaches of Gadaye and Malika, erosion has only affected their aerial part. This erosion has led to the erection of micro cliffs at the bottom of the dunes, the disappearance of the upper beach and a change in the shape of the beach profile, causing the slopes to variation. This strong erosion associated with temporary flooding of a good part of the back beach can be linked, in addition to the scale of the swell, the low topography of the environment, the small widths of the beaches and their open nature due to no obstacle for swells. In addition, it would have reflected a strong sensitivity of the northern coast of Dakar to these exceptional events. The increase in the frequency of these events could lead to a strong and generalized erosion of this area. These results confirm the interest of a rigorous vulnerability study for a good management of the occupation of this area which is currently under strong human pressure due to the extension of the northern clearance way which facilitates people and good movements.

Keywords: Beach, Beach profile, Dunes, Erosion, Morphological

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S.03004: HOLOCENE SEDIMENTS OF THE CENTRAL PORTUGUESE CONTINENTAL MARGIN (WESTERN PORTUGAL): IMPLICATION FOR PROVENANCE AND GEODYNAMIC SETTING

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Abstract

Petrography and Mineralogy analyses are used to determine the provenance and identify the main factors governing recent fine sediment distribution patterns from the Portuguese continental shelf (Barra and Stubał Canyons). Thirty-three samples from the continental slope and rise of the Grand Banks and neighboring seamounts were collected and examined. Sediments on the Portuguese shelf include i) carbonate-rich sands, ii) residual detritus calcareous skeletal debris of marine organisms, and iii) subarkosic fluvial sand. The composition and distribution of these petrofacies are variable; carbonate-rich sands occur over much of the outer shelf and upper slope with a critical CI and CE content, reminiscent of "calcareenites". In contrast, the inner shelf is covered by subarkosic fluvial sand, derived mostly from the Rio Mondego river. This terrigenous component for all the samples results from weathering crustal continental rocks and their sedimentary covertures transported by rivers as suspended load. Although most sediments are not in compositional equilibrium with the present-day shelf environment, there is considerable evidence to suggest that many may be in at least partial textural equilibrium. Holocene reworking has removed most fine-grained sediment, leaving only coarse to medium sand. Some fine-grained fluvial sediment escapes the estuaries and near-shore during floods and storms, but this influx is not sufficient to offset the effect of winnowing by currents and waves. A significant portion of the modern near-shore sediment may be derived from landward transport of fine-grained sediment from the central and outer shelf. However, the evidence of active sediment movement on the shelf sand and gravel's net lateral transport appears limited because of the lack of present-day terrigenous sedimentation. If those surfaces were preserved in the geologic record, much of it probably would be a carbonate-rich layer, containing altered and reworked skeletal material representing a variety of depositional environments.

Keywords: Western Iberian, Coastal shelf, Petrography, Provenance, Sediment distribution, Portugal.

S.03005: SEDIMENTOLOGY AND GEOCHEMISTRY OF MUD VOLCANOES IN THE MOROCCAN ATLANTIC MARGIN

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Abstract

A mud volcano (MV) is a circular morphology building constructed on the surface by the extrusion of clay material from a deep source. These volcanoes are located in areas with strong deep sedimentation: in accretionary prisms, near the active continental margins, and submarine fans close to the passive margins. The study of submarine mud volcanoes is of considerable interest for several reasons. In this study, we present an analysis of three gravity cores collected from mud volcanoes in the Moroccan Atlantic Margin to investigate the main sedimentological, mineralogical, and geochemical characteristics. The sieve analysis was used to determine the sediment grain size distribution; clay mineralogy was analyzed by X-ray diffractometer (XRD). Geochemical contents were performed using Inductively Coupled Plasma – Atomic Emission Spectroscopy ICP-AES after the sediment fraction (<1mm). Grain size varies from clayey sand to sandy clay. The XRD analysis of clay fraction revealed heterogeneous mineralogical composition; The kaolinite and illite are more abundant (c.a 60%) than the smectite and chlorite, representing approximately 20 % of each. This heterogeneity can be related to the nature of the parent materials and clay neoformation mechanisms concerning Physico-chemical alteration. Metal Trace Elements (MTE) 's vertical distribution shows that the proportions of elements mainly increase towards the cores' lower part. Contamination and enrichment factors showed a variable degree of contamination depending on each element's concentration in the sediment. All the studied MVs displayed low contamination factors of Cr, Cu, Ni, As, Al, Fe, Co, Pb, V, Zn, and Ti. However, Ag, Cd, and Mo values indicated considerable contamination in the Tangier and Al Idrissi MVs and moderate to low contamination in the Meknes MV. The statistical analysis results displayed five factors affecting the designated mud volcanoes, as Biogenic and Carbonate, Cold Seep, deep layers, and lithogenic factors.

Keywords: Moroccan Atlantic Margin, Mud volcano, Geochemistry, Clay mineralogy, Gulf of Cadiz

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S.03O06: EVALUATION OF THE SEDIMENT TRANSPORT AND DYNAMICS IN THE ATLANTIC COASTAL LAGOON : CASE OF MOULAY BOUSSELHAM LAGOON THE NUMERICAL MODELLING APPLICATION

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Abstract

Lagoon ecosystems are among the most vulnerable ecosystems, often subject to multiple stresses, including a number of disturbances to the balance of the lagoon ecosystem in terms of hydrosedimentary dynamics. The Moulay Bousselham lagoon is one of the ecosystems that are directly affected by such factors. Moulay Bousselham lagoon (34°47'N-6°13'W and 34°52'N-6°14'W) is located on the Atlantic Ocean. This lagoon is 9 km long, about 5 km wide, and exchanges water with the ocean through a major inlet about 357 m wide. This basin is made up by the morphology of a depression, in a north-southern direction, limited by a continental cliff and by a coastal consolidated dune ridge. This site is also home to a number of human activities and is the site of tourism and artisanal fishing. Within the framework of this thesis, the analysis and evaluation of morphosedimentary and hydrodynamic processes will make it possible to fill the gaps in the sedimentary dynamics in the Bousselham lagoon, which was not yet completely understood, will present a numerical methodology to study the impact of natural processes (sea level rise, swell ...) and anthropogenic processes (project for the installation of a dam) on the current sedimentary dynamics of the lagoon and will also highlight the links between socio-economic and climatic change and their impacts on the lagoon, bearing in mind that conflicts of use, environmental or societal are multiplying, especially as sea level rise threatens activities and populations, which will require Integrated Coastal Zone Management. In this sense, this work follows a first application of the MIKE 21 FLOW MODEL HD FM to the lagoon of Moulay Bousselham in order to 1) study the erosion-deposition patterns of this lagoon through the application of numerical modelling; 2) Simulate its hydrodynamic circulation; 3) Evaluate the impact of extreme events on the sediment dynamics in the lagoon. The results that will be obtained relate to the impact of the developments from a hydrodynamic point of view and the location of the sectors subject to erosion and the sectors subject to accretion. For the long term, the evolution of the lagoon can be determined.

Keywords: Lagoon Moulay Bousselham, Morphosedimentary, Modelling Application, MIKE 21

S.03007: STUDY AND DESCRIPTION OF THE CURRENTS OF THE MOROCCAN ATLANTIC COAST

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Abstract

Short Paper Abstract : On the Moroccan Coast, the shores of the Atlantic Ocean stretch for 3000 kilometers. which gives it a considerable maritime potential. It is committed to a policy of environmental preservation, the fight against global warming and the reduction of greenhouse gas emissions to promote all renewable energies. The diagnosis of Morocco's maritime potential can be studied using marine information from sea currents, waves, wind, water temperature, water salinity and other types of parameters required for this evaluation. This study is based on monthly data of sea currents, winds and surface temperature from the Marine Copernicus site and processed by statistical methods using computer tools such as MATLAB software to highlight the main characteristics of our site facade: North Atlantic and South Atlantic Sea in relation to the parameters studied to exploit them to study the possibilities of installation of marine renewable energies.

Keywords: North Atlantic, South Atlantic, Currents, wind, Temperature, Marine Copernicus, Marine Renewable Energies.

S.03O08: SAN GIOVANNI DI SINIS OF SARDINIA AND THE COASTAL AREA OF RABAT-KÉNITRA: DIAGNOSIS AND ANALYSIS OF TWO MEDITERRANEAN AND ATLANTIC COASTAL SITES

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Abstract

This study is the subject of a comparison of the dynamics of evolution of the coasts and especially of the quaternary formations. The comparative study of two Atlantic and Mediterranean coasts will allow us to recognize the common parameters of the effects of eustatic variations linked to climate change during the Quaternary. Stratigraphic analysis of the Upper Pleistocene on the west coast of Sardinia (San Giovanni di Sinis, Oristano) has made it possible to specify the transition from the Tyrrhenian facies of the protected beach and the temperate lagoon to the pre-lagoon facies, all by comparing with those of Ouljian recorded from the coastal strip of Rabat-Kenitra. The Tyrrhenian stratigraphic sequence constitutes a sedimentary response of the Mediterranean eustatic signal, caused by the fusion of a large part of the Icelandic ice, correlated with an interglacial orbital configuration. During this eustatic ascent, the Gulf of Oristano and other large coastal areas of Sardinia were the site of migration from beach environments to previous lagoons and fluvial-lagoon marshes. This stratigraphy covering an erosion surface cut on layers carrying vertebrates. Facies analysis and sequential stratigraphic approaches suggest "eustatic" changes during the overall deposition interval of the marine sequence. The geological sections along the coastal cliffs, the caves and the quarries, cut in the coastal cords of the region of Rabat-Kenitra, which allow us to retrace the natural history of the region since the Pleistocene. The presence of evidence of paleo-shores, neotectonics, and Pleistocene seismicity, prehistoric human remains, lithic industries, and fauna of vertebrates such as elephants, bears, and gazelles testify to an important evolution of the landscape during of the Quaternary. A comparison of the coastal formations of the two will probably provide details on climatic and eustatic variations during the Pleistocene.

Keywords: Sinis, Rabat, Kenitra, Coastline, Geological formations, Paleogeography, Quaternary, Sardinia, Morocco.

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S.03009: TECTONICS AND CARTOGRAPHY OF THE QUATERNARY PLATFORMS OF THE MAZAGAN CORRIDOR (COASTAL MOLE, MOROCCO): CONTRIBUTION OF THE DIGITAL TERRAIN MODEL

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Abstract

The Mazagan corridor, belonging to the Sahel-Doukkala, is located south of El Jadida in the form of an elongated depression NS, about 35 km long and 5 km wide. This corridor is the site of Quaternary deposits in the form of five elongated platforms NS. These platforms are, from the oldest to the most recent and from south to north: the Ouled Rafai platform, the Ouled Douib Sebt platform, the Pasha platform, the Douar El Rhenadra platform; Platform Course Field. As these platforms have a very strong relationship with the elevation in the Mazagan corridor, the DTM is used to study the relationship between the elevation and the different geomorphometric parameters. In this work, the SRTMGL1 DTM was chosen as the base data for the geomorphometric analysis. After a pre-processing of the SRTMGL1 DTM, which aims at reducing the various errors and artifacts, we proceeded to the extraction of the geomorphometric parameters (slope, hypsometry and terrain roughness). In addition, several profiles were extracted to define elevation variations at different platforms. Indeed, the application of the different geomorphometric parameters and the use of the altitudes deduced from the analysis of the profiles made it possible: (i) to propose a new map of the geographical distribution of the platforms and (ii) to highlight an NS fault constituting the western limit of this corridor. The NS distribution and elongation of the Quaternary platform plates in a corridor bounded to the west by a fault in the same direction is probably related to the reactivation of ancient tectonic structures.

Keywords: DTM SRTMGL1, platforms, mapping, Mazagan Corridor, Morocco

S.03P01: GEOCHEMICAL AND MINERALOGICAL CHARACTERIZATION OF COASTAL SEDIMENTS IN AL-HOCEIMA BAY (CENTRAL RIF, MOROCCO)

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Abstract

The bay of Al-Hoceima is part of the Moroccan Mediterranean rim and is located about 16 km from the town of Al-Hoceima. With 40 km of coastline, it is bounded on the east by Cap Rass Terf, on the west by Cap Sidi El Abed and in the center by the Ghiss-Nekor plain. The objective of this work is to characterize the morphosedimentary dynamics of the shores of Al-Hoceima Bay through geochemical and mineralogical analyzes of surface sediments. The results reveal a direct relationship between marine hydrodynamic forcings on the one hand and detrital inputs from land on the other. Calcimetric analysis makes it possible to highlight the transport and deposition processes at the beaches of Al-Hoceima bay. The difference in the fairly high carbonate contents in the western beaches (Isli, Cala Bonita and Quemado) (> 60%) and low in the beaches of the central and eastern zone (Sfiha, Souani, Salina and Lharch) ($\approx$ 15%) is mainly due to the influence of coastal currents, littoral drift and fluvial action. The higher levels of heavy minerals in Lharch beach (18%) are expressed by the presence of volcanic outcrops of Cap Quélatés and Jbel Tamsamen. The low values at the Souani and Tayth beaches (7% on average) are due to erosion by the two types of coastal drift NW-SE and NNE-SSW which carry the sediments of schist origin brought by the Oueds Ghiss and Nekor. While the fairly high contents in the Sfiha beach (12%) are attributed to the accumulation of allochthonous sediments by NW-SE littoral drift which carries sediments of volcano-metamorphic origin from Rass Quélatés.

Keywords: Bay of Al, Hoceima, Central Rif, carbonates, Heavy minerals, morphosedimentary dynamics.

