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Two-year black carbon observations at Everest-Pyramid GAW Station (Nepal, 5079 m a.s.l.)

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Carbonaceous aerosol play a complex role in atmospheric radiative balance; in particular black carbon, primary produced by fossil fuel combustion and biomass burning, both absorbs and reflects incoming solar radiation, thus heating the lower troposphere and cooling the Earth surface. India and China, the most populated and rapidly developing countries, are between the actual major emitters. Thus the Himalayas range is an ideal location to investigate atmospheric composition changes.
Due to technical and logistic difficulties, only few continuous observations of atmospheric constituents are available in this area. One of these observation sites is located in the Khumbu valley at 5079 m a.s.l, where black carbon and other aerosol parameters as well as trace gas concentrations measurements are carried out since March 2006.
The BC seasonal behaviour clearly shows a minimum in summer monsoon season with an averaged concentration of 52 ng m-3 and a standard deviation of 62 ng m-3; the seasonal maximum appears in pre-monsoon period with an averaged concentration of 340 ng m-3 and a standard deviation of 415 ng m-3. During this season black carbon values reached sometime very high levels up to 5 μg m-3 on 30 minutes base, showing high polluted conditions even at 5000 m. Aerosol mass (PM-1), as well as accumulation particle number show very similar seasonal trends, while ultrafine (Aitken+Nucleation) particles are more influenced by nucleation processes.
In this work, we present an analysis of black carbon and aerosol mass variations during the first two years of measurements at the Everest-Pyramid station with the aim to identify background and polluted conditions.