



The summer-fall transition - a surface energy budget perspective



Joseph Sedlar, Michael Tjernström and Thorsten Mauritsen

Department of Meteorology, Stockholm University, SE-106 91 Stockholm, Sweden

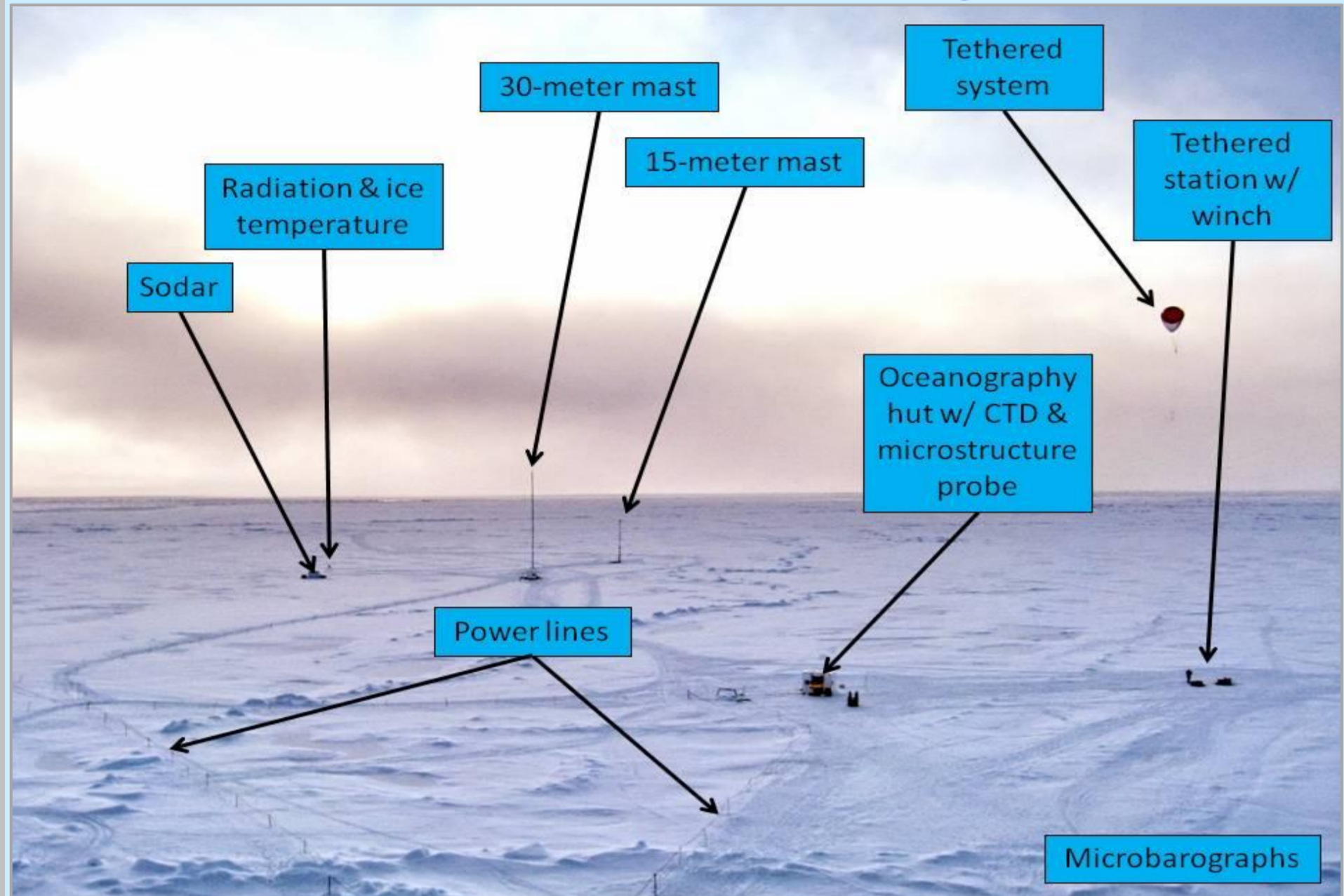
Ian Brooks and Cathryn Birch – Leeds University, UK

Ola Persson and Matthew Shupe – NOAA/CIRES University of Colorado, USA

Anders Sirevaag – Bjerknes Center and University of Bergen, Norway

Corresponding author: josephs@misu.su.se

The "Met Alley"



