located near the Portugal coast. These trajectories also show that several MEDDIES are formed every year and drift at 1000 m depth during 2 or 3 years. A good agreement is obtained between observed and simulated MEDDIES.

URL: http://www.mercator.com.fr

OS62C-0275 1330h POSTER

Seasonal and interannual variations of the NEC bifurcation latitude in a high-resolution ocean GCM

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The variation of the North Equatorial Current (NEC) bifurcation latitude is investigated with a high-resolution ocean GCM. It shows that the NEC bifurcates when it reaches the Philippine coast, along which it branches into the northward flowing Kuroshio and the southward flowing Mindanao Current. The bifurcation occurs about 15 deg.N on average and is confined within depths around 500 m, and the bifurcation latitude varies with time and depth, and furthermore a change of vertical slope with season is also shown. During the northern summer the NEC bifurcation latitude is moved equatorward with a mild slope, while poleward movements with a steep slope are found during the northern winter. The slope change with season is very closely related to the poleward shift of denser water in the upper thermocline layer. On the interannual timescale, the meridional migration of the NEC bifurcation latitude is strongly influenced by the El Nino/Southern Oscillation. They are significantly correlated each other with 2-3 month time lag at the surface and no time lag at lower levels. El Nino pushes the NEC bifurcation latitude more poleward than that of normal wintertime, conversely La Nina prevents it from pushing to the north.

OS62C-0276 1330h POSTER

Simulation of Tropical Rainfall Variability

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The impact of sea surface temperature (SST) - especially the role of the tropical Atlantic meridional SST gradient and the El Nino-Southern Oscillation - on precipitation is investigated with the atmospheric general circulation model ECHAM4/T42. Ensemble experiments - driven with observed SST - show that Atlantic SST has a significant influence on precipitation over West Africa and northeast Brazil.

SST sensitivity experiments were performed in which the climatological SST was enhanced or decreased by one Kelvin in certain ocean areas. Changing SST in the eastern tropical Atlantic caused only significant changes along the Guinea Coast, with a positive anomaly (SSTA) increasing rainfall and a negative SSTA reducing it. The response was nearly linear. Changing SST in other ocean areas caused significant changes over West Africa, especially in the Sahel area. The response is found to be non linear, with only negative SSTA leading to significant reduction in Sahel rainfall. Also, the impact of the SSTAs from the different ocean regions was not additive with respect to the rainfall.

The influence of SST on precipitation over northeast Brazil (Nordeste) was also investigated. Three experiments were performed in which the climatological SST was enhanced/decreased or decreased/enhanced by one Kelvin in the North/South Atlantic and increased by two Kelvin in the Nino3 ocean area. All experiments caused significant changes over Nordeste, with an enhanced/reduced SST gradient in the Atlantic increasing/reducing rainfall. The response was nearly linear. The main effect of the Atlantic SST gradient was a shift of the ITCZ, caused by trade wind changes. The "El Nino" event generates a significant reduction in Nordeste rainfall. A significant positive SLP anomaly occurs in northeast Brazil which may be associated with the descending branch of the Walker circulation. Also a significant positive SLP over the Atlantic from 30S to 10N north occurs. This results in a reduced SLP gradient from the subtropical highs to the equator and a weakening of the trade winds.

OS62C-0277 1330h POSTER

External Forcing that Influence the Irregular Shedding of the Loop Current

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The Loop Current is known to shed eddies at irregular intervals from 3 17 months; the underlying forcing has not, however, been previously identified. We describe here numerical experiments over the western North Atlantic Ocean west of 55oW and from 6o to 50oN, forced by annual-mean (i.e. steady) or monthly temperature (T) and salinity (S) climatology, six-hourly winds (from the European Center for Medium-range Weather Forecast) over the Atlantic Ocean and eddies (from ERS/Topex satellites) in the Caribbean Sea, and examine their separate effects. In all cases, the total transport at 55oW is kept steady to isolate the system from effects further east. In the absence of eddies and winds, and under the annual-mean T/S climatological forcing, the model yields a nearly constant shedding period 9 months. The monthly variation in T/S climatology causes insignificant change to the constant shedding period. On the other hand, winds and eddies can account for the observed spread in the shedding period. Winds tend to cause shedding at shorter intervals, 4 12 months, while Caribbean eddies at longer periods 9 15 months. The underlying mechanism in both is the fluctuating inflow (transport and vorticity) that these forcing cause at the Yucatan Channel. The fluctuating inflow can also cause the eddy to temporarily (1 month) detach from, and then reattach back to, the Loop Current, a phenomenon sometimes observed.

