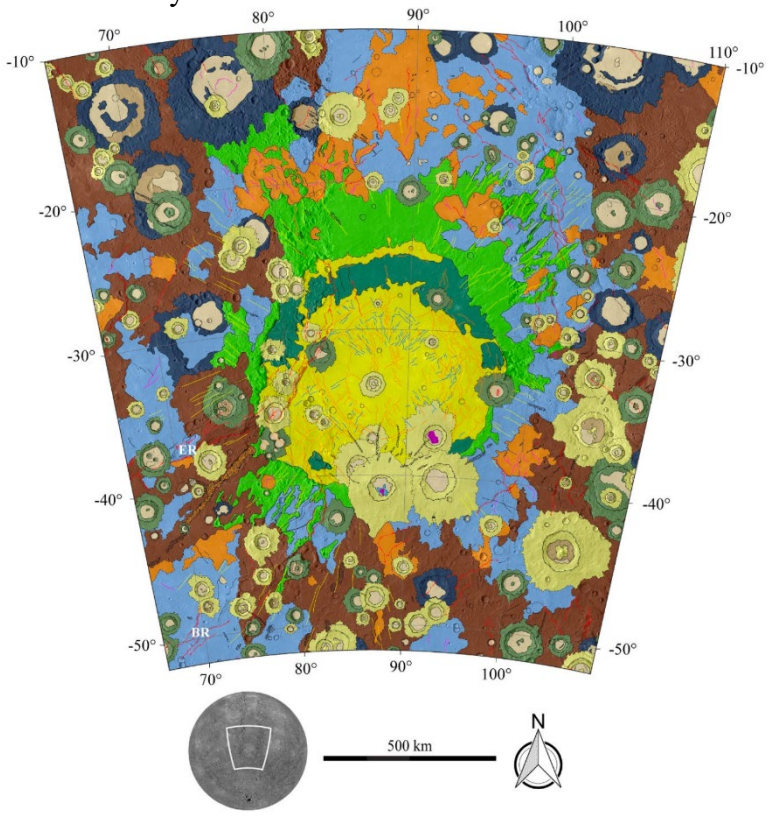
Volcano-tectonics across Moon and Mercury:

(Proposers: Prof. Matteo Massironi, Dr. Riccardo Pozzobon)

Volcano-tectonic structures are pivotal for understanding the thermal and magmatic evolution of planetary bodies. Being of modest sizes Moon and Mercury are particularly suited for investigating the early stage processes of terrestrial planets evolution such as the relationship between impact basin formation, regional tectonism and magmatism of large igneous provinces. Although plate tectonics is lacking on Mercury and the Moon, tectonic structures such as compressional wrinkle ridges, grabens and strike slip faulting are still present and related to tidal despinning, contractional cooling and basin tectonism interplaying with igneous activity often triggered by large basins impacts. Unravelling the tectonic settings on such planetary surfaces will allow us to get more information not only on the origin of the deformations and the associated stress fields, but also obtain constraints on the thickness and mechanical layering of the evolving crust.

It is expected that the PHD student will carry out analysis of high-resolution imagery and topographic data, developing new methodologies for structural analysis on planetary surfaces with particular regard to the Moon and Mercury.



In particular the PHD should be able to deal with:
- the compilation and analysis of high-resolution imagery and topographic data from the Moon and Mercury.
- the identification and characterization of volcano-tectonic structures, including fissures, grabens, and faults.
- the development of new methodologies for structural analysis, including fracture analysis, stress and strain analysis, and fault kinematic analysis.
- the comparison of structural characteristics across different volcanic provinces, and correlation with planetary magmatic evolution.

-the integration of results with existing geological maps and models, and development of new maps and cross-sections.

Hence a solid background in structural geology, and photointerpretation in order to analyze large-scale tectonic structures on planetary surface would be required. Proficiency in GIS and remote sensing software is also essential whereas familiarity with programming languages such as Python and MATLAB would be desirable. Experience in geological mapping, as well as fieldwork in analogue terrains and ability to work in international teams is also well-received.
Indeed the PhD will carry out his work in collaboration to the GMAP teams of the H2020-Europlanet infrastructure involved in geological planetary mapping, instruments teams of planetary mission or mission proposals such as Bepi-Colombo mission to Mercury and Daedalus for the exploration of lava tubes on the Moon and groups working in planetary analogues (EUROPLANET and PANGAEA).

Collaborations: GMAP consortium members (Università di Chieti, INAF-IAPS, ISPRA, LPG/CNRS, DLR, Constructor University Bremen; Polish Academy of Sciences; Open University; China University of Geosciences; Peking University), Bepi Colombo team members (INAF-OAPD, INAF-IAPS, Westfälische Whilelms-Universität Münster, DLR), ESA-EAC.

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