

## **NO<sub>2</sub> seasonal evolution in the background free troposphere from MAXDOAS measurements**

Manuel Gil-Ojeda, Mónica Navarro-Comas, Laura Gómez, Alfonso Saiz-López,  
Jose-Antonio Adame, Olga Puentedura, Yenny González and Emilio Cuevas

*Instituto Nacional de Técnica Aeroespacial (INTA), Torrejón de Ardoz, Spain*

e-mail: [gilm@inta.es](mailto:gilm@inta.es)

A novel method to retrieve minor species concentrations at the instrument level in high mountain observatories has been applied to study the NO<sub>2</sub> evolution in the subtropical free troposphere (FT). Volume mixing ratios are obtained by dividing the horizontal slant column measured by Multi-Axis Differential Optical Absorption Spectroscopy (MAXDOAS) by the length of the horizontal optical path. This path is computed from the O<sub>2</sub>-O<sub>2</sub> collisional complex DSCDs evaluated simultaneously to the NO<sub>2</sub>. High mountain MAXDOAS measurements take advantage of the averaging over very long paths, which allows the retrieval of species present in very low concentrations minimizing the unwanted effect of the boundary contamination due to upslope breeze. Results show a background NO<sub>2</sub> mean level of 35 pptv with well defined seasonal pattern, quite in phase with the amount of available radiation, suggesting production within the FT photochemically related rather than long range transport. Only occasionally NO<sub>2</sub> bursts are observed, generally related thunderstorm electrical activity, boundary layer break-up or long-range transport.