Landscape evolution in Northern Adriatic regions in Late Pleistocene

(Proposer: Prof. Alessandro Fontana)

The changes which characterized climate and surface processes between the last part of Mid Pleistocene and the peak of LGM are still poorly understood, especially in temperate and Mediterranean regions. In particular, the changes induced by the glaciations occurred before LGM on the terrestrial, freshwater and amphibian ecosystems, remarkably affecting the vegetation cover, as well as the consequences on the geomorphological framework are intriguing, but difficult topics to be investigated. Important triggering factors are glacier decay at the penultimate glacial termination and during the last interglacial, as well as the frequent and severe fluctuations of temperature and rainfall patterning MIS 3. A major obstacle is represented by the lack of available outcrops and the scarce preservation of suitable paleo-environmental archives.
Besides speleothems analyses, the study of stratigraphic sequences of coastal and lagoon facies is a major source of information that allows a multidisciplinary approach which can integrate together the depositional analyses with paleobotany, micropaleontology, paleomagnetic and geochronological constrains.

A key point of the research project is the possibility to study both sides of Adriatic, comparing the karstic area of Istria with the low-lying alluvial plain formed by the large fluvial systems of SE Alps. Despite the common framework characterizing both sides, they display very different regional situations, that were likely contrasting also along Mid and Upper Pleistocene.

The Pdh candidate will have to develop the knowledge through the analysis of some cores that have been already collected but have been investigated in detail only for LGM and later periods. Other long cores will be drilled during the PhD project. One of the major goals is the recognition of main climatic phases and short-lived events through the integration of pollen data, other stratigraphic and geochronological information, and numerical reconstructions of climate parameters. Selected portions of some deep cores will be investigated through XRF-cores scanner for looking for alternative paleo-environmental proxies.

In particular, a 120-m deep core has been drilled in Istria Peninsula and recovered coastal, lagoon and alluvial deposits arriving to the Mid Pleistocene. Currently this is the deepest Quaternary sequence documented along the coast between Slovenia and Montenegro and have great potential of correlation with the cores recently studied in the major lakes of southern Balkans. Several deep cores have been collected along the Italian coast from Monfalcone to the Po Delta and could allow detailed comparisons with the opposite side of the Adriatic.

Collaborations with national and international research institutes are planned for learning innovative methods and carrying out specific analyses (CNR-IGAG Milan; CNR-ISMAR Bologna; ETH Ion Beam Lab Zurich). In particular, the paleobotanical analyses will be carried out in collaboration with CNR-IGAG Milan.

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