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Geomorphological characteristics of elongate subglacial bedforms in the terminal zone of a palaeo-ice stream, NW Poland

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A large body of literature concerns the morphology and spatial patterns of drumlins, mega-scale glacial lineations and other related subglacial bedforms. Geomorphological analyses of these streamlined bedforms facilitate identification of palaeo-ice streams and yield data to constrain their dynamics in time and space. In this study we investigated the morphometric characteristics and spatial patterns of over 1300 streamlined bedforms in the Stargard drumlin field (NW Poland) marking a terminal area of a major last-glacial palaeo-ice stream based on a high-resolution digital terrain model (LiDAR).

Most of the streamlined bedforms are 600 to 800 m long, while the modal class of their widths is from 200 to 250 m. Almost 50% of the bedforms are between 3-6 m high and only slightly below 4% are higher than 10 m. The elongation ratios of ca. 60% of the population ranges from 1.5 to 3.0 and the modal class is 2.00-2.25. The overall pattern of the field reveals a distinct curvature corresponding to a radial flow pattern in a big ice lobe, but local deviations grouped in several discrete zones occur. The variations in spatial characteristics of the streamlined bedforms reflect different subglacial conditions and the diversified topography of the pre-ice advance terrain, both resulting in a spatial and temporal mosaic of ice flow velocities and directions.