

2016

Geology Abstracts

Second Annual International
Conference on Geology
6-9 June 2016, Athens, Greece

Edited by Gregory T. Papanikos

THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH



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Conference on Geology
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Preface

This abstract book includes all the abstracts of the papers presented at the 2nd Annual International Conference on Geology, 6-9 June 2016, Athens, Greece, organized by the Athens Institute for Education and Research. In total, there were 26 papers and presenters, coming from 19 different countries (Albania, Brazil, Canada, China, Colombia, Egypt, France, India, Japan, Morocco, Portugal, Romania, South Africa, Switzerland, Tunisia, Turkey, UAE, Ukraine, USA). The conference was organized into nine sessions that included areas such as Geotechnology, Territorial Development, Geological Processes and other related fields. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books of ATINER.

The Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized more than 150 international conferences and has published over 100 books. Academically, the Institute is organized into six research divisions and twenty-seven research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

Gregory T. Papanikos
President

FINAL CONFERENCE PROGRAM
2nd Annual International Conference on Geology, 6-9 June 2016,
Athens, Greece

Conference Venue: [Titania Hotel](#), 52 Panepistimiou Street, 10678 Athens,
Greece

Monday 6 June 2016

(all sessions include 10 minutes break)

08:00-08:30 Registration and Refreshments

08:30-09:00 Welcome & Opening Address (ROOM C- Mezzanine Floor)

- Gregory T. Papanikos, President, ATINER.
- George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.

09:00-10:30 Session I (ROOM D- Mezzanine Floor): Geology and Tectonics

Chair: Olga Gounta, Researcher, ATINER.

1. Hassan Eliwa Ibrahim, Professor, Minufiya University, Egypt, Mamoru Murata, Professor, Naruto University of Education, Japan, B. Buhler, Institut für Geologie, Germany, Ch. Breitkreuz, Institut für Geologie, Germany, J. Pfänder, Institut für Geologie, Germany, Kh. El-Gameel, Minufiya University, Egypt, S. Mohamed, National Authority for Remote Sensing and Space Sciences (NARSS), Egypt, D. Garbe-Schönberg, Universität Kiel, Germany, F. Hauff, Helmholtz Centre for Ocean Research, Germany & U. Linnemann, Senckenberg Naturhistorische Sammlungen Dresden, Museum für Mineralogie und Geologie, Germany. U-Pb Zircon Geochronology and Sr-Nd-Pb Isotopic Geochemistry of the I- and A-type Intrusions in Gharib Segment, Northern Eastern Desert, Egypt: Implications for Their Origin and Tectonic Setting.
2. Derya Ayral Cinar, Research Assistant, Sinop University, Turkey & Avery H. Demond, Professor, The University of Michigan, USA. Diffusion of Iodide in Low Permeability Clayey Soils.
3. Djebbi Marwa, Ph.D. Student, Georesources Laboratory, Tunisia & Hakim Gabtni, Associate Professor, Georesources Laboratory, Tunisia. Integration of Gravity and Seismic Methods in the Geometric Characterization of a Dune Reservoir: Case of the Zouaraa Basin (NW Tunisia).

10:30-12:00 Session II (ROOM D- Mezzanine Floor): Computational Methods in Earth Sciences - Management of Geographical Areas

Chair: Hassan Eliwa Ibrahim, Professor, Minufiya University, Egypt.

1. *Jorge Rocha, Auxiliary Professor, IGOT - University of Lisbon, Portugal, Catarina Rodrigo, Researcher, IGOT - University of Lisbon, Portugal, Claudia Viana, Researcher, IGOT - University of Lisbon, Portugal & Angela Barbosa, Researcher, IGOT - University of Lisbon, Portugal. Predictor

Variables Effects on Urban Cellular Automata Based Models.

12:00-13:30 Session III (ROOM D- Mezzanine Floor): Stress Factors and Impact on Human Health and Social Factors I

Chair: *Jorge Rocha, Auxiliary Professor, IGOT - University of Lisbon, Portugal.

1. Nicholas Vlachopoulos, Associate Professor, Royal Military College of Canada, Canada & Efrosyni-Maria Skordaki, Researcher, Royal Military College of Canada, Canada. Risk Assessment and Ranking of Small Arms Ranges (SAR) with Significant Environmental Impact on Military Bases.
2. Emma Harris, Lecturer, University of South Africa, South Africa, Engela De Crom, Senior Lecturer, Tshwane University of Technology, South Africa & Ann Wilson, Lecturer, University of South Africa, South Africa. Pigeons and People: Mortal Enemies or Lifelong Companions? A Case Study on Staff Perceptions of the Pigeons on the University of South Africa, Muckleneuk Campus.
3. El Mouatassime Sabri, Ph.D. Student, Sultan Moulay Slimane University, Morocco, Ahmed Boukdir, Professor, Sultan Moulay Slimane University, Morocco, Abdallah El Mahboul, Secretary, Minister of Energy, Mining, Water, Morocco, Rachid El Meslouhi, Chef of SIG Department, Hydrological Basin Agency, Morocco, Mustapha Mabrouki, Professor, Sultan Moulay Slimane University, Morocco, Vivien Romaric Ekouele Mbaki, Ph.D. Student, Sultan Moulay Slimane University, Morocco, Abdelhamid Zitouni, Ph.D. Student, Sultan Moulay Slimane University, Morocco, Wissal Baite, Ph.D. Student, Sultan Moulay Slimane University, Morocco & Zhour Echakraoui, Ph.D. Student, Sultan Moulay Slimane University, Morocco. Predicting Soil Erosion and Sediment Yield in Oued El Abid Watershed, Morocco.
4. Ismail Karaoui, Ph.D. Student, University Sultan Moulay Slimane, Morocco. Flood Inundation Mapping of Risk Zones and Identification of Consequences in the future Flood Events at the River Alfet - Oued Al Abid watershed- Using HEC-RAS and HEC-FIA Models.

13:30-14:30 Lunch

14:30-16:00 Session IV (ROOM D- Mezzanine Floor): History, Application and Management in Spatial Planning - Water and Waste Management

Chair: *Jesus J. Lara, Associate Professor, The Ohio State University, USA.

