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Assessment of Upper Ocean Beam Attenuation Data Collected During the South Atlantic Ventilation Experiment

Transmissometer data were collected during six South Atlantic Ventilation Experiment (SAVE) hydrographic expeditions conducted from November 1987 to March 1989 from R/V Knorr and Melville. A total of 361 beam attenuation profiles were made with a SeaTech transmissometer interfaced with a CTD/rosette. These data were processed and examined as vertical sections of the surface 500 m. Although the data are not synoptic, we also have mapped the data in plan view for presentation. Data were integrated for the upper 30 m for comparison with the distribution that might be obtained from satellite color data. No synchronous satellite data are available for those years, but we have compared our data with ocean color data from other years for comparable seasons. In general, values are high in the Argentine Basin and along the upwelling areas of the western coast of Africa. Values were low in the central gyre region between 5° and 35° S. This matches the chlorophyll distribution based on a 30-month compilation of CZCS data for the South Atlantic, reaffirming that most particulate matter in surface waters of the open ocean is of recent biological origin. Comparisons will also be made with the hydrology and currents to interpret the observed distributions.

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NEPTUNE and the Perfect Storm

At mid- to high-latitudes, most winter deepening of oceanic mixed layers occurs during one, or at most a very few, major storms. Such events are unpredictable and rarely coincide with scheduled scientific cruises. In the absence of observations of turbulent entrainment during the extreme events which accomplish major mixed layer deepening, models of the surface ocean assume that the effects of dominant storms resemble those of minor storms. The power and bandwidth available at a NEPTUNE node would enable establishment of upper ocean "observatories" which would allow critical examination of this assumption, determining the (nonlinear) combination of forcing characteristics which make a storm "perfect" for mixed layer deepening. Components of such an upper ocean observatory already exist. With sufficiently high sample rates, specialized ADCPs can pro-

vide estimates of mean velocity shear, turbulent stresses and kinetic energy dissipation rate, as well as the surface wave velocity field. Backscatter sonars track surface-generated bubble clouds transported by Langmuir cells, while ambient noise sensors provide estimates of wind speed and, potentially, of precipitation. Looking upwards from a mooring placed below the maximum winter mixed layer depth, such an acoustic observatory avoids two major problems associated with attempts to measure upper layer turbulent velocity fields during violent storms, namely equipment survival and sensor motion. Continuous high-frequency observations require the power and data transmission rates which are foreseen for NEPTUNE nodes. Alternate "on-demand" sampling requires real-time control, another feature of NEPTUNE technology.

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Data Management and Archiving for NEPTUNE

Project NEPTUNE plans to instrument the Juan de Fuca plate and its boundaries, in the Northeast Pacific, to allow reliable real-time observations and control of sea floor and water column experiments for several decades. A well-integrated data management and archiving system is important to the scientific and educational goals of the project given the nature of the data produced by NEPTUNE:

- the wide variety and number of instruments
- heterogeneous data
- the multi-disciplinary science goals
- the projected terabytes-per-day data volume
- long life span of the project

Data entering the data management and archive system must be properly and packaged. At the other end, the system must allow the research and public education communities to easily access relevant archive data. In between lies management of the data flow, catalog generation, data storage, data processing pipelines and numerous other components. This paper will present the goals of the NEPTUNE data management and archiving system, will outline a preliminary design, and will discuss the challenges facing the community.

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