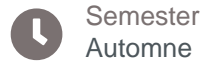
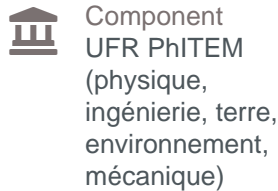


UE Active Faults



- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX9SRAE

Presentation

Description

Active faults are those producing earthquakes. Their knowledge is thus a prerequisite to any seismic hazard analysis. The objective of the 'active faults' class is to make the students familiar with these structures, and establish the links and common properties between long-term geological faults and instantaneous earthquake ruptures. We start reminding a few basics in rock and fracture mechanics that allow understanding why the Earth crust and lithosphere break through faulting and earthquakes. We then see on which criteria most active faults can be identified in the surface morphology. The modern tools allowing such identification are described. We show that faults are organized features that form hierarchical, larger-scale systems, whose geometry brings information on long-term fault evolution, kinematics and mechanics. The long-term kinematics and evolution can then be more precisely quantified using data such as geomorphology and geochronology. We discuss these methods of quantification, the assumptions on which they rely, their implications in terms of long-term fault slip rates, earthquake sizes and recurrence times, etc... Then, we go back to earthquake ruptures, which we analyze with a 'geological eye' (analysis of static parameters). Doing so, we point out the differences and similarities between earthquake ruptures and long-term faults, and discuss the properties of faults which most control the earthquake behavior. We also characterize how faults behave during a single, then multiple seismic cycles, and introduce the recently discovered complexities of both the seismic cycle and its repetitions. Combining the present knowledge on long-term faults and earthquakes, we then try to understand how faults may grow in time, i.e., accumulate slip and propagate laterally through the repetition of large earthquakes. We eventually suggest how that understanding may help anticipating the occurrence and size of the future earthquakes.



Course parts

UE Active Faults - TD	Tutorials (TD)	9h
UE Active Faults - CM/TD	Lectures (CM) & Teaching Unit (UE)	30h
UE Active Faults - TP	Practical work (TP)	9h

Useful info

Campus

› [Grenoble - University campus](#)