

MASTER OF SCIENCE IN PHYSICAL OCEANOGRAPHY

an

**VISUALIZATION AND ASSESSMENT OF GLOBAL OCEAN DATA ASSIMILATION
EXPERIMENT PROFILE DATA FOR THE PACIFIC OCEAN**

Timothy A. Anderson-Lieutenant, United States Navy

B.S., University of Notre Dame, 1995

Master of Science in Physical Oceanography-June 2001

Advisor: Mary L. Batteen, Department of Oceanography

Second Reader: David Dimitriou, Fleet Numerical Meteorology and Oceanography Center

The Global Ocean Data Assimilation Experiment (GODAE) is an endeavor that will likely change the path of oceanography for many years. This attempt to assimilate, organize and provide massive quantities of widely varied oceanographic and meteorological data to the world could be a catalyst for new and innovative research opportunities. One of the data sources important to GODAE and of great possible value, the Array for Real-time Geostrophic Oceanography (ARGO), is another innovation that may lead to significant improvements in oceanographic modeling and research. The concept of thousands of autonomous floats, reporting ocean conditions to a database that can assimilate and provide this data in real or near-real time, affords countless opportunities for new methods of ocean prediction.

The true test of GODAE is to assess the utility of the data available in a real world setting, and ascertain the relative usefulness as it relates to research opportunities and operational data needs. This thesis will assess the utility of the USGODAE data server by retrieving, processing, visualizing and employing the data in observing conditions in and near the Kuroshio Current. By attempting to use the data server in a method similar to future research and operational use, an understanding of its true potential may be reached.

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Computing and Software, Environmental Quality, Sensors, Surface/Under Surface Vehicles-Ships and Watercraft, Modeling and Simulation

KEYWORDS: Global Ocean Data Assimilation Experiment, GODAE, Array for Real-Time Geostrophic Oceanography, ARGO, North Atlantic Ocean Basin, Drifting Buoys, Ocean State Prediction, Climate

**VISUALIZATION AND FEASIBILITY ANALYSIS OF THE GLOBAL OCEAN DATA
ASSIMILATION EXPERIMENT, NORTH ATLANTIC BASIN,
SEPTEMBER 1999 TO MARCH 2001**

Jennifer R. Hauser-Lieutenant, United States Navy

B.S., United States Naval Academy, 1995

Master of Science in Physical Oceanography-June 2001

Advisor: Mary L. Batteen, Department of Oceanography

Second Reader: David Dimitriou, Fleet Numerical Meteorology and Oceanography Center

The development of the Global Ocean Data Assimilation Experiment (GODAE), its relationship to the Array for Real-time Geostrophic Oceanography (ARGO) project, and Fleet Numerical Meteorology and Oceanography Center's role in GODAE are discussed in this thesis. The drifting buoys used for data collection are described and the data available is outlined. This thesis analyses GODAE data available from the North Atlantic Ocean, collected in near-real-time from September 1, 2000 through March 8, 2001,

PHYSICAL OCEANOGRAPHY

in order to evaluate the relative success of the experiment to date and to identify the scope of possibilities for utilizing this data both at present, and once GODAE and ARGO are fully operational. The GODAE project endeavors to be a single database, serving as a collection point for worldwide oceanographic data to be utilized in ocean climate prediction. GODAE does not offer a mechanism for visualization of the data available. This thesis analyzes the data presently available through graphic representation. Visualization products include: float trajectories, temperature (T) and salinity (S) profiles, T-S diagrams, mixed layer depths and observed temperature compared to temperature climatology.

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Computing and Software, Environmental Quality, Sensors, Surface/Under Surface Vehicles-Ships and Watercraft, Modeling and Simulation

KEYWORDS: Global Ocean Data Assimilation Experiment, GODAE, Array for Real-Time Geostrophic Oceanography, ARGO, North Atlantic Ocean Basin, Drifting Buoys, Ocean State Prediction, Climate