FIRE II Cirrus

Mission Summary

Date: November 18, 1991
Julian Day: 322
Experiment Day: 6

Summary | Active Sensors | Passive Sensors | Sonde and Sfc Met

Mission Scientist: David Starr
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Mission Objective:

Clear sky spectral radiation data set

Mission Description:

Coordinated very clear sky spectral radiation measurements from ground-based systems, aircraft (ER-2 and Sabreliner) and satellites (NOAA and GOES). Various lidar systems were used to monitor the completely cloud free conditions and study the Mt. Pinatubu stratospheric aerosol layer during the mission.

Weather Synopsis:

Monday was just about absolutely cloud free all day. Afternoon temperatures reached 70deg.F with a pleasant southerly breeze. In the morning hours, a few cumulus fractus clouds were observed, while a few shreds of middle level cloud cirrus seen on the northwest horizon in late afternoon.

Synoptic Situation:

Severe clear over Kansas, Oklahoma and Texas. Winds aloft are strong (60 to 100 knot maximums over the region) and from the southwest in advance of a weak short wave trough located just to the west of the continental divide. The upper levels are extremely dry. Clouds hold back of the continental divide through most of the day as the moisture is confined to levels below about 500 mb. Beautiful cirrus form over Nebraska and into Iowa during the afternoon and middle level clouds make it into north Texas by late afternoon. Tropopause heights from 14.5 to greater than 16.5 km are observed. There does appear to be a break between the lower and upper troposphere near the 8-9 km level.

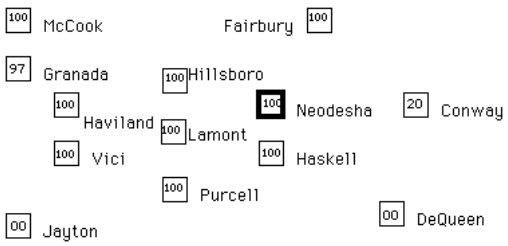
Aircraft	Depart	Land	Notes
NASA ER-2	13:20 CST		On station 2035-2345 UTC, N-S legs over Hub, NE-SW legs over Tulsa, minor probs
NCAR King Air			No flight
NCAR Sabreliner	14:03 CST	17:00 CST	Data system failure, SPEARAD data okay but most of met and flux data lost, N-S legs
UND Citation			No flight

Satellite	Hub Overpass Time	Zenith Angle	Azimuth Angle	RAOB
NOAA-11	21:03:12	19.70	258.20	yes
	09:27:41	29.22	102.16	yes
NOAA-12	14:27:36	9.27	283.92	yes
	01:47:30	29.59	259.38	yes

Rawinsonde Operations:

- Inner NWS stations (Type A): Enhanced mode @ 12, 18, and 00 UTC
- Outer NWS stations (Type B): Routine @ 12 and 00 UTC
- Hub CLASS station: Satellite overpasses @ 15, 21, 02, 10 UTC
  - plus enhanced mode at 12, 18, and 00 UTC
  - continuing probs with low level winds
- Remote CLASS stations: Enhanced mode @ 12, 18, AND 00 UTC
  - minor probs with low level winds
- Hub GSFC/WFF station: Launches @ 19, 22, and 23 UTC
- CSU Parsons station: Launches @ 15, 19, 21, and 22 UTC

NWS Wind Profiler Status:



FIRE Profiler Status:

- CSU 405 MHz @ Parsons: Continuous operation (RASS from 15 to 22 UTC)

- PSU 50 MHz @ Coffeyville: Not operational
- NOAA 405 MHz @ Coffeyville: Not operational

SPECTRE Operations:

Highlights include Wisconsin interferometers close to setting records for continuous operation. SIRIS also performing well. Neither 50 Mhz or 400 Mhz RASS operational. 400 Mhz RASS partially submerged in standing water from weekend rain. Raman did not attempt daylight measurements.

Aircrew/Mission Scientist Debrief Notes:

- SABRELINER: Absolutely clear. SPEARAD worked well although the problem of the nose-boom shadowing the instrument along some headings (fn of heading and time of day) must be worked around. Racetrack flight legs of 10 minute length flown at 10, 15, 20, 25, 30, 31, 33K' on N-S heading over Hub site. Unfortunately, the Sabreliner data systems failed after one leg of the pattern at 10K' and was not restored until the patterns at 31 and 33K'. It is not known at this if the data from the latter two altitudes can be retrieved. Only the CSU radiation instruments were unaffected by the data system failure - the cryogenic frost-point hygrometer data was on the failed data system.
- ER-2: N-S legs from 2030 to 2200 over the Hub and then NE-SW legs (in solar principle plane) over Tulsa until about 2345. Some minor glitches. Further offset (MAS) and saturation (EOC) adjustments made.
- OTHER: Raman lidar came up at about 0030 for 1/2 hour and then went down for awhile. The feeling is that the atmosphere was fairly homogeneous during this day and that we have a good Raman vs HIS vs HIRS water vapor data set. U.Wisc. VIL worked well - good PBL description (top at 1.48 km).

