Systematic trends are observed in the stable carbon and nitrogen isotopic compositions of eight sponge species collected at a series of stations in Key Largo, FL, ranging from the Florida Bay side out to the outer reef tract. These trends appear to be related to gradients in organic matter sources as well as in situ biogeochemical processes associated with microbial symbionts hosted within sponge tissues. The observed δ^{13}C trend features a continuous C-13 depletion going from nearshore, shallow waters out to the outer reef. This δ^{13}C trend could result from a greater abundance of seagrass-derived carbon in the < 5m-sized particulate organic carbon filtered by sponges from shallow, nearshore waters. However, individual sponge species exhibited systematic differences in their absolute range of δ^{13}C values at a given station suggesting that carbon sources or biogeochemical processes may differ significantly among species. Significant shifts in δ^{13}C values could be expected to result from increased contributions of microbial photosymbionts to sponge nutrition over inshore to outer reef gradients in nutrition mode described by previous researchers. Isotopic gradients can be hypothesized to result from shifts in CO2 concentration gradients and transport rates to symbionts in phototrophic sponges. Symbiotic algae, including cyanobacteria, have a demonstrated ability to actively pump bicarbonate as an alternate C source under the CO2 -limiting conditions expected for the symbiont, thereby generating extremely enriched δ^{13}C values through dramatically reducing isotopic fractionation. Observed δ^{15}N values exhibited no systematic spatial variability. However, δ^{15}N values in all *Ircinia spp.* were systematically depleted (N-15 depleted) from typical oceanic values relative to six other sponge species. This depletion appears to result from N2 fixation by microbial symbionts *Ircinia spp.* are known to host. N2 fixation appears not to occur at appreciable rates, or the results of it are obscured, in the other sponge species studied given their heavier δ^{15}N values typical of marine particulate organic matter.

OS12R HC: 323 C Monday 1330h

Zooplankton: Feeding, Growth, and Distribution II

Presiding: **N H Marcus,** Florida State University**; R S Lampitt,** Southampton Oceanography Centre

OS12R-01 1330h

Interactions Between Meso- and Micro-Plankton: Deductions From Fine Scale Distributions in Three Dimensions Obtained Using In Situ Holography.

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Interactions between mesozooplankton and their detrital or microplankton prey are not controlled by the average concentrations of these entities in the water column. For many years it has been known that distributions are invariably patchy but the relationships between the patches in the real world have been very hard to deduce. It is these relationships that determine the interactions between an organisms and its food and in order to obtain a deeper understanding of such interactions, observations must be carried out on the appropriate spatial scales. Using a novel in situ holographic camera, we present data from a Scottish Sea loch on the fine scale three dimensional distributions of particles and organisms on a range of spatial scales. We describe the distribution of potential food particles in the cubic centimetre around mesozooplankton and compare this to control volumes outside their swimming range. This enables us to calculate the effects of patchiness on the encounter rates that would be expected in the real ocean.

OS12R-02 1345h

ZOOVIS: A New High-Resolution Digital Still Camera System for Quantifying Zooplankton Distributions and Abundances.

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The zooplankton visualization and imaging system (ZOOVIS) consists of a high-resolution (4.19 megapixel) monochrome digital still camera and strobed light-sheet coupled to a CTD package and connected to a surface computer via an electro-optical cable and winch. ZOOVIS was designed to be a zooplankton CTD a vertical profiling instrument capable of quantifying the distribution and abundance of meso- and macro-zooplankton with concurrent environmental data on comparable spatial and temporal scales. This paper will provide an overview of the system architecture and operation. During the fall of 2001, ZOOVIS was deployed in Knight Inlet, a fjord along the coast of British Columbia, Canada to provide sea-truth for concurrent high-frequency acoustic studies of zooplankton distributions in the vicinity of the fjord sill. Preliminary results from the ZOOVIS deployments during that cruise will be presented.

