GEODOCT 2020

Annual symposium of the Doctoral School of Geology,
Faculty of Geology and Geophysics, University of Bucharest
27 November 2020, online

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Chairmen
Prof. Dr. habil. Eng. Mihai Emilian Popa
Prof. Dr. Eng. Cristian Mărunțeanu
Prof. Dr. Eng. Daniel Scrădeanu

Programme

Authors	Title	Schedule
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Sorin Balan	Integrated methods for the determination of natural greenhouse gas emissions (CH_4 and CO_2) in the coastal area of the Black Sea adjacent to the Danube Delta	10.10 – 10.30
Andra Olariu, Marin Palcu	The origin of ammonium and its transport in underground waters in the conditions of an operating mineral water production well in middle Ciuc Depression, Eastern Carpathians	10.30 – 10.50
Cătălin Florin Bouaru, Victor Mocanu, Ionelia Panea	Retrieval of subsurface structural information from active and passive seismic data recorded in the Sacel area, Romania	10.50 – 11.10
Maria-Mădălina Bucur, Bogdan Mihai Niculescu, Victor Mocanu	Geoelectrical investigations of salinization phenomena in freshwater aquifers. Applications in the southern coastal area of the Romanian Black Sea	11.10 – 11.30
Alexandru Gabriel Călin, Mihai Emilian Popa	Exceptional preservation of a fossil wood from the Bozovici Basin and paleoclimatic implications	11.30 – 11.50
Șerban – Andrei Dragomir	Preliminary conceptual model of the post-Getian hydrogeological structures in Oltenia	11.50 – 12.10
Andrei Gabriel Dragoș	Ground penetrating radar and magnetic studies at two archaeological sites in eastern Romania and their application in archaeology	12.10 – 12.30

Andrei Gabriel Dragoș	Magnetic and ground penetrating radar investigations at the Aegyssus archaeological site	12.30 – 12.50
Maria Doina Ghiran, Mihai Emilian Popa, Ștefania Gheorghe	Macerals from Badenian source rocks of the Getic Depression, Romania	12.50 – 13.10
Cătălina Ghiță, Elena Dumitrescu, Ana Gabriela Cracica, Ruxandra Cordonasu, Ramona Vișoiu, Andreea Vladimirescu	Remediation of crude oil contaminated soil by enhanced natural attenuation technique	13.10 – 13.30
Oana-Mihaela Ion, Mihai Ducea, Claire Currie, Constantin Balica	Fate of subducted carbonate platforms in Tethyan environments: insights from geodynamic modeling	13.30 – 13.50
Oliver Livanov	Resistivity measurements in the eastern part of the Noviodunum archeological site, Isaccea, Tulcea County	13.50 – 14.10
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Daniel Mihăilescu	Critical infrastructure and the influence over landslide hazard map	15.10 – 15.30
Marius-Bogdan Barbu	Applications and challenges of marine magnetic data processing	15.30 – 15.50
Andrei Panaiotu, Mihaela Carmen Melinte-Dobrinescu, Ioan Munteanu	Recent Paleogene – Miocene age revisions and their implications in the Getic Depression stratigraphy	15.50 – 16.10
Cornel Păunescu, **Valentin Mihalcea**	The role of Metrology in the case of the precison leveling necessary for the realization of gravimetric networks	16.10 – 16.30
Roxana Pirnea, Mihai Emilian Popa	Lithological and facies characteristics of the Lonea Formation in the western part of the Petroșani Basin	16.30 – 16.50
Bogdan-Alexandru Torcărescu, Virgil Drăgușin, Ștefan Vasile, Claire Terhune, Alexandru Petculescu, Marius Vlaicu, Silviu Constantin, Emanoil Știucă, Tiberiu Bogdan Sava, Gabriela Odilia Sava	A Pleistocene-Holocene fossil carnivore assemblage from the Stoieni cave (Mehedinți County, Southwestern Romania)	16.50 – 17.10
Eugen Tudor, Ioan Munteanu, Mihaela Carmen Melinte-Dobrinescu	The influences of tectonic processes on the Mio-Pliocene stratigraphic sequences of the East Carpathians foreland basin	17.10 – 17.30
Daniel Ungureanu	A new sponge (Porifera) genus of Discostromatinae Subfamily in Middle Oxfordian of Ghindarești, Central Dobrogea	17.30 – 17.50

Adrian Popa, Mihai Emilian Popa	Habitat mapping on Romanian shelf using geophysics methods coupled with direct probing of sediments	17.50 – 18.10
Mihai Simionescu	Fluid emissions from the Romanian Black Sea continental shelf in front of the Danube Delta – preliminary data	18.10 – 18.30
Mihai Emilian Popa, Cristian Mărunțeanu, Daniel Scrădeanu	Concluding remarks	18.30 – 18.40

GEODOCT 2020: ABSTRACTS

INTEGRATED METHODS FOR THE DETERMINATION OF NATURAL GREENHOUSE GAS EMISSIONS (CH_4 AND CO_2) IN THE COASTAL AREA OF THE BLACK SEA ADJACENT TO THE DANUBE DELTA

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Keywords: Equilibrator, methane, Danube River, costal area.