1. Paul Claval, Emeritus Professor, University of Paris-IV (Paris-Sorbonne), France & Colette Jourdain-Annequin, Emeritus Professor, University of Grenoble, France. For Whom the Mediterranean Sea is "Our" Sea?
2. Franciane Araujo de Oliveira, Ph.D. Student, Universidade Federal de Goiás, Brazil & Celene Cunha M. Antunes Barreira, Professor, Universidade Federal de Goiás, Brazil. The Water Uses in the Multiple Actors' Representation: A Territorial Approach of Rio Doce's Medium Course Watershed in Southwest Part of Goiás.
3. *Mirela Tase, Lecturer, University of Durres, Albania. The Tourism Potential of Lagoon Ecosystems along the Adriatic Coast Provide.

16:00-17:30 Session V (ROOM D- Mezzanine Floor): Sedimentology, Stratigraphy and Paleography

Chair: *Mirela Tase, Lecturer, University of Durres, Albania.

1. Jingeng Sha, Professor, Nanjing Institute of Geology and Paleontology, China. Pan-Tropical Distribution of Mesozoic Bivalves: Palaeogeographic Implications.
2. Xin Rao, Assistant Professor, Nanjing Institute of Geology and Paleontology, China, Jingeng Sha, Professor, Nanjing Institute of Geology and Paleontology, China & Huawei Cai, Nanjing Institute of Geology and Paleontology, China. Discovery of *Auroradiolites biconvexus* (Bivalvia: Hippuritida) from the Mid-Cretaceous Sangzugang Formation in the Xigaze Forearc Basin, Lhasa Block.
3. Mihaela Melinte-Dobrinescu, Senior Researcher, National Institute of Marine Geology and Geo-ecology, Romania, Titus Brustur, Senior Researcher, National Institute of Marine Geology and Geo-ecology, Romania & Ion Stanescu, Geologist, National Institute of Marine Geology and Geo-ecology, Romania. From Black Shales to Red Shales: A Tale of Anoxic to Oxidic Changes in the Eastern Carpathians.

17:30-19:00 Session VI (ROOM B- Mezzanine Floor): History, Application and Management in Spatial Planning - Territorial Planning and Management

Chair: Paul Claval, Emeritus Professor, University of Paris-IV (Paris-Sorbonne), France.

1. *Sayed Sharaf, Researcher, Abu Dhabi Systems and Information Centre, UAE & Pere Serra, Lecturer, Universitat Autònoma de Barcelona, Spain. Charge Detection in Al-Ain Region.
2. *Ana Peric, Post-doc Fellow, Swiss Federal Institute of Technology, Switzerland & Bernd Scholl, Professor, Swiss Federal Institute of Technology, Switzerland. Transnational Cooperation in Europe: The Example of Integrated Spatial and Transport Development along the Hamburg-Athens Corridor.
3. Paulo Irineu Barreto Fernandes, Professor, Federal Institute Triângulo Mineiro (Campus Uberlândia, MG), Brazil. Geophilosophy: Is There a Geographical Primacy of Thought?

21:00-23:00 Greek Night and Dinner (Details during registration)

Tuesday 7 June 2016

09:30-11:00 Session VII (ROOM D- Mezzanine Floor): Computational Methods in Earth Sciences - Computational Methods in Weathering

Chair: Emma Harris, Lecturer, University of South Africa, South Africa.

1. Zaitao Pan, Professor, Saint Louis University, USA. Current and Future Precipitation Extremes Over Mississippi and Yangtze River Basins. (Tuesday June 7, 2016)
2. Catalina Perea Pineda, Student, Universidad Industrial de Santander, Colombia. Static Corrections for Weathering Layer using Wave Equation Datuming and Delay Time Techniques.
1. Solomon Eghosa Uhumamure, Ph.D. Candidate, University of Venda, South Africa. Fuel Wood Choice by Households, Driving Force and Health Implications. A Case of South Africa as a Developing Country.

11:00-14:00 Educational and Cultural Urban Walk Around Modern and Ancient Athens (Details during registration)

14:00-15:00 Lunch

15:00-16:30 Session VIII (ROOM D- Mezzanine Floor): Pure and Applied Geophysical Studies

Chair: Zaitao Pan, Professor, Saint Louis University, USA.

1. Dhekra Khazri, Ph.D. Student, Georesources Laboratory, Tunisia & Hakim Gabtni, Associate Professor, Georesources Laboratory, Tunisia. Determination of Aquifer Geometry using Geophysical Methods: A Case Study from Sidi Bouzid Basin (Central Tunisia).
2. *Valery Korepanov, Scientific Director, Lviv Center of Institute for Space Research, Ukraine & Vira Pronenko, Head of Department, Lviv Center of Institute for Space Research, Ukraine. Electromagnetic Pollution of Earth's Ionosphere.

16:30-18:00 Session IX (ROOM D- Mezzanine Floor): Special Topics

Chair: *Valery Korepanov, Scientific Director, Lviv Center of Institute for Space Research, Ukraine

1. Marluce Silva Sousa, Professor, Instituto Federal de Educação, Brazil, Iraci Scopel, Professor, Universidade Federal de Goiás, Brazil & Dimas Moraes Peixinho, Professor, Universidade Federal de Goiás, Brazil. Regional Diversity and Inequality in Brazil.
2. Carlos Rios, Lecturer, Universidad Industrial de Santander, Colombia, Oscar Mauricio Castellanos-Alarcón, Universidad de Pamplona, Colombia & Carlos Augusto Zuluaga-Castrillón, Universidad Nacional de Colombia, Colombia. A Rare Al₂SiO₅ Triple Point in Metapelitic Rocks of the Silgará Formation, Santander Massif (Colombia).
3. Mohamed Benzaggagh, Professor, University Moulay Ismail, Morocco, Mohamed Oumhamed, University Moulay Ismail, Morocco, Bruno Ferré,

Dame du Lac, France & Jean-Louis Latil, Le Maupas, France. Late Albian Ammonites and Biozones of the Oyster Shelly Marls and Limestones Formation from the South Rifian Ridges (Northern Morocco).

4. Saureesh Das, Ph.D. Student, University School of Basic and Applied Sciences, India & Rashmi Bhardwaj, Professor, University School of Basic and Applied Sciences, India. Complexity Analysis of Atmospheric Element in Ecology.

