VALIDATION FIELD EXPERIMENT

WHERE: MOBY SITE (HAWAIIAN ISLANDS)

WHEN: JULY OR NOVEMBER 1997

SHIPS: TBD

AIRCRAFT: NASA **C-130Q**

AIRCRAFT VALIDATION UTILITY

1. INTRA-PIXEL VARIABILITY

2. EXTEND BUOY AND SHIP MEASUREMENTS OVER
   SATELLITE IMAGE

GENERAL FLIGHT PLAN

1. TRANSIT: WALLOPS + MOFFETT FIELD, CA + HONOLULU

2. OPERATE FROM: NAVAL AIR STATION, BARBER'S POINT, HONOLULU
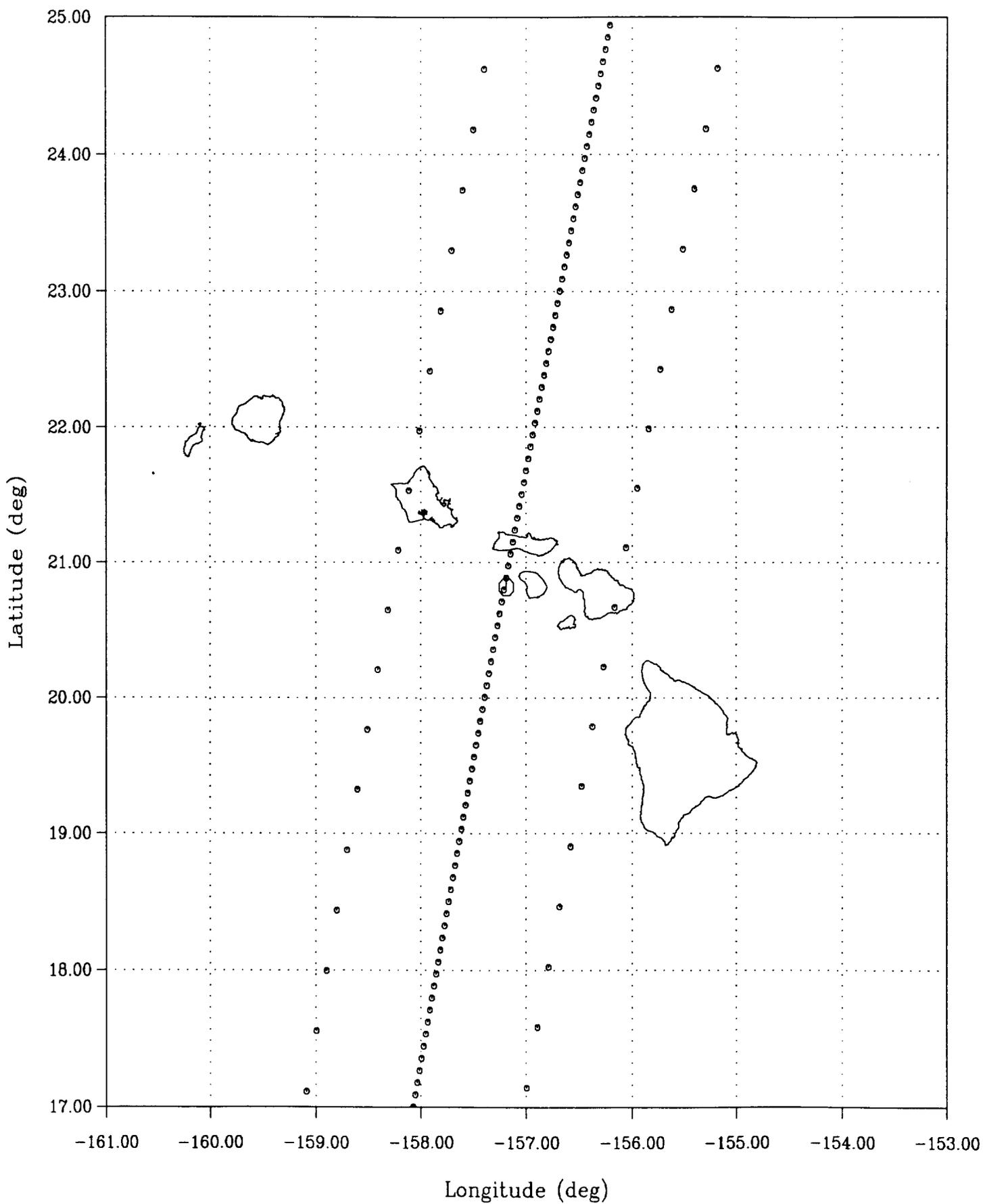
   ●FLIGHT ALTITUDE: 152 METERS (500 FEET)

POTENTIAL MISSIONS-OF-OPPORTUNITY

-CALCOFI (SCHEDULE TBD)

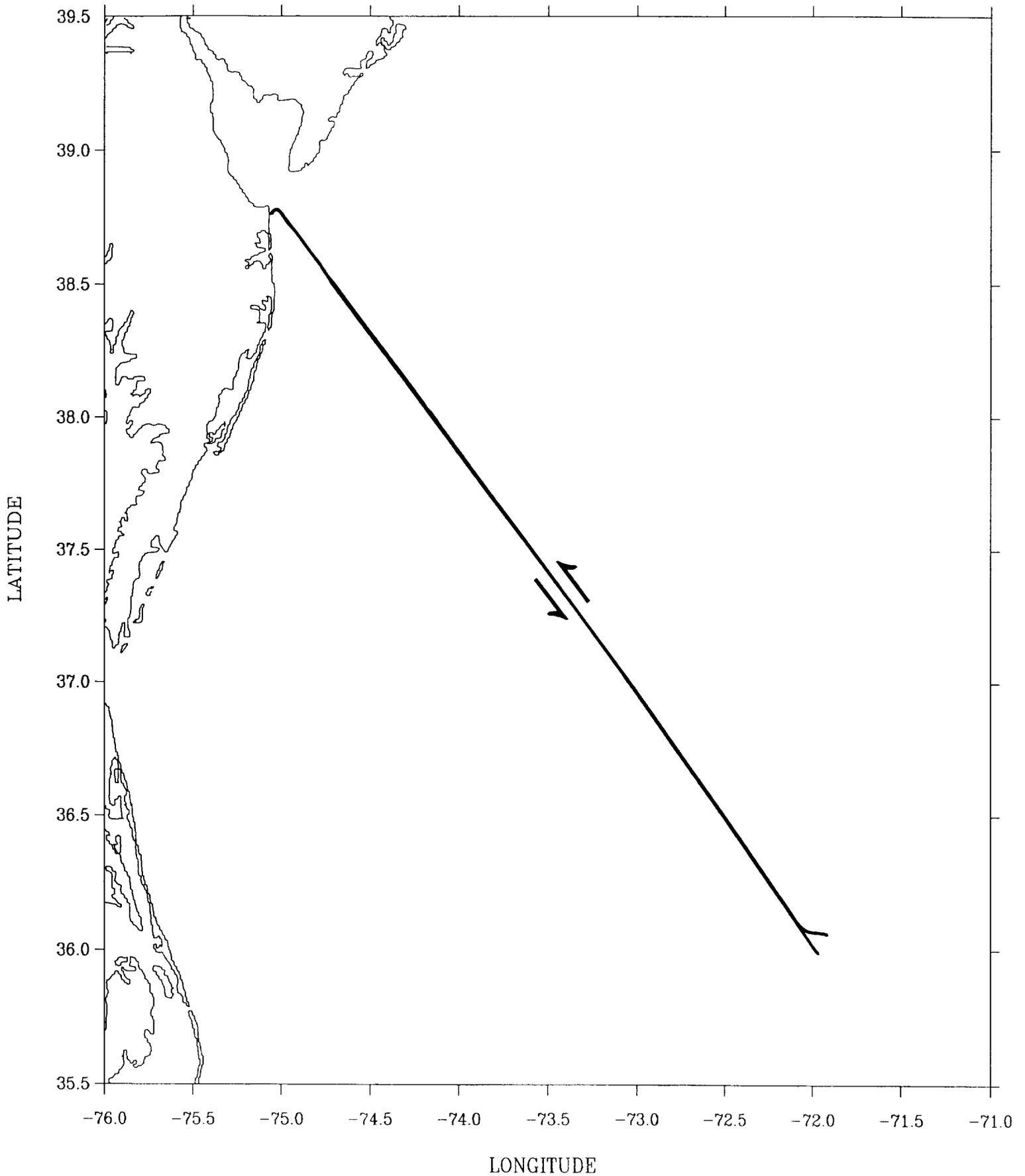-GREG MITCHELL, OTHERS

MISSION FLIGHT TRACK LINES

MOBY CAL/VAL

AIRCRAFT DATA

1. CHLOROPHYLL FLUORESCENCE 683NM
-532NM LASER-INDUCED
-645NM WATER RAMAN NORMALIZED
-CHLOROPHYLL MG/M^3

2. CDOM FLUORESCENCE 450NM
-355NM LASER-INDUCED
-402NM WATER RAMAN NORMALIZED
-CDOM ABSORPTION COEFFICIENT

3. PHYCOERYTHRIN FLUORESCENCE
-560NM PHYCOUROBILIN-RICH
(PUB-RICH, -DEEP OCEAN)
-590NM PHYCOERYTHROBILIN-RICH
(PEB-RICH, -COASTAL-SHELF)

