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Department of Marine Sciences
Presents a Seminar by

Steven J. Greybush
Pennsylvania State University

The Weather on Mars: Insights from combining Spacecraft Observations and Models

The weather on Mars exhibits features both familiar and alien to those on earth: extratropical cyclones with frontal systems; water ice and CO₂ ice clouds and caps; thermal tides; topographic flows; dust devils, regional, and global dust storms. Here, we examine traveling weather systems in a reanalysis of several years of Martian weather. The Ensemble Mars Atmosphere Reanalysis System (EMARS) combines insights from Thermal Emission Spectrometer (TES) and Mars Climate Sounder (MCS) spacecraft observations of temperature and aerosol with the GFDL Mars Global Climate Model (MGCM) using the Local Ensemble Transform Kalman Filter (LETKF) assimilation scheme. The resulting product provides hourly reconstruction of the atmospheric state (e.g. temperature, winds, surface pressure, and aerosol fields) and uncertainties over several Martian years. Wave climatologies reveal the seasonal latitudinal migration of waves along the ice cap edge baroclinic zone, the interaction of weather systems with topography, and interannual variability of wavenumber regimes. Synoptic weather maps on Mars reveal the structure of cyclones, and that reanalyses have converged upon a unique synoptic state. Predictability of waves, their sensitivities, and their role in the development of Mars atmosphere dust storms are discussed.

Host: Kelly Lombardo

Time & Date: 11:00 am, Friday, October 19, 2018

Place: Marine Sciences Building, Seminar Room 103

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