

Supplement information for Dynamic and thermodynamic processes affecting atmospheric moisture and its transport during the ARTofMELT expedition, spring 2023

Tuomas Naakka, Sonja Murto-Menger, Timo Vihma, Michael Tjernström

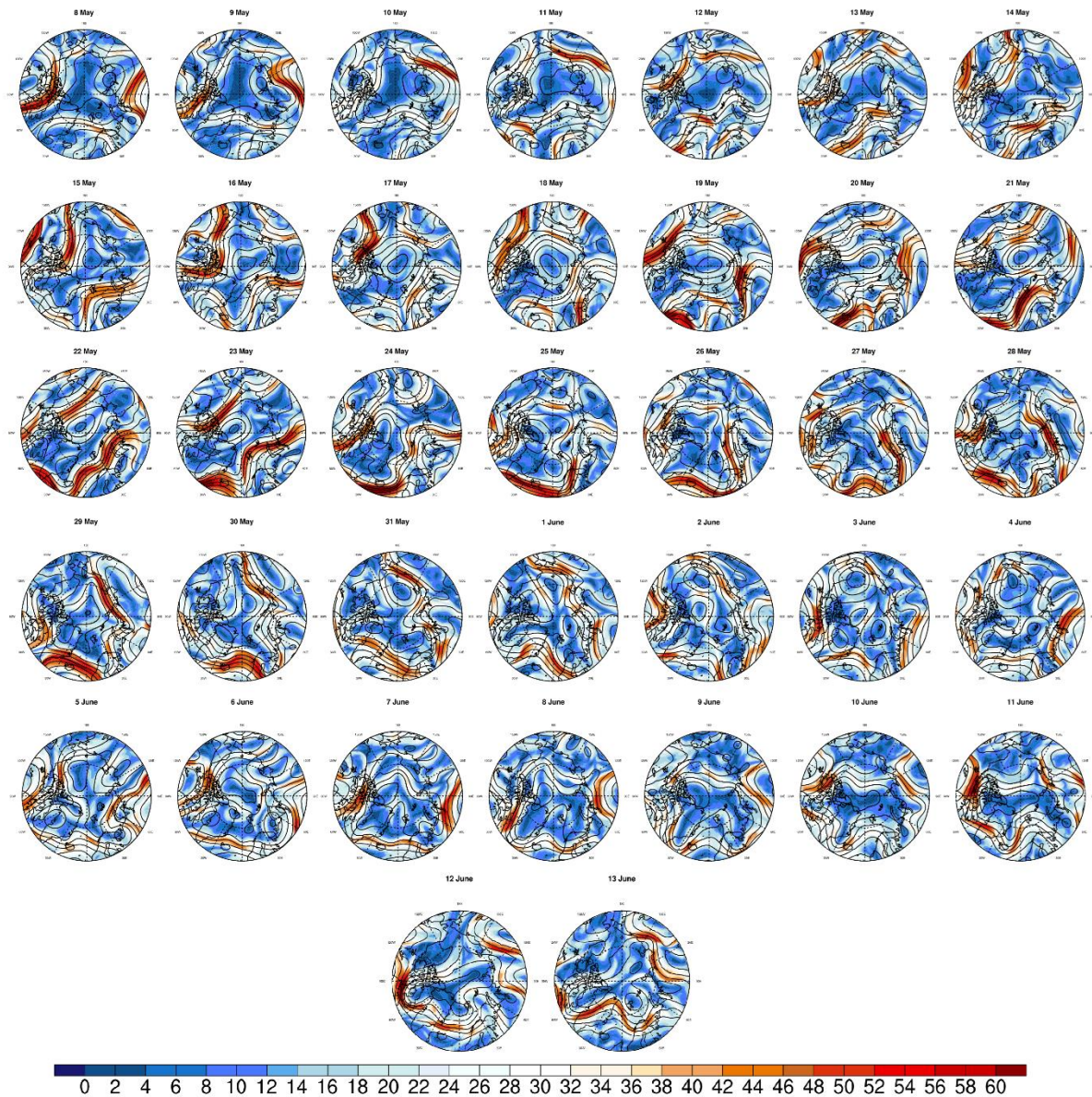


Figure S1. Daily 300 hPa geopotential (black lines) and wind speed (m/s, colours) at 300 hPa level

