

Examples from the activity of ELGI abroad*International Geological Expedition in Cuba**

The Hungarian–Cuban complex geological and geophysical group continued its activities in the region of Holguin (southern part of Cuba) in the framework of the International Geological Expedition established by the countries of the Council of Mutual Economic Aid. By the end of 1986 the geological mapping of an area of 3310 km² on a scale of 1:50,000 and the supplementary regional geophysical prospecting as well as the geological–geophysical prospecting for mineral resources on a scale of 1:25,000 of an area of 72 km² had been performed on the territories, that had become known during mapping and that were considered to be perspective from the point of view of mineral resources.

In the area of investigation, mineralization is usually connected with metamorphism along diorite–gabbro veins penetrated into serpentinite ultramafics. Some ore indications, e.g. that of the name Mayabe–Santa Maria, seem to be prospective for gold and copper. The pyritized metasomatic zone below the surface iron cap can easily be traced by geophysical methods. The prospecting drillings verified the geophysical indication and the extent of the ore deposit along the strike and at depth.

*International Geological Expedition in Mongolia**

The Hungarian–Mongolian group carrying out integrated geological–geophysical prospecting in the framework of the International Geological Expedition, took part—in the course of 1986—primarily in the exploratory and evaluating work at the Mengen Ender silver–polymetallic ore occurrence. In addition, the geological mapping of several other indications of mineral resources was carried out on a scale of 1:50,000. This work included mapping of the Mogoy Chulut area for rare earths. In order to follow the ore-bearing zones, in addition to geophysical mapping, the geoelectric layer tracing method of experimental–methodological character was introduced in different variants: down-hole–surface, down-hole–down-hole and surface–surface.

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Main results of the prospecting:

- a new ore deposit was found at the eastern side of the Ender Tzagan ore field by means of geophysical mapping;
- further evidence was found for the existence of the potential resources of rare earths on the Mogoy Chulut area;
- quartz veins of tungsten, molybdenum and silver content were detected on the Tzagan Chulut area. Further prospecting is being carried out in 1987;
- ore zones could be followed between trenches and the hidden outcrops of the ore zones penetrated by boreholes could be detected by a detailed ore-geophysical survey.

*Bauxite exploration in Greece**

On behalf of the Greek Helikon Bauxites Co., for a period of 3 months we performed geophysical measurements for bauxite exploration in the neighbourhood of the town of Distomon. Our task was to investigate the so-called second bauxite horizon on a few areas of altogether more than 2 km². Bauxite occurs as a hard rock in this area, with an average thickness of 0–10 m and a resistivity of 500–900 Ω m, based on dc soundings. The underlying bedrock is Upper Jurassic (Kimmeridge) limestone. The overburden comprises Upper Jurassic (Tithonian) and Cretaceous (Cenomanian) limestones, with similar resistivities (3000–6000 Ω m). The dip of the folded and often fractured rocks is high, sometimes over 60°. The fault zones are filled either with karst water or with argillaceous clastic sediments, therefore parts of them became conductors.

The results of the test survey showed the following methods suitable for the task: Turam mapping, down-hole–surface potential mapping and Maxi-Probe multifrequency sounding. On those territories where the examined bauxite horizon was close to the surface (0–60 m) we utilized vertical electric soundings and VLF mapping. It was difficult to carry out down-hole–surface potential mapping because of the high resistivity of the very dry and rocky surface.

In view of the Turam anomalies we set up an irregular grid of frequency sounding points. The results of these two methods enabled us to draw an approximate tectonic picture. After that, we were able to classify the Turam anomalies and make suggestions for drill sites. At our suggestion the elongated positive anomaly shown in the middle of the Turam field strength ratio map (*Fig. 112*) was checked by drillings. It was found that the anomaly was generated by a bauxite lens with a maximum thickness of 3.5 m.

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The frequency sounding section shown in *Fig. 113* does not indicate bauxite but it does reflect the depth conditions appropriately.

VIBROSEIS[®] measurements in Austria*

On behalf of the Rohöl-Aufsuchungs GmbH (RAG—a Mobil-Shell joint undertaking), we performed Vibroseis field measurements in the picturesque mountains of Upper-Austria. The technical parameters were as follows:

Number of measured profiles: 20

Geophone distance: usually 20 m (25 m in one profile, 12.5 m in a test profile)

Number of channels: 120

Coverage: 3000% in 25% of the profiles, 6000% in 75% of the profiles

Number of records: 6311

Total length of the profiles: 170 km

Overall measuring period: 4 months, by double shift crew

Recording instrument: DFS-V—CS—2502 (Texas Instruments—Sercel)

Preprocessing, involving data input, demultiplexing, trace gather according to depth points, NMO and stacking, was carried out on ELGI's container-mounted R-11 field centre. Further processing was performed in the Prakla Computer Centre in Vienna, in RAG's head office.

We have already carried out VIBROSEIS measurements in many difficult places from the Mátra mountains in Hungary to Greece; this one—however—surpassed all the others. At the client's request, the profiles had to be straight lines, only the vibrators were allowed to follow country roads and accessible places. With this spread and vibrator arrangement there was no need for crooked line processing, what is more, the distribution of the depth points was near to uniform. If only the mountains had not been so steep, if only the cables had not been so heavy and if only it had not rained for 1 month. But it did rain. Thus, the very heavy, 120-channel cables had to be dragged along, sliding about in the mud, uphill and downhill. Somehow or other the vibrators were able to find room in the narrow asphalted roads but as soon as we left them, the representative of the local tourists' club immediately wrote a letter to the Upper-Austrian newspaper *Neue Kronen Zeitung* and protested against the spoiling of tourist routes. We adopted a policy of appeasement and as a result of our 'diplomatic' activity, the local population realized that inasmuch as oil and gas are wanted, then the VIBROSEIS method preserves the environment much more than does explosion seismics. We were even able to demonstrate that we would do our best to protect the environment and to make good any damage. After that, a half-page article was published in the daily *Salzkammergut Zeitung* which reported on our activities in a friendly

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way. In spite of these field- and environmental problems we managed to achieve very high efficiency. On average the monthly output was more than 1,500, 120-channel Vibroseis records.

The length of time spent on vibration and measurement was over 40% of the work time. RAG's representative put it in writing that he was fully satisfied with the quality of the measurements apart from the high standard of efficiency. Even in the company newspaper, *Mobil World*, an article appreciating our work was published (*Fig. 114*).

An important factor concerning the good quality of the seismic records was that ELGI's container-mounted preprocessing centre was available, enabling us to select the appropriate field parameters and to continuously adapt them to varying field conditions.

Library

The present stock of our *Library* amounts to 28,122 volumes of books and periodicals as well as 10,991 miscellaneous items. In 1986 our stock was increased by 542 books, 347 volumes of periodicals, 649 documentary publications and 350 brochures on instruments. Our collection of periodicals has been enlarged by 6 new ones. As a result of international exchange we received 318 publications and dispatched 3,355 publications to 587 addresses in 59 countries. In 1986 the services of our Library were utilized by 4,797 readers/borrowers.

Publications

In 1986 the following publications were issued:

- Annual Report of the Eötvös Loránd Geophysical Institute of Hungary for 1985;
- Geophysical Transactions, vol. 32. Nos. 1, 2, 3;
- Study of the Earth Tides (*Bulletin of KAPG*) No. 8.