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Differences and similarities in MaCWAVE summer and winter temperatures and winds

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Small meteorological rockets released inflatable falling spheres during the MaCWAVE Campaign. The Mountain and Convective Waves Ascending Vertically Experiment (MaCWAVE) was carried out in two parts, a summer sequence from Andoya Rocket Range (69N) during July 2002 to examine convective initiation of gravity waves and a winter sequence from ESRANGE (68N) during January 2003 to examine mountain-terrain initiated gravity waves. The sphere-tracked data provided significant information about the variation of temperature and wind from 70 km and above. The changes observed may be considered akin to tidal motion; unfortunately the launch activity was restricted to 12-hour periods, thus the observation of a full diurnal cycle was not possible. During summer, temperature variation was smaller than that observed during winter when peak to null differences reached 15-20 K at 80-85 km. Variation in the zonal winds varied up to 100+mps in summer and winter. Examination of the times of peak wind vs altitude showed that the peak zonal wind occurred approximately two hours ahead of the peak meridional wind. We provide details about the measurements and observed variations.