A brief review of Reactive Gases Observations at Izaña Atmospheric Observatory (2006-2009).

Y. González[1,2], S. Rodríguez[1,3], E. Cuevas[1], R. Ramos[1], J.C. Guerra[4], J.M. Baldasano[2]

[1] Izaña Atmospheric Research Centre, AEMET, Associated Unit CSIC "Studies on Atmospheric Pollution", C/ La Marina 20, planta 6, E38071, Santa Cruz de Tenerife, Canary Islands, Spain. *email: ygonzalez@inm.es
[2] Barcelona Supercomputing Centre, Torre Girona, C/ Jordi Girona, 31, E08034, Barcelona, Spain.
[3] University of Huelva, Associate Unit CSIC "Air Pollution", Campus El Carmen, E21071, Huelva, Spain
[4] University of La Laguna, Atmospheric Physics Laboratory, S/C de Tenerife, Spain

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The reactive gases as carbon monoxide (CO), volatile organic compounds (VOCs), oxidised nitrogen compounds (NO_X, NO_Y), and sulphur dioxide (SO_2) play a key role in the atmospheric chemistry and its relations with climate, either through control of ozone and the oxidising capacity of the atmosphere, or through the formation of secondary aerosols, exerting a direct effect on radiative forcing. In spite of being essential for the understanding of the free troposphere chemistry, measurement programs for most of them in the subtropical region are still scarce compared with those carried out in the boundary layer.

In this work the results of the reactive gases programme installed at Izaña GAW station since late 1996 will be presented. Different atmospheric factors exert a marked influence on the trace gas observed levels. In a synoptic scale, above the inversion layer, the descending branch of the Hadley cell and the proximity of the Azores high drive a catabatic flow over the Izaña Observatory favouring free tropospheric conditions. The Izaña Observatory is impacted, on one hand, by upper troposphere air masses as result of cut-off low developments over middle latitude North Atlantic, and on the other hand by dust-loaded continental air masses from the Sahara. In a local scale, an increase in SO_2 and NO_X levels is observed due to the upward flows during daylight. Higher levels are also observed during extended episodes of atmospheric instability associated to depressions that break the inversion layer and provoke ascending polluted flows. In any case, such levels remain low (~ thousands of ppt). At night, under free troposphere conditions, the levels of sulphur dioxide and nitrogen oxides are typically below the detection limits (50 ppt for NO-NO_X, and 60 ppt for SO_2, figure 1). In some episodes, an increase in nitrogen oxides (NO_X, i.e. NO and NO_2) associated with thunderstorm lightning has been also observed at Izaña Observatory.

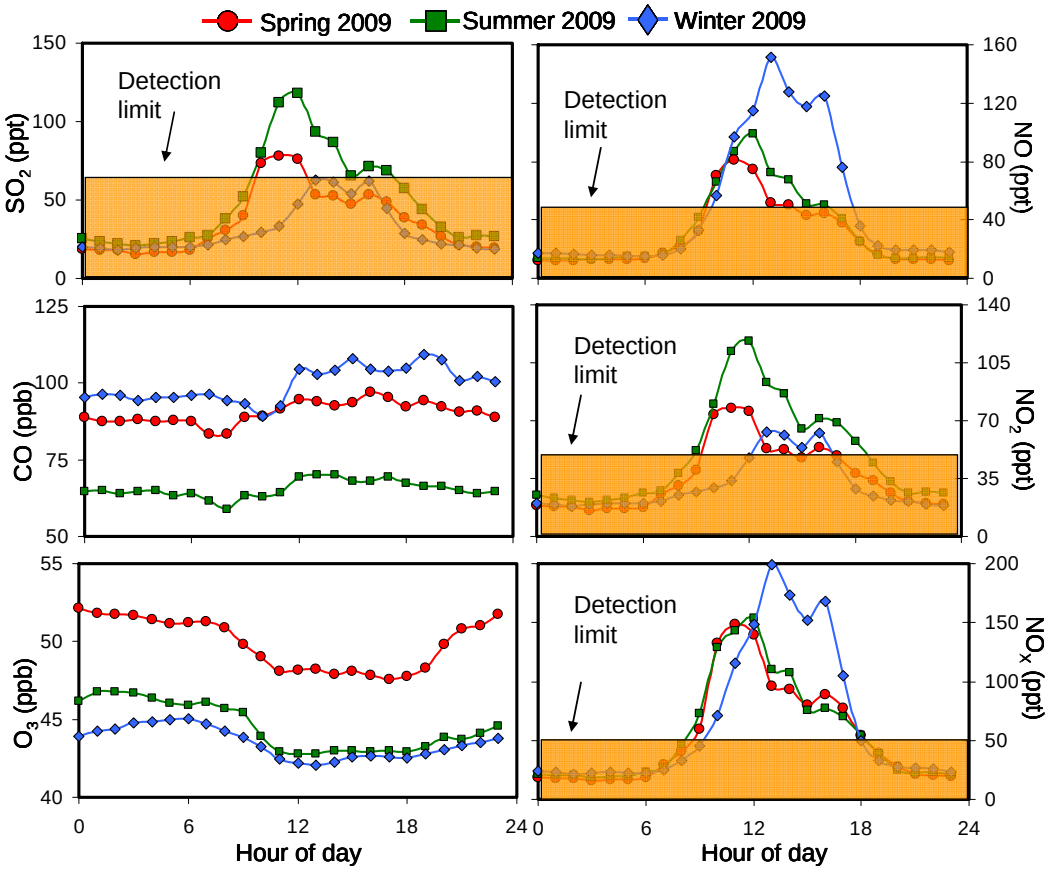

Figure 1. Seasonal daily cycle mean of 2009: spring (Apr-Jun), summer (Jul-Sep) and winter (Jan-March).

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