Geophysical Research Abstracts
Vol. 21, EGU2019-8716, 2019
EGU General Assembly 2019

Mixed phase clouds: Studying the global co-variability of cloud ice, aerosols and updraft velocity.

Diego Villanueva and Ina Tegen
Leibniz Institute for Tropospheric Research, Modelling, Germany (ortiz@tropos.de)

There is large uncertainty on the temporal and spatial variability of cloud phase and its relationship to aerosol and atmospheric dynamics. Ice nucleating particles like mineral dust and cloud condensation nuclei like sulfate aerosol affect the partition between cloud ice and supercooled liquid between 0 °C and 42 °C. Previous studies have also showed the spatial correlation between cloud ice occurrence and parameters of atmospheric dynamics like updraft velocity, humidity and atmospheric stability. Using the cloud phase retrievals from two A-Train satellite products together with two aerosol and atmospheric model reanalyses, a strong co-variability has been found between the day-to-day mixing-ratio of mineral dust and the occurrence of cloud ice at the global scale. Furthermore, by studying regions of different updraft regimes, the relationship between mineral dust, sulfate and ice occurrence could be studied with a strong constrain on atmospheric dynamics. The results show that the ratio between mineral dust and sulfate may be used to define two different cloud glaciation regimes. In each of these regimes, the updraft velocity seems to have different impacts on the cloud ice occurrence.