URL: http://zooplankton.lsu.edu/zoovis.htm

OS12R-03 1400h

Food Limitation of Temperate Marine Copepods: Naupliar and Copepodite Responses to Primary Productivity

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Copepods are the most abundant metazoan grazers in the oceans, yet the response of their growth rates to various environmental factors remains unclear. Part of the uncertainty is due to the differences in response of the developmental stages, since both body size and shape differ significantly between nauplii and copepodites. In order to determine the influences of food and body size on naupliar and copepodite growth rates, artificial cohort analyses were performed on *Acartia* and *Eurytemora* species in the Bay of Fundy during the summer of 2000 under a natural range of chlorophyll a concentrations. Observed growth rates were compared to maximum growth rates published in the literature in order to assess whether the observed rates were at or near maximum, and the relationship between chlorophyll a concentration and growth rates was determined via multiple regression analyses. Over half of the observed growth rates were higher than the maximum values at similar temperatures in the literature, indicating 1) that the published literature does not represent maximum growth, 2) that there are discrepancies between various methods of measuring growth rates of copepods or 3) growth rates vary among populations within species. Copepodite growth rates were positively related to chl a concentration in the >20μm size fraction (r^2 = .45, p=.0005), but not related to body size, while the naupliar growth rates were only related to body size (r^2 = 0.68, p<0.0001), and were not related to chl a concentration in any size fraction (0.2 - 2.0 μm, 2-20μm, >20μm particle size). This indicates either that nauplii do not experience food limitation under natural conditions, or that they are feeding on other food sources which are not measured by chlorophyll analyses. These results suggest that the different life stages of copepods respond differently to varying food concentrations, or that the diets differ significantly among developmental stages. This has important implications for future food web trophodynamic studies in marine systems.

OS12R-04 1415h

Effects of Hypoxia on the Survival and Life History Traits of Acartia tonsa

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Concern for the increasing occurrence of coastal zone hypoxia has generally focused on the direct, short-term impact of reduced dissolved oxygen (DO) levels, on the survival of commercially important species. Copepods, especially the naupliar stages, are important food web components yet only a few studies have considered the effect of reduced DO levels on their survival and behavior. This study considered the impact of sub-lethal oxygen concentrations on copepods. Acartia tonsa were reared at 25 oC at saturating DO (control), and reduced DO concentrations of 1.5 or 0.7 ml/L. Oxygen concentrations were maintained in replicate flasks, by bubbling with air (control), or mixtures of nitrogen and oxygen. Egg production, but not survival was significantly different between the controls and 1.5 ml/L treatment. Survival and egg production were significantly lower at 0.7 ml/L compared to the control. Growth and development rates are also being compared. The results suggest that sub-lethal as well as lethal effects may have important repercussions on population and community dynamics.

OS12R-05 1430h

Copepod Hatching Success Rate in Ecosystems With High Diatom Concentrations the Paradox of Diatom-Copepod Interactions Revisited

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Diatoms dominate phytoplankton assemblages during the spring bloom and in upwelling areas. Copepods are usually the main component of the zooplankton in those areas and prey of most larval fish.

Some recent laboratory studies have suggested that diatoms may have a deleterious effect on the hatching success rate of copepod eggs. This challenges the classic view of the diatom-copepod interactions. Conceptual models of the areas and periods of high productivity in the marine environment, upwelling areas and spring blooms, are based on the energy flowing from diatoms to fish through copepods. If a deleterious effect of diatoms occurs in situ, secondary production by copepods could in fact be limited by their diatom prey. Therefore, our understanding of the energy transfer from primary production to fisheries in some of the most productive and economically most relevant marine ecosystems could be seriously flawed.

As part of a series of field experiments, we have measured diatom concentration and copepod egg hatching success rate in a range of areas representative of those high productivity ecosystems: Gulf of Alaska, Iceland basin, Labrador Sea, Scotian shelf, Gulf of St. Lawrence, Georges Bank, English Channel, Long Island Sound, Oregon and Namibia upwelling areas and South Georgia (Antarctica). Experiments were performed with 16 species of copepods and diatom concentrations ranging from 0.06 to 700 mg C m-3 or from

0.2 to 99 per cent of the microplankton biomass. Generally, hatching success rate varied between as much as 80 and 100 per cent. Although low hatching success rates were occasionally observed, we found no relation between hatching success rate and diatom biomass or dominance in the microplankton. The absence of a deleterious effect in our study can be explained either because the previous laboratory results were not due to toxicity but nutritional deficiency, or because the diatom species observed during our field study were not toxic. In any case, the wide geographic and seasonal range considered in this study lead us to conclude that low hatching rates due to diatoms must be extremely unusual in the field. Consequently, there is no need to revise our conceptual models of energy transfer from phytoplankton to fish in diatom dominated systems.

