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PETROGRAPHY OF THE DUNGAN FORMATION
EASTERN SULAIMAN RANGE, PAKISTAN.

BY

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Abstract: The Dungan Formation is palaeocene to Early Eocene in age and comprises a 98m thick predominantly carbonate sequence. It extends about 200 km from north to south along the Sulaiman Range. The formation consists of nodular to massive limestone with subordinate shale, marl, sandstone and limestone conglomerates. The limestone is dark grey to brown and creamy white, and weathers brown, grey and buff yellow. In the southern Sulaiman Range, the shale becomes more as compared to that of northern part. The shales are dark blue grey, brown and olive in colour, which weathers grey to green. The conglomerates are usually composed of pebbles and cobbles of grey and brown limestone and marl, embedded in a matrix of soft, ash grey calcareous shale.

The Formation is rich in fossils including foraminifers, gastropods, bivalves and calcareous algae. The foraminifers belong to miliolids, coskinolina, lockhartia, miscellanea, ranikothalia, nummulites, assilina, operculina, alveolina, discocyclina, athecocylina, actinosiphon, globorotalia and globigerina. The calcareous algae are mainly red algae which includes archaeolithothamnium, lithothamnium, mesophyllum, lithophyllum, and jania, where as the green algae are clypenia, trinocladus, and acicularia. The other fossils are bryozoa, echinoderms, mollusks and corals. The cement types in the formation includes peloidal, neomorphic, isopachous bladed, drusy, and syntaxial overgrowth. On the basis of this study the formation comprises of calcareous mudstone, wackestone, packstone and grainstone.
RHYOLITE FROM THE ISLAND ARC SEQUENCE OF THE BELA OPHIOLITE-MELANGE COMPLEX, PAKISTAN

BY

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AND

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Abstract:- Feldspar-pyric rhyolite occurs as a conspicuous feature of the outcrops near Goth Sahfi (GPS=27°32.5’ N: 66° 23’E), north of Wadh town in Balochistan. The rocks occur within a suprasubduction zone island arc complex, that makes an essential component of the Bela ophiolite-melange complex. The major-trace-and rare earth-element contents of the rhyolite, alongwith those of toher acidic rocks from the same complex, have been determined. The rhyolite represents the most evolved amongst the igneous rocks of the island arc sequence, and formed by the fractional crystallization of basaltic magma without crustal assimilation. The chondrite-normalized REE patterns of this island arc sequence exhibit progressive enrichment in REE with magmatic evolution, culminating with crystallization of rhyolite.
FLUID INCLUSION STUDY OF THE STRATABOUND TUNGSTEN AND STRATIFORM LEAD-ZINC MINERALISATIONS CHITRAL, NORTHERN PAKISTAN

BY

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Abstract:– Stratabound tungsten and stratiform lead-zinc mineralisations lie within the Hindu Kush terrane, Chitral, northern Pakistan. Scheelite has been found mainly in the calc-silicate quartzite and subordinate tourmalinite associated with metapelite at Miniki Gol. Whereas the stratiform and stratabound lead-zinc mineralization is mainly confined to the marble horizon at Besti Gol. The conformability of the sulphide mineralization with the host marble indicates that the lead-zinc mineralization has been precipitated in synsedimentary environment. In contrast, tungsten at Miniki Gol appears to be genetically related to leucogranite that is exposed 400m away from the scheelite mineralization.

Miniki Gol metasediments have undergone at least two deformational events accompanying Barrovian-type of metamorphism followed by the emplacement of leucogranite.

The fluid inclusion study of the Miniki Gol tungsten deposits and Besti Gol lead-zinc deposits indicates the presence of two contrasting hydrothermal fluids. The former is dominantly aqueous whilst the later contains substantial amount of volatiles including CO₂, CH₄ and ± N₂. The consistency of the fluid inclusions both within leucogranite and calc-silicate rocks signify a genetic link between the scheelite mineralization and the possible post-magmatic hydrothermal fluids. Both the salinity and temperature of the hydrothermal fluids decrease from leucogranite and pegmatite to scheelite-bearing calc-silicate quartzite indicating an influx of possible meteoric water.

