Comparison of ECMWF analyses with GPS radio occultations

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A remaining problem for the GRACE gravity field analysis is the de-aliasing of short-term non-tidal atmospheric and oceanic mass variations. For computation of the atmospheric contribution and for forcing of the used ocean model various parameters from an atmospheric weather model, such as surface pressure, geopotential height, or temperature and humidity at different vertical levels, are applied. These atmospheric parameters are assumed to be error free. Any departure from this assumption leads to aliasing and misinterpretation of the resulting gravity field. Therefore, for all atmospheric parameters realistic error characterizations should be established. The current atmospheric model for the GRACE gravity field analysis is the European Centre for Medium-range Weather Forecast (ECMWF) model. One way to develop error measures would be to compare the ECMWF model with other data bases, e.g. from the National Center for Environmental Prediction (NCEP) or with independent global atmospheric data sets. In our contribution we compare the ECMWF multi-level temperature and geopotential height data with GPS radio occultation (RO) data from different satellite missions: CHAMP since 2001, GRACE and COSMIC since 2006. The RO technique uses GPS radio signals received aboard low orbiting satellites for atmospheric limb sounding. Global atmospheric temperature profiles are derived with high vertical resolution. Mean bias and standard deviations of the compared parameters will be shown and discussed, especially over the Antarctic region. Careful attention is given to the fact that ECMWF assimilates CHAMP and GRACE RO data since December 2006. Any differences between the pre- and post-assimilation period will be pointed out.