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Geological structure of the Earth's crust above the Moho discontinuity in Yugoslavia

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Summary. The Moho discontinuity was modelled on the basis of the 6 DSS profiles across the Yugoslav area, by the use of regression analysis and expressed by fitting surfaces from the 1st up to the 4th degree. Their characteristics were correlated to the geological structure of the Earth's crust, with intention to point out their connection with the deformations of the Moho discontinuity.

The Moho surface was determined by the synthesis of data from the 6 DSS profiles across the Yugoslav area (after Drageševic & Andrić 1982) and from the corresponding data for neighbouring countries (after Beranek *et al.* 1980, Cassinis 1983, Chermak & Rybach 1982, Conrad 1982, Giese 1983, Ibrmayer *et al.* 1983, Kiskyras 1981, Morelli 1983, Radulescu *et al.* 1977, Sollogub & Chenukov 1983, Velinov & Petrov 1976). A relatively narrow belt of the greatest Moho depth stretches beneath the Dinarides from the Alps to the Hellenides (Fig. 1). Among the shallower sections an uplifted belt stretching from the southern Alps through the Adriatic basin to the Mediterranean is distinguished. To correlate the forms of the Moho deformations and the geological structures above it, the Moho was modelled by regression analysis and expressed by fitting surfaces of the 1st up to the 4th degree. In such a manner the Moho beneath Yugoslavia was separated into 3 individual units. The first one is mainly comprised of the Pannonian basin and a large part of the Dinarides, the second one the Adriatic basin and the third one the Serbo-Macedonian massif including part of the Dinarides and Hellenides. The residuals for each of the separate units (i.e. the differences between the Moho and the corresponding regression fitting surfaces) were studied in detail. They were correlated to the DSS profiles as well as to the surface geological structures and specific care was taken concerning the form and length of the boundaries between the uplifted and deeper parts of the Moho discontinuity in respect to fitting surfaces. According to such residual boundaries *supposed fault zones* (SFZ) were extended and classified into 3 categories depending on the number of appearances on particular residual maps in respect to fitting surfaces of the 1st up to the 4th degree. The following SFZ were emphasized: Zagreb-Banja, Luka-Čačak, middle Adriatic islands-Dubrovnik-Albania and Livno-Albania (Fig. 2). The SFZ Zagreb-Banja Luka-Čačak and shorter segments between Čačak and Niš, the area around Skopje and northeast from Ljubljana corresponded to the faults determined on the DSS profiles. However, the middle Adriatic-Albania SFZ could not be correlated to the DSS faults, although a very steep slope of the Moho existed along the SFZ.

In addition, the most important Earth surface faults were considered. They bound the geotectonic units and larger structural complexes and zones in the observed area (after: Andelković, 1982, Dimitrijević, 1982, Grubić, 1980, Herak, 1986, Sikošek & Medvenitsch,

