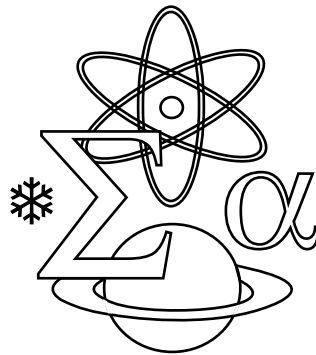


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EFFECTIVENESS OF FLEET MANAGEMENT SYSTEM — A REGIONAL STUDY CASE

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ABSTRACT

Communication between machines enables innovative advances in technology. Currently, machine to machine (M2M) capabilities that are improving and simplifying the way of doing business are developing. An M2M portfolio is enabling solutions in industries ranging from health care, retail services, smart energy, transportation, logistics and automobiles. In addition, the highest level of security, reliability and low-cost services is provided to ensure successful deployment in the complex M2M ecosystem. The system scales to all possible fleets, of all sizes, and provides business with a best-in-class, robust, highly reliable solution for deploying business-critical applications. We report data on the M2M market in SE Europe and make recommendations for its introduction here. The system offers features such as vehicle history, reporting, fuel efficiency module, directions, alarms and geo-fencing. A case study concerning taxi companies is reported. The investigation involved interviews to identify the problems the companies face. The results indicate this technological innovation supports businesses at their earliest stage of growth, and provide a seamless path of expansion.

Keywords: Fleet management solution, innovation tools, cost reduction, operation efficiency

CALIBRATION CONTROL OF ELEKTA LINEAR ACCELERATOR PHOTON BEAM (IAEA–WHO AUDIT)

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ABSTRACT

The linear accelerator (linac) is the accepted workhorse in radiotherapy and its calibration is of the greatest importance for the prescribed dose delivery. Dosimetrically the linear accelerator photon beam output is the main parameter. Periodic monitoring of linac is essential as it promotes optimization of radiological procedures with respect to patient dose and image quality by detecting unplanned changes in dose levels or when local or national diagnostic reference levels are exceeded, when remedial action is required. A postal audit dosimetric service through the SSDL network for improving the status of radiotherapy dosimetry worldwide purposes is offered by IAEA/WHO. Installed in Hygeia Hospital in Tirana, Albania, the photon beam from 6 MV and 18 MV Elekta linear accelerator was audited via this postal audit dosimeter service using thermo luminescent dosimeters. The result of the audit of differences between the hospital reported dose and the IAEA/WHO SSDL dose measurement was less than 2 percent. This audit served as a means to address proper calibration procedures developed for linear accelerator beam in Hygeia Hospital. It is recommended that the postal audit is used by other radiotherapy services in Albania.

Keywords: calibration, Elekta linear accelerator, photon beam, radiation therapy, postal audit

A SELF-MADE LAB-SCALE SYSTEM FOR CHEMICAL SYNTHESSES IN SUPERCRITICAL CO₂

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ABSTRACT

In the present paper, information on a self-made lab-scale system for inorganic and organic syntheses in supercritical CO₂, consisting of a metering and filling glassware subsystem suitable for metering and filling desired amounts of CO₂ in special shaped quartz ampoules, and two other subsystems is provided. The quartz ampoules, serving as reaction vessels, and two cylindrical batch reactors, as the main parts of the set-ups, are designed and constructed for periodical use. CO₂ inside the quartz ampoules plays the role of the reaction medium counter pressured by the amount of CO₂ outside the ampoules. Reaction conditions up to 400 bars and 673 K can be reached with the only restriction being the autoclaves sealing. The system was successfully employed using supercritical CO₂ as a reaction medium for a variety of reactions between inorganic species.

Keywords: lab-scale system, supercritical CO₂ syntheses, batch reactor, reaction medium

PECULIARITIES OF ULTRABASIC ROCK MAGNETISM AND PALAEOMAGNETISM OF ALBANIDES OPHIOLITES

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ABSTRACT

Based on magnetic susceptibility measurements in outcrops in the field, together with determination of induced and remnant magnetization in the samples collected in ultrabasic rocks, gabbro and volcanic rocks in six characteristic profiles from south to the northern Albania carried out by Frashëri and Bushati in 1995, the present paper provides information on the peculiarities of the ophiolite magnetization in the country's Alpine folded belt, especially on palaeomagnetic studies and results. Magnetic properties of the rocks were determined in the Geophysical Department, Faculty of Geology and Mining, Polytechnic University of Tirana, and Geophysical-Geochemical Centre of Tirana. In addition, Palaeomagnetic samplings were carried out, and the data analysed in the Palaeomagnetic Laboratory, Leoben University, Austria, and that of Aristotle University, Thessaloniki, Greece, as well as in the Institute of Geophysics, Academy of Sciences of the Czech Republic. The fresh dunites and hartzburgites of the tectonic sequence did not exhibit magnetic properties. In addition, as their degree of serpentinization is equal, they cannot be distinguished by their magnetization (Table 1). Moreover, their magnetic properties vary by about the same amount.