Over the time, by raising awareness and recognizing the importance of greenhouse gases in the context of global Climate Change, the need for accurate measurements has led to a permanent development of analysis methods and equipment. In our study, for measuring CH_4 and CO_2 concentrations at the sea-air interface we used a measurement system based on the photoacoustic infrared detection method - INNOVA 1412i which is a highly accurate and reliable gas monitor. The monitor has the ability to compensate for temperature, pressure fluctuations and water vapor interference. For the conversion of the liquid phase from near surface into the gaseous phase we used a shower headspace type equilibrator. Water is pumped from ~2 m below surface and passing through the equilibrator it is assumed that partial pressure of dissolved gases in water will come to equilibrium with the partial pressure of the headspace air. Measurements performed over more than 10 years in the coastal area of the Black Sea in front of Danube Delta showed a high spatio-temporal variation. The input of Danube River waters, rich in organic matter and nutrients, into the coastal area led to a significant increase of greenhouse gases content, especially CH_4 concentrations with two orders of magnitude compared to the open sea, reaching a saturation ratios higher than 10 000%.

APPLICATIONS AND CHALLENGES OF MARINE MAGNETIC DATA PROCESSING

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Keywords: marine magnetics, target detection, data processing.

Data processing in marine environments presents a variety of challenges to overcome in order to fully exploit their potential. These types of measurements rarely benefit from perfect working conditions and as a result the data processing stage require a lot of work to correct and prepare the data for the final stages of data processing and interpretation. For this study data obtained in 2018 during "*Implementation of a geophysical investigation and monitoring tool of the Romanian maritime space*

security – MAR-S" project was used to test various processing methods of magnetic data that highlight different structures, trends or targets in marine environments. The data was subsequently corrected for diurnal variation followed by various filtering process with the aim to eliminate or reduce the influence of several factors (bearing, depth to sea bottom, vessel influence etc.). Various processing methods were then used to either generate a target database and to generate maps of the magnetic field that highlight the effect of geological structure at various depths, the presence of objects on the sea bottom or buried in sediments and the suitability of such methods for these purposes. The results of the study are evidenced by a target list of magnetic anomalies generate by objects that lay on the seafloor or are buried in the sediments, maps of total horizontal derivative (THDR), first vertical derivative (VDR) and other geological filters that help amplify geological anomalies. Among the target list there are several shipwrecks, an oil pipeline and remnants of a WWII marine mines barrage. The maps highlight several trends of the geological structures and two important magnetic anomalies generate by deep geological structures are present. Following the results, it is possible to say that the methods used provides a suitable applicability for both aims, while several observations were made for the improvement of measurements methodology in future expeditions.

RETRIEVAL OF SUBSURFACE STRUCTURAL INFORMATION FROM ACTIVE AND PASSIVE SEISMIC DATA RECORDED IN THE SACEL AREA, ROMANIA

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Keywords: active seismic, passive seismic, subsurface geology.

Subsurface structural models are built after processing and interpretation of seismic reflection data recorded using active seismic measurements. The depth of investigation depends on various factors, such as the type of seismic source and geologic conditions. In areas with complex subsurface geology, the attenuation of the seismic energy generated by explosive or surface seismic sources is strong and cause obtaining of weak reflections from the geological targets of interest. An alternative is to perform passive seismic measurements for several hours in order to record seismic waves generated by natural seismic sources which might act into the subsurface at great depths. Body-wave reflections from deep targets might be retrieved from passive seismic data after their processing. The active and passive seismic data presented in this study were recorded in the Sacel area, Romania, with the purpose to obtain information about the subsurface geology. Previous studies showed the presence of two deep faults, the Saliste and Dragos Voda faults. The active seismic measurements were performed along a crooked line which crossed the Sacel village. A combination of explosive and surface seismic sources was used to generate seismic energy. Weak reflected waves were seen on most of the records, mainly as an effect of the wave propagation through the faulted geologic formations. Insufficient seismic energy was generated in points located on the central part of the line in order to protect the houses of the villagers. As a result, the central part of seismic section is clean, without clear reflections. Body-wave reflections were retrieved using seismic interferometry by cross-correlation applied on noise panels recorded in the vicinity of the Sacel village. The passive seismic measurements were performed for about three continuous hours. Packets of reflections interpreted on the passive seismic section could be well correlated with those seen on the active seismic section. Coherent groups of reflections were also interpreted on the passive seismic section at times greater than 4 s.

