

EGU2020-13725

<https://doi.org/10.5194/egusphere-egu2020-13725>

EGU General Assembly 2020

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Observations and simulations from an arctic fjord and valley environment in Svalbard

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We present results from a set of field campaigns conducted in an arctic valley and fjord environment in central Spitsbergen, Svalbard. These field campaigns, which are conducted as part of a graduate class at the University Centre in Svalbard (UNIS), address a range of phenomena typical for the arctic atmospheric boundary layer using both observational and numerical means. These phenomena include low-level jets, cold pools, drainage flows, and air-sea interactions, several of which typically are challenging to accurately model. On the observational side, we utilise a range of sensors and instrumentation platforms, such as portable weather stations, a tethered sonde (anchored weather balloon), small temperature sensors (TinyTags), sonic anemometers, automatic weather stations, and drones. As of this year, the sensor suite will also constitute a wind lidar and a microwave temperature profiler. The resulting datasets represent a unique model-independent data set from a region where observations are otherwise sparse. On the numerical side, we utilise data from the high-resolution (2.5 km horizontal grid spacing) AROME-Arctic weather prediction model. AROME Arctic is run operationally by the Norwegian Meteorological Institute (MET Norway) for a domain covering Northern Fennoscandia, larger parts of the Barents Sea, and Svalbard. We use the model data both to plan our fieldwork and for interpreting our observations. In turn, we use the observations for improving our understanding of the mentioned phenomena and also for validating the model.