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Stability of methane in near surface layers of Mars

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Methane has been detected in the atmosphere of Mars by ground-based observations, Mars Express and MGS [e.g. 1, 2, 3]. Since then, its origin remains a puzzle. The goal of this study is to assess the stability of methane in the near subsurface of Mars.

The Berlin Mars near Surface Thermal model [4, 5] was updated to study the stability of methane in near surface layers of Mars. The main features of the model are a high vertical resolution down to the centimeter range, the realistic treatment of the thermal properties of ice-rock mixtures, a detailed treatment of gas flux within the near surface layers and into the atmosphere, and a variable temporal resolution which allows studying diurnal as well as annual variations.

The model allows studying the behaviour of subsurface methane on a timescale where the soil has not yet reached thermo-dynamical equilibrium. This approach allows studying "young" ice-related deposits, which might form in response to climate variations on short timescales as well as "old" persistent deposits.

The presentation will describe the model and the assumptions, and will discuss the main outputs.

References

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