

Project acronym: DESIGN

Project title: Dendroecological Exploration of Shrubs in West Greenland

Project leader: Allan Buras, Technische Universität München, Germany

Discipline: Earth Sciences & Environment

Station(s): Arctic Station (Greenland)

By means of shrub-dendroecology, DESIGN will deepen our understanding of shrub growth in the Arctic. Following a stratified sampling design, the impact of geothermal springs, moth outbreaks, as well as micro-site conditions on shrub growth will be studied. Gaining such knowledge probably allows for increasing the precision of shrub-ring width based reconstructions of environmental parameters such as growing season temperature, sea surface temperatures, and glacier melt.

Control-replicate analyses between geothermal springs and normal-tempered tundra, between moth-outbreak affected periods and non-affected periods, as well as between different micro-sites shall answer the question whether and how these influencing factors act on shrub growth. Moreover, Principal Component Gradient Analysis will explore the obtained data for individualistic shrub growth which - if present - would result in varying strengths of climate-growth relationships. Incorporation of the obtained knowledge will likely allow for increasing the precision of shrub ring-width based transfer functions with the aim to reconstruct the melting of the Greenland Ice Sheet.

DESIGN will be conducted at Arctic station, Greenland. This location was specifically chosen due to the availability of several promising shrub species (*Salix glauca*, *Salix arctica*, *Betula nana*), the occurrence of geothermal springs, the likely occurrence of moth outbreaks in the recent past, and the opportunity to extend an already existing dendrochronological shrub-network which so far covers southwest, north, and east Greenland (Kobbefjord, Johannes V. Jensen Land, and Zackenberg, respectively).