

Ice nucleating particles from a large-scale sampling network: insight into geographic and temporal variability

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The number concentration of ice nucleating particles (INP) is an important, yet under quantified atmospheric parameter. The temporal and geographic extent of observations worldwide remains relatively small, with many regions of the world (even whole continents and oceans), almost completely unrepresented by observational data. Measurements at pristine sites are particularly rare, but all the more valuable because such observations are necessary to estimate the pre-industrial baseline of aerosol and cloud related parameters that are needed to better understand the climate system and forecast future scenarios. As a partner of BACCHUS we began in September 2014 to operate an INP measurement network of four sampling stations, with a global geographic distribution. The stations are located at unique sites reaching from the Arctic to the equator: the Amazonian Tall Tower Observatory ATTO in Brazil, the Observatoire Volcanologique et Sismologique on the island of Martinique in the Caribbean Sea, the Zeppelin Observatory at Svalbard in the Norwegian Arctic and the Taunus Observatory near Frankfurt, Germany. Since 2014 samples were collected regularly by electrostatic precipitation of aerosol particles onto silicon substrates. The INP on the substrate are activated and analyzed in the isothermal static diffusion chamber FRIDGE at temperatures between -20°C and -30°C and relative humidity with respect to ice from 115 to 135%. Here we present data from the years 2015 and 2016 from this novel INP network and from selected campaign-based measurements from remote sites, including the Mt. Kenya GAW station.

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