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## Deciphering the pedogenic and sedimentary archives and long-term landform dynamics to reconstruct complex landscape evolution within a lowland gully catchment over the Holocene

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For the landscape and climatic conditions of the Eastern European Plain fluvial processes are considered to be the leading geomorphic force during the Holocene. Different hierarchical levels of fluvial landforms from individual hillslopes through gully network to river systems are characterized by various degrees of resilience and relaxation times in response to external impacts of different duration, magnitude and frequency. These characteristics of fluvial systems largely depend on their spatial scale, effective discharges and morphodynamics. Particularly important is understanding of hydrological and geomorphic connectivity at various scales, rates and patterns of hydrological and sedimentary signals propagation and variable sources-pathways-sinks structure of geomorphic cascades under changing climate and land use conditions. It is generally accepted that landscapes of the European plains have experienced alternating periods of relative stability and significant shifts in climate, soil and geomorphological development over the Holocene. A number of studies has been devoted to the Holocene soil and gully erosion processes in Russia and other European countries. Available sources of information on the past erosion and deposition cycles in small catchments include truncated soils, completely or partially infilled gullies, colluvial deposits and lake or reservoir sediments. The highest temporal resolution may be derived from lacustrine sediments. Such geoarchives are characterized by continuous records and often store signals of landscape changes, surface dynamics and vegetation variability (including land use patterns for the historical period) in decadal to seasonal resolution. However, because of the problem of variable fluvial connectivity and associated limited sediment delivery in cascade fluvial systems, quantification of small catchment sediment budget can be a very difficult task requiring thorough consideration of colluvial deposits storages and remobilization.

This study presents the new results of multidisciplinary reconstruction of interaction of geomorphic and soil-forming processes, landscape changes and stabilization phases during the Holocene for the Puzbol gully catchment (about 7.95 km<sup>2</sup>) draining the Borisoglebsk Upland northeastern slope towards the Nero Lake (Yaroslavl Region, central European Russia). The study

is based on complex geomorphic, lithostratigraphic and soil surveys by means of detailed field description, photo-fixation, sampling and laboratory analysis of materials from >40 natural or artificial exposures, cores and soil sections. Observed absence of the early Holocene deposits can be explained by generally negative sediment budget of the catchment. It was more likely caused by high-magnitude low-frequency runoff events associated with climatic extremes rather than by dominance of continuous moderate erosion. A series of the middle Holocene 14C dates obtained by analyzing total organic carbon from humic layers of buried soils, lake gyttja and peats provides strong evidence of the synchronous phase of landscape stabilization in both upper and lower parts of the Puzhbol catchment accompanied by active infilling of smaller tributary gullies along its banks at middle part. The upper part of the Puzhbol Gully fan sediment shows clear evidence of synchronous accumulation of agrogenic colluvium and gully alluvium since XIIth Century on top of the Nero Lake terrace deposits.

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