



## **Large-Scale Retrieval of Sea Ice Thickness and Snow Depth using CryoSat-2 and SMOS Satellite Data**

Shiming Xu

Tsinghua University, Center for Earth System Science, Beijing, China (xusm@tsinghua.edu.cn)

Sea ice thickness and the snow depth are important parameters for both climate studies and forecast operations. Based on the data synergy method with active altimetry and passive L-band radiometry data, large-scale retrieval of sea ice parameters is carried out with concurrent CryoSat-2 and SMOS data, including sea ice thickness and the snow depth over the sea ice. The freeboard products from CryoSat-2 are investigated for the applicability in the data synergy. The co-variability of snow depth and freeboard is incorporated in the retrieval for multi-year sea ice. Besides, the inclusion of snow morphology features is demonstrated to have a large effect on the reduction of the bias of the retrieved parameters. By using airborne data (CryoVEx and Operation IceBridge) for verification, we carry out retrieval with satellite data and show that both sea ice parameters can be retrieved.