

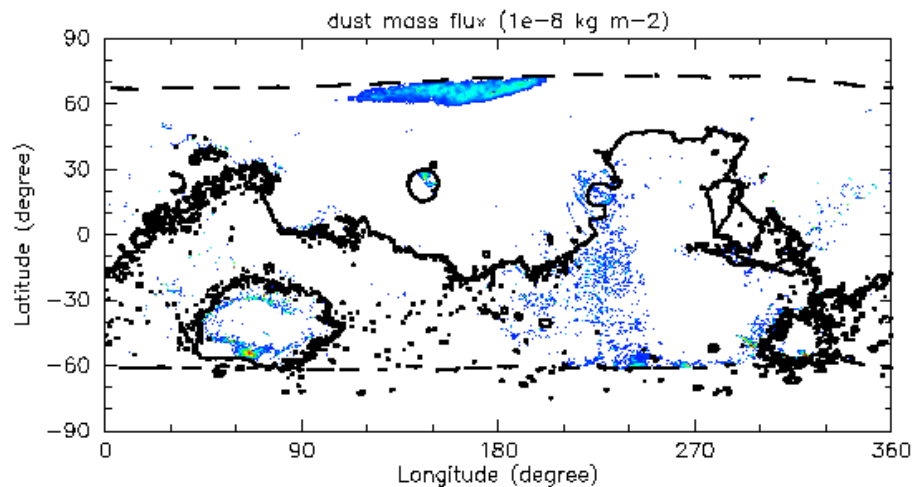
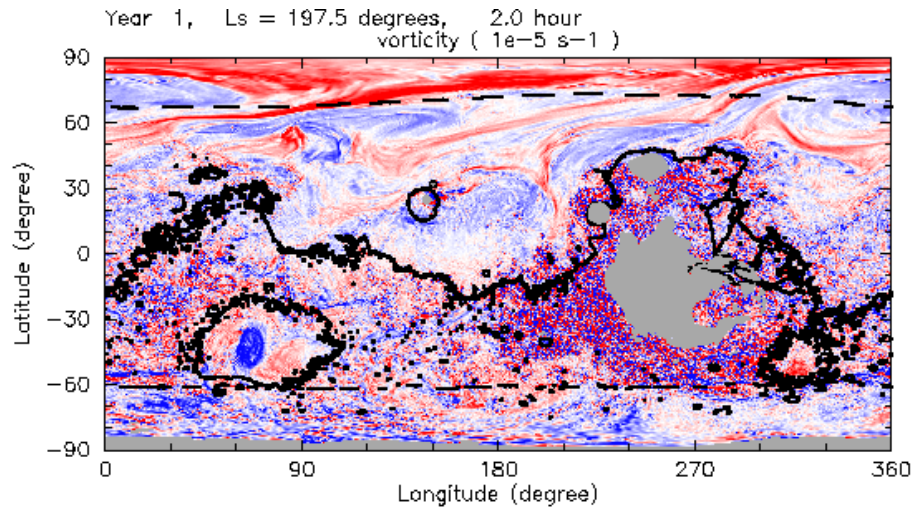
High resolution general circulation model experiments of the Martian atmosphere: Resolution dependence of disturbance and surface stress



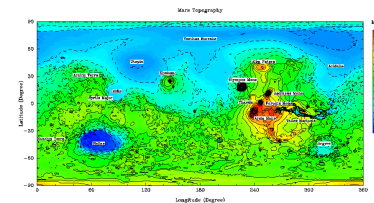
Experimental setup

- Resolutions
 - T639L96, T319L96, T159L96, T79L96
 - horizontal grid size $\Delta x \sim 11, 22, 44, 89$ km
 - 96 vertical levels up to ~ 90 km
- Dust condition
 - “passive dust experiment”
 - Dust optical depth is fixed to be 0.2.
- Seasonal condition and integration period
 - 40 Mars days at northern fall season from an initial condition of a snapshot of low resolution experiment
- Sensitivity test experiment with uniform surface properties
 - In these experiments, surface orography is flat, and surface albedo and thermal inertia are assumed to be constant.
- Experiments are performed on the Earth Simulator.

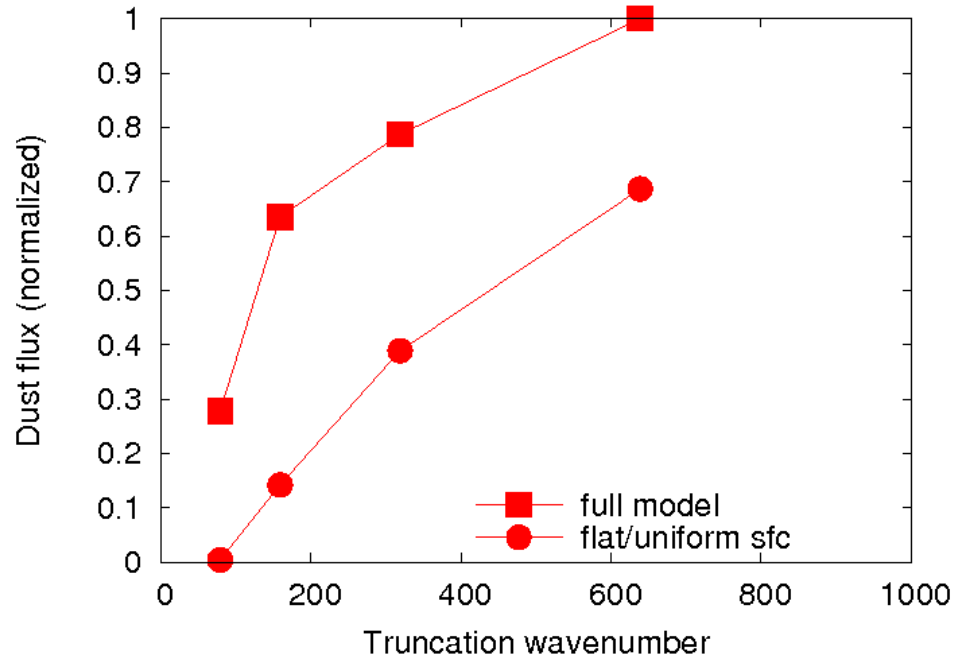
Dust lifting in the model



- Intense dust lifting events occur around fronts.
- Dust lifting associated with some characteristic orography is also observed.
- Small scale vortices seem to contribute on dust lifting too.



Resolution dependence of global mean dust flux



- In both cases with and without surface property variations, global mean dust mass flux increases with increasing resolution.
- Dust mass flux in the case with surface property variation is larger than that in the case without surface property variations.
 - Importance of orography-related circulation on dust lifting.