Europlanet TNA Report

PROJECT LEADER

Name: Cristian Carli[1] and Matteo Massironi[2]
Address: 1) Iasf-INAF; Via fosso del cavaliere 100, 00133, Roma, Italy; **2) Department of Geoscience, University of Padua; Via Gradenigo 6, 35131, Padova, Italy.** **E-mail:** cristian.carli@iasf-roma.inaf.it**;** matteo.massironi@unipd.it**.**

COLLABORATORS

Name:	**Affiliation:**
Eleonora Ammannito (1)	IFSI – Roma
Sabrina Ferrari (2)	Department of Geoscience, University of Padua
Fabrizio Nestola (2)	Department of Geoscience, University of Padua
Date of TNA visit:	1-5 November (Carli-Ammannito) 13-17 December (Ferrari-Nestola)
Host laboratory:	PEL – DLR institute

Project Title –

We have brought together two different projects as required by Europlanet:

- Basalts emissivity at Mercury's conditions (Carli C.)
- The chameleon-like surface of Mercury: how the temperature variations affect the spectral behaviour of geological materials (Massironi M.)

- Report on the outcomes of the TNA visit (approx 1 page)

During the first week of measurements we had measured a set of six samples, resulting from two rock samples. From each rock sample we produced a slab and two different grain-size powders, a coarse grain-size (<500 μm) and a thin grain-size (< 20 μm). All samples were measured in a wide range of wavelength from 4 to 50 μm at four different temperatures, as scheduled. The wavelength range was covered using two detectors, one up to 16 μm, the other from 16 to 50 μm. All the samples were heated using 3, 5, 7, 9 ampere, with the slab samples that have reached required temperatures, whereas for powder samples we achieved lower temperatures. After a first set of measurements of the blackbody to calibrate the data, we started to measure the first sample. Each sample was measured following always the same procedure: first we put the sample in the chamber, then the chamber and instrument were evacuated

and the sample heated at 3 ampere, after one hour with a stable current, we took the measure, changing the beam-splitter, once completed the acquisition for all the range of wavelength we gave the next level of ampere until complete all the range of intensity. The chamber was cooled to room temperature when the set of four measurements for a sample was finished. Then this set of operation was repeated for each sample.
Once finished the measurements a preliminary correction of the data was obtained considering the blackbody measurements and sample radiance for both the detectors.
During the second week we measured a set of four single-phase mineral samples (two different clino-pyroxenes, a plagioclase and an Mg-rich olivine) considered among the most likely constituents of the Herman surface regolith, and two rock slabs deriving from anorthosites and gabbros of the Flakstado Basic Complex (Norway). At the Department of Geosciences in Padua, the samples were well characterized at room conditions by single crystal X-ray diffraction and analyzed by electron micro-probe (WDS method, which allows high-accuracy chemical analysis thanks to its high peak resolution). After then, the single-phase samples were reduced in two different grain-size range end-members about the Herman surface regolith: <45 μm and 100-160 μm. All samples were measured in a range of wavelength up to 16 μm at three different temperatures. For each sample the emissivity were firstly measured at earth-condition, then at higher temperatures in vacuum condition - in another specific chamber - with the same procedure of the first week measures. In the same way, the slab samples reached the required temperatures whereas powder samples achieved probably lower temperatures.
At the moment we are elaborating discussing, and interpreting our "in-situ" data.

Please include:

- Publications arising/planned (include conference abstracts etc)

Once the data will be ready we plan to show them at international congresses (probably at Cospar, EPSC, AGU…), and produce one or two papers on international Journals.

- Host approval The host is required to approve the report agreeing it is an accurate account of the research performed.