The richer in ferromagnetic minerals the rocks (such as secondary magnetite) are, the higher the magnetic values are. An induced magnetization ($80\text{--}130 \times 10^{-5}$ units SI) can be conditioned by presence of 0.1 percent of magnetite. Depending on the degree of serpentinization, serpentines magnetism values are from unmagnetic to strongly magnetic. Firstly, the physical properties of the ultramafic rocks vary within broad limits. In some cases a

group of rocks is distinguishable by its physical properties being different from the surrounding rocks. Pyroxenite magmatism exhibits quite big differences. However, most of the pyroxenite is weakly magnetic. Different types of massifs have different gabbros magnetization, on average $I_r=0.007$ A/m and magnetic susceptibility $535 \cdot 10^{-6}$ SI units. Qafzezi village in the south-east of the country is characterized by gabbros with stronger magnetization: $I_r=52.825$ A/m.

Chromite ore deposits and occurrences are characterized by an inversed vector of magnetization. Here, negative magnetic anomalies can be met over magnetic chrome spinel ores. Studies on orientation of the remnant magnetization vector of the ores and the surrounding rocks are a means to address formation conditions and changes over time. For some massifs is preserved approximate orientation of the vectors of remnant magnetization.

In the north-eastern edge of the ophiolitic belt of Albanides, in Komani, the volcanic rocks have a clockwise rotation, analogous with the external Albanides.

The direction of the magnetization of gabbros in the massif of Qafzez in South-East of Albania is approximate with the orientation of the magnetism vector of the gabbros massif in Chalkidiki, Greece.

COMPARISON OF DIFFERENT RESISTIVITY ARRAYS USING ERT AT TWO ARCHAEOLOGICAL SITES IN ALBANIA

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ABSTRACT

Electrical resistivity tomography (ERT) was applied in geoelectric surveys carried out in Bylis and Apollonia—two archaeological sites in Albania—in 2010 and 2011. Two squares of size 30 x 25 m, close to the old gymnasium, and 30 x 20 m, near to the old theatre in Bylis, as well as five squares around the Roman baths in Apollonia were surveyed. To the NE, NW, SW and SE of the Roman baths squares of dimensions 30 x 20 m and 30 x 30 m were surveyed. One square of size 60 x 50 m was also surveyed using 60 connected electrodes. The geoelectric surveys of the squares involved use of 2-D parallel profiles 1.5 m from each other, with electrodes spaced apart by 1 m. The squares were surveyed using two geometric configurations: Wenner and dipole–dipole arrays. The collected data were interpreted with use of the inversion resistivity method involving Software Res2dinv for each profile (Loke 1996; 1999). True resistivity of the subsurface was obtained with use of nonlinear equations defined with the least-squares inversion method, from the measured apparent resistivity values. 3-D interpretation of profiles was carried out and maps of different depths were compiled. The use of both arrays helps to better understand the spatial extent of resistivity anomalies. The true resistivity models taken from the inversion of apparent resistivity measurements, are almost the same, with little changes, where the Wenner array gave better results to vertical changes, whereas the dipole–dipole array to lateral ones. The ERT method was found to delineate very well a thickness of cultural layer and buried archaeological objects inside it. Rich in limestone,

the basement in Bylis revealed high resistivity features, while comprising a clay layer, the Roman bath area in Apollonia had low resistivity values.