The presence of CO₂ in the miniki Gol pegmatite and the occurrence of calcite in the calc-silicate rocks probably suggest two phases of the same fluid, the earlier CO₂-rich and later aqueous fluids. The volatiles such as CO₂ and B in the ore-forming solutions may have played a role in the transportation of tungsten. Subsequent removal of CO₂ and high pH value in the tungsteniferous fluids have probably facilitated the precipitation of scheelite. On the basis of thermometric data, a temperature of 450 ± 50°C is proposed for the growth of scheelite in the study area.
THE STUDY OF THE EVOLUTION OF HAZARA KASHMIR SYNTAXIS IN NORTHERN PAKISTAN AND ITS EFFECTS ON THE CIVIL ENGINEERING STRUCTURES BASED ON GRAVITY AND MAGNETIC DATA

BY

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AND

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Abstract: Gravity and magnetic study in the Hazara and its adjoining areas of Northern Pakistan indicated sedimentary and metasedimentary wedge in the form of Hazara-Kashmir Syntaxis (HKS) which exists on the Precambrian crystalline crust of Indian shield. This study also indicates the presence of decollement under the western limb and absence under the eastern limb of HKS. The gravity modeling shows the crystalline crust of 38 km which extends all the way in the Lesser and Sub-Himalaya of Northern Pakistan and occurs as faulted blocks between hazara Lower Seismic Zone (HLSZ) and Bagh Basement Fault (BBF). There is no indication of the pre-existing horst or projection on the leading edge of the Indian Plate. The presence of decollement under the western side of Jhelum fault and absence under the eastern side and the collision of Indian and Eurasian plates are responsible for the formation of HKS. The southward migration of sedimentary and metasedimentary wedge of the western limb of HKS developed the Jhelum fault. At present the western limb moves southward between Jhelum and Kalabagh faults. The seismicity in the area along this fault is low due to the presence of decollement but the area is tectonically very active. The western limb of HKS moves southward at a rate of 2cm per year and 41Km net slip was calculated along the Jhelum Fault. The folding, faulting and landsliding along the Jhelum fault, Kalabagh fault and the Salt Range Thrust Front (SRTF) have been observed. As a result of southward movement of western limb of HKS the cracks develop in the RCC structures constructed across the river Jhelum which is running along the Jhelum fault. The roads constructed along the river Jhelum are also damaged due to the active nature of the Jhelum fault.
Abstract:- The depositional style and the diagenetic events in the Jurassic carbonate shelf deposits of the Samana Suk Formation exposed at Sikhar Ridge (Sangargali) and the Thai Barrier Sections, near Abbottabad (along the Abbottabad-Nathiagali Road) has been studied. As far as twenty-nine microfacies have been identified in both the sections, but few selective have been illustrated. The sediments in the Samana Suk Formation have been subjected to various diagenetic events, of which dolomitization is the most significant. At least two phases of dolomitization have been determined. The zonation in the dolomite crystals represents the nature of the pore water chemistry. Dedolomitization has led to the development of porous horizons.
SODIUM PYROXENE IN THE KOGA FELDSPATHOIDAL SYENITES, BUNER SWAT, NW PAKISTAN

BY

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Abstract:- The Koga feldspathoidal complex predominantly comprises of foyaites, foyaitic feldspathoidal suites, garnet bearing feldspathoidal syenites and pulaskitic feldspathoidal syenites. Clinopyroxenes in these rocks suites from various intrusions and dykes have been analyzed by electron microprobe. Sodic pyroxenes are unusual and fall within the narrow field of aegirine- jadeite. Aegirine compositions range from $Ae_{75} \ Jd_{25}$ to $Ae_{80} \ Jd_{20}$ and hedenburgite component is absent. The chemistry of aegirine in the feldspathoidal rock suites has been interpreted and their evolutionary trend is discussed. The proxene fractionation trend established in the Koga feldspathoidal suites appears to be unique.
MUD TURBIDITES FROM THE MADEIRA ABYSSAL PLAIN, WEST OF GIBRALTAR, NORTH ATLANTIC.