S.03P02: MACROSCOPIC EVOLUTION OF A FLEXIBLE PAVEMENT DETERIORATION, ANALYSING THE ROAD INSPECTIONS RESULTS. APPLICATION: MOROCCAN NATIONAL ROAD NUMBER 06

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Abstract

For each policy of road maintenance, there are two methods of assessing the condition of a pavement, the environmental inspection which is generally based on a visual survey to define the various surface damages such as : Potholes, pull-outs, and cracks, and another physical one using new technology equipment to evaluate the progression of structural deterioration based on the measurements of the evenness, flatness and deflection of a pavement using the longitudinal profile analyzer and the deflectograph. In this cedi, the condition of a pavement is an essential parameter to evaluate the quality of the pavement at a given time and to prevent future scenarios of possible maintenance. In this regard, the analysis, collection and abstraction of this road database (RDB) is a very complex and essential process to study. In this regard, and in the framework of our collaboration with the Moroccan National Center for Road Studies and Research, we propose in this article a study of the macroscopic evolution of the surface and structural condition of a flexible pavement by comparing the results of the inspections carried out between 2008 and 2016 with that which we carried out in 2018, on a length of 50 Km, starting from the kilometre point PKd 0+080 to the end kilometre point PKf 0+130 belongs to the Moroccan national road number 06 (RN 06), connecting the city of Khémisset to Meknes This operation starts with a cutting of the study section in 1 km sections, the analysis and the abstraction of the Road Data Base, the representation in the form of a matrix of degradation subdivided in four levels: A, B, C and D, for the purpose of quantifying and classifying the degradations, to provide an image of the state of the paved surface network, to identify the areas of equi-quality classified according to the levels of degradations, the linear interpolation of the data, and a probabilistic projection on the possible future degradations.

Keywords: Road inspection, Flexible Pavement, Surface index, Structure index, Deterioration.

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S.04C01: THE IMPORTANCE OF IWRM FOR THE BALANCE OF COASTAL AREAS

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Abstract

IWRM is a process of coordinated development and management of water, land and associated resources to maximize economic and social welfare in a fair manner, without compromising the sustainability of vital ecosystems. Participatory management of these resources by local communities is crucial. Moroccan legislation foresees integrated water resources management based on a participatory approach, but it is not really put into practice. Many experts and officials in the field have difficulty switching from their top-down management approach. As a result, local communities remain passive recipients of material assistance and find it difficult to become stakeholders. The biggest obstacle, however, is the failure to recognize local communities and their associations as true partners. By focusing on resource mobilization rather than socioeconomic and environmental well-being, this top-down management has shown its limitations. Like other countries on the southern shore of the Mediterranean, Morocco is retaining almost all of its surface water and overexploiting its groundwater resources. The current imbalance of its coastal areas is likely to worsen with the increase in needs and the scarcity of resources in even more unfavorable climatic conditions. The example of the coastal area of the province of Al-Hoceima is illustrative. Recognizing this shortfall, Morocco has just institutionalized the participatory management of its water resources through the creation of the Hydraulic Basin Councils responsible for examining and giving an opinion on issues relating to water planning and management. These councils are made up of one third institutional representatives and two thirds elected representatives. The support to the installation and operationalization of these Basin Councils, which are real democratic bodies for dialogue, will be relevant and necessary.

Keywords: IWRM, participatory management, top-down management, Hydraulic Basin Councils, coastal area

S.04Co2: SOIL WATER BALANCE

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Abstract

One critical problem confronting mankind today is how to manage the intensifying competition for water between expanding urban centres, traditional agricultural activities and in-stream water uses dictated by environmental concerns (Soil Water Balance). In the agricultural sector, the prospects of increasing the gross cultivated area are limited by the dwindling number of economically attractive sites for large-scale irrigation and drainage projects. Therefore the required increase in agricultural production will necessarily rely largely on a more accurate estimation of crop water requirements on the one hand, and on major improvements in the construction, operation, management and performance of existing irrigation and drainage systems, on the other. The failings of present systems and the inability to sustainably exploit surface and groundwater resources can be attributed essentially to poor planning, design, system management and development. This is partly due to the inability of engineers, planners and managers to adequately quantify the effects of irrigation and drainage projects on water resources and to use these effects as guidelines for improving technology, design and management. To take full advantage of investments in agriculture, a major effort is required to modernize irrigation and drainage systems and to further develop appropriate management strategies compatible with the financial and socio-economic trends, and the environment. This calls for a holistic approach to irrigation and drainage management and monitoring so as to increase food production, conserve water, prevent soil salinization and water logging, and to protect the environment. All this requires, among others, enhanced research and a variety of tools such as water control and regulation equipment, remote sensing, geographic information systems, decision support systems and models, as well as field survey and evaluation techniques. To tackle this challenge, we need to focus on the following issues: affordability with respect to the application of new technologies; procedures for integrated planning and management of irrigation and drainage systems; analysis to identify causes and effects constraining irrigation and drainage system performance; evapotranspiration and related calculation methods; estimation of crop water requirements; technologies for the design, construction, and modernization of irrigation and drainage systems; strategies to improve irrigation and drainage system efficiency; environmental impacts of irrigation and drainage systems and suitable measures for creating and maintaining sustainability; Institutional strengthening, proper financial assessment, capacity building, training and education.

Keywords: Irrigation, Drainage, Sustainable Development, Networking System.

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S.04001: METALLIC TRACE ELEMENTS CONTAINED IN THE SEDIMENTS OF DAYET ER-ROUMI LAKE (MOROCCO)

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Abstract

Lake ecosystems are complex and dynamic aquatic environments, characterized by great ecological and economic importance. However, the risk of pollution by heavy metals of anthropogenic origin is high. Sediments, an essential compartment of ecosystems, act as a reservoir for micropollutants, and are also a source of continuous contamination. Our study was carried out at Lake Dayet Er-Roumi (SIBE), the only permanent natural lake in the Khemisset region (Morocco), where several forms of pollution have been recorded, all linked to human activities. We have set as an objective the contribution, by a qualitative and quantitative analysis, to the evaluation of metallic pollution of sediments by Spatio-temporal monitoring of certain heavy metals such as Mn, Zn, Cr, and Cd. The sediments were collected (during the winter season) using an Ekman bucket at 3 measurement stations S1 and S2 (the side where there is more anthropogenic activity (agriculture and domestic)), and S3 (center of the lake). The heavy metal concentrations in our samples were determined by the microwave plasma atomic emission spectroscopy (MP-AES). Analysis of the results revealed that the concentrations of heavy metals (Mn, Zn, and Cr) in the sediments of Dayet Er-Roumi Lake, at all stations, far exceed the recommended standards (Canadian standards). The maximum concentration of Zn and Mn was recorded in S1, it reached respectively 1960.852 and 1299.134 mg/kg of dry weight, then the maximum concentration of Cr was recorded at the level of S3 (102.757 mg/kg of dry weight), with an absence of Cd in all the study stations. Also the calculation of contamination factor "FC" reveals polymetallic contaminations dominated mainly by three elements, Zn, Cr, and Mn which are being the most worrying. Ultimately, the sediments of Dayet Er-Roumi Lake are very rich in Mn, Zn, and Cr. These results reflect the signature of anthropogenic inputs and therefore of agricultural pollution and soil erosion as well as domestic waste. Therefore, monitoring and surveillance are necessary for integrated and ecological protection of this aquatic ecosystem classified as SIBE.

Keywords: Lac Dayet Er, Roumi, heavy metals, sediments, anthropogenic pollution, SIBE, Morocco.

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S.04002: PHYSICOCHEMICAL CHARACTERIZATION OF THE COASTAL AQUIFER OF GHISS-NEKKOUR (NORTH EAST OF MOROCCO)

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Abstract

The mechanisms that are responsible for the salinization of groundwater are miscellaneous and complex. The mode of natural salinization of waters depends basically on the geographic (coastal, continental, etc.), geological (nature of the aquifer, mineralogy of sediments, etc.) and climatic context. The anthropogenic salinization of waters depends on the activities and practices identified in areas below which the most vulnerable aquifers circulate. In this context, and in order to study the origin of the salinization of groundwater in the coastal aquifer of Ghiss-Nekkour, main source of drinking water supply for the city of Al Hoceima and its hinterland, several hypotheses can be discussed, we have retained five :Anthropogenic salinization ; Salinization related to the local geological context ; Salinization linked to the intrusion of seawater. We are targeting a marine intrusion as a natural phenomenon whose intensity depends on several natural factors. Which intensity could be amplified by two major factors : Overpumping in the coastal zone and / or around the mouths of the Ghiss and Nekkour rivers ? Sea level rise in the context of climate change? In order to verify these hypotheses, we opted for a comparative approach involving various order criteria : geological, geochemical, isotopic, hydrogeological, geophysical and climatological. In a first phase, we spatialized the physicochemical results of the Ghiss - Nekkour groundwater. The electrical conductivity of the Ghiss - Nekkour groundwater varies from west to east. The lack of a sewage treatment plant and the use of autonomous sanitation systems are in favor of a more or less remarkable increase in the nitrate concentration in groundwater.

Keywords: Aquifer, Alluvial groundwater, Groundwater, Salinization, Seawater intrusion, Soils.

S.04003: SALINIZATION PROCESS OF THE COASTAL AQUIFER OF GHISS €“ NEKKOUR (NORTH-EASTERN MOROCCO)

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Abstract

The Ghiss - Nekkour alluvial aquifer plays a strategic role in the supply of drinking water to the city of Al Hoceima and its hinterland, however, this water resource is under various pressures. In fact, in addition to its overexploitation, this aquifer is threatened by the degradation of its quality following its salinization and its contamination by various sources of natural and anthropic pollution. In this context, and in order to study the origin of the salinization of the groundwater of the Ghiss - Nekkour aquifer, several hypotheses were discussed, four was retained: i) Salinization linked to the local geological context; ii) Salinization following an intrusion of seawater; iii) Overpumping in the coastal zone and/or around the mouths of Ghiss and Nekkour rivers and iv) Sea level rise in a context of climate change. In order to verify these hypotheses, we opted for a comparative approach involving various criteria: geological, geochemical, isotopic, hydrogeological, geophysical and climatological. The results obtained made it possible to identify the geological origin of the salinity of groundwater. This salinization remains of a natural order linked to contact with geological formations but greatly amplified by anthropic action linked to the over-pumping of water in areas now sensitive to marine intrusion.

Keywords: Marine intrusion, Aquifer, Groundwater, Alluvial groundwater, Ghiss, Nekkour

S.04004: ASSESSMENT OF THE VULNERABILITY OF SURFACE WATERS TO CONTAMINATION USING « DKPR » APPROACH APPLICATION AT THE LEVEL OF THE CATCHMENT AREA OF THE GHISS DAM IMPOUNDMENT (NORTH EAST MOROCCO)

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Abstract

In the present work, we present the results of the application of the "DKPR" approach for the assessment of the degree of vulnerability to contamination of the watershed of the Ghiss Dam, a hydraulic structure under construction in order to ensure the supply of drinking water to the city of Al Hoceima and the neighbouring centres, in addition to the protection of the downstream area against floods generated during the Ghiss wadi floods. The latter drains agricultural plots, natural areas, uncultivated land and rural settlements. The DKPR approach thus adopted involves four parameters : (1) - Accessibility of the aquatic environment (D), (2) - Water functioning of the soil and subsoil (K), (3) - Physiography of the catchment area (P) and (4) - Rain erosion (R). The final result is a map obtained by additionally combining the index maps of these four parameters using GIS and remote sensing tools. The overall vulnerability index obtained by this combination varies in a range of values from 0 to 4 .It is divided into five classes with different degrees of vulnerability ranging from "very low" to "very high". The analysis of the final vulnerability map obtained by applying the DKPR approach will thus provide useful technical support to water resource managers and decision-makers to better identify areas with a high degree of vulnerability and to plan all the necessary measures for its protection.

Keywords: DKPR approach, Contamination, Degree, GIS, Remote sensing, Vulnerability

S.04005: COMPARATIVE STUDY TO ASSESS THE ANTROPIC AND NATURAL VULNERABILITY OF SURFACE WATER USING THE DKPR AND RUSLE APPROACHES CASE OF THE WATERSHED OF THE JOUMOUAË, DAM (COASTAL BASIN OF GHISS, NORTH EAST MOROCCO)

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Abstract

The salinization of surface water in a coastal context is a problem leading to a qualitative degradation of this resource by various sources of anthropogenic and natural pollution. In this context, we present results of a comparative study using "DKPR" and "RUSLE" models to evaluate the degree of surface water vulnerability against pollution, especially in the sub-watershed of the JoumouaË dam, a hydraulic infrastructure providing drinking water for the Targuist city. The study area is occupied by agricultural plots, natural areas and rural-type habitats. The "DKPR" model adopted as qualitative approach involves four parameters: (1) - Accessibility of the aquatic environment (D), (2) - Water functioning of the soil and subsoil (K), (3) - Physiography watershed (P), (4) - Rainfall erosivity (R). The final result is a resource vulnerability map obtained by additionally combining index maps of these four parameters using remote sensing and GIS. The "RUSLE" model applied as quantitative approach integrates five factors in a multiplying function namely: rainfall erosivity (R), soil erodability (K), slope length and steepness (LS), cover-management (C) and support practice (P) in a remote sensing and GIS environment. The analysis of the final vulnerability maps of the above-mentioned approaches will be a useful support for water resource managers and decision-makers to better identify areas of high risk as well as their protection.

