



## **Submarine slumping structures in the Quaternary deposits of the Northern and Western slopes of Derbent basin (Caspian Sea)**

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The present-day and Quaternary gravitational (slumping) processes in the whole Caspian Sea region are of the big interest due to the active oil and gas industry development. During 2004-2006 several scientific cruises of R/V "Rift" the new high-resolution seismoacoustic GEONT (Sparker) and SES (Parametric Echo Sounder) data were collected from the Central part of Caspian Sea, including Western and Northern slopes of Derbent basin. In the upper part of Western slope of Derbent basin (dip angles  $\sim 1^\circ$ ), the East-vergent gravitational slump duplexes within the Neopleistocene sedimentary succession (up to 20 meters thickness in the studied site and more than 200 meters to the west) and related cut-off structures were firstly recognized in the vicinity of oil/gas potential Yalama-Samur structure [Khain et al., 2003, Glumov et al., 2004, etc]. The spatial relationships between reflectors of deformed Neopleistocene (lower) unit and almost undeformed Holocene (upper) sediments (1-2 meters of thickness) may point to the existence of the intercutaneous wedge structure of slumping origin. The calculated minimum average velocity of slumping movement during all the Holocene is 1.5 cm/year (we have used local timescale for Caspian region [Leonov et al., 2005]), but real velocity must be much higher. In the lower and steepest (3-4 $^\circ$ ) part of the slope we have found chaotic record of sediment reflectors and also some other indications of recent active slumping processes [Verzhbitsky et al., 2007; Levchenko et al., 2007]. In the Northern-Northeastern slope of the Derbent basin tens of rootless  $\sim$  E-W trending folds within the Quaternary sediments were recognized on the seismic profiles. The folds occupy  $\sim$  150 meters of the uppermost part of sedimentary cover and do not developed lower. The wavelength of the folds ranges from  $\sim$  100-200 meters to 0.5-1 km, dip angles of layers usually do not exceed several degrees. It is likely, that

described area of deformed sediments represents northern - northwestern continuation of exogenous gravitational folds zone, distinguished earlier by Maev [1999] along the eastern slope of Derbent basin [Lobkovsky et al., 2007]. The existence of weakly expressed angular unconformities within the deformed Quaternary sedimentary unit may point to at least three phases of slumping movements during mentioned above period. We also found the existence of a number of gravitational normal faults (present-day in age?) with vertical offset of the uppermost sedimentary layers and bottom surface up to 5-6 meters. The data obtained significantly specify the localization and structural expression of Present-day - Quaternary submarine gravitational processes in the Central Caspian Sea. These results are necessary for taking into consideration for oil and gas industry submarine engineering services design. The work was supported by "World Ocean" Program of RAS, RFBR no. 05-05-64685, EC project no. 502247 (COMSHELFRISKS) and RSSF.