

Aula Marchetti, 11.30

Understanding the links between surface and deep Earth processes: Observations and numerical modeling

Classically, research pertaining to the Solid Earth (i.e., lithosphere, asthenosphere) and the Fluid Earth (i.e., hydrosphere. cryosphere and atmosphere) developed independently. However, observables from the surface geology provide some of the principal constraints on geodynamic and tectonic models. Conversely, deep geodynamic processes give rise to topography, erosion, and sediment generation, which are the basis of surface geology. The relevance of research on deep and surface Earth processes is thus enhanced through a focus on their interactions.

In this presentation, I will focus on



feedbacks between surface and deep Earth geodynamics and how they conditioned the Cenozoic evolution of the Neo-Tethyan margin (e.g. Eocene-Oligocene India-Eurasia collision and Quaternary Alpine history). I will show how geological observations and numerical modeling can be iteratively integrated to constrain the mechanisms through which feedbacks between mantle flow, crustal deformation, erosion, continental ice-cap building/melting, and sea level changes find expression. In addition, I will highlight possible future research directions on several natural laboratories and how such research can be successfully conducted at the University of Milano Bicocca.