



Seminario

Alpine sections through time: a mirror of evolving observations and thoughts on the tectonics of the Alps

Giovedì, 28 novembre – ore 16:30
Aula Arduino

Relatore: **Dr. Claudio Rosenberg**

Sorbonne Université - Institut des Sciences de la Terre Paris (iSTeP)

Abstract

Geological structures of the Alps start to be documented by drawings in the early 18th century, and a subtle transition takes place from sketches of natural landscapes in which geological beds and tectonic structures are well exposed, to sections that reproduce the lateral continuity of structures over long distances. The aim of these sections passes from the simple documentation of peculiar structures until the end of the 18th century, to the assessment of lateral and vertical spatial relationships between geological units in the very first years of the 19th century. Through the 1st half of the 19th century, cross sections only represent the observable part of valley flanks and evolve from panorama-type drawings, including topographic effects that depend from the point of observation of the geologist, to sections with continuous beds of constant thickness, independent of the point of view of the author. It is only in the 2nd half of the 19th century that geologists dare to expand their interpretations to non-exposed parts of the valley flanks. This graphic change expresses the need to clarify long-standing debates on the interpretation of structures in some Alpine areas. At the beginning of the 20th century cross sections are used to illustrate the syntheses of the entire Alpine chain. It is only at this time that geologists are capable to reduce the complexity of local areas to the very first-order structures of the Chain, identified as large-scale nappes. The lateral projection of surface structures along fold axes and the understanding of the nappe structure of the orogen allows for the construction of sections that reach up to 20 km depth and 10 km height above the surface. The direct observation of geological structures is entirely replaced by the map-based construction, and sections of the same area can be extremely different based on the author's interpretation. By the third decade of the 20th century orogen-scale cross sections of the Alpine crust are quite precise and not very different from those that are drawn at the end of the same century. A new break-through in the construction of Alpine sections and the assessment of Alpine structures comes around 1970, after the theory of Plate Tectonics. This theory provides the scientists with a firm idea on the deep-mantle structure of the orogen, before the existence of geophysical data could image such structures. As a consequence, cross sections of the Alps become extremely conceptual, following the newly born theory of subduction. It is very emblematic for that period to have papers illustrating in cross sections the evolution of Alpine orogeny through time, avoiding the illustration of the present-day structure, the only one that needs to be based on observations instead of concepts. The merging of such concepts with observations in order to assess the deep structure of the orogen is a slow process and a major goal of the last 50 years of Alpine research.

Proponente: **Lapo Boschi**