Objective of this work package is to analyze and model present, past and future atmospheric processes and climatic variations over the Tibetan Plateau with a special focus on implications for landscape and vegetation dynamics during the late Holocene and near future. With the temporal variation of the hydrological cycle being the major determinant for environmental processes in the target area, we will focus our investigations on the relationship between monsoonal as well as mid-latitude variability and environmental dynamics. Given the complex and scale-crossing interrelations of the different impact factors we aim to integrate global and regional climate modelling, statistical downscaling, surface parameterization and geostatistical methods within a comprehensive climate analysis and modelling chain.

The major goals of our work package are:

- production of high resolution climate fields using a large ensemble of global atmospheric forcing fields for studies of dendroecological dynamics, of carbon and oxygen isotope signals, and sediment archives
- statistical analyses of extreme events (drought and wetness), determination of the long-term memory and potential predictability in the monsoon system and the estimation of future risks connected to the hydrological cycle
- provision of data bases for calibration of palaeoclimatic proxy data series and generation of synthetic tree ring and sediment time series for a detailed statistical comparison with observations and proxy based paleo-climatic indications
- identification of global and regional forcings, which determine a possible threshold behaviour in strength and extent of the monsoon system
- identification of teleconnections and interaction mechanisms between the dynamics of the monsoon system and global atmospheric modes (e.g. North Atlantic/Pacific Oscillation or El Nino Southern Oscillation)
- projection of future changes of the hydrological cycle over the Tibetan Plateau for alternative climate scenarios

The main product of our work package will be a freely available portable climate model chain which can be used by local research centers at moderate infrastructure costs. The model chain can be run in hindcast mode (retroactive simulations), ensemble mode (Late Holocene paleoclimate simulations) and in scenario mode (climate change simulations). Moreover, we will provide statistical tools to analyse space and time correlations, extremes and potential predictability of the hydrological cycle over the Tibetan Plateau.