

## **Mega floods, rivers or strong winds? Casting light on the genesis of giant Pleistocene lineaments in the foreland of the Russian Altai**

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The western foreland of the Russian Altai in the West Siberian lowlands is dominated by the vast loess covers of the Priobie loess plateau. In the interfluvium of the two rivers of the region, the Irtysh and the Ob River, the flat landscape inhibits striking NNE-SSW striking linear erosion features. These lineaments are eroded 5-35 m into the loess plateau, and the valley bottoms are covered by forested dunes. The ridges in between are intensively cultivated. To the north, the land cover changes due to gradual transition from the steppe towards the Siberian taiga. The ridges are covered by boreal forest and linear erosion features by swamps and the ridges by boreal forest. The genesis of these prominent features was debated within the last decades. Possible explanations cover tectonic lineaments, fluvial erosion and ripples caused by outbursts of catastrophic floods from the Altai Mountains. Here, we present geomorphological evidence for the aeolian origin of these features based on field investigations, maps, satellite images and digital elevation models. These lineaments, which partially span for more than 150 km, are up to 17 km wide and do not show characteristic features of fluvial valley, since the shape of the lineaments is too straight and does not show braided river characteristics as e. g. the Ob or the Irtysh valley. The sheer size of these features also does not support the hypothesis of tectonic activity or a catastrophic flood since events like this would be imprinted in other environmental archives of the region. They are incised into loess landscapes indication Late Pleistocene age. We show that the features show remarkable similarities with Pleistocene mega yardang systems throughout the world. These systems can usually be found in arid to hyper-arid environments, but were also described in e. g. the mid-latitude regions of Hungary. We hypothesize that the Pleistocene glaciations of the Altai Mountains enhanced the strength and the influence of the westerlies in the Altai forelands. These strong winds took up sands deposited by the Irtysh River which eroded into the loess plateau in the interfluvium. Therefore, we propose an aeolian origin of these remarkable features in southern Siberia.

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