Seasonal coupling in the Gulf Stream region between the atmosphere and ocean via feedback to surface heat flux is investigated using models and observations. Heat budget analysis in a regional diagnostic model shows that on interannual time scales, the heat content in the upper ocean leads the flux of heat from the ocean to the atmosphere by approximately three months, with a warmer ocean leading to oceanic heat loss. These results are consistent with results from an eddying, data-constrained simulation provided by the ECCO2 (Estimating the Circulation and Climate of the Oceans, Phase II) project. To investigate the seasonal dependence of the coupling, we calculated the lag correlation for multi-year timeseries of heat content and surface heat flux for each month of the year. Significant correlations were found between March upper ocean heat content and June surface heat flux. Correlations between February and April heat content with June surface heat flux were also large, with the heat stored above approximately 600 m. The reasons for the high correlation with June surface heat flux are also investigated. (Abstract ID 11817)

Thompson, P. R., College of Marine Science, University of South Florida, St. Petersburg, USA, fillupthompson@gmail.com
Mitchum, G. T., College of Marine Science, University of South Florida, St. Petersburg, USA, mitchum@marine.usf.edu

LOW FREQUENCY COASTAL SEA LEVEL ALONG THE AMERICAS

Interannual to decadal variations in tide gauge sea levels from the western boundary of the North Atlantic are highly coherent from Central America to Nova Scotia. Half of the variance is captured by a single spatially uniform time series despite geographic and oceanographic boundaries, and the processes responsible for this coherence were investigated. The GECCO ocean model adequately reproduces the observed coastal variability, and a diagnosis of monthly mean model fields showed that the coastal height variations are coherent with open ocean variations over most of the western half of the basin. These variations can be simulated with a simple Rossby wave model forced by winds over the Atlantic. Although these are coastal tide gauges, at these low frequencies the data primarily reflect basin-scale rather than coastal processes, which suggests caution in the interpretation of these data in coastal studies. (Abstract ID 11603)

Thomsen, J., IFM-GEOMAR, Kiel, Germany, jthomsen@ifm-geomar.de
Casties, I., IFM-GEOMAR, Kiel, Germany, icasties@ifm-geomar.de
Pansch, C., IFM-GEOMAR, Kiel, Germany, cpansch@ifm-geomar.de
Körtzinger, A., IFM-GEOMAR, Kiel, Germany, akörtzinger@ifm-geomar.de
Melzner, F., IFM-GEOMAR, Kiel, Germany, fmelzner@ifm-geomar.de

EFFECTS OF ELEVATED pCO_2 AND NUTRITION ON *MYTILUS EDULIS* GROWTH: COMPARISON OF FIELD AND LABORATORY STUDIES

Whereas highly elevated seawater pCO_2 (>2000µatm) reduces growth of the blue mussel *Mytilus edulis*, calcification rates are maintained under intermediate pCO_2 levels (<1500µatm) when food supply is sufficient. In a laboratory study, post settled larvae were exposed to different pCO_2 and feeding treatments. Calcification was lowered by high pCO_2 but CO_2 impacts were much less pronounced than the effects of variations in food supply. This was also observed in the high pCO_2 and low pH (average pH 7.76) Kiel Fjord. Specimens were characterized by much higher calcification rates compared to mussels that were transplanted to a low pCO_2 site (average pH 7.93). These results can be explained by two-fold higher particulate organic carbon (POC) concentrations in the Fjord indicating that calcification is a function of energy supply rather than carbonate chemistry. Thus, today's dominance of mussels in Kiel Fjord is a consequence of high CO_2 tolerance of the earliest benthic stage and energy supply in an eutrophic habitat which enables high growth rates. In conclusion, lowered rates of calcification might be a consequence of enhanced energy turnover under elevated pCO_2. Under sufficient feeding conditions, mussel calcification appears to be relatively robust towards future ocean acidification. (Abstract ID 12344)

Thomson, J., University of Washington, Seattle, USA, jthomson@apl.washington.edu
Schwendeman, M., University of Washington, Seattle, USA, mss28@u.washington.edu
Gemmrich, J., University of Victoria, Victoria, Canada, gemmrich@uvic.ca

OBSERVATIONS OF FETCH-LIMITED WAVE EVOLUTION

Observations of surface-gravity wave evolution, including growth, dissipation, and spectral transformation, are applied to evaluate a radiative transfer budget for wave energy. The observations are from the Strait of Juan de Fuca during a series of winter storms with wind speeds up to 20 m/s and wave heights up to 2.5 m. Wave spectra, wind stress, and breaking dissipation are measured from an autonomous wave-following platform, termed SWIFT, which uses uplooking sonars to measure turbulent dissipation within breaking crests. A quasi-equilibrium of wind input and breaking dissipation is shown to be robust, even in the case of rapid wave development under strong forcing. This is consistent with an observed equilibrium slope in the high-frequency tails of the wave spectra. These in situ observations are compared with breaking crest-length distributions obtained from video recordings of the sea surface, in which spectral components of the breaking field are identified. (Abstract ID 9955)

