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DACAPO-PESO: Remote Sensing and In-situ Observations in Sub-Antarctica (53°S,71°W) to Enhance the Understanding of Aerosol-Moisture-Cloud-Precipitation Interaction

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The southern midlatitudes and Sub-Antarctica are a key region for the Earth's climate and a source for uncertainties in climate modelling. The low concentration of ice nucleating particles is considered to diminish the efficiency of heterogeneous ice formation. Climate models underestimate the supercooled liquid water content which causes shortwave radiation biases.

The project DACAPO-PESO (Dynamics, Aerosol, Cloud And Precipitation Observations in the Pristine Environment of the Southern Ocean) which is being conducted in Punta Arenas (53°S, 71°W), Chile from Nov 2018 – March 2020 is endorsed by YOPP (Year of Polar Prediction) and fills an observational gap in the Southern Oceans, for which to date hardly any combined observations of lidar, cloud radar and microwave radiometer are available.

During that field experiment, LACROS (Leipzig Aerosol and Cloud Remote Observations System) of Leibniz Institute for Tropospheric Research (TROPOS) which comprises numerous remote sensing instruments, including multi-wavelength polarization Raman lidar, cloud radars, microwave radiometer, radiation sensors among others is deployed. From March 2019 onwards, additionally in-situ observations of the INP and cloud condensation nuclei properties were collected by TROPOS on a 623m high mountain 10 km upwind of the LACROS site. Meso-scale numerical modeling will provide support for interpretation of the results.

The presentation will be dedicated to

- a) provide an overview of the setup of DACAPO-PESO
- b) show case studies of how instrument synergies are used to characterize aerosol-cloud-interaction processes in the pristine atmosphere over Punta Arenas and
- c) show a case study of an Atmospheric River event which was also observed in Antarctica.