Continental ice sheets are recognised for their large impact to other components of the Earth system, including climate. Observations in modern environment are limited in time, and therefore, recognition of former ice sheets dynamic behaviour is crucial for proper interpretation and prediction of future environmental changes. One of the key challenges in the interpretation of former environmental changes is to assess the timing and duration of specific events.

The proposed research focuses on the reconstruction and quantification of the Weichselian ice sheet dynamic in the Wielkopolska. The project will also examine the timing of advance and decay of the Weichselian Ice Sheet in central west Poland. Main scientific objectives are: (1) Paleoglaciological reconstruction of ice sheet dynamic behaviour; (2) Recognition of timing of glaciation and deglaciation of the Weichselian ice sheet in Wielkopolska based numerous new OSL and terrestrial cosmogenic nuclide (TCN) data (in this project Be-10).
Data about the nature and timing of Pleistocene events from the Northern Hemisphere, especially regarding past continental ice sheets, are required to provide insight into the extent and nature of past climate changes, which in turn are crucial for proper understanding of future environmental changes. Recently, the problem of timing and patterns of glacial events in Europe started to be very important for the scientific community and several projects were launched aiming to assess dynamics at the scale of the whole ice sheets, but most attention is paid to the ice mass behaviour during deglaciation. However, there is still relatively little amount of chronostratigraphic data for the southern limit of the Scandinavian Ice Sheet, based on the C-14, TL, OSL methods, TCNs, especially when comparing to situation related to the last British Ice Sheet. Previously, recognition of glacial events in central western Poland focused mainly on lithological and morphological criteria. Thus, information about the character of glaciation and deglaciation (like deglaciation rates) or causes (like type of climatic impact) were often unknown or oversimplified, mainly because there were no possibility to assess the absolute age or duration of specific events. One of the first studies using absolute dating suggested the age of the maximum extent for glaciation in Poland for 21-20 ka BP, based on C-14 dates. More modern stratigraphy of the Weichselian was based on further C-14 and new litho- and morphostratygraphy studies.

The maximum stage of the Weichselian glaciation is well-recognised in the Lower Vistula region. However, there has been not much done with respect to precise dating in west Poland. The assumption that the maximum extent of the main stage in Wielkopolska took place not earlier than about 21 ka is based on the TL dating of the deposits in the Konin region. Recently, new dates based on OSL and TCN dating were provided for Poland but they are based on data outside Wielkopolska. An extrapolation of data from Germany and other parts of Poland is only possible to a very limited extent, because the dynamics of the ice sheet's margin was highly variable in different regions. Moreover, most researches are dedicated to the deglaciation periods. Much less attention was paid to the timing during the advance of the Weichselian ice sheet and, thus, the advance velocity is not well-known. Hence, the realization of the project is of a great importance to fill the gap with dates and provide holistic reconstructions of ice sheet dynamic for the whole southern part of the Weichselian Ice sheet.
Main result of the project - reconstruction of the glacial history of the southern part of the Scandinavian ice sheet – will be essential for further recalibration and reinterpretation of the late Pleistocene glaciations as well as will served as a perfect base for ice sheet modelling.

The project will provide new chronological (timing) and glaciological (advance and retreat rate, duration of equilibrium state) data that will allow for reliable reconstruction of timing and dynamics of ice sheet growth and decay along the southern flanks of the Scandinavian ice sheet during the Weichselian glaciation. This state-of-art knowledge will deliver foundations for the calibration of the ice sheet models. Project results will be useful for researchers that work also on numerical ice sheet modelling of modern ice sheet, which use glaciation and deglaciation rates and chronological data for making predictions, glacial/climate interaction reconstructions, permafrost evolution after ice sheet decay, ice margins evolution, etc.