



Influence of the Observation Geometry on the Estimation of Gravity Wave Amplitudes using TIMED-SABER, NDMC and Radiosonde Measurements and Conclusions concerning Wave Characteristics

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Gravity wave parameters can be derived by means of different instrumental techniques. Due to instrument specific limitations, information about the waves' amplitudes is averaged individually in time and space; this leads to an underestimation of amplitudes depending on wavelengths and periods, respectively.

Global TIMED-SABER temperature data from 2002 to 2013 are analysed with respect to gravity wave activity in the strato- and mesosphere as well as in the mesopause region. Depending on geographical position significant differences for the ascending and descending part of the orbit can be observed when gravity wave activity is averaged over one Yaw-cycle. Due to the specific orientation of the fields-of-view at polar latitudes the result might be explained by a preferred horizontal wave orientation.

Analyses of radiosondes released at ALOMAR, Northern Norway in late winter / early spring 2012 confirm a preferred orientation of wave fronts which is parallel to the mountain ridge. The analysis is repeated for Oberpfaffenhofen, Southern Germany in the vicinity of the Alps. The underestimation of amplitudes by SABER is quantified for both locations on a statistical base.

Finally, gravity wave activity in the mesopause is derived from NDMC data including amongst others the stations at ALOMAR and Oberpfaffenhofen. The effects of the size and orientation of the different fields-of-view are discussed.

Conclusions how to make use of the different instrumental averaging effects in terms of gravity wave characterization are drawn.