4. SEA SURFACE TEMPERATURE
-HEIMANN INFRARED RADIOMETER

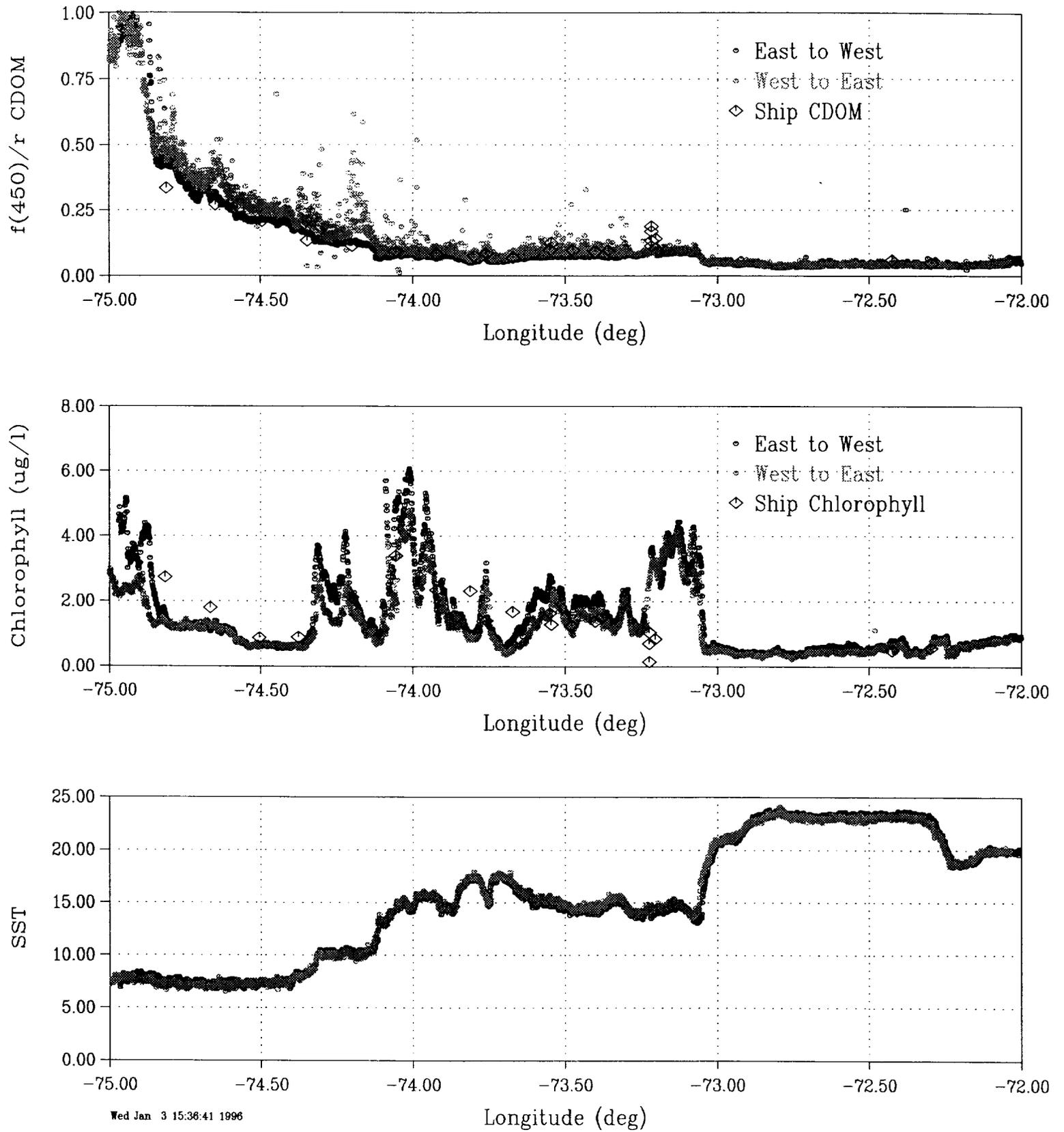5. AXBT'S (AS NEEDED)

EXAMPLES OF DATA

1. MAJOR DIFFERENCE IN CHLOROPHYLL OVER 3 DAYS

2. SHIP SAMPLING SPANS -2 DAYS

3. AIRCRAFT -2 HOURS
   HIGHLY REPRODUCIBLE OUTBOUND-TO-INBOUND

4. CONTRAST CDOM ABSORPTION TO CHLOROPHYLL ABSORPTION

5. SIMULATES MANY TEST SITES (COASTAL, SHELF, SLOPE, GS, SARGASSO)

6. SST FOR INTERPRETATION

7. LASER SPECTROMETER UPGRADE IN 1995: PUB-RICH AND PEB-RICH

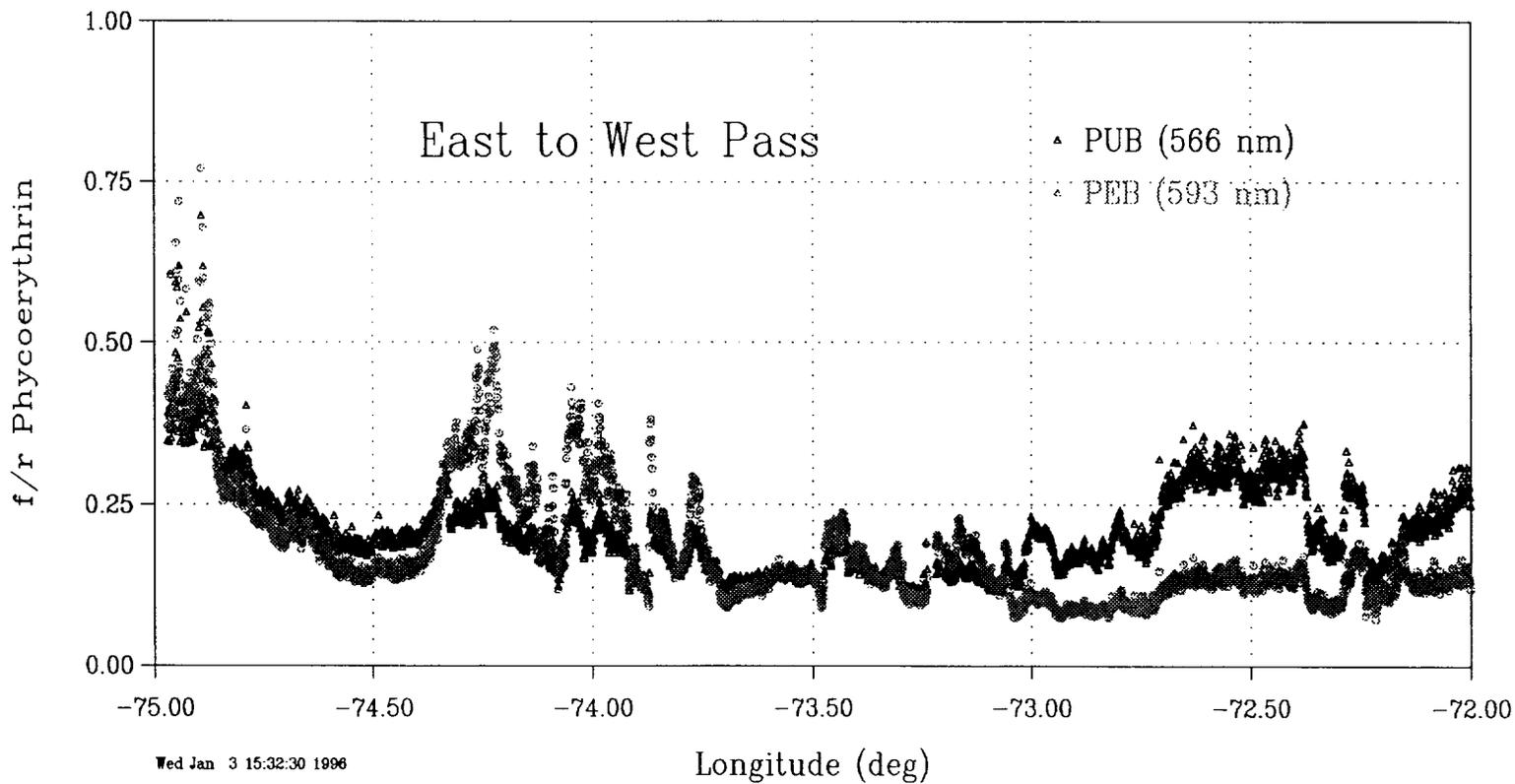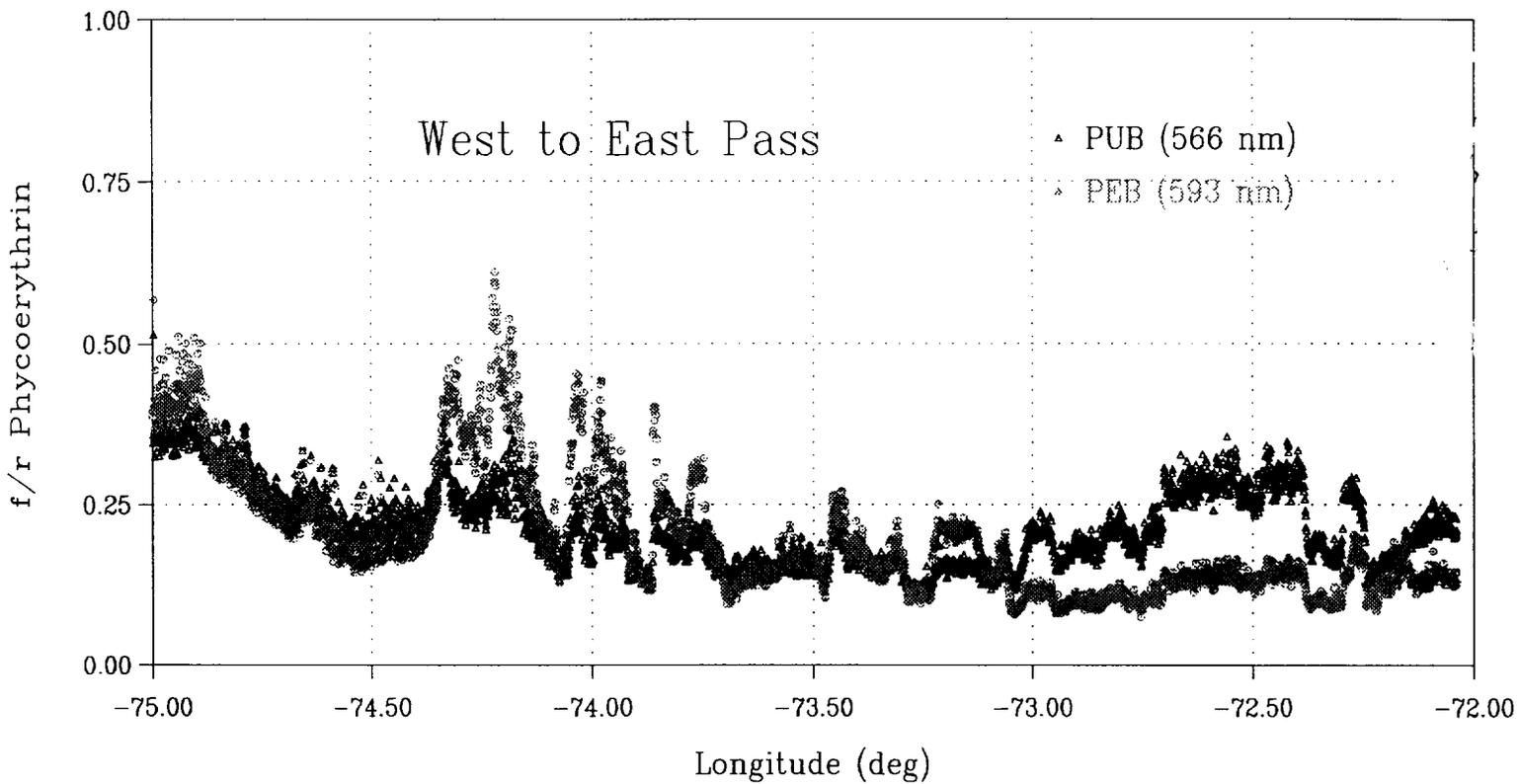SeaWiFS/MODIS -- 31MAR95

