

MITUCH E., POSGAY K., V. B. SOLLOGUB, A. V. TCHEKUNOV, L. A. KHILINSKIJ

## KÍSÉRLETI FÖLDKÉREGKUTATÓ SZEIZMIKUS MÉRÉSEK DEBRECEN (MNK) ÉS BEREKSZÁSZ (SZU) KÖZÖTT

A cikk ismerteti a Kárpát-Balkáni Földtani Asszociáció határozata szerint tervezett III. számú nemzetközi kéregkutató vonal mentén végzett magyar-szovjet előkészítő kísérleti mérést és az eredményeket.

Э. МИТУХ, К. ПОШГАИ, В. Б. СОЛЛОГУБ, Л. А. ХИЛИНСКИЙ, А. В. ЧЕКУНОВ

## ОБ ОПЫТНЫХ РАБОТАХ ГСЗ В РАЙОНЕ Г. ДЕБРЕЦЕН (ВНР) И Г. БЕРЕГОВО (УССР)

Описываются совместные советско-венгерские опытные работы по международному профилю ГСЗ № III, предусмотренному решением Карпато-Балканской геологической ассоциации и излагаются полученные результаты.

## EXPERIMENTAL SEISMIC CRUSTAL INVESTIGATIONS BETWEEN DEBRECEN (HPR) AND BEREGOVO (USSR)

E. MITUCH, K. POSGAY, V. B. SOLLOGUB, A. V. TCHEKUNOV,  
L. A. KHILINSKIJ

Within the Carpatho–Balkan region and the neighbouring parts the Earth's crust has an extremely complicated and varying structure. The VI-th session of the Carpatho–Balkan Geological Association (Cracow, 1963), considering the important scientific and practical significance of the knowledge of the crustal structure, planned a program of seismic crustal investigations along several international profiles.

Among the profiles planned, Profile III is one of the most important (Fig. 1). It passes through the area of the Ukrainian SSR (Ostrog–Dolina–Beregovo), of the Hungarian PR (Debrecen–Szeged) and of the Yugoslavian SR (Szeged–Dubrovnik), traversing, from NE to SW, the Russian Platform, the foreground of the Carpathians, the folded Carpathians, the Sub–Carpathian Basin, the Pannonian (Hungarian) Basin adjacent to the former, and the Dinarides, ending at the Adriatic Sea. Along this profile, in order to prepare a successful execution of the investigations, the Soviet and the Hungarian

A kézirat 1966. XII. 1-én érkezett.