Keywords: Geoelectric, Electrical resistivity tomography, archaeological site, apparent resistivity, true resistivity, inversion

APPARENT STRESS DETERMINATION FROM BROADBAND SEISMIC ENERGY AND MOMENT OF SMALL AND MODERATE EARTHQUAKES IN ALBANIA

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ABSTRACT

Apparent stress for different seismotectonic conditions in Albania is determined based on records of small to moderate earthquakes recorded by Albanian Seismological Network (ASN). The method is based on Wyss and Brune (1968) definition which employs broadband radiated seismic energy and seismic moment as the main macroscopic physical parameters characterizing a seismic source. The method is a means to address correction of seismic source spectra locally, for attenuation and radiation effects. Consequently, a set of 69 earthquakes has been selected, for which the waveforms recorded on both horizontal components are only processed. Source parameters are determined from displacement source spectra using Brune \dot{u}^2 model. Radiated seismic energy is computed based on PSD velocity spectra, by discrete integration in frequency domain. Sources are grouped according to tectonic areas characterized by different stress regimes. Each of the group is coded as al001, al002, al003, al004 and al005, respectively for longitudinal Adriatic and Ionian seismogenic zones, transversal Elbasan–Dibra seismogenic zone and Mirdita zone as part of the inner domain. The achieved apparent stress varies in an average within the interval 0.01–10 MPa. Variation in apparent stress values for Albania, generally in accordance with global ones (0.03–6.69 MPa) was observed. Apparent stress scales with the seismic moment with the assumption of a constant shear modulus in each area

($i = 0.3 \times 10^5$ MPa). Also, a mechanism dependent scaling $\sim M_0^{[-0.1]-[-0.26]}$ for oblique faults and $\sim M_0^{[0.69-1.75]}$ for pure thrust and normal faults has been achieved as well, showing the importance of this physical source parameter in the seismotectonic characterization of a seismically active region.

Keywords: apparent stress, radiated seismic energy, seismic moment, scaled energy

ULTRAMAFIC INTRUSIONS IN ALBANIAN OPHIOLITES: PETROLOGICAL IMPLICATIONS

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ABSTRACT

Partially rooted in the uppermost part of the mantle sequence, ultramafic intrusions in Albanian ophiolites occur mainly within plutonic sequence of both western and eastern ophiolites where heteradcumulate poikilitic plagioclase wehrlite and wehrlite dunite within western and eastern ophiolites could be respectively met. Pyroxenites form an aureole of the ultramafic intrusions, or small irregular segregations within ultramafic intrusions. Formation of the ultramafic intrusions relates to melt generation and mantle–melt interaction processes in the uppermost part of the mantle sequence. This crystal mush of ultramafic composition has intruded the plutonic sequence of the western and eastern ophiolites. The crystal mush by which the MOR-type western ultramafic intrusions crystallized was supposed to be derived by disintegration of a relatively less depleted mantle section, whereas eastern ultramafic intrusions with IAT and partly boninitic affinity are formed due to the consolidation of a crystal mush derived by disintegration of a highly depleted mantle section.

Keywords: ophiolite, poikilitic wehrlite, pyroxenite, melt–mantle rocks interaction, lateststage magmatism

IMPACT OF NATURAL ZEOLITES ON THE GROWTH OF RYEGRASS ON SANDY SOIL

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ABSTRACT

Zeolites from Munella in Albania were used as supplements in the sandy soils of Divjaka region (central-western Albania) in an experiment to assess their effect on plant growth. The impact of natural zeolite in combination with NPK on the ryegrass growth and on the chemical properties of sandy soil was carried out in an experiment in the greenhouse at Agricultural University of Tirana. *Lolium multiflorum* was used as the experimental plant. Natural zeolites of Munella occur as separate layers hosted by andesite-dacite volcanic sequence of the eastern-type Albanian ophiolites. The zeolitic mineralisation consists of Stilbite-Stellerite solid-solution. Their cation-exchange capacity ranges from 192–242 meq/100g showing a strong affinity for the cations of Pb^{2+} , Cu^{2+} and Zn^{2+} . The respective concentrations of the exchangeable cations in zeolite were 137, 81 and 65 meq/100g, below the measured cation exchange capacity values. Divjaka is rich in undeveloped sandy soils characterized by a thin active layer, low content of humus and other essential nutrients of plants. Seven combinations of Munella zeolites with chemical fertilizers were used in the present experiment as a means to address the impact of zeolites in the increase of fertility of poor sandy soils. Soil and plant samples were analysed for pH, humus, cation exchange capacity, available P and K, total N, Cu, Zn, Mn, Fe, Ca and clay, as well as for total P, K, Ca, Mn, Cu, Zn and Fe. Zeolites are of great importance for agriculture as they enhance plant growth, improve the efficiency and value of fertiliser, improve water infiltration and

retention, improve yield, retain nutrients for use by plants, improve long-term soil quality and reduce loss of nutrients from soil. In addition, zeolites act as a buffer in improving the water capacity of soils, especially during the driest period of the year (July–August). Zeolites conserve longer soil humidity, and consequently healthier plants were obtained.

