



Exploring climate changes in mountainous ecosystems in the Andes of South Ecuador

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The Andes Mountains of Ecuador are one of the most biologically diverse regions of the world with high ecosystem diversity. Particularly the complex structure of the terrain causes a variety of ecosystems across small scales that are strongly related to zonal and altitudinal gradients in climate parameters. At the eastern slopes mountain rain forest dominate because extensive rain amounts occur due to impinging easterlies. They advance warm-moist air from the Amazon basin to the Andes and subsequently lead to an orographic enhancement of cloud and precipitation. In contrast, the western slopes are under the influence of a strong seasonality driven by the South American monsoon system leading to distinct rainy and dry periods which is reflected in the deciduous forest / dry forest. Additionally, as a result of the altitudinal gradient paramo ecosystem occurs above the timberline. In the light of recent and future climate changes as an indicator for loss of biodiversity these ecosystems are strongly endangered. Therefore the high resolution climate indicator system (hrCIS) for South Ecuador is developed to derive climate change indicators relevant for ecosystem research. The hrCIS is generated applying the regional climate model Weather Research and Forecasting (WRF) in a dynamical downscaling approach. It covers a time period 1995 to 2015 with a spatial and temporal resolution of 4 km and 1 hour, respectively, on the inner domain. On the basis of important climate change indicators, e.g. precipitation and temperature, their recent developments associated with the respective ecosystem are presented and discussed.