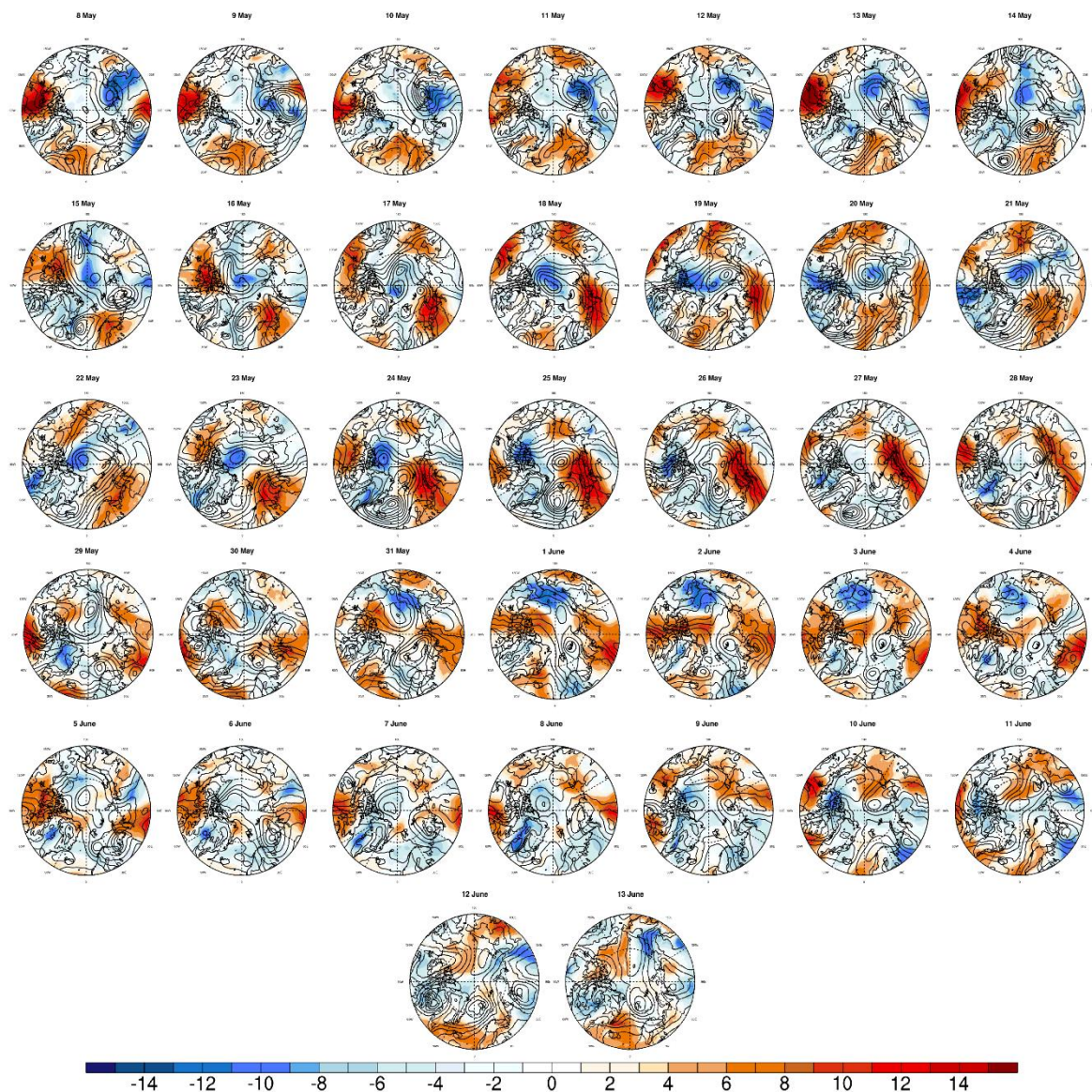


Figure S2. Daily mean sea-level pressure (black lines) and temperature daily anomaly from climatological mean (K, colours) at 850 hPa level