Keywords: zeolite, inorganic amendment, sandy-soil, Stilbite-Stellerite solid-solution

EFFECTS OF TWO COMBINED ORAL CONTRACEPTIVES ON PROTEIN C PATHWAY IN A GROUP OF ALBANIAN WOMEN

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ABSTRACT

Combined oral contraceptives, oral hormone replacement therapy and thrombophilia are recognized risk factors for venous thromboembolism in women. The present investigation aims at determining the effect of two combined oral contraceptives on the protein C pathway in the coagulation system of a group of healthy Albanian women. In this investigation, 36 women between the ages of 24 and 51 years, twenty of them taking ethinyl estradiol 30µg and gestodene 75µg and 16 of them taking ethinyl estradiol 30µg and levonogestrel 75µg for 1–2 months were included. The subjects had no history of thromboembolic disease. Plasma was used for measuring levels of PT, fibrinogen, protein C, factors V and VIII, both prior to and after stopping pill use. We used coagulometry to measure PT, factor V, factor VIII and fibrinogen, while protein C was measured using *enzyme-linked fluorescent assays (ELFA)*. Data were analyzed with SPSS 20 software. Comparison of values of the parameters between before and after treatment showed that concentrations of fibrinogen, protein C and factor VIII were significantly increased following treatment ($p < 0.05$), while no significant changes in the levels of factor V, PT and APTT ($p > 0.05$) were reported. The results show that changes in the haemostatic system and protein C pathway after oral contraceptive use might increase the risk of thrombotic situations. For women prescribed oral contraceptives predictive testing of haemostatic parameters is recommended.

Keywords: oral contraceptives, protein C, factor VIII, factor V, thrombosis risk

HUMAN PAPILLOMAVIRUS (HPV) AND CERVICAL CANCER KNOWLEDGE AMONG FEMALE ALBANIAN STUDENTS

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ABSTRACT

Human Papillomavirus (HPV) is the most common sexually transmitted infection affecting one-half to three-quarters of sexually active individuals over the course of their lifetime and the cause of 99.7% of cervical cancer cases. The present paper investigates awareness among Albanian female students about HPV and its relationship with cervical cancer. A questionnaire survey of students (N=568) between the ages of 18 and 26 years in the Faculty of Natural Sciences was conducted between December 2012 and January 2013. Nearly one-half of students (46.5%) affirmed that sexual activity is associated with cervical cancer, but only slightly more than one-third (37.9%) identified HPV as the leading factor in the disease. More than one-half (56.7%) of students were aware of cervical cancer detection with the Pap Test, just less than one-third (30.5%) were aware of the availability of protective vaccination, and nearly two-thirds (64.1%) were interested in being vaccinated. The results were analysed by two different age groups—18–21 years and 22–26 years. Member of the younger group were more aware of risk factors ($p<0.05$) such as multiple sex partners, sexual intercourse before age 18, and having contracted sexually transmitted diseases. Members of the older cohort were more aware of other risk factors ($p<0.05$) such as having genital warts, smoking cigarettes, use of oral contraceptives, poor diet or nutrition and use of tampons.

Keywords: Risk factors, HPV, Cervical cancer, Albanian students, vaccine

DISTRIBUTION OF SOME TRUE BUGS MIRIDAE (HEMIPTERA) IN DIFFERENT ECOSYSTEMS IN COASTAL ALBANIA

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ABSTRACT

Systematic and ecological data on true bugs (Miridae, Hemiptera) collected during 2011 and 2012 from coastal habitats near Kavaja, Albania, were compiled. Seventy-six individuals, representing 21 species from 15 genera, were analysed. *Deraeocoris* was the most represented genus, with three species (frequency, 14%) present. Fifteen species (two-thirds of those studied) were found in habitats at Mali i Robit, which had a level of diversity similar to nearby Golem (based on the Jaccard similarity coefficient), about 44 per cent. Nine species (43%) were Palearctic.