21:00-22:30 Dinner (Details during registration)

Wednesday 8 June 2016
Cruise: (Details during registration)

Thursday 9 June 2016
Delphi Visit: (Details during registration)

Franciane Araujo de Oliveira
Ph.D. Student, Universidade Federal de Goiás, Brazil
&
Celene Cunha M. Antunes Barreira
Professor, Universidade Federal de Goiás, Brazil

**The Water Uses in the Multiple Actors' Representation: A
Territorial Approach of Rio Doce's Medium Course
Watershed in Southwest Part of Goiás**

In this thesis are analyzed the water uses under multiple actors' representation in a territorial approach of Rio Doce's middle course watershed, in the southwest part of Goiás, Brazil. With the territory and subsistence agriculture and ranching's "modernization" increases the capitalist farming and ranching, changing the pace of production and technologies employed in the production process, the space organization and also the water uses and senses. The Rio Doce's basin and southwest part of Goiás are representative for the analysis of water uses and meanings because of the plurality of actors and activities involved in the production process. The research problem that is expected to answer is: how the territorialized actors in Rio Doce's basin represent the uses and meanings of water according to its place in the world? Following a plural methodological conduct, primary and secondary quantitative and specially qualitative data are used, which reveal the meanings gave by these actors to the spatial reality in discussion. In this research area, hegemonyed by agribusiness, both the export agriculture activity as well as the ranching one make the water enter in international economy device, having, in consequence, a geopolitical sense.

Derya Ayrar Cinar
Research Assistant, Sinop University, Turkey
&
Avery H. Demond
Professor, The University of Michigan, USA

Diffusion of Iodide in Low Permeability Clayey Soils

Transport through the low permeable lenses is governed by diffusion and has been found very critical in remediation of hazardous waste sites because these layers cause extension of the remediation times by releasing the contaminants accumulated in them back to the remediated aquifer. Therefore, clayey subsurface zones are considered as secondary contamination sources especially for the waste sites with common groundwater contaminants such as trichloroethylene (TCE) or tetrachloroethylene (PCE). Although transport, i.e. diffusion, through clayey layers is such an important process which determines the efficiency of remediation, the diffusion coefficient in saturated clayey soils is generally estimated with procedures based on porosity (ϵ) and developed for unsaturated sandy soils without considering the unique component of clay soils: clay minerals. Clay minerals have extremely small particle size and negatively charged surface which significantly increase the tortuosity and result in a very complex transport through these soils. In order to fulfill the gap in experimental data about diffusion in clay soils, the diffusion coefficient of iodide was measured also expecting that it would serve as the baseline to examine the diffusion of common organic contaminants such as TCE. Diffusion coefficient of iodide was measured in saturated silt and silt-Na-montmorillonite clay mixtures by a steady state procedure known as time-lag method. The average effective diffusion coefficient of iodide was determined to be 2.00×10^{-6} cm²/sec, 1.91×10^{-6} cm²/sec, and 1.02×10^{-6} cm²/sec for the silt ($\epsilon:0.44$), silt-clay mixture that was allowed to expand during saturation ($\epsilon:0.43$), and silt-clay mixture that was confined to prevent expansion ($\epsilon:0.66$), respectively. Overall, it appeared that neither clay percentage nor porosity alone is sufficient to describe the diffusive characteristics of a clayey soil. Besides, comparison of the experimental results with the estimations demonstrated that methods estimating the diffusion coefficient as a function of porosity overestimated the experimental data severely (>350% relative error).

Mohamed Benzaggagh
Professor, University Moulay Ismail, Morocco

Mohamed Oumhamed
University Moulay Ismail, Morocco

Bruno Ferré
Dame du Lac, France

&
Jean-Louis Latil
Le Maupas, France

Late Albian Ammonites and Biozones of the Oyster Shelly Marls and Limestones Formation from the South Rifian Ridges (Northern Morocco)

Lithostratigraphical analysis of several sections of the Oyster shelly marls and limestones Formation of the Cretaceous South Rifian Ridges Basin, previously assigned to Vraconian, lead us to distinguish five rather constant members within. The second member, here called the Lower shelly marly limestones, provided a rich ammonite fauna consisting of *Mortoniceras (Mortoniceras) pricei* Spath (1922), *Mortoniceras (Deiradoceras) cunningtoni* Spath, 1933, *Mortoniceras (D.) aff. albense* Spath, 1933, *Mortoniceras (D.) bipunctatum* Spath, 1933, *Mortoniceras (M.) inflatum* (Sowerby, 1818), *Mortoniceras (M.) fallax* (Breistroffer, 1940), *Hypenoceras faugeresi* sp. nov. and *Venezoliceris bituberculatum* (Collignon, 1966). This ammonite fauna allowed us to assign the lower and middle parts of this member to the *Mortoniceras (M.) pricei* and *Mortoniceras (M.) inflatum* Zones. Its upper part likely belongs to the *Mortoniceras (M.) fallax* Zone. The fourth member, the Upper shelly marly limestones, provided, in its lower part, rare *Mortoniceras (M.) pachys* (Seeley, 1665) of the *Mortoniceras (M.) fallax* Zone; its upper part probably belongs to the *Mortoniceras (M.) rostratum* Zone. The first member, the Silty marly limestones, the third one, the Platy limestones, and the fifth one, the *Rhynchostreon* marly limestones, which have so far not provided any ammonite, can belong respectively to the base of the Upper Albian (*Diploceras cristatum* Zone?), the base of *Mortoniceras (M.) fallax* Zone, and to the Lower Cenomanian? The underlying Conglomerate and sandy marl and Calcareous sandstone Formations, previously assigned to the Upper Albian (*Mortoniceras inflatum* Zone) can have an Early-Middle Albian age.

Paul Claval

Emeritus Professor, University of Paris-IV (Paris-Sorbonne), France
&

Colette Jourdain-Annequin

Emeritus Professor, University of Grenoble, France

For Whom the Mediterranean Sea is "Our" Sea?

In the book II of his Geography, Strabo precises the purpose of this discipline: "to describe the inhabited world in its known parts" (Strabo, II, 5, 5). In order to achieve such a result, the geographer learns from astronomy, physics (Strabo, II, 5, 1) and geometry (Strabo, II, 5, 4). He may then tackle with his specific task: "to define the inhabited world" (Strabo, II, 5, 4). In order to do it, he represents it through a map (Strabo, II, 5, 13). This one shows how the inhabited space is built: "It is first the sea that describes the land" (Strabo, II, 5, 17).

Several gulfs indent the inhabited space - more particularly "that we call the Inner sea or 'our' sea" (Strabo, II, 5, 18): "from all these points of view [...]our sea owns a great superiority and thus it is from there that we have to start our World tour" (Strabo, II, 5, 18).

Strabo presents the approach of the geographer in a perfectly objective way: he is a man of science. His tone changes abruptly when dealing with the Inner sea: the narrator appropriates it saying: 'our' sea.

We would ponder here over the use of this possessive, which supposes a global knowledge of the Mediterranean World by people who consider it as their home - a situation that seldom predominated.