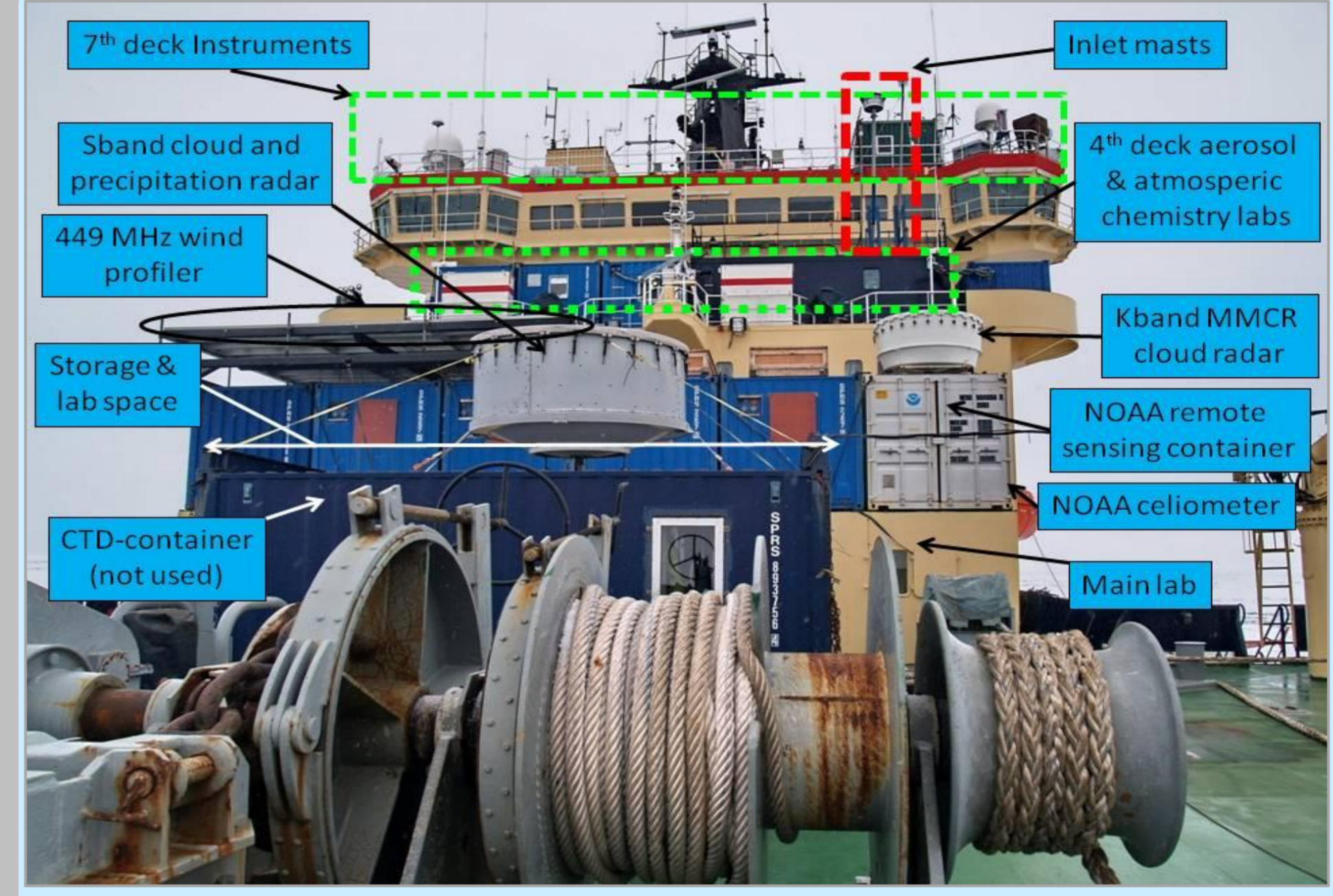
The name "Met Alley" was adopted after the SHEBA experiments "Met City". The observations here were mostly related to atmospheric and oceanic turbulent fluxes.

The objectives

The transitions between melt (summer) and freeze (winter) conditions are poorly understood, yet the length of the melt season, and consequently the settings for the following winters freeze are partly set by these. Obviously, the summer melt is determined by the fact that solar radiation prevails in summer, but are the transitions simply determined by the gradual arrival or decline of the sun?

