Séminaire IPGS le Mardi 14 Novembre à 13h45.

Intervenant : Aurélien Mordret, MIT (https://sites.google.com/site/aurelienmordretswebpage).

Titre : Toward a 3D thermo-mechanical model of the Greenland lithosphere from ambient noise tomography

Abstract :

During the past 120 million years, the Greenland craton drifted over the Iceland hotspot; however, uncertainties in geodynamic modeling and a lack of geophysical evidence prevent an accurate reconstruction of the hotspot track. I image the Greenland lithosphere down to 200 km depth with seismic noise tomography. The 3D shear-wave velocity model obtained using 4-5 years of continuous records from the GLISN seismic network is well resolved for most of the Greenland main island. The crustal part of the model clearly shows different tectonic units. The hotspot track is observed as a linear high-velocity anomaly in the middle and lower crust, most probably associated with magmatic intrusions. In the upper mantle, a pronounced low-velocity anomaly below the East coast might be due to the remnant effect of the Iceland hotspot when it was at its maximum intensity. Thermo-mechanical modeling suggests that this area has higher temperature and lower viscosity than the surrounding cratonic areas and experiences a higher than average surface heat flow. This new detailed picture of the Greenland lithosphere will drive more accurate geodynamic reconstructions of tectonic plate motions and help to better understand the North Atlantic tectonic history. Models of Greenland glacial isostatic adjustment will benefit from the 3D upper mantle viscosity model, which in turn will enable more precise estimations of the Greenland ice-sheet mass balance.