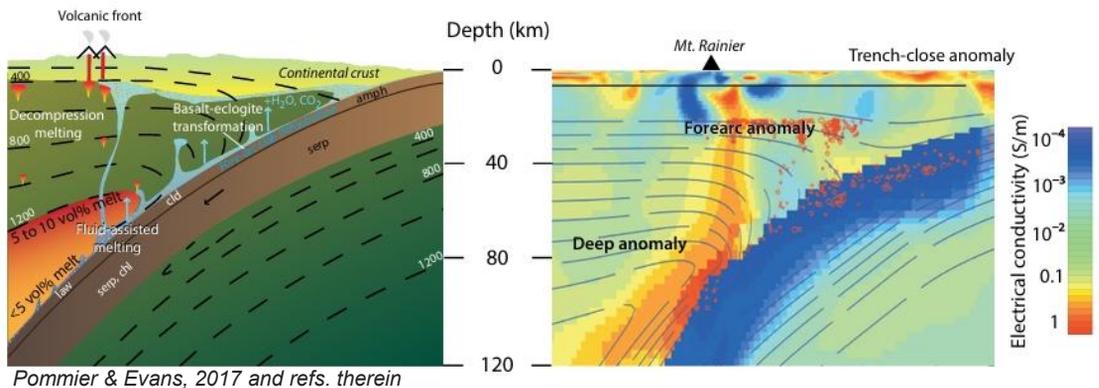




Tracking Volatiles in Planetary Interiors using Laboratory Measurements



Pommier & Evans, 2017 and refs. therein

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19 Marzo 2026 - 14:30 aula LIFS (3 piano)

Abstract

Volatile species such as carbon, hydrogen, and sulfur are present in terrestrial mantles and contribute to the evolution and dynamics of planetary interiors. Elucidating their transport at depth requires probing their physical and chemical properties at relevant pressure and temperature conditions. For instance, on Earth, substantial amounts of carbon and hydrogen are subducted into the mantle, contributing to partial melting at depth and causing geophysical anomalies. Early in the history of terrestrial planets, the presence of volatiles in a magma ocean influences the structure of silicate melts, affecting transport properties and crystallization. This presentation will explore the effect of volatiles on the transport properties of melts in terrestrial planets using high-pressure experiments and multiple spectroscopy techniques, such as impedance spectroscopy, NMR spectroscopy, and Raman spectroscopy. Based on recent laboratory results, two examples will be presented, one focusing on the onset of carbonate melt formation and connectivity in the Earth's upper mantle, and the other investigating the bonding of sulfur in Mercury's highly reduced magma ocean.



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