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## Tracing the late Holocene storminess at the Polish Baltic Sea coast – regional survey and local in depth research.

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Within the Baltic Sea basin, the frequency and intensity of coastal flooding caused by storms is influenced by wind direction and exposure of the coast. Strong (north)westerly winds associated with the North Atlantic Oscillation hit large parts of the Polish coast, while (north)easterly winds affect Puck Bay. Following from that, the research on the frequency and magnitude of past storminess within the Baltic Sea sheds light onto regional climatic conditions indicating changes in wind-field directions and storminess in north-western and northern Europe. Despite the fact that the Baltic Sea basin area bears potentially vast amount of information on the past storminess and climatic conditions on the regional scale, no systematic, basin-wide research on storm deposits and analysis of frequency and intensity of storminess is available.

The spatially variable occurrence of sedimentary evidence for coastal flooding caused by storms indicates necessity for multisite investigations in order to develop reliable records of past storm frequency and intensity. As the historical written sources and instrumental records are insufficient to draw informative conclusion on the past storminess, the survey in search for the depositional evidence of catastrophic coastal flooding has been undertaken along the Polish coast, from the Puck Bay to Wolin Island. Following from that, detailed research on the storm deposits has been undertaken in 4 key locations (one is presented here, Mechelinki).

The survey allowed to create the list of features common for the locations where sedimentary evidence for coastal flooding is preserved. These include flat, inundational character of the coast, prevailing organic deposition in lowlands close to the shore and non-tidal character of adjacent marine basin.

Mechelinki peatland (Puck Bay) is separated by a N-S extending sand barrier from the open sea and exposed to (north)easterly winds. Investigated sedimentary succession comprises ca. 450 cm of peat interdigitated with few centimetres thick layers of sand. The origin of sand has been

established based on multiproxy investigation including: particle size, shape (automated MorphologyG3, thin sections), diatom, XRF and heavy mineral analyses. Geochronology has been established based on  $^{14}\text{C}$  and  $^{210}\text{Pb}/^{137}\text{Cs}$  measurements. In the Mechelinki research site, the evidence for about 20 coastal flooding events which took place during the last 5000 years has been discovered. The results prove, there is no universal method to differentiate the storm deposits from the sediments of other origin and only the combination of multiproxy analyses bears unambiguous results.

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