temperature regime (-3.3°C ± 1.5°C). We therefore will present a modified equation, which is based on our alkenone results of particulate matter in the sea surface water.

OS22F-02 1330h POSTER

Total Alkalinity Crossover Points in the Pacific Ocean

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As part of the NOAA JGOFS synthesis group, we have been examining the internal consistency of the CO_2 data collected during the WOCE/JGOFS cruises. This paper summarizes the analyses of the crossover points of spectroscopic pH and total alkalinity (TA) in the Pacific Ocean. A total of 20 crossovers were examined to determine the differences in TA in the measurements in the deep waters (>2500 m) between two stations that were in close proximity. The measured values of TA in the deep waters were fit to quadratic equations of sigma-3 ($\sigma_3 = \rho$ - 1 at 3000 db, ρ is the density, kg m^3) by least squares at each crossover station. The differences between the equations were examined at ten equally spaced intervals over the σ_3 values. The differences varied between 0.3 to 11 μmol kg^{-1} with an average difference of 3.6 ± 2.6 μmol kg^{-1}. Only four crossover points were examined for pH. The pH differences range from 0.0018 to 0.006 with an average difference of 0.004 ± 0.001. These results indicate that direct measurements of pH and TA in the Pacific Ocean are internally consistent within the 2 σ precision of the field measurements (± 4 μmol kg^{-1} in TA and ± 0.002 in pH).

OS22F-03 1330h POSTER

Dissolved Inorganic Carbon Crossover Points in the Pacific Ocean

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Between 1991 and 1996, carbon measurements were made on 25 U.S. WOCE, U.S. JGOFS and NOAA OACES cruises in the Pacific Ocean. These cruises were cosponsored by the National Science Foundation, the U.S. Department of Energy and NOAA's Climate and Global Change Program. Although at least two carbon parameters were measured on all of the cruises, dissolved inorganic carbon (DIC) was the only parameter common to all of the cruises. The measurements were collected over six years by ten different laboratories. Together, these data comprise the most comprehensive high-precision survey of carbon distributions in the Pacific Ocean with a greater than 10 fold increase in the number of samples analyzed than for the GEOSECS expedition of the early 1970's. As a part of the JGOFS Synthesis and Modeling Project we have been working to combine these data into an internally consistent, unified dataset. Additional DIC data collected by international investigators have also been included, where possible, to fill in holes in the US survey program. In an effort to ensure the accuracy and internal consistency of these data we have compared the deep water (>2000 m) DIC values measured on different cruises in areas where two or more cruises overlapped or crossed (within ~100 km). Data from each of the comparison stations were plotted against the density anomaly referenced to 3000 dbar (σ_3). Polynomial fits of the data from each cruise were evaluated at evenly spaced intervals over the density range common to both sets of stations. These results together with information on the calibration procedures, analyses of Certified Reference Materials (CRMs), the quality of duplicate analyses, internal consistency with other carbon parameters and with large-scale correlations with hydrographic parameters were used to suggest minor adjustments to some of the cruises to optimize the internal consistency of the data. Our results show that a unified Pacific dataset of over 30,000 samples can be achieved with an estimated precision and accuracy of ±2μmol/kg.

URL: http://cdiac.esd.ornl.gov/cdiac/oceans/glodap

OS22F-04 1330h POSTER

Prospects for Using Historical Transmissometer Data in Large-Scale Assessment of POC

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Transmissometer data have been collected using instruments provided by our group over the last decade in collaboration with WOCE, JGOFS, and other large-scale hydrographic programs. These data include basin-wide transects in the North and South Atlantic, North and South Pacific, Indian, and Southern Oceans. We have proposed to analyze these data and convert the beam attenuation values to POC using the beam attenuation:POC relationships derived by our group during JGOFS Process studies. Stramski et al. (1999, Science, 285: 239-242) have introduced algorithms to estimate POC from satellite backscatter data for the Southern Ocean for both surface values and euphotic zone integrations. In a similar manner, our basin-wide data will be compared with satellite backscattering data on appropriate seasonal and space scales to establish region-specific algorithms. A compilation of historic hydrographic/optical data has been compared by season with recent satellite data by Mishonov et al. (1999, IUGG-99, Vol. B., p. 242) and the results further validate our proposed global synthesis of POC in Case I waters (non-coastal) using satellite-derived data.