Keywords: DKPR approach, RUSLE, Vulnerability, Pollution, GIS, Remote sensing

S.04006: MAPPING AND QUANTIFICATION OF SOIL EROSION USING RUSLE, GIS AND REMOTE SENSING: CASE STUDY OF MOHAMED BEN ABDELKRIM EL KHATTABI WATERSHED (CENTRAL RIF - MOROCCO)

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Abstract

Soil erosion is known for being the most dangerous form of soil degradation in Morocco, particularly in the Rif region. Its evaluation is quite effective in planning and conservation of basins housing hydraulic structures. This study aims to assess soil erosion susceptibility in the Mohamed Ben Abdelkrim El Khattabi watershed. The methodology consists of combining GIS and remote sensing techniques to map the major factors involved in the erosion process (Rainfall erosivity (R), Soil erodibility (K), Slope (LS), Cultural practices (C) and Anti-erosion support (P)) and integrating them into the revised universal soil loss equation (RUSLE) adapted to Moroccan conditions. The case study area is located in the eastern part of the internal Rif (Morocco), is a mega mountainous basin with a surface area extending to 773 km². It contains the Mohamed Ben Abdelkrim El Khattabi dam downstream before opening onto the Mediterranean by a wide alluvial plain east of the city of Al Hoceima. It is characterized by a semi-arid Mediterranean climate, steep slopes with a predominance of classes between 15° and 45°, a tender and diversified lithology and a sparse plant cover. The results obtained show the high watershed's excessive vulnerability to the risk of water erosion. The synthetic map shows the erosion sensitivity distribution degrees wise in the catchment area with an average annual soil loss rate of 6.44 t/ha/year. These results could contribute to the development watershed management strategies by prioritizing the severe and very severe risk/erosion prone parts and may be of help to decision-makers and developers regarding any decision to restore heavily eroded areas in the Mohamed Ben Abdelkrim El Khattabi Watershed.

Keywords: Water Erosion, RUSLE model, Mohamed Ben Abdelkrim El Khattabi Watershed, Central Rif, Morocco.

S.04007: STUDY OF EXTREME PRECIPITATION EVENTS AND THEIR FUTURE EVOLUTION IN NORTHERN MOROCCO (TANGIERS-TETOUANE -AL HOCEIMA): STATISTICAL APPROACH AND MODELING UNDER THE SOFTWARE R

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Abstract

Today global warming has become an unquestionable certainty all over the world, however this reality is causing harmful effects on the climate and in particular weather hazards that will lead to further natural disasters that could jeopardize many vital socio-economic sectors and jeopardize their future development. The aim of this work is to analyze the evolution of rainfall extremes in northern Morocco. On the other hand, this study will also allow the analysis of the probability of extreme daily rainfall based on the series of maximum daily rainfall between 29 and 54 years. The data were provided by the link GHCN (Global Historical Climatology Network) based on the 3 main climatological stations in Northern Morocco "Tangier", "Tetouan" and "Al-Hoceima". The northern region was chosen in the framework of this study, it is one of the most coveted areas of the Moroccan Atlantic coast and the Mediterranean Sea by its tourist, urbanized and industrialized infrastructures. The interest of studying the climate and its impact on intoxication requires statistical tests recommended by the National Meteorological Organization (NMO). The main statistical tool we used in this study is extreme value theory (EVT), described by Reiss and Thomas (2007). It allows us to establish the distribution properties of extremes (maxima or minima) and excesses above (below) a high (low) threshold. It will help us to study the properties and statistical modelling of rainfall series and to predict climate events of large return periods in the future. In order to demonstrate the effectiveness of our mathematical model chosen and help decision makers to highlight preventive protective measures and risk management that has become fundamental today in northern Morocco and especially the region (Tangiers-Tetouane -Al Hoceima).

Keywords: Extreme rainfall, (TVE) Extreme Value Theory, Northern Morocco, Global Warming, Return period, R software.

S.04008: INTEGRATION OF THE RUSLE MODEL IN ASSESSING SOIL LOSS AND SILTING OF THE IDRIS 1ST DAM, INAOUENE WATERSHED

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Abstract

Soil erosion is a major concern on a global scale, and it is much more alarming in some regions of the world such as Morocco where the combination of climatic aggressiveness with inappropriate human practices have led to significant and sometimes irreversible soil degradation. Much of the material removed from the soil ends up in the hydrological networks and silts up the water reservoirs. In regions under severe erosion, silting process is at the origin of the sharp drop in storage capacity. Furthermore, this risk also threatens the performance of dams through the degradation and deterioration of the safety of the reservoir as well as blocking the discharge devices, which reduces the lifespan of the dam. The Inaouene watershed has all the conditions leading to high erosion, leading to a decreasing in soil thickness and a significant transport of solids. Our objective is to estimate the annual water erosion rate in the watershed, in order to compute the soil losses. This calculation was carried out using the RUSLE model integrated in a Geographic Information System (GIS). This method provides an important support to decision-makers for simulating scenarios for planning erosion control interventions. Obtained results highlight that Inaouene watershed undergoes an annual water erosion of 68.35 t/ha/year (averaged between winter and summer). This value corresponds to a high erosion process, explained here by high slopes, low vegetation cover, and high rainfall between in the basin. Towards the downstream part of the basin, we notice a quite high erosion values (43.2 t/ha/year on average). The low values of the topographic factor (LS) at this level and the high values of rain-flow erosivity (R) lead to a rapid filling of the dam by sediments and subsequently the decrease of its capacity, as well as the degradation of water quality.

Keywords: Inaouene watershed, Idriss 1st dam, Erosion, RUSLE method.

S.04009: SALINIZATION AND POLLUTION IN COASTAL AQUIFERS:MOROCCAN CASE STUDIES

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Abstract

In recent years we have been experiencing increasing attention on the fundamental role groundwater plays in sustaining development and wellbeing of populations worldwide. However, multiple pressures hamper the status of groundwater resources. Marine intrusion caused by intensive pumping and nitrate pollution are two major environmental problems encountered in several Mediterranean coastal aquifers. Two case studies will be presented: (1) The Oued Laou aquifer (Tétouan, Morocco), where the application of a numerical approach to describe the influence of pumping, for drinking water supply and for irrigation, on the interface freshwater-saltwater was adopted. The aim is to study the hydrodynamics of groundwater and the movement of the interface between freshwater and saltwater, first in steady state, for limits under flow conditions and for open limits " open boundaries ". The results of the numerical simulation show that the commissioning of additional boreholes for drinking water supply would generate a more remarkable advance in the freshwater / saltwater interface. (2) The Bou-Areg aquifer (Nador, Morocco), where the diagrams relating to piezometric evolution, on a series of wells for a period of ten years, showed a very general downward trend. The analytical results plotted on the Piper hydrochemical diagram made it possible to distinguish two types of water facies at the level of the plain: sodium chloride and sulphate, and calcium sodium and chloride. These types of facies originate from the three geochemical processes that control the salinity of the waters at the aquifer: anthropogenic pollution by nitrate, salt dissolution and marine intrusion.

Keywords: Piezometry, hydrochemistry, nitrate pollution, salinity, marine intrusion, modeling, oued Laou aquifer (Tétouan, Morocco), Bou, Areg plain (Nador, Morocco)

S.04010: THE HYDROLOGICAL RISK IN THE AREA OF SIDI BOULENOUAR (PROVINCE OF OUJDA) MODELING AND SPATIAL MAPPING

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Abstract

The area of Sidi Boulénouar is located about 20 km southwest of the city of Oujda. It is drained by the two main rivers Hassa and Al-abidine. This area experienced especially in October 2008, a devastating flood that caused damage those are limited to losses of domestic materials and vegetable crops, the erosion of agricultural land and the decommissioning of the access track to the douar by the solid transport of the river Hassa. In order to protect Sidi Boulénouar from flooding, we based ourselves on hydrological and hydrodynamic studies. The first study concerns the mapping of flood-generating watersheds, the calculation of their geometric characteristics using the GIS and the calculation of project flows of 10, 20, 50 and 100 years using empirical formulae. Hydrodynamic flood modelling for different return periods was performed using HEC-RAS and HEC-Georas. This modelling enabled us to draw up the necessary development plans to ensure the transit of floods generated without spillage on the agglomeration. Flood simulations yielded results in terms of flooded surface. Thus, for Hassa the flooded area is 586 m² for a 10-year return period and 30509 m² for a 100-year return period. For Al-abidine, the flooded area reached 169 m² for a 10-year return period and 11219 m² for a 100-year return period. For this purpose, we have proposed civil engineering works such as a retention basin, canals to divert water and nozzles to reduce the risk of flooding.

Keywords: hydrological risk, GIS, Simulation, Cartography, Sidi Boulénouar.

S.04011: APPLICATION OF ELECTRICAL TOMOGRAPHY FOR THE HYDROGEOLOGICAL STUDY OF THE FEZ-TAZA CORRIDOR, CASE OF BIR TAM-TAM (MOROCCO)

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Abstract

The study area is located in the Bir Tam-Tam region which is part of the Fez-Taza corridor, which is part of the eastern part of the South Rifain furrow. The study area belongs to the geological context of the Fez-Taza corridor, which includes the formations from the Paleozoic age (Substratum formed by the Primary shales and sandstones) up to the Plio-Quaternary. It is constituted by outcrops mio-pliocenes and quaternary which allow to appear, in places, liasic terrain; the most important is the high bottom of Bir Tam-Tam. The latter are based almost in agreement on the permo-triassic deposits encasing a thick dolerite casting. From a groundwater resource point of view, the only important aquifer in the region is formed by the limestone-dolomitic formations of the lower and middle Lias. This work contributes to the multidisciplinary geological, hydrogeological, hydrological and geophysical exploration of groundwater in the Bir Tam-Tam region of the Fez-Taza corridor. Our main objective is the release of water resources in our study area for the supply of drinking water in the region and irrigation of agricultural areas. Potential zones are located at the Lias fracturing zones. This study is interested in understanding the hydrogeological context of the study area through geophysical methods such as Vertical Electrical Sounding (VES) and Electrical Tomography. The comparison of geological data, Drilling data and the interpretation of the results of electrical tomography and soundings have made it possible to highlight the geoelectric levels likely to constitute a potential aquifer and to locate possible structural accidents (faults) affecting the dolomitic limestone formations of Lias that could drain groundwater.

Keywords: Aquifer, Bir TamTam, Electric Tomography, Fez Taza Corridor, Hydrogeology, Vertical Electric Sounding (VES).

S.04012: MODELING AND MAPPING OF COASTAL AQUIFER VULNERABILITY TO SEAWATER INTRUSION USING SEAWAT CODE AND GALDIT INDEX TECHNIQUE : CASE OF THE RMEL AQUIFER €“ LARACHE, MOROCCO

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Abstract

The study area of Rmel-O. Ogbane aquifer currently faces major water challenges related to the sustainable management of water resources. Climate change and Sea Level Rise can increase the risks and the costs of water resources management, impact the quantity and quality of water resources. Hence, for the purpose of planning and management. An integrated approach is developed for linking climate models and groundwater models to investigate future impacts of climate change on groundwater resources. Climate projections show an increase in temperature of about 0.45 °C and a reduction in precipitation of 16.7% for the period 2016-2050. The mean sea level will rise by up from -6.45 cm by 2017 to -21.3 cm by 2040. Simulations of seawater intrusion corresponding to various combinations of groundwater extraction, predicted climate change and sea level rise show that the area will be contaminated on the NW sector of the coastal part, in which the toe would reach about 5.2 km inland and will be intruded with high salinity (15-25g/l). Beyond these zones, the contamination of the aquifer will be limited. Moreover, these results were also confirmed by the vulnerability assessment using the GALDIT technique, adapted to vulnerability mapping to seawater intrusion in the study area. The results reveal that the fringe littoral areas of the aquifer are the most affected by seawater intrusion with a high risk in the northwestern part of the study area. Hence, better strategies for groundwater development and management will be necessary to protect the freshwater aquifers to the marine intrusion.

Keywords: Climate change, Climate models, Groundwater models, Rmel, O. Ogbane, Sea level rise, Seawater intrusion, GALDIT Index Technique.

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S.04013: APPLICATION OF THE USLE MODEL TO ESTIMATE WATER EROSION IN THE OUED ZA WATERSHED.

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Abstract

Located in the eastern region of Morocco. The Oued Za watershed is the main tributary of the Oued Moulouya (the most important Moroccan oued that flows into the Mediterranean Sea). The Oued Za drains three large and distinct units forming a watershed with a surface area of 15884 Km². The latter is characterized by a semi-arid climate, scarce and irregular rainfall combined with a low vegetation cover which causes severe erosion. The soils are increasingly degraded and the sediments resulting from this erosion contribute to the silting up of dam reservoirs. The objective assigned to the present study is to integrate the thematic maps of the different factors of the Universal Soil Loss Equation (USLE) into the Geographic Information System (GIS) with their databases. The results indicate that for the Oued Za watershed, the potential loss is 11023255.9 t/ha/year. The results can help implement soil management and conservation practices to reduce soil erosion by sub-basin and in the Oued Za watershed.

Keywords: Morocco, Orientale, erosion, Oued Za, USLE, SIG.