OS62C-0278 1330h POSTER

Modes of Variability in the Yucatan Channel Flow

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Results obtained from a high resolution primitive-equation northwest Atlantic Ocean model with realistic topography and wind forcing are analyzed, in order to study the dynamics of the flow through the Yucatan Channel (YC) and the water mass exchange between the Gulf of Mexico (GOM) and the Caribbean Sea. The variability of the flow and the complicated model flow field structure in the YC are in good agreement with recent observations. An Empirical Orthogonal Function (EOF) analysis reveals the spatial and temporal variability of the along-channel flow. Three major dynamical modes were identified: 1. The EOF mode-1 (which contains 50% of the total energy) represents the cross-channel meandering of the upper frontal position. 2. The EOF mode-2 (which contains 18% of the total energy) represents variations in the magnitude of the inflow transport into the GOM and often correlates with Loop Current eddy shedding events. 3. The EOF modes-3 and 4 (which together contains 18% of the total energy) represent variations in the deep current over the sill. The most energetic peaks in the spectra of the time evolution of the EOF modes are at periods of about 6, 9 and 11 month, which are close to the observed main frequencies of eddy shedding events in the Gulf.

URL: http://www.aos.princeton.edu/WWWPUBLIC/PROFS

OS62C-0279 1330h POSTER

Variability of Freshwater Transport in the Northern Gulf of Mexico

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Numerical model simulations of the Gulf of Mexico predict an annual cycle of surface salinity throughout the northern Gulf that compares well to historical hydrographic data. The processes involved in producing this annual cycle are investigated using model and surface drifter data. Model experiments are used to examine the roles of mesoscale eddy activity and the seasonal variability of wind forcing and river discharge in connection with the upper ocean salinity field. It is shown that the annual cycle of the local winds greatly influences the fate of the freshwater discharged by the local rivers, primarily the Mississippi river. Model results and drifter data show that the low salinity water is transported westward over the broad Louisiana Texas Shelf in the fall and winter. This water is transported southward as a coastally attached current and often offshore by jets associated with eddy pairs along the western continental margin. In the spring and summer, the low salinity water of the northern Gulf spreads over deeper water to the east of the Mississippi Delta where it is influenced by the offshore circulation. Mesoscale eddies associated with the Loop Current can then entrain the low salinity water and transport it great distances from its origin. This pathway is shown to be associated with an increase in biological productivity offshore of the West Florida Shelf in the summer.

OS62C-0280 1330h POSTER

On the Interaction of Cyclonic Eddies with the Loop Current

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The life cycle of cyclonic eddies associated with the Loop Current (LC) evolution is studied using the Navy Coastal Ocean Model, Topex/Poseidon altimetry, and AVHRR images. It is shown that the formation of the cyclones in the western side of the LC is related to its dynamics, with their time of generation in the last stage of the anticyclone shedding from the LC. It is shown that the longest period registered between eddy shedding, between February 1998 and August 1999, is associated with the presence of a large cyclone that remains north of the LC during several months. Using numerical simulations, it is shown that large cyclones develop sporadically in the region and that they block the northward penetration of the LC. The LC is leaks mass, momentum, and energy through a jet and small anticyclones moving along the slope of the West Florida Shelf, east of the cyclone. The process causes an enlargement of the period between eddy shedding.