Significant Hardware Problems:

- Sabreliner data systems failure for met and flux profile data.
  - This was a major disappointment
- Hub CLASS winds continue to have problems at low levels.
- U. Utah and U.Wisc HSR lidars not operational.
- PSU 50 MHz profiler/RASS not operational.
- NOAA 405 MHz RASS not operational.
- Sabreliner TDDR radiometer not ready.

Highlights of FIRE Operations:

- A landmark day for measurement of spectral radiation in the atmosphere with coincident observations from multiple upward-looking ground-based systems, downward-looking satellite and aircraft systems (ER-2).

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Instrument Logs

Active Sensors

Active Sensor	UTC Hour																								Notes
	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	
Utah Lidar H																									NOT OPERATIONAL
LaRC Laser Ceilometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Wisc HSR Lidar H																									TESTING
Wisc Vol Image Lidar									X	X	X	X													
GSFC RAMAN Lidar H													X	X	X	X	X	X							
NOAA CO2 Lidar H		X	X	X	X	X	X	X	X	X	X	X	X	X	X										
NOAA Radar H																									NOT OPERATIONAL
PSU Radar H																									NO OBSERVATIONS
PSU Laser Ceilometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PSU 50 MHZ Wind Prof H																									NOT OPERATIONAL
PSU/NOAA 50 MHz RASS H																									NOT OPERATIONAL
NOAA 405 MHz RASS H																									NOT OPERATIONAL
LaRC Lidar P	X	X	X	X	X	X	X	X	X	X	X														
CSU Wind Prof/RASS P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BOTH FROM 15 TO 22 UTC
CSU Laser Ceilometer P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

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Passive Sensors

Passive Sensor	UTC Hour																								Notes
	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	
NOAA μ-wave Radiometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NOAA Sun Photometer H				X				X			X														
NOAA H20 Photometer	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NOAA IR Flux Radiom. H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NOAA Dobson Ozone H				X				X																	
NOAA Surface Ozone H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NOAA Trace Gas H								CF					F	C											
PSU μ-wave Radiometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	SOME NOISE PROBLEMS

PSU Sun Photometer H																								NO OBSERVATIONS
PSU Solar Flux Radiom. H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PSU IR Flux Radiometers H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
PSU Sky Video H																								NO OBSERVATIONS
Utah IR-Window Radiom. H																								NOT OPERATIONAL
Utah Sky Photo. H																								NOT OPERATIONAL
LaRC Video H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
AFGL Sky Imager H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Ames Radiometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	CALIBRATIONS DONE
Denver Solar Radiom. H							X	X	X	X	X													
Denver IR-Spectrometers H							X	X	X	X	X	X	X	X	X	X								
GSFC IR-Spectrometer H										X	X			X	X	X	X	X	X					
Wisc. IR-Spectrometer H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
MRI Sun Photometer H		X	X	X	X	X	X	X	X	X	X													LANGLEY CALIBRATION DONE
MRI IR Radiometer H	X	X	X	X	X	X	X	X	X	X	X	X												
MRI Spectro-Radiom. H			X	X	X	X	X	X	X	X														
MRI Solar Flux Radiom. H	X	X	X	X	X	X	X	X	X	X	X	X												
GSFC Sun Photometer H		X	X	X	X	X	X	X	X	X	X													
CSU Sun Photometer P								X	X	X	X	X												
CSU IR-Window Radiom. P							X	X	X	X	X	X	X											
CSU Solar Flux Radiom. P	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
CSU IR Flux Radiometers P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
CSU IR-Spectrometer P							X	X	X	X	X	X	X											
CSU Sky Video P				X	X	X	X	X	X	X	X	X	X											

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Sondes and Surface Meteorology

Sondes + Sfc Met Sensor	UTC Hour																							Notes
	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	
NOAA Ozone Sonde H															X										
WFF Sonde H		X				X		X	X		X	X													
NCAR Cloud Ice Sonde H																									NO LAUNCHES
NCAR/CLASS Sonde H	X		X				X			X			X	X									X		
NCAR PAMS H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NCAR/CLASS (remote)	X						X						X												
NCAR PAMS (remote)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PARSONS DOWN UNTIL 19 UTC AND AGAIN AT 09 UTC
CSU Sonde P				X				X		X	X														DATA LOSES ABOVE 250 MB
CSU Sfc Meteor. P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Type A NWS Sondes																									
Type B NWS Sondes																									
PSU Sfc Meteor H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	