S.04014: HEAVY METAL CONTAMINATION IN SURFACE WATER OF MOHAMMEDIA WETLAND, MOROCCO

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Abstract

Mohammedia wetland, located in an urban area, is a complex of water bodies which correspond to the estuary of El Maleh Wadi and its flood plain. This Ramsar Site is home to rich and diverse biotopes and biocenosis. Mohammedia wetland receives significant anthropogenic inputs from both point and non-point upstream sources. The intensification of human activity has not stopped modifying the functioning of this fragile ecosystem and accelerating its degradation. Its classification since 2005 as a Ramsar Site should encourage its protection. To do this, it is necessary to understand the origin of pollution in the wetland in order to better plan its preservation and restoration. Within the current literature on Mohammedia wetland, biotic is used dominantly in determining the ecosystem's health. Some studies are available on sediment and surface water characteristics but based on analysis carried out between 2000 and 2002. This work presents current water quality investigation with wider spatial coverage including Mohammedia wetland and a selected segment of El Maleh Wadi which feeds the wetland. The study consists of determining the dominant contaminants and their spatial variation in the study area. The objective is to highlight the possible connections of El Maleh Wadi water quality and ecological problems in Mohammedia wetland. The field study made it possible to identify and map the pollution discharged into El Maleh Wadi and which reaches the wetland. The analysis carried out show that the concentration of most of heavy metals far exceed the thresholds relating to aquatic life set by the Moroccan regulation. All evidence directs towards a water quality degradation in the study area generated by industrial activities, sewage discharges and leachate of the old landfill located upstream.

Keywords: Mohammedia wetland, urban pollution, cartography, characterisation, aquatic life standards

S.04P01: PHYSICO-CHEMICAL CHARACTERIZATION OF THE WATERS OF AL-HOCEIMA BAY (RIF CENTRAL, MOROCCO)

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Abstract

The bay of Al Hoceima is part of the Moroccan Mediterranean rim. It occupies the central part of the Rif. With 40 km of coastline, it is bounded on the east by Cap Rass Terf, on the west by Cap Sidi El Abed and in the center by the Ghiss-Nekor plain. Its hydrodynamics depend on the general circulation of the Mediterranean. The marine area of the bay is affected by the southern branch of the east-west trending high pressure gyre. The most frequent swells are from sector WNW, NE to ENE. The tide is semi-diurnal, with a fairly low amplitude and in a microtidal regime. Four physicochemical parameters of the surface water of Al-Hoceima bay were provided from the Copernicus marine site namely; temperature, salinity, dissolved inorganic nitrogen and phosphate. The objective lies in the comparison of the spatio-temporal evolution of these parameters at the level of the bay of Al-Hoceima in relation to ocean circulation and seasonal climatic variability. The variation in the temperature of the surface water of Al-Hoceima Bay during the year 2019 marks a seasonal influence of the Mediterranean climate with a thermal amplitude that does not exceed 10 ° C. The variation in the salinity of the surface water of Al-Hoceima bay during the year 2019 is between 36 mg / L and 36.69 mg / L. The minimum values recorded are due to the decrease in the water temperature, on the other hand the concentration increases with the rise in temperature. The monthly variation of dissolved inorganic nitrogen and phosphate during the year 2019 is in direct relation to the seasonal processes of oxidation of organic matter and phytoplankton proliferation on the one hand and on the other hand to the circulation. oceanic. The fairly high contents of dissolved inorganic nitrogen and Phosphate during the cold winter season are mainly linked to the predominance of degradation and mineralization processes of organic matter thus favored by the decrease in water temperature and the rising water. background rich in nutrients. However, the decrease in the levels of these elements during the spring testifies to the resumption of phytoplankton activity with the increase in water temperature and the amount of sunshine. This continues until complete depletion of these elements during summer and fall.

Keywords: Keywords: Bay of Al, Hoceima, Ri Central, Ocean circulation, Physico, chemistry, Surface water

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S.04P02: STUDY OF THE IMPACT OF FRESHWATER SOURCES ON THE OUALIDIA LAGOON

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Abstract

The lagoon of Oualidia, located on the Atlantic coast between El Jadida and Safi is one of the coastal sites in Morocco where develop several activities especially socio-economic. The objective of this study is to contribute to the understanding of the impact of freshwater resurgences on the Oualidia lagoon, by describing the physicochemical parameters, the temperature and the salinity of the water, measured in 14 main sources and 11 at low tide with 3 reference zones at the channel level, were studied during the month of May 2018. Temperature and salinity indicate a clear influence of tide and current (flood and ebb) where marine water influence downstream of the lagoon and the salinity is reduced progressively upstream, due to continental/underground freshwater seepages inside the lagoon which play a dominant hydrological role. And since it is essential to ensure a qualitative and quantitative management, the idea was to measure the flow of its sources to have an idea about the average quantity of fresh water which returns to the lagoon and to make a connection between these parameters in order to have the impact of these sources on the lagoon system of oualida. The adapted methodology allowed to establish the typology of this site, this environment is subdivided into three zones: a) the downstream zone, is clearly influenced by the sea (contribution of phosphatic elements, small variations of temperature and salinity) ; b) the intermediate zone, undergoing both the marine influence and the continental influence; (c) the upstream zone which is very confined and has a reservoir of nitrogenous elements, suspended matter and organic matter.

Keywords: Lagoon, Oualidia, Morocco, impact, hydrology, underground freshwater, salinity, debit.

S.04P03: AGRICULTURAL SOIL QUALITY OF RIVERBANKS OF FEZ-RIVER UPSTREAM, MOROCCO

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Abstract

In Fez city, urban and peri-urban agricultural soils in high exploitation are undoubtedly suffering from the negative effects of anthropogenic inputs, namely fertilizers, pesticides, atmospheric fallout. Assessment of its impact would be necessary. This study was performed to bring out physicochemical and geochemical characterization of agricultural soils of riverbanks of Fez-river Upstream. Agricultural surface soil samples were collected from nine sites of three soil types, namely Calcisols (CL1,CL2,CL3,CL4), Cambisols (CM1,CM2) and Vertisols (VR1,VR2,VR3). These soil samples have been the subject of physical and chemical analyses such as Moisture, soil pH, Electrical conductivity, carbonate content, organic matter content and Soil particle size. Geochemical analyses were performed to determine the total concentrations of Heavy Metals (Cr, Cu, Pb and Zn). The evaluation of total heavy metals of the samples was done using triacid attack mineralization extraction method (HF, HNO₃ and HClO₄) in an open system. The multi-element analysis of Heavy Metals is inductively coupled plasma-atomic emission spectrometer (ICP-AES) in order to calculate and evaluate different soil contamination indexes and potential ecological risk to identify their anthropogenic and natural sources. The obtained results show that soils are generally alkaline with a high calcium carbonate content (34.11%-66.67%CaCO₃), electrical conductivity is less than 200µS/cm soils are considered as low salt content; rich in organic matter which reaches 15%. The results of the geochemical analyses show that the total concentrations of Cr, Cu, Pb and Zn at the studied agricultural soils generally greater than the Upper Continental Crust (Wedepohl, 1995), while for Pb the total content at CM 1 site is greatly exceeds the values of the UCC as well as the global average soil content (Kabata-Pendias, 2010) which reaches 135µg/g. PCA analysis was carried out to identify heavy metals sources, the two main components are identified for 86.79% of total variance. Cr, Cu and Zn are correlated to the first component and Pb to the second. The first component is related to agricultural activities and the second to vehicular traffic. Contamination indexes show that for Enrichment Factor (EF) the soils are in general ranging from minimal enrichment to moderate enrichment by heavy metal except for CL2 and CM2 samples that have significant enrichment by Cu, CM1 and VR2 have significant enrichment by Pb and CM 2 sample has moderate enrichment by Cr. Geoaccumulation Index (I_{geo}) indicate that soil samples are unpolluted to moderately polluted except CM1 Soil sample I_{geo}=2.36 which is strongly polluted by Pb. According to Hakanson L. 1980, Contamination factor indicates that soil have moderate contamination, except for VR2 and CM2 that respectively has considerable and very high contamination. Degree of contamination show that soil samples have low contamination degree DC.

Keywords: Agricultural Soil, Heavy Metals, Physicochemical analysis, Contamination Indexes, Risk Assessment, Fez, Morocco.

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S.04Po4: HYDROCHEMISTRY, QUALITY AND TRADITIONAL TECHNIQUES OF GROUNDWATER PRESERVATION IN THE BOKOYA MASSIF (CENTRAL RIF, MOROCCO)

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Abstract

In the Moroccan Bokoya massif, water availability has become a major concern due to the scarcity of this useful substance. In this semi-arid area, groundwater is the main source of drinking water, agricultural given the scarcity of surface water. In this context, the present study is conducted with the aim of knowing and understanding the processes of groundwater mineralization in the Bokoya Massif and to evaluate and monitor its quality. The study of the hydrochemical characteristics of the groundwater of the Bokoya Massif was carried out using a combination of hydrochemical, hydrogeological and multivariate statistical analysis methods. This study highlights the different physico-chemical characteristics of the analyzed waters. The waters of the Bokoya massif are very hard and saline. The hydrochemical facies of these waters is mainly chloride-sodium. The geochemical factors controlling the water chemistry of the said water are ion exchange and evaporation. The graphical representation in the factor space highlights two groups of waters, the first of which shows the most mineralized samples due to the phenomenon related to water-rock contact, and the second group shows samples contaminated by anthropogenic activities. The methods used to conserve and protect groundwater from various pollutants are numerous, including digging wells at high elevations and constructing roof structures.

Keywords: Rif, groundwater, hydrochemistry, quality

S.04P05: IMPACT OF MINING WASTE ON WATER RESOURCES IN THE TOUISSIT BOU-BEKER REGION –MOROCCO

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Abstract

The Touissit – Bou Beker district is located in northeastern Morocco, about thirty kilometers southeast of the city of Oujda. This lead, zinc and copper mining district has been known since 1926 and hosts the largest Mississippi Valley-type zinc-lead deposit in North Africa, with historical production exceeding 75 Mt of ore. The sulphide mineralization mainly consists of sphalerite and galena, and is hosted by Middle Jurassic dolomite sequences. The deposit has a length of 1.8 kilometers, trends in a East-NorthEast direction, and has an average thickness of 25 meters. Since 2002, a very large quantity of potentially toxic mining waste has been generated and stored randomly in the middle of the urban environment at the level of tailings ponds. The total volume of this waste is estimated to be 10 million m³ for a surface footprint of around 65 hectares. The potential impact on the environment is obvious since they contain significant levels of sulfide minerals and various heavy metals. The purpose of our study is to simulate the impact of mining waste on the quality of water resources in this area. Two water-sampling surveys (spring, well and stream waters) carried out in the dry (summer) and wet (spring) periods provided 29 samples for physico-chemical and heavy metal analyses. The survey showed that the surface and groundwater flows take place from the North-East towards the South-West. The water contamination levels exceed by far the safe standards fixed by the World Health Organization (WHO) and the location of mining waste promotes the transport of contaminants downstream. Our study demonstrates that the dissolution of the various ore-related minerals present in the mine tailings (sulfates, sulfides and sulfosalts, among others), presents a serious source of ongoing contamination.

Keywords: Mining waste, water quality, Touissit Bou, Beker, Morocco

S.05Co1: MARINE PLASTIC POLLUTION, CASE OF MOROCCAN SEAFLOOR

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Abstract

The marine environment is subject to a wide variety of pollution threats from several sources, including marine solid waste. UNEP define marine litter as any persistent solid matter, manufactured or transformed, discarded, disposed of or abandoned in the marine and coastal environment. These debris are made up of several pollutants of various types and sizes, they contain plastic, paper, fiber, wood, etc. Plastic debris take a very important place in the composition of solid waste. It reached 335 million tonnes worldwide in 2016 (Plastics Europe, 2018). Plastics represent 50 to 80% of marine litter, which is linked to the high density of populations on the mainland coasts. In recent decades, scientists have become interested in studying microplastics, which have invaded all compartments of the marine environment, namely the abiotic and biotic parts. Due to their small size, microplastics can be ingested by marine organisms, having varied feeding strategies and occupying different trophic levels. Ingested microplastics can cause several harmful effects on organisms, including inhibition of growth and metabolism, such as reproductive dysfunction and serious effects on diet. Also these particles can be vectors of other micro-pollutants like persistent organic pollutants and metals. Studies exploring the effects of microplastics on human health are still scarce. In this presentation, we will provide an overview of seafloor marine debris distribution in Atlantic and Mediterranean continental shelf, hot spot areas and the results of analysis of presence of microplastics in the stomach contents of some pelagic and demersal fish species.

Keywords: marine debris, microplastic, Atlantic Ocean, Mediterranean Sea, pelagic species, demersal species.

S.05O01: FEEDING AND GROWTH COUPLING DURING DIFFERENT DEVELOPMENT LARVAE PHASES OF THE MEDITERRANEAN MUSSEL MYTILUS GALLOPROVINCIALIS L. FROM AMSA BAY

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Abstract

The spat supply for mussel farming in Morocco is essentially based on seed capture and collection from natural beds. The irregularity of natural recruitment in the exploited areas, and the difficulties encountered during the spat collection have led to the development and improvement of reproduction techniques under controlled condition in hatcheries. In this study all stages of larval development were followed especially within and between different development stages. The Trocophore larva stage begins with a size 63.25 μm and reaches the pediveliger stage (size 272.56 μm) during 18 days of development. The growth rate in terms of length gain was very important from Larvae D to eyespot stage (8.16 μm day⁻¹, 10.2 μm day⁻¹ and 12.44 μm day⁻¹ for D-shape, vilegere and eyespot stages respectively). From Eyespot stage to pediveliger stage the growth rate in length has been decreased (11.53 μm day⁻¹). The same scenario have been observed in terms of width growth rate (4.72 μm day⁻¹, 8.06 μm day⁻¹, 11.08 μm day⁻¹ and 9.87 μm day⁻¹ respectively). The decreased growth rates between the development stages is explained by particles selection and food processing (consumption rates) recorded during different growth stages. However, the reduced growth in shell length could clearly be explained by the beginning of tissue growth (gain in tissue mass). Therefore, the simultaneous effect of specific food supply and temperature is undertaken in order to reveal the unknown relationship between shell and tissue growth during development and growth of mussel larvae.

