



## **Probing the Arctic – insights from combining surface station observations and model analyses**

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The Arctic system is changing, and to understand the mechanisms and feedback processes contributing to these changes, an integrated spatial-temporal approach is needed. International Arctic Systems for Observing the Atmosphere (IASOA) observatories are predominantly located at coastal locations, which makes their data potentially relevant for both land and ocean areas. Numerical weather prediction (NWP) model analyses and forecasts provide a means of relating such point measurements to the atmospheric state over a larger area. Using ECMWF's re-analysis and forecasting system it is shown how comparison of station observations with NWP output provides insight into the flow-dependence of spatial representativeness. It also reveals systematic shortcomings in the model which need to be considered when the model is used as a tool to gain a better understanding of relevant physical processes. Well-known modelling challenges in the Arctic are discussed, such as the representation of low cloud, in particular at low temperatures, as well as ice/ocean/land-atmosphere interactions. The importance of surface-based observations, such as provided by IASOA observatories, is considered in light of the scientific plan for the Year of Polar Prediction 2017-19.