Modern geological investigations focus frequently on climate changes in the geological past and searching for processes being analogues to present day environmental changes. Especially hot topic is the origin, effects and rate of global sea-level changes (so-called eustatic changes). It is well known that sea-level changes might be related to melting and prograding of the polar ice caps. However, there are also other climate related processes which contribute to the phenomena. Sea-level rise might occur during warm periods as a result of thermal expansion of sea-water. On the other hand a sea-level fall might be an effect of increasing ground water retention due to climate humidity increase and accelerated chemical weathering, as well as uplift of mountain ranges and continental areas. Late Jurassic and Early Cretaceous epochs (ca. 153 – 139 Ma) are excellent targets to trace origins of sea-level changes in essentially ice free world, in early phases of Alpine mountain building processes.

Paleoenvironmental conditions are widely recorded in sedimentary rocks. Within the scope of this project we attempt to reconstruct the paleoclimatic, tectonic and eustatic events which took place in the Late Jurassic and earliest Cretaceous in deep water basins of the former Western Tethys Ocean. The investigated section will be located in the Tatra Mts. in the Northern Calcareous Alps (Austria), and Mecsek Mts (southern Hungary).

The age of the studied rocks would be estimated using biostratigraphical method (mostly planktonic microorganisms) and magnetostratigraphy. The latter bases on identification of bipolar changes of the geomagnetic field direction recorded in rocks. Paleoenvironmental conditions will be reconstructed using magnetic susceptibility (MS) method. MS is a very cheap and quick method being a measure of para- and ferromagnetic particles transported from the land to marine basins. Relative MS variations in deep water sediments might be matched with sea-level changes. During sea-level low, large land areas were subjected to erosion and intensive transport of detrital particles toward sea-basin occurred, resulting in elevated MS values in sediment record. During sea-level high, obviously decrease MS values are expected. Additional tools for profound understanding of paleoecological conditions would be sedimentological, mineralogical and geochemical analyses (major and trace elements).

Determination of uranium content would be crucial for paleoceanographic reconstructions. Uranium is usually stored in relatively large amounts in sediments during so-called anoxic events. These are periods of significant oxygen depletion of bottom sea waters, usually related to major climate warming and greenhouse conditions. Clay mineral assemblage would reveal the climate humidity variations.

Integration and interpretation of entire dataset would give insight into paleoclimatic and paleoceanographic changes through time. Correlation with other sections in the Western Tethys (Balkan area, Pannonian basin, SE France) would reveal influence of early phases of Alpine orogeny on climate dynamics.