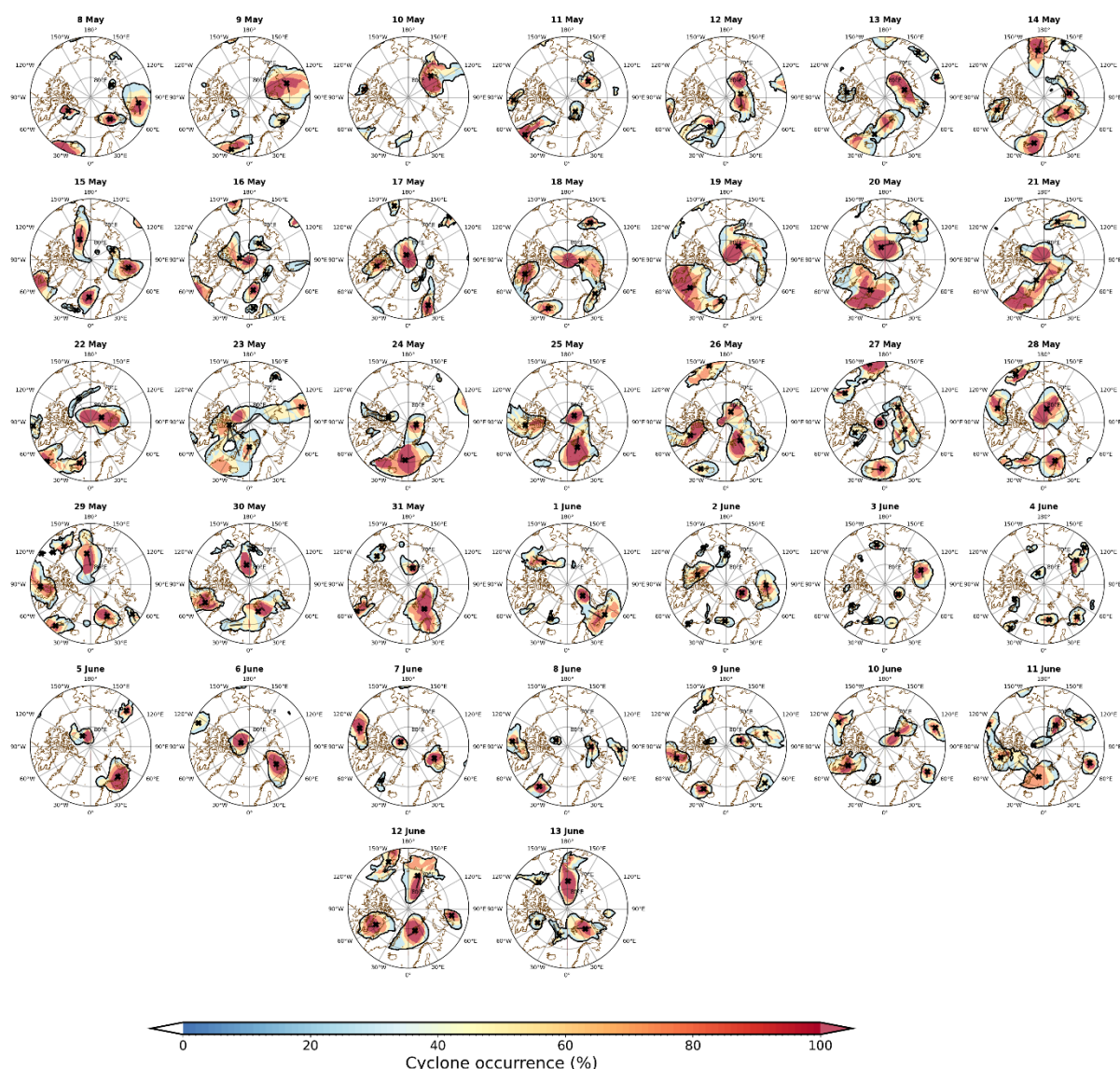


Figure S3. Occurrence of cyclones (colours), the black contour shows the maximum region associated with a cyclone object within the day, the black line inside the object shows the track of the cyclone during the day. If a cyclone persists for longer than a day, the track outside the day is not shown on the subplot, but it is shown on the next or previous subplot so that the propagation of one cyclone over several days can be seen in consecutive subplots. Black cross within each object shows the cyclone location at 12 UTC for each day

