



Finanziato dall'Unione europea
NextGenerationEU



Ministero dell'Università e della Ricerca



Italiadomani
PIANO NAZIONALE DI RIPRESA E RESILIENZA



Consiglio Nazionale delle Ricerche

PNRR Project – Task 1500-08 | Progetto: EMM – Earth Moon Mars

Nadir and limb radiative transfer models for Earth, Mars and other Planetary atmospheres

Overview

The new fast radiative transfer code, named ***σ4Mars***, extends the application of the ***σ-FORUM*** Earth model to the atmosphere of Mars. It is designed for the fast and accurate production of Martian radiance spectra in the longwave infrared (IR) region under nadir geometry.

Technical features

- Study of the composition and vertical structure of the Martian atmosphere
- Spectral range: 90-3010 cm^{-1} (@ 10^{-2} or 10^{-3} cm^{-1})
- Gas: CO_2 , CO, H_2O , O_3 , HCl, HDO
- Aerosol: ice clouds, dust
- Continuum: CIA (Collision-Induced Absorption) CO_2 self

Applications

- Study of the composition and vertical structure of the Martian atmosphere
- Analysis of dust and clouds
- Comparative studies between Earth and Mars
- Development of retrieval algorithms (test and validation of inversion techniques, studies of spectral sensibility, uncertainty estimation).
- Data analysis (fast elaboration of infrared datasets, interpretation of observations, integration inside process chains). The figure shows an example of simulation of the code and the spectral regions observed by two recent Martian instruments.
- Preparation of future planetary missions (pre-launch simulation, optimization of spectral bands, analysis of radiometric performances)

