

## B05-O04

### CLIMATOLOGY OF POLAR LOWS IN THE NORDIC AND BARENTS SEAS OVER 1995-2008 BASED ON SATELLITE DATA

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Polar lows are intense mesoscale atmospheric low-pressure weather systems, featured by short life-time and small size. They develop during wintertime in high latitudes over marine areas in both hemispheres, but in the Arctic they are most vigorous and dangerous. One of the major areas of polar low occurrence in the Arctic is area encompassing the Nordic and Barents seas. Polar lows are usually associated with gale force winds and intensive air-sea interaction. Therefore, the polar low climatological data are of critical importance. There are several existing polar low climatologies, but most of them are based on modelled and reanalysis data, weather maps and partly on infrared imagery. However, polar lows are often not detected at the weather maps and are under-represented in current reanalysis datasets. Therefore, the most informative polar low studies should base on the comprehensive joint analysis of different satellite data from various instruments. Among the satellite sensors, microwave radiometers have important advantages for detecting and tracking polar lows. This is independence on day and night time and clouds, and regularity and high temporal resolution in polar regions provided by past and current satellite radiometers. In this content the new approach for detecting and tracking polar lows was developed based on satellite passive microwave data (*Bobylev et al., 2011*). It consists of retrieval of atmospheric columnar water vapour fields from satellite passive microwave data (e.g., SSM/I and AMSR-E), reveal vortex structures in these fields, identification of these structures with polar lows, verification of identity of each revealed vortex structure with polar low using other satellite data (e.g., AVHRR imagery and data on sea surface wind speed derived from SSM/I, or scatterometers) and polar low parameters (life-time, size, location, moving speed) estimation and trajectory tracking.

Based on this approach, the new 14-year (1995-2008, September-April) dataset and climatology of polar lows in the Nordic and Barents seas were created. Totally 637 polar lows were detected above these seas over the considered period with average frequency 45.5 cyclones/year. Overwhelming majority of polar lows in this climatology has diameter from 100 to 400 km and life-time from 3 to 18 hours. Maximum of polar low occurrence is observed in south-west Barents Sea, north-east Norwegian Sea and in the Greenland Sea south-west of Svalbard.

#### References:

Bobylev, L.P., E.V. Zabolotskikh, L.M. Mitnik, and M.L. Mitnik (2011). Arctic Polar Low Detection and Monitoring Using Atmospheric Water Vapour Retrievals from Satellite Passive Microwave Data. *IEEE Transactions on Geoscience and Remote Sensing*, **49**, No. 9, 3302-3310, doi:10.1109/TGRS.2011.2143720.