CGD SEMINAR

NCAR

DATE: Tuesday 11 February, 2020

TIME: 11 am – 12 pm

LOCATION: NCAR, Table Mesa Drive
Main Seminar Room

TITLE: **Constraining Middle-Atmosphere Orographic Gravity Wave Drag: Observations, a mini-MIP, and an OSSE Near the Drake Passage**

SPEAKER: **Christopher Kruse, NCAR**

Orographic gravity wave (OGW) drag is one of the fundamental physics parametrizations employed in every global numerical model across timescales from weather to climate. These parameterizations have significant influences, both direct and indirect, on the atmosphere's general circulation from the troposphere at least through the mesosphere. Despite their significant influence, observational constraints on these parameterizations are still largely lacking.

Presented here is a team project jointly supported by SPARC and the International Space Science Institute with the overall objective of providing new quantitative constraints for OGW drag parameterizations. Specific objectives are to evaluate methods that quantify vertical fluxes of horizontal momentum (MF) from satellite observations via an observing system simulation experiment (OSSE), a validation of WRF, UKMO, ECMWF, and ICON models against satellite and balloon observations, and an inter-comparison of OGW properties (e.g. MF and drag) within these models. Evaluation of satellite-based estimates of MF and model validation/inter-comparison will help to better quantify actual MF in the stratosphere, providing the best stratospheric MF and drag estimates for parameterizations to reproduce to date.

Two unique aspects of the project are that all models involved are deep, extending up to 1 Pa. This allows inclusion entire instrument weighting functions for AIRS observations, allowing direct, quantitative comparison between AIRS (and other satellite-borne) observations and the models. The second is the effort to perform an OSSE within the simulations, allowing comparison between MF from satellite-based methods within the models to the true MF in the models.

Preliminary results show that models of similar resolution produce similar middle-atmosphere momentum fluxes and drag. High-resolution (dx = 3 km) models compare well, but still underrepresent observed wave amplitudes. Analyzed mesospheric tides used to force the models significantly modulate resolved GWs and their drags.

Live webcast: https://www.ucar.edu/live

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