OZONE SOUNDINGS ON EASTER ISLAND (27°S, 109°W, 51 M.A.S.L): REPRESENTATIVITY AND TENDENCY ANALYSES

L. Gallardo(1), J. Quintana (2), and R. Valdés(3)

(1) Centro de Modelamiento Matemático de la Universidad de Chile, Casilla 170, Correo 3, Santiago, Chile; (2) Dirección Meteorológica de Chile, Aeropuerto Comodoro Arturo Merino Benítez, Casilla 63 (Correo Internacional), Santiago, Chile; (3) Centro de Química Ambiental, Universidad de Chile, Casilla 653, Santiago, Chile

About 70 ozone soundings have been collected on Easter Island (27°S, 109°W, 51 m.a.s.l.) since early 1996. In this work we provide a representativity and tendency analysis of these soundings. Our aim is to characterize the station in terms of typical air masses and the influence of different processes affecting the tropospheric ozone balance. We are particularly interested in exploring the relative importance of photochemistry of biomass burning related species and stratosphere-troposphere exchange (STE). A spring maximum in ozone is a feature apparent on a hemispheric scale over the Southern Hemisphere as derived from satellite, in situ measurements and from model simulations. The visual inspection of climatological records from satellites strongly suggest that the spring maximum is due to secondary O3 formation in connection with the widely spread biomass burning in the tropics during spring, particularly over Africa and South America. However, the role of the quasi-stationary spring subtropical jet (STJ) over the Eastern Pacific cannot be ruled out. In fact, there is evidence that STE in connection with the STJ may be very important in the subtropics. We use potential vorticity (PV), water vapor and the like as STE proxies. The statistical analyses considers, on the one hand, the traditional climatological description of the data in terms of seasonal and annual cycles, and, on the other hand, a more process oriented analysis based on clustering techniques. When available, outputs of global models describing ozone are used. Altogether, we expect these data and the analyses provided hereby to improve our understanding of tropospheric ozone over this area of the Southern Hemisphere, and to promote and facilitate the use of these
data for scientific purposes, for instance when improving satellite retrievals or when designing large-scale campaigns.