Figure 1

31-MAR-95

Figure 2

Wed Jan 3 15:36:41 1996

31-MAR-95

West to East Pass

▲ PUB (566 nm)
▵ PEB (593 nm)

East to West Pass

▲ PUB (566 nm)
▵ PEB (593 nm)

Wed Jan 3 15:32:30 1996

Longitude (deg)
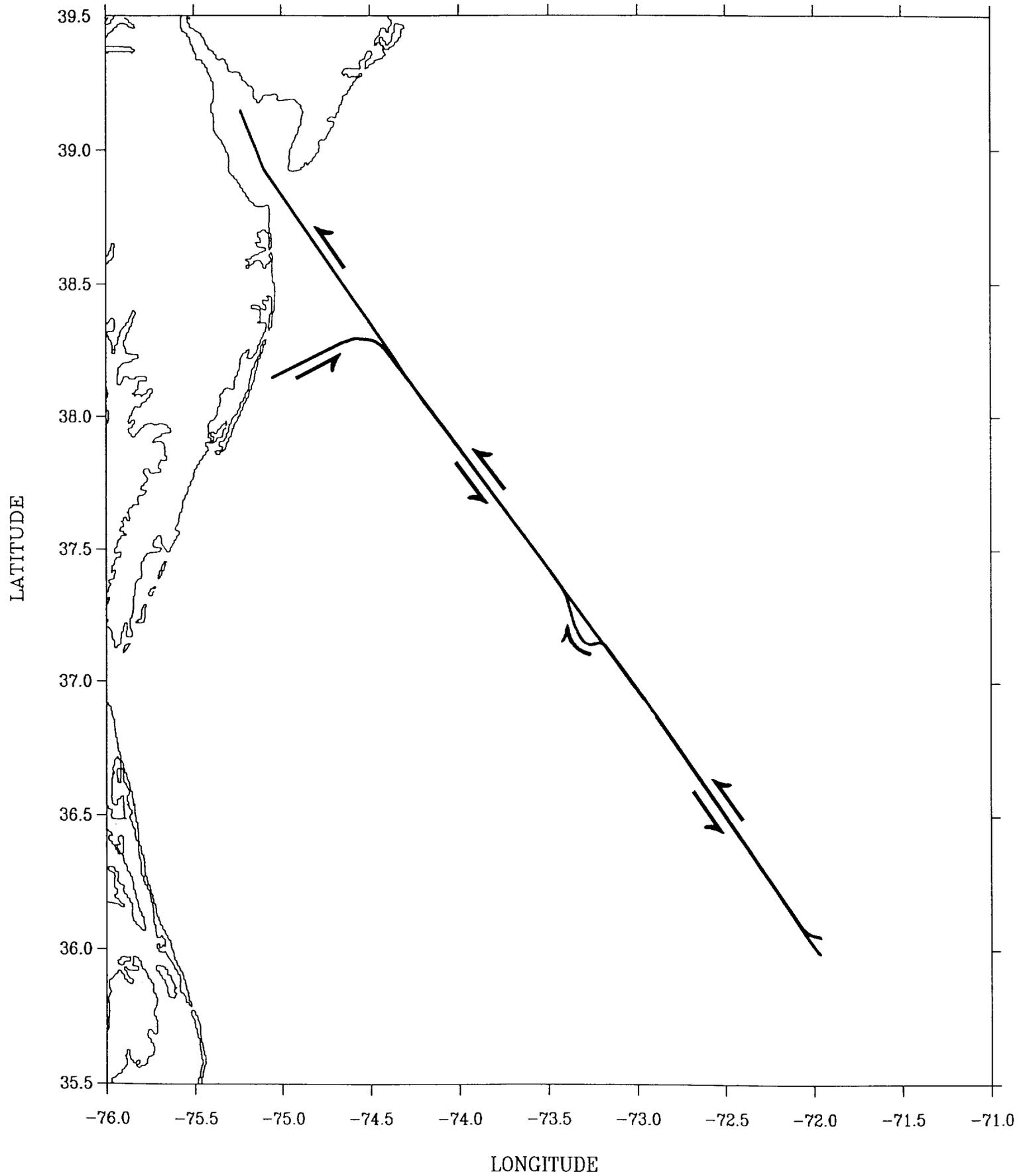
Figure 3
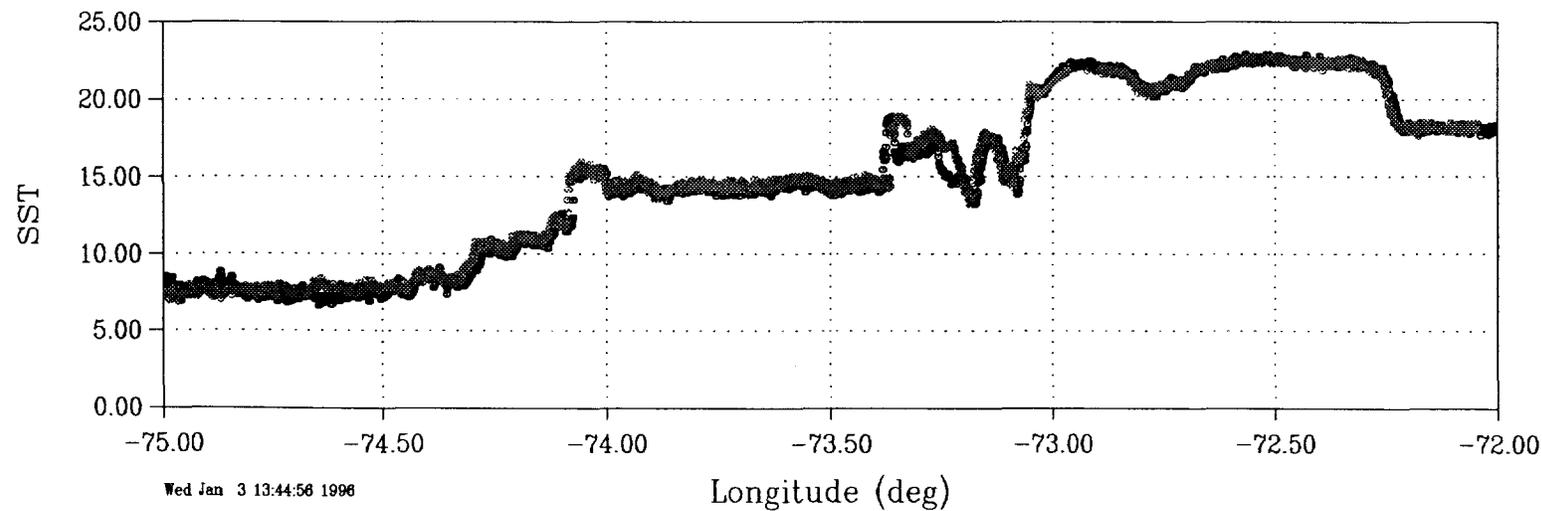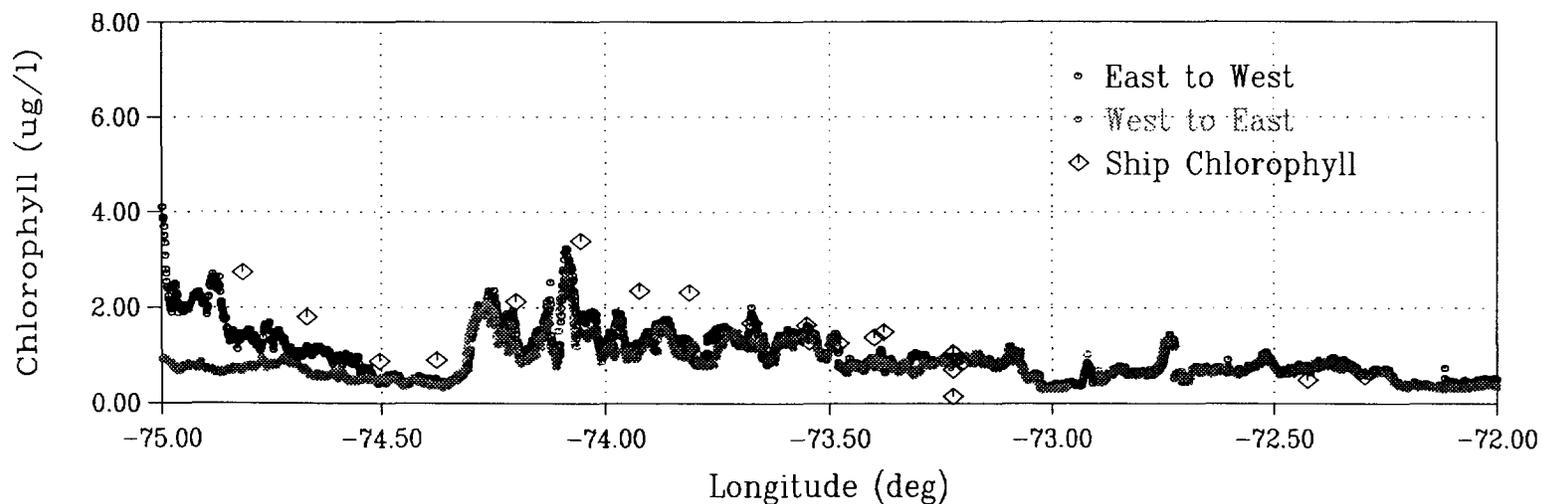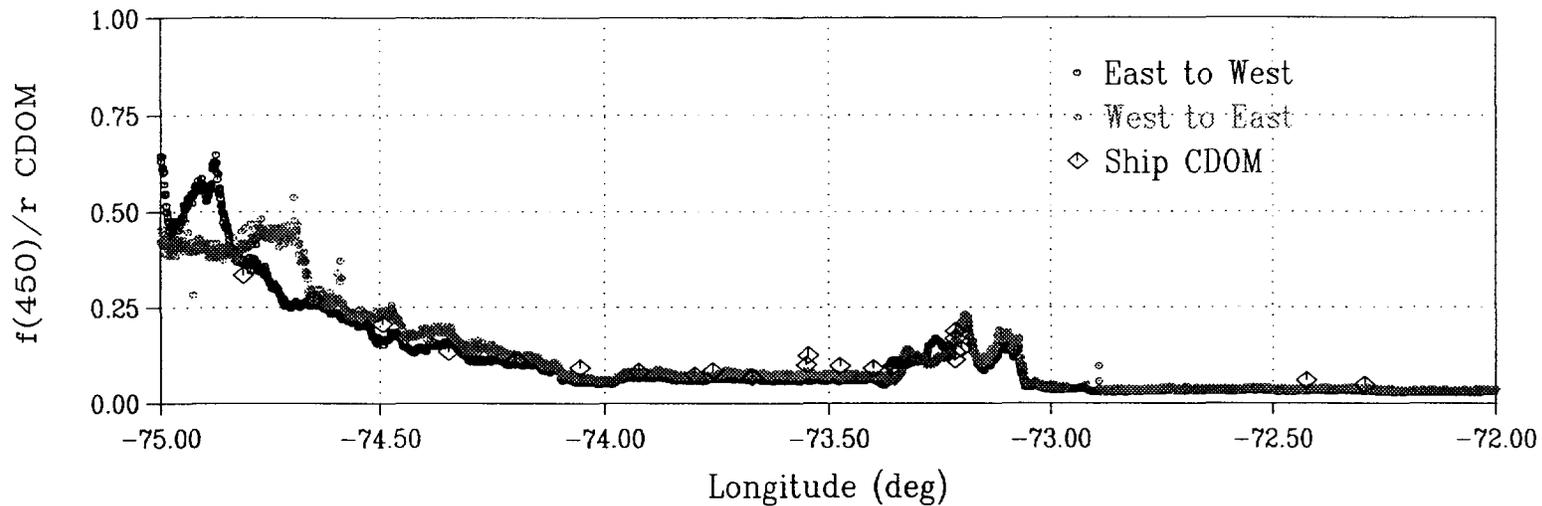
SeaWiFS/MODIS Mission — 03 April 1995

