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Prediction of Meteorological Conditions for the Mars Science Laboratory Rover Curiosity and comparisons with the Rover Environmental Monitoring Station (REMS) measurements

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The Mars Regional Atmospheric Modeling System (MRAMS) is applied to the Gale Crater region, the landing site of the Mars Science Laboratory (MSL) Rover Curiosity. The landing site within Gale Crater is at one of the lowest elevation locations between the crater rim and the ∼4 km high central mound known as Mt. Sharp. As Curiosity heads toward its long term target of Mt. Sharp, the meteorological conditions are expected to change due to the increasing influence of topographically-induced thermal circulations that have been predicted by numerous previous studies [1, 2 ,3, 4]. For the first time ever, these mesoscale model predictions of slope flows can be validated against the meteorological data that is currently being collected by the Rover Environmental Monitoring Station (REMS) [5]. We first provide a comparison of MRAMS predictions (pressure, temperature, winds, and ground temperature) to the REMS data available near the season of landing (∼LS 150-200) in order to provide a baseline of model performance, and then we provide predictions of the meteorological conditions as a function of season and expected location of the rover as a function of time.

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