

HECATE Project: The Evolution of Venus: Coronae, Subsurface Structure and Volcano- Tectonics

^{1,2}Barbara De Toffoli, ¹Ana-Catalina Plesa

¹German Aerospace Center, DLR, Institute of Planetary Research

²Department of Geosciences, University of Padova (barbara.detoffoli@gmail.com)

Abstract

The analysis of the Venusian geological record and in particular of coronae, one of the most puzzling volcano-tectonic features of our Solar System, holds pivotal clues to reconstruct the tectonic evolution of Venus and could reveal crucial information for understanding the planet's interior and its thermal evolution.

Here we present the HECATE project that proposes a multidisciplinary approach intertwining geological observations and mapping, statistical analytical procedures, and geodynamical modeling to address major scientific questions for the geological and geodynamical evolution of Venus. The project aims to collect observable geological evidence of the surface and use this to determine the structure of the shallow subsurface and further to constrain the dynamics of the deeper interior. HECATE will hence connect the different planetary layers (the surface, the shallow subsurface, and the deep interior) that are often addressed individually.

HECATE will be carried out in close collaboration between the hosting institution (University of Padova) and DLR (German Aerospace Center, Berlin) and will provide the first comprehensive, multidisciplinary, and well-rounded study on Venusian coronae, by producing high quality, accessible and reusable datasets of planetary mapping products, mechanical and rheological structure of the shallow subsurface, and geodynamical investigations with a strong focus on magmatic processes.

HECATE is a highly ambitious but timely project. The results obtained herein will provide valuable information to identify targets of interest for the future Venus missions, EnVision (ESA) and VERITAS (NASA), whose aims include the determination of the volcano-tectonic activity of Venus.

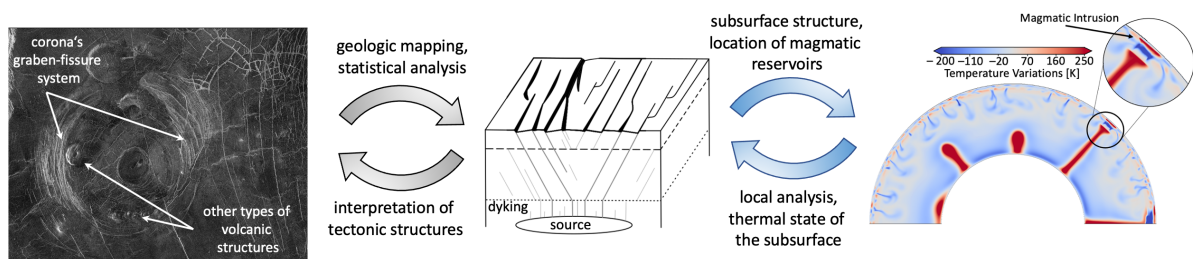


Figure 1: Investigations proposed by the HECATE project. The multidisciplinary approach adopted here includes geological observations and mapping, statistical analytical procedures, and geodynamical modeling.