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Hunting for Methane on Mars: one Martian year of survey with ACS on TGO

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Hunting for Methane on Mars: one Martian year of s on TGO

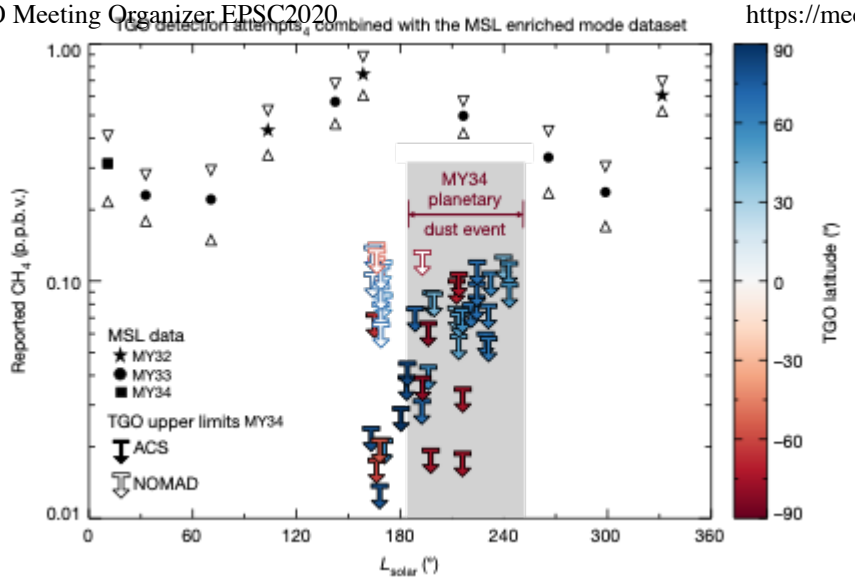
Franck Montmessin et al.

Abstract

The Atmospheric Chemistry Suite (ACS) [1], one of the four science experiments on board ESA-Rosc Orbiter (TGO) mission has started science operations in March 2018. ACS consists of 3 infrar unambiguous detection of trace gases of potential geophysical or biological interest. The dataset repo detection attempts conducted during the first complete Martian year (almost two Earth years) of o occultation observing mode in orbit around Mars.

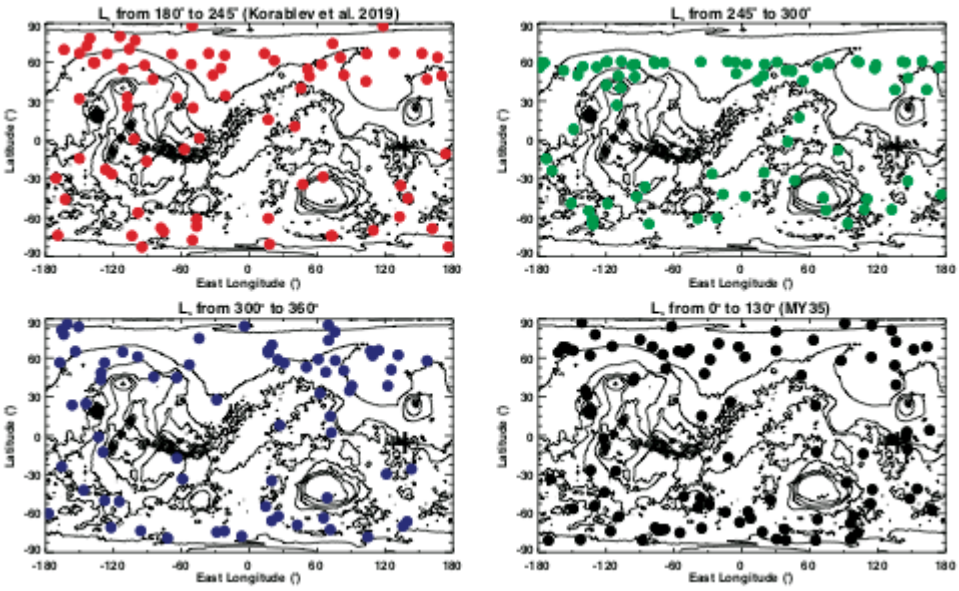
The Trace Gas Orbiter (TGO) of the ESA-Roscosmos ExoMars mission has ended its trip to Mars, reacl After a year-long aerobraking phase, its scientific mission has begun on April 22nd, 2018 with the execu The primary objective of TGO is to detect, map and locate trace gas sources, possibly revealing biological) activity on Mars. The instrument of interest here is the infrared spectrometer Atmosphe covers a wavelength range from 0.7 to 17 µm at very high spectral resolution (λ / Δλ from 5,000 to 50 solar occultation. Its performances complete the TGO trace gas detection arsenal together with NOMA TGO.

A large part of the first months of the ACS observing mission has enabled the sensitive search of gas fraction of the Martian globe. The results from the first occultation up until early September 201 incidentally covered the onset, the full development, and the demise of the Planetary Encircling Dust instruments orbiting currently around Mars. Observing conditions proved more favourable than anticipa cases to probe the Martian atmosphere close to the surface (<5 km) where the MSL Curiosity rover h seasonally varying background level of CH4 concentrations ranging between 240 and 650 pptv [2].



The first five months of ACS CH4 detection attempts were reported in [3], revealing the absence of me Martian globe (Figure 1). Part of the attempts at that time was impaired by the presence of abundar prevent observing the lower troposphere of Mars (<30 km) where methane, if detectable, presumably c

The ACS dataset analyzed here covers a period of more than 25 months, which is five times more analyzed. This gives us a chance to perform a deeper exploration into the potential presence of metha have for our understanding of active geophysical and physicochemical processes prevailing at Mars.



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