



Progresses on the Intensive Observation Period of Watershed Allied Telemetry Experimental Research

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The Watershed Allied Telemetry Experimental Research (WATER) is an intensively 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 catchment scale. It was taken place in the Heihe River Basin, the second largest inland river basin in the arid regions of northwest China.

WATER consists of the cold region, forest, and arid region hydrological experiments as well as a hydrometeorology experiment. It was divided into 4 phases, namely, the experiment planning period, pre-observation period, intensive observation period (IOP) and persistent observation period. The field campaigns have been completed, with the IOP lasting from March 7 to April 12, May 15 to July 22, and August 23 to September 5, 2008, in total, 120 days, more than 280 individuals of scientists, engineers, students, and aircrews from 28 different institutes and universities were involved in. A total of 26 airborne missions, about 110 hours were flown. Airborne sensors including microwave radiometers at L, K and Ka bands, imaging spectrometer, thermal imager, CCD and LIDAR were used. Ground measurements were carried out concurrently with the airborne and space-borne remote sensing at four scales, i.e., key experimental area, foci experimental area, experiment site and elementary sampling plot. A network of hydro meteorological and flux observations was established in the upper and middle reaches of the Heihe River Basin. The network was composed of 12 super Automatic Meteorological Stations (AMS), 6 Eddy Covariance (EC) systems, 2 Large Aperture Scintillometers (LAS), and plenty of China Meteorological Administration (CMA) operational meteorological and hydrological stations. Additionally, we also used ground-based remote sensing instruments, such as Doppler Radar, ground based microwave radiometer and truck-mounted scatterometer and lots of auto measurements instruments. Various and abundant satellite data were collected, consisting of visible/near infrared, thermal infrared, active microwave, LIDAR and other data.

In the presentation, we introduced the preliminary results obtained from the observations of hydrological variables, particularly on snow, frozen soil, precipitation, soil moisture and evapotranspiration. The retrievals of the forest structure, biogeophysical and biogeochemical parameters from remote sensing were also introduced. The developments of scaling methods and catchment-scale hydrological data assimilation system were briefly described.

With the accomplishment of the IOP, WATER has achieved a preliminary goal of establishing a public experimental field and developing a multi-scale, multi-resolution and high quality integrated dataset. The analysis of the data, developing and validation for models and algorithms, and building of the information system of WATER will continue in the next stage and limited revisits to the field are anticipated.