

ATS/CIRA Colloquium

Daniel McCoy

Assistant professor at the University of Wyoming in the Department of Atmospheric Science

3 p.m. Thursday, Aug. 26

ATS 101

Hosted by Maria Rugenstein

Constraints on Climate Sensitivity from the Extratropics

The extratropics (roughly 40°-poleward) are the cloudiest region on Earth. The atmospheric regime in these regions varies rapidly on a scale of hours to days. In contrast to the subtropics, the cloud feedback predicted in this region by GCMs tend to be negative. However, the most recent model intercomparison contributing to AR6 has displayed a shift towards more positive feedbacks, leading in turn to the emergence of very high (>5K) effective climate sensitivities (ECS) in state-of-the-art GCMs. We will discuss cloud feedbacks in this region through a combination of convection-permitting global simulations, regime compositing of observations and GCMs, and large-scale constraints on the hydrological cycle. The most probable range of extratropical cloud feedback based on observations of the present day, and inferred ECS will be presented.

The extratropics can also tell us a lot about historical forcing from aerosol-cloud interactions. Outflows from East Asia and North America lead to high cloud droplet number concentration in the Northern Hemisphere storm tracks. In contrast, the Southern Ocean is one of the most pristine regions on Earth-giving us a window on the pre-industrial state of the atmosphere. Aerosol-cloud interactions in these regions will be discussed and contrasted. Constraints on historical aerosol forcing based on observations of these regions, and by extension ECS, will be discussed.

Bio

2010 B.S. Physics from New Mexico Institute of Mining and Technology

2016 PhD Atmospheric Science supervised by Dennis L Hartmann at University of Washington

2016-2020 Postdoctoral research with Paul Field at the University of Leeds and the UK MetOffice

Assistant professor at the University of Wyoming in the Department of Atmospheric Science

My interests include:

Aerosol-cloud interactions, cloud feedback, biogenic aerosol sources, extratropical cyclones, climate model evaluation, remote sensing

Colloquia page: atmos.colostate.edu/colloquia