CLOUDS AND THE EARTH'S RADIANT ENERGY SYSTEM
CERES
NASA

Fixed-Wing
Airborne
Radiometer

C-FAR

Terra Validation
Instrument Checkout Flight Results
24 March 2000

R.J.Wheeler, E.K. Feldl, M.R. Wilson, G.C. Purgold

CLOUDS AND THE EARTH'S RADIANT ENERGY SYSTEM
CERES
NASA

Fixed-Wing Airborne Radiometer

C-FAR Measurement Complement

Up-Looking Radiometers
FR Spectral Hemispheric 0.4 - 2.20 µm
Eppley PSP 0.3 - 3.0 µm
Eppley PIR 5- 50 µm

Ambient Total Temperature
Ambient Dewpoint
Barometric Pressure

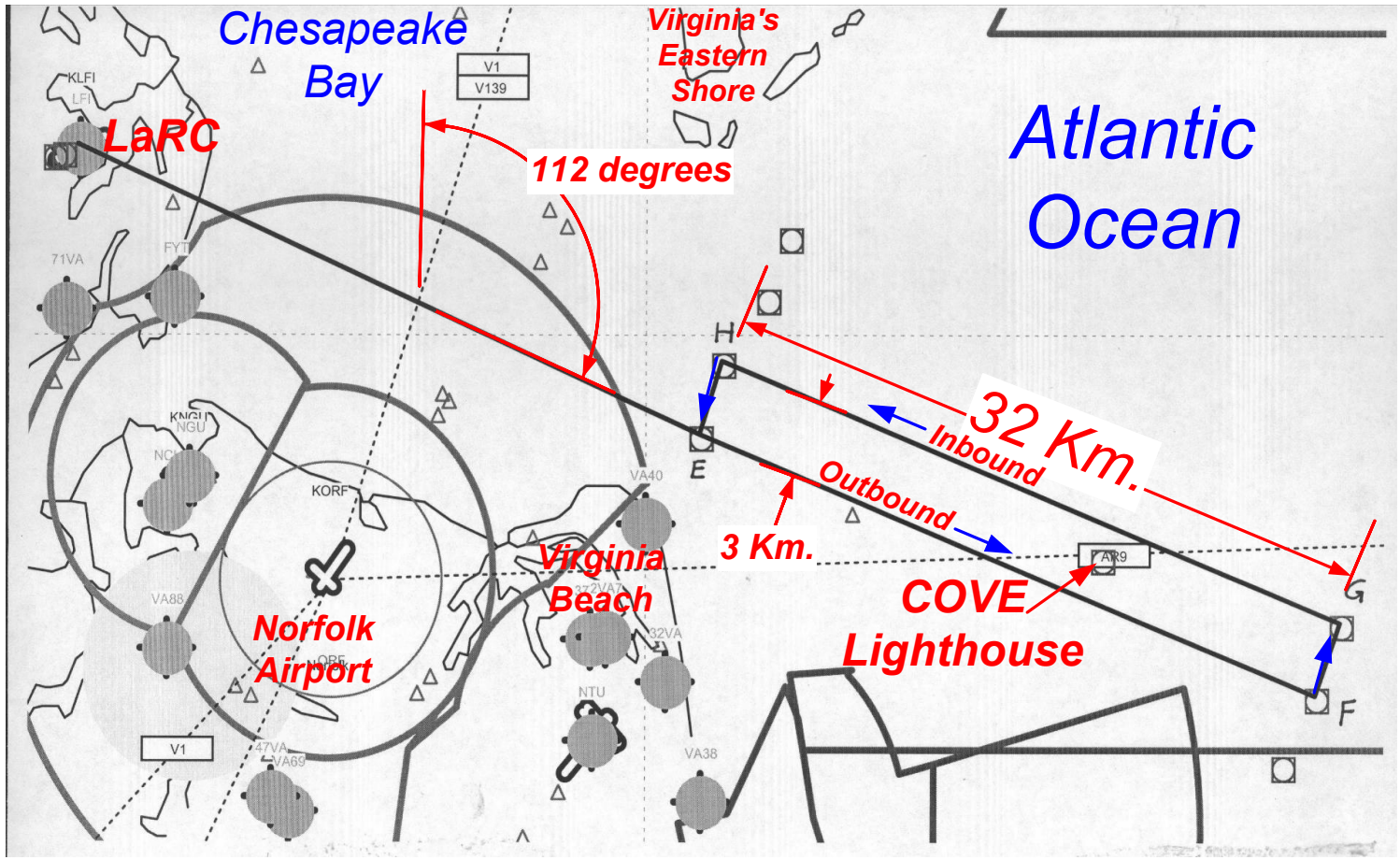
GPS Position & Time
Internal Flight Pattern
Generation & Navigation
Gyro Attitude and Heading

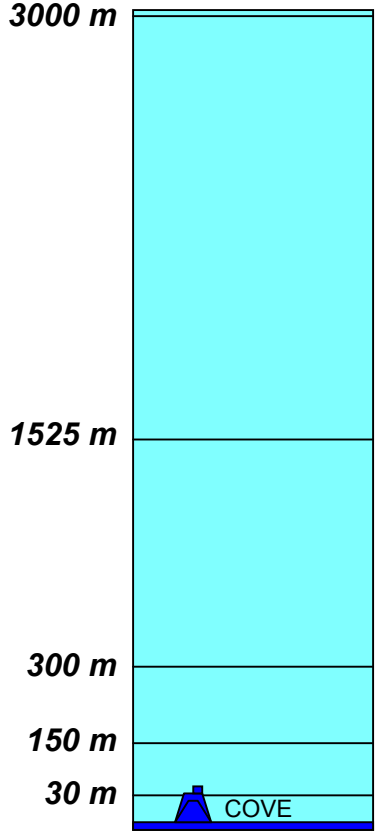
Down-Looking Radiometers
FR Spectral Hemispheric 0.4 - 2.20 µm
Eppley PSP 0.3 - 3.0 µm
Eppley PIR 5- 50 µm
Narrow FOV Spectral Directional Radiance
Scanner 0.35 - 2.5 µm (October 2000)