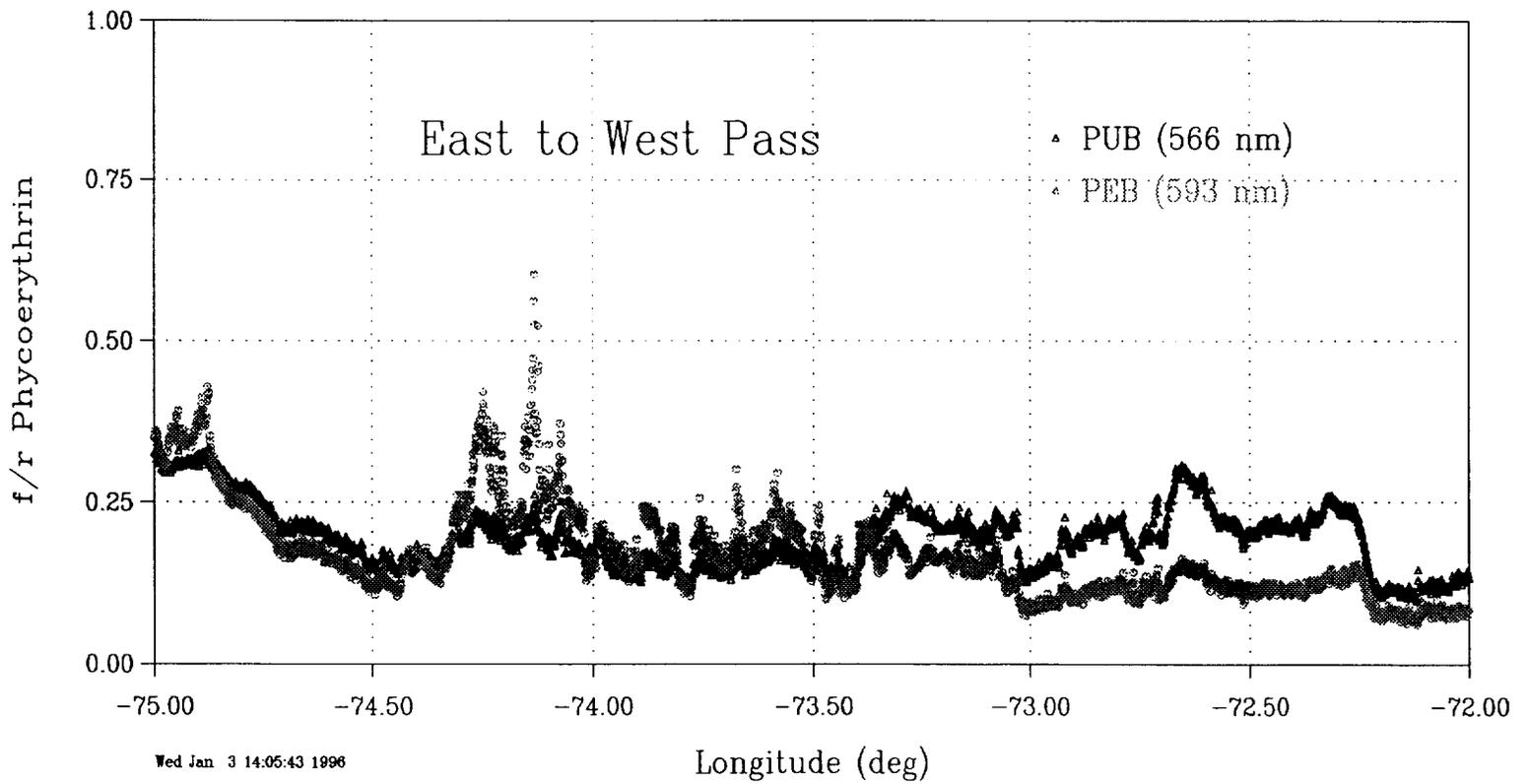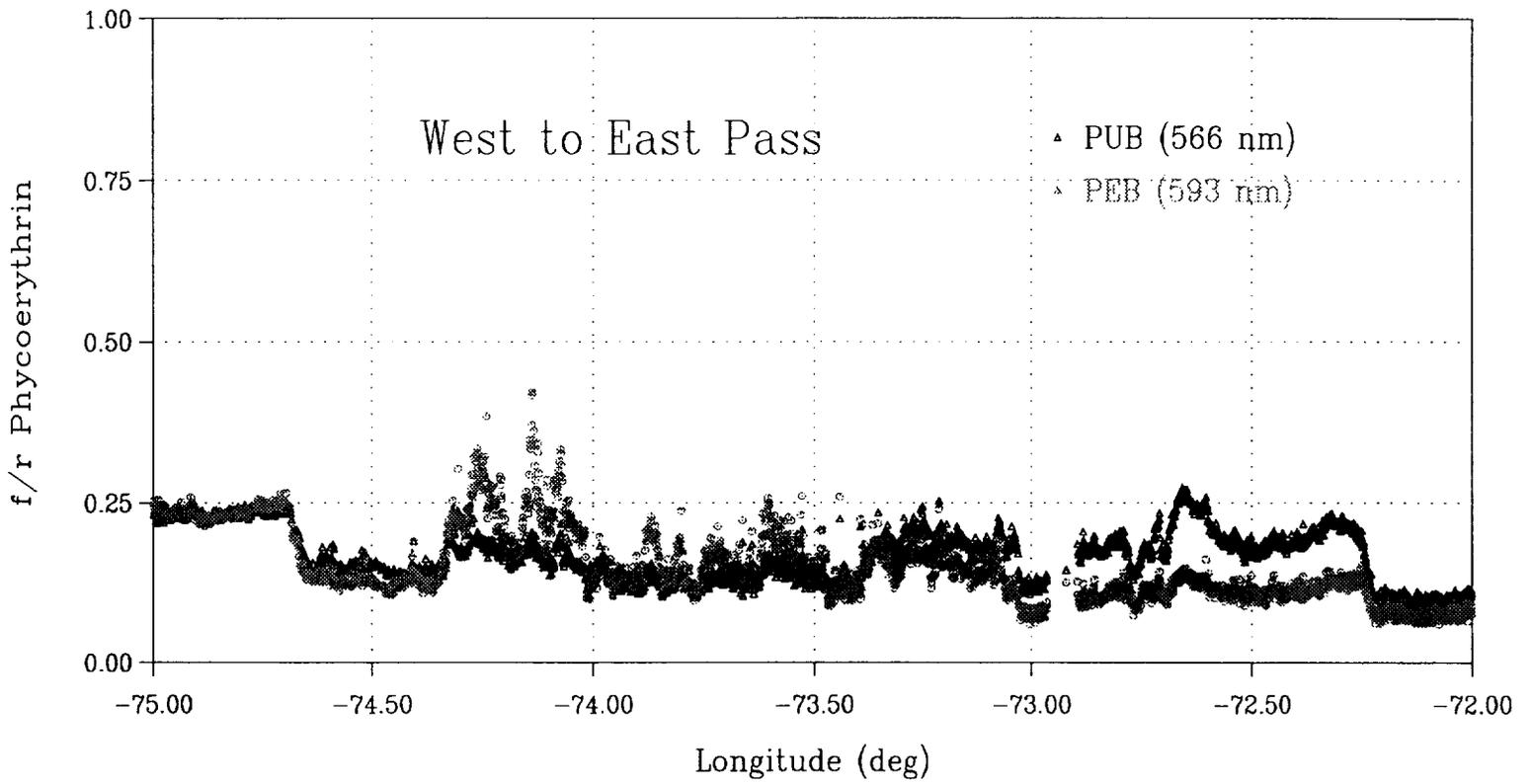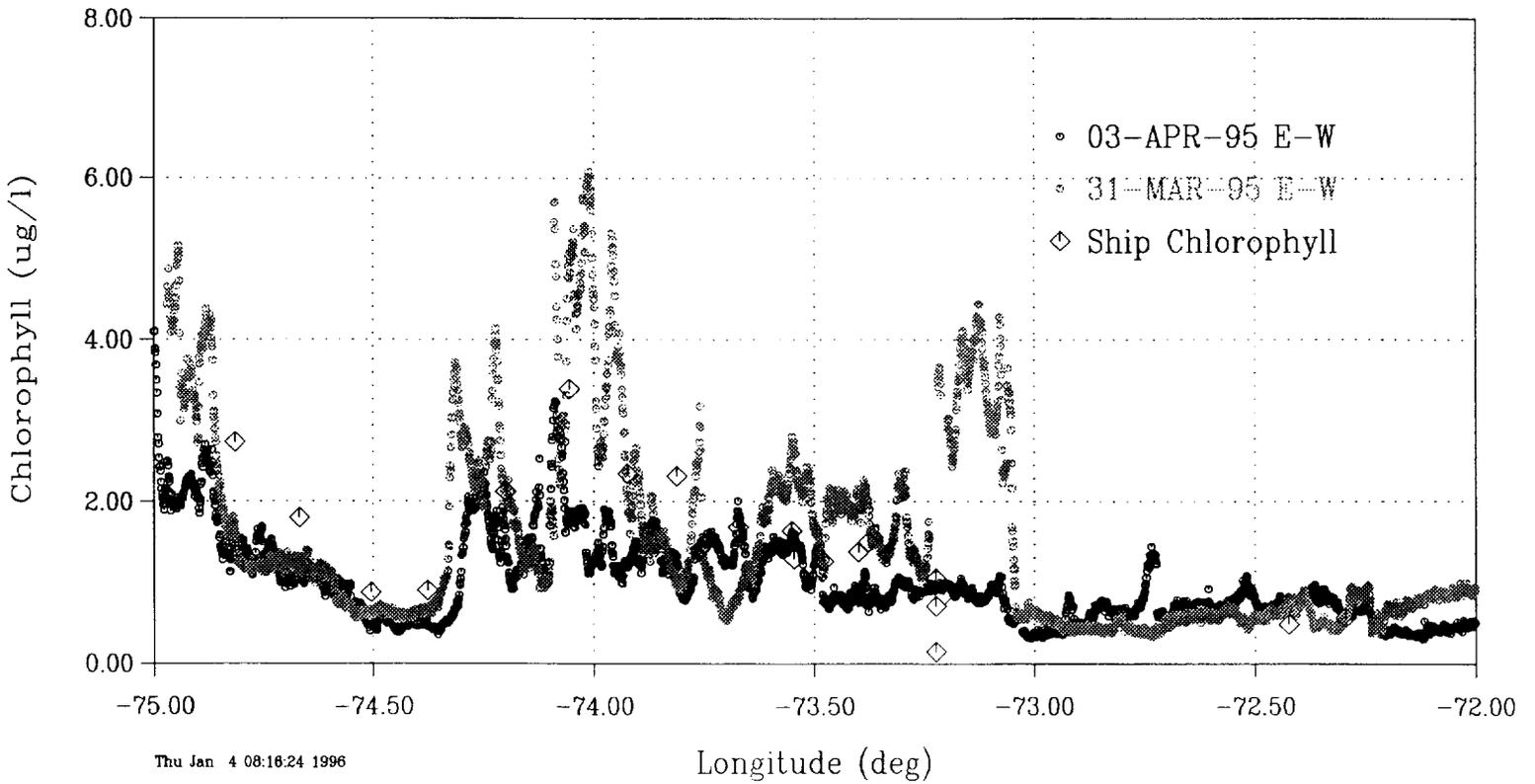**Figure 4**

