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Total water vapor over Arctic sea ice, land ice and open ocean

A method for estimating vertically integrated water vapour (TWV) in polar regions has been developed. TWV datasets of 50km resolution have been produced since 2002, based on data from satellite microwave humidity sounders

Water vapor (WV) is the most important greenhouse gas and the source of clouds and precipitation. Monitoring of water vapour in the Arctic on long time scales is essential for predicting Arctic weather and understanding climate trends

Standard methods to observe atmospheric water vapor do not work in polar regions where water vapor content is low.
By combining data from the microwave imagers AMSR-E/2 over open water and a new retrieval from the humidity sounders AMSU-B and MHS onboard the NOAA and METOP platforms, a data set of vertically integrated WV has been generated. Examples of monthly mean TWV are shown in Fig. 1.

The data set is used in a multi-disciplinary data assimilation study to characterize greenhouse gas mass transport and to explain greenhouse gas (GHG) patterns in the Arctic. This will help to reduce uncertainties in future climate simulations.

The data are available in NetCDF and png formats:
- https://catalog-intaros.nersc.no/
- https://www.seaice.uni-bremen.de

References
[1] Triana-Gómez, A. et al.: Improved water vapour retrieval from AMSU-B and MHS in the polar regions. Atmos. Meas. Tech. 13, 3697–3715, DOI: 0.5194/amt-2019-253
[2] Wentz, F. J. and T. Meissner. 2004. doi: https://doi.org/10.5067/AMSR-E/AE_OCEAN.002.
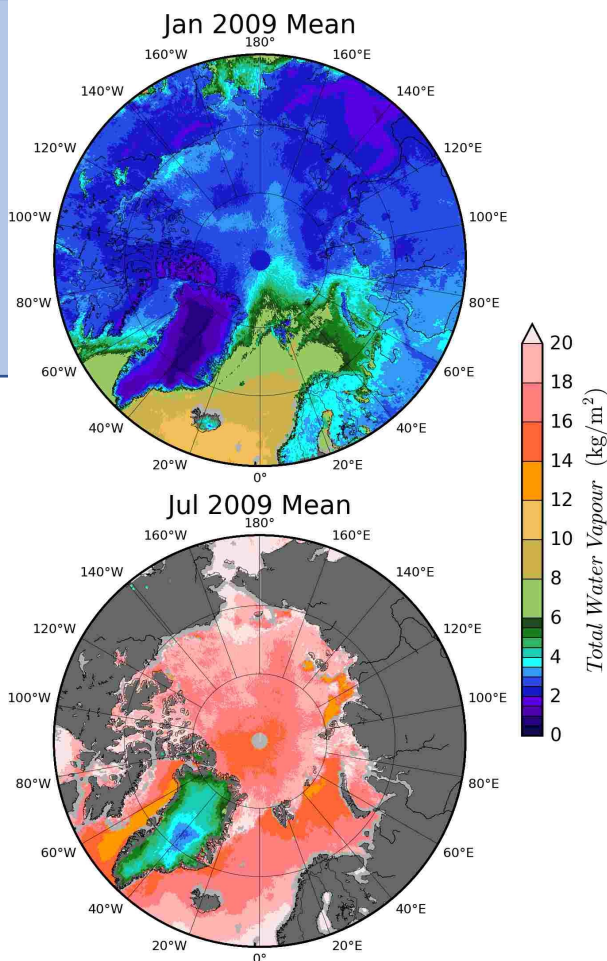

Figure 1. Map of monthly mean TWV for January and July 2009

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