Thorne, L. H., Stony Brook University, Stony Brook, USA, lesley.thorne@stonybrook.edu
Hodge, L. W., Duke University , Beaufort, USA, lynee.williams@duke.edu
Read, A. J., Duke University, Beaufort, USA, aread@duke.edu

COMBINING PASSIVE ACOUSTICS AND SATELLITE OCEANOGRAPHY TO EVALUATE CETACEAN HABITAT USE IN THE SOUTH ATLANTIC BIGHT

In the South Atlantic Bight (SAB), the Gulf Stream (GS) front and Gulf Stream Frontal Eddies (GSFEs) are known to provide important habitat for foraging seabirds, but their effect on cetacean abundance and distribution has not been considered. Using data from moored High-frequency Acoustic Record Packages (HARPs) in Onslow Bay, we assessed the effects of dynamic oceanography on odontocete vocalization rates. Satellite images of sea surface temperature during HARP deployments were used to identify local water masses (Gulf Stream, shelf waters and Gulf Stream frontal eddies) relative to HARP locations for three HARP deployments, representing a total deployment time of 313 days (10/10/2007 – 01/16/2008; 04/24/2009 – 08/9/2009; and 11/8/2009 – 02/24/2010). Both the total duration of all vocal events and the total duration of click events, respectively, were analyzed for all odontocetes together, and also for sperm whales (*Physeter macrocephalus*), Risso's dolphins (*Grampus griseus*), short-finned pilot whales (*Globicephala macrorhynchus*), and delphinids separately. The presence of GSFEs and the location of the GS front influenced cetacean vocalization rates and we discuss these findings in relation to the ecology of the study species. (Abstract ID 12484)

Thornton, D. C., Texas A&M University, College Station, USA, dthornton@ocean.tamu.edu
Brooks, S. D., Texas A&M University, College Station, USA, sbrooks@geos.tamu.edu
Deng, C., Texas A&M University, College Station, USA, dch312@gmail.com
Vidaurre, G., Texas A&M University, College Station, USA, german.vidaurre@gmail.com

MARINE DISSOLVED ORGANIC MATTER (DOM) AS A COMPONENT OF MARINE AEROSOL AND CLOUND CONDENSATION NUCLEI (CCN) OVER THE PACIFIC OCEAN

The ocean contains a large pool of non-living organic carbon estimated to be 1000 Pg C, of which dissolved organic carbon (DOC) contributes 662 Pg C. While mechanisms for transferring material from surface ocean to atmosphere are well established, there has been little research on the role of marine organic matter in atmospheric processes. We participated in a transect of the Pacific Ocean during which we continuously measured cloud condensation nuclei (CCN) activation and a suite of chemical and biological variables. Secondly, size-fractionated sea water sample were collected, re-aerosolized, and analyzed to determine their CCN activation. These experiments indicated that marine high molecular weight dissolved organic matter (DOM) is an efficient CCN. Aerosol particles collected during the cruise were analyzed by Raman micro spectroscopy and contained a range of organic moieties. During a follow-up cruise, biopolymers in the form of gel particles were found to be concentrated in the sea surface microlayer (SML) compared with the underlying water. Our results indicate that marine DOM contributes to marine aerosol with the potential to significantly affect CCN activation. (Abstract ID 10472)

Thoroughgood, C. A., MARACOOS / University of Delaware, Newark, USA, ctgood@udel.edu
Kuska, G. F., MARACOOS / University of Delaware, Newark, USA, kuska@maracoos.org

STAKEHOLDER ENGAGEMENT—A CRITICAL ELEMENT TO MARACOOS SUCCESS

The accomplishment of the MARACOOS mission "To seek, discover, share, and apply knowledge and understanding of our coastal ocean" requires a societal data translation infrastructure that complements the data generation and modeling infrastructure. While modern society has come to accept the benefits of science and technology, there are still situations where multiple use demands, as is the case with the regional marine and coastal resources, cause conflict. What is the best approach for MARACOOS to use in serving complex societal needs? The usual response to this question is education; however, in today's world of social networking, the answer is engagement. The vision of MARACOOS is to establish a Stakeholder Liaison Service, with Stakeholder Liaisons possessing expertise that can be directed to MARACOOS' five theme areas: (1) Maritime Safety, (2) Ecological Decision Support, (3) Water Quality, (4) Coastal Inundation, and (5) Offshore Energy. This Stakeholder Liaison Service, designed to expand information dissemination facilitated by technology, facilitate synthesis integration and translation of MARACOOS products to appropriate end uses for stakeholders, and formalize a system for Stakeholder feedback, will be discussed. (Abstract ID 12051)

Thorrold, S. R., Woods Hole Oceanographic Institution, Woods Hole, USA, sthorrold@whoi.edu
McMahon, K. W., Woods Hole Oceanographic Institution, Woods Hole, USA, kmcmahon@whoi.edu
Berumen, M. L., King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

REVISITING THE SOURCE OF CARBON FUELING FISHERIES ON CORAL REEFS