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## Precipitation over the Southern Ocean: synoptic analysis and model evaluation using ground-based remote sensing and in-situ measurements

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Precipitation is still a poorly known variable in the Southern Ocean/Antarctica due to the lack of measurements. Unique precipitation measurements were carried out during the Swiss Polar Institute's Antarctic Circumnavigation Expedition (ACE) (December 2016 - March 2017). High temporal resolution measurements of precipitation were performed by a Snow Particle Counter (SPC) and by a micro rain radar (MRR) aboard the RV Akademik Tryoshnikov. Radiosondes were launched periodically to observe the vertical structure of the atmosphere. Additionally, MRR and radiosonde measurements from Dumont D'Urville station (DDU) were available when the expedition was in the Mertz Glacier region. These data offer a rare opportunity to evaluate model and reanalysis products performance in a region without regular precipitation measurements. In this study, ECMWF's ERA5 reanalysis product and Antarctic Mesoscale Prediction System (AMPS) model data are evaluated using ACE and DDU in-situ observations. Two snowfall events that occurred around Mertz Glacier during the ACE campaign were chosen to compare ERA5 and AMPS data with in-situ measurements. The first event on 2 February 2017 was associated with an extratropical cyclone east of Adelie Land and a moderate along-shore moisture transport. The second event on 8-10 February 2017 was associated with a cyclone west of Mertz blocked by a high-pressure ridge, directing an intense moisture transport (identified as an atmospheric river) and precipitation to DDU. To assess if ERA5 reanalysis and AMPS (Antarctic Mesoscale Prediction System using Polar-WRF model) are able to represent these different types of precipitation events, we analyse the differences in precipitation amount between in-situ, model and reanalysis data and compare modelled vertical profiles with radiosonde measurements.