FIRE II Cirrus
Mission Summary
THE LAST DAY

Date: December 7, 1991
Julian Day: 341
Experiment Day: 25

Summary | Active Sensors | Passive Sensors | Sonde and Sfcmet

Mission Scientist: David Starr
Deputy Mission Scientist: none

Mission Objective:

NOAA/AVHRR underflight with observation of cloud microphysical and radiative properties in conjunction with GOES observations in addition to the more general objective of observing the regional development and dissipation of cirrus systems.

Mission Description:

Day #2 of Third Intensive Observing Period.

- IOP: The synoptic situation did not really develop as hoped. We had hoped for but not really expected either a more rapid movement of the large-scale baroclinic leaf system or ridging in the central US to bring the moist southern flow aloft back over us. Neither happened. Nonetheless, we collected good large-scale and regional scale data sets that will hopefully prove useful for study of the systems that were there.
- NOAA/AVHRR: An absolutely perfect coordinated multi-aircraft NOAA underpass mission with additional flight lines oriented with respect to the GOES scan. We have been after this case for some time and finally nailed it. The Sabreliner acquired excellent cloud extinction observations while the Citation observed cloud microphysics and the ER-2 scanned from above at just about the exact time and place (along satellite ground track) of NOAA overpass. The target was a cirrus cloud band oriented across the satellite track. Airplanes flew a stacked pattern along the band. The best optical phenomena observed during the entire experiment were seen by the Citation crew in this cloud band.

Weather Synopsis:

A lovely day in Coffeyville. Scattered low clouds (20-30) and no cirrus. Afternoon temperatures reached the low 60's with southerly winds.

Synoptic Situation:

The upper level cloud system that had been sampled over the last few days slid to our south with cirrus mostly confined to south of the Texas border. The cutoff trough in the southwest had mostly filled although some ridging was still evident from east Texas into Colorado. Winds aloft were less than 50 knots at 300 mb from the WSW. A beautiful baroclinic leaf cirrus system extended from SW of San Francisco into Montana and the Dakotas ahead of an advancing large-scale trough.

Aircraft	Depart	Land	Notes
NASA ER-2	12:00 CST	16:15 CST	AVRIS scene at Parsons and Hub, then NOAA/AVHRR underflight at Texarkana
NCAR Sabreliner	13:34 CST	15:44 CST	NOAA/AVHRR underflight at Texarkana
UND Citation	13:22 CST	16:28 CST	NOAA/AVHRR underflight at Texarkana
NCAR King Air			no flight

Satellite	Hub Overpass Time	Zenith Angle	Azimuth Angle	RAOB
NOAA-11	20:45:12	18.60	72.57	3-hourly
NOAA-12	14:35:12	20.57	285.03	3-hourly

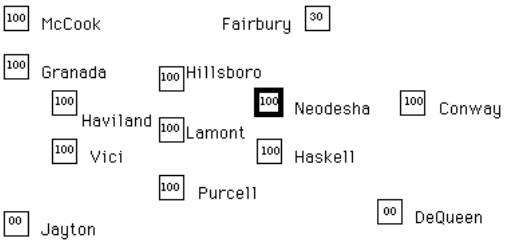
Rawinsonde Operations:

- Inner NWS stations (Type A): Intensive mode @ 12, 15, 18, 21, and 00 UTC
- Outer NWS stations (Type B): Intensive mode @ 12, 18, and 00 UTC
- Hub CLASS station: Intensive mode @ 12, 15, 18, 21, and 00 UTC
- Remote CLASS stations: Intensive mode @ 12, 15, 18, 21, and 00 UTC
- Hub GSFC/WFF station: none
- CSU Parsons station: none

FIRE Profiler Status:

- CSU 405 MHz @ Parsons: Continuous operation (no RASS)
- PSU 50 MHz @ Coffeyville: Continuous operation with RASS
- NOAA 405 MHz @ Coffeyville: Not operational

NWS Wind Profiler Status:



SPECTRE Operations:

Many instruments began to pack up. SPECTRE is over.