Fixed-Wing Airborne Radiometer

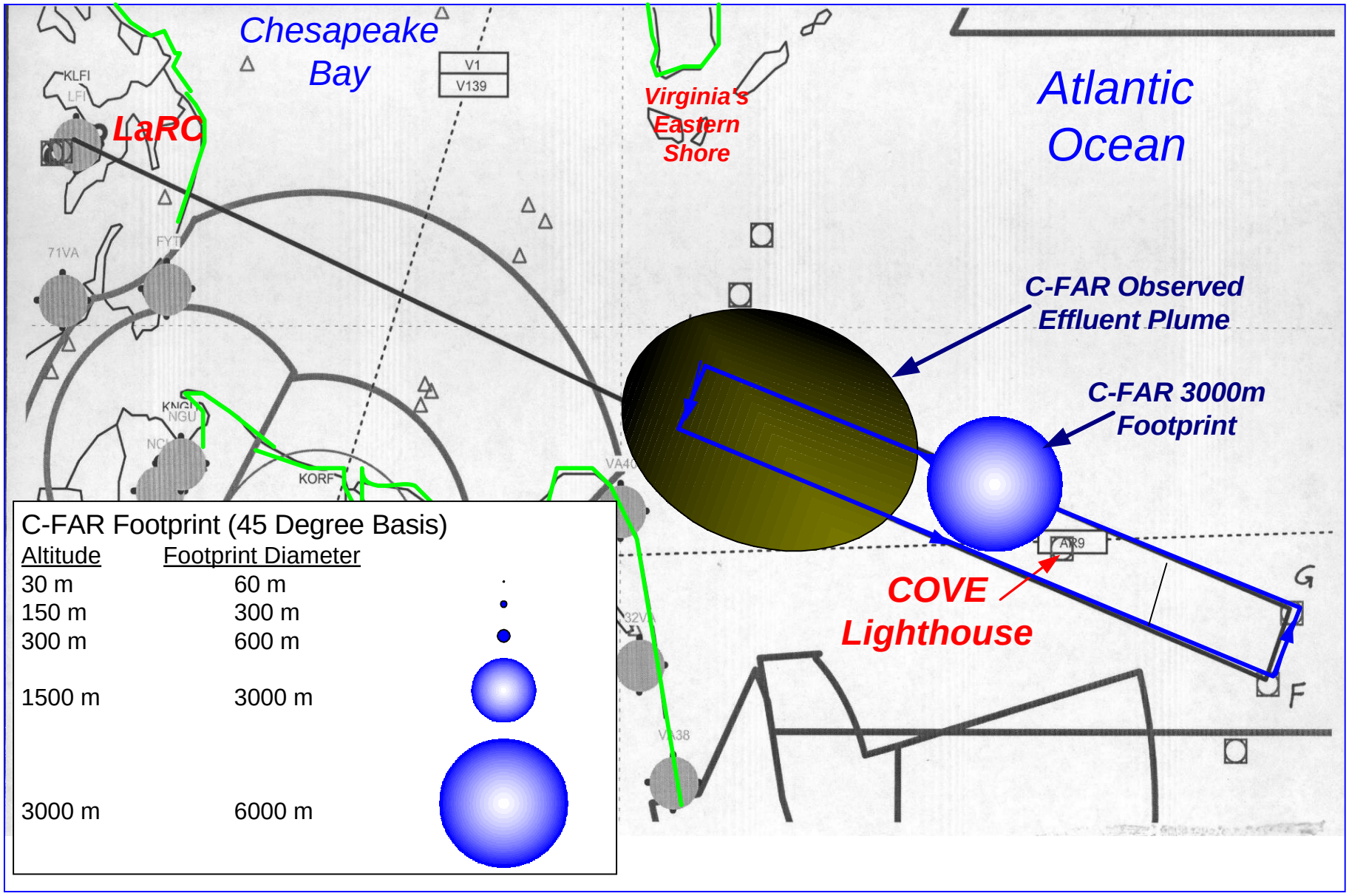
The C-FAR Clear-Sky Terra Coincident Ocean Validation Flight Profile.

- ***Five complete patterns from 30 to 3,000 m MSL.***
- ***CERES Ocean Validation Platform Coincident Measurements.***
- ***Inital Data Flights Conducted 8 & 24 March 2000.***