OS12R-06 1445h

The Active Transport of Carbon and Nitrogen Caused by Zooplankton Diel Vertical Migration

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It has been recognised for some time that the diel vertical migration of interzonal zooplankton might provide a route for the "active" transport of organic material into the deeper layers of the ocean. While such a mechanism may prove to be of importance in global biogeochemical cycles, it still remains a little known component of the "biological pump". A relatively simple field sampling technique has been devised in order to address this issue (Hays et al. 1997), and the results presented here represent the first comprehensive test of this technique. A total of four interzonal migrant zooplankton species were collected from three contrasting marine environments: (1) Calanus sp. from the Clyde Sea Area in western Scotland, (2) Pleuromamma xiphias and Thysanopoda aequalis from the Bermuda Atlantic Time-series Study (BATS) site in the Sargasso Sea, and (3) Nyctiphanes australis from Doubtful Sound in New Zealand. Measurements of body length, dry weight and body carbon and nitrogen content made over the diel cycle revealed strong variability between individuals, being most pronounced in Calanus sp. and least in N. australis. This variability tended to mask any significant diel change in body carbon and nitrogen content, the detection of which is essential for accurately quantifying the active transport of these elements. The potential methodological and biological causes of this variability are discussed, and recommendations made for future attempts to measure active transport in the field. Additional insights into the ecology of vertically migrating zooplankton gained during the course of this study are also discussed.

OS12R-07 1500h

Diel Synchronicity Between Water Column Marine Snow Concentration and Particulate Carbon Flux in the Surface Waters of the Santa Barbara Channel

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Macroscopic ocean aggregates (>0.5 mm), generically categorized as marine snow, serve as the primary transporter of surface-derived organic matter to the ocean interior and seafloor. Any process affecting the size, composition, or abundance of marine snow can alter ocean biogeochemistry, carbon sedimentation, and food availability to mid-water and benthic organisms. Diel variations in water column marine snow abundance have been observed in the surface waters of the Santa Barbara Channel (0-100 m) and in the North Atlantic (270 m). Various processes have been suggested to explain this periodicity such as daily pulses in mixed layer turbulence and grazing of diel vertically migrating zooplankton. However, it is unknown whether this water column signal translates into a diel pulse in carbon flux out of the surface waters. In this field study we investigated the temporal relationship between water column marine snow concentration and sediment trap carbon flux. We deployed a moored sediment trap at 100 m in the Santa Barbara Channel, California which collected samples at 6 hour intervals. A profiling in situ still camera system was used to document marine snow size, abundance and distribution in the upper 100 m every 6 hours in the vicinity of the sediment trap. We found a nighttime decrease in marine snow total particle volume that was concurrent with a nighttime increase in particulate carbon flux to 100m. These data support previous studies of water column marine snow periodicity and indicate that this diel cycle is driven by processes that increase nighttime particle flux rates. Diel flux patterns are likely to have a significant impact on mid-water and benthic ecology particularly with regard to animal grazing strategies, reproductive cycles, and waste production. Pulsed flux may also create patchy vertical distribution of particle associated biota and remineralization products.

OS12R-08 1535h

Uptake of Transparent Exopolymer Particles (TEP) by Marine Copepods

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Transparent exopolymer particles (TEP), at least partly derived from dissolved organic matter released by marine microorganisms, constitute an abundant component of organic carbon in the ocean. Although TEP play an important role in aggregate formation and vertical particle flux, feeding on TEP by marine mesozooplankton may influence TEP-abundance and dynamics in the oceanic environment. We investigated the uptake of TEP generated by the diatom *Thalassiosira weissflogii* by marine copepods. Experiments conducted with ^{14}C-labeled exudates revealed that various developmental stages of *Temora longicornis* actively feed on TEP. While a small fraction of the ingested radioactivity could also be attributed to active DOC uptake, adsorption of radioactivity to the surface of the copepods was negligible. Feeding rates on TEP were low when offered as a single food source. However, in the presence of other particles like diatoms uptake of both TEP and DOC increased substantially. This suggests that copepod grazing could play an important role in the dynamics of TEP in the oceanic surface layers.

