



Global simulations of Ice Nuclei Particles of Terrestrial and Marine Origin

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Ice Nuclei Particles (INPs) are rare atmospheric aerosols that enable ice formation in mixed-phase clouds at temperatures higher than needed for homogeneous ice nucleation. Therefore INPs affect significantly the radiative properties and lifetime of clouds as well as precipitation rates. The main known sources of INPs are K-feldspar mineral dust particles, which are emitted from deserts, and marine aerosols, which are enriched in organic matter and are released through the sea surface microlayer by bubble bursting. The ice formation ability of terrestrial bio-aerosols such as fungi, pollen and bacteria has not attracted enough attention until now. In the present study the global 3-D chemistry transport model TM4-ECPL has been used to simulate the global INPs concentrations of marine and terrestrial origin, including terrestrial bio-aerosol and dust. Comparison of the model results with available INPs measurements shows reasonable agreement. Desert dust is found to dominate the concentration of INPs over the entire Northern Hemisphere. Marine organics become important over remote oceans and particularly the Southern Ocean while terrestrial bio-aerosols contribute to INPs concentration mainly close to the emission sources.

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