



Analysis of UV radiation values during a low ozone episode over Extremadura (Spain) in January 2006

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In the last years, events of extremely low ozone during two or three days have been reported in both hemispheres. This type of episode is named ozone mini-hole and it could have a notable influence on ultraviolet (UV) radiation values measured at the surface. The main objective of this work is to analyze, firstly, the causes in detail of a low ozone event which occurred in January 2006 and, secondly, the corresponding effects of this anomalous episode on the UV radiation measured at three locations in Extremadura (South-Western Spain).

We analyzed the ozone mini-hole event using total ozone data provided by the OMI/NASA satellite instrument. The evolution of these values show a decrease in total ozone amount from 18-20 January 2006 above three locations of Extremadura region, with a minimum on 19 January: 247 DU (Badajoz), 241 DU (Cáceres) and 240 DU (Plasencia). The total ozone amount decreased about 16%-19% with respect to January mean values (period 1996-2005). After the 20 of January, the total ozone amount returned to levels which can be considered usual for these geographical locations and season. The back trajectories analysis by HYSplit model in the three locations shows that the notable decrease of total ozone amount coincides practically with a fast rise of isentropic trajectories height. Therefore, vertical displacement of air parcels affected the total ozone column by simply decreasing the pressure thickness of the ozone layer, without changing the mixing ratio.

UV erythral radiation (UVER) measurements, recorded by three Kipp & Zonen broad-band radiometer, located at Badajoz, Cáceres and Plasencia, have been used to study the effects of the low ozone episode on UV radiation. The anomalous event

coincided with cloudless conditions. Thus, on 19 January 2006 a notable increase (between 23% and 37%) in mean measurements of UVER (between 11 and 13 hours UTC) was recorded when compared to UVER values measured on 19 January 2005. This notable increase in winter UV solar radiation may involve harmful effects for organisms adapted to receive less radiation in that season (e.g. early developmental stages of terrestrial plants and phytoplankton).