Geophysical Research Abstracts
Vol. 15, EGU2013-8254, 2013
EGU General Assembly 2013

The latest tectonic movements in the transitional extension settings on the coasts of Buor Kaya Bay, Laptev Sea

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The Laptev Sea coast is one of the most complicated regions in the world in terms of geological structure and mechanisms of the latest tectonic movements. This is an area where both extension and contraction forces coexist. Such rare setting occurs because of the transition from the stretching young rift structures on the Laptev Sea shelf (Ust-Lena Rift, Bel'kov-Svyatoy Nos Rift, Anisinsky, South Laptev Sea Rift and so on [1]) to the continental structures of the Verkhoyansk orogenic belt. Therefore, the recent tectonic movements have been very active in this region, and a complicated system of fractures, including strike-slip faults, drop faults and thrust faults, has formed.

The task of the present work was to analyze the structure of lineaments, the dynamics of the neotectonic movements and their influence on modern relief in several key areas on the coasts of the Laptev Sea in the extension setting of a transitional zone from shelf to continental rifting. The studies include morphostructural mapping with the help of field and remore sensing data, rose diagrams analysis for faults, fractures and rock jointing, etc.

The main key area has been Tiksi and lake Sevastian region, western Buor Kahaya Bay coast. The territory is mainly composed of bedrock (mainly mudstones and sandstones) dissected by many lineaments, fractures and cleavage.

Two prevailing directions for modern fractures and lineaments exist: a north-eastern and a submeridional one. Their types vary considerably. In the western part of the study area, the Sevastian mass overthrust is situated [2]. At the same time, in the eastern part of the key area closer to the shore, drop faults of submeridional or north-eastern direction prevail. They also sometimes have a shear component, especially the ones directed north-easterly. The less numerous fractures of north-western direction are mainly shear faults.

The lake Sevastian area and lake Sevastian plane can be considered as a big submeridional graben with flat bottom surface. The adjacent Sogo graben has a north-eastward direction. In this Cenosoic graben, Paleogene coal-bearing deposits have formed. The deformations of this geological body (the coal-bearing deposits have been uplifted and are now part of a slope of mount Sogo) suggest that the shape of the Sogo graben has changed in the Neogene-Quarternary time.

All of the presented facts suggest that the territory has undergone several stages of neotectonic development. The first stage has probably been a contraction stage (with the axis of contraction directed sublaterally) when the Sevastian mass overthrust has formed. In this period, horsts, grabens and thrust faults, mainly submeridional, have formed.

After that, a phase of extension began, probably with two phases during which the submeridional and the north-eastern drop faults have formed. Shear movements in the north-western and north-eastern direction have also occurred. All of these movements have been probably connected with the increasing influence of the southern part of Ust-Lena Rift in the Buor Khaya Bay which caused subsidence in the axial part and uplift on the flanks.

References

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