



## **Interactions between the dynamics of the solid Earth and its surficial envelopes**

Jean Braun and Eric Deal

ISTerre, Université Grenoble Alpes and CNRS, BP 53, 38041 Grenoble Cedex 9, France

Tectonics and mantle convection are the primary drivers of surface uplift and subsidence which give rise to surface topography and slope. Surface processes, such as erosion and sedimentation, are responsible for the transfer of material from regions of elevated topography to low lying coastal plains and continental interiors, and, ultimately, the oceans. Surface processes are mainly controlled by the availability of water at the Earth's surface and their efficiency should therefore be a strong function of precipitation, and how it is partitioned between surface flow and infiltration in the subsurface. It is also well documented that, through orography, surface topography exerts an important control on the patterns of precipitation at the Earth's surface indicating that important feedbacks and interactions may control the complex evolution of surface topography and climate. In this presentation we will combined observational constraints with the results of quantitative models driven by stochastic processes to provide some responses to the following fundamental questions concerning the interactions between the solid earth and the hydrosphere:

- how sensitive are erosional processes to variability in precipitation patterns?
- what is the erosional response to long-term variations in precipitation rate and how is it recorded in the geological record?
- how do deep Earth processes affect climate through the formation of surface topography and its chemical and physical alteration?