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# KlimaCampus Colloquium

Thomas Birner

## The changing width of Earth's tropical belt

Earth's tropical belt can be defined by the band of rainy equatorial regions bordered by the arid subtropics to the north and the south. Converging near-surface trade winds transport moisture into the so-called Intertropical Convergence Zone, a meandering front of convection that brings rain to the equatorial latitudes and heats tropical air through the condensation of water vapor. This heated air rises through the troposphere and diverges poleward into the upper troposphere of both hemispheres, eventually subsiding in the subtropics, where it dries and stabilizes the atmosphere against convection. Because of the strong latitudinal gradients in temperature and precipitation at the edges of the tropical belt, any shift in its edges could drive major local changes in surface climate. There is mounting evidence of a gradual broadening of the tropical belt over the last few decades.

In this talk, I will first discuss the morphology of the tropical belt in terms of a range of metrics that have been used to define it. I will then summarize our current understanding of how these tropical width metrics are inter-related, how the tropical belt width has changed in the past four decades, and how it is predicted to change over the 21st century. Results based on quasi-observational data (reanalyses) will be critically compared to results based on climate models. I will furthermore discuss the role of tropical versus extratropical dynamics in determining the width of the tropical belt and its changes.

**Thomas Birner, Department of Atmospheric Science, Colorado State University, is invited by Stefan Bühler, Meteorological Institute.**

**Bundesstraße 53, Room 22/23 (ground floor)**