OS62D MCC: 270 Saturday 1330h

Remote Sensing of Ocean Surface Winds and Their Scientific Applications I *(joint with A, GC)*

Presiding: **W T Liu,** Jet Propulsion Laboratory**; S Xie,** University of Hawaii

OS62D-01 1330h INVITED

The Status of Measuring Ocean Winds From Space

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We will review the current status of measuring ocean winds with satellite microwave radiometers and scatterometers. It has been 16 years since the first SSM/I was launched. The SSM/Is now provide the longest continuous time series of satellite winds. We will discuss the wind retrieval accuracies of the 6 SSM/Is as well as two more recent microwave radiometers: the TRMM microwave imager (TMI) and the AMSR-E. Wind retrievals using different combinations of microwave channels will be compared. The inter-satellite calibration of these multiple sensors and the problems associated with constructing decadal time series of winds will be described. The passive radiometer retrievals will be compared to active scatterometer wind retrievals coming from NSCAT and QuikScat. The relative errors between the active and passive wind retrievals will be illustrated. We will discuss the calibration and validation of these satellite wind retrievals using the network of ocean buoys and the difficulty of calibrating and validating extremely high winds.

URL: http://www.ssmi.com

OS62D-02 1345h INVITED

The Sverdrup Circulation in the Tropical Pacific Based on ERS Winds

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The Sverdrup circulation in the tropical Pacific is constructed from satellite scatterometer winds, compared with measured ocean currents, and diagnosed in an ocean GCM. Previous depictions of the Sverdrup circulation near the equator have shown only weak vertically-integrated flows; here we show that the actual transports are not weak, and investigate whether the discrepancy is due to inaccuracies in the wind forcing or to Sverdrup dynamics being too simple in this region. Scatterometer winds show a strip of positive curl along the SST front north of the equator in the eastern Pacific that is due to air-sea interaction. Including that additional element of curl forcing greatly improves the realism of the Sverdrup representation, compared to that based on ship or reanalysis winds. However, the magnitudes of the equatorial transport are still too small by a factor of about two. While the nonlinear (advective and friction) terms are small in the model momentum balance, they are order (1) in the vorticity balance, especially because their meridional derivatives are large near the equator. Examining the effect of the nonlinear terms through the vorticity balance shows that advection acts to intensify the mean currents of the tropical Pacific, including both the equatorial undercurrent and the westward off-equatorial South Equatorial Current, as has been previously argued. However, the principal nonlinearity is due to the acceleration and deceleration of the equatorial undercurrent, not to meridional convergence.

URL: http://www.pmel.noaa.gov/~kessler/kjm01-abstract.html

OS62D-03 1400h INVITED

The Fertilisation of the Sea by a Tropical Cyclone

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Traditionally accepted mechanisms of nutrient supply to the upper ocean are insufficient for supporting the new production in the oligotrophic ocean estimated from geochemical tracers1-3. This paradox, whose resolution is critical for a full understanding of the global carbon cycle, has generated an intensive search for sources of allochthonous nutrients to the upper ocean3-9. Episodic injections of nutrients as a result of enhanced vertical mixing and upwelling across the nutricline pumped by tropical cyclones, is a possibility that has been much speculated yet largely undocumented by direct observations10-13. Here we use a combination of newly available remote sensors and show that the impact of a moderate cyclone can be far reaching. In July 2000, tropical cyclone Kai-Tak transgressed through the South China Sea (SCS). It caused up to 300 times increase in phytoplankton biomass and 9aC reduction of sea surface temperature. A minimum of 0.8 Mt of carbon, equivalent to 2-4% of the annual new production in the oligotrophic SCS, has been generated. Given that there are in average 14 tropical depressions/cyclones passing SCS annually, their contribution to the SCS carbon cycle is significant.

OS62D-04 1415h

Impact of Quikscat Data on Numerical Weather Prediction

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One of the important applications of satellite surface wind observations is to increase the accuracy of weather analyses and forecasts. Satellite surface wind data can improve numerical weather prediction (NWP) model forecasts by contributing to improved analyses of the surface wind field and air sea fluxes. Through the data assimilation process,these data can also improve atmospheric mass and motion fields in the free atmosphere above the surface.

