

Proposed project addresses one crucial issue being the relationship between sudden climate events, solar activity and natural climate evolution. Sudden climate events comprise a significant element of the Holocene climate variability (geological period in which we currently live). These events are characterized by rapid climate changes affecting environmental regime and human population. Paradoxically, society is becoming increasingly vulnerable to extreme natural climate changes as a result of civilization development. Our objective is to examine prior interglacial period to the Holocene being the Holstein interglacial. What is the purpose of conducting such research (?) Because only by means of using a reference point, the impact of anthropopressure that is currently occurring and the role of human activity in climate evolution can be entirely understood. It is worth emphasizing that forecasts for future global warming raise two problematic questions: Notably, future predictions of global climate warming raise highly challenging question: “has a future abrupt climate event the potential to interrupt global warming for several decades?”

Numerous records of Interglacial 11 also known as Holstein provide comparable, thus highly analogous conditions to those of the Holocene. During the Holstein Interglacial, which began about 410,000 years ago and lasted for about 30,000 years in total, there were two short-term climate oscillations called the Older and Younger Holstein Oscillations (OHO and YHO). These oscillations were violent episodes lasting about 300 years and were characterized by a decrease in temperature and humidity. The main purpose of this project is to synchronize two positions of laminated deposits in Ossówka (eastern Poland) and Dethlingen (western Germany) using stratigraphic markers such as volcanic ash and cosmogenic radionuclide dating (^{10}Be). This approach will be used to track in detail the consequences of climate change during the two mentioned oscillations in order to identify their spatial range and time patterns in Europe. Why is this so important (?) It is often postulated that large portions of Greenland's ice sheet have melted during the Holstein Interglacial, the second climatic event (YHO) may be a response to this process and therefore might serve as an answer to sudden climate events that are predicted to be occurring due to future global warming. Detailed knowledge concerning past interglacial determinants, in which human activity did not affect the climate, is significant in the context of currently observed climate change. For this reason, learning about the past is so essential as it provides vast information that cannot be modeled nor predicted without this knowledge. It is important to distinguish between natural and anthropogenic causes of temperature changes, atmospheric circulation and other factors forcing the need for future climate change scenarios. For this purpose, it is planned to apply innovative multi-method approaches to carry out the proposed research. High-resolution of 5-10 years temporal biological proxies (pollen, *Chironomidae*, *Cladocera* and diatoms), geochemical data (μ -XRF element scans), terrestrial biomarkers and their stable hydrogen isotope ($\delta\text{D}_{\text{wax}}$) will be employed to reconstruct atmospheric responses to rapid climatic and environmental changes during events of the OHO and YHO at times of the Holstein Interglacial.