Flux Observations in the Watershed Airborne Telemetry Experimental Research

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Abstract: The Watershed Airborne Telemetry Experimental Research (WATER) is a simultaneous airborne, satellite-borne and ground based remote sensing experiment aiming to improve the observability, understanding, and predictability of hydrological and related ecological processes at a catchment scale. WATER consists of the cold region, forest, and arid region hydrological experiments as well as a hydrometeorology experiment and took place in the Heihe River Basin, a typical inland river basin in the northwest of China. The field campaigns have been completed, with an intensive observation period lasting from March 7 to April 12, May 15 to July 22, and August 23 to September 5, 2008, in total, 120 days. 25 airborne missions were flown. Airborne sensors including microwave radiometers at L, K and Ka bands, imaging spectrometer, thermal imager, CCD and LIDAR were used. Various satellite data were collected. Ground measurements were carried out at four scales, i.e., key experimental area, foci experimental area, experiment site and elementary sampling plot, using ground-based remote sensing instruments, densified network of automatic meteorological stations, flux towers, and hydrological stations. Based on these measurements, the remote sensing retrieval models and algorithms of water cycle variables are to be developed or improved, and a catchment-scale land/hydrological data assimilation system is being developed.

A network of hydrometeorological and flux observations was established in the upper and middle reaches of the Heihe River Basin. The network was composed of 7 newly installed Automatic Meteorological Stations (AMS), 4 new Eddy Covariance (EC) systems, 2 new Large Aperture Scintillometers (LAS), 5 existing AMSs, 2 existing ECs, 8 CMA operational meteorological stations, and 34 CMA regional meteorological stations. They are distributed in three KEAs of WATER, covering an area of 23,700 km^2. This enhanced network would meet the requirement for developing, improving and verifying the integrated watershed model. The meteorological observations are also going to be used to generate a high resolution atmospheric forcing dataset.

The observations obtained in WATER will be available online in May, 2009 through the WATER Information System.

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