The SeaWinds scatterometer on the QuikScat satellite was launched in July 1999 and represented a dramatic departure in design from the other scatterometer instruments launched during the past decade (ERS-1,2 and NSCAT). The NASA Data Assimilation Office (DAO) was the first data assimilation center to assimilate QuikScat SeaWinds data and evaluate their impact on numerical weather prediction. Following the launch of QuikScat, a detailed evaluation of the initial surface wind data sets was performed as part of a collaborative project between the Environmental Modeling Center of NCEP, NESDIS and the DAO. More recently, the impact of Quikscat data was evaluated in detailed experiments using the NCEP operational data assimilation system. As a result of the beneficial impact obtained, NCEP began operational utilization of Quikscat data. Results from these experiments as well as recent DAO assimilation experiments showing the impact of Quikscat data on stratospheric analyses and forecasts will be presented at the meeting.

OS62D-05 1430h

Winds from Space for Gulf of Mexico

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The upper ocean response to surface forcing by a hurricane is investigated with a new high-resolution simulation of the Gulf of Mexico using the Navy Coastal Ocean Model forced by satellite-observed surface winds. The model simulates the effects of the hurricane winds measured by the SeaWinds scatterometer on submesoscale and mesoscale oceanic features. SeaWinds on QuikSCAT has approximately twice daily coverage of the Gulf of Mexico; however, it rarely covers this whole Gulf of Mexico. This coverage is less than ideal for rapidly evolving or translating systems. Therefore, three types of forcing fields are developed and evaluated. One type of wind field is the Eta-29 product, another is based purely on scatterometer observations, and the third product uses scatterometer wind vectors objectively blended with the ETA models surface winds. The two scatterometer fields have 0.5x0.5 degree grid spacing. The influence of the energetic forcing over the wide shallow West Florida Shelf is examined in detail. Herein we consider only the influence of a tropical storms surface stress on the West Florida Shelf. The modeled impacts on Sea Surface Height (SSH) and surface currents are large compared to sub-tidal (diurnal and semidiurnal) influences. Comparison to in situ observations demonstrates the tremendous improvements when scatterometer data are used to produce the surface stress fields. The gridded fields combined with the NCOM model remarkably effectively reproduce the in situ observations.

URL: http://www.coaps.fsu.edu

OS62D-06 1445h

Coupling Between Wind and Sea Surface Temperature

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QuikSCAT reveals convergence zones south of the equator all year round; they are in parallel with the intertropical convergence zones (ITCZ) north of the equator in the eastern Pacific and across the Atlantic Ocean. For most of the time the southern ITCZ are weaker than the northern ones. While the stronger ITCZ is collocated with the local maximum of sea surface temperature (SST), with magnitude above the threshold for deep convection, the weaker one is located where the trade-winds suffer the strongest deceleration, poleward of the cold tongue caused by equatorial upwelling. The microwave radiometer on the Tropical Rain Measuring Mission is used to measure SST. Over the tropical instability waves (TIW) which is the eastward propagating temperature fronts at the northern and southern boundaries of the equatorial cold tongue, surface wind speed and SST are observed to be in phase, while the wind convergence is in quadrature with SST. The observations lead to the hypothesis that the coupling between SST and winds are caused by the increase in buoyancy induced mixing and reductionn in wind-shear in the atmospheric boundary layer over warmer water, and vice versa over cooler water. The hypothesis is supported by atmospheric wind and temperature soundings measured on a research cruise in the tropical Pacific. The relation between SST and winds is also observed over the cold wakes behind tropical cyclones and during bathymetry induced winter cooling in the Asian marginal seas. The boundary layer mixing mechanism is perhaps applicable over a spectrum of spatial and temporal scales.

OS62D-07 1500h

Satellite observations of air-sea interaction over the Kuroshio

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Satellite microwave measurements are analyzed, revealing robust co-variability in sea surface temperature (SST) and wind speed over the Kuroshio and its Extension (KE). Ocean hydrodynamic instabilities cause the KE to meander and result into large SST variations. Increased (reduced) wind speeds are found to be associated with warm (cold) SST anomalies. This positive SST-wind correlation in KE is confirmed by in-situ buoy measurements and is consistent with a vertical shear adjustment mechanism. Namely, an increase in SST reduces the static stability of the near-surface atmosphere, intensifying the vertical turbulence mixing and bringing fast-moving air from aloft to the sea surface.