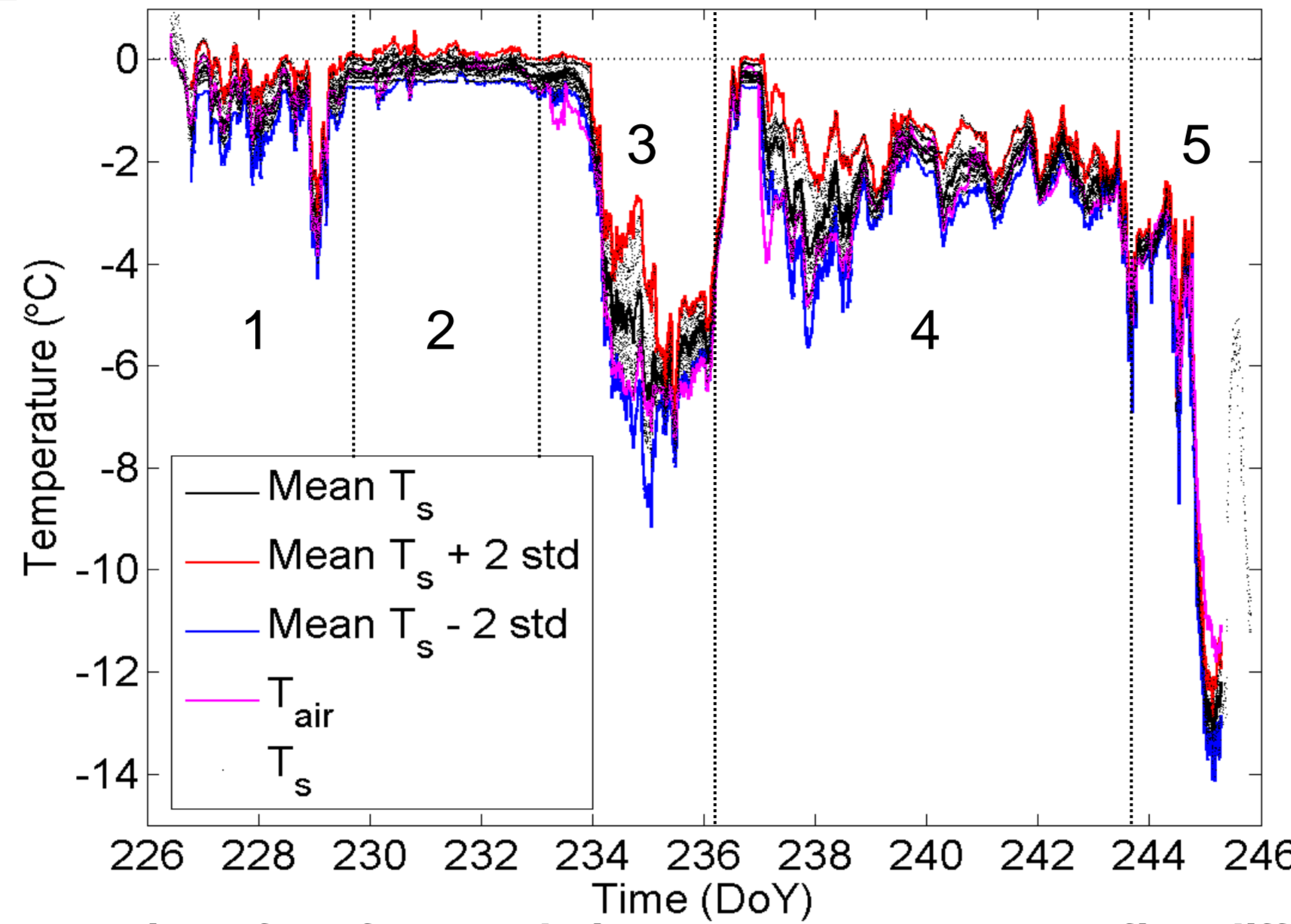
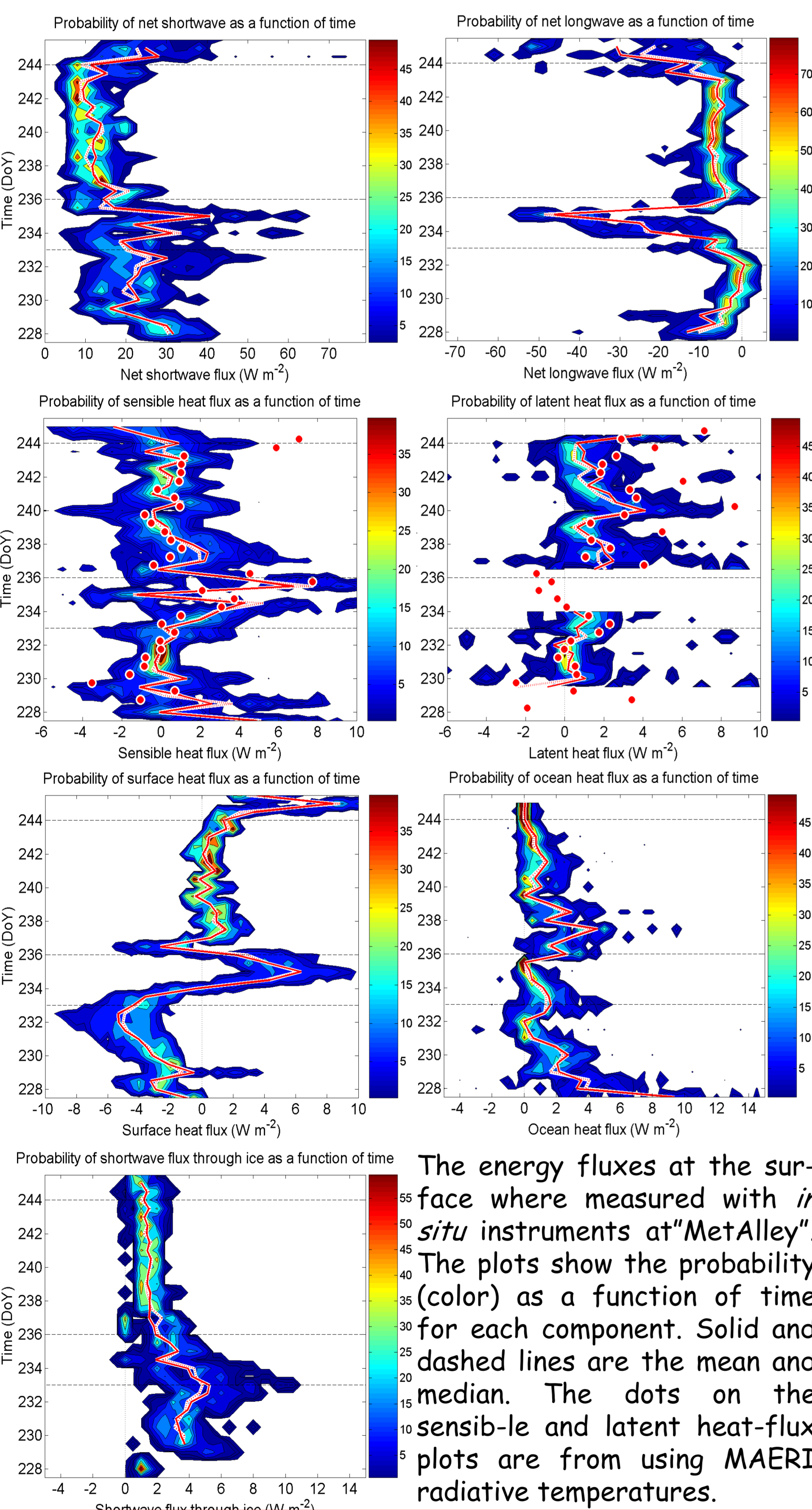
Within the scope of ASCOS (the Arctic Summer Cloud Ocean Study), one objective was to capture the fall transition, between the late summer melt and the early autumn freeze-up. This was essentially successful. Essentially all the components of the energy fluxes at the surface was measured during this transition, along with surface-based remote sensing of clouds and monitoring of the entire environment. This allows a complete survey of the conditions that contributed to this transition