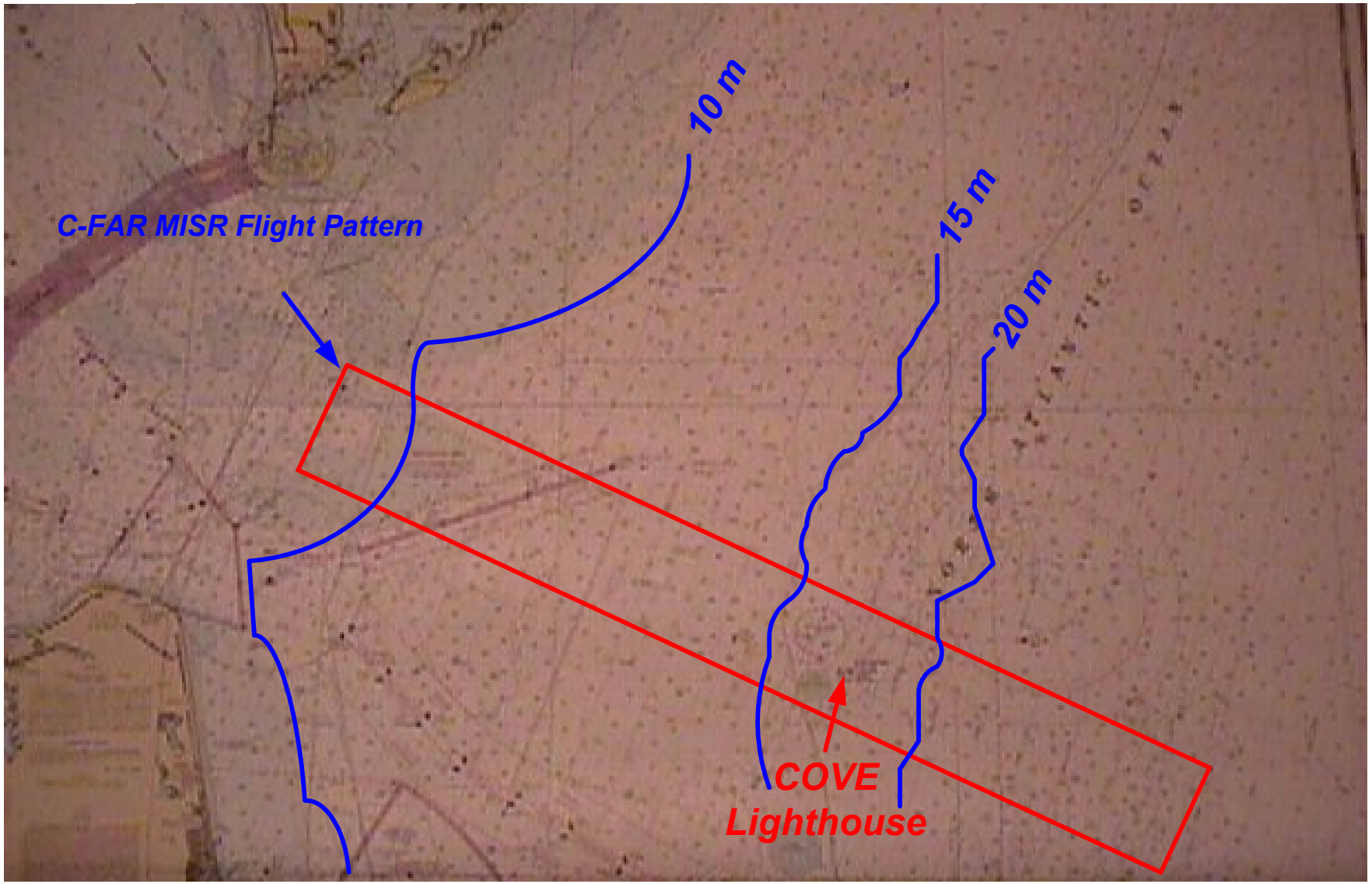


Terra / MISR Coincident Validation Flight
24 March 2000

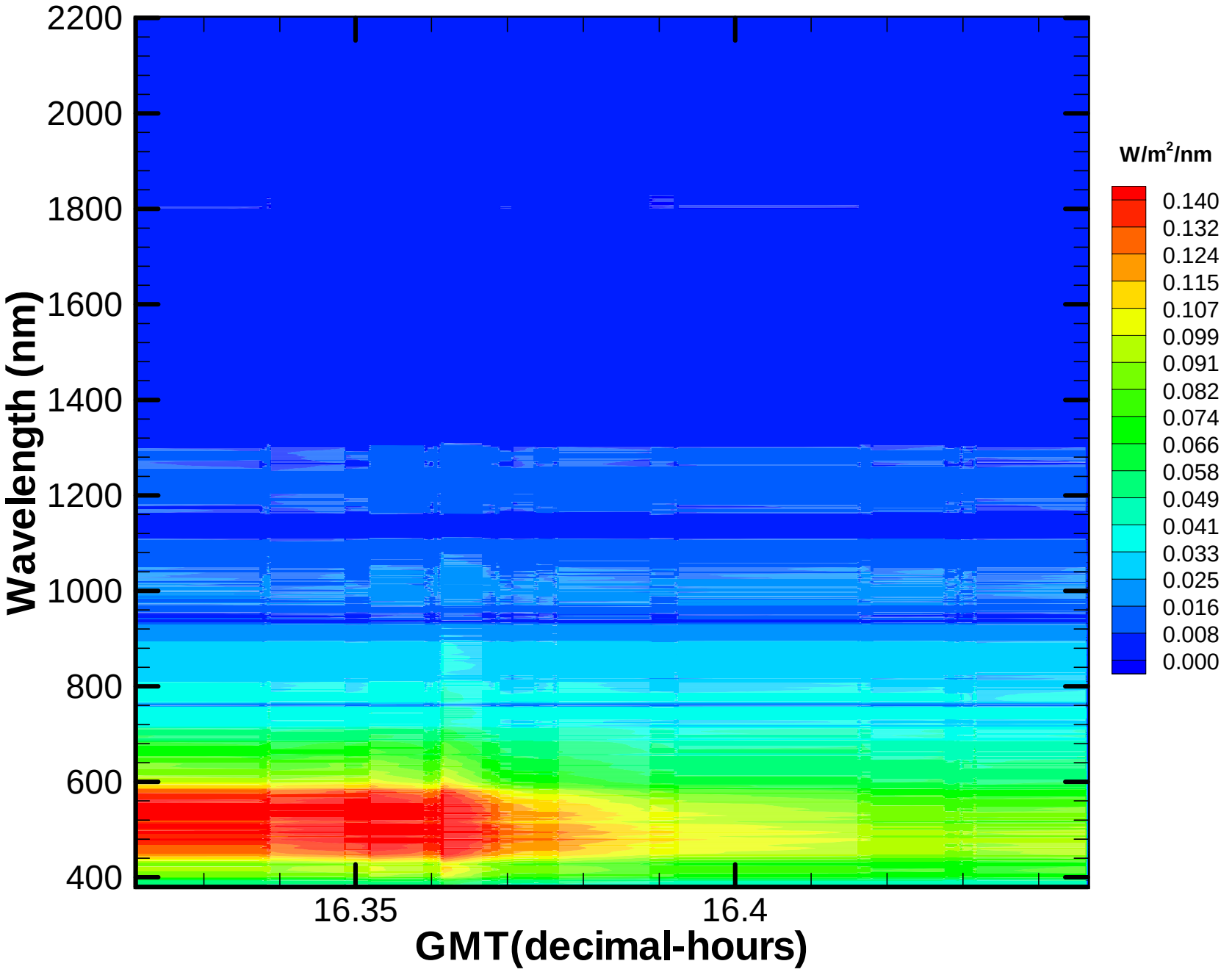


COVE Region Soundings

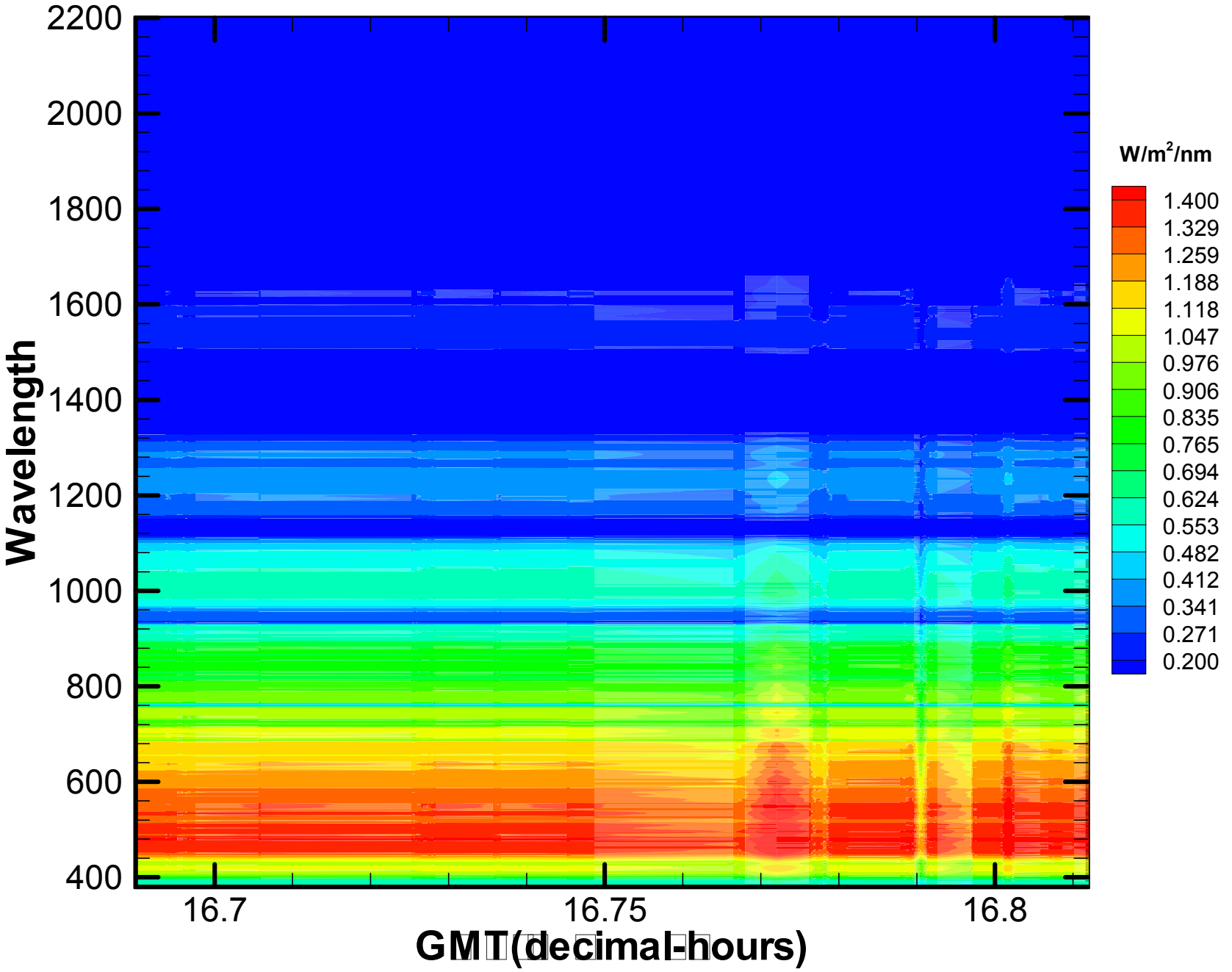
