

**Institut für Geophysik**  
**Geophysikalisches Kolloquium**  
**Sommersemester 2024**

Montag, 15.04.2023

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**Unveiling Venus, a natural laboratory for Earth-like planets:  
a geodynamic perspective**

No other planet that we know of resembles Earth as much as our neighbour Venus in terms of size, mass, and chemical makeup. The two planets once formed under very comparable conditions, but their environments today could not be more different. Whereas Earth environment is habitable and allows for liquid water, Venus has a crushingly thick atmosphere over a hellish, hot surface. This divergence presents a fundamental question in Earth and planetary sciences: why (and when) have Earth and Venus evolved so differently? Several upcoming space missions to Venus, such as NASA's VERITAS and ESA's EnVision, aim to shed light on this mystery. These missions, as well as my research, particularly address the dichotomy between Earth's "plate tectonics" and Venus' lack thereof.

In this presentation, I will show how the powerful synergy of geodynamic modeling and (mission) observations can reveal important insights into the tectonic and volcanic history of rocky planets. I will focus on 3D modeling of tectonic and magmatic structures unique to Venus (so-called "coronae" and "chasmatae"). These features, linking Venus' deep interior to its surface and atmosphere through volcanism and resurfacing, shed light on the planet's long-term evolution and present-day state. Importantly, the integration of these geodynamic models with mission data revealed widespread and ongoing magmatic activity on Venus, challenging long-held assumptions of the planet's geological nature.

I will then will look forward to the exciting 'Decade of Venus' that awaits us - and how geodynamic modeling is a fundamental component in the preparation of VERITAS and EnVision. Finally, I will touch upon the many synergies of Venus sciences with Earth and (exo)planetary sciences, which highlights Venus' status as a unique natural laboratory for studying the evolution of (Earth-like) planets.

Das Kolloquium findet um 16:00 Uhr im Seminarraum GEO 315, Corrensstr. 24, 48149 Münster statt. Alle an dem Thema Interessierten sind hierzu herzlich eingeladen.

**Die Dozenten des Instituts für Geophysik**