

Analysis of hypothetical strong earthquake and tsunami in the Central Kuril Arc

L. Lobkovsky (1), E. Kulikov (1)

(1) Shirshov Institute of Oceanology, Moscow, RUSSIA (vic1110@imag.net / Fax +7 095 1245983)

The “Seismic gap” conception has been earnestly confirmed by the megathrust earthquake which took place on December 26, 2004 in the Indian Ocean. The giant seismotectonic break stretched north from Sumatra (Nikobar and Adaman islands) in the region that had not revealed high seismic activity for 150 years. By now the geophysical scientific society has sufficiently realized the necessity of the research of active tectonic zones such as island arcs that could include regions of “preparation of strong earthquake”. Analysis of historical seismic data for the Kuril – Kamchatka zone has revealed a seismic gap zone located in the central part of the Kuril Arc that is similar to the Zond area. A complex geophysical and geological study was carried out in this region during the marine expedition (R/V “Academician Lavrentiev”) in August – September 2004. The preliminary results of analysis of collected geophysical and geological data have shown clear segmented structure of ocean lithosphere in subduction zone. According to the geodynamic “keyboard” model a strong earthquake of $M > 8$ could occur here in nearest decades. Estimations of postseismic vertical seabed displacement for such a hypothetical strong earthquake ($M = 8.5$) were used to initiate a numerical hydrodynamic model of the tsunami propagation in the North-West Pacific. Presence of the deep channel in the Central Kuril Arc allows tsunami waves to penetrate into the Okhotsky Sea and hit the Eastern coast of the Sakhalin with amplitude about 5 m. Taking into account the complex oil and gas production infrastructure in this region we can point out to the high risk of the catastrophic devastation and pollution in case of tsunami.

The work was supported by RFBR no. 05-05-64685 and 05-05-64585 and EU project no. 502247 (COMSHELFRISKS).