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Comparison of microphysical Properties of Tropical and Midlatitude Cirrus Clouds using Active Remote Sensing Observations

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Cirrus clouds cover permanently more than 30% of the planet. They are made of ice crystals, that come in an infinite variety of sizes and shapes. Due to this variability, the radiative impact of cirrus clouds is not very well understood, and they remain an important source of uncertainty in General Circulation Models and climate prediction. Recent field experiments have shown that, due to different formation processes, midlatitude or tropical cirrus clouds show deep differences in ice crystal shapes and sizes. This is especially important considering tropical ice clouds play an important part in the increase of stratospheric humidity, which influences climate change, contributes to ozone decay and has doubled over the last decade. As, even more importantly, these parameters drive the cloud radiative impact, a better understanding of their geographic and temporal distribution is required to begin parametrizing cirrus clouds in GCMs and evaluate their influence on climate change.

A classification of particle shape based on active remote sensing will be presented, with additional in-situ probe observations. An analysis of three years of midlatitude cirrus observations, amounting to nearly 2500 hours, will be compared to results from an extensive field experiment in the tropical area. Differences will be discussed, and the potential expansion of this comparison using spaceborne observations will be discussed.