03-APR-95

Wed Jan 3 13:44:56 1996

Figure 5

03-APR-95
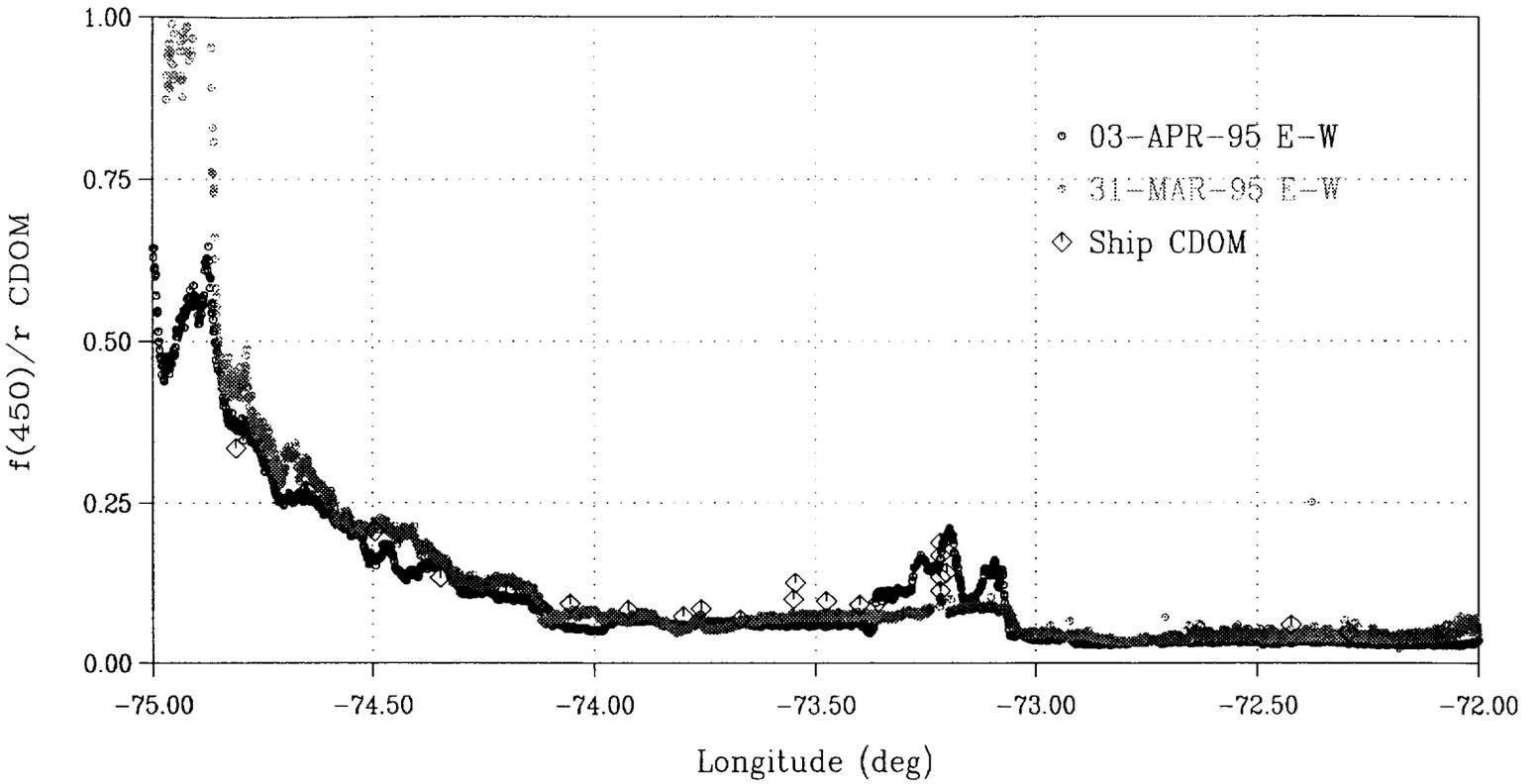

Figure 6

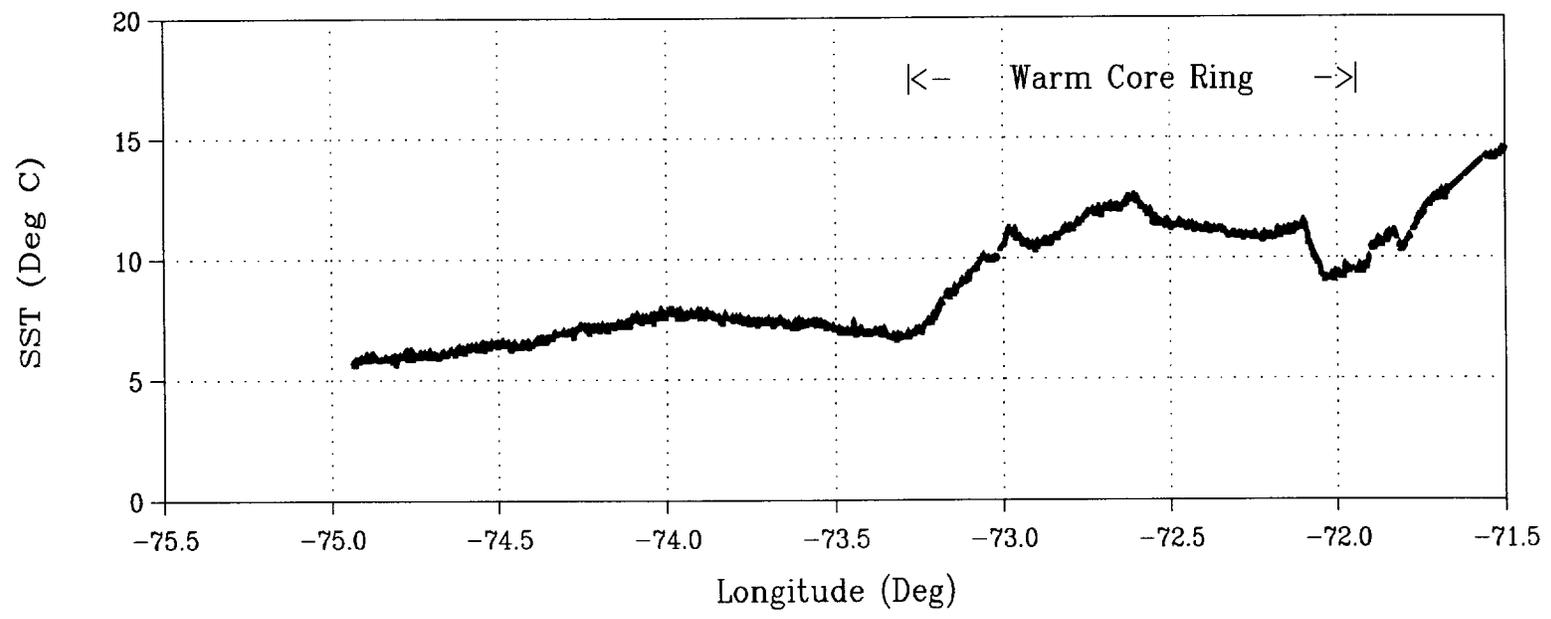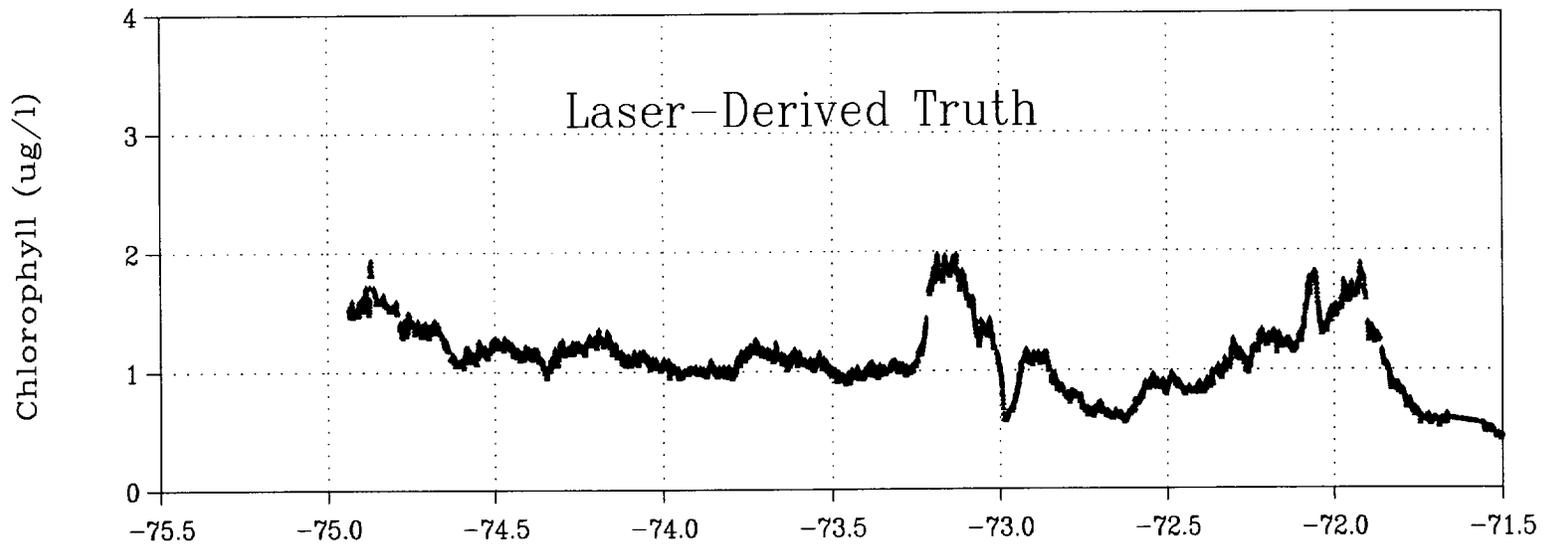# 