

Marine

THE NAVY/NOAA OCEANOGRAPHIC DATA DISTRIBUTION SYSTEM (NODDS)

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ABSTRACT

The Navy/NOAA Oceanographic Data Distribution System (NODDS) uses a Fleet Numerical Oceanography Center (FNOC) host computer (PDP 11/60) with a hardware configuration to a main frame (CDC 6500) computer for processing, storing and transmitting unclassified products and data to both government and non-government (commercial) users. Presently, the network communications subsystem consists of over 200 minicomputers distributed throughout the United States and overseas (TYMNET network), the telecommunications link of non-TYMNET users, and all necessary modems. This paper gives an overview of the system.

1. BACKGROUND

The "SEASAT" satellite was launched in June 1978 and operated for only a few months until its failure in October 1978. Its basic mission was to demonstrate the feasibility of measuring various environmental parameters via remote sensing; such as ocean surface temperature, winds, and currents. The Satellite Data Distribution System (SDDS) was used to make SEASAT data available to the user community.

When the satellite failed, some unclassified Navy oceanographic and meteorological products generated by the U.S. Navy's Fleet Numerical Oceanography Center were substituted for the original satellite data. The SDDS logo remained until 30 September 1982. Figure 1 shows the flow of data for the original SDDS program.

On 1 October 1982, the SDDS program was renamed the Naval Oceanographic Data Distribution System (NODDS) with the same Navy products being provided to the users. This evolution of the SDDS program was described by Lazanoff (2).

On 1 July 1983, NODDS became a joint program between the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce, and the U.S. Navy. Since NODDS became the Navy/NOAA Oceanographic Data Distribution System, the number of users has nearly doubled. No basic changes were made to the system; only the management of the NODDS program shifted to NOAA. Table 1 shows this growth:

2. COMMUNICATIONS

The monthly average of the PDP 11/60 computer connect time has increased from about 400 hours per month to over 800 hours due to this increased usage. Figure 2 shows this growth pattern.

With the additional users, the NODDS Resident Manager's time on the PDP 11/60 has also increased accordingly to service the individual NODDS user directories. Also, a NODDS "after hours" answering service has been necessary.

Currently, 26 users access the PDP 11/60 via TYMNET. The daily usage graph (figure 3) indicates two peak periods during the day. The major period is associated with the normal business cycle. The east coast users log on between 0800 to 0900 eastern time, followed by the west coast users three hours later, 0800 to 1000 Pacific time. The second peak period, between 2000 to 2300 local Pacific time, is associated with the extended range products generated by the 00 GMT operational computer run at Fleet Numerical.

For continental U.S. users, a TYMNET fee is charged to commercial users. For commercial users outside the continental U.S., an international TYMNET fee is an additional charge. For the Canadian users, this additional fee is called Data-Pak.

In March 1984, a test of the ability of the International Marine Satellite (INMARSAT) to transmit a NODDS graphic product across country from Monterey, CA, to Washington, D.C., was successful. With this success, any INMARSAT vessel "at sea" will be able to access the PDP 11/60. The vessel must have the compatible display equipment and modem. Plans are currently being made to support various ships in Antarctica during the upcoming field season.

3. PRODUCTS

NODDS products are available in binary, tabular, graphic, and alphanumeric formats. Standard meteorological charts are available both in graphic and binary formats, while tabular and spectral point information use data at specific gridpoints of the model. The newest alphanumeric summary is a plain language message generated by the Joint Ice Center, Suitland, MD, describing the ice limits for both the

north and south polar regions. The oceanographic products and data range from sea surface temperatures to subsurface structure charts, to spectral wave information and marine winds. A NODDS Users Manual is available for creating one's own NODDS product directory from the various operational meteorological and oceanographic models at FNOC. Figures 4, 5, and 6 are examples of NODDS products.

