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Ageing and transport of organic aerosols

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Aerosols on the high-Alpine site Jungfraujoch (Switzerland, 3580 m.a.s.l.) were characterized during several campaigns by aerosol mass spectrometry using the Aerodyne Q-AMS. Factor analysis of organic and inorganic aerosol species revealed different secondary and aged aerosol components for campaigns in 2002, 2004, and 2005. As for other sites, two different types of oxygenated organic aerosols (OOA) could be extracted: type I represents highly processed secondary organic aerosol (SOA) and is correlated with particulate sulphate, whilst type II is more volatile and its temporal behaviour is similar to particulate nitrate. Type I is typically characterized by a high m/z 44 : m/z 43 ratio, which is much smaller (or even below 1) for type II. Mass fragment 44 represents highly oxidized aerosol (such as dicarboxylic acids, COO+), whereas m/z 43 is indicative for less oxidized species such as aldehydes and ketones (CH2CHO+ or CH3CO+). Here we further examined the potential source regions of these components and their age during winter and summer campaigns based on back trajectories and molecular clocks.