GEOELECTRICAL INVESTIGATIONS OF SALINIZATION PHENOMENA IN FRESHWATER AQUIFERS. APPLICATIONS IN THE SOUTHERN COASTAL AREA OF THE ROMANIAN BLACK SEA

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Keywords: Electrical Resistivity Tomography, fault and fracture system, freshwater coastal aquifer, saltwater contamination, Vertical Electrical Sounding

Freshwater coastal aquifers around the world can be affected by seawater intrusion, consisting of the movement of marine saltwater into these aquifers. The negative effects of this salinization phenomenon are a reduction in the available freshwater storage volume, the contamination and the abandonment of drinking water production wells. In Romania, such intrusion has been detected in the southern part of Black Sea's coastline, in Costinești and Vama Veche. In Costinești area, between 1991 and 2010, Vertical Electrical Sounding (VES) surveys were carried out, identifying and monitoring a seawater intrusion, generated by the overexploitation of drinking water. The reduction of freshwater exploitation led to diminishing contamination and its gradual disappearance. In Vama Veche area the geoelectrical researches were initiated in 2008, with 23 VES surveys, which revealed a minimum resistivity anomaly associated with seawater intrusion at 45 m average depth, advancing at least 200 m inland. In 2019 the researches were restarted. A number of eight profiles with a total length of 1800 m were imaged via 2D Electrical Resistivity Tomography (ERT). This high-resolution survey indicated that the seawater intrusion is more extended, reaching at least 500 m distance from the coastline, and it allowed the identification of potential intrusion pathways, represented by a system of fractures or faults.

EXCEPTIONAL PRESERVATION OF A FOSSIL WOOD FROM THE BOZOVICI BASIN AND PALAEOCLIMATIC IMPLICATIONS

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Keywords: Silicified wood, *Taxodioxylon*, Bozovici Basin, Miocene

The Cupressaceous (Coniferales) genus *Taxodioxylon* is described and illustrated from Bozovici Basin, Miocene in age, as silicified wood fragments with an exceptional degree of preservation. The permineralization includes amorphous and cryptocrystalline silica types. The cross section reveals growth rings indicating a seasonal palaeoclimate in a warm and humid environment. The Bozovici Basin yields a rich palaeobotanical and palaeozoological association which is still largerly unstudied, although its high palaeobiodiversity and high preservation of the fossil material. Fossil plants are represented by compressions including pteridophytes, gymnosperms and angiosperms, and by

permineralized fragments including mainly conifer woods. The fossil fauna is represented by rich invertebrate and vertebrate material.

PRELIMINARY CONCEPTUAL MODEL OF THE POST-GETIAN HYDROGEOLOGICAL STRUCTURES IN OLTENIA

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Keywords: Dacian Basin, GIS, hydrogeology, conceptual model

The following presentation aims to synthesize different types of data (climatological data, geomorphological data, hydrological data, geological data, tectonic and structural features and hydrogeological data) in order to create a conceptual model of the hydrogeological structures in the Dacian Basin. The analysis concerns the Post-Getian (Upper Dacian to Holocene) deposits in Oltenia, a south-western Romanian province. Processing the data mentioned above using GIS technique should give an idea of the hydrogeological setting and conditions, representing a preliminary conceptual model of the area taken into discussion. It will thus result a set of synthetic maps showing the regional hydrogeological structures in Oltenia.

GROUND PENETRATING RADAR AND MAGNETIC STUDIES AT TWO ARCHAEOLOGICAL SITES IN EASTERN ROMANIA AND THEIR APPLICATION IN ARCHAEOLOGY

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Keywords: GPR, magnetic surveys, non-destructive, radargrams.

Geophysical methods used in archaeology are largely adapted from those used in mineral exploration, engineering, and geology. Most of them are non-destructive, cost-effective, and more efficient when surveying large areas and the main objective of these methods is to identify and delimitate subsurface anomalies that could represent buried bodies of archaeological interest. In this presentation, the effectiveness of GPR and magnetic surveys is demonstrated at two archaeological ancient roman sites (two fortresses located in Eastern Romania, Tulcea County). The two surveyed fortresses (Aegyssus and Halmyris) are characterized by differences in soil conditions and hypothesized archaeological features. With the GPR method, a high-resolution data acquisition was adopted with the aim of reconstructing the location, depth, and shape of the archaeological structures in the selected areas. Signal processing and the time-slice representation techniques were used for the analysis of the collected data. Magnetic methods were also used to identify and represent magnetic field anomalies caused by source bodies in the basement. A total of 6 perimeters were surveyed with a 250 MHz antenna aiming in identifying archaeological anomalies in order to assist archaeologists in an excavation program and one of the more relevant GPR perimeters was also prospected via magnetic methods with a G856 proton magnetometer. The GPR results indicated geophysical anomalies

characterized by hyperbolic reflections. These anomalies were confirmed by the excavation of test units, allowing the identification of anthropogenic features such as ancient walls, foundations, remnants of civil structures, and several objects and artifacts (numerous portions of walls, amphorae and, other household objects). Archaeological excavations and interpretations were conducted systematically after completing the geophysical surveys (2019) and confirmed the location and shape of most of the individualized structures. The purpose of this presentation is to demonstrate the accuracy with which GPR and magnetic data can be matched to excavation data and the improvement it offers in target definition. Besides these, several examples of cases in which GPR prospecting was not successful are shown along with the causes and parameters that triggered excess noise on the resulted sections and radargrams and incoherent, or unclear, data.

