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# Characterization of the Subtropical UTLS from a long-term radiosonde and ozonesonde series (1992-2006) analysis

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Renewed interest has merged with the role of the stratosphere and the processes of exchange with the troposphere in the climate system. Understanding the tropopause physical basis and its role in transport is central for accurate modelling of UTLS chemical and dynamical processes. One of the difficulties in analyzing STE is the characterization of the tropopause, a task significantly more complex in the subtropics as compared to mid latitudes since a double tropopause is commonly observed, most of the time associated to the presence of the subtropical jet. The goal of this work is to perform a climatological characterization of the tropopause region in a subtropical site based on 865 ECC-type ozonesonde profiles, November 1992 - December 2006, at the Tenerife station, and ECMWF ERA reanalysis potential vorticity. Tropopause has been computed according to four different definitions: a WMO thermal tropopause (TT), a cold-point tropopause (CT), an ozone tropopause (OT) in which both the mixing ratio and vertical gradient of ozone are considered and a dynamical tropopause (DT), identified as the level of maximum potential vorticity gradient. A double TT is found except for summer months. The first TT observed, TT1, is found at an altitude that ranges from about 12.5 km, in winter and early spring, to 16 Km in summer, whereas the second TT observed, TT2, is found at about 16.5 km altitude with no significant seasonal variation. The CT is found to be about 1 Km above TT2. Concerning the OT, it has been found a pattern that seems to be related with the Subtropical

Jet position, pointing to air masses exchange between the troposphere and the inter-tropopauses region. The DT ranges from about 12 Km altitude in winter and spring, when it fits the potential vorticity 3.5 PVu (potential vorticity units) isoline, to 15 Km in summer, fitting the 8.5 PVu isoline. When the maximum potential vorticity gradient criterion is applied to the altitude range 15-20 Km, a second DT is found exactly at the TT2 altitude, with a value of 10 PVu. In summary, we can consider an UTLS region over Tenerife confined between the DT (as low boundary) and the CT (as upper boundary). The thickness of the UTLS varies seasonally from about 6-7 Km in winter to 2-3 Km in summer.