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The response of Bonis Catchment in Calabria –Southern Italy to different management options under climate change scenarios.

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Forests ecosystems provide several ecosystem services among which the regulation of the hydrological cycle. These ecosystems are exposed to different forms of disturbances induced by human activities, management strategies, and climate change. The objective of INNOMED project, for the Italian case study, is to understand the response of forest to different silvicultural practices under climate change conditions. The study site is the the Bonis catchment located in the mountain area of Sila Greca (39°25'15"N, 16°12'38"W), in the Calabria region (southern Italy). This small catchment has a surface of 1.39 km^2 and a mean elevation of 1131 m above sea level. Almost 93% of the total area is covered by forest stand, dominated by about 50-year-old Calabrian pine (Pinus laricio Poiret) forests. In order to simulate the response of the catchment to different climate and management scenarios, FEST-WB distributed hydrological model was used. Within the framework of this project, FEST-FOREST module has been implemented in order to consider vegetation dynamics interactions with the hydrological response of the watershed. Since 1986, the basin was monitored through the installation of different instruments. Rainfall was measured by three rain gauges (with a tipping bucket) together with temperature that were measured at three different meteorological stations. In May 2003, a tower for measurement of eddy fluxes was installed at an altitude of 1100 m a.s.l, on a 54 years old plantation of Laricio pine which allowed monitoring of other parameters. Runoff was measured at the outlet of the catchment using a gauging structure. These data were used for the calibration and validation of the model before being implemented for future scenarios simulations. The results of these simulations delivered the potential impacts and the vulnerability of the Bonis catchment to different scenarios. These outcomes provide for the stakeholders a scientifically based and solid information for a sustainable management of the catchment.