Keywords: *Mytilus galloprovincialis*, larvae rearing, growth, feeding, Amsa

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S.05002: POTENTIAL UTILITY OF USING MULTI- BIOMARKERS APPROACH FOR DIAGNOSTIC THE HEALTH STATUS OF MEDITERRANEAN COASTLINES IN MOROCCO

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Abstract

Biomarkers concept are used to determinate the impact pollution by an early and sensitive response in organism exposed to a wide range of pollutants. In fact, the use of this biological approach in Moroccan Mediterranean coastlines characterized by various aggressions was necessary. In order to monitor the quality of this environment, a multi-biomarkers approach was used to assess the biological impact in mussel, *Mytilus galloprovincialis*. The sampling sites chosen for this study are located at two hotspot sites namely; the marina of Kabila (K), the mouth of a continental emissary in Martil (Me) and at one reference site correspond to aquaculture farm in M'diq Bay (Mq). In this context, eight biomarkers were measured for two seasons (hot and cold) in the whole soft tissues of mussel as indicators of oxidative stress (CAT, SOD, GR and GPxs activities), biotransformation (GST), oxidative damage (MDA), neurotoxicity (AChE activity) and genotoxicity (CSP 3-like activity). The biocenosis impact study showed in the two seasons a significant difference in the response of some biomarkers at the two hotspot sites (Kabila, Martil) compared to the reference site (M'diq). Indeed, an increase in CAT, GR, GPx and GST translated the alteration of their status health, reflecting a level of environmental disruption generated by port activities and industrial and domestic discharges in this area. Also, a high level of MDA and CSP-3 activities was observed, which confirmed that both sites had undergone oxidative and molecular damage. Finally, to validate the multi-biomarkers approach relevance used in this work, a global principal component analysis (PCA) of all the biomarkers was performed. Indeed, the results of the PCA demonstrated that whatever season that the CAT, GR, T-GPx, GPx Se-d, GST, MDA and CSP3 are the most efficient biomarkers among those used for biomonitoring on this coast.

Keywords: Moroccan Mediterranean coast, Biomarkers, *Mytilus galloprovincialis*

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S.05003: CARTOGRAPHY, IDENTIFICATION AND EVALUATION OF THE ANTIOXIDANT ACTIVITY OF SOME SEAWEEDS FROM MARCHIKA LAGOON, MOROCCO.

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Abstract

The Marchica lagoon is classified Site of Biological and Ecological Interest. Is one of the most important lagoons in the Mediterranean region, covering an area of 115 km². It is an ecosystem that presents several economic, ecological and tourist interests. The objective of this study is to participate in the identification and mapping of existing macroalgae in several sites of the lagoon and the evaluation of the antioxidant activity of the most abundant species. Sampling campaigns were carried out at five sites of the lagoon, and ten samples of each site were collected at a depth varying between 0.5 and 3 m. The samples, taken by scuba diving, were located and mapped by ArcGis software. The botanical identification of the harvested algae was carried out by macroscopic and microscopic techniques based on the guide for recognition and monitoring of macrophytes in the lagoons of Languedoc-Roussillon (2011). The four most popular algae species from Marchica Lagoon were dried, and their antioxidant activity determined using the DPPH technique. The botanical survey revealed the presence of 17 algae distributed over five sites; the main algae are *Ulva lactuca*, *Enteromorpha prolifera*, *Gracilariagracilis* and *Gracilariaverrucosa*. All the algae studied revealed the ability to bind free radicals and the ethanolic extract of *Gracilariaverrucosa* was characterized by the highest antioxidant power compared to other algae extracts with an IC₅₀ of 2.49 mg/ml. This study, carried out for the first time in the Marchica lagoon, focused on the richness and biodiversity of the lagoon in terms of macroalgae, which could be used as a source of bioactive molecules in the pharmaceutical and agri-food sectors, with a view to the rational development of Moroccan bio-resources.

Keywords: Marchica lagoon, *Ulva lactuca*, *Enteromorpha prolifera*, *Gracilaria gracilis*, *Gracilaria gracilis*, antioxidant activity.

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S.05004: COEXISTENCE IN THE MEDITERRANEAN SEA, AL HOCEIMA, MOROCCO: INTERACTIONS BETWEEN FISHING AND COMMON BOTTLENOSE DOLPHINS Tursiops truncatus (MONTAGU, 1821)

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Abstract

The purse seine fishing activity plays a major role in the economy of the Al Hoceima region, which generated more than 500 employees in 2004. Recently, attacks by bottlenose dolphins (*Tursiops truncatus*) on fishing gears have influenced this activity, and despite the efforts made by the government, to reduce these attacks, no useful results have been obtained. Our study is based on data collected from professionals and use the on-board observer method. The study showed that during the fishing operations more than 30% of the gears were attacked, these attacks have influenced the performance of the purse seine activity, especially the decrease in production which did not exceed 1933 tons during the year 2019 and the loss of fishing nets due to the tearing of the seines which constitute additional loads. This problem has led the majority of the purse seiners to change their area of activity from the Mediterranean Sea (Al Hoceima) to the Atlantic Ocean (Tangiers, Laarache and Kenitra). In This study period we counted 133 bottlenose dolphin individuals as bycatch.

Keywords: Al Hoceima, bycatch, bottlenose dolphins, purse seine

S.05005: ECOLOGICAL MODELS IN FISHERIES MANAGEMENT: ALBORAN MARINE PROTECTED AREA WITH ECOPATH MODEL

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Abstract

The Alboran sea is a transition zone between Atlantic and Mediterranean ocean containing a mix of species, these interactions between this two economic zone (EEZ) and the commercial stock in the Alboran sea that are currently in a critical situation mainly due to the intense fishing overexploitation. Here, we propose to address the ecological questions and assess the effect of fishing on the exploited ecosystem, evaluate the impact and location of Alboran marine protected area. The application of Ecopath model in the marine ecosystem allow evaluating the impact of fisheries and analyzing the state of overexploitation of fisheries resources in the EEZ area and to achieve sustainable exploitation of fishery and preserve marine biodiversity. The choose of functional groups based on the more exploited fishes in the Alboran sea. The results showed that the trophic levels (TL) of the 31 compartments of our ecosystem varied between 1 (for primary producers and detritus) to 4.73 (for *Epinephelus* spp), and the biomasses and productions are concentrated in TL 2 and 3. The high proportion of primary productivity treated and recycled, which means that the system is still in development and this is the basic information that we already have on the ecosystem which confirms by our model, the primary production / Total biomass rate equal to 8.04, these statistical results confirm that our ecosystem is healthy and stable with high photosynthetic activity and natural mineral resources in the sediments which allow good net primary production which will be transformed into energy and material flows at each trophic level in the food web.

Keywords: Ecopath model, Fisheries, Marine Protected Area, Alboran

S.05006: GEOGRAPHICAL AREA EFFECT ON SHEEP MEAT QUALITY OF BENI-GUIL BREED: A LOCAL MEAT LABELED IGP TO PROMOTE QUALITY AND PRESERVE BIODIVERSITY IN MOROCCO

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Abstract

Currently, meat consumers are more conscious about the authentic meat products linked to their origin; and this circumstance generates a growing demand for labeled sheep meat. In eastern Morocco, the Beni-Guil (BG) sheep meat is a Protected Geographical Indication (PGI) product. Several factors are known to influence the meat quality such as geographical area (GA), feeding, gender, animal age, and livestock system. The aim of this study is to examine the effect of GA on meat's essential amino acids (EAA), fatty acid profile (FA), and trace elements of BG sheep meat using longissimus lumborum muscle (LL). The chemical composition of the LL muscle was evaluated from 24 female lambs obtained in the two main cradles of BG breed (Ain Beni-Mathar (Cr1) and Tendirara Cr2). The results show that the EAA and FA profile were affected by GA ($p > 0.05$), whereas, the microelement content is not influenced (p

Keywords: Beni, Guil, Sheep meat, Geographical area, Amino acids, Fatty acids, Trace elements

S.05007: PHYSICO-CHEMICAL CHARACTERIZATION OF WATER AND METALLIC CONTAMINATION OF MYTILUS GALLOPROVINCIALIS IN THE COASTAL ZONE OF SAIDIA

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Abstract

Marine pollution is one of today's most alarming problems. Indeed, water is a vital natural resource for life. The metal pollution of aquatic ecosystems is increasing due to the effects of urbanization and industrialization (anthropogenic activities). As a result, heavy metals contamination is a serious threat to public health because of their toxicity, long persistence, bioaccumulation, and biomagnification in the food chain. The aim of this investigation is to evaluate the physico-chemical quality of seawater and to assess the contamination risks *Mytilus galloprovincialis* mussels by Cadmium, Zinc, Iron, and Copper. The study was carried out in three stations of Saidia coast during the July 2019. The seawater was analyzed for its physico-chemical parameters, and the heavy metals content in mussels was determined by ICP-AES. The results show that the tested water has a pH value ranging between 7.48-7.62 with nitrate and nitrite content range between 0-4.78 mg/L, 0.007-0.181 mg/L, respectively. The recorded water conductivity and oxydability values ranging respectively from 22 to 55 ms/cm and from 5.67 to 10.47 mg/L. The mean concentration found in the mussels were in decreasing order, Iron (13.5 mg/kg), Zinc (2.3 mg/kg), Copper (0.65 mg/kg) and Cadmium (0.02 mg/kg), respectively. The obtained results indicate that all values are below the threshold recommended by Food and agriculture organization and world health organization.

Keywords: seawater, *Mytilus galloprovincialis*, pollution, Saidia coast, heavy metals

S.05008: MICROPROPAGATION OF ZYGOTIC EMBRYOS FROM GENETICALLY DIVERSE ALMOND (PRUNUS DULCIS MILL.) SEEDLING ORCHARDS IN EASTERN MOROCCO

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Abstract

Numerous studies on perennial crops have shown that almond has a low tolerance to climate-changing [1], which led to detailed study for its adaptation by focusing efforts on developing heat-tolerant almond varieties. The long period of perennial agriculture creates special challenges in a changing climate. Areas well-suited for growing may become unsuited during the life of a single orchard. The selection of a variety is complicated by the possibility that future climates will be poorly adapted to the most suited variety for the current climate. Hence the interest of having a large variability of tolerant genotypes. In the eastern Mediterranean region of Morocco, seedling almond trees are largely grown, mainly in rain fed areas with poor soils that receive little attention from farmers, which created an important gene pool, both for breeding programs and the selection of superior genotypes adapted to difficult pedo-climatic conditions. For the conservation of crop biodiversity in these almond groves, micropropagation is considered as a feasible technique for clonal production and regeneration of superior planting materials under controlled conditions to produce in a fast way disease-free mature plants. Zygotic embryos of several local ecotypes of the almond native population known as "Beldi", were cultivated on Murashige and Skoog (MS) medium supplemented with different concentrations and combinations of auxins and cytokinins. The results showed that zygotic embryos have a high embryogenic potential since it showed better competence to in vitro tissue culture compared to more differentiated and mature tissues such as leaves. Multiple shoot initiation from embryos on MS medium containing 1mg/L of 6-Benzyl-aminopurine (BAP) combined with 0.5 mg/L of Indole butyric acid (IBA), 30g/L sucrose, and 7g/L agar has been observed. High rooting rate was obtained on ½ MS medium supplemented with 1mg/L of IBA. The rooted shoots were acclimatized using a 1:1:1 mixture of perlite, sand, and soil and were successfully adapted to in vivo conditions.

Keywords: Almond, Biodiversity, Micropropagation, Plant growth regulators, Climate changes

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S.05009: THE EFFECT PYROLYSIS TEMPERATURE CHANGES IN THE CHARACTERISTICS OF ORGANIC MATTER OF TANGIER LANDFILL SOIL (MOROCCO)

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Abstract

The quantities of pyrolysate obtained by pyrolysis are very low compared to the gasification. The large quantities produced are observed in the range 600-650 °C. After the spectra CG/SM we have the distribution of the chains n-alkanes (C₂₄-C₂₇) and n-alkenes with the presence of aromatic compounds that can be derived from lignin or aromatic hydrocarbons, even if the quantities of pyrolysates are very low. Aliphatic hydrocarbons are obtained in the form of alkene / alkane doublets. They can come from radical cuts. The intensities of these peaks IR varied with the increase in temperature. We observe a decrease in intensity of the peaks at 1460, 1430 and 875 cm⁻¹ characteristic of the vibration frequencies of carbonate ions. We also note that these bands disappear at 750-800 °C, which explains the total decomposition of these groups at this temperature.

Keywords: pyrolysate, pyrolysis, n, alkanes, Aliphatic hydrocarbons, temperature.