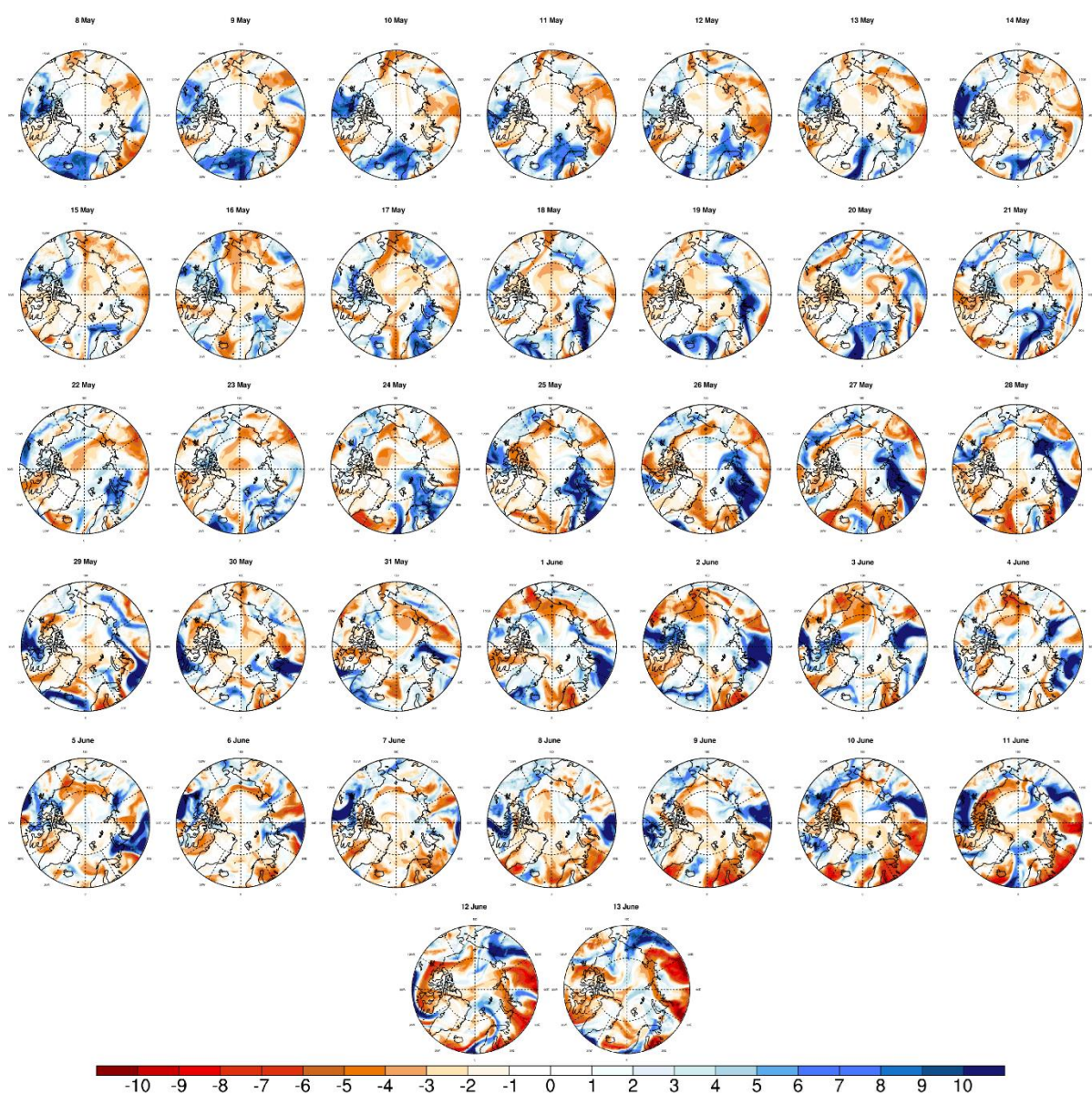


Figure S4. Vertically integrated water vapour daily anomaly from climatological mean (kg/m^2 , colours)

