

History of Martian dust storm observations: Possible links between ancient Chinese records and Martian dust storms

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Abstract:

Martian global dust storms (MGDS) are planet-encircling events that alter the Martian environment from the surface to near space, posing significant challenges to rovers and future exploration missions. Despite its importance, predicting different levels of the MGDS remains a challenge due to the limited availability of historical observations. While the existence of the MGDS was first confirmed by spacecraft in 1971, historical records date back only to the early 20th century. China has a long tradition of astronomical observations spanning centuries, with precise planetary records documented in the New Book of Tang specially. Here, we re-examine 160 historical observations of Mars documented in the New Book of Tang, identifying four exceptionally detailed records described Martian color changes. At least one of these records may correspond to a severe MGDS, providing a possible observation on MGDS activity. These findings suggest that ancient records could serve as valuable datasets for characterizing MGDS intensity levels. By integrating historical observations with modern planetary science, this study offers new insights into the variability of MGDS and contributes to improving future predictions.