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## Morphological signatures of the glacial lake-outburst flood and their paleohydraulic implications in the Rospuda valley (NE Poland)

Dhiraj Kumar<sup>1</sup> and Piotr Weckwerth<sup>2</sup>

<sup>1</sup>Nikolaus Copernicus University Torun, Department of Geomorphology and Quaternary palaeogeography, Poland (dk20rs048@doktorant.umk.pl)

<sup>2</sup>Nikolaus Copernicus University Torun, Department of Geomorphology and Quaternary palaeogeography, Poland

The geomorphological evidence of catastrophic glacial floods has been unearthed in several parts of northern Europe. A wide diversity of landforms related with glacial meltwater flows have been reported within the area covered by the Scandinavian Ice Sheet during the Weichselian glaciation in the European Lowland (Høgaas et al., 2016; Weckwerth, et al. 2019; Hansen et al., 2020). Our study area covers the Rospuda Valley and outwash plain (Rospuda outwash), which is located in north-eastern Poland and has a prominent features originated from the glacial lake outburst flood. These features set comprise two- and three-dimensional megadunes located in the middle and distal portions of the Rospuda outwash. This outwash starts from the end moraines, which are intersected by a flat-bottomed spillway which interconnects with subglacial channel feeding proglacial outwash. Using GIS tools and on the base of geomorphological mapping, megadunes morphology and morphometry were analysed. The basic geomorphometric parameters as megadunes length, width and height were used to assess floodwater flow depth, velocity and discharge. We used different methods to calculate the flow velocities, i.e. after Kennedy (1963), Baker (1973) and Darcy-Weisbach equation, adopted for three different megadunes clusters. Palaeohydraulic calculations suggest that the flow depth during glacial lake-outburst flood varied in the range of 16-20 m and the flow velocity was around  $12\text{-}23\text{ ms}^{-1}$ . Considering these, the average floodwater discharge was in the range of  $17\text{-}109 \times 10^3\text{ m}^3\text{s}^{-1}$ .

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### References:

Høgas f. and Oddvar Longva., 2016. Mega deposits and erosive features related to the glacial lake Nedre Glomsjø outburst flood, southeastern Norway. *Quaternary Science Reviews*, 151, 273-291.

Weckwerth, P., Wysota W., Piotrowski J.A., Adamczyk A., Krawiec A., Dąbrowski M., 2019. Late Weichselian glacier outburst floods in North-Eastern Poland: landform evidence and palaeohydraulic significance. *Earth-Sciences Review*, 194, 216-233.

Hansen, L., Tassis, G., Høgaas, F., 2020. Sand dunes and valley fills from Preboreal glacial lake outburst floods in south-eastern Norway—beyond the aeolian paradigm. *Sedimentology*, 67(2), 810-848.

