

SEMINAR

Transport-radiation feedbacks in the tropical tropopause layer

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The tropical tropopause layer (TTL) represents a crucial region of the global climate system as it regulates much of the flux of trace gases entering the stratosphere. Specifically, the stratospheric water vapor content is determined by temperatures in the TTL through dehydration by freeze-drying of air as it ascends through the extremely cold tropical tropopause. Water vapor plays a key role in the radiative budget of the entire stratosphere with associated impacts on tropospheric and surface climate. The upwelling branch of the Brewer–Dobson circulation (BDC) directly affects TTL temperatures through adiabatic cooling. BDC upwelling also indirectly affects these temperatures through the influence of ozone transport on radiative heating.

In this talk I will present results highlighting the important role of feedbacks between transport and radiation in the TTL, whereby transport modifies the vertical distribution of water vapor and ozone, which in turn radiatively modify temperatures. In particular, the transport-radiation feedback due to ozone is found to be responsible for approximately 20% of the temperature response to upwelling perturbations on annual and longer time scales. Implications for the role of such feedbacks in climate sensitivity will be discussed.

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Refreshments 3:15 p.m

NCAR Foothills Laboratory

3450 Mitchell Lane, Boulder, CO 80301

FL2-1022, large seminar room

Live webcast: <http://ucarconnect.ucar.edu/live>

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