31-MAR-95 to 03-APR-95 Comparison
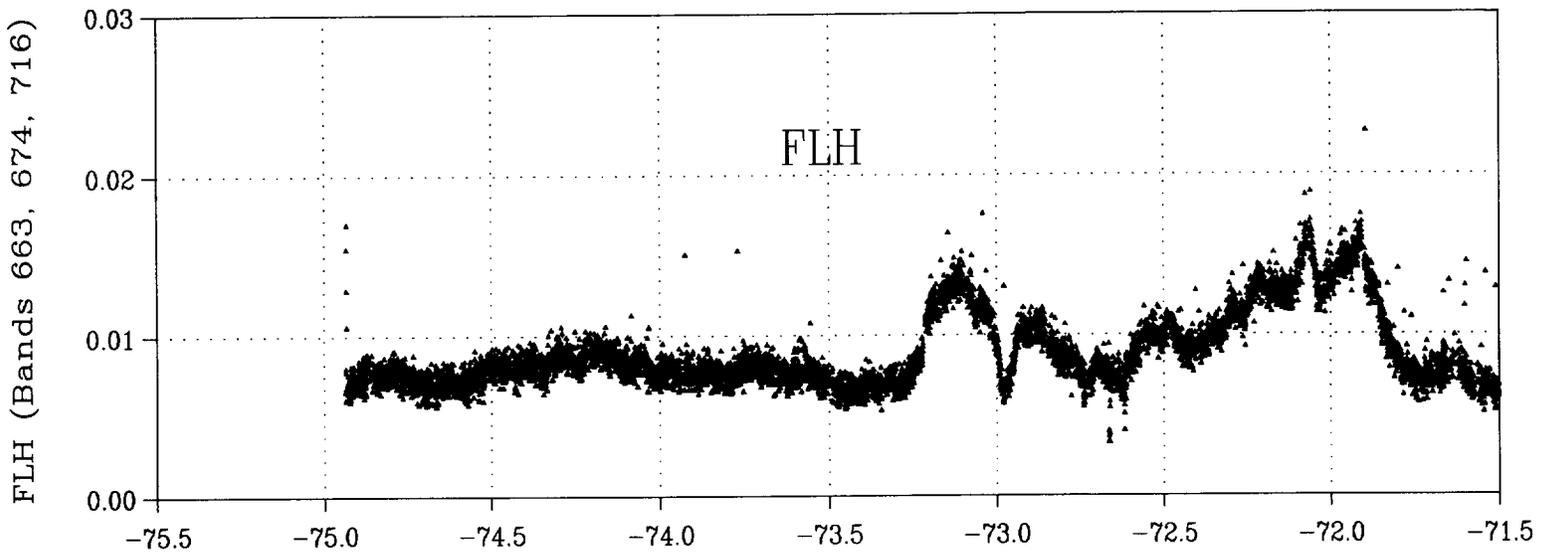

Figure 7

31–MAR–95 to 03–APR–95 Comparison
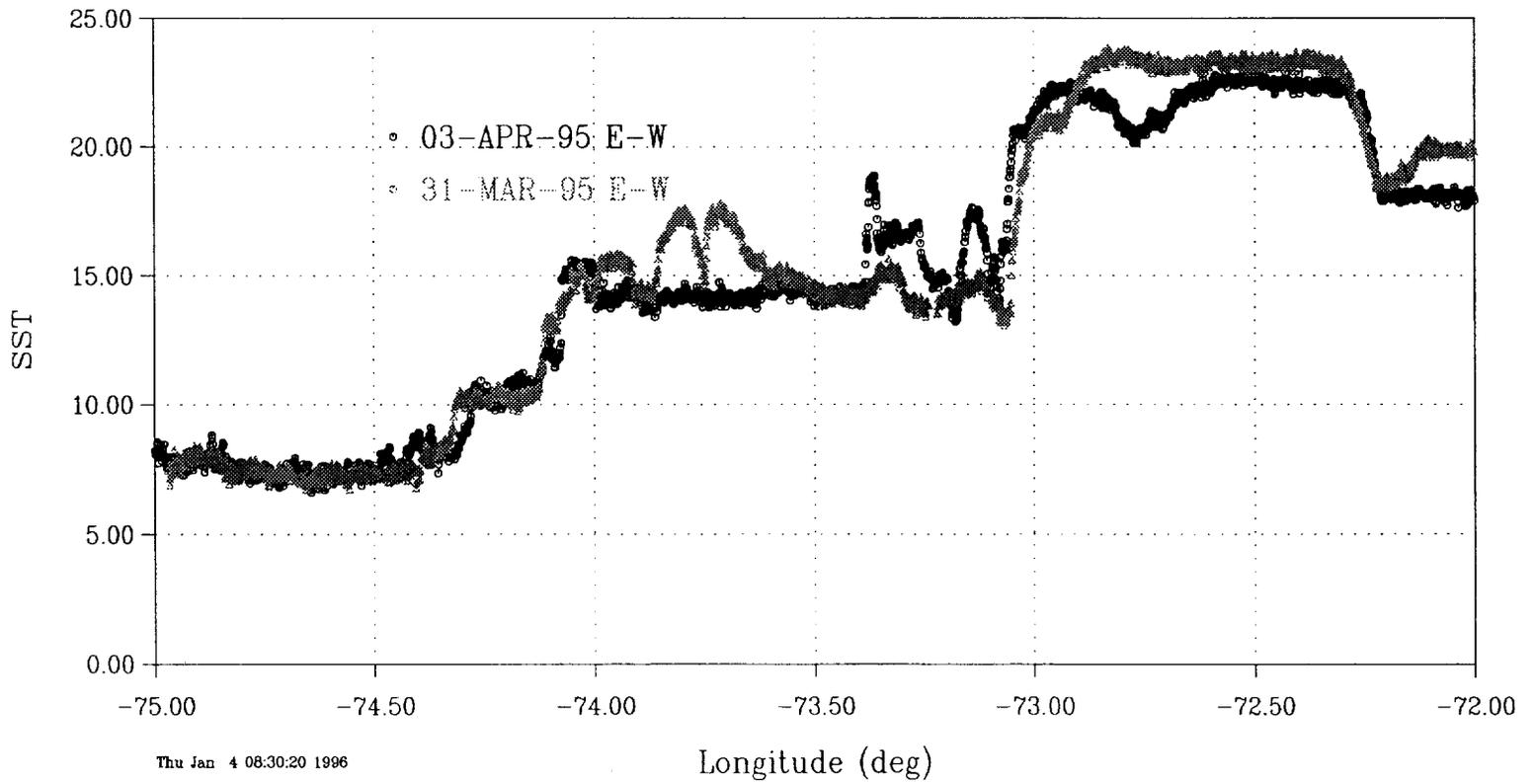
Thu Jan 4 08:30:20 1996

