



PNRR Project – Task 1500-12 | EMM project– Earth Moon Mars PLATA (b):

Planetary images, Laboratory experiment, Terrestrial Analogues

PLATA is an infrastructure for a comprehensive study of sand and dust mobilization in the Martian lower atmosphere and consists of two parts: a) A laboratory facility able to recreate the conditions of low-pressure planetary bodies and b) the infrastructure to analyse Martian images and exploit data from atmospheric models. Here we describe the latter and the **Martian Surface/Atmosphere Web Interface**.

Martian bedforms image analysis:

Images of Martian bedforms (ripples and dunes) are analysed at the Planetary Image Facility (INAF Capodimonte). Data from the NASA Ames Global Circulation Model are exploited through the Martian Surface/Atmosphere Web Interface (CNR ISAC), allowing comparisons between the modelled Martian surface winds and the aeolian bedforms at the surface of the Red Planet.

Applications:

- Comprehensive studies of Martian surface geology, sand fluxes, present and past atmospheric configurations and Martian climate change.
- Testing and calibration of Martian atmospheric models.

Martian Surface/Atmosphere Web Interface



Welcome to this innovative platform that transforms data from NASA Ames General Circulation Model (GCM) into valuable insights on the interaction between atmospheric flows and surface materials on Mars. This interface enables users to:

- Analyze sand flux directions and dune orientations.
- Examine dune orientation under high sand availability (bed instability mode).
- Study dune alignment under limited sand availability and complex flow patterns (finger mode).
- Adjust key planetary parameters like obliquity, eccentricity, and atmospheric pressure to explore long-term climatic changes.

Designed for the scientific community, this platform offers a powerful tool to test atmospheric models and enhance our understanding of Martian local geology.

[Aeolian Dynamics Map](#)

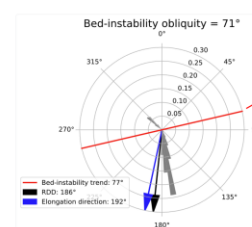
[Plot Tool](#)

[Simulations Archive](#)

If you're interested in directly visualizing the output of the Mars GCM reference simulation, you can visit the NASA Ames web interface.

Martian Surface/Atmosphere Web Interface

Simulation: 00
 Flux Model: Martin and Kola 2017
 Threshold: 0.01 Default
 Gamma: 1.6
 Latitude: 18
 Longitude: 14



Predicted dune (ripple) orientation!

Martian Surface/Atmosphere Web Interface output parameters:

- Model-predicted bedform orientation and elongation (to compare with the 'real' orientation seen in Martian images).
- Sand flux direction(s).
- Resultant drift direction (RDD).

Martian Surface/Atmosphere Web Interface tunable parameters:

- Sand flux models (two main models can be employed).
- Threshold for sand movement.
- Location (different lat/long coordinates).
- Different orbital configurations (study of past climate).

Empowering the scientific community with accessible, data-driven insights into Martian surface and atmospheric interactions.