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Seasonal variations in the horizontal wind structure from 0-100 km above Rothera station, Antarctica (67° S, 68° W)

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Abstract. A medium frequency spaced-antenna radar has been operating at Rothera station, Antarctica (67° S, 68° W) for two periods, between 1997-1998 and since 2002, measuring winds in the mesosphere and lower thermosphere. In this paper monthly mean winds are derived and presented along with three years of radiosonde balloon data for comparison with the HWM-93 model atmosphere and other high latitude southern hemisphere sites. The observed meridional winds are slightly more northwards than those predicted by the model above 80 km in the winter months and below 80 km in summer. In addition, the altitude of the summer time zero crossing of the zonal winds above the westward jet is overestimated by the model by up to 8 km. These data are then merged with the wind climatology obtained from falling sphere measurements made during the PORTA campaign at Rothera in early 1998 and the HWM-93 model atmosphere to generate a complete zonal wind climatology between 0 and 100 km as a benchmark for future studies at Rothera. A westwards (eastwards) maximum of 44 ms⁻¹ at 67 km altitude occurs in mid December (62 ms⁻¹ at 37 km in mid July). The 0 ms⁻¹ wind contour reaches a maximum altitude of 90 km in mid November and a minimum altitude of 18 km in January extending into mid March at 75 km and early October at 76 km.

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