Mean Low Tide Depths



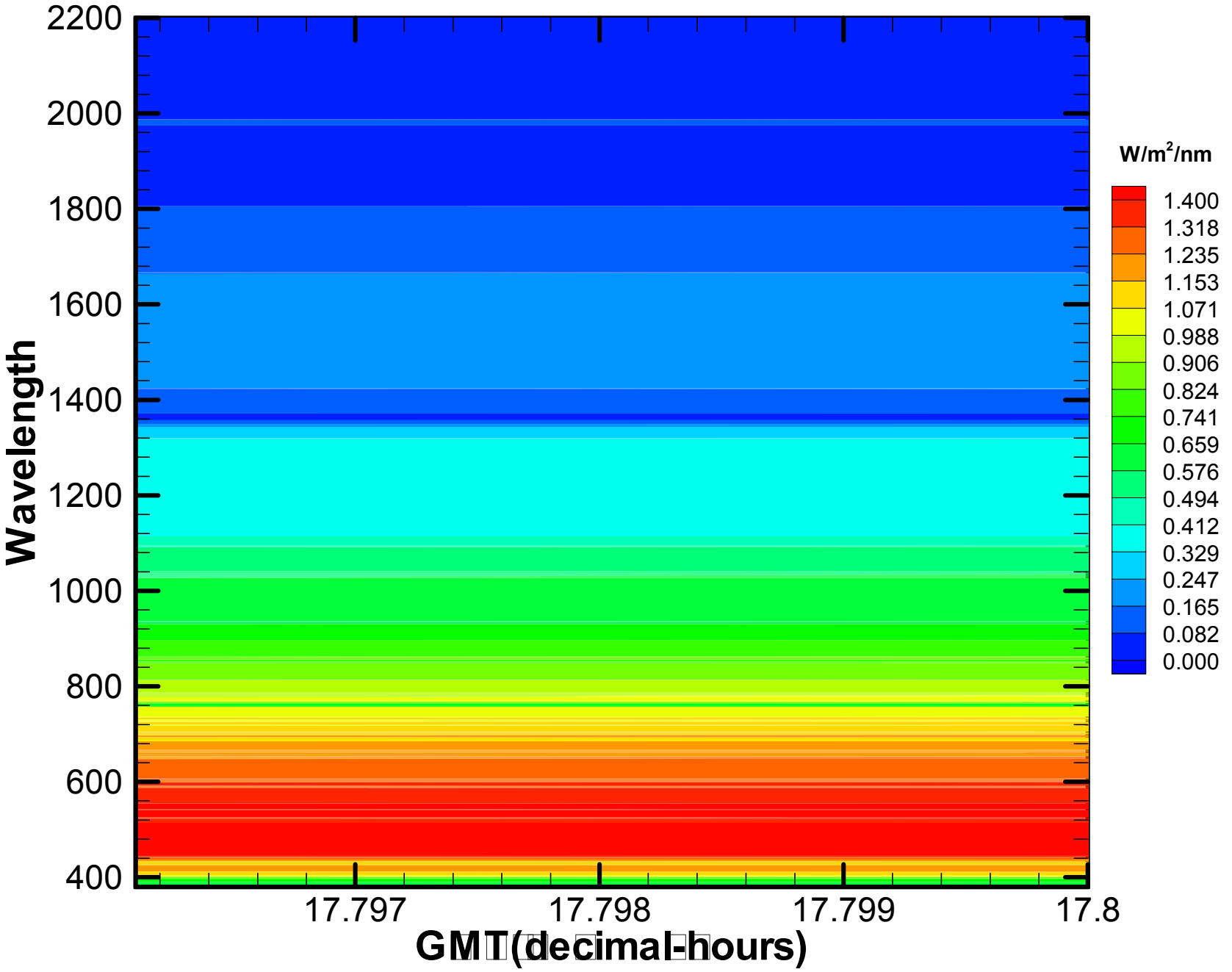
CFAR - Upwelling Spectroradiometer - Full Range
MISR Overflight Coincident Data
24 March 2000 (Day 084)
150 m MSL, Outbound Leg