1- If Strabo were a Roman, the expression *mare nostrum* would sound normal. But he was a Greek. Was it normal, for the Greeks, to appropriate themselves the Mediterranean sea? Yes, for three reasons : (i) From the first images (Achilles' shield) to cartographic representations (the Ionian map), the Mediterranean sea was for the Greeks an inner sea. (ii) For them it was already a World space their gods and heroes travelled up and down. Very soon a dialectic game developed between reality (travels, trade, conquest) and mythic imagination. (iii) As many Greek intellectuals living in Rome, Strabo considered Rome as a full member of the civilized community formed by the Greek World and saw in it its legitimate heir.

2- The idea that the Mediterranean sea was "our sea" disappeared with the division of the Roman Empire and later, Islam. It reappeared in the 19th century. Science then underscored the unity of the Mediterranean environment. Artists got enthusiastic with its light. Controlling the whole Mediterranean World, Western Imperialism gave it back its unit and appropriated it.

Paulo Irineu Barreto Fernandes

Professor, Federal Institute Triângulo Mineiro (Campus Uberlândia,
MG), Brazil

Geophilosophy: Is There a Geographical Primacy of Thought?

This paper presents results of studies on the concept “Geophilosophy” introduced by Deleuze and Guattari, in the text “geophilosophy”, in the book “What is Philosophy?”. With this term, the authors highlight the immanent character of philosophy, drawing attention to the geographical elements that have influenced and influence the construction of thought, as the relationship of humans with the territory, with the ground, with the place, and with Earth. Deleuze and Guattari say that the first philosophers created their own approach to nature, treating it by concepts and not by figures, as does, for example, the myth. The concept is a “bridge” between the relative and the absolute, and the thought is not a direct link between subject and object, but is done in relation with the territory, with the place. For Deleuze and Guattari the creator of the term “geophilosophy” was Nietzsche, when he sought to enumerate some common social aspects in different countries. Thus, philosophy would be, first of all, a geophilosophy, and the thought was born in the relationship between the thinking subject and the geographic features: the place, the territory, the landscape, and Earth. However, the term “geophilosophy” took on multiple meanings, among which are: the concept of valorization of the planet Earth, as highlighted by Caterina Resta (Italy), criticism of globalization, made by Milton Santos (Brazil) and the notion of geophilosophy as an investigative method, as presented in the “geophilosophical” notes of the prologue to poem “On Nature”, by Parmenides of Eleia, drafted by Gabriele Cornelli, which this study discusses more broadly.

Saureesh Das

Ph.D. Student, University School of Basic and Applied Sciences, India
&

Rashmi Bhardwaj

Professor, University School of Basic and Applied Sciences, India

Complexity Analysis of Atmospheric Element in Ecology

This paper deals with the mathematical modelling of environment cycle where atmospheric elements are competing for naturally available oxygen. The nonlinear kinematic reactions between the atmospheric components have been studied through differential rate equations which form a nonlinear three dimensional system. Using stability analysis the inter-relation between the reaction parameters for the stability of the atmospheric cycle has been studied. Through phase portraits and time series analysis the mutual sustenance of the atmospheric elements has been discussed and it is observed that the reaction parameters are essential for the efficient functioning of the natural cycles, control of chaos and maintenance of the ecological balance. It is concluded that the transfer of stability provides either the mutual coexistence of the atmospheric elements or the extinction of individual element which has serious impact on continuity of environmental cycles and ecological balances.

Emma Harris

Lecturer, University of South Africa, South Africa

Engela De Crom

Senior Lecturer, Tshwane University of Technology, South Africa

&

Ann Wilson

Lecturer, University of South Africa, South Africa

**Pigeons and People: Mortal Enemies or Lifelong
Companions? A Case Study on Staff Perceptions of the
Pigeons on the University of South Africa, Muckleneuk
Campus**

Pigeons have been a part of our lives for as long as we can remember. Some people view them with joy, others disdain. Regardless of the perception, control measures are often implemented against the birds in a bid to reduce their presence in urban environments without considering the views of members of the public in the process. Complaints about pigeon activity are, typically, given more attention than praise for these birds. However, people who are pro-pigeons are often not provided with the forum to express their views of the birds. This study explored the perceptions of staff with

regard to the pigeons inhabiting the University of South Africa's Muckleneuk campus. Two hundred and forty-six participants provided their opinions on the pigeons, their related activities and the perceived impact on staff on the campus. Recognising that both people and urban wildlife play a role of cause-and-effect in human-wildlife conflicts can contribute to understanding peoples' relationships and perceptions of animals which transgress the boundaries between urbanisation and nature. By considering peoples' perceptions, attitudes and behaviours towards urban wildlife, management strategies can be significantly informed in the process of mitigating conflict. The study has shown that the negative perception of pigeons, which was assumed to be the position of all the people affected by the pigeons at the University of South Africa's Muckleneuk campus, is in fact incorrect. Participants would rather encourage the nesting and breeding activities of the pigeons on campus, as they felt that the human-pigeon interactions and the viewing of squabs in nests contributed positively to their work environment. Pigeon control strategies should therefore not solely be on the biological aspect of a perceived pigeon problem, but should also include the human association.

Hassan Eliwa Ibrahim

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U-Pb Zircon Geochronology and Sr-Nd-Pb Isotopic Geochemistry of the I- and A-type Intrusions in Gharib Segment, Northern Eastern Desert, Egypt: Implications for Their Origin and Tectonic Setting

New Sr-Nd-Pb isotopic and geochemical data and LA-ICPMS U-Pb zircon ages from the magmatic intrusives in the extreme northern Eastern Desert, Egypt, are presented here to discuss the geochronology, petrogenesis and tectonic implications. The magmatic intrusives are alkaline granites from G. Gharib, alkali feldspar granite and granodiorite from G. Zeit, and syenites from the Kharaza pluton. These Latest Neoproterozoic intrusives were developed during the final evolution stage of the tectono-magmatic cycle of the Juvenile crust in the northern Arabian-Nubian Shield.

Gharib alkaline granites yielded a crystallization age of 564 ± 4 Ma with inherited zircons of age ranging between 580 and 620 Ma. Gharib granites share all the A-type granite petrographic and geochemical characteristics with high SiO₂, alkalis, Rb, Nb, and LREE and low CaO, FeO^T, MgO and Nb, Ta, P, Ti, Ba, and Sr concentrations. These granites

are meta-aluminous to peralkaline and have strongly negative Eu, and highly fractionated REEs. The A1-type alkaline Gharib granites have ϵ_{Nd564} of -3.6 to -3.9, and fdsp $^{207}Pb/^{204}Pb$ ratios of 15.56 - 15.61, which suggest their derivation from mantle with assimilation of an old crust. These geochemical data would support that Gharib alkaline granites were presumably generated from mantle with a crustal contribution.

