



Evaluation of modelled AMPS (Antarctic Mesoscale Prediction System) precipitation in the Southern Ocean

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During the Antarctic Circumnavigation Expedition (ACE) (Dec. 2016 - March 2017), as the name implies, a ship's cruise around entire Antarctica, precipitation was measured continuously on board "Akademik Tryoshnikov" using micro radar, a snow particle counter, and two Wenglor particle counters. Even though the data are restricted by the fact that they stem from a moving ship, they offer a unique opportunity to evaluate data from the Antarctic Mesoscale Prediction System (AMPS) for an area where no routine precipitation measurements are available. Whereas the snow particle counter only considers solid precipitation, the Wenglor particle counters and the micro radar can be used for both snow and rain measurements. Additionally, during each snowfall snowflake imprints were collected using formvar-coated slides. Particle size and geometry were analysed and used to support the determination of precipitation rates from radar and particle counter data. In the presented study, the different observational data are compared to AMPS model output, both for the whole time period of the expedition and for several high-precipitation events. AMPS basically employs (Polar) WRF and has a resolution of eight km in Domain 2 that covers the continent and the southern parts of the Southern Ocean, where the larger part of the cruise took place, and 24 km in Domain 1, which extends as far north as the tips of South America, South Africa, and Southern Australia. The synoptic situation of the precipitation events and the corresponding moisture transport are analysed. In some cases, frontal passages could be studied in detail, while in other cases the ship moved with the frontal system, so that high precipitation amounts were observed for an extended time period.