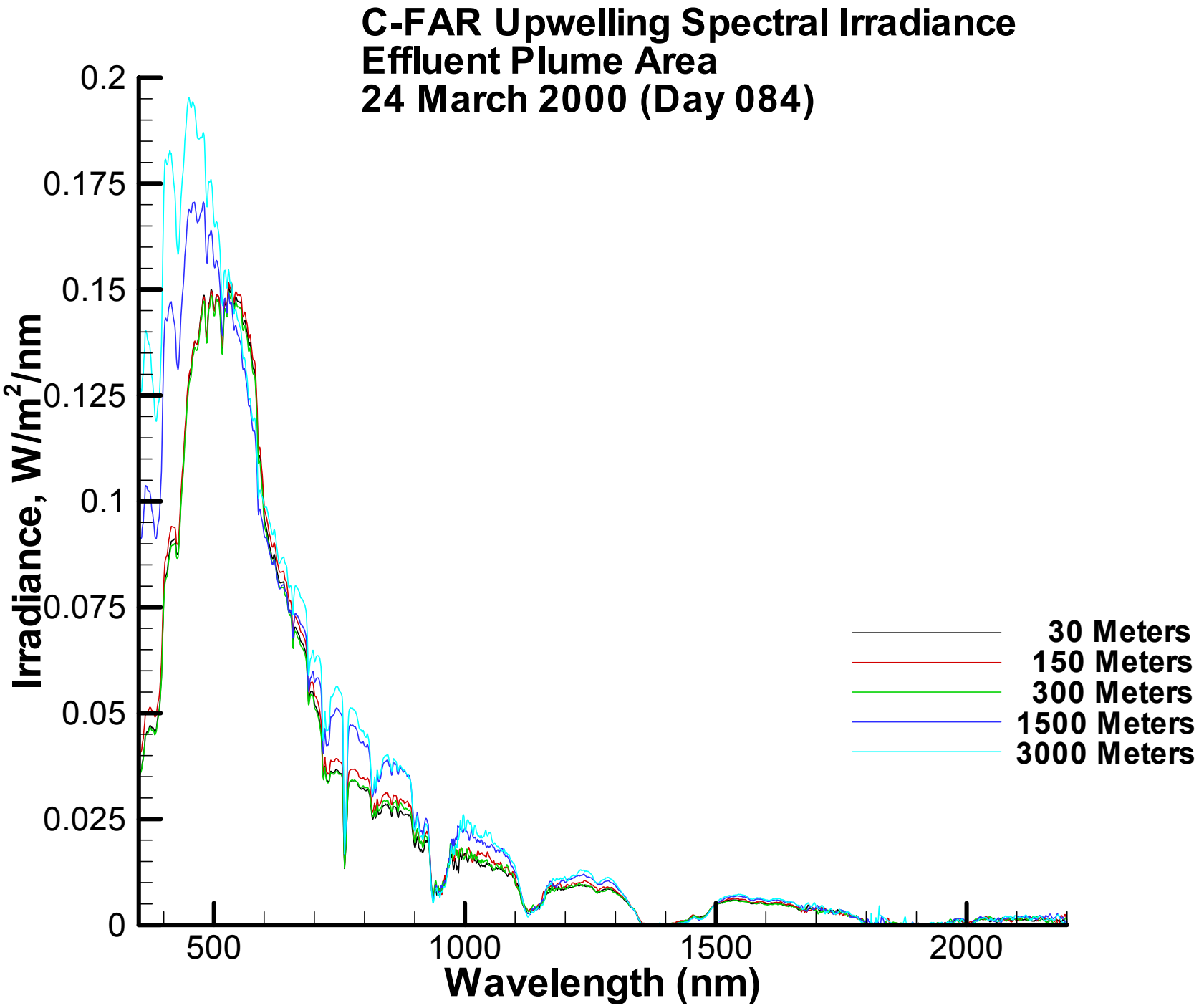


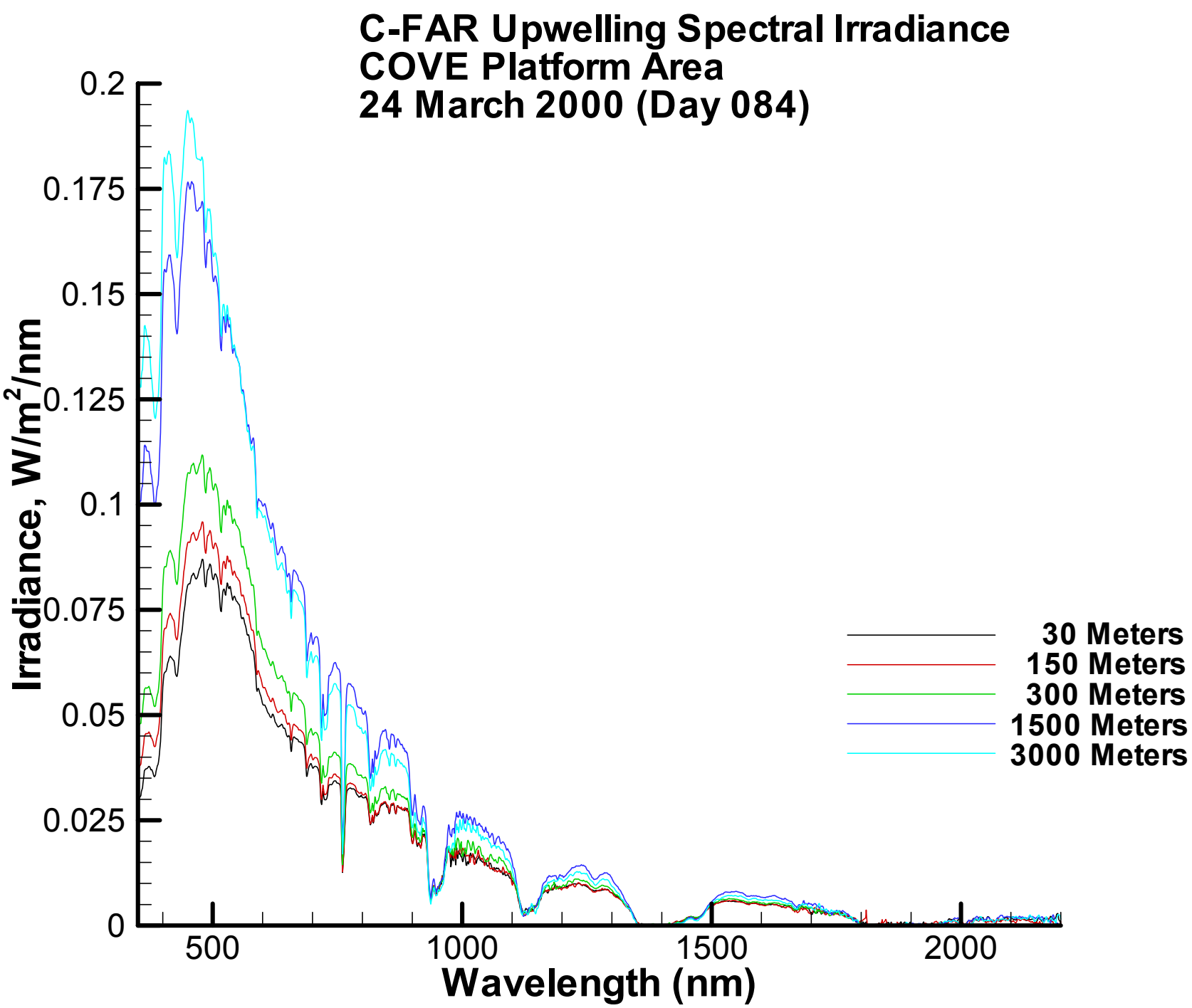
CFAR - Downwelling Spectral Radiometer -Full Range
MISR Overflight Coincident Data
24 March 2000 (Day 084)
30 Meters Altitude, Outbound Leg