OS12R-09 1550h

Influence of Environment and Food Supply on Survival of *Crassostrea gigas* Larvae: A Modeling Study

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A biochemically-based model was developed to simulate the growth, development, and metamorphosis of larvae of the Pacific oyster, *Crassostrea gigas*. The model is unique in that it 1) defines larvae in terms of their protein, neutral lipid, polar lipid, carbohydrate, and ash content, 2) tracks weight separately from length to follow larval condition index, and 3) includes genetic variation in growth efficiency and egg quality to better simulate cohort population dynamics. Simulations show that departure of temperature, salinity or food content from optimum levels reduces larval cohort survival, generally either because some larvae fail to metamorphose successfully or because an increase in larval life span increases losses to predation. Also, different food compositions produce widely varying survivals at the same food concentration. The simulations suggest that the ratio of the combined carbohydrate and lipid pools to protein may best describe the overall quality of the food. In simulations emphasizing genetic variability within the cohort, larvae with high growth efficiency originating from large eggs outperform other egg quality-growth efficiency combinations for most environmental variables, including temperature, salinity, and food content. In contrast, whereas the simulations suggest that the influence of suboptimal temperature, salinity, or food content is to compress genetic variation by uniformly favoring high growth efficiency and large eggs, the simulations with food quality provide evidence of a mechanism that would expand genetic variation, because variations in food quality favor a much broader range of genetic types. The simulations support the supposition that food quality is an important variable controlling larval cohort success.

OS12R-10 1605h

Spatial Variability of Meso- and Macro-zooplankton in Surface Waters Near Offshore Petroleum Platforms in the Northern Gulf of Mexico

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Offshore petroleum platforms in the northern Gulf of Mexico are notable for their large aggregations of reef-associated and pelagic fishes. One hypothesis explaining increased numbers of fishes near these complex structures is potential enrichment of food resources. Holoplanktonic macrozooplankton have been shown to be a major component of the diets of one of the most abundant medium-sized pelagic fish (*Caranx crysos*) at mid-shelf petroleum platforms in the northern Gulf of Mexico. During the summer of 2000, samples of meso- and macro-zooplankton were collected from the up-current and down-current sides of two platforms located east of the Mississippi Delta. In addition, acoustic backscattering volume measurements were recorded during plankton sampling using a calibrated 1200 kHz acoustic Doppler current profiler. This paper will examine spatial patterns of zooplankton biomass in the vicinity of offshore petroleum platforms based on net and acoustic surveys and discuss the implications of these patterns for food availability to *C. crysos*.

OS12R-11 1620h

Variations in Copepod Community Structure off the Washington and Oregon, USA Coast in June and September During the Recent El Niño-La Niña Period

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During June and September 1998-2000, we conducted detailed hydrographic and plankton surveys off the coasts of Oregon and Washington, USA. Similar sampling grids were followed each cruise, ranging from 47.9°N to 44.7°N and from 2 to 60 km offshore. 195 vertically-towed 0.5-m net samples were collected, enumerated and analyzed for copepod community structure. Non-metric multidimensional scaling was used to identify seasonal and annual differences in copepod community composition. Cluster analysis and Indicator species analysis of all cruises combined identified unique copepod communities. The El Niño period of June 1998 was dominated throughout the sampling area by "warm water" species such as *Corycaeus anglicus*, *Paracalanus parvus*, and *Metridia pacifica*. In September 1998, *Calanus pacificus*, *Acartia tonsa*, and *Clausocalanus* spp. were added to the list of species indicative of El Niño. During the La Niña periods of June 1999 and 2000 the copepod community had shifted to include the subarctic neritic species, *Calanus marshallae*, *Pseudocalanus mimus*, and *Acartia longiremis*. In September of those two years the subarctic species were still prominent near-shore, while "warm water" species were more abundant at the shelf break. There was no indication of differences alongshore nor with the Columbia River plume, and temperature versus salinity plots did not indicate that these cluster groups were associated with particular water masses.

MON

OS12R-12 1635h

Mesozooplankton Abundance and Distribution in the Western Arm of Lake Superior

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Traditionally, Lake Superior has been regarded as an ultra-oligotrophic body of water. Results from early studies indicated that low zooplankton abundance was found throughout the lake. More recent studies provide data supporting a heterogeneous distribution of zooplankton patches correlated with mesoscale physical features.

Using an undulating instrument package consisting of an Optical Plankton Counter (OPC), fluorometer and CTD, a 2-day survey was conducted throughout the western arm of Lake Superior in late September, 2000. Data were integrated into 2m depth bins and used in conjunction with data from net tow samples, gathered at stations within the survey grid, to investigate the spatial variability of mesozooplankton in terms of species diversity, percent composition, and relation to mesoscale physical features.