MAGNETIC AND GROUND PENETRATING RADAR INVESTIGATIONS AT THE AEGYSSUS ARCHAEOLOGICAL SITE

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Keywords: GPR, anomalies, magnetic investigations, anthropogenic features.

Magnetic and GPR (Ground Penetrating Radar) methods are very important and widespread geophysical means of investigating archaeological sites as very effective methods able to detect shallow buried structures of archaeological importance. Their main advantages are represented by the fact that they are non-invasive, cost-effective, and very efficient in terms of data resolution and processing. The Aegyssus archaeological site is located on the Monument Hill Park in the north-eastern section of Tulcea Municipality and its fortress was built at the end of the fourth century B.C. Its name, of Celtic origin, was derived from a legendary founder, Caspios Aegyssus and at the beginning of the second century A.D., the settlement was included in the Roman Danubian Limes (which meant the system of river fortifications meant to defend all the incorporated roman territories south of the Danube). Furthermore, the fortress of Aegyssus was an important military headquarters and an essential point for transit trade on the Danube. The geophysical investigations have been performed through the integrated use of two different high resolution and non-invasive geophysical techniques: magnetic mapping and GPR prospecting. The magnetic investigations have been carried out using a protonic magnetometer G-856 GEOMETRICS in gradiometric mode, with the two magnetic sensors set in a vertical direction separated by a distance of 1 m (for the terrestrial survey on one perimeter) and a G-882 GEOMETRICS high-resolution Cesium vapor magnetometer (for survey applications of the Danube on two perimeters). Also, a total of 3 ground penetrating radar perimeters were prospected with a 250 MHz GPR antenna system aiming to identify certain archaeological anomalies in order to assist archaeologists in an excavation program. The anomalies, identified by using the geophysical methods mentioned above, were confirmed by the excavation of test units, allowing the identification of anthropogenic features such as defensive and domestic walls and a variety of household objects (mainly pottery). The results showed the efficiency of GPR and magnetic methods in identifying potential buried archaeological targets, as they are oriented towards reducing costs and increasing the probability of contributing to Romanian cultural heritage.

MACERALS FROM BADENIAN SOURCE ROCKS OF THE GETIC DEPRESSION, ROMANIA

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Keywords: Badenian source rock, macerals, vitrinite suppression, reflectance, type of kerogen

This research aims the use of petrographic analysis for quantitative determination of macerals and rank, and qualitative assessment of liptinite macerals fluorescence belonging to Badenian source rocks of Centre part of the Getic Depression, Romania. The study is focused to macerals composition, rank, and type of kerogen determination. Moreover, the characteristics determined by the Rock-eval analysis, were also considered. From quantitative maceral analysis of the polished blocks the following types of macerals were identified: vitrinite, sporinite, cutinite, resinite, and inertinite (terrestrial origin) frequently associated with marine origin alginite, such as: lamalginite and telalginite. The color of liptinite in fluorescence light ranges between green-yellow to bright yellow. Vitrinite suppression can be observed in some rock samples, because the temperature maturity parameters (Tmax) and depth of burial are high, and vitrinite random reflectance is low. High liptinite content and the frequency of clay minerals in all samples are other factors that influence the decrease of reflectance. Pyrite is present as framboidal and dispersed shapes indicate the anoxic depositional environment. Badenian source rock is dark, grey to black marls with subordinate intervals of silty marls being also present. Mean random reflectance of vitrinite (Ro%) ranges between 0.42% and 0.55%, corresponding to Tmax which varies between 409˚C - 443˚C. The Total Organic Carbon (TOC) of analyzed samples varies between 0.41 wt.% and 1.97 wt.%, the results suggesting fair to good hydrocarbon generation potential. From 25 samples analyzed, 17 are immature, and 7 are early mature. Following the van-Krevelen diagram most of the analyzed source rock samples represent mainly Type III kerogen, indicating a generative gas potential. In two samples from Piscu Stejarului and Bibești structures, Hydrogen oil index values of 205 mg HC/g TOC and 505 mg HC/g TOC correspond to the Type II-III kerogen (oil & gas potential generation). Both marine and terrestrial origins of macerals were identified.

REMEDIATION OF CRUDE OIL CONTAMINATED SOIL BY ENHANCED NATURAL ATTENUATION TECHNIQUE

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Keywords: soil remediation, TPH-total petroleum hydrocarbons, biostimulation, RENA - remediation by enhanced natural attenuation.