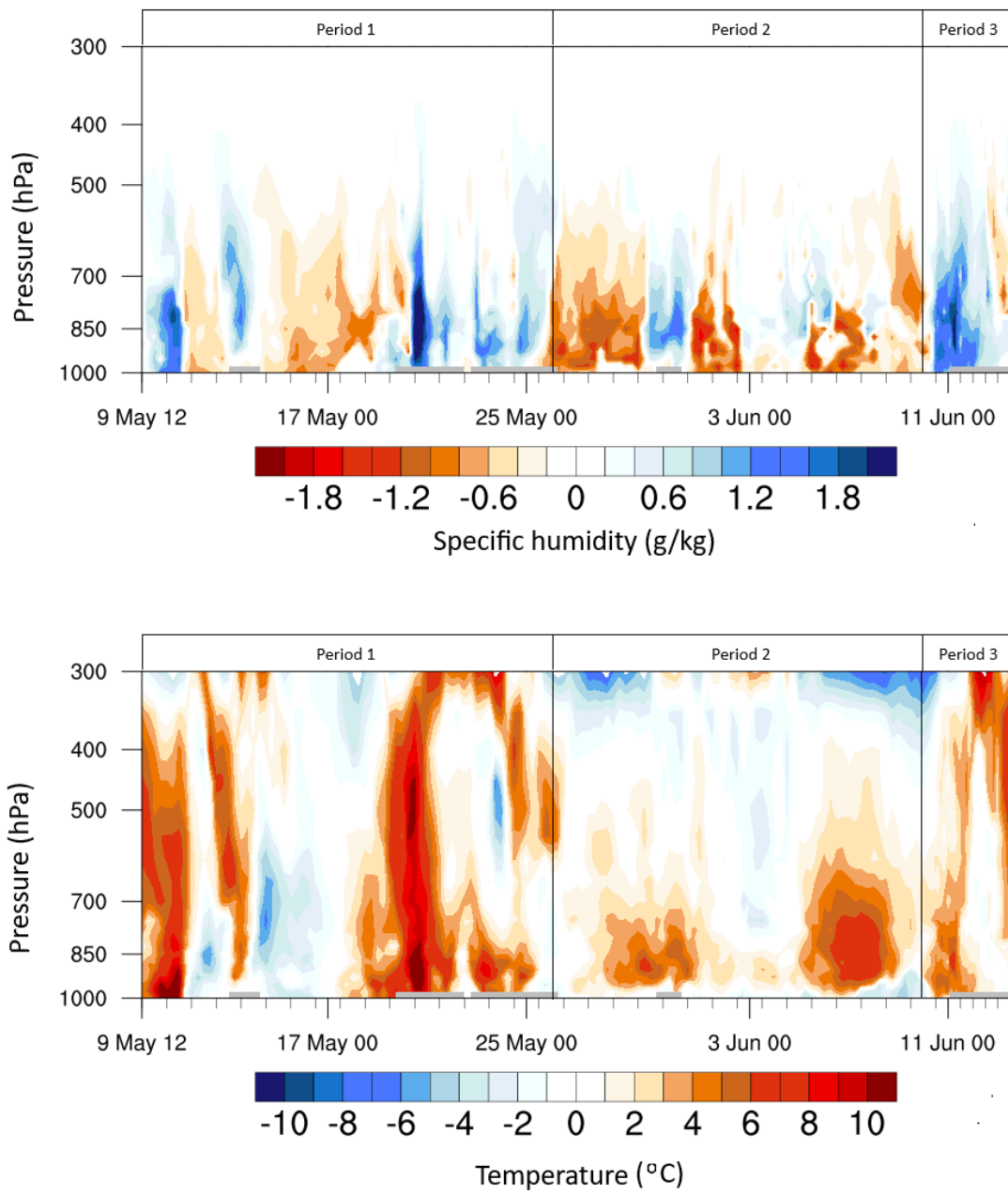


Figure S5. Specific humidity (g/kg, upper panel) and temperature (°C, lower panel) anomaly in soundings launched from *Oden* in comparison with from 30 years climatological mean from ERA5.

