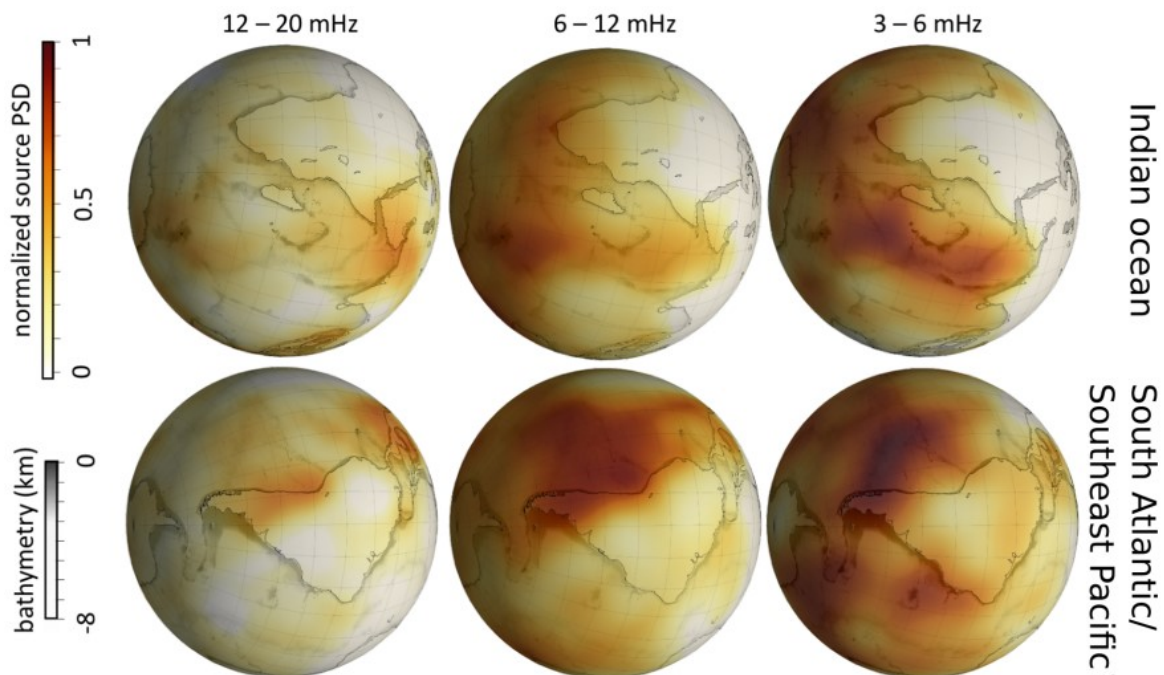DIPARTIMENTO
DI GEOSCIENZE

Seminario

Tiny shakes: utilizing and modeling ambient seismic noise and induced seismic sequences

Martedì, 7 marzo 2023 – ore 16:30 Aula Arduino

Relatore: **Dr. Laura Ermert**

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Ambient seismic noise is immensely useful in imaging and monitoring Earth's interior. While applications of ambient noise seismology have become increasingly sophisticated, limitations imposed by its complex nature have also become apparent. In this seminar, I will introduce a "classic" application of ambient noise seismology as well as current limitations and how we could address them. Finally, I will discuss how some of the considerations used for modeling ambient seismic noise can also be used to model induced seismic sequences. As an application of urban ambient noise monitoring we studied the seismic velocity changes underneath Mexico City, observing the influence of earthquakes, temperature, and precipitation on shallow shear wave velocities. Furthermore, we detected a long-term increase in seismic velocity that may be linked to soil compaction of the lacustrine clay and may have implications for seismic hazard assessment. Applications of this kind are based on the notion that background seismic noise provides a repetitive source of energy that is reasonably well distributed. However, depending on the field setting, ambient and urban seismic noise sources can be highly variable in space and time, which leaves an imprint on the ambient noise cross-correlations that are used in applications. This poses particular challenges for full-waveform imaging with ambient noise and for monitoring seismic attenuation. In the second part, I will introduce strategies to model the effect of variable ambient noise sources on the observed noise cross-correlations. The principles applied for modeling ambient noise can also be used to model continuous seismic time series more generally – including those containing impulsive events. In the last part, I will briefly illustrate how to model sequences of induced seismic events in an effort to improve the seismic monitoring and de-risking of enhanced geothermal reservoirs.

Proponente: **Lapo Boschi**