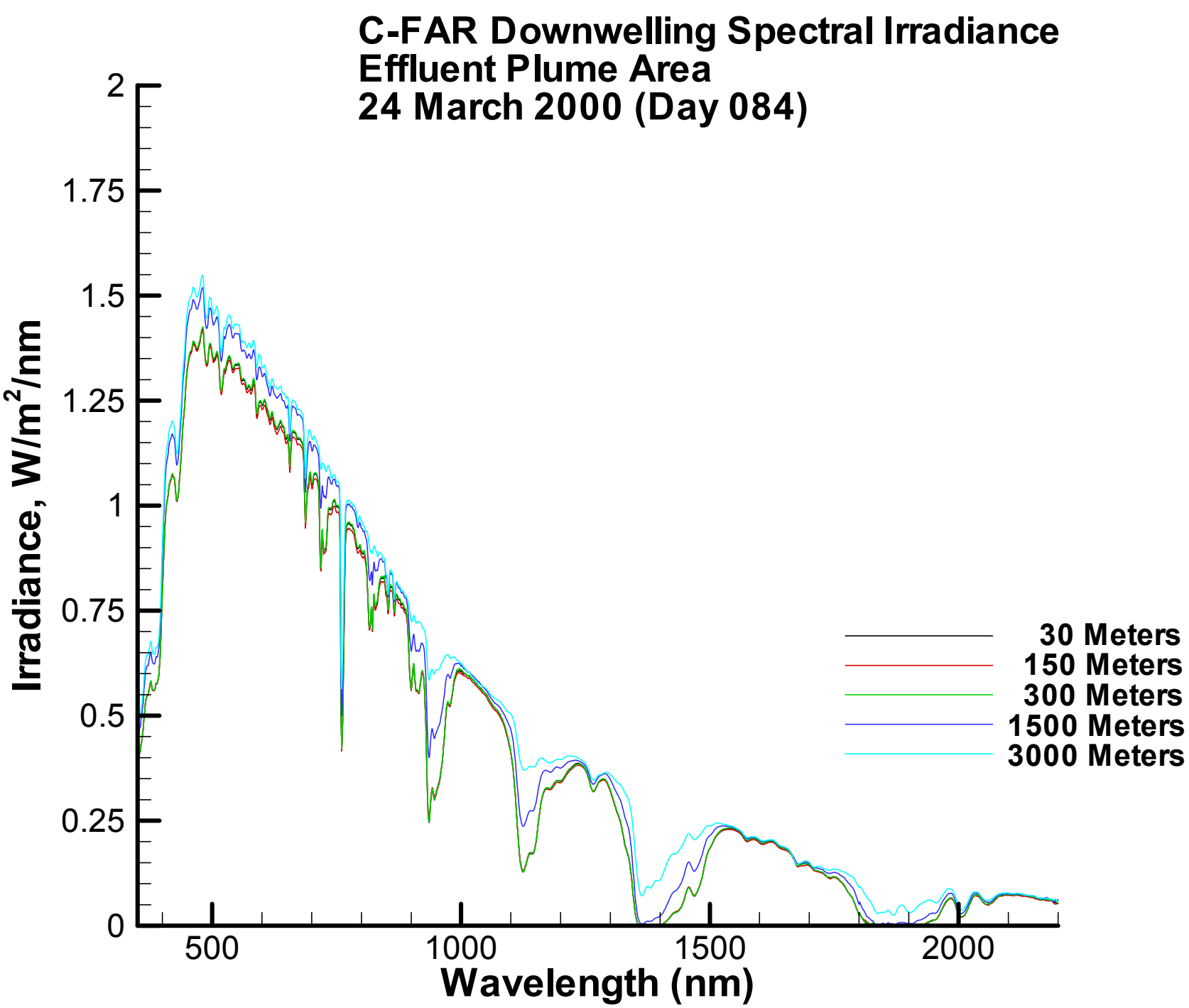


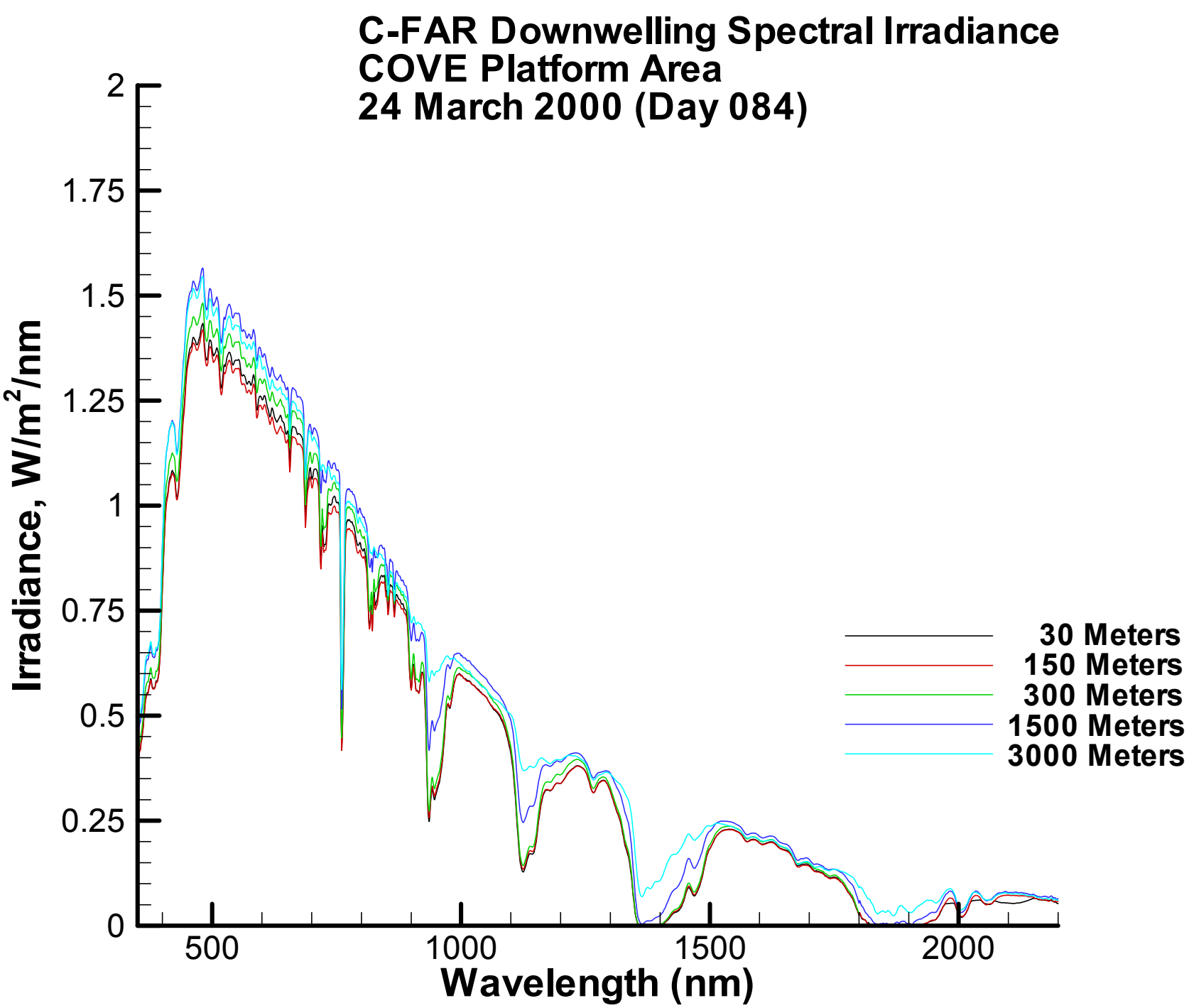
CFAR - Downwelling Spectral Radiometer -Full Range
MISR Overflight Coincident Data
24 March 2000 (Day 084)
3000 Meters altitude, Outbound Leg

