A regional evapotranspiration network for climate-resilient water management in mountain agro-ecosystems

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1 Introduction.

Accurate quantification of **evapotranspiration (ET)** is a key challenge for understanding land-atmosphere interactions and optimizing water use in agriculture, under ongoing climate change. Distributed information on ET is commonly derived through models based on remote sensing and crop coefficients, which often fail to capture the strong spatial variability associated with heterogeneous landscapes and the complex response of ET to climatic drivers.

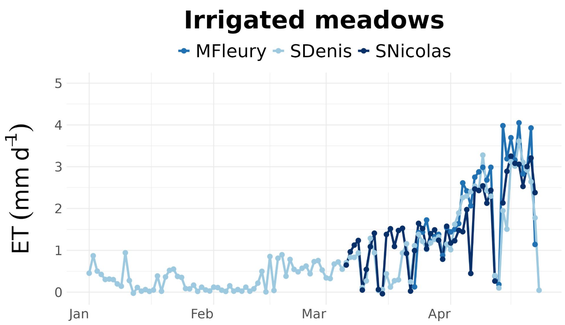
This study highlights the added value of direct ET observations

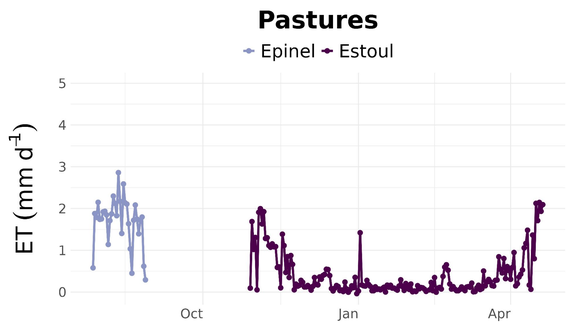
2 The Network.

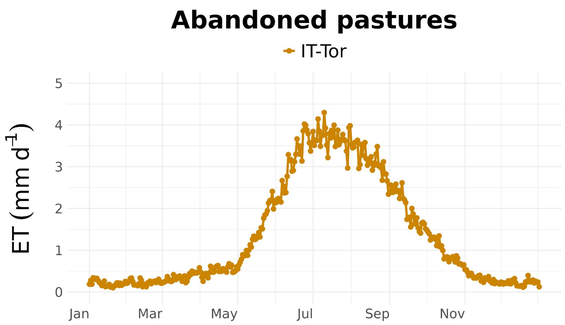
During 2025, within the Agile Arvier project (Next Generation EU), we implemented a **regional network for direct ET measurements** across the Aosta Valley region (north-western Italian Alps). Seven LI-710 evapotranspiration sensors (LI-COR) were installed across representative agricultural systems in the area. To further strengthen the observational network, these measurements have been integrated with long-term ET datasets from two ICOS-associated sites in the region (IT-Tor, IT-TrF), providing decadal-scale context, and with three additional LI-710 already present in the same territory.

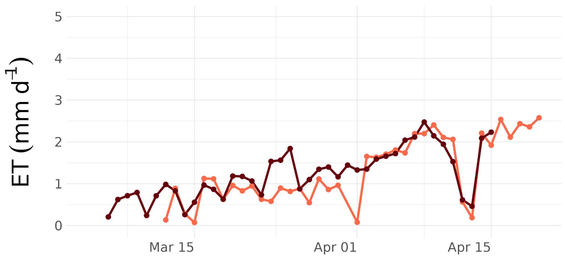
The final network totalizes **twelve monitoring sites**, including a vineyard, an apple orchard, six meadows and pastures, a European larch forest, an abandoned pasture, a wetland, and a high-altitude rocky environment, distributed along an altitudinal gradient from approximately **500 to 3100 m a.s.l.**

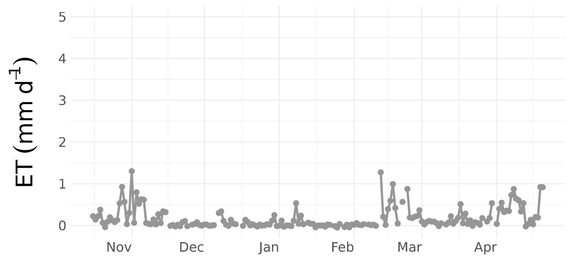
3 Results.

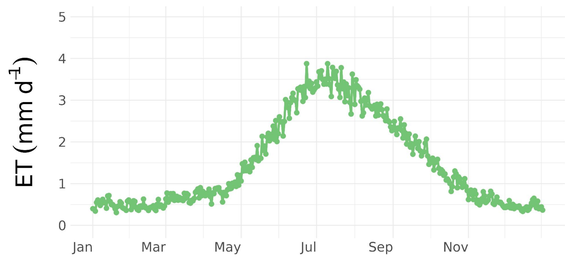


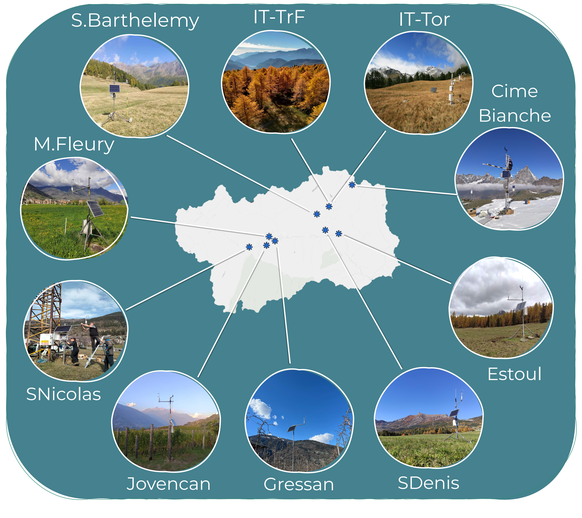


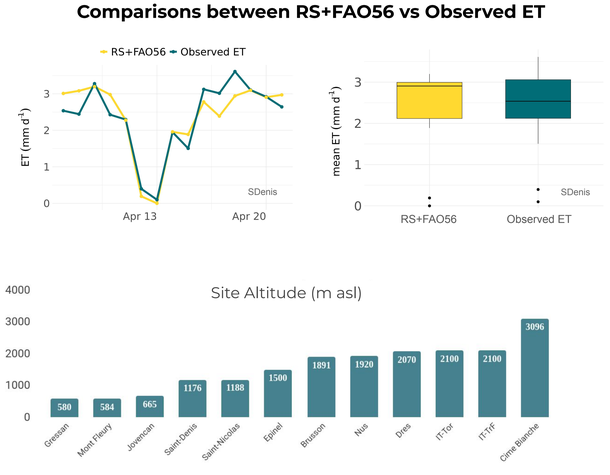












4. Conclusions and future perspectives.

Direct ET measurements will be compared with regional **irrigation water requirement (IWR)** data to refine estimates and improve irrigation management. Insights will support policymakers and enhance agricultural tools. Future steps include integrating data into climate and hydrological models. By year-end, an open-access online dataset will be available for scientists and policymakers.... STAY TUNED!

⟹ https://www.arpa.vda.it/temi-m/clima ⟸

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