

THE AREAS OF MUD VOLCANISM IN THE SOUTH CASPIAN AND BLACKSEA: SEISMICITY AND NEW TECHNOLOGY OF SEISMIC ESTIMATION

Levin Leonid (1), Solodilov Leonid (1), Panahi Behrus (2), Kondorskay Nadezhda (3)

1. *The V.V.Fedynsky Centre of Regional Geophysical and Geoecological Researches (V.V.Fedynsky Centre GEON), Moscow, Russia, E-mail: geon@dol.ru*

2. *Geology Institute Azerbaijan National Academy of Sciences, Baku, Azerbaijan, E-mail: rtap@azintex.com*

3. *United Institute of Physics of the Earth Academy of Sciences Russia, Moscow, Russia, E-mail: lagova@upil.rssi.ru*

The South Caspian and Azov-Black Sea sedimentary basins are characterized by complex geodynamic setting and great thickness of the sedimentary cover, ranging from 10 to 25-30 km. Geodynamic setting has return relationship between belts of the high seismicity and areas of a mud volcanism. The belts of seismicity are connected with zones of subduction or more exactly of the pseudosubduction (F.Bunss, V.E. Khain) i.e. subduction without spreading of above asthenosphere part of a mantle. The depths of the earthquakes foci here range from 50-60 to more than 100 km. The upwelling of the asthenosphere above zones of the pseudosubduction has a consequence a high concentration of hypocenters of earthquakes in an elastic-brittle layer with maximum values of total released energy of seismic waves up to $10^{21} - 10^{23}$ erg-km⁻²-year.

In the Caspian – Black Sea region two main belts of pseudosubduction are distributed: northern, from Absheron – Balhan sill and Eastern Caucasus up to South Crimea and Dobrudja with possible termination in the Vranich zone of the Eastern Carpatians; southern, from the Alborz and Talesh to Pontides orogens and farther to the area of north of the Rhodopian massive. In the south of the Alpine belt it is possible a development of one else pseudosubduction belt along orogens of the Zagros and Taurides. The deep of earthquakes foci have here 75-100 km. The areas of the mud volcanism are distributed in the inner parts of the sedimentary basins with great thickness of sedimentary cover, where the upwelling of asthenosphere was in the geological past more possible until the Early Cenozoic. In the directions from indicated belts the to areas of the mud volcanism values of released seismic energy decrease to $10^{17} - 10^{18}$ erg-km⁻²-year, but danger of environment disasters during development of the oil/gas industry is conserved.

For estimate of seismic risk a complex technology is used which includes the following section: a study of established seismicity, distribution of released energy of seismic waves; differentiation of regional lineaments and faults by seismic activity on a base of quantitative parameters (magnitudes, energy of seismic waves, data on historical events); delamination of the lithosphere in the elastic-brittle and plastic-viscous layers; analysis of direction of earthquakes hypocenters migration in the plastic-viscous layer; determination of space position of the seismic hazard zones and high seismic potential sites in the elastic-brittle layer.

The experience of researches on a base of indicated technology for the Caspian region had result a difference between predicted and observed coordinates of 5 destructive earthquakes with magnitude with more than $M > 5.0$ to 25 km.