Geophysical Research Abstracts,
Vol. 11, EGU2009-2835-1, 2009
EGU General Assembly 2009

SwissSMEX: Monitoring and Investigating Soil Moisture-Climate Relationships in Switzerland

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Soil moisture plays a key role in the soil-vegetation-atmosphere system. It is an important memory component which stores precipitation and radiation anomalies, and it directly impacts the partitioning of energy and water fluxes. However observations of soil moisture and evapotranspiration, necessary to study these interactions, are scarce. With the Swiss Soil Moisture EXperiment (SwissSMEX) an observational network of 15 stations for soil moisture measurements in Switzerland is currently being established. Profile measurements of soil moisture (4-6 levels down to 0.60-1.20 m) are performed with sensors based on the time domain reflectrometry and capacitance methods. In addition, also profile measurements of soil temperature are performed at all sites. For each site information about the soil texture, layering and vegetation is available. With the installation up to 1.20 m not only the surface-atmosphere interaction but also root water uptake and the surface-subsurface interaction of soil moisture can be determined. Consequently, a better understanding and prediction of processes and their interactions in the land-atmosphere system is expected. The spatial and temporal variability of soil moisture within and between the different sites will be analyzed. By including soil moisture data based on remote sensing techniques, regionalization approaches will be investigated to transfer the gained knowledge from the point to the regional scale. We will discuss the setup of the network, and evaluate the used soil moisture sensors. We will also show the first in situ observations of the spatial and temporal variability of soil moisture in the Swiss Plateau.