

Publication

Atmospheric ice nuclei at the high-altitude observatory Jungfraujoch, Switzerland

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The state of a slightly supercooled ephemeral cloud can be changed by the presence of a few particles capable of catalysing freezing, and potentially result in precipitation. We investigated the atmospheric abundance of particles active as ice nuclei at -8 degrees C (IN-8) over the course of a year at the highalpine station Jungfraujoch (3580 m.a.s.l., Switzerland) through the use of immersion freezing assays of particles collected on quartz micro-fibre filters. In addition, we determined IN-8 on a hill in the planetary boundary layer 95 km northwest of Jungfraujoch and in the dust laden Saharan Air Layer reaching Tenerife. Results indicate a strong seasonality of IN-8 at Jungfraujoch. Values were largest during summer (between 1 and 10 m(-3)) and about two orders of magnitude smaller during winter. Sahara dust events had a negligible influence on IN-8 at Jungfraujoch. Seasonality in the boundary layer was not observed in the upper, but in the lower bound of IN-8 values. Values <1m(-3) were only found on cold winter days, when IN-8 were more likely to have already been activated and deposited than on warmer days. A good correlation between IN-8 and maximum daily temperature at Jungfraujoch (R-2 = 0.54) suggests IN-8 abundance at Jungfraujoch may be limited most of the year by microphysical processing related to IN activation in approaching air masses.

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