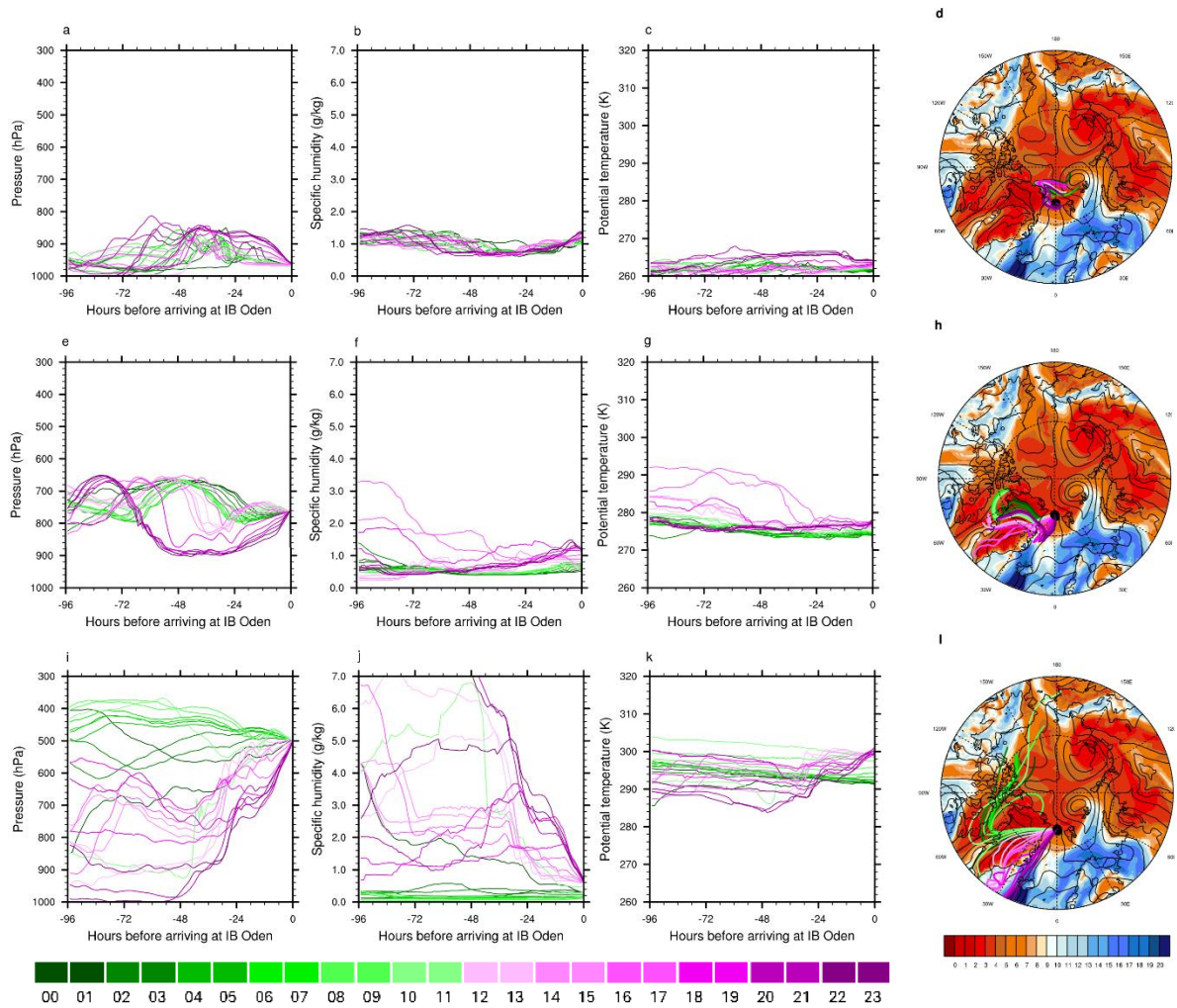


Figure S6. Pressure (left), specific humidity (middle) and potential temperature (right) along backward trajectories from initialized Oden at (a-c) 50 hPa AGL, (e-g) 250 hPa AGL, and (i-k) at 500 hPa between 00 – 23 UTC on 12 May (one trajectory calculated for each hour for each pressure level). The maps on the right show the horizontal tracks of trajectories during 96 hours before their arrival at Oden with SLP (contours) and vertically integrated water vapour (kg m^{-2} , colours) on 12 May 00 UTC. Green and purple colours in the lines indicate the initialization time (hour) of trajectories