South of Japan, the Kuroshio is known to vary between nearshore and offshore paths. Both paths seem semi-permanent and can persist months to years. As the Kuroshio shifts its path, coherent wind changes are detected. In particular, winds are high south of Tokyo when the Kuroshio takes the nearshore path while they are greatly reduced when this warm current leaves the coast in the offshore path.

Further upstream in the East China Sea, on the warmer flank of the Kuroshio Front, there are a zone of high wind speed and a band of raining cloud due to the regions unstable atmospheric stratification near the surface. Surface wind convergence is roughly collocated with the Kuroshio Current. By increasing the baroclinicity and condensational heating, the Kuroshio Front aids the growth of the so-called Taiwan cyclone, an important winter weather phenomenon for Japan.

The positive SST-wind correlation over the strong Kuroshio Current and its extension is opposite to the negative one often observed in regions of weak currents such as south of the Aleutian low that is considered to be indicative of atmosphere-to-ocean forcing.

URL: http://iprc.soest.hawaii.edu/~xie

OS62D-08 1515h

Estimation of Air-Sea Gas Transfer Using Conically Scanning SeaWinds Scatterometer Normalized Backscatter

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In this study we develop an algorithm that allows us to derive global gas transfer velocities (k) from SeaWinds normalized radar backscatter (σ_o) with a 25 km, one day resolution. We achieve this objective through a combination of theoretical physics of scatterometer backscatter and calibration with another algorithm developed for TOPEX's dual frequency altimeter. The altimeter-based algorithm is calibrated with field data collected as part of the NSF CoOP Coastal Air-Sea Chemical Fluxes Program. At the heart of both algorithms is the relationship between normalized radar backscatter and the "partial" mean square slope ($\langle \tilde{s}^2 \rangle$) of the gravity-capillary surface waves. Using the dual frequency capabilities of TOPEX we are able to probe only that portion of the gravity-capillary wave field most directly involved in active gas transfer, hence the *partial* mean square slope. The altimetry algorithm is valid only for incidence angles close to nadir, whereas the scatterometry algorithm is applicable to much higher incidence angles. Higher incidence angles allow greater spatial (and temporal) coverage at the price of complicating the signal with an azimuthally dependent modulation, which must be removed before the calibration with altimetry can be done. The results from the TOPEX algorithm are used to constrain the output of the SeaWinds algorithm, which we present as normalized to the Schmidt number for CO_2 in sea water at 20°C (*i.e.* 660). Derivation, sensitivity and application of the SeaWinds algorithm will be discussed and initial results shown.

OS62D-09 1550h

Air-Sea Fluxes in the Southern Ocean: Dual Deliberate Tracer Results from the SoFex Experiment

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During the Southern Ocean Iron Fertilization Study, (SoFex) the iron-fertilized patches were tagged with the deliberate tracer Sulfur Hexafluoride (SF6) to be able to follow the iron enriched water mass. In conjunction with the SF6 injection of the Southern patch a trace amount of the isotope 3He was added as well to determine the gas exchange rate from the change of 3He and SF6 ratio over time. The resulting air-sea gas exchange estimates from the dual deliberate tracer method were related to wind speed. The trend of decrease in ratio of 3He and SF6 with time could be well modeled with either a quadratic or cubic dependence with wind speed (U) with relationships of gas transfer velocity, k = 0.34U2 and k = 0.0277 U3, close to those proposed previously by Wanninkhof (1992) and Wanninkhof and McGillis (1999) which yielded coefficients of 0.31 and 0.0283, respectively.

