



The role of modern geodynamics in the transformation of the local erosion basis in the Arctic river systems

Elizaveta Shapovalova

OIL and GAS RESEARCH INSTITUTE Academy of Sciences, Moscow, Russian Federation (esshap@gmail.com)

To assess the impact of modern geodynamic processes in the erosion of river channels in the area of oil and gas field, located in the permafrost region the following studies were made:

interpretation of satellite images to identify fault zones in the structure of the landscape oil and gas field, located in the subarctic zone;

mathematical modeling of extensive and local subsidence in the found faults areas;

field measurements within the territory of the field.

These studies led to conclusions about influence of modern geodynamic processes on activation of erosive processes.

Dimensions of the studied field is approximately 40*60 km. As a result of extensive sagging modeling on its territory for the period of the end of the development the sag depth of the Earth's surface equal to 90 cm was obtained. In this case, the slope of the Earth's surface with respect to the central part of the study area will be $4.5 * 10^{-5}$. This slope is comparable with the values of the average slope of lowland rivers. For example, for the Ob River it is $4 * 10^{-5}$. This case shows that the river flowing through the field, due to changes in the local erosion basis may be experiencing channel deformation in its central part.

According to the observations and model calculations local subsidence of the Earth's surface in fault zones induced by mining, lead to the Earth's surface inclines order $7 * 10^{-5}$ - $1.2 * 10^{-3}$. Field observations in 2014 in areas where active faults identified revealed a number of factors of changes in the river channel. There were areas overdeepened channel, tear off and slipped down blocks of rocks, leading to the subsequent transformation of the channel, as well as additional thermal erosion gullies that increase the accumulation of sediments and alter the structure of the river network. The combination of modern geodynamics with thermokarst processes in perennial permafrost layer enhances erosion.

This investigations have shown that the factor of modern geodynamics of natural or man-made influences on the transformation of the river system at the present stage of its development. This is a new factor. Previously, it was not taken into account, among other geomorphological factors in the analysis of structure changes of the Earth's surface.