The Kharaza syenites yielded a crystallization age of 586 ± 5 Ma with inherited zircons of age ranging between 600 and 660 Ma. The Kharaza syenites share the geochemical signatures of Gharib alkaline granites but exhibit more depletion in SiO_2 , Nb, and Rb and a strong enrichment of CaO, FeO^T , Na_2O , Ba, Zr, Sr, and Pb with no negative Eu anomaly. The A2-type setting, shoshonitic affinity and these geochemical features together with the isotopic compositions of initial Sr_{586} of 0.70403 - 0.70382, ϵ_{Nd586} of -2.1, and fdsp $^{207}Pb/^{204}Pb$ ratios of 15.59 - 15.60 suggest that the Kharaza syenites were mostly generated by partial melting of crustal rocks and a possible subordinate contribution of mantle component.

The Zeit granitoids yielded a crystallization age of 587 - 635 Ma with inherited zircons of 590 and 630 Ma age range. Compared to Gharib granites and Kharaza syenites, Zeit granitoids are I-type, metaluminous and high K-calc-alkaline and have much lower Nb, and ΣREE and high Sr concentrations. The isotope composition (initial Sr_{587} of 0.70312, ϵ_{Nd586} of -2.4, and fdsp $^{207}Pb/^{204}Pb$ ratio of 15.54) shows that Zeit granodiorites were derived from partial melting of juvenile lower crust that originated from mantle contaminated by continental crust. The presence of a considerable amount of inherited zircons supports a role of old crustal material in the genesis of the studied intrusives.

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**Flood Inundation Mapping of Risk Zones and
Identification of Consequences in the future Flood Events
at the River Alfet – Oued Al Abid watershed- Using HEC-
RAS and HEC-FIA Models**

Despite the semi-arid to arid nature of its climate, Morocco is submitted, like all the Mediterranean countries, to floods which can be very damaging for public and private infrastructure, and can cause many victims among the populations.

On Monday, August 10, 2015, following heavy rains, the water level of the Alfet river increase in a very remarkable way, which caused the flooding of the residents in Douar Iminwargue (Tillouguite town, Azilal province). This flood has caused human and very serious material damage, such as the death of 5 peoples, the destruction of 5 houses, and the cut of the regional road No. 302 connecting the study area and the center of Tillouguite, and the collapse of two bridges over the river Assif Ahansal.

This catastrophic event at a small Douar suffer already in very difficult living conditions, led us to make a detailed study of the river Alfet watershed to arrive at a better understanding of its hydrological characteristics and how he reacted during especially intense rain.

In this context, relying on a flow database and / or precipitation, an hydraulic simulation using the software HEC-RAS was conducted to determine the extensive flooding in various recurrences of 10, 20, 50 and 100 years.

The determination of flood levels served us to identify areas with a high risk to be affected by the 100 years flood recurrence, and thereafter estimate the impacts due to flooding by the use of the software Hec-Fia.

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Determination of Aquifer Geometry using Geophysical Methods: A Case Study from Sidi Bouzid Basin (Central Tunisia)

Because of Sidi Bouzid water table overexploitation, this study aims at integrating geophysical methods to determine aquifers geometry assessing their geological situation and geophysical characteristics.

However in highly tectonic zones controlled by Atlassic structural features with NE-SW major directions (central Tunisia), Bouguer gravimetric responses of some areas can be as much dominated by the regional structural tendency, as being non-identified or either defectively interpreted such as the case of Sidi Bouzid basin. This issue required a residual gravity anomaly elaboration isolating the Sidi Bouzid basin gravity response ranging between $-3,6$ and 4 mGal and crucial for its aquifers geometry characterization. Several gravity techniques helped constructing the Sidi Bouzid basin's residual gravity anomaly, such as Upwards continuation compared to polynomial regression trends and power spectrum analysis detecting deep basement sources at (3km), intermediate (2km) and shallow sources (1km). Further gravity treatments highlighted the structural features of Sidi Bouzid basin over Horizontal and vertical gradient, and also filters based on them such as Tilt angle and Source Edge detector locating rooted edges or peaks from potential field data detecting new geophysical lineaments.

Sidi Bouzid basin (central Tunisia) is also of a big interest cause of the unknown total thickness and the undefined substratum of its siliciclastic Tertiary package. Therefore, a geophysical methods integration based on gravity survey supporting available seismic data through forward gravity modeling, enhanced lateral and vertical extent definition of the basin's complex sedimentary fill via 3D gravity models, improved depth estimation by a depth to basement modeling approach.

A categorical multidisciplinary geophysical study of the Sidi Bouzid basin aquifers can be accomplished via an aeromagnetic survey and a 4D Microgravity reservoir monitoring offering temporal tracking of the target aquifer's subsurface fluid dynamics enhancing and rationalizing future groundwater exploitation in this arid area of central Tunisia.

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Electromagnetic Pollution of Earth's Ionosphere

The Earth's ionosphere responds to external perturbations originated mainly in the Sun, which is the primary driver of the space weather (SW). But solar activity influence on the ionosphere and the Earth's atmosphere, though most important, is not a unique factor affecting its state - there is also significant impact of powerful natural and anthropogenic processes, which occur on the Earth's surface and propagating in opposite direction - from the Earth's surface to the ionosphere. Numerous experimental data confirm that anthropogenic electromagnetic (EM) effects in the ionosphere are observed and the consequences of their impact on the civilization are not currently known. Parasitic EM radiation from the power supply lines, when entering the ionosphere-magnetosphere system, might have considerable impact on electron population in the radiation belts. Its interaction with trapped particles will change their energy and pitch angles; as a result increased charged particles precipitation might occur. Observations of EM emission by multiple low orbiting satellites have confirmed a significant increase in their intensity over the populated areas of Europe and Asia. Recently, there are many experimental evidences of the existence of power line harmonic radiation (PLHR) in the ionosphere. The examples of PLHR, which were detected by "Sich-1M", "Chibis-M" and "Demeter" satellites, have been presented and discussed.

The available experimental data and theoretical estimations allow us conclude with a high degree of certainty that the permanent satellite monitoring of the ionospheric EM pollution is necessary for: a) objective assessment and prediction of SW conditions; b) evaluation of the daily or seasonal changes in the level of energy production; c) construction of a map for estimation of near space EM pollution.