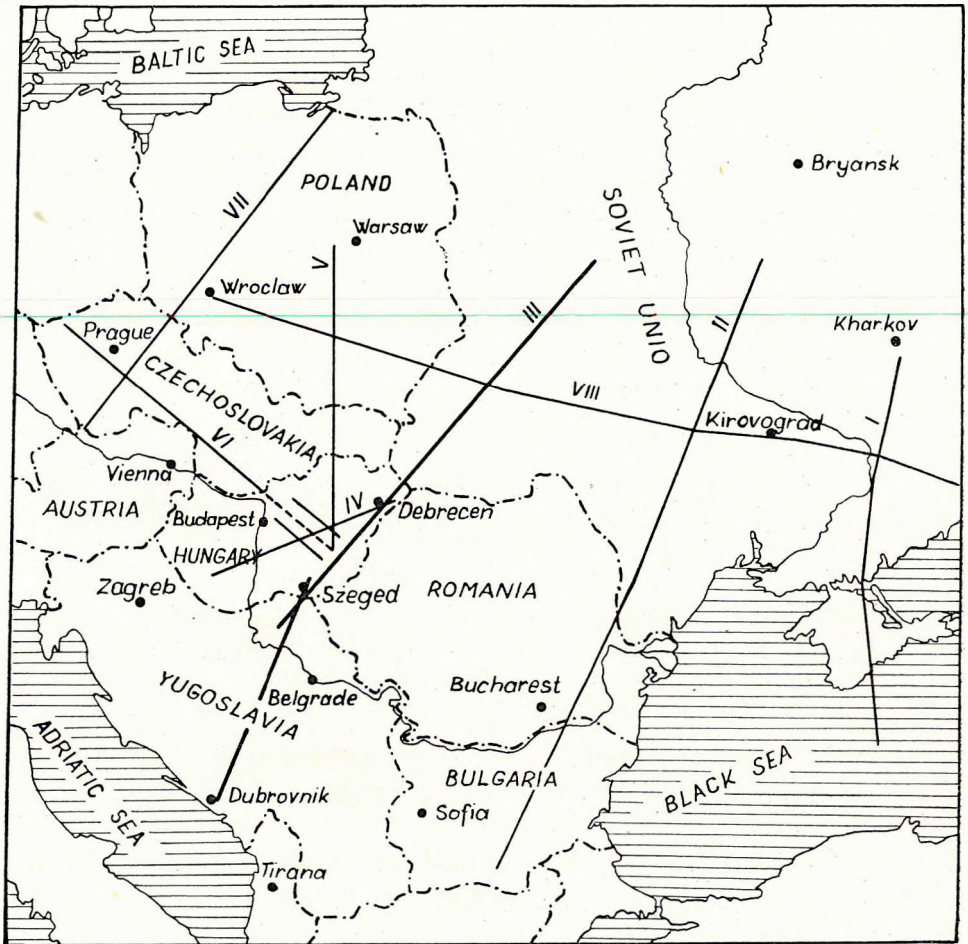


Fig. 1. International profiles of seismic crustal investigations

1. ábra. A nemzetközi szeizmikus földkéregkutató vonalak

Фиг. 1. Международные профили ГСЗ

geophysicists (the Geophysical Institute of the Ukrainian Academy of Sciences and the Roland Eötvös Geophysical Institute in Budapest) carried out joint experimental measurements in 1965 (SUBBOTIN et al., 1965; TCHEKUNOV et al., 1965; MITUCH — POSGAY, 1965). On the territory of the Ukrainian SSR, shots were made in two points, and the generated elastic oscillations were recorded on the territory of Hungary (A, B) at distances of 76,55, 91,37, 91,63 and 106,42 km. On the Hungarian side, similarly two shots were made, and the resulting waves recorded in the region of Gorbok (Ukrainian SSR) at distances of 82,8 and 115,4 km (C, Fig. 2). The charges varied between 300 and 480 kg.

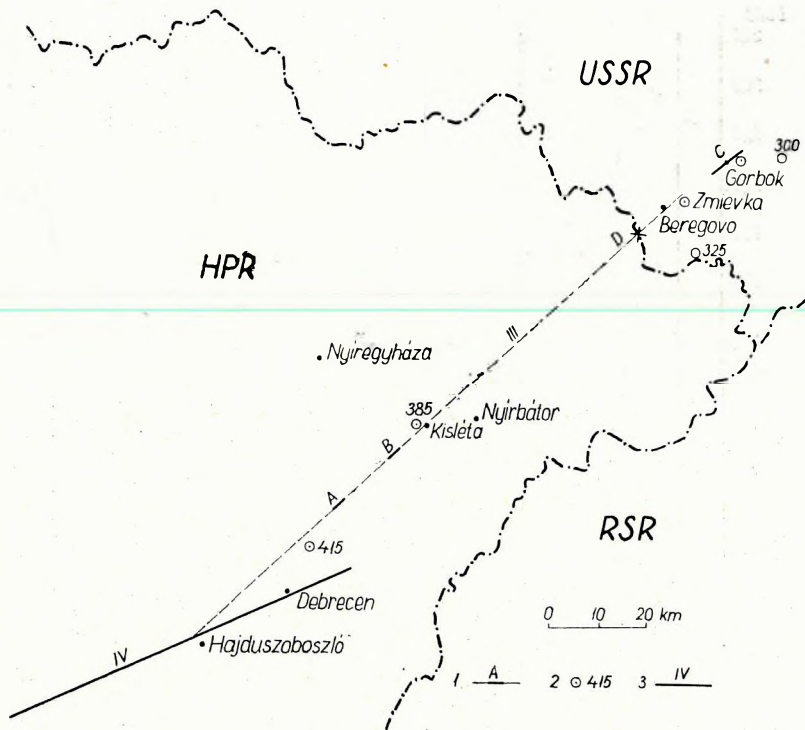


Fig. 2. Plan of shotpoints and recording sites

- 1 - instrument positions
- 2 - shotpoints
- 3 - crustal profile

2. ábra. A robbantó- és regisztrálási pontok elhelyezésének vázlatja

- 1 - műszerállások
- 2 - robbantópontok
- 3 - kéregkutatói szelvény

Фиг. 2. План расположения пунктов взрыва и пунктов регистрации

- 1 - стоянки сейсмостанций
- 2 - пункты взрыва
- 3 - профиль ГСЗ

The seismograms recorded both by the Soviet and the Hungarian side give evidence of relatively favourable wave-propagation conditions. Of course, the small amount of the obtained information does not permit accurate conclusions on the crustal structure over the area investigated, still it proved to be sufficient to determine the approximate depth and dip of the Mohorovičić surface, further the position of the so-called "granitic layer".

