

## **TropiC: Understanding tropical cirrus by combining laboratory cloud simulation and field experiments with process and circulation modelling**

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### **Abstract:**

This project is part of a NSF PIRE international partnership on tropical cirrus that is led by the University of Chicago and involves several universities in the US and across Europe.

One of the least-understood parts of the atmosphere is the tropical tropopause layer (TTL), the high (14-18 km), cold (T to <-90 C) transition region between the well-mixed troposphere and the statically stable overlying stratosphere, where ascending air is dehydrated to the extreme dryness of the stratosphere. That dehydration occurs in large part by formation of ice clouds (cirrus), which are ubiquitous in the TTL, covering some 30% of the tropics at any given time. These cirrus represent a tiny fraction of the Earth's hydrological cycle, but it is increasingly apparent that they play a disproportionate role in the climate system via their radiative interactions. High-altitude cirrus represent a significant uncertainty in projections of future climate change. The NSF PIRE program is intended to bring together an international team for coordinated studies that will advance knowledge of cirrus via a multitude of modeling approaches, theory and observations, including experiments with the KIT AIDA cloud chamber.

Within the NSF PIRE program a team of German researchers at KIT and FZ Juelich is supported by an associated DFG grant and will contribute ICON simulations, Lagrangian box models and observations. This DKRZ project is meant to enable these ICON simulations. The ICON simulation will combine regional low-resolution and high-resolution simulations to study the sensitivity of tropical cirrus to model resolution and cloud microphysics, and to compare the modeling results with Lagrangian box models and observations.

The project is funded by DFG for 3 years.

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