Land Surface Hydrology During the Cloud Land Surface Interaction Campaign (CLASIC) in 2007

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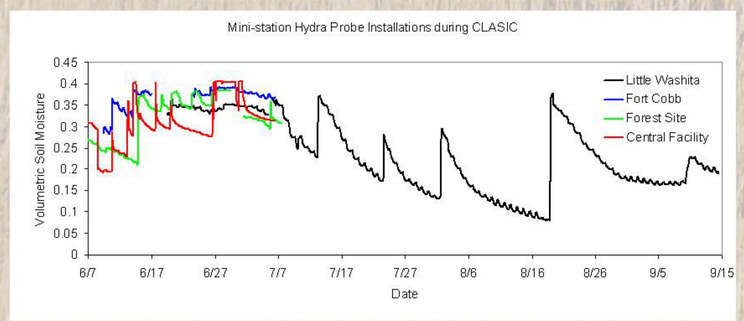
Abstract

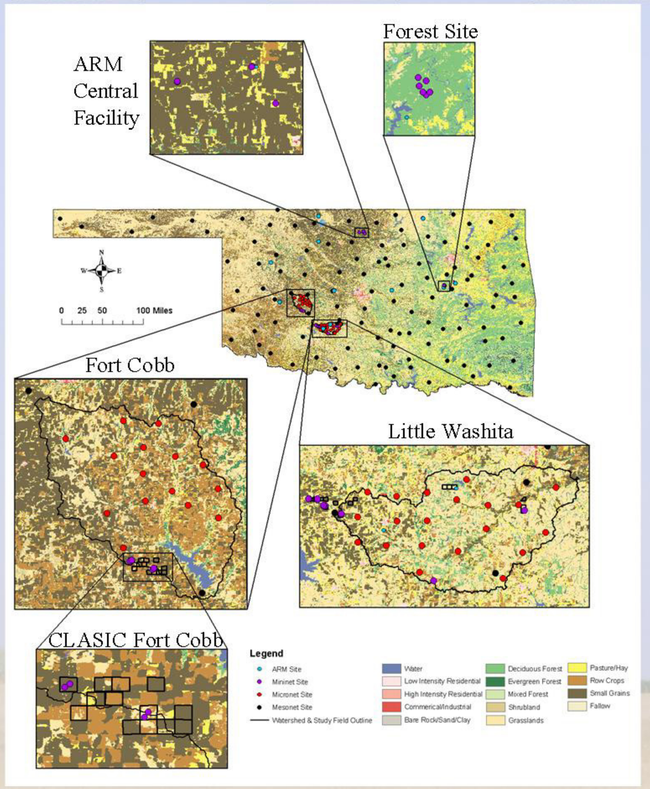
Fundamental to the objectives of Cloud Land Surface Interaction Campaign (CLASIC) is the understanding of the interactions between the atmosphere and the land surface. In addition, CLASIC observations and monitoring will be used to validate the multiple remote sensing products retrieved during the study period. USDA and cooperators focused on characterizing two of the three most important hydrologic components in land-atmosphere interactions; soil moisture (the storage reservoir) and evapotranspiration (the moisture supply to the atmosphere). Precipitation (the moisture supply to the ground) is the third and is readily available. A team of scientists and students recorded highly accurate ground-based observations from two carefully selected locations west of Chickasha, OK; the Little Washita and Fort Cobb watersheds. Each of these watersheds is monitored by USDA in situ networks recording soil moisture, and meteorological data. In addition, ground teams recorded high density measurements within selected field scale plots for scaling to the remote sensing footprints. Tower based surface energy balance observations were made at multiple locations in the watersheds, as well as other locations, as well as other locations including the Central Facility and Forest Sites. In addition to the large scale soil moisture measurements conducted throughout the experiment, land cover surveys, vegetation measurements and surface characterizations were also conducted to develop detailed land cover and vegetation water content imagery. Several aircraft remotely monitored these same ground variables to transfer the point information to the entire (~50,000 square km) CLASIC study area. Both the soil moisture and evapotranspiration derived using the ground and aircraft observations will be used to develop and validate satellite-based approaches and land-atmosphere models. Knowledge gained from this study will lead to better prediction tools that will benefit a broad spectrum of applications in agriculture ranging from more accurate weather forecasting to improved water management decisions and crop yield estimation.

Flux Towers and Automated Sampling

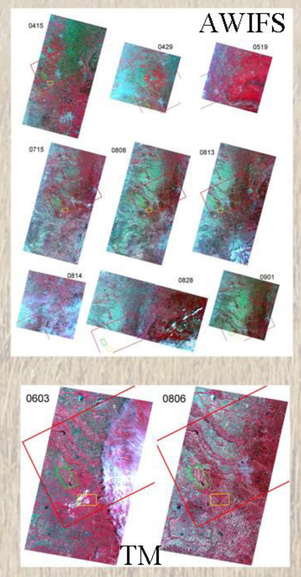


Up to 20 surface soil moisture sensors were operated at remote sites throughout CLASIC and for 2 months post experiment.

Study Areas and Watersheds



Land Cover



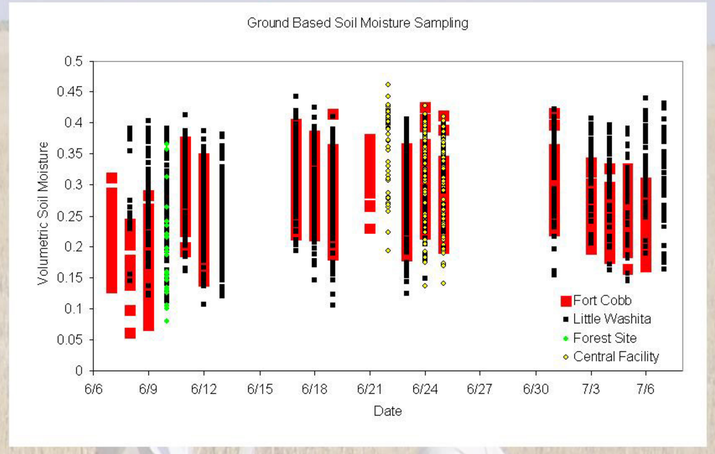
AWIFS and Landsat 5 TM data were collected during the summer of 2007. There was very poor cloud-free imagery available for the CLASIC Study Period. A complex algorithm combined available data from April through September to create a 'CLASIC Land Cover Dataset'.

Soil Moisture Sampling

CLASIC 2007 Land Sampling Calendar

June 3	4	5	6 GSM	7 GSM	8 GSM	9 GSM
10 GSM FS	11 GSM	12 GSM	13 GSM	14	15	16
17 GSM	18 GSM	19 GSM	20	21 GSM	22 CF	23 GSM
24 GSM CF	25 GSM CF	26	27	28	29	30
July 1 GSM	2	3 GSM	4 GSM	5 GSM	6 GSM	7 GSM

PALS-TOI Flight Date



Vegetation Sampling & Site Characterization

Vegation biomass and water content was collected for each dominant agricultural cover throughout the study period. Radiometric measurements were also made incoordination with certain satellite overpasses. Bulk density and surface roughness data was also collected.

Acknowledgements

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