Keywords: True Bugs, Albanian *Hemiptera*, coastal habitats, Durrës

TIME TRENDS IN STATINS USED IN CARDIOLOGICAL CLINIC AT MOTHER TERESA UNIVERSITY HOSPITAL

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ABSTRACT

Hyperlipidaemia represents an important modifiable risk factor in the development and progression of coronary heart disease (CHD). Identification and treatment of patients with hyperlipidaemia play an essential role in the primary and secondary prevention of CHD. Inhibitors of HMG-CoA (3-hydroxy-3-methylglutaryl-CoA) reductase—statins—significantly reduce cholesterol synthesis. Their efficacy in reducing cardiovascular morbidity and mortality has been demonstrated in large intervention trials. The paper provides information about the trends of statin used to improve LDL cholesterol management and controlling risk factors. A retrospective study including randomly selected files (300) of the Clinic of Cardiology, Mother Teresa University Hospital Center was carried out from 2008 to 2010. Detailed demographic data, risk factors for coronary artery disease, presenting clinical characteristics, initial diagnosis, medications within 24 hours, medications at discharge, cardiovascular procedures, and hospitals characteristics were collected. When statins used, the prevalence of disease increased as age increased. Fluvastatin was used throughout 2008. From 2009–2010, atorvastatin and simvastatin were used in 51 percent (46–56%) and 32 percent (27–36%) of the cases, respectively. Statins are strongly recommended in patients with co-morbid CHD to achieve a target LDL goal < 100 mg/dL, and LDL < 70 mg/dL for very high-risk individuals with multiple risk factors. Diagnosis and treatment of hyperlipidaemia with statins in this high-risk group of patients has improved over time.

Keyword: coronary heart disease, hyperlipidaemia, lipid lowering, primary prevention, statin therapy

A REVIEW OF LOAN PORTFOLIO MODIFIED DURATION—DEFINITION AND MEASUREMENT

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ABSTRACT

Modified Duration indicates the percentage change in the price of a bond for a given change in yield. While it is an important and useful tool in investment decision making, it is often not well understood by retail investors. The present paper summarises and explains the concept of Modified Macaulay Duration (hereinafter referred to as modified duration), the most applied mechanism of measuring the sensitivity of the price (the value of principal) of a fixed-income investment to a change in interest rates in financial institutions.

Keywords: Modified Duration, measurement, sensitivity of the price

CLASSIFICATION OF BUILDING QUALITIES AND THEIR INVOLVEMENT IN PROPERTY MARKET VALUATION

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ABSTRACT

Real estate is most commonly defined as land and any improvements made to or on the land, including fixed structures and infrastructure components. The term is also used to describe the ‘bundle of rights’ associated with the ownership and use of the physical characteristics of space and location. Finally, real estate may be described as the business activities related to the development, construction, acquisition, operation, and disposition of real property assets. Real estate appraisal is the process of valuing real property. The value usually sought is the property’s market value based on: i) market environment changes, ii) location, iii) construction quality, iv) maintenance, and v) architecture, which relates to size, parking space etc. As an example of real estate appraisal in Albania, a qualitative report that provides information on the evaluation criteria for the quality of the real estate, is here summarised. It is recommended that market evaluation be undertaken using a weighted scoring model as a resource for the required standards.

Keywords: building qualities, market value, rental income

REACTION OF TWO SUBSPECIES OF *ASTER ALBANICUS* DEGEN TO DIFFERENT MEDIA DURING IN VITRO CULTIVATION

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ABSTRACT

The present paper investigates the reaction of bud explants of two Albanian subspecies of *Aster albanicus* Degen (subspecies *albanicus* and *paperistoi* Qosja) during *in vitro* cultivation. Explanting of apical and lateral buds was carried out via direct organogenesis in two stages. Stage I involved the proliferation of explants in half-strength Murashige and Skoog (MS) culture medium in the presence of auxin NAA (0.1 mg l⁻¹) and gibberellic acid GA₃ (0.1 mg l⁻¹), on which *paperistoi* Qosja developed better than *albanicus*. Stage II involved subculture in MS culture medium in the presence of cytokinin BAP (1 mg l⁻¹) and auxin NAA (0.1 mg l⁻¹). Height growth and the production of secondary adventive buds were recorded during subculture for *Aster albanicus paperistoi* Qosja (Divjaka) but not for *Aster albanicus albanicus* (Shkopet). After one week all plantlets displayed marked chlorosis.

Keywords: *Aster albanicus* Degen, explants, MS culture medium, micropropagation, subculture

ALBANIAN CLIMBERS AT THE SUMMIT OF MOUNT EVEREST

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ABSTRACT

The present paper provides information on physiological adjustments to Mount Everest environment and the schedule followed by the first Albanian climbers of Everest who ascended to the summit of the mountain. The climbers' aerobic profiles both before and after the ascent are here reported, along with the experiences of the climbers themselves.

Keywords: Mount Everest, Albanian climbers