S.05010: THE BYCATCH RATE OF THREATENED MARINE MEGAVERTEBRATES IN FISHING GEARS OF MEDITERRANEAN COAST OF MOROCCO

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Abstract

This study addresses the information gaps by a descriptive analysis of Bycatch of vulnerable species in Moroccan Mediterranean area. The data were collected on board of a commercial vessels from March 2019 to March 2020. The region hosts important population of threatened marine megavertebrates including sea turtles, sharks and rays, marine mammals and seabirds. All of these taxa can be affected by bycatch and this study is a pioneer assessment of the interaction between those species and fisheries for understanding the biodiversity and functioning ecosystem effects of these fisheries. The key results are 15 observers, 909 days at sea observations (339 on-board trawlers, 246 on-board long liners and 324 on-board purse-seiners), 1890 questionnaires. Sharks and rays were dominants in the ByCatch and represented 95% of the total number of bycaught individuals. Approximately, 321 elasmobranchs observed to have been bycaught in the monitored gears, most of them being deep-water sharks (Triakidae, Oxynotidae, Dalatidae). Twelve individuals of *Delphinus delphis*, were also bycaught in purse seiners. Five loggerheads (*Caretta caretta*) were bycaught and zero bycatch for seabird. During this work, incidental captures were therefore limited. The bycatch rate of sharks and rays in the trawlers fishery made up more than 0.18%, common dolphins with 0.016 % and 0.006% for sea turtles and the benthic species with 0.005% and 0.001% respectively for sponges and corals. Those estimates rates represent low rates in comparison to the quantities caught by the target fisheries. Finally, additional research will be required to accurate knowledge of Bycatch quantities, fully understand of fisheries practices and achieves target for bycatch-reduction.

Keywords: bycatch, vulnerable species, fishing gear, Mediterranean Coast of Morocco.

S.05O11: ASSESSMENT OF THE COASTAL MARCHICA WATERSHED THROUGH ECOTOXICOLOGICAL INDICES OF TRACE ELEMENTS IN SUPERFICIAL SEDIMENTS

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Abstract

The geochemical assessment of the sediment inputs from the Marchica watershed, which are the main sources of pollution in the Nador lagoon, is crucial for the protection of this Ramsar site and the conservation of its biodiversity. This study aims to analyze the seasonal distribution of trace elements Pb, Cu, Zn, Cr, Co, and Ba in the superficial sediments of the Marchica watershed, and their correlation to major elements, grain size, and total organic carbon. Samples were taken during the wet and dry seasons of 2018, in the main streams valley carrying the discharges to the lagoon. Five wadis were studied through a representative station for each one. Major analysis were carried out using Bruker S1 Turbo SD hand-held X-ray fluorescence (HHXRF) spectrometer; trace elements analysis were realized by an Agilent 4200 microwave plasma atomic emission spectrometer (MP-AES); granulometry analysis were measured by a laser particle size analyzer (Malvern Mastersizer 2000) and Total organic carbon analysis by a LECO carbon analyzer. Ecotoxicological indices (geoaccumulation index (Igeo), enrichment factor (EF) and contamination factor (CF)) and sediment-quality guidelines (SQGs) were used to evaluate the ecotoxicological risk. The results revealed during both wet and dry seasons a contamination by lead in all streams valley where concentrations were greater than TEL and PEL concentrations. The northwest stream valley, characterized by some industrial activities, and the stream valley crossing the abandoned mine were the most polluted by zinc and copper. Cr, Co and Ba were found to be at minimal pollution during both the wet and dry seasons. Pollution-load indices (PLI) were between 0.72 and 1.49 during wet season and between 0.91 and 2.47 during dry season. Despite the restoration actions achieved around the Marchica lagoon during the last decades by the Moroccan authorities, the watershed continues to have a negative impact on this ecosystem. An environmental management strategy is therefore necessary, taking into account the rehabilitation of the abandoned mining site as well as the updating of the environmental responsibility of industrial companies, particularly those installed before the implementation of the national law on environmental impact studies.

Keywords: Mediterranean Sea, Marchica watershed, Geochemical evaluation, Sediment ecotoxicity.

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S.05012: STUDIES ON RIPARIAN COMMUNITIES IN EASTERN MOROCCO: COASTAL DAYAS AT THE MOUTH OF THE MOULOUYA RIVER

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Abstract

Riparian species colonize the wet banks of aquatic environments (ocean, river, torrent, body of water, dayas...) whatever its size and as long as it isn't dried up. They are highly mobile species that can leave the environment as soon as conditions become unfavorable and recolonize others just as quickly. These communities are very dependent on their environment and have very strict ecological and ethological requirements, which makes them very originals. We carried out monthly sampling of riparian fauna on two dayas (EMDI et EMDII) on the Mediterranean coast, near the mouth of the Moulouya river. We collect all the fauna encountered on the shores during 1 hour of active research. Banks of these dayas are an ecotone where terrestrial, riparian and aquatic species mix. Riparian species dominate the population in terms of richness and abundance: the majority of species are either sporadic (EMDI) or accidental (EMDII). The dominant species are halophilous (genus *Pogonus* and *Tachys scutellaris dimidiatus*). A new species (*Gonocephalum yelamosi*) for Morocco has been collected from these dayas. They also represent a new station, in Morocco, for *Blaps nitens* and a new station, in the region, for *Dyschirius tensicollis* and *Dyschirius africanus*. As other research has shown, species with the same ecological niches that can compete with each other seem to share the occupation of this environment. Thus, *Lophyridia lunulata* is found on the banks during the months of February and March, *Cicindela maura* during the months of April and *Cicindela littorea goudoti* during the month of July. However, this succession has not been observed on the banks of the Moulouya river where they seem to coexist. The same phenomenon seems to occur for species of the genus *Pogonus* and *Pogonistes*, which have populations that reach their maximum expansion at different periods. The limited spatio-temporal position of these habitats allows an overall study of the functioning of their communities, the results thus obtained can easily be extrapolated to larger situations and applied to more general ecological theories.

Keywords: riparian communities, daya, mouth of the Moulouya river

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S.05013: ECOPHYSIOLOGY OF THE MEDITERRANEAN MUSSEL MYTILUS GALLOPROVINCIALIS L; EFFECT OF DIFFERENT MICROALGAE DIETS AND RATION IN BROODSTOCK CONDITIONING

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Abstract

In shellfish practices, the conditioning process is mainly based on the feeding management of broodstock. The importance of this phase depends highly on the choice of the appropriate microalgae diets in terms of quality and food availability (ration) required for maturation in broodstock conditioning. Three diets based on three microalgae species (*Tetraselmis suecica*, *Isochrysis galbana* and *Chaetoceros calcitrans*) and three feeding rations (1%, 2% and 3%) were used to understand the ecophysiology of the Mediterranean mussel *Mytilus galloprovincialis* during Broodstock conditioning. Generally, the results showed that mussels reared under *T. suecica* strain at 1% of food ration have revealed the highest consumption rate among monospecific diets (99,02%). In addition, the combination of this strain with the *C. calcitrans* has increased the consumption rate to 100% at 1%. In terms of consumption and ingestion, mussels reared under monospecific diet based on *I. galbana* at 3% of food ration revealed high values ($1,54 \pm 0,02 \mu\text{g}$) and ($1,36 \pm 0,13 \mu\text{g}$) respectively. Moreover, mussels fed with bispecific diets (*I. galbana* and *T. suecica*) and (*I. galbana* and *C. calcitrans*) at 3% feeding ration have revealed high performance as regards consumption ($16,24 \pm 0,0178 \mu\text{g}$) and ($13,34 \pm 0,03 \mu\text{g}$) respectively and ingestion ($16,24 \pm 0,01 \mu\text{g}$) and ($13,34 \pm 0,03 \mu\text{g}$) respectively. The analysis of ANOVA has shown the high significant influence of both diet and feeding ration on mussels consumption ($F = 23,99$, $df = 6$, $p < 0,001$ et $F = 5,803$, $df = 2$, $p < 0,01$ respectively) and ingestion ($F = 23,99$, $df = 6$, $p < 0,001$ et $F = 5,572$, $df = 2$, $p < 0,01$). In the basis of these results others studies are presently undertaken in order to promote production of local mussel seeds in hatcheries.

Keywords: *Mytilus galloprovincialis*, ecophysiology, conditioning, diets, consumption, ingestion

S.05014: CAROB TREE MICROPROPAGATION ESSAYS (CERATONIA SILIQUA L.)

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Abstract

The carob tree (*Ceratonia siliqua* L.) is an agro-sylvo-pastoral species that has been classified among the most efficient trees. The first publications on "in vitro" multiplication of carob are very recent and show conflicting results. Mastery of this technique seems to be necessary to provide the increased demand of the international market for the gum extracted from the endosperm of the seed, which is a polyside called galactomannan. The aim of this study is to contribute to in vitro propagation of the carob tree. In one hand, we studied micropropagation from adult tree's microcuttings. Our results showed that the most favorable disinfectant is HgCl₂ with 93% surface sterile explants. Comparison of the effect of various hormones with different concentrations (BAP, Zeatin, GA₃, TDZ and ANA) has shown that addition of BAP on MS medium gave a good response of axillary bud development (87,50%), while BAP supplemented with activated charcoal gave the best results (93,33%). As for rooting, it was noted only in the case of seedlings from sprouting (12, 50%). In an other hand, we studied the germination characteristics using different pretreatments and media. We demonstrated that soaking carob seeds in 80% H₂SO₄ gave the highest seed germination rate (100%) in MG2 and MG3 media. Nevertheless water agar gives the highest average number of leaves per plant. After two months, global survival rate during acclimatization was 30%.

Keywords: *Ceratonia siliqua* L, Micropropagation, In vitro, Germination

S.05015: REPRODUCTIVE BIOLOGY OF THE COCKLE CERASTODERMA EDULE (MOLLUSCA: BIVALVIA) FROM TWO LAGOONS ON THE MOROCCAN ATLANTIC COAST

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Abstract

Monthly variations in physicochemical parameters, condition index and reproductive cycle of two populations of the cockle *Cerastoderma edule* in two Moroccan lagoons were studied over a period of 15 months (December 2017-February 2019). Histological analysis showed that the reproductive cycle of the two populations was asynchronous. The beginning of gametogenesis started in autumn at Sidi Moussa (October 2018) while at Oualidia it was in winter (December 2017). For both populations maturation stage reached its peak in spring but Oualidia's cockle went through a second phase of maturation in summer. The first partial spawning at Oualidia Lagoon took place in April and May 2018, after gonad restoration, the second spawning started again from June to November 2018 and its peak was reached in August 2018 coinciding with high temperature (25°C). However, a continuous spawning period and short sexual resting period were observed at Sidi Moussa lagoon. During the autumn, most of the populations showed signs of gonad resorption. The sexual rest stage took place in winter. Condition and gonadal indexes showed seasonal variations in relation with temperature and chlorophyll a, which acted as stimulus for spawning events.

Keywords: *Cerastoderma edule*, lagoon, reproductive cycle, sex, ratio, condition index, gonadal index.

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S.05016: COMPARATIVE STUDY OF THE INHIBITORY EFFICACY OF DIFFERENT INHIBITORS ORGANIC IN 1M HCL APPLIED TO SEMI-HARD AND MILD STEELS USED IN REINFORCED CONCRETE CONSTRUCTION

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Abstract

Metals and alloys differ from other materials in a number of advantageous properties, but they have disadvantages due to their instability in contact with certain media, which leads to a reduction in their resistance to corrosion, the costs of which are enormous, particularly in industrialised countries. These costs could be higher if there were no corrosion protection. The durability of reinforced concrete constructions depends mainly on the corrosion resistance of its reinforcements. Chloride ions are considered responsible for the pitting corrosion of these reinforcements. The protection technique of adding the corrosion inhibitors Acetaminophen (A1), Acetylsalicylic (A2), and a mixture between the latter two molecules, will be the subject of our study in this work of comparison between the results. We studied electrochemical measurements (current-voltage stationary curves) as well as gravimetric measurements (weight loss method) for the inhibition of the corrosion performance of the used molecule Acetaminophen (A1) and Acetylsalicylic (A2) of xc48 steel and mild steel in a (1M) HCl solution. Over a wide concentration range, the results show that these products act as good inhibitors and the inhibition efficiencies at the $5\text{Å}—10^{-3}(\text{M})$ concentration are very interesting. These inhibitors adsorb onto the metal surface according to the Langmuir model.

Keywords: XC48 steel, mild steel, corrosion inhibition, electrochemical techniques

S.05O17: MOROCCAN LAGOONS ECOSYSTEM SERVICES AND GOODS

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Abstract

Lagoons present different biodiversity services and goods including ecological functions and the economic value that contribute to human well-being. Morocco houses five lagoons from the North to the South (Nador lagoon, Moulay Bouselham Lagoon, Oualidia lagoon, Sidi Moussa lagoon, Khenifès lagoon). These lagoons present many services and goods to the population living there especially, aquaculture (in Oualidia, Khenifès) tourism, fishing and agricultural activities. Moreover, the increase of human activities around such ecosystems areas has influenced negatively their environmental quality. In this order, we evaluate the human activities evolution in each lagoon during the four last decades and we analyze the ecosystem services and goods that these lagoons provide by using Ma conceptual framework, which incorporates ecosystems services and goods with human welfare. The current knowledge revealed the important role that these lagoons play for the local population and region economy. Besides, the study highlights that there are common services and goods that these ecosystems provide which imply the need for developing strategies and policies based on approaches that combine all the provided services and goods for sustainable socio-economic and environmental growth.

Keywords: Ecosystem services, Human activities, Environmental quality, Assessment, Ma conceptual Framework, Moroccan lagoons.