4. COMMERCIAL USER FEE

A commercial user fee is determined by NOAA at 6-month intervals and reflects the commercial user's "fair share" of the cost of producing and transmitting NODDS products. Effective 1 October 1984, the user fee was set at \$11.82 per connect hour to the host computer. Inclusive in this hourly rate are the variable costs of Fleet Numerical Oceanography Center, all NOAA costs for the daily management of the system, and the TYMNET costs for the continental United States. International users and non-continental U.S. users will have an additional charge for transmission.

All commercial users are required to sign a NODDS User Agreement prior to access. The term of this agreement is 1 year and it defines the role of the Navy, NOAA, and the user. This Agreement also defines the respective liability of each party for the use of NODDS products.

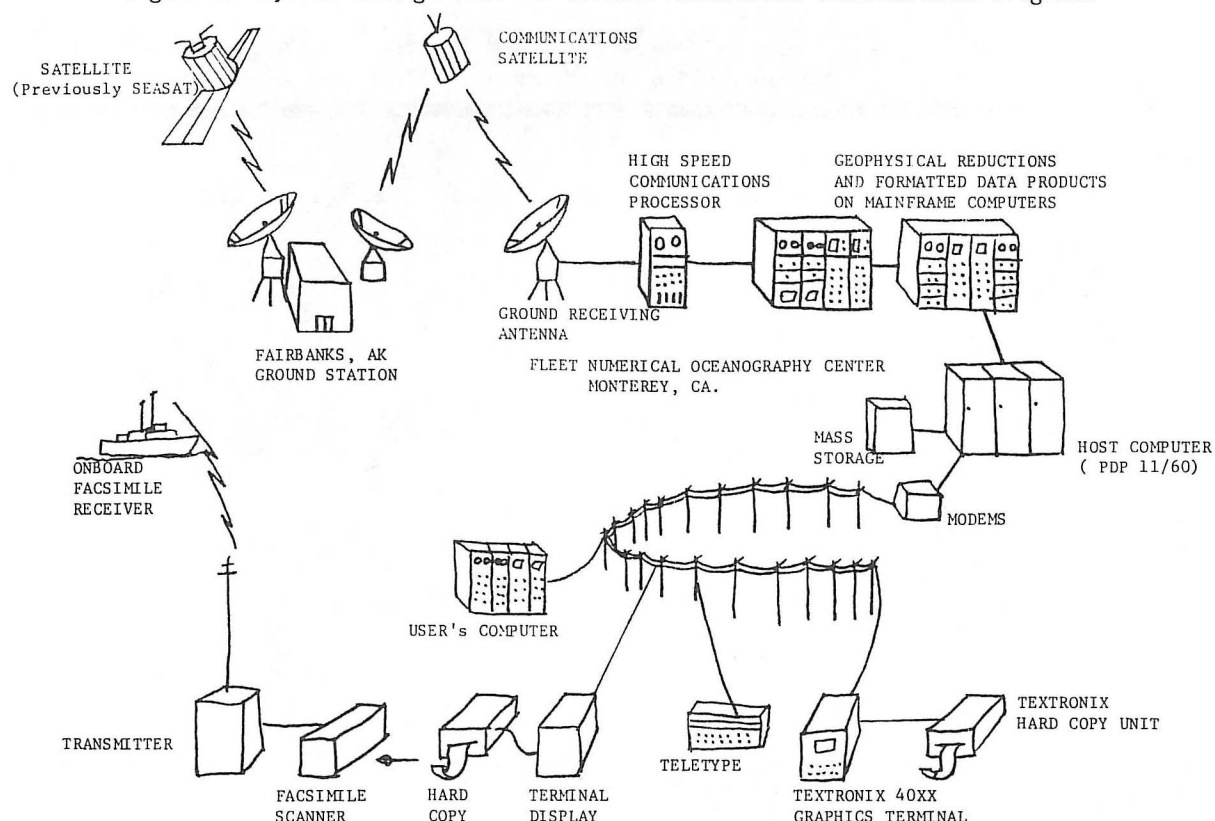
5. CONCLUSION

NODDS is a program that has satisfied both government and commercial users. Its continued growth has caused some concern, and evaluation of the future capabilities of the host computer is now being considered. Both access and availability of additional products via the host computer require a replacement machine in the near future.

