

Assessment of landscape change's impact on Alpine species distribution using a multi-scale approach

There is a strong relation between biodiversity and traditional land use in Mediterranean areas. In these highly human dominated regions traditional activities profoundly shape the landscape with strong consequences on biodiversity pattern.

However, in the last few decades the rapid socio-economic change lead to the abandonment of "marginal" land modifying the landscape structures.

Available remote sensing data can provide information about environmental changes, but the occurrence of temporal and spatial gaps (e.g., the limited temporal archive of historical aerial images and the coarser spatial resolution of satellite data) can reduce the applicability of gained information.

Considering the importance of the scale-dependency of ecological processes, we propose a multi-temporal and scale approach, combining remote sensed and field data, to monitor changes in vegetation and landscape structures and to evaluate their role in shaping Alpine species distribution.

The study area is the Gran Paradiso National Park (NW Italian Alps) and we focused both on 5 altitudinal transects, representative of three altitudinal belts, and on landscape level.

At first, from the interpretation of historical aerial photos in sampled areas, we reconstructed the land cover changes occurred during the last decades and we extended this information to the entire Park landscape, through a supervised classification of satellite data.

Further, we developed a low-cost procedure of UAV (Unmanned Aerial Vehicle) survey adapted to Alpine environment, integrated with botanical sampling, in order to obtain high-resolution land cover maps in test areas to replace the use of aerial photos in supervised classification of satellite data.

This multi-scale analysis of landscape change allows us to detail how the environmental patterns affect the Alpine animal species distribution ranging from discrete areas to entire Park area.

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