Catastrophic coastal flooding events along the southern Baltic Sea coast during the Late Holocene.

Karolina Leszczyńska¹, Damian Moskalewicz², Karl Stattegger¹, and Witold Szczuciński¹

¹Adam Mickiewicz University, Institute of Geology, Geohazards Laboratory, Poznań, Poland (km429@cantab.net)
²University of Gdansk, Department of Geomorphology and Quaternary Geology, Gdańsk, Poland (damian.moskalewicz@ug.edu.pl)

Catastrophic coastal flooding is one of the main forcing agents of short-term coastal system changes and represents a major threat to human activities concentrated along the coasts worldwide, particularly in the light of ongoing climate change. In order to better understand the frequency and character of catastrophic marine inundation events in the past as well as to predict future trends the knowledge on the long-time records of Holocene coastal flooding chronologies is necessary.

The southern coast of the Baltic Sea is an important study area because it is exposed to both, (north) westerly and (north) easterly storms and corresponding seiche effects. Moreover, the negligible tidal forcing does not bias the elevated water table of marine water surge events, so the true coastal flooding signal is preserved in the sedimentary record (Hippensteel, 2010). Furthermore, as demonstrated in a recent study by Piotrowski et al. (2017) in the area of Polish coast the low lying marsh areas behind coastal dunes or at river mouths are promising sedimentary environments to provide with record of catastrophic coastal flooding.

The poster reviews the most up-to-date state of palaeo-tempestological research within the southern Baltic Sea coast summing up the newest findings of the CatFlood project launched in March 2019. The overview of topographical and geomorphological characteristics of field locations, which are most prone to marine coastal flooding and preservation of sedimentological evidence for these catastrophic events will be given based on the pilot study within 16 field locations. The study sites are scattered along whole Polish Baltic Sea coast. Furthermore, in depth observations of features of deposits associated with marine inundation events is provided based on the detailed analysis of sediments from four selected key field locations. The event-layers characteristics are reconstructed by standard techniques such as grain size, shape and texture, heavy mineral composition, mineral versus organic matter ratio analyses. Above that the analysis of internal structure of flooding deposits in microscale is described from thin sections. The composite chronologies and the high resolution age control based on both ¹⁴C dating and ²¹⁰Pb/¹³⁷Cs provides with insights into the chronology of these events. A new approach is the application of seda-DNA analysis in deciphering the marine character of event deposits.

References:


The research project CatFlood is funded by National Science Centre, Poland, OPUS grant nr: 2018/29/B/ST10/00042