IASOA Atmosphere-Surface Exchanges (Flux) Working Group
April 12, 2017

Attendees: Sara Crepinsek, Gabriela Schaepman, Allison McComiskey, Dave Billesbach, Alexander Makshtas, Andrey Grachev, Irina Makhotina, Ralf Staebler, Ola Persson, David Cook, Taneil Uttal, Chris Cox

Presentation on Stable Boundary Layer Studies in the Arctic (Grachev): Presented also at Workshop at Delft University of Technology (Netherlands) on Turbulence in Stably Stratified Planetary Boundary Layers, workshop focused on atmospheric turbulence at the boundary layer, SHEBA site description, SHEBA was ideal experiment since no large-scale slopes or heterogeneities since the site was a few hundred kilometers from the land, SHEBA data are not generally contaminated by drainage or advective flows, ASFG instrumentation (atm. Surface flux group) field campaign overview, deployed 20m main micrometeorological tower on ice pack, use of NOAA/IASOA Arctic datasets, overview of Tiksi observatory, 20m tower for measuring all components of surface energy budget, overview of Eureka observatory, 10m tower for measuring all components of surface energy budget, issues with Arctic measurements (rime issues), Eureka data: annual cycle of difference of the air virtual potential temp between 10m and 6m levels observed at Eureka in 2009, data are based on 1-hour and 1-day averaging of measurements made at the 10m flux tower, important to investigate stable boundary layer in the Arctic, Arctic considered natural laboratory, overview of surface scaling calculations/equations, overview of local scaling of fluxes and why fluxes are measured at specific heights to investigate relationship between two heights, local scaling describes the turbulent structure of the entire surface boundary layer, stable boundary layer regimes from SHEBA data, according to SHEBA data stratification and the Earth’s rotation control the stable boundary layer over a flat rough surface, this regime is associated with shear stress and sensible heat flux that are approximately constant with height and constant flux layer, description of spectra and cospectra for momentum flux and temperature flux, the stability parameters increase with increasing height, figures of the behavior of the bin-averaged downward momentum flux and for the sensible heat flux for five levels of the main SHEBA tower plotted, critical Richardson number, Ekman number and surface layer, Ekman spiral for stable conditions, local z-less stratification (Kansas-type), local z-less scaling has been brought into question by recent measurements from SHEBA campaign, non-dimensional vertical gradients” the SHEBA parameterizations, saving the z-less concept, contradictory results indicate that the validity of z-less stratification is still an open question that requires further clarification, self-correlation and outlier problem, “hybrid” similarity theory, test these equations and parameters on Tiksi and Eureka datasets

Next Steps for IASOA Flux Working Group: begin email discussion of future of group

Action Items:
- Flux Working Group science questions (Uttal, ALL)
- Email working group about goals of group (Uttal, Makshtas)
- Test Grachev parameters on Tiksi and Eureka data (Grachev, Persson, Makshtas)