Remediation by enhanced natural attenuation (RENA) technique represents an in-situ bioremediation technology for intervention in crude-oil contaminated soils. The process is simply based on natural

bioremediation already existent in nature but enhanced by biostimulation of indigenous hydrocarbon utilizing bacteria, through addition of nutrients and oxygen. Soils with historical oil pollution have a higher percentage of such microorganisms capable to degrade oil hydrocarbons and are most desired for application of this technique. RENA technique was used to treat the contaminated land of the pilot site developed on the location of a former demolished oil park, having an old contamination with crude oil. During the treatment consisting in several cycles of land farming works, the soil was periodically turned over or tilled to aerate the structure and helped by application of nutrients and loosening agents. The efficiency of treatment was monitored in terms of TPH degradation rate. The study of applied RENA technique demonstrates that the TPH maximum concentrations in soil were reduced by 85% while the contaminated surface was reduced ten times. However, a threshold was apparently reached where no significant reduction in TPH concentration was achieved sustainable, but actually the process once initiated, continued after the pilot study completion. RENA in-situ bioremediation is a "low tech" method not commonly applied on sites with crude oil contamination. The disadvantages of this method are that is a slower process than ex-situ bioremediation being dependent on weather condition. The advantages are that is an optimal technique in terms of costs benefit ratio, can be used on a large domain of sites with contaminated soil surfaces and it is demonstrated to be environment friendly and the less invasive method that can be used for soil remediation.

FATE OF SUBDUCTED CARBONATE PLATFORMS IN TETHYAN ENVIRONMENTS: INSIGHTS FROM GEODYNAMIC MODELING

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Keywords: subduction, carbonate sediments, diapirism, mantle wedge, Tethys

Forward models of subduction with large amounts of limestone in the form of carbonate platforms were conducted in this study. They are used as initial and boundary conditions for various convergent margins of the Alpine-Carpathian region in the Mesozoic and the Cenozoic, representing different branches of the Tethys ocean. There, downgoing plates contained carbonate platforms in their subducted sedimentary cargo. This scenario is unlike the majority of subducting margins of today where comparatively little carbonated mass enters the bulk of convergent margins. Models with carbonate thickness of 2 km were run; subduction duration up to 40 million years was considered. A mantle wind of 1 cm/yr was used in the wedge to help initiate subduction, and convergence rates of 3 cm/yr were used. The thickness of the upper plate was variable but generally less than 80 km. We show that while in detail models produce different results, one overarching result is that in all experiments, carbonate detaches and rises diapirically at relatively shallow depths, as soon as it enters the mantle wedge. It then mixes into a ductile peridotitic-carbonatic mass in the mantle wedge, similar to relamination models for subducted silicic sediments, although here the effect is amplified due to the buoyant nature of calcite/aragonite/dolomite materials. At longer subduction times and thicker platforms, this material is capable of further mixing into the upper plate lithosphere. Importantly, this ophicarbonatic material remains relatively cold (<1000 ^{0} C) for relatively long periods and forms a secondary mantle convection circuit which may retard partial melting in such settings. Subsequent studies will address the details of partial melting in these environments.

RESISTIVITY MEASUREMENTS IN THE EASTERN PART OF THE NOVIODUNUM ARCHEOLOGICAL SITE, ISACCEA, TULCEA COUNTY

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The Noviodunum archeological site is located at approx. 1.5 km East of Isaccea Town (Tulcea County, Romania). After the Roman conquest of the Getae tribes in the 1st century AD, the settlement was fortified several times. The construction of defensive walls continued in the Byzantine period and even during the Golden Horde conquest. Due to its strategic position, the settlement experienced continuous development until its abandonment in the 14th century. The fortress will be archaeologically investigated in the 20th century, and since then, the interest in Noviodunum past has grown exponentially. The integration of Geophysical methods in Archaeology was an important step in deciphering our ancient history. The Noviodunum archaeological site has been geophysically researched only in a few areas of interest. Therefore, new geophysical surveys were proposed. The resistivity measurements consisting of Electrical Resistivity Tomographies (ERT) configured as Dipole-Dipole Array, carried out in the eastern part of the site, from 2019 to 2020, managed to highlight some challenging facts of archaeological value. The resistivity surveys identified positive anomalies, attributed to the walls of the fortress, at depths that vary between 2 and 7 meters depending on the topography of the land. Positive anomalies corresponding to archaeological levels were outlined near the identified walls, at shallow depths. By comparing the ERT results with the previous archaeological data, it was concluded that these archaeological levels denote intense economic activity and a high degree of habitation in the past. Because the settlement is large (approx. 500 x 250 m) and arranged on several archaeological levels, the need for more detailed and precise geophysical investigation is necessary to differentiate the historical stages of the fort.

CRITICAL INFRASTRUCTURE AND THE INFLUENCE OVER LANDSLIDE HAZARD MAP

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Keywords: landslides, critical infrastructure, systemic risk.

