



Five years of ozonesoundings from the central Himalayas: role of dynamical processes and biomass burning

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Higher water vapour, intense solar radiation and increasing levels of trace species over the tropical Asia are making this region more complex for understanding the physical, dynamical and chemical process over here. One of the most populated regions (The Indo-Gangetic Plain, IGP) of the world and a variety of anthropogenic and biogenic emission sources are also housing in the foothill of one of the pristine region, i.e. Himalaya. Uplifting and transport of polluted air-masses to the higher heights is a major concern in the South Asia. However, observations of vertical distribution of ozone, and other trace gases including water vapour, aerosols and meteorological parameters are very limited in South Asia.

In view of this, an observational facility was setup at ARIES, Nainital (29.4N, 79.5E; 1950 m) in the central Himalayas. Regular, once in a week, balloon borne measurements of ozone, RH, temperature and GPS winds are being made since January 2011. Surface observations of different trace gases (Ozone, CO, NO, NO_y, light NMHCs, SO₂, CO₂ and other GHGs) and aerosols are also being made at this site. Here, we present five years of ozonesoundings observations. A strong seasonal cycle in the lower tropospheric ozone with highest values during spring (~ 100 ppbv) and lowest during summer-monsoon (20-40 ppbv) is discerned. Elevated ozone levels (~120 ppbv) were observed in the middle-upper troposphere along with very high wind speed (~50 m/s) which indicates the role of dynamics in bringing ozone rich air from higher altitude. The signatures of ozone downward transport have also been noticed in TES water vapour and PV. In contrast, such influence is seen to be weaker in the eastern part of the Himalayas. A very clear enhancement (20-30 ppbv) in the lower tropospheric ozone is seen that is induced by the biomass burning. Further analysis of these observations with the help of air trajectories and satellite data will be presented.