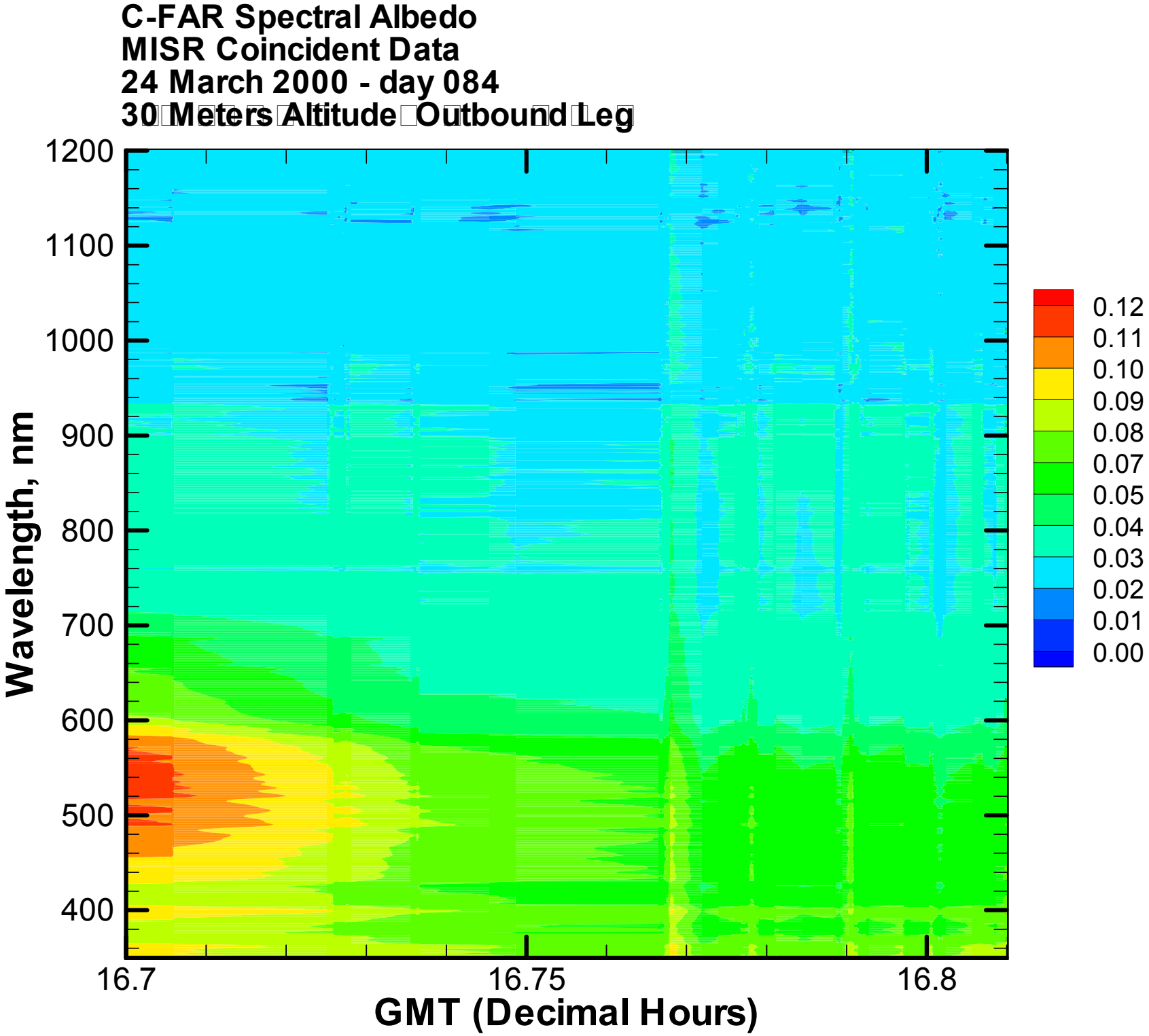


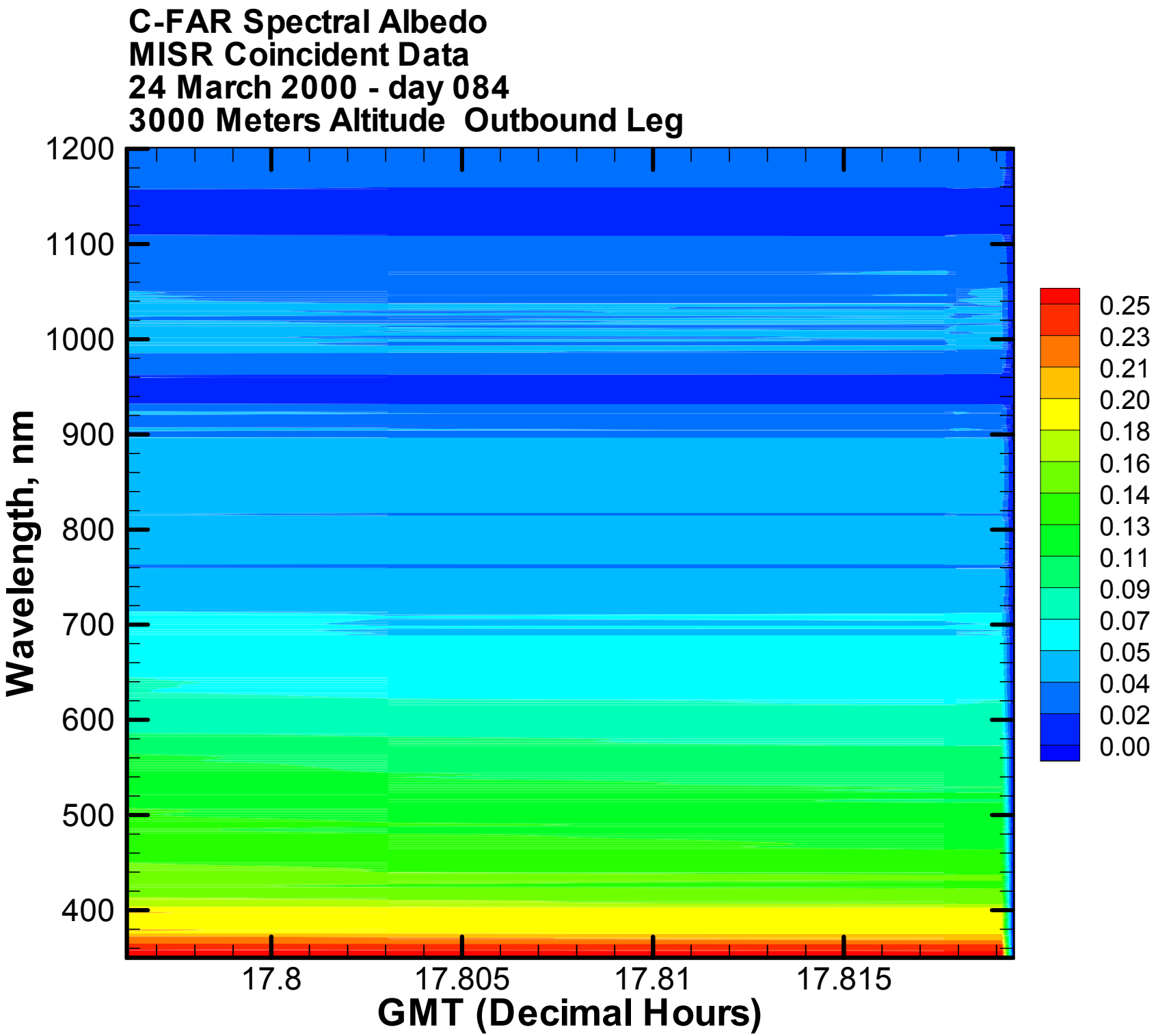

C-FAR Upwelling Spectral Irradiance
Effluent Plume Area
24 March 2000 (Day 084)
Irradiance, W/m²/nm
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
500
1000
1500
2000
Wavelength (nm)
30 Meters
150 Meters
300 Meters
1500 Meters
3000 Meters


C-FAR Upwelling Spectral Irradiance
COVE Platform Area
24 March 2000 (Day 084)
Irradiance, W/m2/nm
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
500
1000
1500
2000
Wavelength (nm)
30 Meters
150 Meters
300 Meters
1500 Meters
3000 Meters