Oden's foredeck



The foredeck and lab roof was dedicated to the surface-based remote sensing. Cloud radars and radiometers were deployed here along with radiometers and a lidar ceilometer.

Energy fluxes above and below the ice



The time series of surface and air temperature suggest five different regimes: #1 & 2 are part of the late summer melt, although different in variability; #3 is a brief cold period, #4 have temperatures near the freezing point of sea water and #5 is the start of the freeze-up.

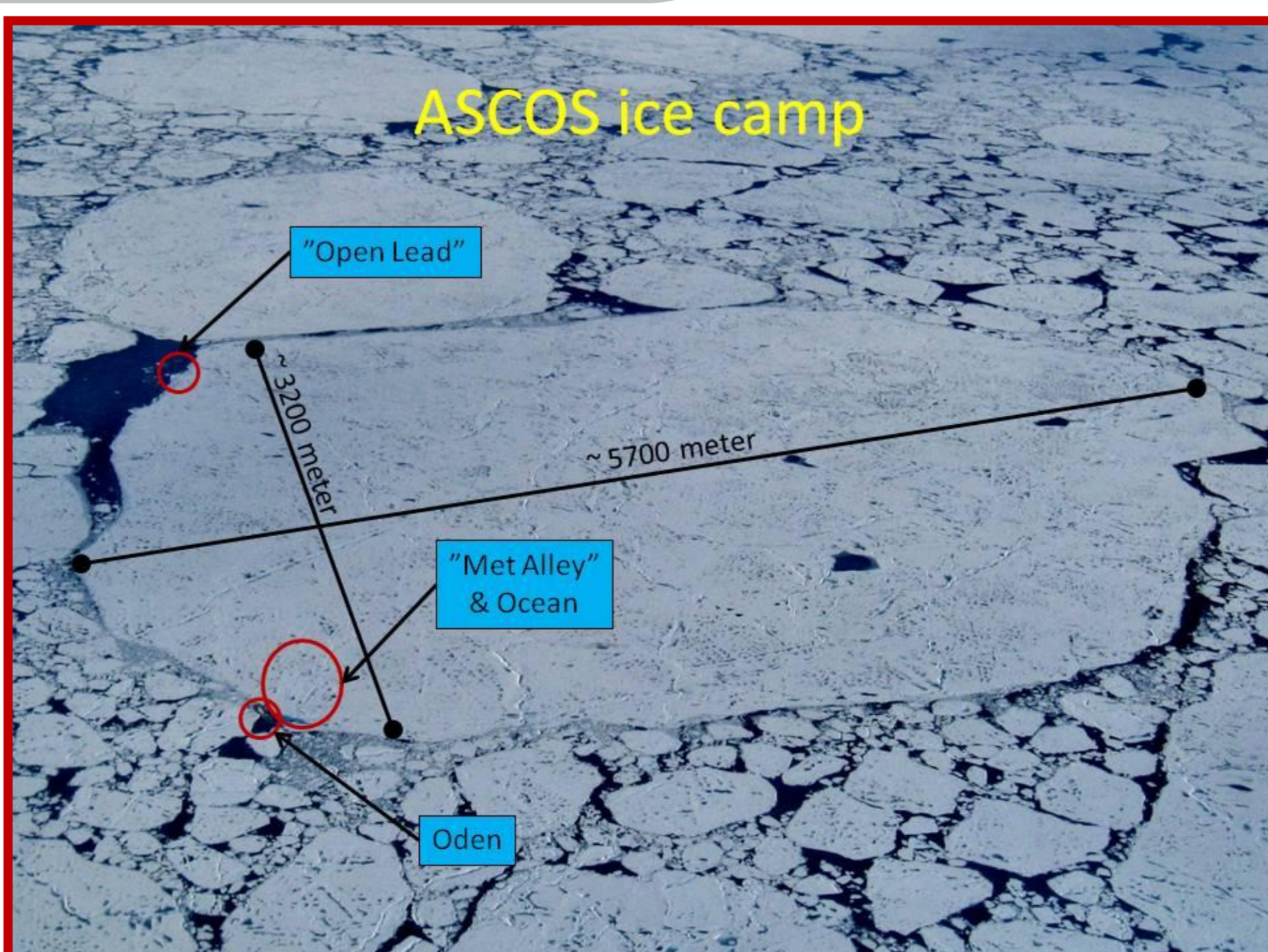
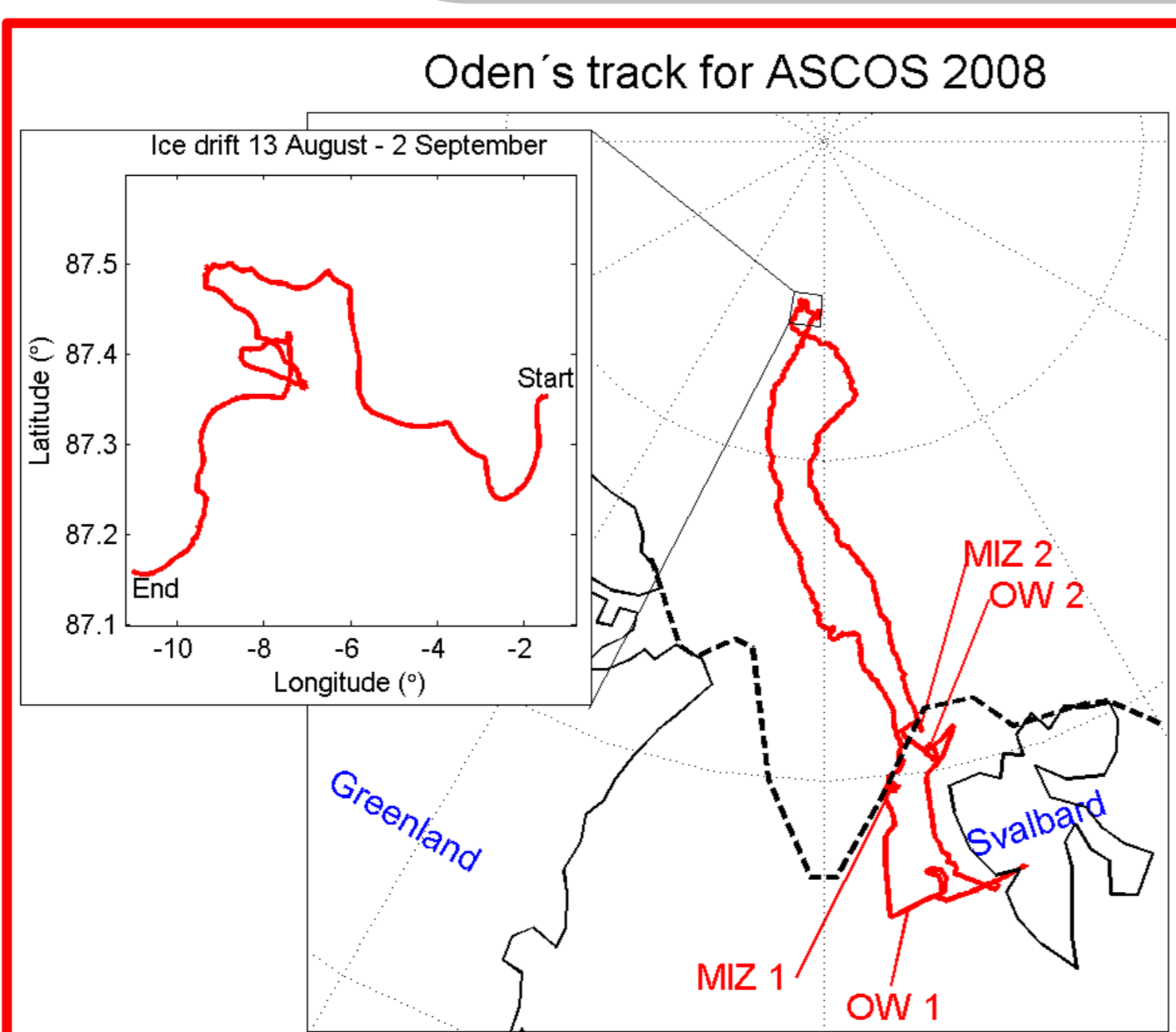
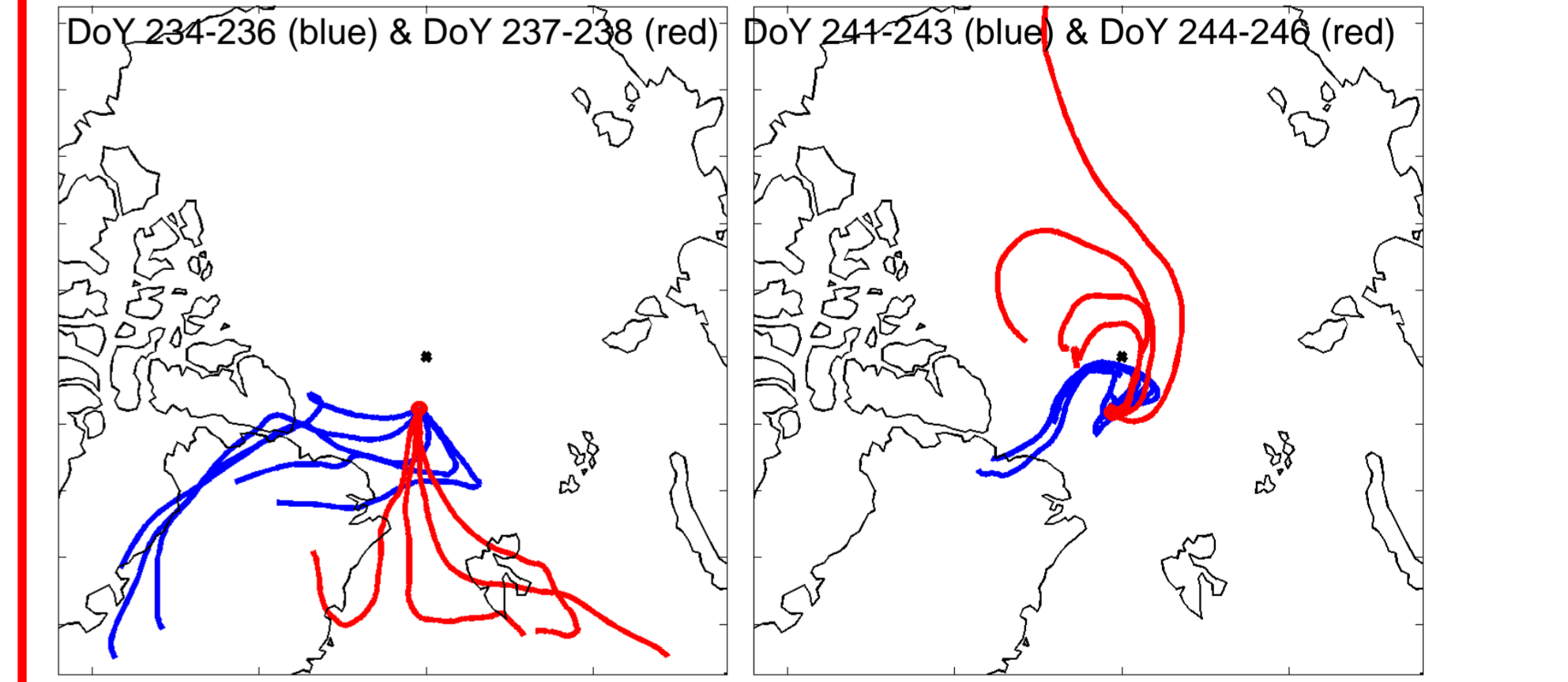
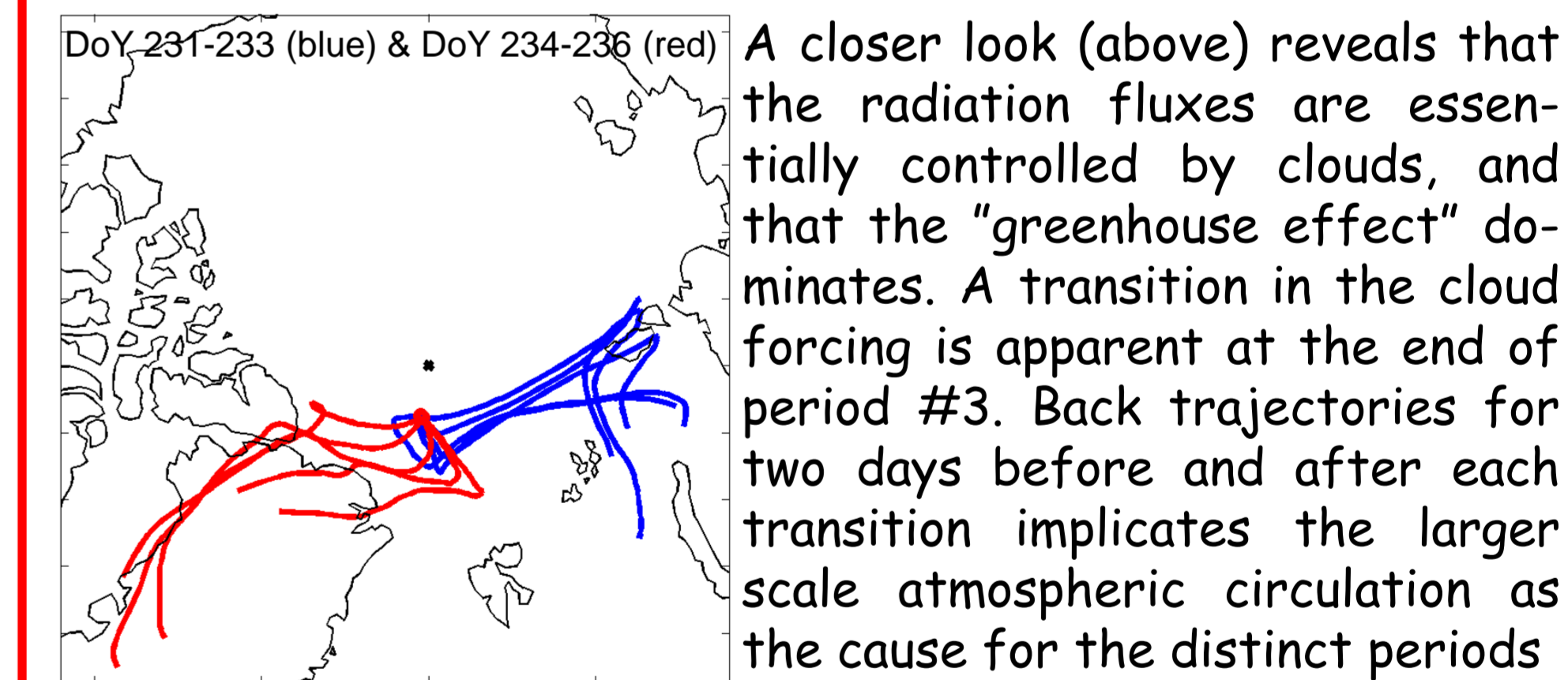
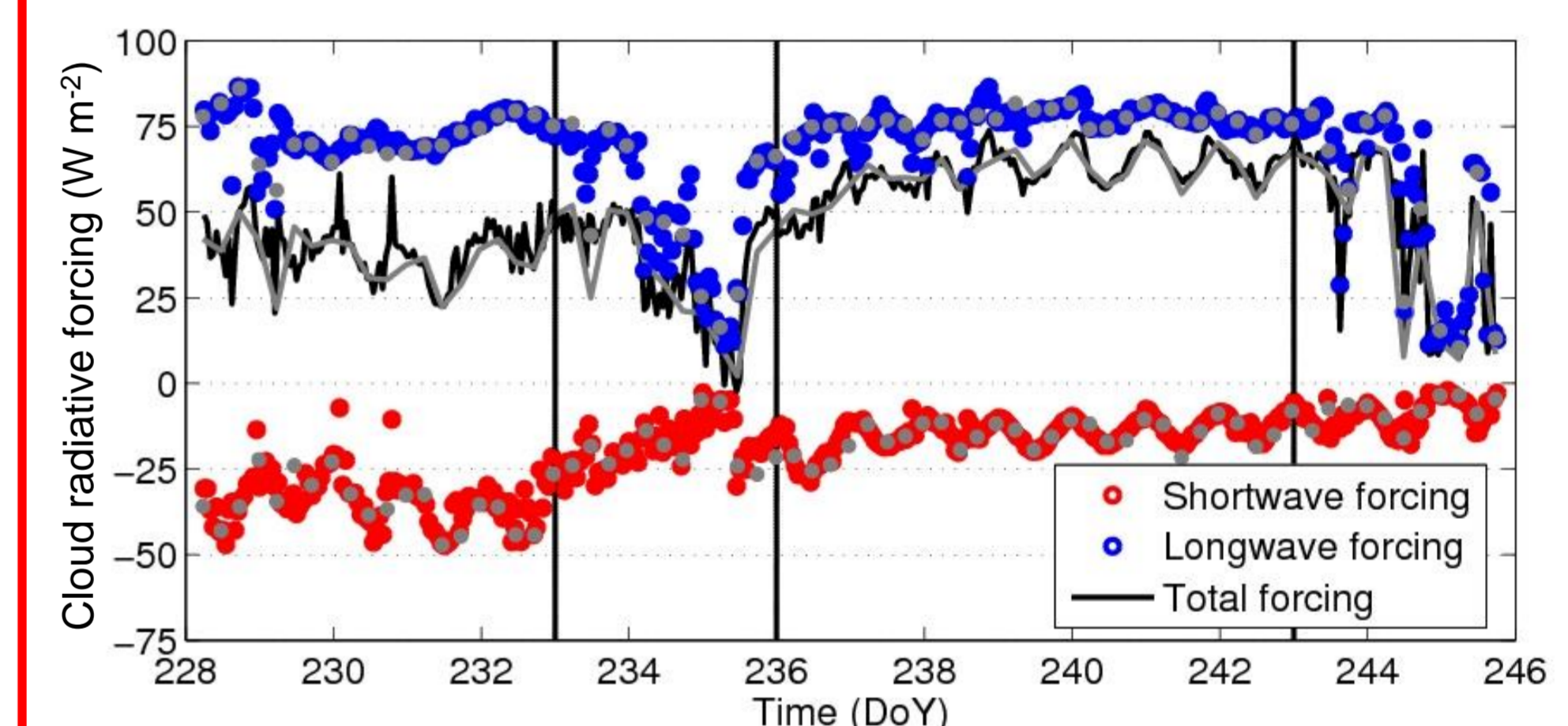
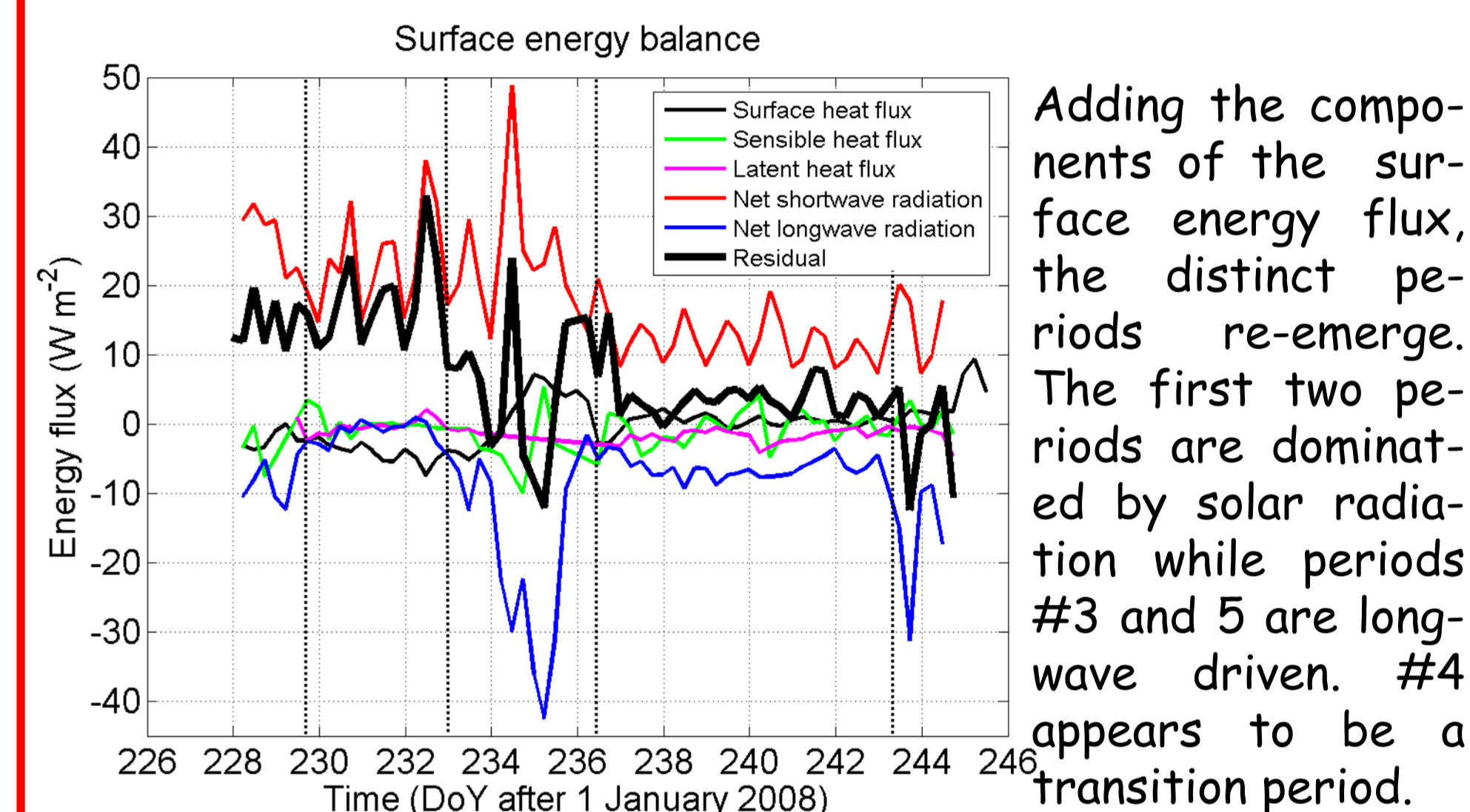


Where, when and how

The Arctic Summer Cloud Ocean Study (ASCOS) was a 40-day expedition, from 1 August to 9 September, 2008. During this, Turbulent flux of heat from the Oden was measured to a drifting 3 x 6 km large ice floe. Oden served as a measurement platform, logistics base for work on the ice and living of solar radiation through the ice quarter for 33 scientists and the 31 person crew and logistics staff.

A main feature of ASCOS was a three-week ice drift, 13 August to 2 September, 2008. Measurements were carried out on the ice, deploying both *in situ* instruments and surface-based remote sensing of clouds and winds, and profiling of temperature and humidity from the observations on the ice.

Results



Acknowledgements
This work is part of ASCOS (the Arctic Summer Cloud Ocean Study) IPY-project and was funded by the Swedish Research Council and the US National Science Foundation. ASCOS was made possible by support from the Knut and Alice Wallenberg Foundation and DAMOCLES (EU 6th Framework Program). The Swedish Polar Research Secretariat provided access to the icebreaker Oden and logistical support. Chief Scientists were Caroline Leck and Michael Tjernström. We are grateful to Oden's Captain Mattias Peterson and his crew.