



## Multi-proxy reconstruction of Arctic summer temperatures over the past 1400 years

Feng Shi (1,2), Bao Yang (2), Fredrik Charpentier Ljungqvist (3), and Fengmei Yang (4)

(1) State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG), Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China (shifeng@lasg.iap.ac.cn), (2) Key Laboratory of Desert and Desertification, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou, China (yangbao@lzb.ac.cn), (3) Department of History, Stockholm University, Stockholm, Sweden (fredrik.c.l@historia.su.se), (4) China Meteorological Administration Training Centre, Beijing, China (yangfm@lzu.edu.cn)

A new multi-proxy summer (June to August) temperature reconstruction for the Arctic region (60 to 90° N) with annual resolution over the past 1400 yr is presented. The reconstruction is performed using a novel ensemble method, Ensemble-LOC, designed to preserve low-frequency variability and minimize the influence of the “spurious correlation” between the proxy and instrumental data. The reconstruction is based on a set of 22 proxy records with annual resolution. We find clear evidences for a cold anomaly AD ~630 to 770 related to the Dark Age Cold Period, a warm anomaly ~950 to 1050 related to the Medieval Climate Anomaly, and a cold anomaly ~1200 to 1900 related to the Little Ice Age. The strong 20th century warming is also evident. There are 3 different and distinct warm periods occurring during the Little Ice Age: 1470-1510, 1550-1570, and 1750-1770. However, about half of the total input proxies are not used in the large majority of the reconstructions. We still need additional proxy records from the Arctic region with annual resolution and a strong response to local temperature to further verify the results of this study and in order to investigate possible spatial patterns of past Arctic temperature variability.