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Environmental change effects on canopy water fluxes of a tropical mountain rain forest in the Andes of Ecuador

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The tropical mountain forest (TMF) in the Andes of SE-Ecuador is globally one of the hottest hotspots of biodiversity. However, biodiversity and ecosystem services are threatened by environmental changes (climate and land use changes). This particularly holds for the mountain rain forest in the river valley of the Rio San Francisco between Loja and Zamora (Ecuador), where ecosystem water and carbon regulation are important services, expected to be especially affected adversely. An interdisciplinary team of Geo-, Bioscientists and researchers from socio-economy have investigated environmental change impacts on ecosystem water services over the last two decades in this area. Particularly changes in canopy water fluxes due to environmental change are one major objective of the ongoing research unit RESPECT (Environmental changes in biodiversity hotspot ecosystems of South Ecuador: RESPonse and feedback effECTs). In the talk, a general overview on environmental change impacts on canopy water fluxes derived from field measurements such as Eddy Covariance and Remote Sensing are presented. To look into future developments, well-adopted Land Surface Models (LSM) are required including suitable plant functional types (PFTs) and focal ecological processes, properly adapted to the complexity of the TMF. In the second part of the talk, the concept and first results of a new way of LSM modelling will be presented. The integrated concept will be finally used to unveil the resistance of the two ecosystem services against future climate change under different land use scenarios.