



Ancient subduction zone in East Sakhalin (Sea of Okhotsk Region)

Alexander Rodnikov (1), Natalia Sergeyeva (2), and Ludmila Zabarinskaya (3)

(1) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (rodnikov@wdcbr.ru), (2) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (nata@wdcbr.ru), (3) Russian Academy of Sciences, Geophysical Center, Moscow, Russian Federation (mila@wdcbr.ru)

In Eastern Sakhalin (Sea of Okhotsk Region) an ancient (Upper Cretaceous-Paleogene) subduction zone is distinguished. On the surface it is manifested by an ophiolite complex, which separates North Sakhalin oil and gas basin from Deryugin basin. This complex is represented with harzburgite, dunite, wehrlite, rodingite, gabbro and amphibolite forming ophiolite plate. It is supposed that in Upper Cretaceous the oceanic lithosphere of the Sea of Okhotsk subducted under Sakhalin, the eastern part of which was an andesite island arc. Behind andesite island arc, in western Sakhalin there was a back-arc basin where sandy – clayey deposits accumulated. Approximately in Miocene subduction of the Okhotsk Sea Plate apparently ceased. It is established that the Deryugin basin was formed at the site of the ancient deep trench after subducting the Okhotsk sea plate under the Sakhalin in Late Cretaceous-Paleogene. The North Sakhalin sedimentary basin was formed on a place of back-arc basin at that time. Sakhalin oil and gas basin is located above the ancient (Late Cretaceous- Paleogene) subduction zone. The Neftegorsk Earthquake has occurred on the North Sakhalin on May 28, 1995 with magnitude $M_s=7.2$, caused victims and destructions of the town. The hypocenter of Neftegorsk earthquake was determined at depth of 18 km near the ancient subduction zone. On a surface the subduction zone manifests itself as deep faults running along Sakhalin. It is probable that the manifestation of the Neftegorsk earthquake was a result of activity of this ancient subduction zone. From a position of the ancient subduction zone under Sakhalin, which is a cause of strong earthquakes here, it follows that the region is one of seismic dangerous in Russia.