The study case is located in an old coal mining site where the hilly geomorphological features and mining activities induced a lot of landslides. The community is mostly made up of low income families with most working men being employed as mining workers. The landslide's damage on the critical infrastructure has a domino effect on decreasing the quality of life in the area.
Infrastructure services are essential for raising and maintaining people's quality of life. Broken roads, interrupted utilities, no access to healthcare buildings, schools, or jobs, can affect people for a long time. It is very hard to define how long and how much (speaking of money) a community can be affected by large landslides. Usually the most vulnerable are the poorest people, because of their informal settlement in an area affected by natural hazards and because to their low resources and low capacity to recover. The main use of the landslides hazard maps is trying to better estimate the infrastructure risk in order to establish how much a community can be affected by landslides. The

modern tools like GIS, databases, open data sources can help to produce good inventory of area affected by landslides and to establish the infrastructure risk. The study applies the concept of systemic hazard, which means the superposition of a natural hazard, a technological hazard and the existence of critical infrastructure. Treating a landslide as a singular natural hazard is no longer enough. From a risk management point of view, a landslide should rather be regarded as a systemic hazard.

THE ORIGIN OF AMMONIUM AND ITS TRANSPORT IN UNDERGROUND WATERS IN THE CONDITIONS OF AN OPERATING MINERAL WATER PRODUCTION WELL IN MIDDLE CIUC DEPRESSION, EASTERN CARPATHIANS

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Keywords: mineral waters, ammonium origin, ammonium plume, groundwater flow modeling, mass transportation modeling.

In many cases in Romania, like in the Neogene Volcanic area of the Eastern Carpathians, the mineral waters, especially the carbonated ones, present themselves with different levels of ammonium concentrations, often over 0.5 mg/l. The main issue regarding the presence of ammonium is identifying its origin, if it is due to the anthropogenic pollution or of endogenic origin. The geological, hydrogeological and hydrochemical data analysis resulted in a conceptual model of the aquifer's spatial position, groundwater movement and mineralization, and ammonium occurrence. The aquifer is located in Pliocene - Quaternary granular deposits, where, at the basement of these granular deposits, in the fracture areas, the groundwater is mixed with carbon dioxide and ammonium emissions, produced in the volcanic chambers. The groundwater flow modeling and ammonium transport simulation elucidated the preferential transport directions and the ammonium plume size. The surface data correlation and the hydrochemical data analysis resulted in the confirmation of the deep ammonium origin. The geological and tectonic aspects, aquifer's recharging, groundwater flow direction, absence of surface pollution sources and correlation of hydrochemical data, all indicate the underground origin of ammonium. .

RECENT PALEOGENE – MIOCENE AGE REVISIONS AND THEIR IMPLICATIONS IN THE GETIC DEPRESSION STRATIGRAPHY

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Keywords: stratigraphic revisions, high variable thickness and dipping, low angle thrusting, fold and thrust belt

The Getic Depression is a distinctive tectonic unit, part of the South Carpathians foreland, located at the contact between the Carpathian orogeny and the Moesian Platform comprising deformed Uppermost Cretaceous – Mid Miocene sediments and the largely undeformed unconformable post-tectonic cover of the Dacian Basin. Its polyphase tectonic evolution is hard linked to the development of Carpathian orogeny, transcurrent and rotational movements relative to Moesian Platform (Paleogene – Early Miocene basin opening and first deformations), foredeep phase and final thrusting of these deposits onto Moesia (Mid-Miocene) and Wallachian out-of-sequence reactivations of previous thrust planes. Most of the studies were influenced by the economic importance this region has in the hydrocarbon industry. Although evolving normally by applying new concepts of structural geology or stratigraphy, the revisions were either too general or too restrictive in their search to explain kinematics only along specific profiles or hydrocarbon structures. One of the major source of errors comes from the old descriptions and interpretations still in use in the oil industry which constitutes the majority of available subsurface data. However, recent local stratigraphic breakthroughs in and around the Getic basin as well as the persistent uncertainties related to the age of some units are strong arguments for attempting a basin scale revision of the Paleogene – Miocene strata. Due to the strong syn-tectonic characteristics, structural geology analysis plays an important part in understanding the stratigraphic record where thick or highly variable dipping strata occur. Here the low angle thrusting, imbrications, duplex structures and transfer zones of a continuously evolving fold and thrust belt system formed in a curved subduction zone challenges the classical, stepwise development of a dominantly strike-slip margin with its high angle faults and inverted basins.

THE ROLE OF METROLOGY IN THE CASE OF THE PRECISON LEVELING NECESSARY FOR THE REALIZATION OF GRAVIMETRIC NETWORKS

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Keywords: leveling, gravimetric network, error, gravity acceleration.

