Geophysical Research Abstracts,
Vol. 11, EGU2009-10514, 2009
EGU General Assembly 2009

Tropospheric ozone variations at the Everest-Pyramid GAW-WMO station (5079 m a.s.l., Nepal): natural and anthropogenic contributions.

P. CRISTOFANELLI (1), P. BONASONI (1), A. MARINONI (1), R. DUCHI (1), F. CALZOLARI (1), U. BONAFE' (1), F. ROCCATO (1), E. VUILLERMOZ (2), G.P. VERZA (2), and M. SPRENGER (3)

(1) CNR, ISAC, Bologna, Italy (P.Cristofanelli@isac.cnr.it), (2) Ev-K2-CNR Committe, Bergamo, Italy, (3) ETH, Zurich, Switzerland.

Surface ozone is a key species controlling the oxidizing capacity of the troposphere and a powerful greenhouse gas. Since March 2006, continuous measurements of its concentration have been carried out at the Everest-Pyramid GAW-WMO station (5079 m a.s.l., Nepal), which is considered representative for the South-East Himalayas. The aim of this activity, conducted in the framework of Ev-K2-CNR "SHARE ASIA" and UNEP –"ABC" projects, is twofold: (a) to characterize the atmospheric background composition at the high Himalayan altitudes; and (b) to investigate the possible influence of polluted air mass transports.

In this work, we present the first systematic evaluation about the influence played by natural (i.e. stratospheric intrusion events) and anthropogenic (i.e. transport of polluted air masses) processes in determining the ozone variations at this measurement site. For this purpose, we analysed two years of continuous measurements concerning in-situ surface ozone, black carbon and meteorological parameters as well as total ozone values from OMI satellite measurements. Further information about the origin of air masses affecting the measurement site was gained from three-dimensional backward trajectories (calculated with the LAGRANTO model) and consideration of potential vorticity values along these trajectories.

Preliminary results suggest that the stratospheric intrusions and the pollution transport events significantly affect tropospheric ozone levels during pre-monsoon and dry seasons, even if strong episodes of pollution transport are also observed during the onset period of the monsoon season.