FOOTNOTES AND REFERENCES

1. CDR. Duernberger is the first NOAA commissioned officer to be assigned to the Fleet Numerical Oceanography Center, Monterey, CA. He received his B.S. in Meteorology/Oceanography from the N.Y. Maritime College. His graduate work includes University of Miami, Atmospheric Science Program and the Applied Science Program, Naval Postgraduate School. His past assignments have been at the National Meteorological Center, National Hurricane Center, and National Severe Storms Forecast Center of NOAA. Prior to his current assignment, CDR Duernberger was Commanding Officer, NOAA Ship KELEZ.
2. Lazanoff, Sheldon, 1983: The Naval Oceanographic Data Distribution System. Sea Technology, Sept., pp. 38-39.

Figure 1. System Configuration for SEASAT Commercial Demonstration Program.



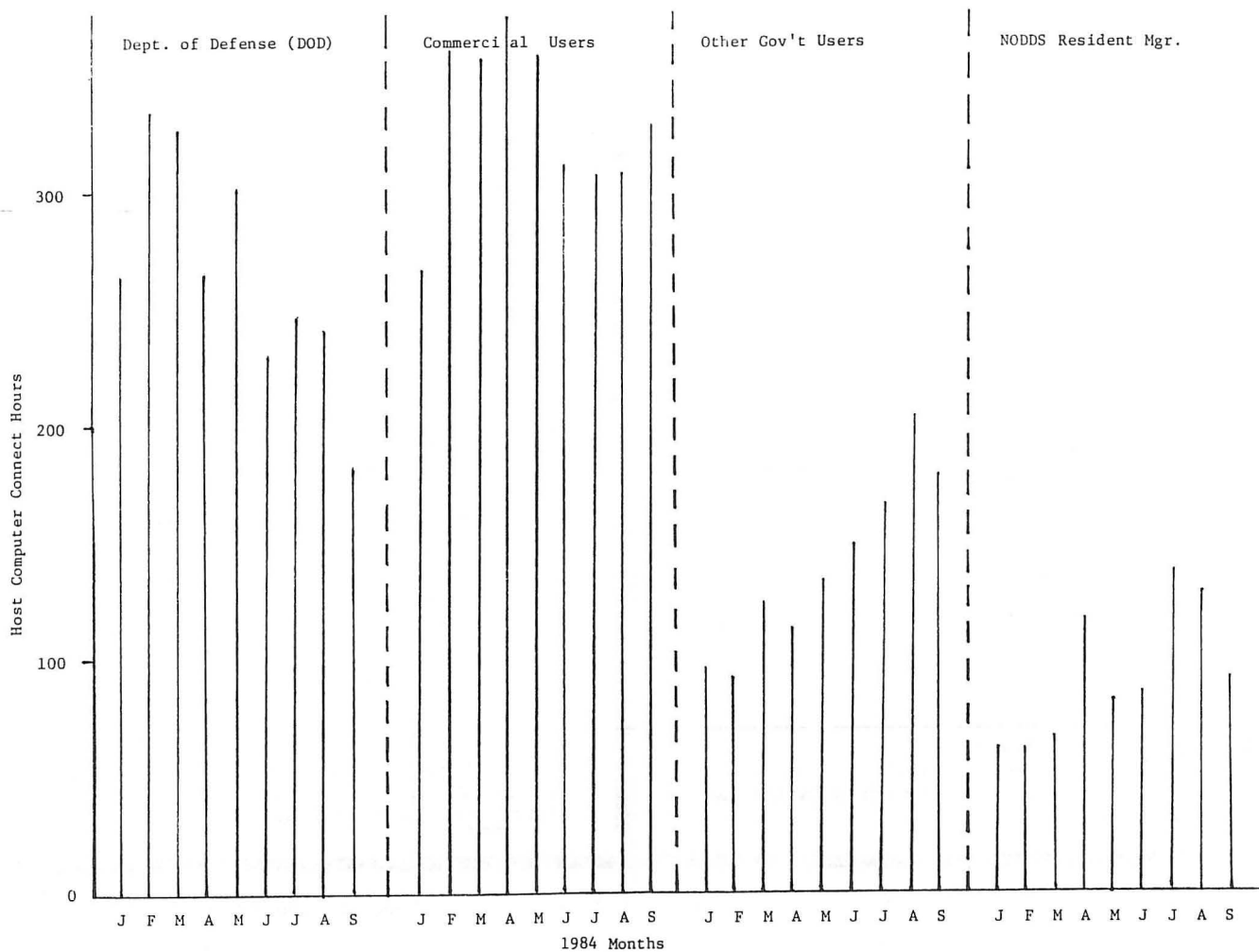


Figure 2. Total Monthly Connect Hours for 1984 by User Groups.