Leveling is the method by which level differences can be determined with very high accuracy. With these differences in level it can be determined altitudes for certain points of interest. The gravity of a point is determined with the help of gravimeters, but the calculations take into account the absolute altitude of that point. The higher the accuracy of determining the altitude of the points, the greater is the accuracy of determining the gravity. For this reason, it is important to determine the errors that accompany the leveling measurements, which are the largest and how they can be avoided. Geometric leveling is the most accurate method of determining level differences. At present, over long distances of hundreds of kilometers, the leveling achieved with the help of GNSS technology is more precise, provided that the ripple of the quasigeoid at the end points is known. The geometric level can be of two types: middle and end. In this case of study is also presented the importance of the use of measuring devices (geometric leveling devices) that must be verified periodically, highlighting the role and importance that must be given to the metrological verification process. The main purpose of this study was to take into account the fact that the determination of the level differences must be carried out in the most rigorous way possible, taking into account the errors that may occur in the measurement process. Metrology can help the users of these devices by operations of rectifying and

minimizing the measurement errors. If the device complies with the verifications, a calibration certificate will be issued specifying the deviations of the measurement of the angles in the horizontal plane and of the average square error of level difference per kilometer of double leveling. Also, these constructive errors can be adjusted by various specific methods, by rectifications in the specialized laboratories of the National Institute of Metrology, but also in laboratories accredited to perform these types of periodic metrological verifications by competent authorized personnel. It is necessary that the verification of these types of devices be performed periodically, every two (2) years or as often as possible, whenever necessary, or when users request it.

LITHOLOGICAL AND FACIES CHARACTERISTICS OF THE LONEA FORMATION IN THE WESTERN PART OF THE PETROȘANI BASIN

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Keywords: Lonea Formation, Petroșani Basin, lithology, sedimentology, Aquitanian.

The sedimentary sequences of the Petroșani Basin which overlay the Danubian and Getic basements are Paleogene to Neogene in age. The Lonea Formation, also known as the Middle Horizon or Horizon no. 2, is Aquitanian in age (Late Eggerian) and has a thickness that varies between 530 m in the west to 150 m in the east. In its western extremity, between Valea de Brazi and Uricani, the formation outcrops along the road that connects the two towns, on the left bank of the Western Jiu river. The outcrops are represented by siliciclastic deposits, mainly including conglomerates, sandstones and clays. The conglomerates include heterogenous elements with different grain sizes. The sandstones have multiple grain sizes and their colour varies from light green and grey to violet. The clays appear in various colours such as dark grey, light green and red-violet. The geometry of the sedimentary deposits yields a Coarsening Upward Sequence that starts at the base with clays, siltstone and fine sandstones, which are gradually replaced towards the top with coarse sandstone, micro-conglomerate and conglomerates. This formation also contains thin layers of coal and its palaeontological content is poor.

HABITAT MAPPING ON ROMANIAN SHELF USING GEOPHYSICS METHODS COUPLED WITH DIRECT PROBING OF SEDIMENTS

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Keywords: Black Sea, Romanian Shelf, Habitat Mapping, Site of Community Importance, Natura 2000

The Romanian Black Sea shelf represents a large part of the Romanian territorial waters. This is particularly important because due to the occurrence of most organisms of the Romanian aquatory and of the most diverse habitats for both organisms and sediments. In 2016 NIMR GeoEcoMar started research projects aiming to mapping the habitats of these areas, both on sedimentological and biological levels. These projects were financed by the Ministry of Research and Innovation - now the Ministry of Education and Research in the framework of national projects. The research projects are focused on protected areas from Natura 2000 network but also on some areas which were under more severe stress. Natura 2000 network sites studied are: *ROSCI-0293 Costinești-23 August* in 2017, *ROSCI-0281 Cape Aurora* and *ROSCI-0094 Sulphide Springs from Mangalia* in 2018 and *ROSCI-0066 Danube Delta-Marine Area* in 2019. In 2018, an area in front of Constanța city and Siutghiol Lake of 53 km^2 was also surveyed as this area was used for providing sand for beach nourishment in Constanța and Mamaia. In 2020 an area of 1 km^2 near Reyna Beach in Constanța was studied, chosen as it has higher diversified faunistic habitats compared to adjacent areas. Habitat mapping on the Romanian shelf will continue at NIMR GeoEcoMar in following years. The methods used included first geophysical followed by direct sediment sampling for providing ground truthing. The chosen area was first surveyed with a sidescan sonar and with a multibeam sonar system and the sea floor mosaic and the bathymetry map were obtained. After studying the mosaic and the bathymetry map, in areas considered different on sedimentological level direct sampling stations were set. Sampling was undertaken either with a Van Veen Grab or with a Box Corer both for sedimentology and for biology samples, two sets of samples were taken for every sampling point. The samples were weighed and analyzed either on the research vessel or in laboratory and parts of the results were published in project reports and in scientific papers.