Figure 8

NASA Warm Core Mission February 24, 1997

Middle Atlantic Bight

LATITUDE

LONGITUDE

24FEB97 WCR (outbound)

FLH

Laser-Derived Truth

|← Warm Core Ring →|

Longitude (Deg)

24FEB97 WCR (inbound)

FLH

Laser−Derived Truth

|← Warm Core Ring →|

Longitude (Deg)
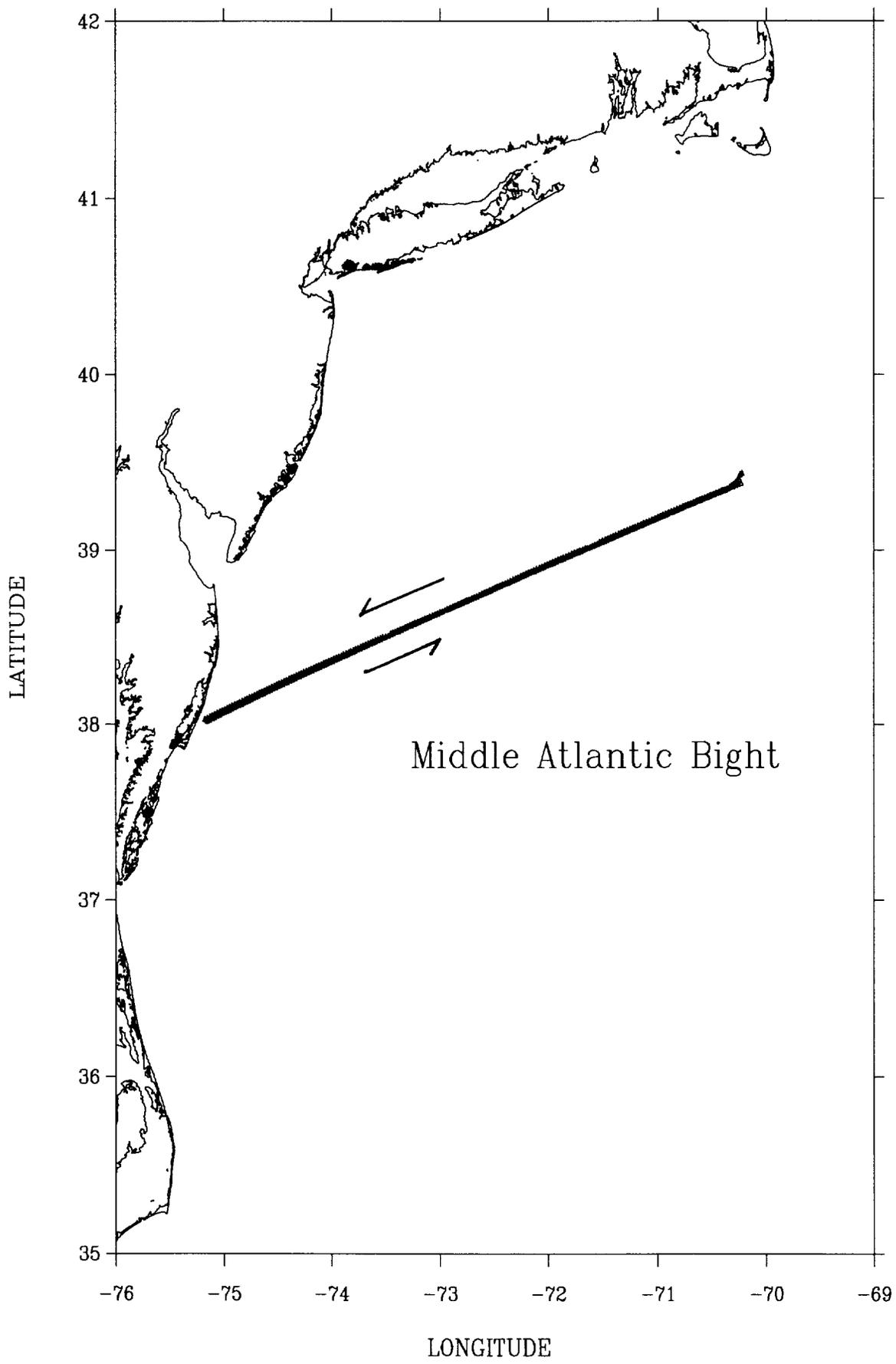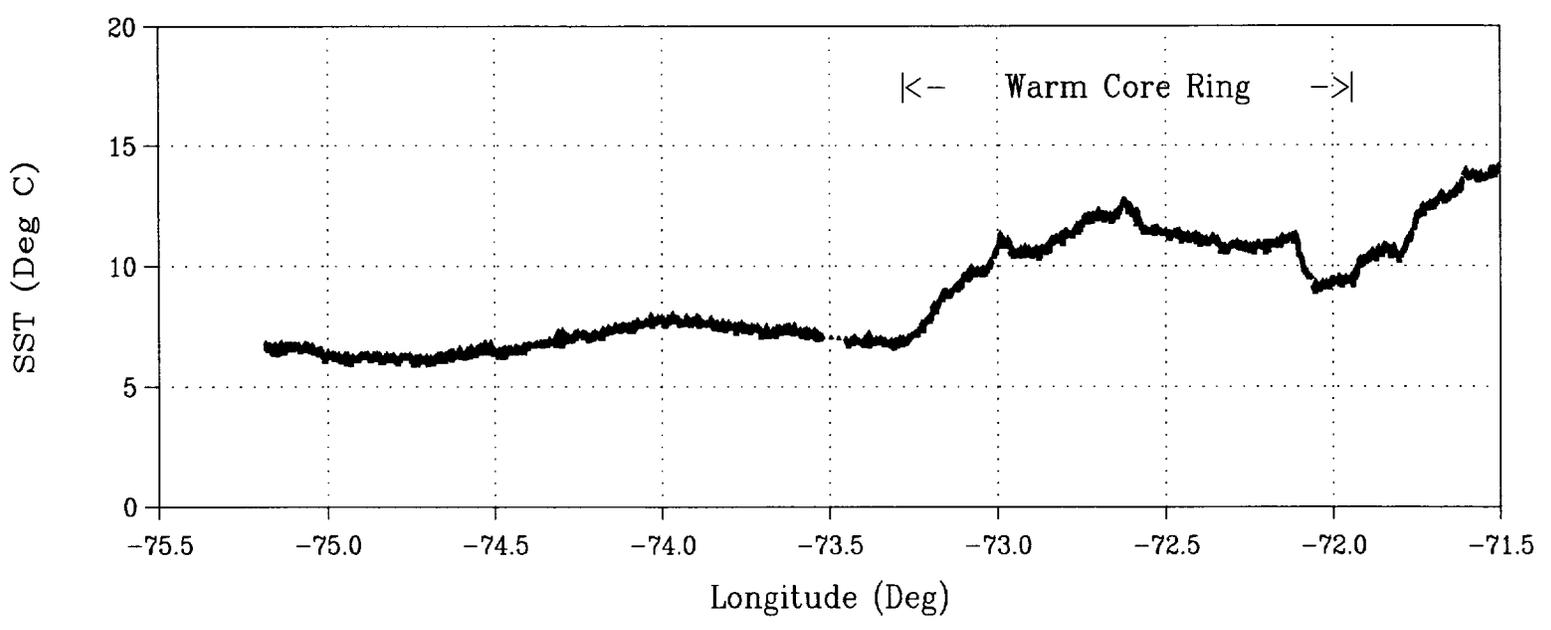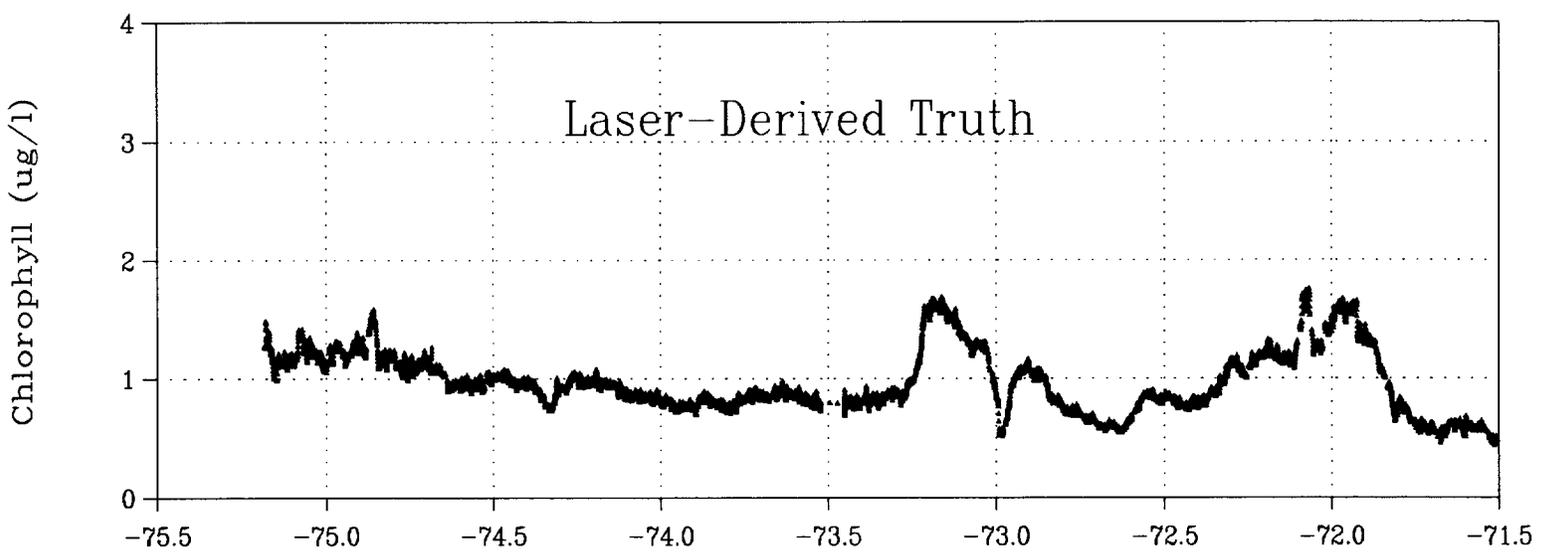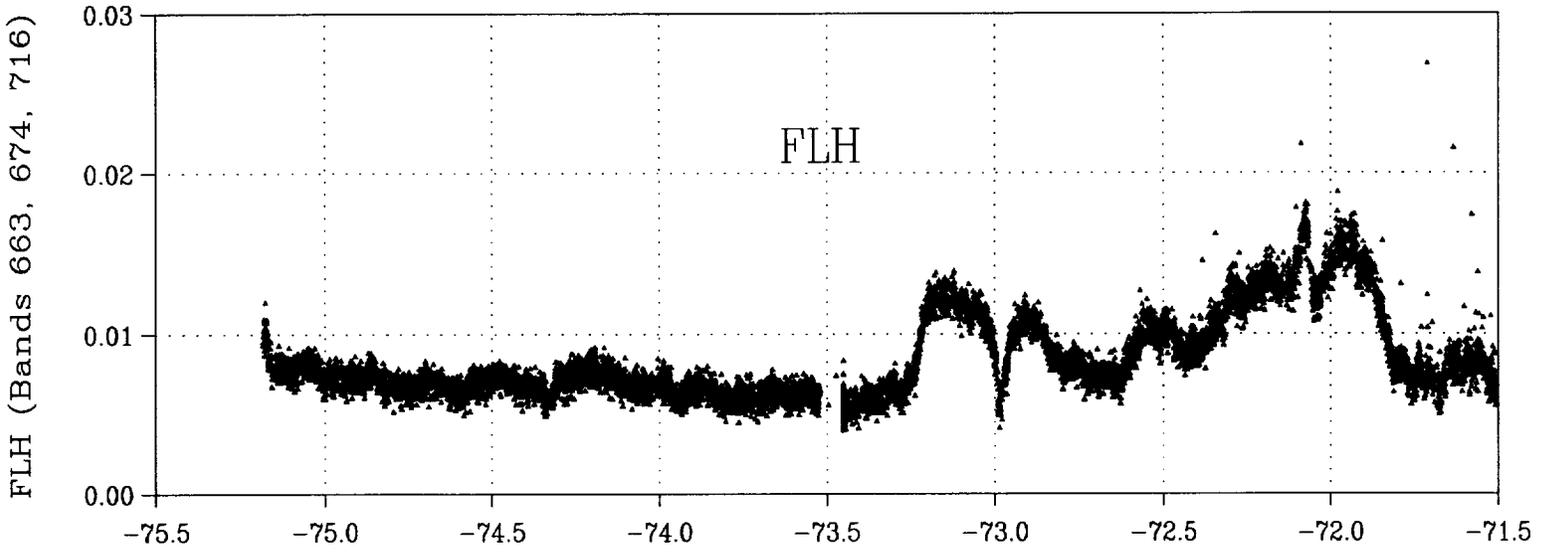
AIRCRAFT DATA PROCESSING