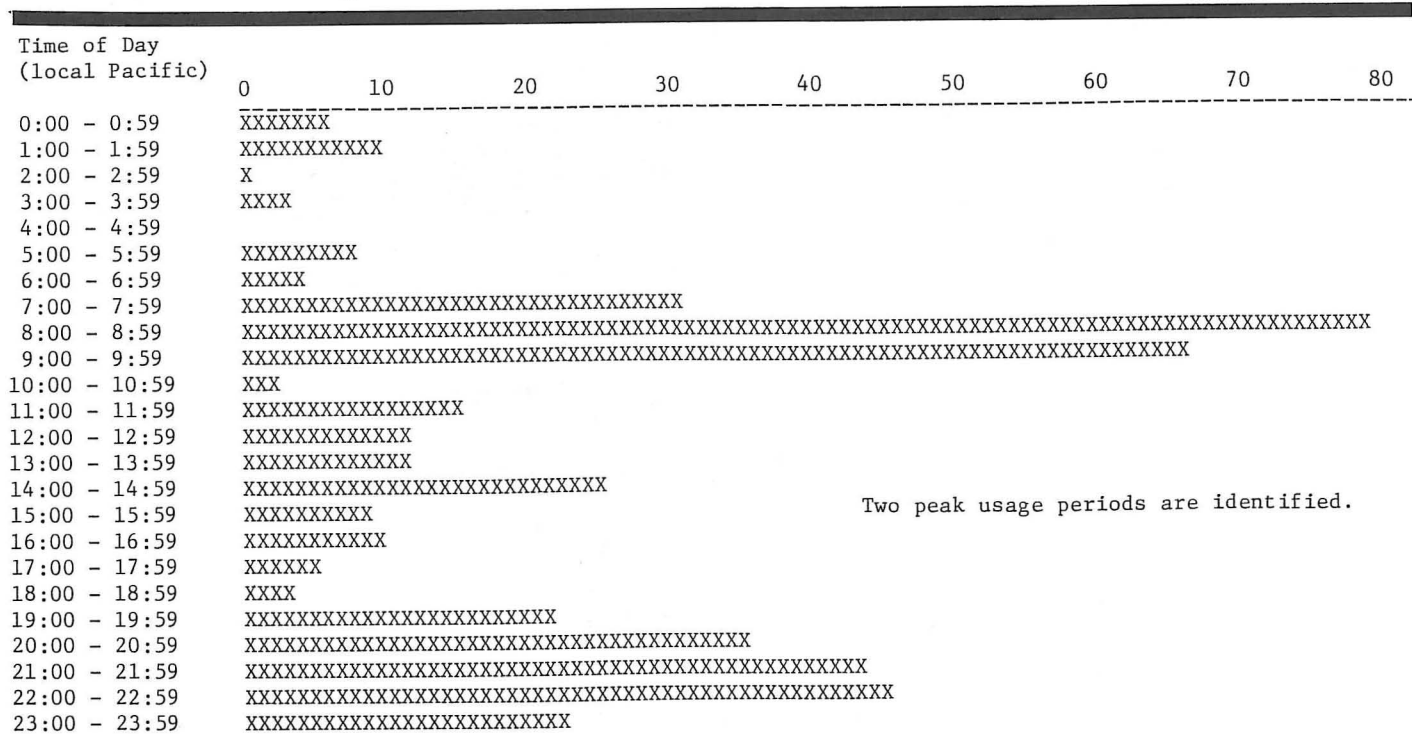


Figure 3. Average NODDS use (Product or Directory access).

