The Latest Mars Climate Database (MCD v5.1)

Conference Item

How to cite:

Millour, Ehouarn; Forget, Francois; Spiga, Aymeric; Navarro, Thomas; Madeleine, Jean-Baptiste; Pottier, Aliz Montabone, Luca; Kerber, Laura; Lefe, Franck; Montmessin, Franck; Chaufray, Jean-Yves; López-Valverde, Miguel; González-Galindo, Francisco; Lewis, Stephen; Read, Peter; Huot, Jean-Paul; Desjean, Marie-Christine and MCD/GCM, Development Team (2014). The Latest Mars Climate Database (MCD v5.1). In: Geophysical Research Abstracts, 16, article no. EGU2014-2102.

For guidance on citations see FAQs

© 2014 Author(s)
Version: Version of Record
Link(s) to article on publisher’s website:

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online’s data policy on reuse of materials please consult the policies page.
The Latest Mars Climate Database (MCD v5.1)

Ehouarn Millour (1), Francois Forget (1), Aymeric Spiga (1), Thomas Navarro (1), Jean-Baptiste Madeleine (1), Alizée Pottier (1), Luca Montabone (1), Laura Kerber (1), Franck Lefèvre (2), Franck Montmessin (2), Jean-Yves Chaufray (2), Miguel López-Valverde (3), Francisco González-Galindo (3), Stephen Lewis (4), Peter Read (5), Jean-Paul Huot (6), Marie-Christine Desjean (7), and the MCD/GCM development team ()

(1) Laboratoire de Météorologie Dynamique, IPSL, CNRS, Universite P. & M. Curie, Paris, France (ehouarn.millour@lmd.jussieu.fr), (2) Laboratoire Atmosphères, Milieux, Observations Spatiales, IPSL, Paris, France, (3) Instituto de Astrofísica de Andalucía, Granada, Spain, (4) Department of Physics and Astronomy, The Open University, Milton Keynes, UK, (5) Atmospheric, Oceanic & Planetary Physics, University of Oxford, UK, (6) European Space Research and Technology Centre, European Space Agency, Noordwijk, Netherlands, (7) Centre National d’Etudes Spatiales, Toulouse, France

For many years, several teams around the world have developed GCMs (General Circulation Model or Global Climate Model) to simulate the environment on Mars.

The GCM developed at the Laboratoire de Météorologie Dynamique in collaboration with several teams in Europe (LATMOS, France, University of Oxford, The Open University, the Instituto de Astrofísica de Andalucia), and with the support of ESA and CNES is currently used for many applications.

Its outputs have also regularly been compiled to build a Mars Climate Database, a freely available tool useful for the scientific and engineering communities. The Mars Climate Database (MCD) has over the years been distributed to more than 150 teams around the world.

Following the recent improvements in the GCM, a new series of reference simulations have been run and compiled into a new version (version 5.1) of the Mars Climate Database, released in the first half of 2014.

To summarize, MCD v5.1 provides:
- Climatologies over a series of dust scenarios: standard year, cold (ie: low dust), warm (ie: dusty atmosphere) and dust storm, all topped by various cases of Extreme UV solar inputs (low, mean or maximum). These scenarios differ from those of previous versions of the MCD (version 4.x) as they have been derived from home-made, instrument-derived (TES, THEMIS, MCS, MERs), dust climatology of the last 8 Martian years.
- Mean values and statistics of main meteorological variables (atmospheric temperature, density, pressure and winds), as well as surface pressure and temperature, CO₂ ice cover, thermal and solar radiative fluxes, dust column opacity and mixing ratio, [H2O] vapor and ice columns, concentrations of many species: [CO], [O₂], [O], [N₂], [H₂], [O₃], ...
- A high resolution mode which combines high resolution (32 pixel/degree) MOLA topography records and Viking Lander 1 pressure records with raw lower resolution GCM results to yield, within the restriction of the procedure, high resolution values of atmospheric variables.
- The possibility to reconstruct realistic conditions by combining the provided climatology with additional large scale and small scale perturbations schemes.

At EGU, we will report on the latest improvements in the Mars Climate Database, with comparisons with available measurements from orbit (e.g.: TES, MCS) or landers (Viking, Phoenix, MSL).