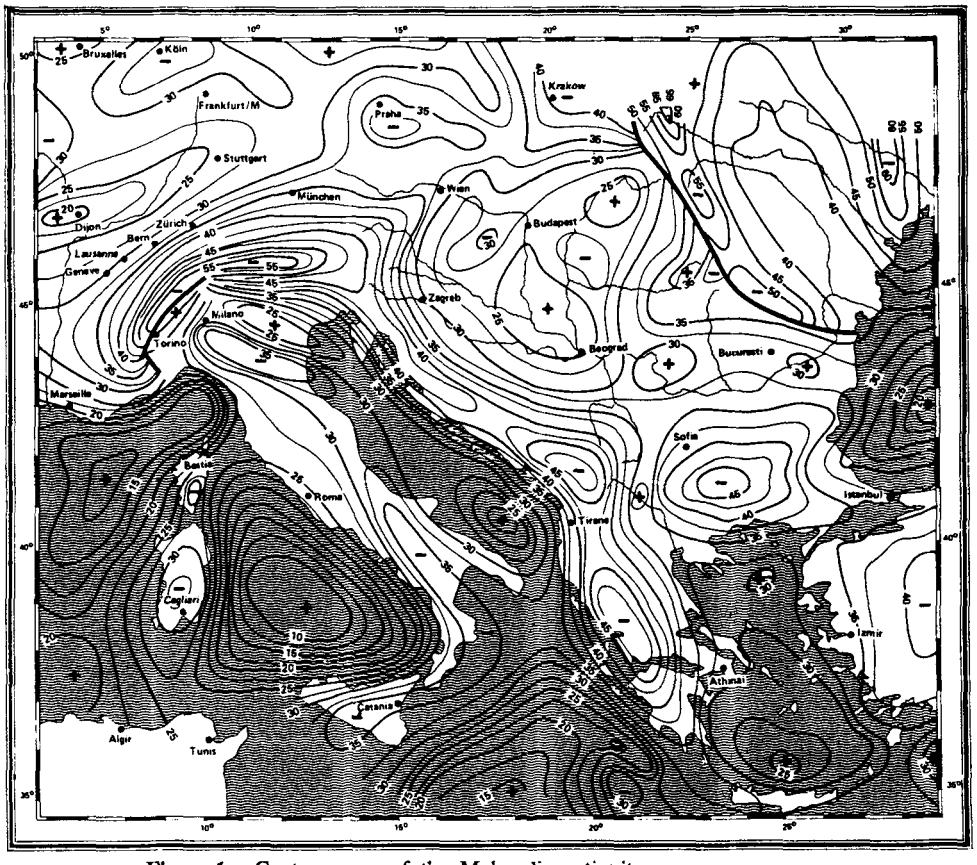

Figure 1. Contour map of the Moho discontinuity

1965). Their relationship to the SFZ can be seen on Fig. 2 (overleaf), where the probable projections of the same faults to the Earth surface and to the Moho are illustrated. As an example we can mention that the most active seismotectonic zone of the area stretches NW-SE with the earthquake foci located in the contact zone between rocks beneath the Adriatic basin and Dinarides. The zone coincides entirely to the extension of the SFZ defined by the steep slope of the Moho.

Satisfactory correlation to the surface and deep geological structures was also achieved within the contact zones between the Dinarides and Alps, Adriatic basin and Alps, Pannonian basin and Serbo-Macedonian massif and Dinarides. Obviously they were the belts of larger deformations and rearrangements of Moho which transferred towards the Earth's surface. Some sections of the contact zones present recent seismotectonic active structures.

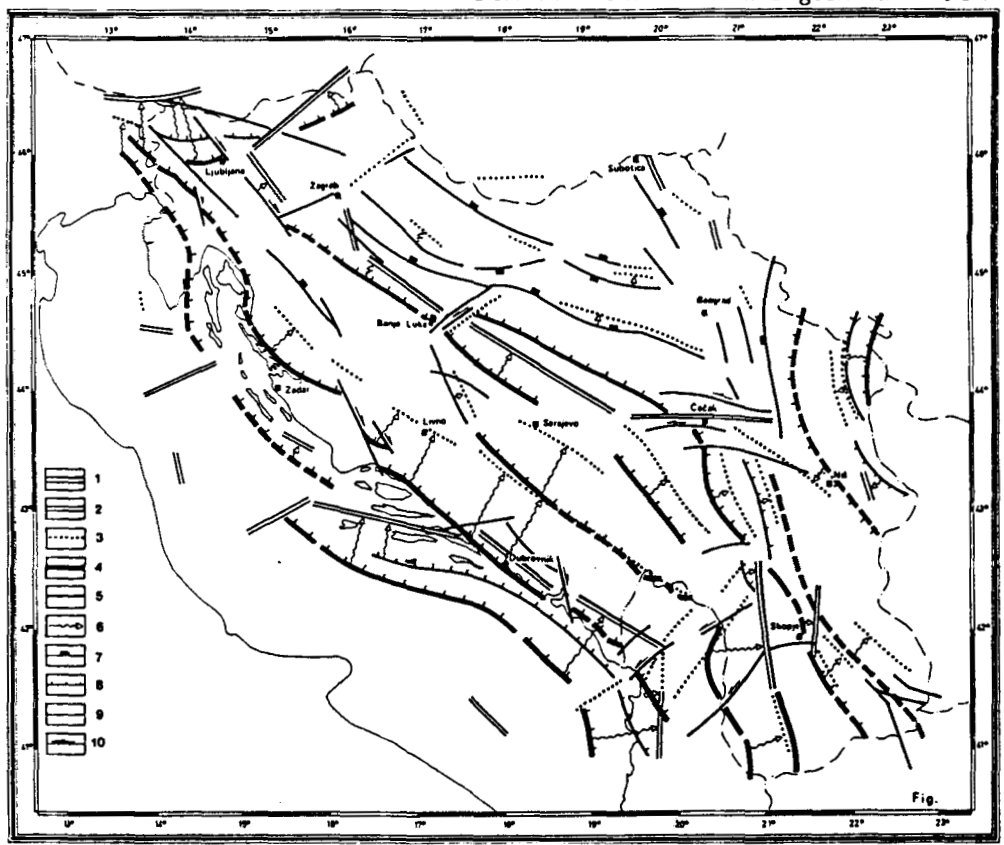

Figure 2. SFZ determined on: 1) 3 or 4 residual maps, 2) 2 residual maps and 3) only 1 residual map. Earth surface faults bordering: 4) geotectonic units and larger structural complexes and 5) larger structural zones. 6) probable projections of the same fault to the Earth's surface and to the Moho. 7) important surface fault with no relationship to the Moho. 8) reverse fault. 9) normal fault. 10) horizontal slip fault.

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