UNIVERSITA' DEGLI STUDI DI PADOVA
DIPARTIMENTO DI GEOSCIENZE
Via Gradenigo 6
35131 Padova
www.geoscienze.unipd.it

DIPARTIMENTO DI GEOSCIENZE

Seminario

Investigating the behaviour of mantle flow beneath the Pacific plate from the modeling of seismic anisotropy

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Aula Arduino

Relatore: **Elodie Kendall**
University College London – Department of Earth Sciences

Abstract:
Mantle convection is the most efficient way to extract excess heat from the Earth's interior. In order to better understand the dynamics of our planet's interior and it's surface expression, plate tectonics, we must probe the patterns of mantle convection by measuring the deformation-induced seismic anisotropy. A current topic which has not yet reached consensus in the seismic community is the radially anisotropic signature beneath the oceans, notably in the Pacific. This study tests the robustness of upper mantle features in six 3-D isotropic and radially anisotropic global mantle models. We compute full waveforms for over 7,000 paths for earthquakes with Mw between 5-7 and focal depths < 50 km. Synthetic surface waves are compared with real seismograms filtered at T ~ 40-100 s. Models with a more detailed radial anisotropic structure, such as SGLOBE-rani produce phase misfits of 0.2 s whereas those models with higher radial anisotropy such as SAVANI are 7.5 s slower than the data. In addition, we perform synthetic tests to investigate the depth resolution of radial anisotropy beneath the Pacific and we setup geodynamical models of a plume-lithosphere interactions to investigate the mantle dynamics and underlying mechanisms.

Proponente: Manuele Faccenda