Martian dust devil statistics from high-resolution large-eddy simulations

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Martian dust devil has an important role in Martian atmospheric circulation, and we examine
statistics of Martian dust devil with a high-resolution (up to 5 m) and wide-domain (about 20 x 20
km^2) large-eddy simulation of the Martian planetary boundary layer. In this study, we define strong
isolated vortex as dust devil. We clarified the distributions of size and intensity and concluded
that the maximum vertical vorticity of an individual dust devil has an exponential distribution,
while the radius and circulation have power-law distributions.
We also examine dependency of the statistics on experimental resolution with a grid-refinement
experiment. These statistics will lead to more accurate estimation of dust injection from the
surface to the atmosphere and a more sophisticated parameterization of the dust injection for use
in general circulation models.

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