The relationship of gas exchange with wind speed determined from the SoFex study along with winds for 2001/2002 obtained from the QuickScat satellite were combined with the climatology of air-sea partial pressure difference of Takahashi et al., 2002 to estimate the air-sea CO2 gas flux for the Southern Ocean (defined as latitudes greater than 34 S). The estimate of -1.4 to -1.5 Pg per year is significantly lower than the values proposed by Takahashi et al. of 1.7 to 2.5 Pg C per year primarily because the wind speed variability is taken into account in our estimate.

OS62D-10 1605h

Trends in the Zonal Winds over the Southern Ocean from the NCEP/NCAR Reanalysis and Scatterometers

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The winds over the Southern Ocean for the entire 54-year (1948-2001) period of the NCEP/NCAR Reanalysis have been decomposed into Principal Components (Empirical Orthogonal Functions). The first EOF describes 83 percent of the variance in the zonal wind. The loading of the EOF shows the predominately westerly surface flow with strongest winds in the Indian sector of the Southern Ocean. The structure of this EOF is similar to the Southern Annular Mode (SAM) identified by Thompson, et al 2000. The amplitude of this EOF reveals a large trend of 4.42 cm/s/yr in the strength of the zonal wind corresponding to a nearly 50 percent increase in the wind stress over the Southern Ocean. Such a trend, if real, would be important in the dynamics of the Antarctic Circumpolar Current (ACC). Recent studies by Gille, et al. (2001), Olbers and Ivchenko (2001) and Gent et al. (2001) have shown that the transport of the ACC is correlated to the variability in the zonal wind with a monotonic increase in the transport with increasing zonal wind strength. However, errors in the data assimilation scheme for surface pressure observations on the Antarctic continent appears to have caused a spurious trend in the sea level pressure south of 40S of -0.2 hPa/yr (Hines, et al. 2000 and Marshall, 2002). The sea level pressure difference between 40S and 60S has risen by 8 hPa over the same period. This sea level pressure difference is used as a proxy for the strength of the zonal winds. Thus, the trend in the zonal wind EOF amplitude may be an artifact of model errors in the NCEP Reanalysis. To check this trend, we analyzed scatterometer winds over the Southern Ocean from the SEASAT, ERS (1 and 2), NSCAT and QuikScat satellites. The scatterometer data is not used in the NCEP Reanalysis and, thus, is an independent estimate of the winds. The SEASAT Scatterometer (SASS) operated for 90 days in July-September, 1978, while the ERS, NSCAT and QuikScat scatterometers provide a continuous dataset from September 1992 through the present. The zonal winds for the combined ERS/NSCAT dataset were decomposed into Principal Components, similar to the NCEP winds. The first EOF describes 78 percent of the variance in the zonal wind. The loading of the EOF is nearly identical in structure to the loading of the NCEP EOF, and the correlation between the amplitudes is 0.93 for the coincident period. The trend in the scatterometer winds is 3.9 cm/s/yr for the eight years, which is not significantly different from the 4.4 cm /s/yr trend of the NCEP winds. The three months of SASS data were projected onto the scatterometer EOF and the amplitudes compared to the long-term NCEP amplitudes. The agreement between the scatterometer amplitudes and the NCEP is remarkable. The comparison between the scatterometer winds and NCEP Reanalysis winds suggests that the trend towards increasing zonal winds is real. The increasing zonal winds over the Southern Ocean may lead to a substantial increase in the transport of the ACC over the past 50 years.

OS62D-11 1620h

Ekman heat flux variability from four wind sources

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The variability in the Ekman heat flux estimated from four different sources of wind is examined. The wind vectors are obtained from the European Remote Sensing (ERS), Quikscat, the Special Sensor Microwave Imager (SSM/I-Atlas) satellites, and from the National Centers for Environmental Prediction (NCEP) model. The temperature in the Ekman layer is estimated by combining the Reynolds sea surface temperature and climatological sub–surface profiles. Except for the Quikscat which span the period between 1999 and 2002, the data sets range a period over 10 years. The annual mean of the meridional Ekman heat flux (EHF) is consistently smaller when estimated with the ERS data. The NCEP tends to get larger values for the North Atlantic while the Quikscat is the largest for the North Pacific. The EHF has a better agreement at sub–tropical latitudes while the largest differences are found near the equator.

