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Mercury's exosphere: ground based observations as a support to the forthcoming Bepi-Colombo. F. Leblanc¹ and J. Y. Chaufray², ¹LATMOS/IPSL, UPMC Univ. Paris 06 Sorbonne Universités, UVSQ, CNRS, Paris, France (francois.leblanc@latmos.ipsl.fr), ²LATMOS/IPSL, UVSQ Université Paris-Saclay, UPMC Univ. Paris 06, CNRS, Guyancourt, France (jean-yves.chaufray@latmos.ipsl.fr).

Ground based observations of Mercury's exosphere have provided a very complementary view with respect to satellite observations. As an example, MESSENGER MASCS observations of the sodium exospheric component showed a rather different portrait of this exosphere with respect to ground based observatories [1]. Indeed, a large set of observations of the high latitudes peak in the sodium exosphere have been reported from ground based observations [2] as well as observations of Mercury's sodium tail [3], whereas MESSENGER could not cover properly these regions because of its orbit and the field of view of MASCS [1]. On the other hand, MESSENGER observations reported the discovery of several new exospheric species [4, 5] and provided for the first time the annual variability of the sodium exosphere at the equator [1] highlighting in an unprecedented way its origins.

Whereas ground based observations can be performed regularly during decades [6, 7], they obviously suffer from limited instantaneous field of view and temporal window. However, ground based observations can obtain almost instantaneous 2D picture of Mercury's exosphere [8], perform very high spectrally resolved observations [9, 10], explore new types of observations [11] and might discover the emission from exospheric species not yet observed [12]. 2D imaging of Mercury's exosphere from ground based observations has been shown to be a very original way to map Mercury's exosphere relations with its magnetosphere [13], a technic that might considerably progress in spatial resolution thanks to a new generation of telescopes equipped with adaptive optics.

Both methods of observations of Mercury's exosphere will therefore continue to be very valuable in the forthcoming years. The ESA-JAXA Bepi-Colombo mission to be launched by the end of 2018 should be a renewed opportunity of coordinated ground-based and in situ observations. In particular, Bepi-Colombo will carry a large set of instruments dedicated to the observations of Mercury's exosphere and will be able to observe it from both MPO and MMO satellites with a more extended spectral range, sensibility and spatial coverage than MESSENGER instruments. A two points of view observation of Mercury's exosphere will also allow to better track any short time variability in Mercury's exosphere that might be induced by our Sun.

In this presentation, we will summarize what we believe are the still open questions regarding Mercury's exosphere, highlighting which new topics Bepi-Colombo set of instruments might be able to address with respect to MESSENGER. We will also underline how ground based observations should contribute to further improve our understanding and support MESSENGER and Bepi-Colombo observations.

References:

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