

Simulating Surface Energy Flux and Soil Moisture at the Wenjiang PBL Site Using a Land Data Assimilation System

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ABSTRACT

This study reports an application of a Land Data Assimilation System developed at the University of Tokyo (LDASUT) to the Wenjiang PBL site located at the edge of the Tibet Plateau, for the period from January to March, 2008. The application was consist of three steps:

The first step was aiming to evaluate the capability of LDASUT to simulate the energy and water fluxes for a vegetated land surface. The LDASUT was first driven by in-situ observed micrometeorological data. Simulated energy fluxes were compared to hourly direct measurements and simulated soil moisture content was compared to the in-situ soil moisture observations at a depth of 4 cm. The results show that the LDASUT well simulated those variables and thus validated the capability of LDASUT.

The second step was designed to check the possibility of applying LDASUT globally and simulating surface energy and water budget worldwide. A GCM output data, the Japan Meteorology Agency (JMA) Model Output Local Time Series (MOLTS), was used as the driving data of the LDASUT. In this step, we failed to simulate the energy fluxes well and it was mainly due to the systematic biases lying in the downward radiation data of JMA MOLTS.

In the third step, we modified original JMA MOLTS data with some simple linear regression equations and used it as the forcing data to run LDASUT. It was found that the performance of LDASUT was improved and reasonable fluxes were simulated. This result demonstrated the feasibility of reliably simulating land surface fluxes with a LDAS driven by model outputs.

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