

Observations and studies on arid and semi-arid land-atmosphere interaction in Northwest China

Yaohui Li

Institute of Arid Meteorology, China Meteorological Administration, Lanzhou, Gansu province, China

Introduction

Institute of Arid Meteorology (IAM), China Meteorological Administration (CMA), is one of the national specialized research institutes in studying basic meteorological system and serving for the public, with primary focuses on aridity monitoring, prediction and warning, proper utilization of water resources, sand-dust storm research and prediction and so on. In this presentation, some key observation and research activities conducted by IAM in land-atmosphere interaction and its potential applications in arid and semi-arid regions will be discussed.

Objects of the observation and experiment

- To research on the land surface process and land-atmosphere interaction in arid and semi-arid regions;
- To research the characteristics and formation mechanism of atmosphere boundary layer in arid and semi-arid regions;
- To research the energy exchange and water cycle rules of agro-ecosystem in arid and semi-arid regions;
- To research the methods of drought monitoring, drought index, formation and evaluation of drought disaster in arid and semi-arid regions;
- To research the remote sensing monitoring in soil-plant- atmosphere system;

Observation and experiment regions and station nets

Main observation regions include arid area of Hexi Corridor and semi-arid area of middle-east region of Gansu Province, China. Arid climate observation systems (ACOS) covers almost all over the northwest part of China. Observation station nets consist kinds of experiment bases and meteorological stations, such as Dingxi Arid Meteorological and Ecological Environment Experimental Site (DAMES) of Institute of Arid Meteorology, China Meteorological Administration.

Observation items and instruments

Eddy Covariance Observation Systems

- Gradients of Temperature, Humidity and Wind
- Doppler weather radars upper-air observation
- Surface radiation balance observation
- Soil temperature, moisture and heat flux observations
- Lysimeter
- Crop ecological observation
- Surface Remote-sensing
- General weather data observation
- Water vapor GPS/MET observation system
- Atmospheric composition observation

Some preliminary results

- The reason that soil become dry on loess plateau in the eastern Gansu
- Soil water “respiration”
- Momentum, sensible heat flux, latent heat flux and bulk transfer coefficient in arid and semi-arid region of northwest China
- Characteristics of surface energy in farmland, grassland and gobi in northwest China
- Characteristics and formation mechanism of atmosphere boundary layer in arid and semi-arid region of northwest China
- Impacts of climate warming on crops in arid and semi-arid region of northwest China.