In Fig. 3, the schematic time-distance curves and the roughly outlined structure of the Earth's crust along the profile Debrecen-Beregovo can be seen. The velocities calculated from the time-distance curves allow to conclude to the existence of two seismic boundaries: the first boundary with a velocity of 6,1 km/sec is probably the surface of the so-called "granitic layer", the



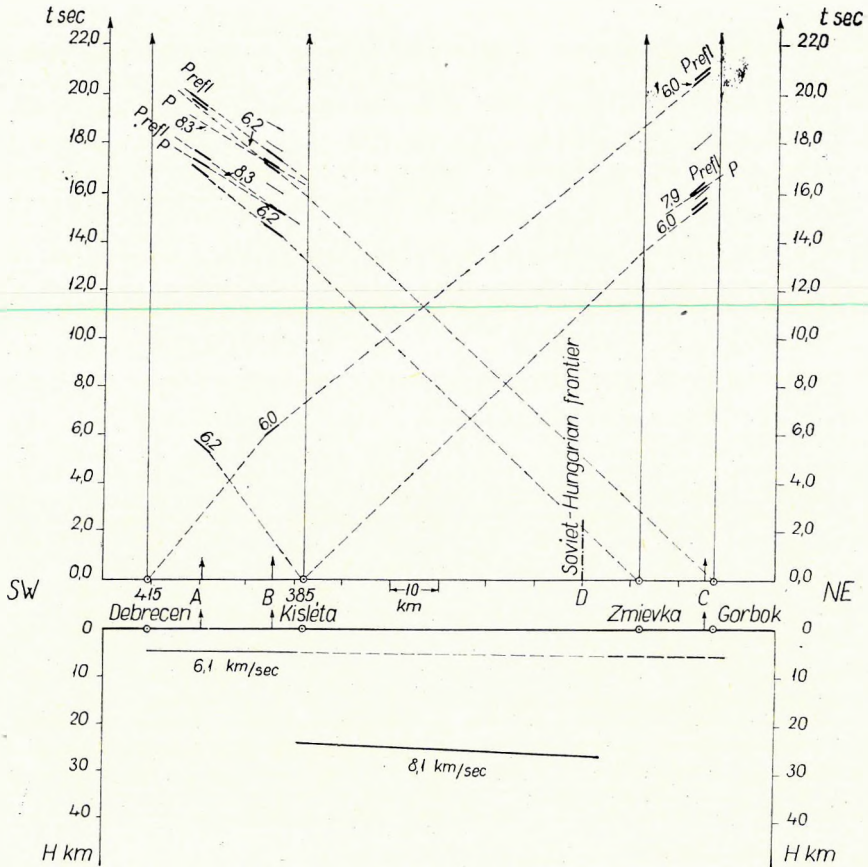


Fig. 3. Time-distance curves of the common experimental measurements and a rough outline of the crustal structure

3. ábra. A közös kísérleti mérések útidőgörbéi és a földkéreg durva felépítése

Фиг. 3. Годографы, полученные при совместных советско-венгерских опытных работах и схема строения земной коры

second is the Mohorovičić surface. From the latter, some transcritical reflexions ( $P_{refl}$ ), on some of the seismograms also refracted waves ( $P$ ) were recorded.

The boundary with a velocity of 6,1 km/sec was determined from the time-distance curve branches of the seismograms, one of an apparent velocity of 6,0, the other, of 6,2 km/sec. This boundary lies in a depth of 5,0 km and shows a certain dip towards NE.

The depth and the dip of the Mohorovičić surface was determined from refracted waves with apparent velocities of 7,9, resp. 8,3 km/sec, further from transcritical reflexions. This surface is similarly dipping towards NE; its depth is increasing from 24,0 km in the south-west to 27,4 km in the north-east.

As it is known (GÁLFI—STEGENA 1960, MITUCH—POSGAY—SÉDY 1964), the depth of the Mohorovičić surface was found earlier to be 23,9 km; this is in a good agreement with the presently obtained data. On the NE end of the profile, the constated depth of the Mohorovičić surface (27,4 km) similarly agrees with the data of the seismic deep soundings made in the north of Beregovo earlier; here, the thickness of the Earth's crust attains 30,0 km. Consequently the data obtained for the depth of the Mohorovičić surface may be regarded as reliable.

Finally it is worth mentioning that the seismograms recorded on Soviet territory show some further, much later and fairly definite arrivals. These may probably be related to seismic boundaries well below the Mohorovičić surface.

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