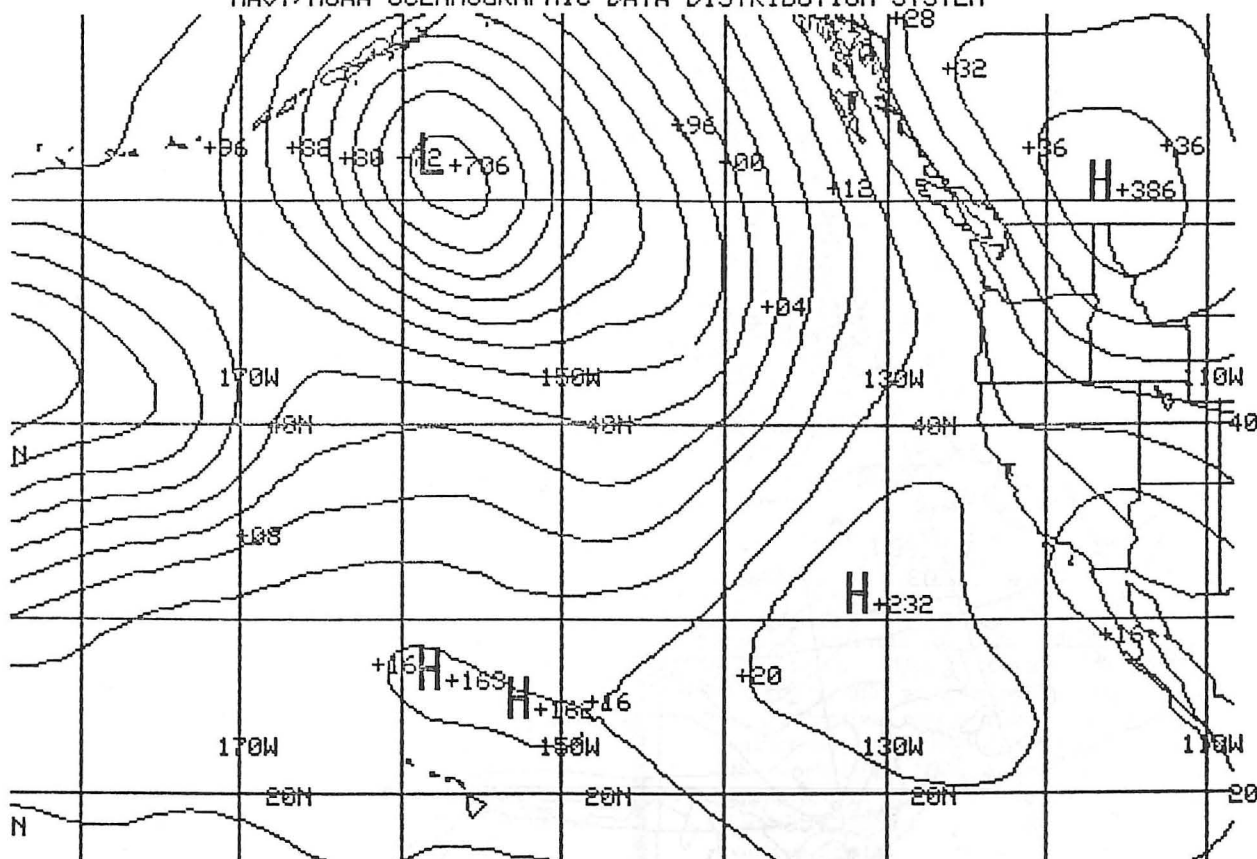


Figure 4. Navy Surface Pressure Chart for 00 GMT, 4 Dec. 1984.