This study is partially supported by SSAU contract N 4-03/13.

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Integration of Gravity and Seismic Methods in the Geometric Characterization of a Dune Reservoir: Case of the Zouaraa Basin (NW Tunisia)

Increasingly, gravity is been used to complement and constrain traditional seismic data and even used as the only tool to get information of the sub-surface. In some regions the seismic data are of poor quality and hard to be interpreted. Such is the case for the current study area. The Nefza zone is part of the Tellian fold and thrust belt domain in the north west of Tunisia. Its tectonic and stratigraphic developments have always been subject of controversies. Considering the geological and hydrogeological importance of this area, a detailed interdisciplinary study has been conducted integrating geology, seismic and gravity techniques.

The interpretation of Gravity data allowed the delimitation of the dune reservoir and the identification of the regional lineaments contouring the area. It revealed the presence of three gravity lows that correspond to the dune of Zouara and Ouchtata separated along with a positive gravity axis espousing the Ain Allega_Aroub Er Roumane axe. The Bouguer gravity map illustrated the compartmentalization of the Zouara dune into two depressions separated by a NW-SE anomaly trend. This constatation was confirmed by the vertical derivative map which showed the individualization of two depressions with different anomaly values.

The horizontal gravity gradient magnitude was performed to determine the different geological features present in the studied area. The latest indicated the presence of NE-SW parallel folds according to the major Atlasic direction. Also, NW-SE and EW trends were identified.

The quality of the available seismic sections and the absence of borehole data in the region, except few hydraulic wells that been drilled and showing the heterogeneity of the substratum of the dune, required the process of gravity modeling of this challenging area that necessitates to be modeled for the geometrical characterization of the dune reservoir and determine the different stratigraphic series underneath these deposits.

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From Black Shales to Red Shales: A Tale of Anoxic to Oxidic Changes in the Eastern Carpathians

An anoxic sedimentation occurred in the outer part of the Eastern Carpathians within the Early Cretaceous. This type of deposition is mirrored in the accumulation of rich-organic black shales in the Moldavian Trough, a narrow deep marine basin, formed on a thinned continental crust of the passive northern margin of western Tethys. The palaeosetting was close by above the CCD, as calcareous nannoplankton assemblages are still present. The age of the Eastern Carpathian black shale units is late Valanginian-late Albian, as it is argued by the agglutinated foraminifers and nannofossils.

Within the Albian–Cenomanian boundary interval, due to the overthrust processes, which affected the outer part of the Eastern Carpathians, i.e. the Outer Dacides and Moldavide system nappes, as well as to the appearance of flexural bulge zones, the circulation pattern changed in the Moldavian Trough. This shift is indicated by the common presence of macroscopically visible authigenic glauconite in the Albian sandstones of the upper part of black shale units, linked to the circulation, in the Moldavid Basin, of the oxygenated turbidity currents.

Around the Early Cretaceous/Late Cretaceous boundary, at the end of the Albian stage, the anoxic/dysoxic regime, expressed by the deposition of the black and dark grey laminated shales interbedded with glauconite sandstones shifted to an oxic one. The latter type of deposition has led to the occurrence of red shales. Hence, in the whole outer nappe structures of the Eastern Carpathians, the black shales were progressively replaced by red shales, at the beginning of the Late Cretaceous.

From the Upper Albian, the red sediments were deposited in a pelagic/hemipelagic facies of the abyssal plain. The youngest Cretaceous red sediments occur in the Turonian–Santonian interval, and are siliciclastic deposits of turbidite lobes.

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Current and Future Precipitation Extremes Over Mississippi and Yangtze River Basins

Under the global warming environment, eastern portions of U.S. and China have experienced intensifying flooding from Mississippi River and Yangtze River Basin, respectively, in past decades. Hundred-year floods occur every 15 years and 15-year floods return every a couple of years. This presentation contrasts observed and CMIP5 model simulated/projected spatial-temporal distribution of extreme precipitation in these two large river basins using 31 CMIP5 models' *historical* and RCP8.5 experiments. Results show that 1) over both river basins, the heaviest rainfall events have increased in recent decades while the lightest precipitation reduced in frequency. Over Mississippi River Basin, both the lightest precipitation (<2.5 mm/day) and heaviest (>50 mm/day) would decrease in frequency notably after mid-2020s while intermediate events occur more frequently in future; whereas over the Yangtze River Basin, all categories of precipitation are projected to increase in frequency over the coming decades. 2) Although the consensus of CMIP5 models was able to reproduce well domain-time mean and even time-averaged spatial distribution of precipitation, they failed to simulate precipitation trends both in spatial distribution and time means. In a similar fashion, models captured well statistics of precipitation but they had difficulty in representing temporal variations of different precipitation intensity categories. 3) The well-documented 2nd half of the 20th century surface summer cooling over the two river basins showed different associations with precipitation trends with higher anti-correlation between them over the U.S. region, implying different processes contributing to the cooling mechanisms of the two river basins.

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Static Corrections for Weathering Layer using Wave Equation Datuming and Delay Time Techniques

During the seismic land acquisition, the data presents variations in the wave arrival times because of the weathering layer and topography effects, which may complicate the correct interpretation of the data. For that reason, it is important to do an adequate processing flow that takes in to account corrections in the seismic trace arrival times. These corrections can be static or dynamic. Where both need knowledge of the weathering layer velocity, and they take in to account the reference datum above or below the topography to adjust the times and position the reflectors. When the topography is rugged and the lateral change velocity is significant, the static corrections aren't enough and it is necessary to implement sophisticated methods which include wave fields propagation. Wave Equation Datuming provides a solution for static calculation through the extrapolation of the data from the acquisition surface in topography to the reference flat datum, where are relocated sources and receivers, nevertheless exist cases where wave equation datuming doesn't work as perfect as shift static. This project consist in evaluate the 2 methods (static shifts and wave equation datuming) in different real data 2D and synthetic models 2D which simulate rugged weathering layer, and velocity variations, to know the range of applicability of the methods. The results will be evaluated taking in to account the continuation of events, continuation of reflectors, and relationship between sign and noise of the stacked images.

