

Climatology Explains Intermodel Spread in Tropical Upper Tropospheric Cloud and Relative Humidity Response to Greenhouse Warming

Objective

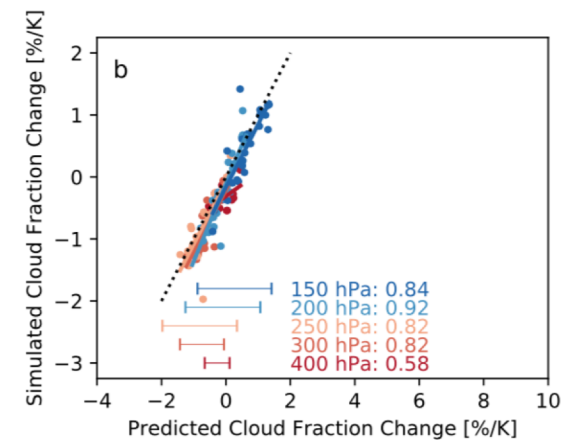
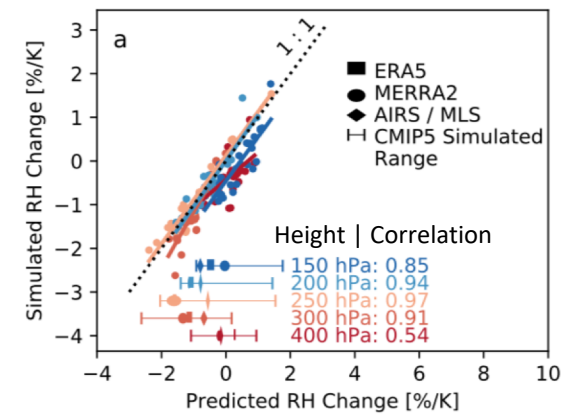
- Identify and demonstrate model climatological controls on future changes in clouds and relative humidity

Research

- Theoretical research indicates that future changes in clouds and relative humidity may be related to their spatial distribution in the current climate
- This study investigates whether such theoretical research holds in CMIP5 atmosphere-ocean general circulation models (GCMs)
- This study shows that inter-model differences in GCM end-of-century projections of cloud and relative humidity changes can be predicted using the GCM's climatological fields

Impact

- This research shows that improving model representation of the current, observable climate should lead to more reliable projections
- Future changes in clouds and relative humidity may be constrained using current observations



Simulated end-of-century changes in tropical upper tropospheric relative humidity (top panel) and cloud fraction (bottom panel) compared to predicted changes. The predictions are based solely on model representation of the current (1980 – 2018) distribution of clouds and relative humidity.

Reference: S. Po-Chedley, M. D. Zelinaka, N. Jeevanjee, T. J. Thorsen, & B. D. Santer, 2019: Climatology explains intermodel spread in tropical upper tropospheric cloud and relative humidity response to greenhouse warming. *Geophys. Res. Lett.*, **46**, doi: 10.1029/2019GL084786