



Cross-tropopause exchanges and Ozone exceedances in the North of Portugal

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Ozone concentrations observed in a background station located in a rural region in the North of Portugal reveal several episodes of extremely high concentration values, raising the question of whether such extreme episodes result mainly from stratospheric intrusion events or from local scale air-pollution transport and transformation processes.

An extensive analysis is performed on the atmospheric circulation over the North Atlantic and the European sectors in order to identify the physical mechanisms that may account for recorded exceedances during the period 2004-2007. The study relies on thermohydrodynamical fields from the reanalysis data set of NCEP/NCAR (National Centers for Environmental Prediction/National Center for Atmospheric Research) and obtained results provide evidence of the contribution from cross-tropopause exchanges. In particular, it will be shown that Stratosphere to Troposphere Transport (STT) events take place over the Atlantic Ocean and Europe, move east with the mean flow and penetrate downward through a weak potential temperature gradient.