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Regional characteristics of dust haze transport on Mars

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Regions favorable (FRs) for expansion of dust storms on Mars are identified. We performed many numerical simulations where, in the northern fall ($L_s=180$), dust was injected into the atmosphere artificially from dust sources located all over the planet. Such dust transport simulations provide global maps of dust expansibility (i.e. "dust expansion potential") and show that dust expansibility differs greatly between different regions on Mars. These global maps show that dust loaded from certain areas in the northern mid-latitudes tends to spread widely within a few days. Dust injected in the vast regions around Tharsis and the Sirenum-Aonia regions also tends to spread extensively depending on local time. On the other hand, dust injected at high latitudes in either hemisphere does not spread extensively. Such global maps indicating regions favorable for dust storm expansion are a clue to understanding expansion processes and climatology of great dust storms on Mars. Moreover, none of the approach described in the presentation to understanding expansion processes and climatology of great dust storms has been taken elsewhere. In our presentation, we present results of simulations for other seasons as well as $L_s=180$ and consider concrete mechanisms of dust expansion in and around each FR.

Keywords: Mars, dust storm, transport, numerical simulation