Geophysical Research Abstracts
Vol. 14, EGU2012-511-3, 2012
EGU General Assembly 2012

Spatiotemporal analysis of soil moisture at a Tibetan Plateau soil moisture/temperature monitoring network

L. Zhao (1,2,3), K. Yang (1), J. Qin (1), Y. Chen (1), W. Tang (1,2), H. Wu (1,2), C. Lin (1,2), M. Han (1,2), and C. Montzka (3)

(1) Institute of Tibetan Plateau Research, Chinese Academy of Sciences, China (yangk@itpcas.ac.cn), (2) Graduate University of Chinese Academy of Sciences, Beijing, China (zhaolong@itpcas.ac.cn), (3) Agrosphere Institute (IBG 3), Research Centre Jülich, Jülich, Germany (c.montzka@fz-juelich.de)

The Tibetan Plateau - the so called "Third pole", plays an important role in the Asian monsoon and water resources. To study the mechanism of soil-vegetation-atmosphere interactions and to validate satellite soil moisture and temperature products, a Soil Moisture/Temperature Monitoring System (SMTMS) is established on the Tibetan Plateau to measure areal soil moisture at two scales. The network locates within an area of 100km$\times$100km close to the city of Naqu to match a GCM grid. 50 sites in total were deployed since 2010. All the sites were set to measure 4 layers soil moisture/temperature at 0$\sim$5cm, 10cm, 20cm, and 40cm depth, with a measuring time interval of 30 minutes. In addition, a denser observing network was established within a sub-scale area of 25km$\times$25km in the GCM grid to match the pixel of currently ongoing satellite microwave observing missions (AMSR-E, SMOS, etc.). Field soil samples were collected at all sites for sensor calibration.

We will present preliminary analyses on the spatiotemporal features of soil moisture based on the calibrated surface layer soil moisture data. The objective is to: (1) obtain the number of required sites (NRS) that can capture the field mean soil moisture even randomly distributed in the area; and (2) to define the most representative site or a combination of sites that can estimate the field mean soil moisture in high accuracy. Cross comparisons were carried out between different temporal scales (half-hourly, daily, and 10days) and spatial scales (0.25° and 1°). Key findings are as follows: (a) the quality of field measurement is consistent according to the time series of soil moisture and precipitation; (b) the number of required sites (NRS) is insensitive to temporal scales, while larger NRS is required with increasing spatial scale; (c) a combination of 5 chosen sites can give robust and stable estimate of areal mean soil moisture, and these sites are approximately uniformly distributed.

Validations of satellite products and soil moisture/temperature upscaling analysis are ongoing, and the in situ data will be released within one year.