



## Climatology of low-level jets from reanalysis and observations

Minttu Tuononen (1), Victoria Sinclair (2), Timo Vihma (3), Ewan O'Connor (4), Ville Vakkari (5), and Lauri Laakso (6)

(1) Finnish Meteorological Institute, Helsinki, Finland (minttu.tuononen@fmi.fi), (2) The University of Helsinki, Helsinki, Finland (victoria.sinclair@helsinki.fi), (3) Finnish Meteorological Institute, Helsinki, Finland (timo.vihma@fmi.fi), (4) Finnish Meteorological Institute, Helsinki, Finland (ewan.oconnor@fmi.fi), (5) Finnish Meteorological Institute, Helsinki, Finland (ville.vakkari@fmi.fi), (6) Finnish Meteorological Institute, Helsinki, Finland (lauri.laakso@fmi.fi)

A low-level jet is a localised maximum in the vertical profile of wind speed that typically occurs in the lowest 1000 m above the surface. Low-level jets are important for aviation, transportation of moisture and pollutants, and wind energy applications. The strong wind shear associated with low-level jets can be harmful for wind turbines but enhanced wind speeds related to low-level jet maxima can possibly be utilized for wind power production. Therefore, it is important to know where low-level jets occur and to obtain detailed information about their characteristics.

An eleven year winter time (October to March) climatology of low-level jet occurrence and their characteristics was developed based on the Arctic System Reanalysis – Interim dataset along with an objective low-level jet identification algorithm. The highest low-level jet occurrence frequencies were found to be associate with strong gradients in topography, such as near the coastlines of Greenland and the Sea of Okhotsk and in other mountainous areas in Siberia and Alaska. Sea-ice edge regions with strong baroclinic zones and sea areas fully covered with sea ice were also found to favour the occurrence of low-level jets.

In addition to the results based on the reanalysis dataset, the results of low-level jet characteristics from observational data will be presented. Using three years of Doppler lidar observations from Utö, a small island in the south-western edge of the Finnish archipelago in the Baltic Sea, low-level jet occurrence, characteristics and forcing mechanisms are determined. Thus, we obtain a more comprehensive picture of low-level jets in the Finnish archipelago, which is important for planning of wind power plants.