Results clearly identify a warm-water surface layer above the shallow depths of the south shore, with colder waters upwelling along the north shore. The highest densities of phytoplankton occurred along the boundaries of the water masses as well as within the warm, surface layer. Zooplankton, on the other hand, were most heavily concentrated in the deep, cold waters, reaching abundances up to 20,000 individuals m^{-3}, differing from previous views of a positive correlation between abundance and temperature. In terms of species composition, the calanoid copepod *Leptodiaptomus sicilis* was most abundant at all stations sampled, typically comprising 40% of the sample in warm water regions and 70% of the sample in cold regions. In terms of biomass, however, large bodied cladocerans such as *Daphnia galeata mendotae* and *Bythotrephes cederstroemi* dominated in the warm water regions. In cold waters, mysids and large-bodied copepods such as *Limnocalanus macrurus* comprised more than 50% of the total estimated biomass.

OS12S HC: 318 B Monday 1330h

Coastal Sedimentation II

Presiding: **A S Ogston,** University of Washington**; S J Bentley,** Louisiana State University

OS12S-01 1330h

Sediment Properties, Grain Size Distributions, and Acoustic Scattering From the Sea Floor

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Sound speed and bulk density are the two sediment properties that effectively control high-frequency (10-100 kHz) acoustic scattering from the sea floor. This assertion is based on a number of acoustic experiments conducted in diverse environments over the past 20 years and codified in a backscattering prediction model by the University of Washington-Applied Physics Laboratory. An extensive database of sediment properties and backscattering measurements has been developed from which empirical correlations among geological index properties and geoacoustic properties are made. Using multiple regression techniques, we relate sediment sound speed and sediment density to sediment grain size parameters of mean grain size, grain sorting, percent gravel, percent silt, and percent clay. Attempts to relate measurements of seafloor roughness, another major factor controlling acoustic scattering, to grain size parameters result in some ambiguities. Ultimately, we test the respective abilities of grain size and roughness parameters to accurately predict high-frequency scattering from the sea floor.

OS12S-02 1345h

Effects of Benthic Fauna on Acoustic Scattering from the Seafloor

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Biological processes (bioturbation) are known to alter seafloor morphology and sediment physical properties. Seafloor characteristics profoundly affect the backscatter of acoustic energy from the seafloor and, in turn, acoustics can be used to characterize types and quantify rates of biological processes. Two examples of the use of forward and inverse acoustic models to characterize these relationships are given. The first demonstrates the effects of temporal changes of seafloor morphology on acoustic backscatter strength in sandy sediment. The second experiment, in soft muddy sediment, demonstrates the effects of discrete scattering and changes in sediment heterogeneity on volume backscattering from the seafloor. Both experiments include the effects of naturally occurring seafloor changes and artificial experimental manipulations. The authors conclude with speculations on the future use of acoustics to characterize biological processes at the seafloor.

OS12S-03 1400h

Multibeam Imagery and Surface Sediment Distribution of the Dynamic Inner Shelf of the Eel Margin, Northern California

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A high-frequency (300 kHz) multibeam sonar survey was conducted on the inner shelf of the Eel margin in August 2000 in order to understand the sedimentation patterns of the inner shelf. Data were acquired in water depths from 8-m to 65-m with a hull-mounted Simrad EM 3000D multibeam echosounder, which simultaneously provided depth and backscatter information in a swath that was typically 8 times the water depth. Grab samples were collected during the same cruise in order to ground-truth the multibeam imagery and to learn about the surface sediment distribution over the survey area. Quantitative spatial patterns and correlations have been sought using empirical orthogonal function (EOF) analysis. By combining the surface sediment information with the multibeam data we are able to better understand sediment transport pathways and the dynamics of the sedimentary environment.

The multibeam data reveals the general morphology and texture of the inner shelf as well as the presence of distinct features, including shore-normal scours, which appear to be related to sediment transport events. In addition, bedforms, typically sand waves with wavelengths of approximately 1-m, were observed in the sonar imagery and may contribute to broad patterns in backscatter. A directionality dependence of backscatter that was noted during our survey may be related to the presence of these bedforms, particularly in the sandy regions.