1. LASER SPECTROMETER CALIBRATION

-NIST LAMP + PLAQUE + TRANSFER TO 0.75 METER DIAM. SPHERE (EXT.)

-NIST LAMP + PLAQUE + TRANSFER TO 4 INCH DIAM. SPHERE (INTERNAL)

2. PMT LINEARITY: LONG-TERM, RECHECK

3. LASER SPECTROMETER DIGITIZER BIAS

- MEASURED IN REAL-TIME

- BIAS REMOVED DURING POST-PROCESSING

4. AIRCRAFT LOCATION: GPS

REMOVAL OF CDOM FLUORESCENCE FROM THE WATER—RAMAN SPECTRAL LINE

$$F(402) = 0.59\ F(450)$$

AIRCRAFT DATA ANALYSIS

1. $CHL = 3.6\ F(683)\ /\ R(645)$ [MG/M^3]

2. $a_{cdom}(355)\ =\ 4.5\ F(450)\ /\ R(402)$ [M-l]

3. PUB-RICH/ PEB-RICH   [UNITLESS RATIO]
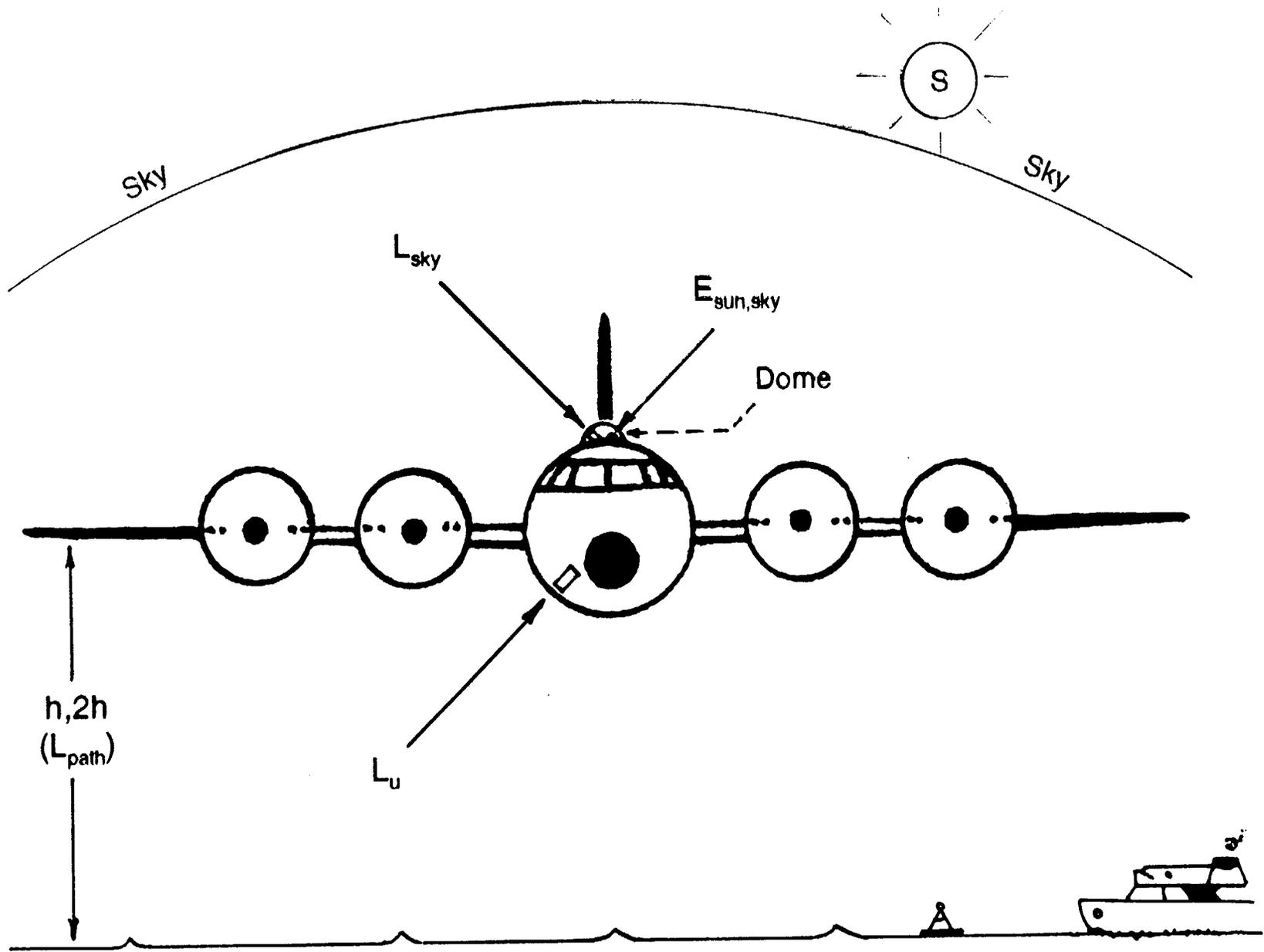
4. SEA SURFACE TEMPERATURE   [^{0}C]

L_{sky}

$E_{sun,sky}$

Dome

L_u

Sky

Sky

S

h,2h
(L_{path})

OTHER DATA PASSIVE

1. UP-WELLED RADIANCE (256 CHANNEL PDA SPECTRORADIOMETER #l)
   - FLY DENNIS CLARK'S 'SPARE" SPECTRORADIOMETER ?
   - **FLY KEN'S** "SPARE" RADIOMETER ?

2. CONVERT AT-AIRCRAFT UP-WELLED RADIANCE TO WATER-LEAVING RADIANCE
   - REMOVE 152 METERS OF PATH RADIANCE FROM UP-WELLED RADIANCE
     - -REPEAT A FLIGHT TRACK LINE AT 304 METERS (1000 FEET)
     - -SUBTRACT TO OBTAIN PATH RADIANCE CORRECTION
     - -ASSUMES UNIFORM VERTICAL DISTRIBUTION OF AEROSOLS
   - REMOVE REFLECTED SKY BY MEASURING SKY RADIANCE
     - -USE 256 CHANNEL SPECTRORADIOMETER # 2
     - -ASSUME 0.021 $L_{w,sky}$ IS REFLECTED FROM OCEAN SURFACE

3. DOWN-WELLED IRRADIANCE AT 152 METERS ALTITUDE
   - USE 256 CHANNEL PDA SPECTRORADIOMETER # 3
     - - COSINE COLLECTOR APERTURE

4. CALIBRATION
   - WALLOPS CALIBRATION LABORATORY (LASER LAB COMPLEX)
   - DALHOUSIE/SATLANTIC CONFIGURATION AT WALLOPS
     - - NIST LAMP, LABSPHERE PLAQUE, ROOM-IN-A-ROOM, FLAT BLACK WALLS, MULTIPLE BLACK OPTICAL CURTAINS, NO FLUORESCENT OVERHEAD LIGHTS

R   —