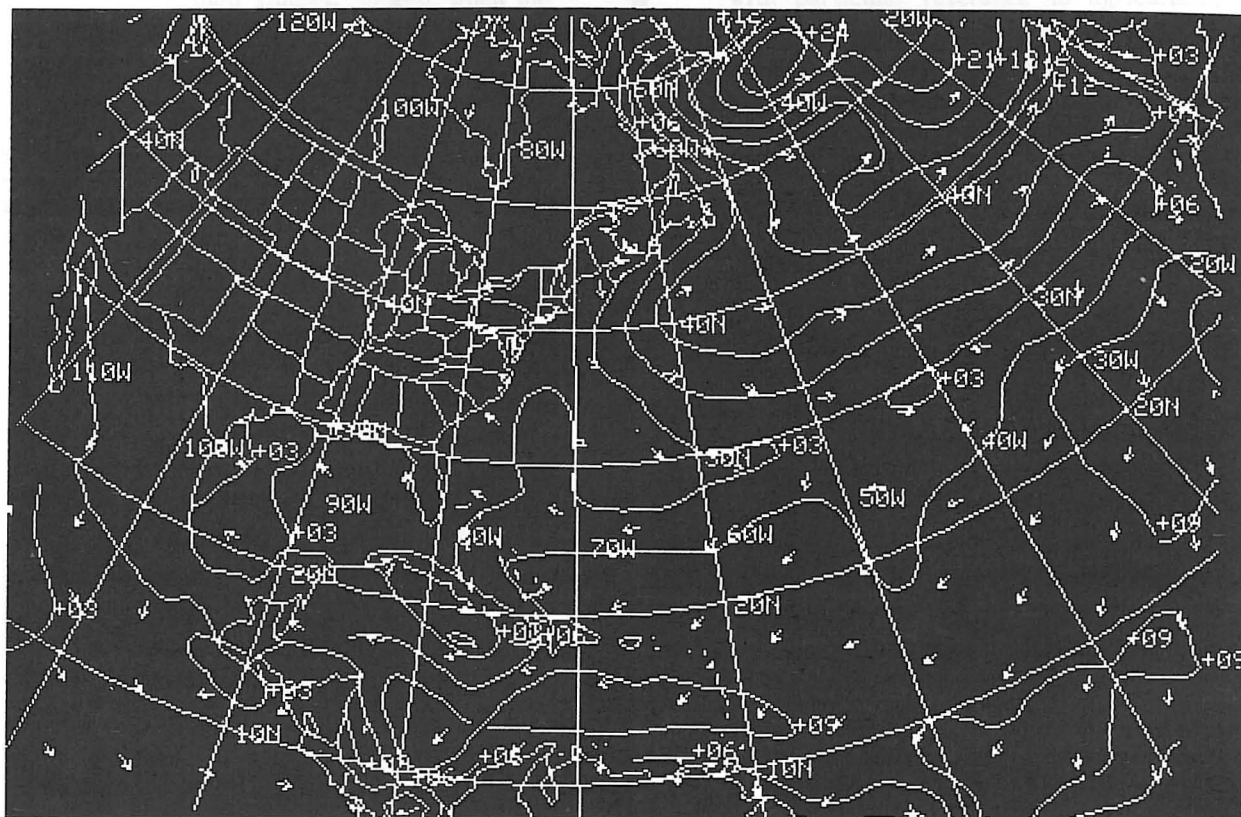
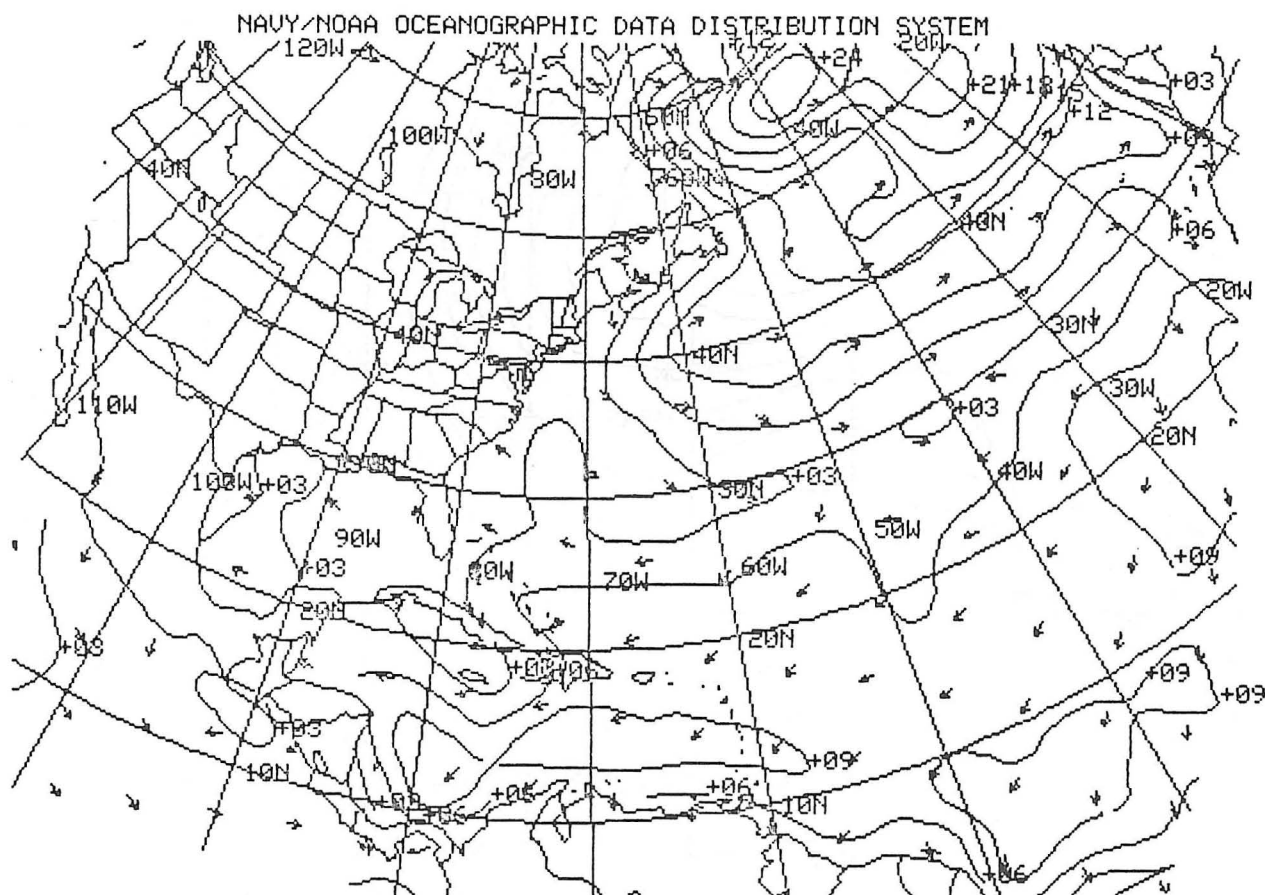


Figure 5. Navy Significant Wave Height and Direction Analysis for 12 GMT, 3 Dec. 1984.



Different Color Projection for Wave Analysis for 12Z 03 Dec. 1984

Figure 6

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