BY

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Abstract:- Three cores, two (DII806) from the southern and one (DII813) from the northern area of the Madeira abyssal plain, each 15m to 18m long, were studied in detail. These cores were selected due to their thick, fine grained nature and environmental significance. The muddy sediments in these cores may be divided into hemipelagite and turbidite facies on the basis of sedimentary structures, texture and composition. Turbidites and hemipelagites regularly alternate with each other, together with a few amalgamated turbidites. The ratio of turbidite to hemipelagite in these cores ranges from 13:1 to 6:1. Hemipelagites are highly to moderately bioturbated, mottled with ring type burrows, rich in forams and nannofossils. Turbidites display a variety of primary structures that include cross lamination (T), parallel lamination (T), indistinct parallel lamination (T), homogenous mud (T6-7) and bioturbated mud (T). The internal organization of the sedimentary structures is complex showing no obvious and consistent vertical sequential arrangement, but the general upward fining from silty bases to muddy tops, the type and general sequence of the sedimentary structures and the general restriction of Dioturbation to the tops of these beds all suggest that were deposited essentially from gravity driven, initially turbulent flows that gradually waned in energy (low concentration turbidity flows). The internal variability and multiple repetition of sedimentary structures tend to favour deposition from pulsatory turbidity flows. It is believed that during earthquakes or other widespread slope failure, several slum-generated mass flows may be initiated at different points along the open margin, evolving into turbidity flows of different size and hydraulic behaviour, which ultimately may coalesce to form a large flow consisting several pulses.
To detect the extent of saline intrusions in the sediments of Morfa Bychan area, a small coastal town situated between Criccieth and Porthmadog, North Wales, U.K., combined resistivity, electromagnetic soundings and chemical methods were used.

A total of thirty one vertical electric soundings (VES) were made at selected sites using Simple Wenner & Offset Wenner arrays and twenty three electromagnetic (EM) soundings were also measured at selected Centres of the sites where previously VES were made in the study area. Several of these soundings were measured adjacent to borehole sites to aid in correlating the geophysical interpretations to chemically detected water quality data. By correlating the interpreted surface geophysical data to water quality data from the boreholes, depth to a bulk resistivity ranging from 8 ohm-m to 35 ohm-m (or chlorides concentration from 250ppm to 500ppm/ a mixing water or transition zone) and depth to a bulk resistivity of 7 ohm-m or less (or 500ppm chloride concentration or more/a saline water zone) could be mapped in an unconfined aquifer.

The permeability values of the sediments by field and laboratory tests gave additional supporting data.

The study revealed that combined electrical and chemical observations provide a dependable means for the detection and mapping of saline intrusions and that the aquifer in the area has been intruded and the extent of saline intrusions is a function of permeability, volume of fresh water, sand dunes and bed rock available to prevent inland movement.
CONODONTS FAUNA FROM
COL DES TRIBES, MONTAGNE NOIRE, FRANCE

BY

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AND

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Abstract: The Study of Conodonts in a 37 meters thick stratigraphic section of the Griote Formation at Col des Tribes (Mont Peyroux), was carried out. As a result of the analysis, 23 species of the genera Ancyrodella, Ancyrognathus, Icriodus, Palmatolepis and Polygnathus were discovered which indicate the zones of Rhenana, Traingularis, Crepida, Rhomboidea and Marginilera.
Abstract:- A preliminary palynological study of the Tobra Formation, Nilawahan Gorge, Central Salt Range has yielded a relatively rich and well preserved palynoflora dominated by miospores and pollen grains. The palynoflora is dominated by gymnosperm pollen grains of both monosaccate and bisaccate origin. These are Aratrisporites fischeri, Cannanoropollis niazuddinii, Densipollenites indicus, Nuskoisporites cf. N. dulhuntyi, Plicatipollenites indicus, Plicatipollenites trigonales. All of these are monosaccate pollen which are described here systematically.
GEOTECHNICAL EVALUATION OF A WEIR SITE ON KURRAM RIVER, MIANWALI

BY

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Abstract: Exploring of sub surface soil and rock condition has long been an item of interest for those involved in evaluation of soil and rock as a foundation material. Horizontal and vertical variations of soil and rocks have introduced a large scatter of engineering characteristics of these materials. The need of detailed investigations prior to any engineering activity has increased with increasing scientific knowledge. The purpose of this paper is to present the variation of various engineering characteristics and parameters of an area near lsakhel in Mianwali District on Kurram River.
Abstract:- Environmental geological study of the Dera Ghazi Khan area has been carried out through five maps of environments to maintain natural environments. The maps inform about geology, natural resources, land use planning, water resources and its management and geological hazards about development of the area. These information are helpful to the financial advisors, urban planners and government advisors for fast development of the area without loss of life and property.