

MLAM

Three dimensional limited area modelling of Martian atmosphere

Why and what?

Model

Some Results

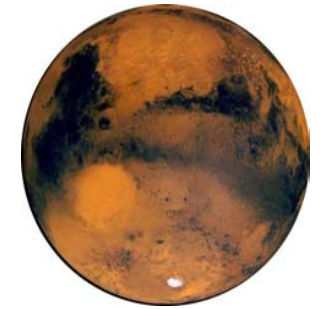
Future

Summary

Why ...

Common curiosity of mankind

- Increase knowledge of planets and solar system
- New high resolution data from Mars
- Similarity of Earth and Mars

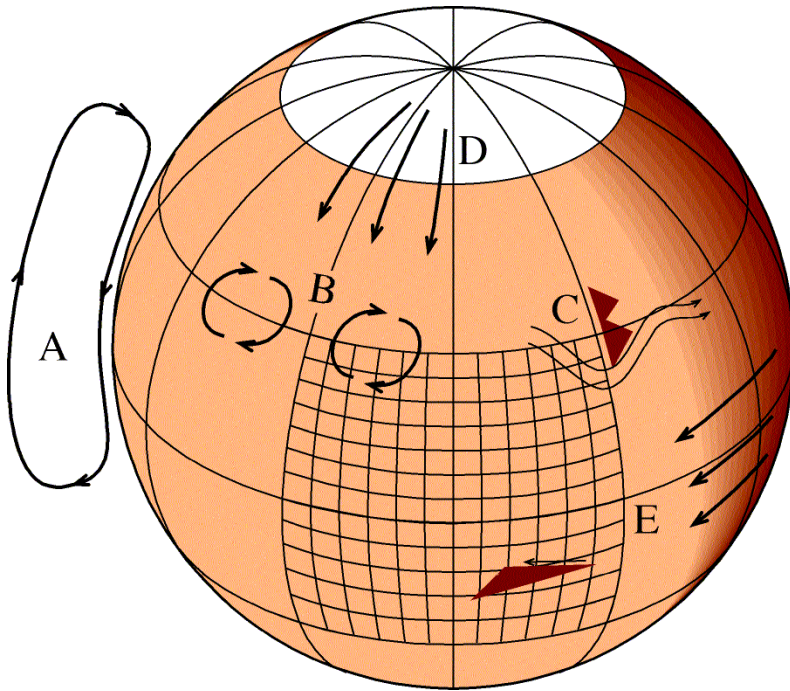


Orbital period (d)	365.24	687
Rotation period (h)	24	24.63
Mean distance from the Sun (km)	149.6×10^6	227.9×10^6
Obliquity or inclination of rotation axis ($^{\circ}$)	23.45	25.19
Radius (km)	6378	3393
Equatorial surface gravity (m/s ²)	9.78	3.72
Mass (kg)	5.976×10^{24}	0.642×10^{24}
Surface pressure (hPa)	1013	8
Solar constant (W/m ²)	1367	589

Why...

- Good testbench for Earth models (Hirlam) due to Martian extreme conditions
- Weather forecasts for future Mars missions (for e.g. Beagle 2, Netlander)
- Natural continuity to UH 1D- and 2D-models

... and what?



- Hadley circulation
- Baroclinic eddies
- Stationary eddies resulting from flow over topography
- CO₂ sublimation flow
- Thermal tides
- Slope winds

Model boundary data

Boundary fields initialised:

Mars Climate Database (MCD):

U-wind

V-wind

Surface pressure

Temperature

Surface temperature

Mean data

Oxford Mars GCM

Continuous data

Surface fields initialised:

Orography:

MOLA (Mars Global Surveyor's
Mars Orbiting Laser Altimeter)

Albedo:

TES (Mars Global Surveyor's
Thermal Emission Spectrometer)

Thermal Inertia:

TES (Mars Global Surveyor)

Surface Pressure:

MCD

Oxford Mars GCM

Modifications

- *Tools for making boundaries, data format conversions*
- *New Radiation code*
- *Modifications to the Surface scheme*

Thermal inertia to the model

- *Changing the physical constants, e.g. gravity, surface pressure*

HARD CODED in too many subroutines!!!!

