**SENTINEL**

**The reSponsEs of Italian mouNTaIN Ecosystems to cLimate change, è stato proposto per un finanziamento**

Global warming is the main driver of biodiversity changes in European summits.Understanding how the mountain flora is coping with climate change (CC) and how futuremountains will look like in terms of plant species, communities and ecosystem services isimportant to define mitigation strategies to slow down potential biodiversity loss andmaintain ecosystem services provisioning. Studies on CC effects on mountain florahighlighted upward shift migrations of warm-generalist plant species at the expense ofcold-adapted plants, generating species turnover, functional shifts and novel bioticinteractions, which could affect soil-vegetation-atmosphere water and carbon exchanges,contributing to long-term changes in ecosystem services delivery. First signals indicatethat CC impacts on biodiversity will be visible first in the Mediterranean region. Yet, we arefar from understanding the fate of plants and habitats in these mountain summits.Focusing on Italian summits, SENTINEL aims to answer key questions on the future ofEuropean mountains based on resurveys of permanent research areas included in theGLORIA network. Relying on data collected from the 7 Italian GLORIA sites in the past 20years by the Italian GLORIA network, trends of species distribution, diversity changes andbiotic homogenization in the Italian mountains will be evaluated (WP1). Furthermore, tocarry out in-depth studies of CC impacts on species distribution and ecosystemfunctioning, the relationship between atmosphere, soil, vegetation and plant traits will beinvestigated, focussing on carbon and water fluxes. For this purpose, new data will becollected in the Northern Apennines, formalizing the creation of the first Italian GLORIAMaster site. SENTINEL will use plant regenerative traits (WP2) to create an identikit ofwinners and losers to CC, which will allow to model future scenarios for summits flora.Additionally, the role of soil-atmosphere (WP3), and of insect (herbivory & pollination)(WP4) interactions with vegetation in driving plant community dynamics will be integratedin the analysis for the same study area. Thereby we will get insight into new interactionspromoted by CC and how they contribute in reshaping plant communities. Finally, we willcombine data into state-of-the-art statistical models to predict scenarios of future mountaincommunities (WP5). The results are expected to provide key indications for the presentand future management of highly vulnerable mountain areas, offering support to betterdefine conservation

strategies to the stakeholders. Data collected within SENTINEL will beintegrated in the eLTER (European Long-Term Ecosystem Research) Network for theestablishment of a Research Infrastructure (RI) in 2025, focused on the study ofecosystem integrity and impacts of CC at an European scale. The information and modelswill be included in the Virtual Research Environments of LifeWatch ERIC.

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