Surface sediment analysis reveals that some of the backscatter patterns are in fact due to changes in sediment type, while others are likely due to changes in seabed roughness. Most of the inner shelf is characterized by high backscatter and is composed of fine sand and there is a gradual transition to muddy sediments toward the mid-shelf, which is characterized by lower backscatter. The EOF analysis shows that the sediments of the high backscatter region of the inner shelf are generally well correlated with the exception of a distinct band extending from the entrance to Humboldt Bay offshore to the region of muddy sediments. These sediments are related to those of the mid-shelf depocenter and may indicate an offshore sediment transport pathway for fine sediments originating in the Eel River. This is further substantiated by the presence of shore-normal scours in this region, which are indications of offshore sediment transport.

OS12S-04 1415h

Properties of Inner-Shelf Sediment: An Example From Northern California

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To understand the sedimentary history of a siliciclastic, tectonically active inner-shelf environment, fifty vibracores were collected in water depths ranging from 20 m to 55 m on the Eel margin, northern California. The cores were digitally photographed and x-rayed to reveal sedimentary structure. They were analyzed also for bulk density and p-wave velocity at 1 cm increments down the cores. Additional laboratory analyses included: the amount of silt and clay (i.e., percent mud), detailed grain-size analysis of the sand fraction, and evaluation of the presence of ^{210}Pb and ^{137}Cs. Cores exhibit changes in grain size along and across shelf, as well as vertically. Finer sand dominates within ∼10 km of the Eel River mouth, which is consistent with Stokes settling from the Eel River plume. Coarser sediment is found north of the Eel River mouth (>10 km) and may have a northern source or be a remnant of earlier sea-level conditions. Vertical variations in the cores preserve the record of extreme environmental events on the Eel margin. Muddy layers that correlate with large floods are found interbedded with sand. Two types of muddy layers are observed. Type I has >90% mud and is identifiable through visual observation and a decrease in bulk density. Type II is more diffuse due to partial winnowing by concurrent or subsequent wave activity, the mud layers are not visually obvious, and they are characterized by an increase in bulk density due to poor sorting of sediment. Using ^{210}Pb and ^{137}Cs geochronology to identify the surface of the mud layer deposited by the 1964 flood, the estimated accumulation rate of sand on the inner shelf since that time ranges from 1.3-3.3 cm/y. Excluding the preservation of significant flood layers (e.g., 1995 and 1997 floods) on the inner shelf, approximately 6-13% of the fine-grained sediment discharged by the Eel River over the last 36 years is accumulating interspersed with the inner-shelf sand. An additional ∼1% of the fine-grained sediment discharged since 1964 may be accounted for as distinct flood layers interbedded with the inner-shelf sand. Between 53-62% of the sand discharged by the Eel River, both in suspension and as bedload, can be accounted for on the inner shelf. Other regions that may be accumulating sand include the mid-shelf mud deposit and the Eel canyon. Thus, the inner-shelf region plays a significant role in controlling the fate of sand and mud supplied from terrestrial sources.

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The Role of Fluid Muds Composed of Amazon Sediment on Shoreface Accretion in French Guiana

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A combination of remotely sensed, change detection surveys, particle-reactive radioisotopes in sediment cores, and water column data were utilized in studies of the shoreface mud belt in French Guiana to examine how mangrove recruitment and shoreline progradation and erosion is controlled by episodic changes in alongshore Amazon sediment supply. Aerial and satellite time series images demonstrate that mangrove areas erode at rates of 1-3 km2/yr for each ∼30-km-long shoreline zone not protected from wave attack by an offshore mudbank. Shorelines opposite mudbank zones are observed to accrete at rates up to 5 km2/yr. High inventories of 7Be and low 234Th in sediment cores collected from the intertidal and shallow subtidal (<3 m) zone along the leading edge of an advancing mudbank in western French Guiana demonstrate that a large proportion of the sediment in the inner mudbank likely originates from eroded mangrove deposits immediately updrift. Downcore radiochemical inventories further suggest that limited sediment deposition takes place in the intertidal zone during mudbank passage, an observation that suggests the need for a mechanism to get sediment from the subtidal mudbank to the shoreline above MHW where observations show it is rapidly colonized and stabilized by mangroves. Fluid muds are present ephemerally in the intertidal zone and relatively continuously in the shallow subtidal as outlined by CTD/OBS cast data. Radiochemical inventories and anomalous temperature/salinity signals in the intertidal fluid muds suggest an offshore source for these dense (∼100 g/l) bottom layers. We hypothesize that fluid muds are driven to the shoreline by coastal setup during high-energy season. Newly deposited muds on the shoreline have radiochemical signatures that match those in the fluid mud and are distinct from older, underlying sediments. We outline a