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Bias extreme values analysis of tropopause height observations from CHAMP data and NCEP-NCAR reanalysis

I. Bordi (1), A. Dell'Aquila (2), **M. Petitta** (1) and A. Sutera (1)

(1) Department of Physics, University of Rome "La Sapienza", P.le Aldo Moro 2 00185 Rome, Italy

(2) Progetto Speciale Clima Globale, ENEA, Via Anguillarese 301 00060 Santa Maria di Galeria, Rome, Italy

GPS radio occultation measurements, for their high vertical resolution, can provide accurate values of the tropopause temperature and height.

Recently the seasonal tropopause structure in mid-latitudes, based on an intercomparison between the NCEP–NCAR reanalysis and radio occultation data from the CHAMP satellite, was analyzed and a good agreement between the two datasets was found, at least for periods characterized by a high number of occultation measurements.

In this work we present an extreme values analysis of the discrepancies of the tropopause height observations as deduced from CHAMP data and from NCEP-NCAR reanalysis.

Starting from CHAMP profiles at given positions, we compute the tropopause heights and compare their values with those obtained from NCEP-NCAR reanalysis by averaging over the nearest grid points. The tails of the distribution of the resulting differences are analyzed and statistical methods are applied to compute the distribution of the extreme values. The analysis is performed for the globe, and then for polar, mid-latitude and tropical regions.

Finally, in order to understand why some biases occur, we analyze the spatial patterns of the tropopause height corresponding to the unveiled extreme values.