



A Triple-Scale Soil Moisture and Freeze-Thaw Monitoring Network on the Third Pole

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Atmospheric and hydrological processes over the Tibetan Plateau directly impact its surrounding climate and environment at a variety of spatial/temporal scales. Remote sensing and modeling are expected to provide hydro-meteorological data needed for these process studies, but in situ observations are required to support their calibration and validation. For this purpose, we established a dense monitoring network on central Tibetan Plateau to measure two state variables (soil moisture and temperature) at three spatial scales (1.0, 0.25, 0.05 degree) and four soil depths (0~5cm, 10cm, 20cm, and 40cm). The experimental area is characterized by low biomass, large soil moisture dynamic range and typical freeze-thaw cycle. The network consists of 54 sites with their elevation varying over 4470 ~ 4950 m. Soil texture and soil organic matters are measured at each site, as auxiliary parameters of this network. In order to guarantee continuous and high-quality data, tremendous efforts have been made to protect the instruments from flooding, to calibrate soil moisture sensors, and to upscale the point measurements.

As one of the densest mesoscale soil moisture networks in the world, our network meets the requirement for evaluating a variety of soil moisture products and for soil moisture scaling. As an activity of the “Third Pole Environment” Program, it will directly contribute to the “water-ice-air-ecosystem-human” interaction theme. The data will be open via the International Soil Moisture Network and recent two-year data will become accessible soon.