Geophysical Research Abstracts
Vol. 17, EGU2015-6376-1, 2015
EGU General Assembly 2015

SPICAM on Mars Express: a 10 year in-depth survey of the Martian atmosphere

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The SPICAM experiment onboard Mars Express has accumulated over the last decade a wealth of observations that has permitted a detailed characterization of the atmospheric composition and activity from the near-surface to above the exosphere.

SPICAM is dual ultraviolet (110 to 320 nm)-infrared (1 to 1.7 μm) spectrometer specifically designed to retrieve the major and minor species abundances of the Martian atmosphere [1]. SPICAM has the distinct capability of ob-serving with a variety of geometrical configurations; monitoring the column-integrated abundances of ozone, water vapor as well as aerosols in a nadir-looking mode, characterizing their vertical distribution in either stellar or solar occultation modes so as to constrain their presence above typically 10 km up to 140 km of altitude (for CO_2) [2,3,4]. In a dedicated limb staring mode, SPICAM can infer the density of hydrogen atoms from 200 up to 10 000 km of altitude while using the resonantly scattered solar photons at the Lyman-alpha emission line of Hydrogen [5,6].Since the beginning of its operations at Mars, SPICAM has performed several thousands of stellar and solar occultations and has provided a multi-annual tracking in nadir mode.

Here, we present a synthesis of the observations collected to date in order to assemble a single, coherent picture of the Martian atmosphere specifically adressing the issue of water decomposition into its lighter component (hydrogen) that can escape to space. In doing so, we propose a different angle for the long-term evolution of water and hydrogen on Mars.

References: [1] Bertaux, J.-L., et al., (2006), JGR 111, E10S90 [2] Forget, F., et al., (2009), JGR, 114, E01004. [3] Lebonnois, S., et al., (2006), JGR, 111, E09S05. [4] Montmessin, F., et al., (2006), JGR, 111, E09S09. [5] Chau-fray, J.-Y., et al., (2008), Icarus, 195, pp. 598-613. [6] Chafin, M. S., et al., (2014), GRL, 41, doi:10.1002/2013GL058578.