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Transnational Cooperation in Europe: The Example of Integrated Spatial and Transport Development along the Hamburg-Athens Corridor

As defined by the European Commission, the corridor Hamburg-Athens is one of the core European transportation axes. However, this corridor is not only of European importance – it coincides with the migration route and is one of the key areas for international, mainly Chinese, investments in transportation hubs and lines, such as Piraeus port and Balkan railway lines. Such global issues makes the Hamburg-Athens corridor a key strategic area in Europe. The paper poses the thesis that only transnational cooperation can improve the development of the corridor, particularly in terms of integrated spatial and transport development. Since the paper presents the results of the initial phase of the European project on transnational cooperation in the domain of integrated spatial and transport development along the Hamburg-Athens corridor, the overview of the results is given as follows. Firstly, the paper presents the main trade, economic and demographic statistic indicators in order to clarify the strategic position of Europe in transcontinental relations. Secondly, the major findings of the European documents on transnational cooperation are briefly given in addition to the overview of trade, economic and demographic parameters relevant for the countries along the Hamburg-Athens corridor. The overview of the current state and future development in the field of transport (rail, road and waterway) and spatial development (i.e. strategic areas) is particularly stressed. Finally, the close interaction between transport and spatial development in the cities along the corridor is presented. For this purpose, some of the positive examples of integrated spatial and transport development, such as Hamburg, Berlin and Vienna, as well as some less successful cases as Budapest, Belgrade and Athens are discussed. Such a multi-scalar perspective is believed to provide a better examination of the current situation. Moreover, it will briefly give a hint on the dynamics of transnational cooperation (in broader terms), as well as the cooperation process among many stakeholders from various domains, mainly transportation and spatial planning (in narrow terms).

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**Discovery of *Auroradiolites biconvexus* (Bivalvia:
Hippuritida) from the Mid-Cretaceous Sangzugang
Formation in the Xigaze Forearc Basin, Lhasa Block**

Rudist, a kind of special bivalve having significant implications in stratigraphic and palaeogeographic correlations, mainly lived in Tethyan Ocean margins and adjacent areas from the mid-Oxfordian to the end of Cretaceous. In the north of Lhasa Block in Tibet of China, rudists have ever been reported from the upper part of mid-Cretaceous Langshan Formation, and the most abundant taxon *Auroradiolites biconvexus* represents the Late Albian age. Here we report a discovery of *A. biconvexus* from the limestones of Sangzugang Formation in Qiabulin section, Xigaze Forearc Basin, which locates at the southern margin of the Lhasa Block.

A. biconvexus specimens from the Sangzugang Formation are characterized by markedly convex left valve and radially oriented undulations on the inner margin of the outer shell layer. The occurrence of *A. biconvexus* in both Sangzugang and Langshan formations indicates that the Sangzugang Formation can be correlated with the Langshan Formation biostratigraphically, and the age of rudist beds of Sangzugang Formation should be Late Albian. In addition, this discovery enriches the fossil records of Southwest Asian to Pacific radiolitids province, and contributes to discuss the palaeogeography of the Lhasa Block.

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A Rare Al_2SiO_5 Triple Point in Metapelitic Rocks of the Silgará Formation, Santander Massif (Colombia)

A rare occurrence of polymorphs of Al_2SiO_5 , kyanite, andalusite, and sillimanite in Metapelitic Rocks of the Silgará Formation, Santander Massif (Colombia) is discussed here, revealing new evidence on that they are close to equilibrium Al_2SiO_5 triple point. In this study the occurrence of the three polymorphs Al_2SiO_5 and petrogenetic implications described. The mineral composition of the rock of interest is represented by garnet, staurolite, kyanite, andalusite, sillimanite, biotite, muscovite and quartz. The polymorphs of Al_2SiO_5 have a similar chemical composition, although with different crystal structures stable at different PT conditions. Based on the PT diagram with the stability fields of Al_2SiO_5 polymorphs, we consider that andalusite is stable at low PT conditions. With increasing P, andalusite is replaced by kyanite, and, with increasing T, andalusite and kyanite are replaced by sillimanite. Mineral assemblages with the Al_2SiO_5 triple point provide very useful information in metamorphic petrology.

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Predictor Variables Effects on Urban Cellular Automata Based Models

There have been developed important efforts to improve the understanding of the mechanisms of production and reproduction of the urban space, as in the case of differentiated development, auto organization and the study of complex systems. The new approaches regarding the complexity between urban and non urban interactions, recognize various subsystems, interconnected and complex in themselves, and assume the urban development as a structural determinant, which decisively affects the non urban systems.

Analyzing the factors used in land use/cover change (LUCC) models of we can observe that some of them are recurrent, e.g. land use, zoning and road network. Beyond this, however, many others are used. In this paper we analyze the effective importance of each of these predictive factors for the end result of a simulation model based on cellular automata. For this purpose we use 14 predictive sub models (e.g. maximum entropy, supported vector machines, genetic algorithms, artificial neural networks, etc.) to conduct a sensitivity analysis, applied to a test area on the South Bank of the Tagus River near Lisbon (Portugal).

Sensitive analysis makes it possible to determine the predictive factors that most contribute to the results and if there is a group of factors that has high correlation with others and what are they. In a last phase, it can be claimed that an analysis of this type helps to improve the models because it provide us data about the fragility of the model even before the modification of certain parameters.

The analysis was made through the jackknife method which is based on multiple sub samples. The jackknife method stands over the "leave-one-out" principle and its particularly useful in models that involve small samples, because it allows all observations to be used in the estimation of the model parameters.

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**Predicting Soil Erosion and Sediment Yield in Oued El
Abid Watershed, Morocco**

This study was conducted in the Oued El Abid watershed upstream of the Bin El Ouidane dam, in Tadla-Azilal province to quantify the dam siltation rates. To assess the annual soil erosion and the sediment yield the universal soil loss equation (*USLE*) was used. A geographic information system (GIS) was used to generate and integrate maps of the *USLE* factors. A spatial distribution of soil erosion in the Oued El Abid watershed was obtained. The soil erosion was determined for each rural commune in order to identify the soil erosion hotspot and estimate the amount of soil that has been transported downstream (*Bin El Ouidane Dam*). Soil erosion ranged from very limited values for flat and well covered areas to over 2100 t /ha/y in mountainous areas with sparse vegetation. The total annual soil loss within the watershed is estimated at 19.6 million tons per year. An equation of sediment delivery ratio (*SDR*) based on river gradient was calculated. It was found that the value of (*SDR*) at the outlet of the watershed Oued El Abid was 0.07 with a sediment yield of 1.37 million t /y which affect the durability of the dam.

