



## **Establishing CH<sub>4</sub> detection limits with the MIR channel of the ACS instrument onboard TGO**

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The Trace Gas Orbiter (TGO) of the ESA-Roscosmos ExoMars mission has ended its trip to Mars, reaching the planet in October 2016. After a year-long aerobraking phase, its scientific mission has begun on April 22nd, 2018 with the execution of the first solar occultation. The primary objective of TGO is to detect, map and locate trace gas sources, possibly revealing a residual geophysical (or even biological) activity on Mars. The instrument of interest here is the infrared spectrometer Atmospheric Chemistry Suite (ACS). ACS covers a wavelength range from 0.7 to 17  $\mu\text{m}$  at very high spectral resolution ( $\lambda / \Delta\lambda$  from 5,000 to 50,000). ACS operates in nadir and solar occultation. Its performance and scientific objectives make it complementary to NOMAD, the other spectrometer dedicated to trace gas characterization.

A large part of the first months of the ACS observing mission has enabled the sensitive search of gaseous methane over a substantial fraction of the Martian globe. The results from the first occultation up until early September 2018 will be presented. This period incidentally covered the onset, the full development and the demise of the Planetary Encircling Dust Event observed by several other instruments orbiting currently around Mars. Observed conditions proved more favorable than anticipated, and it was possible in a few cases to probe the Martian atmosphere close to the surface (<5 km) where the MSL Curiosity rover has established the existence of a seasonally varying background level of CH<sub>4</sub> concentrations within a range comprised between 240 and 650 pptv.