



Study of Tropospheric ozone (TOR) variability over Iberian Peninsula

Pavan Kulkarni (1), Daniele Bortoli (1,2), Rui Salgado (1,3), Manuel Antón (1,4), Maria João Costa (1,3), Ana Maria Silva (1,3)

(1) Geophysics Centre of Evora (CGE), University of Évora, Évora, Portugal (pavannpl@yahoo.co.in), (2) Institute for Atmospheric Science and Climate (ISAC-CNR), Bologna, Italy, (3) Department of Physics, University of Évora, Évora, Portugal, (4) Departamento de Física, Universidad de Extremadura, Badajoz, Spain

To study tropospheric ozone (O₃) variability and the increase in the number of months with higher tropospheric O₃ concentration over the Iberian Peninsula, NASA Langley Tropospheric Ozone Residual (TOR) data has been analyzed for the 1979–2005 period. The maximum tropospheric O₃ amount over the entire Iberian Peninsula was found in June (~41 DU) and a minimum in December (~29 DU). Over North Atlantic Coast (NAC) and Mediterranean Coast (MC) the maximum tropospheric O₃ amount was found in July (~41 DU) and June (~42 DU) and the minimum was found in December (~28 DU and ~30 DU, respectively). The West Atlantic Coast (WAC), Pyrenees Mountain Range (PMR) and Central Iberian Peninsula (CIP) have an extended period of maximum tropospheric O₃ amount, during June and July over WAC (~44 DU) and PMR (~39 DU), and during May, June and July over CIP (~40 DU). Similarly, WAC, PMR and CIP have an extended period of minimum tropospheric O₃ amount, during December and January over WAC (~30 DU) and CIP (~29 DU) and November and December over PMR (~28 DU). The high concentration of ozone in July over the Atlantic Ocean near Iberian Peninsula are due to the presence of Azores anticyclone, extending in ridge through the Cantabrian Sea to the British Isles and West and Central Europe, and related photochemistry and dynamics, has profound effect on the observed higher ozone concentration over WAC zone. Strong seasonal cycle in tropospheric O₃ amount has been observed with large variation over NAC (~49%), followed by WAC (~48%) and MC (~41%) compared to CIP and PMR (~38%). When the data are compared over the Iberian Peninsula for the two periods (1979-1993 and 1997-2005), a systematic increase in the number of months with higher tropospheric O₃ concentration has been observed during the second period with respect to the first. These increases are almost 8% to 24% over NAC, 6% to 17% over WAC, 5% to 24% over CIP, 6% to 23% over MC and 13% to 18% over PMR. It has been observed that topography, climatology and population density distribution plays a crucial role in the variability of tropospheric O₃ amount and increase in the number of months with higher tropospheric O₃ concentration.