



## **Evaluation of atmospheric models using radio sounding observations on the Antarctic plateau**

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Three of the latest global reanalysis products, the regional climate model RACMO and the operational weather forecast system AMPS were evaluated against vertical profiles obtained from radio soundings on the Antarctic plateau. Measurements at Kohnen Station (75°S, 0°E, 2892 m a.s.l.), which represent independent in situ data, were performed in January 2006, December 2013 and January 2014 four times a day. JRA-55 had marginally the most accurate temperature profiles, MERRA-2 had the best relative humidity profiles and ERA-interim had the smallest errors in wind speed profiles. Biases and root mean-square errors vary considerably with altitude in the troposphere and in the tropopause region. Surface or elevated inversions in the lowermost 1000 m of the atmosphere are captured quite differently. ERA-interim always shows a surface inversion with thickness and temperature increase that hardly vary in the course of a day. Overall, the frequency of surface and elevated inversions is better captured at 00 UTC and 06 UTC compared to 12 UTC and 18 UTC in JRA-55 and MERRA-2 as well as in the two regional models, which indicates that processes in the boundary layer, which lead to an erosion of a surface inversion are still poorly represented in the models. All reanalyses and regional models are able to simulate a low-level jet. However, ERA-interim, RACMO and AMPS underestimate the frequency at all four observation times.