S.05018: LITHOLOGY AND HYDROCARBON POTENTIAL EVALUATION OF SHARYOOF-8 WELL, BLOCK 53, MASILA BASIN EAST OF YEMEN

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Abstract

A detailed analysis of the lithological characterization of two formations, Saar (Dolomite and Carbonate member) and Qishn (clastic and carbonate member) in the Early Cretaceous of the Sharyoof-8 well, block 53, Masila Basin (eastern Yemen) was described in order to determine the hydrocarbon trapping style of the clastic Qishn member. The lithology characterization has been determined based on a vertical analysis of the well log and the lateral cross plots of the porosity and tri-porosity (lithology/porosity). These parameters were calculated from density/neutron matrix, density /Gamma ray and sonic/neutron and tri-porosity (M-N). As a result, the lithological characteristics indicated the presence of three main lithological components, carbonate in the Saar formation, sandstone for the clastic Qishn member and limestone for the carbonate Qishn member. The Qishn sandstone member was divided into sub-units, namely Units S1A, S1B and S1C, derived from the analysis of well logs to determine hydrocarbon bearing zones. This analysis revealed the presence of one hydrocarbon-bearing unit, which is S1A. This unit contains low water saturation (>40%), good effective porosity (up to 18%) and a small volume of shale (less than 0.132%). While Unit S1C has a water saturation up to 50%, a shale volume up to 11% and a porosity up to 17%, Unit S1B has lower reservoir characteristics ($V_{sh}>18\%$, $\phi_{Eff}<15\%$ and $sw=1\%$), indicating the absence of hydrocarbons in these units.

Keywords: cross plots, well logging, Masila Basin, Sharyoof, 8 well, hydrocarbon

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S.05Po1: MICROPALEONTOLOGICAL STUDY OF THE MOROCCAN NORTHERN ATLANTIC COASTLINE SEDIMENT: FORAMINIFERA AND OSTRACODA INVENTORY AND MORPHOLOGICAL ABNORMALITIES.

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Abstract

This work presents a micropaleontological study of sediments from the Moroccan Northern Atlantic coastline (Larache). This work aims to determinate the foraminifera and ostracods responses to different variations in environmental conditions through development of certain abnormalities. In this regard, sediment samples were collected along the Larache coastline then they were subjected to microscopic analysis in the laboratory in order to characterize the associations of ostracods and foraminifera populations on one hand and on the other hand, to determine the anomalies that could be justified by a faunistic response to variations in environmental conditions.

Keywords: micropaleontological, foraminifa, ostracoda, coastline of the Larache, Asilah

S.05P02: VALORIZATION OF THE PASTORAL PLANT "QUERCUS SUBER" USED IN THE FODDER.

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Abstract

Pastoral plants have always played a very important role in the maintain of the balance of the environment and the global ecosystem. Indeed, the capital pastoral plants attribute in the restoration of degraded landscapes. Under conditions conducive to sustainable agriculture, they can contribute to the diversification of agricultural systems and to the improvement of soil fertility. In addition, they are often an important source of income for people living in rural areas. *Quercus suber* (Cork oak), also called corsier, is a tree of the Fagaceae family such as chestnut and beech. It is a remarkable species of oak, slow growing, even young, but which can live for hundreds of years! Raised with a rounded port, sometimes tortuous, it can reach several tens of meters high (10-15 m high in general). The cork oak forest presents a great socio-economic interest through the production of wood and cork mainly. From an ecological point of view, it allows the maintenance of a particularly important biodiversity. It is within this framework that our study falls within the scope of: to develop this plant we proceeded to the study of the chemical composition (MM, MAT, MG), fibers (ADL, ADF, NDF) and digestibility to determine its nutritional and protein value. After the previous analysis we obtained the following results: the mineral matter of this plant was 4.06%, fat 4.39%, nitrogen 10%. For the fiber content, NDF 53.50% and ADL 13.84%. For in-vitro digestibility we obtained 72.56% and enzymatic digestibility 50.21%. Energetic and protein values obtained were 0.46 UFL/Kg MS, 0.34 UFV/Kg MS, 57.67 PDIN g/KgMs and 24 PDIE g/KgMS. The plant is low in indigestible fiber, which makes digestibility easier and high, moderately rich in total nitrogen which is an important element for a good forage, also appreciated by animals. The scientific research in our laboratory is still in progress for the study of essential oils, and the component molecules of this plant, to study the medicinal and therapeutic effects.

Keywords: pastoral plants, *Quercus suber*, food, Analysis, nutritive value

S.05Po3: MICROPALAEONTOLOGICAL STUDY OF THE MOROCCAN WESTERN COASTLINE SEDIMENT: FORAMINIFERA AND OSTRACODA INVENTORY AND MORPHOLOGICAL ABNORMALITIES.

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Abstract

This work concerns a micropaleontological study that aims to establish an inventory of Foraminifera and Ostracoda species sheltering the coastal zone of the western Moroccan Mediterranean and to determinate any morphological changes and abnormalities that may be related to environmental disturbance. In this context, multiples samples of sediment were taken from three sites along Moroccan Western coastline. The samples were fractionated and dried and then studied using the binocular microscope.

Keywords: Foraminifera, Ostracoda, coastal zone, Western Moroccan, Mediterranean, environment, morphological changes

S.05P04: CONTRIBUTION TO UPDATING THE KNOWLEDGE ON THE MALACOLOGICAL BIODIVERSITY CHARACTERIZING COASTAL AND MARINE ECOSYSTEMS OF MOROCCO

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Abstract

The coasts of Morocco extend over 3500 kilometers on two facades: a Mediterranean facade of nearly 550 km long and an Atlantic facade which extends over nearly 3000 km. The coastal areas are made up of various environments: beaches, rocky foreshores, estuaries, lagoons, which favors the presence of a rich and diversified malacological fauna. The history of malacological studies in Morocco dates back to 1795 by Chemnitz who worked on some of Morocco's terrestrial and marine species. Since that time, many researchers have studied the Moroccan malacological fauna, the interest of malacological studies has increased in early 2000 because of the diverse biological and ecological interests of these animals, despite the numerous research studies done on the marine environment and molluscs in Morocco, no list of Moroccan species has been systematically established in recent years. Therefore, the present work provides a modest contribution to a better knowledge of the marine malacological fauna and consequently of the biodiversity of our country. During the realization of this work, all the previously published works, articles and various research and books on this field in Morocco were used as a source of information, and mainly the table of molluscs made by Cheggour in 2002 during his research work in the framework of the project: Catalogue of Marine Invertebrates of Morocco CIMM, in collaboration with the Faculty of Marine Sciences of the University of Cadiz. According to our investigations, the mollusc fauna of Morocco comprises 555 species, 330 species belonging to the class of gastropods, 200 species of bivalves, 21 species of cephalopods and 4 species of polyplacophores, divided into 127 families.

Keywords: Molluscs, Morocco, Systematics.

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S.05Po5: PASTORAL PLANT (OCIMUM BASILICUM), ANIMAL FEED: EFFECT AND QUALITY OF PRODUCTION

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Abstract

Man has long used plants to satisfy his needs from food, medical and cosmetic use. The pastoral plants are all the herbaceous existing in the natural courses, are regenerative plants, contribute in the maintain of environment's ecology and allow a great biodiversity. In recent years the use of pastoral plants in animal feed has been a subject of great debate, for the valorization of these plants, which can have important nutritional values, also from the medical and economic point of view. For this, we have chosen to study pastoral plants from northern Morocco. *Ocimum basilicum* or Basil is an aromatic plant commonly used in cooking and also as medicinal plants. Our study aims to determine firstly the nutritional value of this plant as fodder and secondly the study of its therapeutic and medicinal properties. We studied the chemical composition (mineral matter, nitrogen matter, fat), fiber content (ADF, NDF, ADL), digestibility, energy values (UFL, UFV) and protein values (PDI). The results obtained are satisfactory, the 4.35% of mineral matter, 4.81% of nitrogen 4.32% of fat. The fiber content was: 11.42% for CB, 40.54% for NDF, 20.39% for ADF and 11.60% for ADL. Enzymatic digestibility was 61.47% and in vitro digestibility was 89.22%. And finally the energetic values were 0.52 UFL/Kg MS, 0.38 UFV/Kg MS, the protein values were 26 PDIN g/KgMS, 33 PDIE g/KgMS. According to the results obtained, we can classify this plant as a good fodder, since they are poor in protein and low in indigestible fibers, which makes the digestibility uncomplicated; on the other hand for this plant the digestibility is high which makes the fodder more appreciated by the animals. Therefore, our work is still in progress to study this plant for medicinal and therapeutic uses, and to extract essential oils to see the different benefits of this plant.

Keywords: Pastoral plants, *Ocimum basilicum*, Valorization, Fodder, Analysis

S.05Po6: POMOLOGICAL STUDY OF AN ALMOND BELDI ECOTYPE AND FOUR INTRODUCED ALMOND VARIETIES FROM THE NORTH-EASTERN MOROCCO

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Abstract

In the North-Eastern Morocco, almond tree has been cultivated for centuries. The implanting of this tree has been widely practiced traditionally by the rural residents, which results a great genetic diversity and a large ecotype commonly called "Beldi". Weight (g), Width (mm), Length (mm), Thickness (mm), Geometric diameter (Dg) (mm), Sphericity (%) and Volume (mm³) were measured and calculated for nuts and kernels of one selected genotype from Beldi (BL1) ecotype and compared with four introduced almond varieties, which are: Marcona (M), Ferragnes (Fg), Ferraduel (Fd) and Fournat de Breznaud (Fnb). The results show that the BL1 nuts has the lowest value in Width (20.88mm), Dg (21.12mm), Sphericity (24.67%) and volume (4982.5mm³), while Marcona and Fournat de Breznaud present the lowest value in Length (28.11mm), Thickness (14.71mm) and Weight (3.23g) respectively. In the other hand, Ferraduel nuts present the highest value of Weight (4.14 g), Width (24.71 mm), Thickness (16.54 mm), Dg (23.90mm), Sphericity (27.23%) and Volume (7744.44mm³) and Fournat de Breznaud shows the highest values of Length (36.90mm). For the almond kernels, Fournat de Breznaud and Ferragnes present the highest value for Weight (1.17g), Width (15.17mm), Length (26.45mm), Thickness (8.31mm), Dg (14.48mm), Sphericity (18.30%) and Volume (1594.67mm³), whereas Beldi and Marcona show the lowest value for Weight (0.79g), Width (12.42mm), Dg (12.35mm), Sphericity (17.45%), Volume (1024.87mm³) and Length (19.68mm). Double kernel was not detected for Marcona, Fournat de Breznaud and Ferragnes while Beldi and Ferraduel present 81 and 28% respectively. Pomological traits of almond nuts and kernels present significant difference for the analysed parameters at $P < 0.05$. Thanks to regional pool genetic diversity and although this genotype (BL1) from "Beldi" ecotype present lower physical parameters, there are other genotypes that deserve to be investigated and compared with the introduced varieties. In addition and from the whole data, it was assumed that, at least, Ferraduel, Ferragnes and Fournat de Breznaud could be recommended for this region.

Keywords: Almond tree, Kernels, North Eastern Morocco, Nuts, Pomological parameters

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S.06001: UTILIZATIONS OF AGRICULTURAL WASTE AS NATURAL ADSORBENT FOR THE REMOVAL OF EMERGING CONTAMINANTS

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Abstract

In recent years, emerging pollutants have been received much attention due to their potential harmful impact on ecosystem and human health. These are unregulated chemical compounds that are newly introduced or already present in the environment, but with poorly known characteristics and impacts. These contaminants are divided according to different sources and characteristics, including the excessive use of personal care products, pesticides, detergents, pharmaceuticals, surfactants, disinfection byproducts and endocrine disrupting compounds. Biosorption is considered as a potential alternative to the existing conventional technologies to remove emerging pollutants from wastewater due to ease of operation, lower cost, and environmentally friendly. Moreover, the biosorbents are several advantages, including their availability in nature, low cost, simplicity to be obtained and used as adsorbents. The present review describes recent developments on use of biosourced material, mainly the shell of crustaceans, waste of almond, watermelon, melon, peach, nuts, dates and wood for the removal of emerging pollutants from wastewater. We mainly focus on their configuration, biosorption performance, regeneration/reuse, their application and development in the future.

Keywords: Emerging pollutants, Biosorption, Wastewater.

S.06002: PHYTOTOXICITY AND GENOTOXICITY ASSESSMENT OF WASTEWATER DURING TREATMENT BY INFILTRATION PERCOLATION SYSTEM

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Abstract

The biological wastewater treatment plants have not been designed to remove the micropollutants, they have synergistic effects on the environment underestimated. In this sense, this study aims to evaluate the genotoxic and phytotoxic effects of raw and treated wastewaters from WWTP by infiltration percolation of M'zar, Agadir city. Physicochemical parameters (pH, EC, TSS, BOD, COD, NH₄⁺ and PO₄³⁻), genotoxicity using the Vicia faba micronucleus test and phytotoxicity through the germination index GI % on *Lepidium sativum* (aleois cress), *Cichorium endivia* (chicory endive), *Lactuca sativa* (lettuce crappy and Red curly Batavia lettuce) and *Brassica rapa* (hammer white turnip and purple collar turnip), was carried out for wastewater samples. The results obtained show the efficient of WWTP to reduce the concentration of some physicochemical parameters to levels within those recommended by the Moroccan legislation for discharge and reuse except for EC, with an elimination rate reached 99% for all of TSS, DBO and NH₄⁺, 96% for COD and 63% for PO₄³⁻. Regarding the phytotoxicity, raw wastewater showed a GI less than 50% (between 8% and 33%) who is considered highly toxic, except for both of cress 100% and white hammer turnip 158%. On the contrary, the highest GI recorded of treated wastewater at the tow lettuce cultivars (curly Batavia lettuce 147% and lettuce crappy 104%) which shows the high sensitivity of this species. As well as raw and treated effluent are phytotoxic to chicory endive and purple collar turnip with a GI less than 80%. Furthermore, the genotoxicity, determined by the frequency of micronuclei, decreased significantly after wastewater treatment. While a high genotoxic effect was obtained for raw wastewater sample (10.5 μ g/l), the reduction in micronucleus frequency reached 89% after treatment. From the examination, it is clear that a differential sensitivity scale not only between species but also between cultivars.