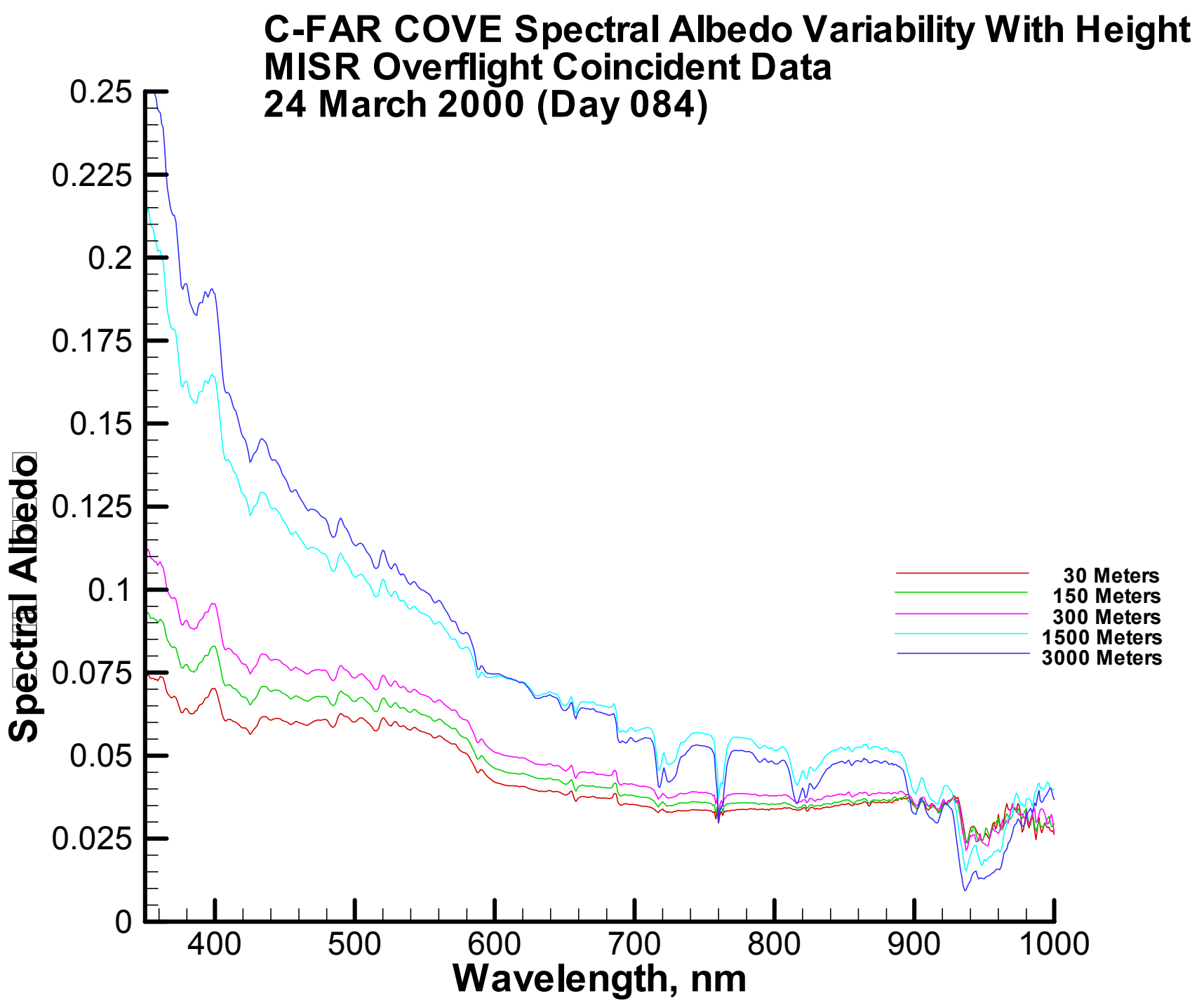

C-FAR Downwelling Spectral Irradiance
Effluent Plume Area
24 March 2000 (Day 084)
Irradiance, W/m2/nm
Wavelength (nm)
0
0.25
0.5
0.75
1
1.25
1.5
1.75
2
500
1000
1500
2000
30 Meters
150 Meters
300 Meters
1500 Meters
3000 Meters

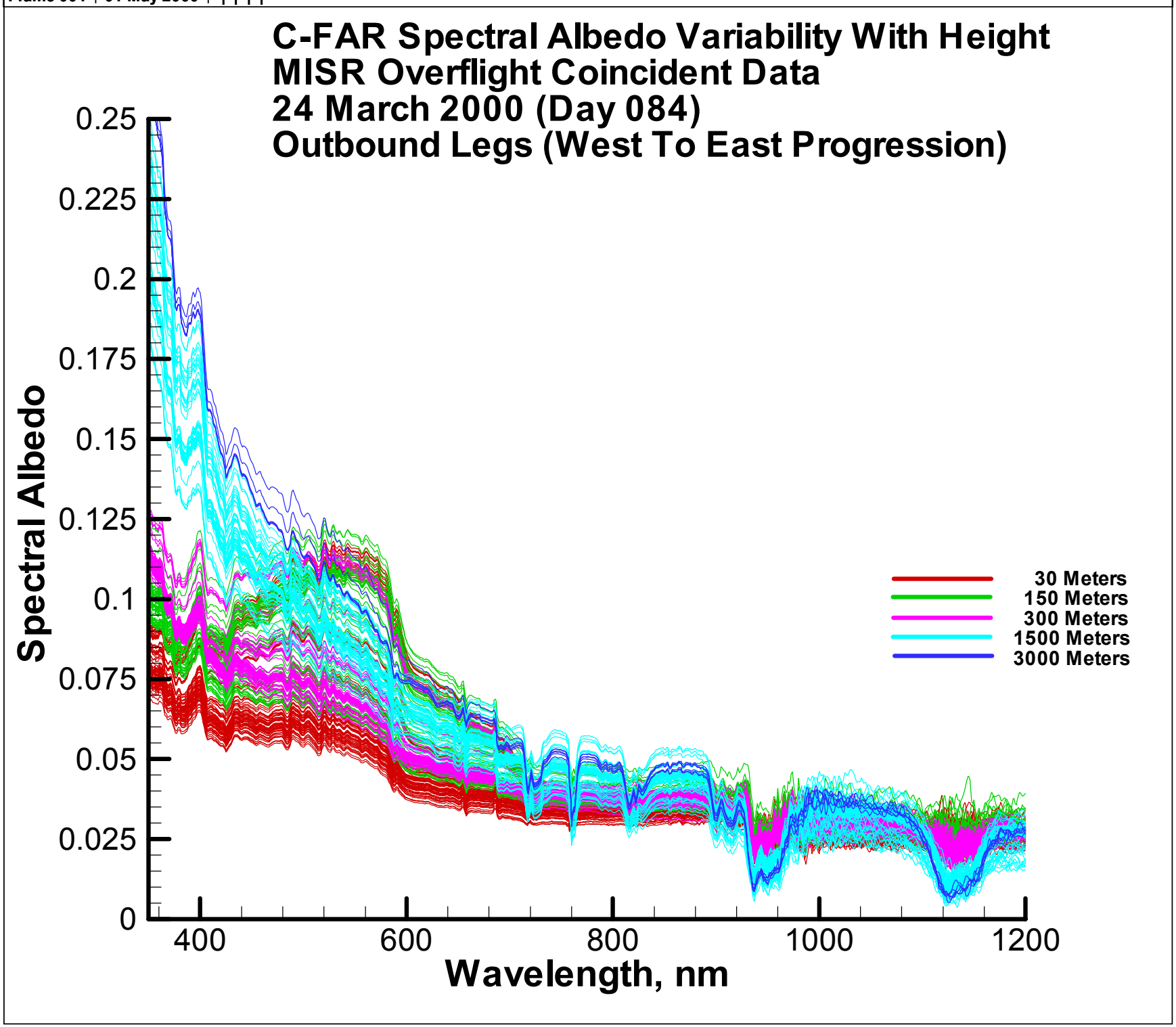

C-FAR Downwelling Spectral Irradiance
COVE Platform Area
24 March 2000 (Day 084)
Irradiance, W/m2/nm
Wavelength (nm)
0
0.25
0.5
0.75
1
1.25
1.5
1.75
2
500
1000
1500
2000
30 Meters
150 Meters
300 Meters
1500 Meters
3000 Meters


C-FAR Spectral Albedo
MISR Coincident Data
24 March 2000 - day 084
30 Meters Altitude Outbound Leg
1200
1100
1000
900
800
700
600
500
400
Wavelength, nm
16.7
16.75
16.8
GMT (Decimal Hours)
0.12
0.11
0.10
0.09
0.08
0.07
0.05
0.04
0.03
0.02
0.01
0.00


C-FAR Spectral Albedo
MISR Coincident Data
24 March 2000 - day 084
3000 Meters Altitude Outbound Leg
Wavelength, nm
1200
1100
1000
900
800
700
600
500
400
17.8
17.805
17.81
17.815
GMT (Decimal Hours)
0.25
0.23
0.21
0.20
0.18
0.16
0.14
0.13
0.11
0.09
0.07
0.05
0.04
0.02
0.00

Frame 001 | 27 Apr 2000 | | | |




C-FAR Spectral Albedo Variability With Height
MISR Overflight Coincident Data
24 March 2000 (Day 084)
Outbound Legs (West To East Progression)
Spectral Albedo
0.25
0.225
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
400
600
800
1000
1200
Wavelength, nm
30 Meters
150 Meters
300 Meters
1500 Meters
3000 Meters

Fixed-Wing Airborne Radiometer

C-FAR Schedule

April - May 2000 - Broadband Pyranometer & Pyrgeometer Enhancements, Spectroradiometer Recertification

June 2000 - Resumption of Terra Coincident COVE and Hogg Island Flights 2 - 4 Per Month on Optimum Overpass Dates.

August 2000 - Begin Spectral Radiance Scanner Integration

October 2000 - Spectral Radiance Scanner Local Instrument Checkout Flights (COVE / Hogg Island)

November / December 2000 - Yuma Desert BRDF

Spring 2001 - ARM CART (TBD)

C-FAR On The Web at: www-svg.larc.nasa.gov/~Ceres