OS22F-05 1330h POSTER

Comparing Fluxes Intercepted by Deep Sediment Traps: The Effect of Trapping Biases

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One of the goals of the Joint Global Ocean Flux Study is to investigate the relation between bioproductivity in surface waters and the related deep-water particle flux and the variability of this relation between different oceanic environments. In order to meet this goal measurements of vertical particle fluxes by means of time-series sediment trap studies were conducted in several areas of the eastern North Atlantic.

We investigated to what extent trapping biases may limit our understanding of regional differences in the particle flux. The trapping efficiencies of bottom-tethered sediment traps deployed in the deep eastern North Atlantic between 54°N 20°W and 33°N 20°W (L1, L2, L3), at the European continental margin at 49°N (OMEX) and off the Canary Islands (ESTOC) were estimated by the ^{230}Th calibration method. This approach is based on a balance between the production rate of ^{230}Th in the overlying water column, horizontal transport of ^{230}Th in the water column and ^{230}Th flux measured in the sediment traps. ^{230}Th trapping efficiencies were between 9 % and 143 % showing a trend of increasing efficiencies with increasing water depth. No relation was found between current velocities and ^{230}Th trapping efficiencies. Our investigations suggest that the observation of constant or even increasing particle flux rates with increasing water depths in several of the sediment trap arrays investigated may be a result of sediment trap biases. After correcting for this bias particle flux decreased with depth - as should be expected when the source of the sinking matter is at the surface of the ocean. No clear latitudinal trend in the magnitude of the intercepted fluxes was observed, and no such trend between ocean margins and the open ocean. Our results indicate the correction for the trapping biases to be important for the understanding of the regional differences in the particle flux in the eastern North Atlantic.

OS22F-06 1330h POSTER

SEATS Time-Series Observations of Upwelling North-west of Luzon: Effects of South-east Asian Monsoon

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South China Sea (SCS) is the largest marginal sea in the world aside from the Polar Ocean. Previous studies, including recent intensive paleoceanographic studies, suggest that SCS is sensitive to many types of physical forcing with time scales of short-term (e.g., internal waves and tides, mesoscale eddies, typhoons, etc.), annual (e.g., monsoon), inter-annual (e.g., El Nino), and very long-term (e.g., climate changes) variability. To better understanding how various types of physical forcing influence biogeochemcial cycles in the water column, a time-series study, the South East Asia Time-Series Station (SEATS), was initiated by the National Center for Ocean Research (NCOR), Taiwan, ROC in September 1998. Bimonthly hydrography surveys occupied stations in the tropic SCS at (18-19 N, 118.5 E). The results suggest that the Southeast Asian monsoon, which is northeasterly wind from October to April and southwesterly wind from May to September, has important effects on biogeochemcial cycles of the upper water column. Compared to results obtained during the inter-monsoonal period in September, the water column in January witnessed the shoaling of the nitracline and sustained an elevated phytoplankton standing stock. The surface chlorophyll concentrations (0.25-0.65 mg/m3) were 2-5 times higher than the September values. The subsurface chlorophyll maximum (up to 0.85 mg/m3) was twice as high. Such contrast agrees with scenarios generated by a three-dimensional coupled physical-biogeochemical numerical model. The model predicts a sizable patch of high Chl a off northwest Luzon induced by upwelling in winter. The upwelling is in turn produced by convergence of current in the cyclonic gyre near the Luzon Strait, where the Kuroshio intrudes. In summer the current reverses following the wind change. The nitracline is depressed as downwelling occurs off northwest Luzon, resulting in very low chlorophyll concentrations.

OS22F-07 1330h POSTER

Inventory of Inorganic Carbon Released from Organic Matter Remineralization in the Deeper Arabian Sea

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The Arabian Sea is one of the most productive areas of the world's oceans. Monsoon-forced nutrient supply is the prime factor responsible for the high rates of primary and new production. Part of the produced organic matter is exported to the deep Arabian Sea where most of it is remineralized to dissolved inorganic carbon (DIC), nitrate and phosphate. As the biologically fixed DIC in the exported organic matter is replenished from