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**Pan-Tropical Distribution of Mesozoic Bivalves:
Palaeogeographic Implications**

Abstract Some Mesozoic bivalves have a pan-tropic distribution. After tracking their distribution histories, some significant palaeogeographic events could be clarified. The byssate pectinid bivalves *Chlamys (Chlamys) valoniensis*, *Chlamys (Chlamys) textoria* and *Camptonectes (Camptonectes) auritus* are distributed in the areas between palaeolatitudes of 60° South and North, but they first occurred in the end of the Triassic late Rhaetian, or the earliest Jurassic of western Europe, and subsequently they spread into the southeastern coast of Paleo-Pacific through the Hispanic Corridor during the Hettangian. It demonstrates that the Hispanic epicontinental seaway became established along the rifting area between North America and South America and north Africa of the Pangaeon supercontinent as early as Hettangian or even earlier, connecting western Tethys and eastern Palaeo-Pacific and providing a corridor for migration and exchange of marine creatures between Tethys and Palaeo-Pacific (Sha, 2002). Late Jurassic–latest Cretaceous cemented rudist bivalves are limited in the areas between the palaeolatitudes 30° South and North, occasionally expanded into palaeolatitudes 40° North. They did not colonize the southern Tibet or Indian Plate until Late Cretaceous Campanian and southernmost of India until Maastrichtian, the end of Cretaceous. It implies that the southern and southernmost of Indian Plate respectively did not drift northwards into the tropic area until Campanian and Maastrichtian when Indian Plate ran into Lhasa block (Sha et al., 2014).

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Charge Detection in Al-Ain Region

Al Ain city, also known as the garden city due to its greenery, is the second largest city in the Emirate of Abu Dhabi and the fourth largest city in the United Arab Emirates. The city development shows a fast growth of its urban boundaries during the last 40 years, with a population increase from 51,000 inhabitants (in 1975) to 560,214 (in 2010). Given the geophysical characteristics of the city (sand dunes, mountains and valleys) and the magnitude of recent changes, the objective of this research is to analyze the most recent land-use dynamics, from 2005 to 2014, at a new spatial scale of study, the district. Therefore, the 62 districts that conform Al-Ain have been included and two general master plans considered (1986-2003 and 2003-2015). In order to develop this objective, a principal component analysis was applied to synthesize the spatial dynamics using population data extracted from censuses and land-use data derived from remote sensing images and a vector base map of Al Ain 2014. The results show the spatial changes, at district scale, from the six principal components that were retained. They were labeled as foreign workers associated to commercial services, local people associated to private and public housing, industry, rural activity, housing from big companies and, finally, religious and recreational facilities. According to them, the main urban expansion has been located to the north (Hili and Al Foah districts), with the exception of the large Al Fayda urban promotion placed in the south, and to the west (Remah district) around the main road network connecting Al Ain to Abu Dhabi. Similar expansion direction has been reported in the case of industry (north and west development) but different in the agriculture extension because the main direction has been to the west and south-west (around Abu Krayyah district).

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Regional Diversity and Inequality in Brazil

Brazil is the fifth largest country in area and population in the world, having a great natural diversity and a huge socioeconomic inequality which is reflected also in regional inequality. The natural diversity gave rise to the first Brazilian regionalization conducted by the IBGE (Brazilian Institute of Geography and Statistics), in the 1940s. Later, several official regionalization and regional proposal divisions were carried out, including, gradually, social and economic indicators. These indicators, in turn, demonstrate the intense regional inequality resulting from historical process of territorial ownership and strong social inequality, spatially explicit, though state policies in the 1970s and 1980s have tried to reverse, at least in economic level, this disparity. In 2010, the Southeast Region owned over 50% of the population and the Brazilian GDP. The Northeast Region, which covers parts of the most important territory during the colonial period, which lasted from 1500 to 1822, is the region of greatest social problems, clashing with the image of Brazil emerging-country. Faced with this problem, this paper aims to provide information, from literature and secondary data collection, demonstrating the Brazilian regional inequality, enabling to reflect on the design of regional development policies.

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The Tourism Potential of Lagoon Ecosystems along the Adriatic Coast Provide

The Adriatic coast is characterized by the presence of a highly diversified lagoon system. That is considered to be a high tourism potential and a basis for a more sustainable development of the economy of the area in which they are found. The study aims to identify the values of this wetland complex located in the coastline and is identified as a region in a critical condition and vulnerable to climate change. Here, we can successfully develop several types of tourism: the creative and the ecological. The chaotic urbanization and the problems that derive from it, have arisen massive violation of environmental balance, associated with environmental, social and demographic problems. In our paper, we are based on a multi-year work to show their biodiversity values, as well as the measures needed to be taken in order to build the tourism sector.

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Fuel Wood Choice by Households, Driving Force and Health Implications. A Case of South Africa as a Developing Country

Energy is a fundamental focus of development and it forms the central part of social, environmental and economic challenges in any country. Thus, there is need to understand the energy preferences of households have a major impacts on the energy planning and policy. Fuel wood forms part of the energy mix in most rural households, but in time, the rural poor will run out of fuel wood due to trees been harvested in an unsustainable manner. The use of fuel wood also contributes to the emissions of greenhouse gases as dry wood contains carbon, which is released when burnt or decayed, thereby increasing the contribution of emissions from domestic biomass burning to the global atmospheric trace budgets. The socio-economic status of the people plays a critical role in the preference system, and act critically in ordering the energy usage and patterns. In this study, the need to understand the part played by the socio-economic driving forces for energy preferences in developing countries, in view of this, the Energy Ladder and Consumer Behaviour Model was undertaken. Results indicate that fuel wood still plays an important role in meeting the demand and form part of the energy mix in several areas of developing countries, and income earned by households is the utmost shared factor in energy preferences, which also confirms that the Energy Ladder as true.

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**Risk Assessment and Ranking of Small Arms Ranges
(SAR) with Significant Environmental Impact on Military
Bases**

Spent ammunition at outdoor Small Arms Ranges (SAR) can have a damaging effect on the environment. Small Arms firing ranges may contain metals such as lead, copper and zinc that can leach from bullets and fragments. This may result in soil as well as surface and groundwater contamination. Risk assessments are often conducted for human and ecological receptors potentially exposed to contaminants introduced by associated activities at the firing ranges. This investigation encompassed the provision of a risk assessment and ranking of 65 Small Arms Ranges sites, using readily available information from military bases. The SAR sites were classified with respect to eight parameters: Frequency of use; metal concentrations; soil permeability; risk exposure due to: a) contaminated groundwater and/or surface water, b) contaminated soil, c) clean-up practices; and impact on ecologically sensitive areas. The results of this investigation include the major factors that influence the impact on the environment and human health of all 65 SAR sites considered within this study, as well as descriptions of the ranges that were determined to pose the highest risk to the environment and human health.