FLUID EMISSIONS FROM THE ROMANIAN BLACK SEA CONTINENTAL SHELF IN FRONT OF THE DANUBE DELTA – PRELIMINARY DATA

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Keywords: bathymetry, multibeam, gas seeps, side scan sonar, seismo acoustics

The presence of some important geological and geomorphological structures around the Romanian Black Sea Shelf such as the Danube Delta as well as major tectonic features such as the faults Saint George, Peceneaga Camena, Capidava-Ovidiu and Intra Moesian, influence the development of active seeps in this area. The Danube Delta is considered to be a major player in the formation of the whole system because of significant sediment input that led to the development of major organic matter that after the microbiological degradation are at the origin of diffusive or patchy concentrated gas seeps. This paper presents some preliminary gas expulsion data along the Danube Delta front which have been acquired during two marine research expeditions by the National Institute of Marine Geology and Geo-ecology with the Research Vessel Mare Nigrum. The data has been acquired with the use of a multibeam sonar together with a side scan sonar. Following the acquisition, the data processing allowed in the identification of gas expulsions within the water column, through a series of specialized software. Thus, during the MN 203 and MN 207 scientific cruises, there have been identified a number of 169 gas expulsions and 21 respectively. For each individual gas expulsion, a series of steps have been followed in order to assign it time and spatial coordinates. According to the

intensities of each expulsion, the data has been classified in three main categories: High Intensity, Medium Intensity and Low Intensity. Following the processing stage, the identified gas expulsions have been integrated within the geological framework of the area, by using tectonic maps together with interpreted geological sections from current literature in order to try to decipher the proper link between the origin of expelled gases, the dynamics of seeps and the local geological framework.

A PLEISTOCENE-HOLOCENE FOSSIL CARNIVORE ASSEMBLAGE FROM THE STOIENI CAVE (MEHEDINȚI COUNTY, SOUTHWESTERN ROMANIA)

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Keywords: Pleistocene, Vertebrates, Carnivores, Last Glacial, Romania.

During the Last Glacial (LG) the mammalian fauna of the Carpathian Mountains in particular and of Europe in general underwent important changes and was influenced both by a dramatic shift in climate, from a colder glacial and peri-glacial environment to a warmer Holocene climate, and by human impact. Here we present the carnivore faunal transition from Stoieni Cave (southwestern Romania), whose chronology is based on ^{14}C dating. Although fossils for both carnivores and herbivores were uncovered in this cave, this work focuses on the study of the carnivore elements, in order to observe the faunal transition from the colder LG to the warmer Holocene, and the impact that climate change had on the local fauna. The study of the material entailed the taxonomical assessment, based on morphologic and morphometric analyses, as well as estimates of relative abundance, based on the minimum number of individuals. Two main stratighraphic units were identified. The lower unit is older than 26,000 cal years BP, and yielded very few bone elements, that are dominated by *Ursus spelaeus* and *Canis lupus* occurences. The upper unit, extends from 26,000 cal years BP to present, is more abundant and more taxonomically diverse. The upper unit also records a shift in faunal composition, marked by the replacement of *U. spelaeus* by *Ursus arctos*, the continuity of *C. lupus*, and the appearance of *Vulpes vulpes*, *Lynx lynx*, *Felis* sp.

THE INFLUENCES OF TECTONIC PROCESSES ON THE MIO-PLIOCENE STRATIGRAPHIC SEQUENCES OF THE EAST CARPATHIANS FORELAND BASIN

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Keywords: foreland, flexure, strike-slip, depocenters

Major tectonic deformations define through time the evolution and geometry of the Orogens and associated fold and thrust belt by large lateral mass movements and uplift rates. The adjacent foreland basin that is being developed because of continental collision and lower plate flexure has a sedimentary fill dependent on these major tectonic moments taking place into the FTB. Thus, we can uncover that there are patterns of thick clastic intervals associated with significant uplift of the Eastern Carpathians, starting with the North-Central part of the orogen uplifted during the Badenian-early Sarmatian times, middle-late Sarmatian, late Meotian-middle Pontian, Romanian, with the latest significant deformation moments during the Quaternary. Identifying these moments using seismic lines and well log patterns shows that all these moments have various strengths and structural styles associated with them, some being treated as major tectonic moments and some as minor. We recognize a transition from small inversions to normal faulting caused by flexure towards more strike-slip and inversions associated with the orogens lateral movements. The final deformations of the orogen are creating flexure again during the most recent times, with faults cutting to surface, as an effect of the orogenic loading onto pre-existing platforms and tectonic units. These uplifts have a significant effect on the fill of the foreland as is creating a bypass route for sediment to be delivered to the depocenter and it is independent to sea level variations. Cyclicity still exists within the sedimentary succession due to sea level variations but at a smaller scale and with a smaller impact on the full succession.

A NEW SPONGE (PORIFERA) GENUS OF DISCOSTROMATINAE SUBFAMILY IN MIDDLE OXFORDIAN OF GHINDAREȘTI, CENTRAL DOBROGEA

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Keywords: sponge, taxonomy, Oxfordian, Central Dobrogea

A new sponge taxon is described, *Pseudohyalotragos simionescui* n.gen. n.sp., assigned to *Discostromatidae* Schrammen 1924 family, *Discostromatinae* Schrammen 1924 subfamily, respectively. Morphological features are described and the taxonomical assignment is assessed. Differences from other genera are discussed. The new taxon is part of the sponge assemblage in the Middle Oxfordian (Upper Jurassic) of Ghindărești (western Central Dobrogea), which adds to the contemporaneous faunas in the area, belonging to other phyla.