Coarse sediments in the Eastern Mediterranien

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Coarse edaphogene material within the deposits of slopes and foots of large positive structures of the Mediterranien Sea bottom was studied by cores up to 350 cm long located along seismic profiles, which run through the West Tartus Ridge and Anaximander Mountains (Training through research cruise, R/V "Gelendzhik", 1991). Under the recent oxidated mud cover large fragments are encountered in the deposits of Early Holocene and Wurme age practically pervasively in the form of single inclusions, admixtures up to 25% and individual accumulations containing varying quantity of carbonaceous-clay matrix.

With regard to roundness clasts and size grus and gravel (0,1-1 cm), scree debris and pebble (1-10 cm) are encountered within fragmental components. Depending on the proportion of these components, gravel-grus deposits, breccia, conglomerates and breccia-conglomerate are described. The most widely developed are coarse clastics composed of the material subsynchronous to Holocene and Wurme deposits. Usually, such accumulations are represented by clay breccia-conglomerate of landslides from the slopes. Scree debris of carbonaceous micritic crusts which have been likely broken on the bottom surface due to the movement of underlying sedimentary masses constitute a considerable part of the clastics. The more rarely encountered are fragments of redeposited sapropel.

In the deposits of several cores coarse material was found, which was more ancient than that of Quaternary age. So, breccia occurs at the depth of 2326 m in the deposits of the trench South-Westwards of the crest Anaximander Mountains within the interval of 27-45 cm from the bottom surface. Alongside micritic-carbonaceous and clay fragments, subsynchronous to Late Wurme time, the breccia contains flattened acute angular fragments of terrigene and carbonaceous bedrock. Among greenish terrigene fragments aleuritic-micaceous compacted clay and graywacke sandstones have been identified. The graywackes are composed of quartz-chlorite-carbonate altered rock, the products of dezintegration. One of the carbonaceous rockfragments is represented by intrabiosparite of shelf-facies genesis, where Y.Y. ZAKREVSKAYA has identified *Nummulites* ex gr. *globulus* Leym. and *Discocyclina* ex gr. *nummulitica* Gimbel of Eocene age. Another fragment of limestone is referred to biosparite and composed of Foraminiferas, where V.G. KOURENKOVA has identified *Orbulina suturalis* d'Orb., *Globigerina bulloides* d'Orb., *Globigerinoides* sp., *Globorotalia* sp. of middle Miocene and Pliocene age. The fragments of dark-coloured carbonaceous-argillaceous-carbonate rock of the same age are found in the deposits of the lower part of the South-Eastern slope of the West Tartus Ridge (the depth is 1515 m) within the interval of 160-168 cm from the bottom surface.

It is characteristic that the breccia with fragments of Tertiary bedrock occurs above accumulations of coarse clastics, subsynchronous to Wurme deposits. This evidences that relief-forming processes took place even till Late Holocene period, due to progressive development of tectonic movemenets, causing first relict silt sliding and redeposition and then the desintegration of the bedrock of upheavals and trench slopes.

Study of the soil deposition on the river Seman Mouth by the use of Cs-137

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Albanian rivers every year transport in suspension to the sea about 50 million tons of sediments (1). Depending on this and on the elements in the hydrological regime of the near shore part of the Adriatic sea, the sea shore line has changed considerably and erosion and deposition parts are formed. One of such deposition part is that of the river Seman mouth. The soil here is salty and does not tilled agriculturally.

Our aim was to determine the mean depth of the depositions in the northern part of this mouth (Fig. 1). We have choosen three points. The distance between points P1 and P2 is about 250 m, while that between points P1 and P3 is about 100 m. The three points are about 1.5 km far from the seashore line.

The method used was that of Cs-137. Cesium, after being in touch with soil, is strongly absorbed and later movements of this radio-nuclide are mostly due to the physical movement of the soil particles (2). In ref. (3.4) cases are given were this radionuclide is used in the soil erosion studies.

Cs-137 is one of the main products of nuclear fission because of its relatively high yield. 5.57 nucley are formed every 100 fissions (5). By calculations we find that, during fission of the nucley in an installation with 1 Mt fissionable energy, the produced Cs-137 activity is 5.88E+09 MBq. The high value of cesium depositions takes place one year later than the explosion.

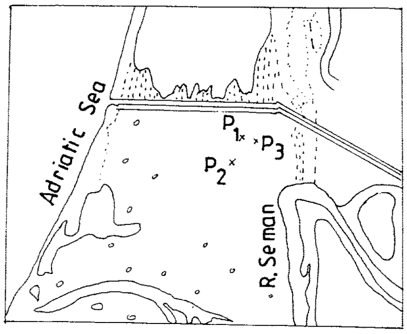

Fig. 1 The position of the points of the study

At the three points we digged up holes of 2 m depth. In the first two holes, in November 1986, the soil samples were taken 5 cm thick, while in the last, in June 1987, 2.5 cm. The samples were dried in 130°C, then they were ground in a mill and sieved through a 100-μm sieve. About 500 g of material was placed in a marinelli beaker to measure the activity. The system used was a gamma-spectrometric one. It consists of a Ge-Hp detector, a 4000 channel analyzer and a IBM XT microcomputer.

The dependances from the depth of the Cs-137 activity in Bq/kg are shown in Fig. 2 and Fig. 3. At the three points, beyond the depths 190 cm, 100 cm and 135 cm, respectively, the material was mainly sand. The respective measurements were excluded. The depths of the soil from the surface to 5 cm are distinguished by a high activity of the Cs-137. This is due to the Chernobyl accident in April 1986. This pollution can be used as the time reference point in cases when the depositions are to be determined. Beyond this depth the quantity of this nuclide increases. The oscillations of the values of Cs-137 can be explained both from the quantity of the Cs-137 that fallout has deposited on the zone of the river in a particular year and from the oscillations in different years of the sediments transported in suspension.

The highest value of the Cs-137 is obtained at 137 cm depth for point P1 and 130 cm for point P3. These depths correspond to the depositions of the year 1963, one year after the maximum of the nuclear explosions. The point P1 in 1957 was between 1 m and 1,5 m under the sea level. This we found from the maps compiled before 1960. At these depths a small part of the sediments was deposited on the sea-bed. The depositions mostly took place at the less depths. They were small when the points were above the sea level and happened when the river gushed. The maximum of Cs-137 at the 180 cm depth corresponds to the depositions of 1955, one year after the peak of nuclear explosions of 1954. At the point P1, the mean annual deposition from 1955 to 1963 is 5 cm and from 1963 to 1986 is 6 cm. After 1963 the depositions are more extensive, the sea is more shallow, so, after about 5 to 10 years this point would be at the sea level.

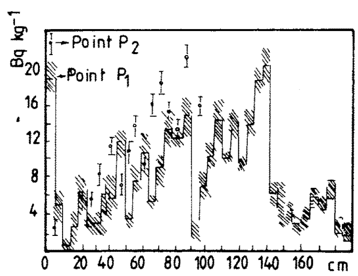

Fig. 2 The dependances of ^{137}Cs activity from the depth, points P1 and P2.

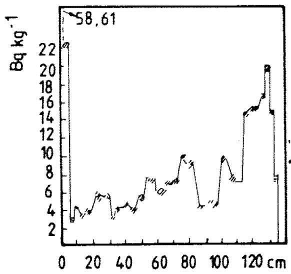

Fig. 3 The dependance of ^{137}Cs activity from the depth, points P3.

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