

Soil Moisture Modeling in the Aosta Valley: Continuum Model Results in comparison with the in-Situ Network across an Alpine Elevation Gradient

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Compared to most regions, where in-situ soil moisture observations are sparse and discontinuous, the Aosta Valley represents a remarkable exception, hosting a monitoring network mainly composed of 10 stations spanning an elevation gradient from 1080 to 2555 m a.s.l. across a ~3000 km² domain. Each station records soil moisture and temperature at 10, 20, and 40 cm depth, complemented by weighing pluviometers across the main catchments. In particular, four stations - Cogne, Courmayeur, La Thuile, and Pontboset, together with the stations of ARPA VdA in Torgnon - have been operational since 2010, providing over a decade of continuous hydro-climatic observations in a complex mountain environment. Also CVA is monitoring soil moisture both with cosmic rays and point probes. Such observational coverage provides a solid basis to compare the results with the results of Continuum model of CIMA Foundation. These findings contribute to many alpine hydrological applications, including drought monitoring, water resource assessment, and hydrological modelling.