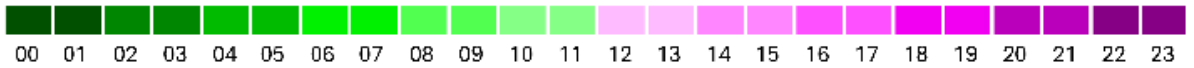
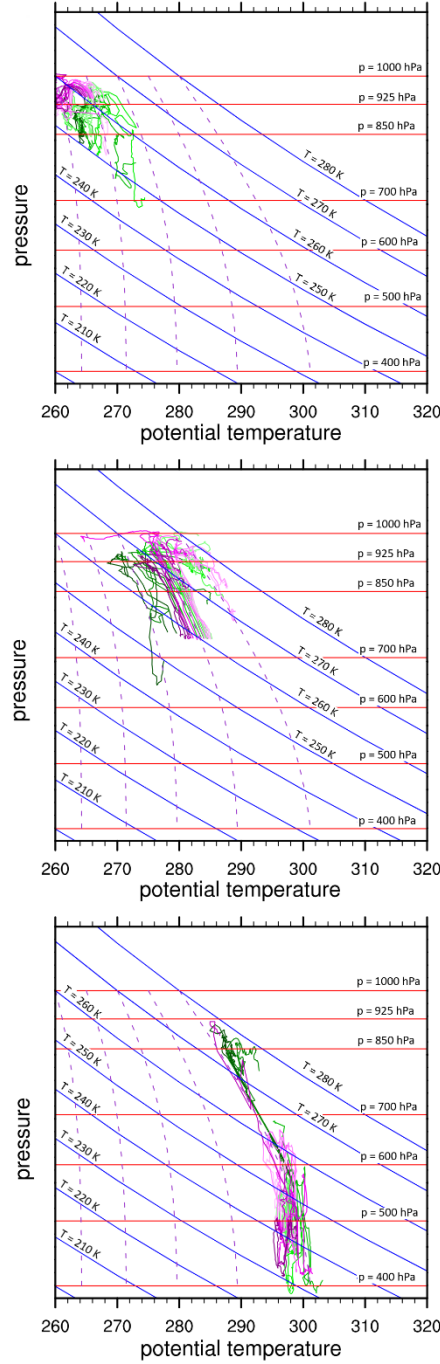


Figure S7. Trajectories of 13 May arriving at Oden 50 hPa AGL (top), 250 hPa AGL (middle), and 500 hPa level (bottom) in potential temperature – pressure -plane. Red lines are pressure isolines, blue lines are isotherms, purple dashed line indicate how pseudo adiabatic lifting affect potential temperature when latent heat of moisture condensation were released for heating of air parcel in adiabatically lifted saturated air parcel. Green and purple lines (colours of the lines indicate the initialization time of trajectories) present the evolution of trajectories arrived at Oden 13 May.