Aircrew/Mission Scientist Debrief Notes:

- NCAR SABRELINER: Flew at about 8.8 km from Hub to Texarkana for rendezvous. Thin wispy cirrus bands were observed prior to target area which had a thick and uniform stratocumulus undercast with an albedo of ~55Flew four reverse heading legs at 7.3 km under the cirrus band at Texarkana. Downward infrared broadband flux increased from 100 (clear) to 154 W m^{-2} with variations of +/-100 W m^{-2} in shortwave flux. This cloud band thinned at the end (satellite imagery suggests that it moved and they were along the edge of it toward the end - they were flying fixed points for closest coordination with other planes). Data looked really good.
- UND CITATION: Flew legs along the cloud band at altitudes of 33, 29, 29 and 31K'. Cloud top was above 33K'. Phenomenal optical effects were noted including sun-dogs with rainbow colors and arcs and under-suns with their own sun-dogs. Crystal habits and sizes varied through the cloud giving the impression or organized differences between different parts. Pristine columns up to 700 um in size as well as aggregates and bullet rosettes were observed. Two huge wave features were noted in the stratus undercast at its northwest boundary both going and coming.

Highlights of FIRE Operations:

- Perfect NOAA/AVHRR underflight mission
- Excellent GOES/bidirectional reflectance mission
- THE END OF THE FIRE CIRRUS-II FIELD CAMPAIGN!

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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																									NO OBSERVATIONS
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																									NO OBSERVATIONS
Wisc Vol Image Lidar																									NO OBSERVATIONS
GSFC RAMAN Lidar H																									NO OBSERVATIONS
NOAA CO2 Lidar H		X			X		X	X	X																
NOAA Radar H																									NOT OPERATIONAL
PSU Radar H				X	X	X	X																		
PSU Laser Ceilometer H	X	X	X	X	X	X	X	X	X	X															
PSU 50 MHZ Wind Prof H	X	X	X	X	X	X	X	X	X	X															
PSU/NOAA 50 MHz RASS H	X	X	X	X	X	X	X	X	X	X															
NOAA 405 MHz RASS H																									NOT OPERATIONAL
LaRC Lidar P																									
CSU Wind Prof/RASS P																									
CSU Laser Ceilometer P																									

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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																									
NOAA Sun Photometer H																									
NOAA H20 Photometer																									
NOAA IR Flux Radiom. H																									
NOAA Dobson Ozone H																									
NOAA Surface Ozone H																									
NOAA Trace Gas H																									
PSU μ-wave Radiometer H	X	X	X	X	X	X	X	X	X	X															

PSU Sun Photometer H																								NO OBSERVATIONS
PSU Solar Flux Radiom. H																								NO OBSERVATIONS
PSU IR Flux Radiometers H																								NO OBSERVATIONS
PSU Sky Video H				X	X	X	X																	
Utah IR-Window Radiom. H																								NO OBSERVATIONS
Utah Sky Video H																								NO OBSERVATIONS
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	X	
AFGL Sky Imager H																								NOT OPERATIONAL
Ames Radiometer H																								NOT OPERATIONAL
Denver Solar Radiom. H																								NO OBSERVATIONS
Denver IR-Spectrometers H																								NO OBSERVATIONS
GSFC IR-Spectrometer H																								NO OBSERVATIONS
Wisc. IR-Spectrometer H			X	X	X	X	X	X	X															

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Sonde and Surface Meterology

Sonde + 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																									
WFF Sonde H																									NO LAUNCHES
NCAR Cloud Ice Sonde H																									NO LAUNCHES*
NCAR/CLASS Sonde H	X			X			X*			X*			X*												* DENOTES NOT VERIFIED
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*			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	
CSU Sonde P																									
CSU Sfc Meteor. P																									
Type A NWS Sondes	X			X			X			X			X												
Type B NWS Sondes	X						X						X												
PSU Sfc Meteor H																									NO OBSERVATIONS