The College of Graduate Studies, College of Science, and the National Space Science and Technology Center cordially invite you to a

Master Thesis Defence

entitled

THE INTERACTIVE SIMULATION OF MARS DUST STORMS WITH THE MARS GENERAL CIRCULATION MODEL MARSWRF AT THE RESOLUTION OF 7.5^{O} X 9^{O} (LATITUDE BY LONGITUDE)

by

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Date & Venue

3:00 PM
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In person in F3-0132 and online via Zoom:
https://uaeu-ac-ae.zoom.us/j/88054843870?pwd=SmhIN2lRVmhua3JhVkRHQkVzZ1dDUT09

Abstract

Dust is one of the most important components of the Martian atmosphere. Dust storms and dust The Mars dust cycle, including dust storm, have a great impact on the temperature, and the climate in general, on Mars. Dust particles in the atmosphere have a great capacity of absorbing/emitting infrared radiation resulting large change in the Martian climate. Local and regional dust storms occur in any Martian Year (MY), but global dust storm events (GDEs), that can cover the whole planet, occur, on average, once every 3-4 MYs. MarsWRF is a Mars version of the terrestrial numerical weather and climate model WRF (Weather Research and Forecasting Model) and part of the PlanetWRF models for planetary atmosphere research. The model is calibrated by me to produce global dust storm events in a few Martian Years but not in others. This requires model calibration by trial and error. The main focus is the formation of global dust storm events. The technique is to run MarsWRF in interactive dust mode. This requires the model user to self-specify the model parameters of the surface dust lifting by dust storms and dust devils. In this thesis the MarsWRF model is run in interactive dust mode at the classical resolution of 7.5° × 9° (latitude by longitude). The resulting dust storms will be compared against higher resolution simulations in Gebhardt et al. (2020).

Keywords: Mars, Atmosphere, Dust, Dust Cycle, Global Dust Storm events, Dust Devils, MarsWRF, Mars General Circulation Model (MGCM).