

CHAPTER XVIII. SATELLITE OBSERVATIONS

A. INTRODUCTION

During the experiment period a number of satellites passed over the Little Washita Watershed. Their characteristics and observational opportunities are summarized in this section.

B. LANDSAT

The only opportunity for a Landsat-5 overpass during the experiment was on June 9. The sky conditions on that day were very cloudy and the scene was not purchased.

C. SPOT

There were two opportunities for SPOT overpasses during the experiment: a) June 12 at approximately 12:27 pm (2° view angle) and b) June 17 at approximately 12:31 pm (9° view angle). Both of the overpasses were acquired by SPOT corporation. At overpass time on June 12, most of the study area had significant cloud cover and it was not purchased. On June 17, portions of the study area were in one clear quadrant of the SPOT scene. Because some of the study area was obscured by clouds, the scene has not yet been purchased. If there is significant interest by several groups, the possibility still exists to obtain this image from SPOT Corp.

A cloud-free scene was acquired shortly after the experiment on July 3, 1992. Because there were no ground-based supporting measurements, this scene was purchased primarily for applications such as mapping and land-use classification.

D. NOAA AVHRR

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This is a TIROS-N series satellite designed to operate in a near-polar, sun-synchronous orbit. There were two satellites in this series that were in orbit during the experiments. NOAA-11 satellite in the ascending node (northbound Equator crossing) has a daytime pass of approximately 1340 hours local solar time. NOAA-12 satellite in the descending node (southbound Equator crossing) has a daytime pass of approximately 0730 hours. Currently, only the NOAA-11 data daytime pass has been evaluated.

Sensor Band Characteristics: ch1 0.57 - 0.68 um
ch2 0.725- 1.00
ch3 3.53 - 3.93
ch4 10.3 - 11.3
ch5 11.5 - 12.4

Sensor Spatial Resolution: 1.1 Km (all bands) at Nadir pass

Temporal Resolution: 14.1 orbits/day

Swath: 2048 pixels wide

Scan Angle Range: -55.4 to +55.4 degrees

Availability of completely cloud free data for the Washita'92 experiment area during the month of June 1992 is limited. There was persistent cloud cover during the experimental period with a minimal clear sky conditions over the watershed area only for a few days. The actual clarity of these potentially clear scenes can be determined only after the data is processed and the watershed area is carefully examined. The potentially clear scenes from NOAA-11 was obtained by viewing the microfilm obtained from U.S. Geological Survey, EROS Data Center, Sioux Fall, South Dakota.

Scene information is from the scene location and overpass dates software (SATCOV, V4.12) developed by John Price (USDA ARS, Beltsville, MD). The sensor view angles were computed for a location coordinate of Latitude: 34.92 Longitude: -98.08.

Date	Orbit No.	Sensor view angle
6/6/93	19068	25
6/13	19167	45
6/16	19209	11
6/17	19223	-30
6/18	19237	-45
6/19	19251	-56
6/20	19265	-64
6/24	19322	4

E. SSM/I SATELLITE RADIOMETERS

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The special sensor microwave imager (SSM/I) has been a part of the Defense Meteorological Satellite Program (DMSP) since July, 1987. It is a multifrequency imaging radiometer that utilizes conical scanning at an incidence angle of 50°. It operates in a circular sun-synchronous near polar orbit at an altitude of 833 km and an inclination of 98.8° (Hollinger et al., 1990). Basic parameters for the sensors are listed below:

Frequency (GHz)	Polarizations	Resolution (km) (along and cross track)
19.35	V and H	69 x 43
22.235	V	60 x 40
37.0	V and H	37 x 28
85.5	V and H	15 x 13

The total swath is 1400 km and for the Little Washita area daily coverage is expected.

Although very little land surface study has been done so far with global observations, it is expected that these data might provide information on systematic changes of vegetation due to natural and anthropogenic causes.

F. ERS-1

The ERS-1 (European Remote Sensing Satellite) is a global environmental monitoring satellite that among other instruments, carries a C-band SAR (VV polarization). During WASHITA-92, the satellite made two passes over parts of the Little Washita basin. On June 10, the satellite passed over the eastern end of the basin (with about 40% coverage). On June 13 the satellite passed over the far western edge (less than 10% coverage) of the basin. Only the June 10 data have been acquired and this is currently undergoing calibration. Because of the doubtful value of the other scene, this has not been ordered.

To our knowledge, no JERS-1 (the Japanese Environmental Satellite, a L-band SAR) data were taken during the time of the experiment although data were requested.

G. REFERENCES

Hollinger, J. P., Peirce, J. L., and Poe, G. A. 1990. SSM/I instrument evaluation. IEEE Trans. on Geoscience and Remote Sensing, vol. 28:781-790.