Model Experiments

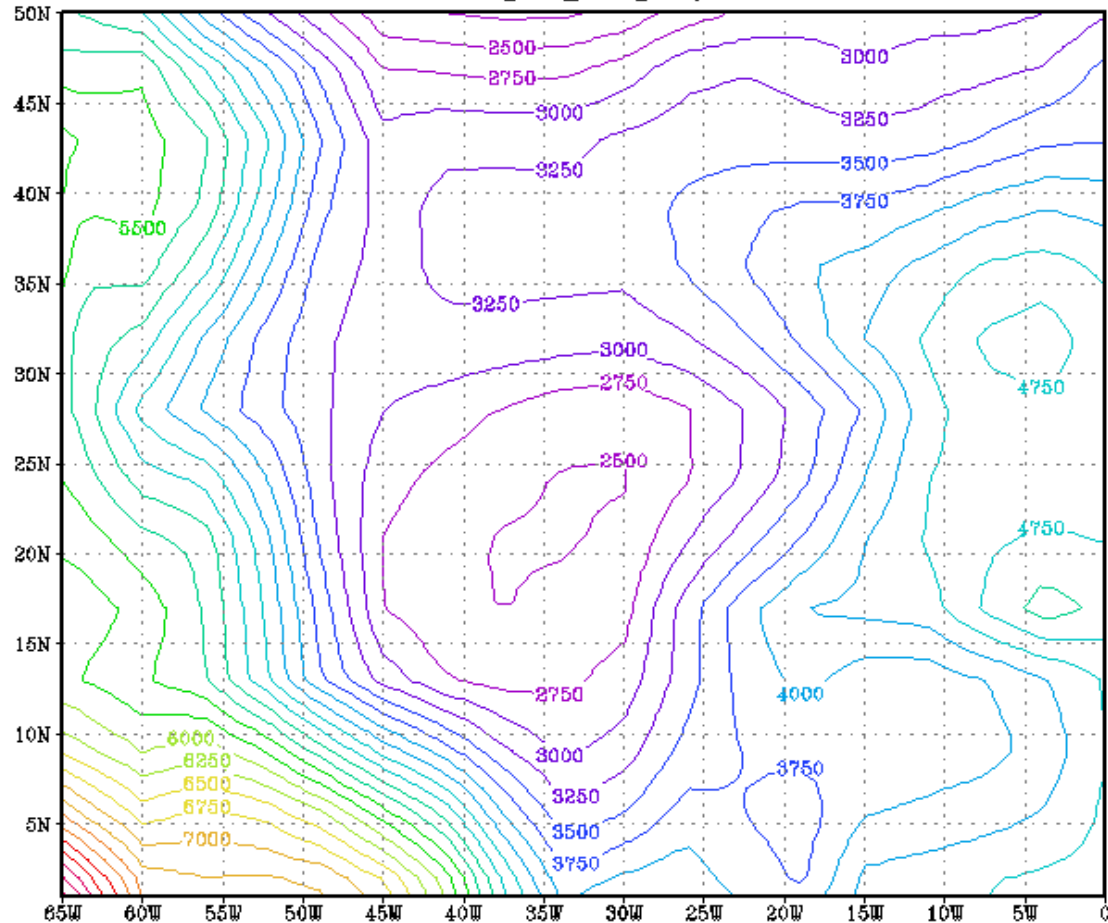
Viking Lander 1 (VL-1) and Pathfinder (PF)

Viking Lander 2 (VL-2)

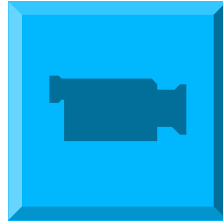
Beagle 2 (in the near future)

Some new results

Topography



Some new results



Future

We continue MLAM's developing:

Topography's elevation angles to radiation code

Dust more realistic

CO2 effects

Moisture

Debugging

Better boundary data from Oxford MGCM

Summary

Mars and Earth are similar

MLAM is up and running :)

Results are promising and model is compatible

Development continues

Contacts are made and co-operation has already started (Oxford)

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AND NO,
There is no life
on Mars,
as far as I know.