



Geomorphic Response to Neotectonic Rise of the Middle Russian Upland: the case of the Ostrogozhsk Uplift (European Russia)

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The Ostrogozhsk Neotectonic Uplift is located in the south of the Middle Russian Upland (East European Plain). Tectonically, it is associated with the northeastern wing of the Voronezh Anticline. Our geomorphological study of the area has shown that the Ostrogozhsk Uplift is an actively growing structure (Romanovskaya, 2015). According to recent studies neotectonic uplift amplitude can be estimated at more than 200 m.

This growth has played a major role in landscape formation all around. This is clearly demonstrated by the following: recent dramatic changes in the flow directions of the rivers Don and Tikhaya Sosna as they had to bypass growing upland; instances of damming up, which created numerous oxbow lakes and led to waterlogging in floodplains; increase in the density of the erosion grid on the upland itself. On three sides, the Uplift slopes down towards neotectonic depressions. Lying at markedly different altitudes, the upland and the river floodplains connected with the depressions now possess contrasting local climates and support contrasting ecosystems. Land rise and concomitant fall of the groundwater table intensified erosion, weathering, karst and slope wash processes. These, in turn, have created numerous canyon-shaped ravines, very steep slopes (>60°) and interconnected bastion-like relief forms. Surrounded by protections in the form of steep slopes and water courses, the area is now a natural fortress which has favored human habitation since the Late Paleolithic Age. In a location in the Tikhaya Sosna river basin, gully erosion has exposed a large accumulation of ancient horse bones and human-made stone artifacts (Upper Paleolithic Multi-Level Archaeological Site Divnogorie-9, 13.5 ka - 14 ka BP) (Kuznetsova, 2014) and a cemetery left by the Mayatskoye medieval settlement (9th-10th centuries AD).

Superimposed on the geology of the area, neotectonic movements and erosion have led to the formation of a very peculiar relief type - an assemblage of chalk outliers, locally known as "divos", or "wonders". Wonders they are, forming the crown glory and the main attraction of the Divnogorie National Park. Spaced by 25 to 30 meters and towering up to 20 meters, they look like almost regular palisades built along the right banks of the Don and the Tikhaya Sosna. This regularity alone suggests tectonic involvement in their origin. Another evidence of tectonic involvement is a dense network of cracks running all through the rock. Each crack is now tightly filled with a cement-like solidified mixture of powdered chalk and silica.

The emerging picture is that of the unparalleled landscape of the area being formed by the work of exogenous agents invited and amplified by neotectonic movements.

Kuznetsova T.V., Bessudnov A.N. et al. Eight thousand of horses' bones and none woolly mammoth! VI-th International Conference on Mammoths and their relatives. Greece. Thessoloniki, 2014.

Romanovskaya M.A., Bessudnov A.N., Kuznetsova T.V. The Role of Neotectonics in Landscape Formation in What Is Now the Divnogorie Nature Park (Southern East European Platform). AGU Fall Meeting, San Francisco, 2015.