To investigate the spatial variability of EHF we use a series of 2D finite impulse response filters. We quantify the role of several regions of the frequency-zonal wave number spectrum of the wind in establishing the observed Ekman heat flux. The mean component of the EHF, which keeps all the variability from the temperature field, is much higher in the low latitudes in the Atlantic. The relative variance of the mean component to the total EHF reaches up to 60% in the Atlantic while in the Pacific it explains only 30% of variance. The contribution to the variability of several bands of planetary westward propagating waves is larger in the Pacific and Indian Oceans while in the Atlantic it can explain at most 20% of the total variance. All wind sources show a change in the variability regime around 15° of latitude with lower frequencies prevailing over meso and small–scale variability within the tropics.

OS62D-12 1635h

Impact of Scatterometer Winds on the Tropical Pacific Heat Budget

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Scatterometer winds not only can be used to improve the predictions of ocean currents in ocean models, but also can impact the upper ocean heat budget through the latent and sensible heat fluxes and through ocean heat flux divergence associated with changes in the current structure. Comparisons against NCEP (National Center for Environmental Prediction) wind stress and NCEP-derived fluxes show substantial differences with the scatterometer derived fluxes, particularly in the equatorial Pacific near the ITCZ (intertropical convergence zone). To test what impact the scatterometer winds have on a modeled tropical Pacific Ocean, we run a three-dimensional isopycnal general circulation model with a tropical Pacific domain from 30S to 30N at 0.5 degree resolution. The model has 16 layers in the vertical and includes an active mixed layer. The model is forced with NCEP stress for spinup, and then parallel runs are done using the NCEP and QuikSCAT stress fields. The surface thermal boundary condition is calculated from the COARE bulk formulae, using the model SST with NCEP atmospheric variables and either NCEP stress or QuikSCAT stress. There are significant differences between the two model runs, with QuikSCAT winds generally giving better performance relative to observations. Along the equator, the QuikSCAT runs show a smaller SST gradient and a lower maximum SST, both of which match the observations better. Comparisons are also made of the model and observational heat content anomaly derived from the TAO and altimetric data. The differences between the two model runs come about not only from changes in the dynamics, but also from changes in the heat flux fields associated with changes in wind speed. Estimates of the latent heat flux differences are particularly sensitive to the wind product in the tropics, with the eastern Pacific and the ITCZ giving the largest differences.

OS62D-13 1650h

Modeling Study of Cross-Shore Exchange Processes in the Southern California Bight Using QuikSCAT Winds

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The South California Bight (SCB) forms a complex bathymetric region (islands, shallow banks, basin, and channels) extending from the coast to about 200 km offshore and from Point Conception to the tip of Baja California. Geographically the region is sheltered from the strong upwelling-favorable winds characteristic of the region north of Point Conception. However, recent QuikSCAT winds, for the first time, clearly reveal a persistent cyclonic eddy centered at Catalina Island within the Bight (Liu et al. 2001). Using a costal circulation model, we have investigated the oceanic response to the newly observed sea-surface winds. Two experiments are carried out to explore the individual roles of wind forcing and topography. The first experiment uses the COADS winds to determine the general circulation of the Bight. The second experiment uses the QuikSCAT winds to examine how the space-time variability of atmospheric forcing affects the frontal structure, circulation pattern, and cross-shore exchange of water masses. Comparisons of these two experiments allow us to identify the combined effect of winds and topography on the cross-shore exchange processes between the Bight and its adjacent waters.

OS62E MCC: 274 Saturday 1330h

Nearshore Processes III *(joint with T)*

Presiding: **N Plant,** Naval Research Laboratory**; A Reniers,** Naval Postgraduate School

OS62E-01 1330h INVITED

The Nearshore Canyon Experiment

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Observations collected in Fall 2003 during the Nearshore Canyon Experiment (NCEX) will be used to test hypotheses about the effect of complex continental-shelf bathymetry on surface gravity waves and on wave-driven circulation. Refraction, diffraction, reflection, scattering, and trapping by abrupt shelf