Keywords: Wastewater treatment by infiltration, percolation, wastewater reuse, phytotoxic effect, genotoxic effect, interspecific and intraspecific sensitivity scale.

S.06003: AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF NEW DEEP EUTECTIC SOLVENTS AND ITS APPLICATION TO CELLULOSE DERIVATIVES MODIFICATION.

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Abstract

A new deep eutectic solvent (DES) has been successfully synthesized based on Benzyltriethylammonium bromide as a hydrogen bond acceptor (HBA) and urea as a hydrogen bond donor (HBD). However, its usability was investigated to the modification of cellulose derivatives, especially to the acylation of hydroxyethylcellulose (HEC). The chemical modification (acetylation) of HEC was carried out in BTEAB/Urea DES system without any additional conventional solvent or catalyst. However, the proposed structure of acetylated HEC (HECA) was confirmed according to the structural spectra analyses (FTIR-ATR, ¹H, ¹³C and APT-NMR). The crystalline behavior of acetylated and unmodified HEC in the DES system was evaluated using XRD patterns, where the thermal stability was evaluated basing on the TD-TGA thermograms. Hence, SEM images and EDX spectra were recorded to prove the changes expected at the morphological level and elemental profile. Yet, nanometric sheets aspect was observed. The Functional Density Theory (DFT) was investigated as useful computational tool to understanding mechanism and donor-acceptor interactions. Wherever, the topological parameters (electron density Laplacian, kinetic energy density, potential energy density and energy density) at the bond critical points (BCP), between TBEAB and Urea, are deducted according to Quantum Bader's theory, and Atoms-in-molecules (AIM). The non-covalent interactions and steric effect in the DES system were studied using the reduced density gradient isosurface (RDG).

Keywords: Deep Eutectic Solvent (DES), Benzyltriethylammonium Bromide (BTEAb), Urea, Quantum chemical, DFT, Cellulose derivatives, Quantum Bader's theory

S.06004: NEW MOF/SCS SYNTHESIS AND STOICHIOMETRY OF LAYERED SODIUM COBALT OXIDE NIBS CHATHODE .

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Abstract

Layered oxide NaCoO_2 compounds have been widely used as cathodes NIBs because of the low cost, abundance of sodium resources and their high density achieved in technologies. On other hand, metal organic frameworks (MOFs) are a class of crystalline organic compounds formed by coordination of metal with organic linkers. In this work, our aim is to provide more specific and engineering -orientated information on the synthesis of MOF material expected for use as SCS precursor, where layered sodium cobalt oxide has been synthesized by new precursor (HEC-EDTA) as green and ecofriendly organic framework in which the metal-organic bending was ensured by carboxylate electrostatic interactions. The synthesis of HEC-EDTA at high advanced crosslinking degree (up to 92 %), was cried out using DAEDT and DMAP as acyl transfer agent, where the lamellar morphology (2D-dimensional microstructure) was suggested from the average functionality of the reaction system. The proposal structures were confirmed using structural analyzes (FTIR and ^{13}C CP/MAS NMR). Refinement of the Na_xCoO_2 layered structure was carried out using x-ray diffraction, the material was indexed using the hexagonal $\text{P6}_3/\text{mmc}$ space group with lattice parameters $a = 6.5222$ (1) , $b = 6.5222$ (1) Å... and $c = 10.2885$ (1).

Keywords: solution combustion synthesis, metal organic frameworks, hydroxyethyl cellulose Ethylenediaminetetraacetic acid

S.06005: NEW QUATERNIZED CELLULOSE BASED GREEN FLOCCULANT : SYNTHESIS, CHARACTERIZATION, AND APPLICATION TO BENTONITE CLAY FLOCCULATION .

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Abstract

The suspensions of clay minerals, in particular bentonite suspension, invariably pose very difficult dewatering and handling problems due to their colloidal size, anisotropic shape and permanent negatively charged basal faces .The flocculation technology, which could separate the solid from solid-liquid phase in a short time, is a feasible and economical way to solve the problems of dewatering in the wet processing of bentonite mineral, and it could reduce energy consumption and improve production efficiency significantly at the same time. In this present work, a nouvel cationic bioflocculant HCT based on hydroxyethyl cellulose was prepared and used to flocculat the bentonite suspension. The HEC was modified by quaternary ammonium using TEA, and the resulted product is characterized using Different spectroscopy techniques (FTIR, ¹H NMR and ¹³C NMR ,DSC ,DRX), this reaction was elaborated with success using TEA , and investigated as low-cost, ecofriendly and nontoxic water-soluble polymers in water treatment. In our knowledge, the new green flocculant has never been discussed in the literature and has never prepared. Flocculation study, according to the effect of various experimental parameters (pH, contact time, flocculant concentrations, etc.), showed an excellent capacity flocculation of bentonite suspension. The treatment efficiency was evaluated by measuring transmittance. Consequently, the new flocculant syntitsid constitute a new candidate promising to be an acceptable flocculantt at the industrial level, especially with its characteristics respecting to environmental criteria and its high efficiency with short contact times.

Keywords: Key words:bentonite, Flocculation, hydroxyethyl cellulose (HEC).

S.06O06: SYNTHESIS OF COPPER NANOPARTICLE ENCAPSULATED IN THE CURCUMIN AND ITS APPLICATION OF THE NUMEROUS THERAPEUTIC ACTIVITIES

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Abstract

In the past few decades, curcumin, a natural polyphenolic phytochemical, has been studied for treating a wide variety of diseases, such as cancer, cardiovascular disease, inflammatory bowel, wound healing, Alzheimer's disease, rheumatoid arthritis and diabetes. In particular, the bioactivities of curcumin as an effective chemo preventive agent, chemo / radiosensitizer for tumor cells, and chemo / radioprotector for normal organs, are of extraordinary research interest in the literature. It has shown promising results as a potential curative agent for a variety of diseases. However, its inherent limitations, such as poor aqueous quality, solubility, low absorption capacity, fast metabolism, and fast elimination from the body have limited its application beyond preclinical studies. Faced with these problems, the synthesis of nanocarriers, especially organic nanocarriers, are promising for curcumin nano formulations, however few exclusive reviews of this progress have been made. This work consists in a initially extracting the curcuminoids by the three solvents, then we proceeded to the synthesis of a copper oxide nanoparticle encapsulated in curcumin that we have characterized by different techniques such as: XRD, IR, UV-Visible, followed by a study of its biological activity.

Keywords: Key words: biological activity, curcumin, extraction

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S.06007: SOLUBILITY MECHANISM OF NOVEL DEEP-EUTECTIC SOLVENT FOR CELLULOSE : COMPUTATIONAL STUDY

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Abstract

To reveal the Solubility mechanism of cellulose in N-benzyl-N,N-diethylethanaminium:Br:zurea several computational study were carried. MD simulation results to the segregation of cellulose oligomers after 20 ns . The segregation of chains established due to the formation molecular clusters driven by stronger intermolecular interactions (i.e., hydrogen bonds , Pi-Pi stacking , Pi-cation interactions , Salt Bridge and hydrophobic stacking),leading at solvation shell formation around cellulose chains. The MD reveals the contribution of each DES components in the process of cellulose oligomers disassociation, in different nanomolecular subclusters Cellulose:DES . the urea and cellulose forms hydrogen bonds (i.e. urea oxygen / hydroxyl hydrogen, urea hydrogen / cellulose oxygen), bromide ions and cellulose forms hydrogen bonds (i.e. Br- / hydroxyl hydrogen, urea hydrogen / cellulose oxygen). on the other hand, bromide ions also act as a bridge between cellulose and polar head of N-benzyl-N,N-diethylethanaminium. The apolar nature of both benzylic tail and cellulose ring lead to the stacking conformation. resulting to breaking down of intermolecular cellulose hydrogen bond and the solvation shell formation.

Keywords: Cellulose, Solubility, mechanism

S.06Oo8: KINETIC AND THERMODYNAMIC STUDY TO ELIMINATE YELLOW X-GL 200% DYE IN AQUEOUS SOLUTION BY BRACHYCHITON POPULNEUS SHELLS

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4 - Laboratory REMTEX, Industrial School of Textile and Clothing, Morocco.

Abstract

In recent years, industrial development has caused many environmental problems. The treatment and reuse of wastewater have become an important issue of great interest to researchers. Commercial synthetic dyes are used as raw materials of different manufacturing processes such as textiles, paper, plastics, leather, foodstuffs, and pharmaceuticals. Most synthetic dyes are highly colored, toxic and carcinogenic, directly impacting human health and aquatic ecosystems. A complete treatment of dye effluents before discharge is urgently needed. This work aims to study the adsorption of Yellow X-GL 200% (X-GL) dye on used Brachychiton Shell (BS) was studied, BS was characterized by several analytical techniques, Infrared Spectroscopy (FT-IR), X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray Analysis (EDXA). The parameters influencing the reaction, such as pH, adsorbent dosage and contact time, were determined. The kinetic study revealed that the surface reaction fits a pseudo-second order model. The influence of temperature on the adsorption allowed the determination of the thermodynamic parameters (ΔG° , ΔH° and ΔS°). Modeling of the experimental results predicted a spontaneous, exothermic sorption.

Keywords: Adsorption, Cationic dye, Brachychiton

S.06009: REMOVAL OF CATIONIC YELLOW X-GL 200% FROM WASTEWATER OF TEXTILE INDUSTRY ONTO CHITOSAN

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Abstract

The colors in textile effluents have become an important environmental problem. These colors are used in dying process and decolorization is an industrial wastewater treatment practice. Therefore, in convention of industrial wastewater treatment practices, dyes are usually removed by using several methods, adsorption is one of the most efficient method. In this work, we were interested in valorizing the shrimp waste in order to use it in adsorbing cationic dyes such as Yellow X-GL 200% from textile wastewater. The bio-sorbent produced from northern shrimp "Penaeus Borealis" is extracted by the hydrothermo-chemical method. The prepared product is characterized by various spectral studies such as infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscope (SEM) and energy dispersive X-ray analysis (EDXA). Chitosan has demonstrated high efficiency in removing anionic dyes from wastewater. In this study we used it to remove cationic dye and compare the adsorption capacity between them.

Keywords: Biomaterials, wastewater, adsorption, Cationic dyes, Anionic dyes, chitosan

S.06P01: VALORIZATION OF CIGARETTE WASTE AS A SOURCE OF CELLULOSE AND DEVELOPMENT OF NEW ANIONIC FLOCCULANTS.

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Abstract

This study was devoted to the modification of cellulose acrylate, made from cigarette waste (acryl-Megot), by citric acid arms linked to the cellulose by sebacic bridges (esterification). The new flocculant showed a significant decrease in the optimal dose of flocculation, which indicates an acceptable improvement in the flocculating capacity of the cigarette butts. The study of the flocculating capacity of the new flocculants was carried out under ambient conditions of temperature and pressure, specifies a temperature of 25 °C and a pressure of 1 atm, and as a function of various experimental parameters such as the pH and the initial concentration Co. The structural identification of the proposed chemical structures was performed using FTIR vibrational spectroscopy and ¹H NMR and ¹³C NMR spectroscopy. X-ray diffraction (XRD) has been used to study the influence of chemical modification of cellulose on the structural order and rate of crystallinity. However, the gain and loss of thermal stability were evaluated based on thermogravimetric analyzes (TGA), while the morphological and textural variations caused by the grafting of the ionic entities on the cellulosic surface were evaluated by SEM scanning electron microscopy coupled with EDX in order to confirm the proposed structures by determining the elementary profile for each sample. The surface electrical charge density of unmodified cellulose and cellulose acrylate was measured as a function of pH using the Zeta potential.

Keywords: cellulose acrylate, cigarette, flocculant

S.06Po2: STUDY OF THE EFFECT OF ACID ACTIVATION OF NORTH EST MOROCCAN CLAYS ON THEIR STRUCTURAL AND TEXTURAL PROPERTIES

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Abstract

This work is devoted to the study of the effect of acid activation North East Morocco clays on their structural and textural properties in order to improve the porous structure, the specific surface and the adsorbant power of these natural materials. The activated samples were characterized by X-ray diffraction (XRD), Fourier transformed infrared spectroscopy (FT-IR), X fluorescence and scanning electron microscope (SEM-EDX). The textural properties, SBET and distribution of pore sizes were determined by physisorption from N₂ to -196 degrees C. The main objective of this study is the application of these materials in the field of removing emerging contaminants from surface water and groundwater.

Keywords: Activation, characterization, clay, structure, emerging contaminants

S.06P03: TREATED WASTEWATER REUSE : BACKGROUND AND IMPACT ON AGRICULTURAL PRODUCTS

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Abstract

The scarcity of water resources is a common problem in the Mediterranean countries. Morocco is one of these countries seriously impacted by the rarefaction of water and the irregularity of its availability. This constraint is considered major as the development of the country is essentially depending on the agricultural domain, which is using about 80% of the water resources. Morocco has been engaged in water resources control through the construction of 144 large dams with a capacity of 18.6 billion m³ and the drilling of several thousands of wells for the use of groundwater. Furthermore, a special focus has been given, during the last three decades, to the wastewater treatment and reuse, considering this practice as a new perspective in the management of water resources. In Oujda, as in several regions of Morocco, the reuse of treated and raw wastewater in agriculture has been practiced unofficially for several years. However, studies of the impact of this practice on the quality and quantity of agricultural products remain rare. The present study is a bibliographic review on the impact of wastewater reuse on agricultural products, with a special focus on olive trees considering its huge importance in the Moroccan agriculture.

Keywords: Wastewater reuse, agriculture, water resources, olive tree

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