The tropopause as derived from upper-air, reanalyses and remote sensing data: (dis)advantages for each method

A. Yuchechen (1,2), S. Lakkis (2,3), P. Canziani (1,2)

(1) Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, (2) Equipo Interdisciplinario para el Estudio de Procesos Atmosféricos en el Cambio Global (PEPACG), Pontificia Universidad Católica Argentina (UCA), Argentina, (3) Facultad de Ciencias Agrarias, Pontificia Universidad Católica Argentina (UCA) (aey@uca.edu.ar)

The purpose of this research is to establish similarities and differences between several ways to obtain the thermal tropopause, i.e., upper-air data, Global Positioning System (GPS) and Reanalysis (e.g., NCEP/NCAR and ECMWF). In the case of upper-air stations, significant as well as mandatory levels can be used. Applying the Lapse Rate Definition (LRT) to the significant levels, exact values for several tropopause parameters can be obtained. By contrast, when the LRT is applied to the mandatory levels, the results are mere estimates of the exact values. Nevertheless, this latter option is valid for regions not covered by the radiosonde network (i.e. over the oceans, mainly in the Southern Hemisphere, SH), because mandatory levels are available not only from radiosonde data, but also from reanalyses gridded data. Data collected from GPS contain different levels for each sounding. Regarding the use of significant levels, GPS and radiosonde data should lead to similar results. However, this is not the case. The height of the tropopause is overestimated at twenty analyzed stations located in the SH when using GPS retrievals. On the other hand, the tropopause derived from reanalyses data yield on an underestimation of the tropopause height. Keeping in mind that GPS and reanalyses data possess systematic errors due to a large number of factors, these propagate into other tropopause parameters and this needs to be improved.