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Alternate Trophic Pathways Support Enhanced Bathypelagic Biomass Over a Mid-Ocean Ridge System

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THE EFFECT OF SALINITY ON PARTICLE FILTRATION RATES OF THE WEST AFRICAN MANGROVE OYSTER, CRASSOSTREA TULIPA

The potential for developing a fisheries industry based on the West African mangrove oyster is high in Ghana. The oyster, Crassostrea tulipa, is a euryhaline organism that thrives in the coastal lagoons of the Ghanaian shoreline. The organism is commonly known, yet further research should be done in preparation for fishery development. Subsequently, this experiment focused on exploring the precise relationship between salinity and filtration rates of the oyster. Oysters gathered from two types of coastal lagoons (closed/open) were exposed to salinities (parts per thousand: ‰) varying from 0‰ to 35‰ and filtration rates were measured based on one-hour intervals. Data showed that salinity had no significant effect on particle filtration rate (measured in parts per million per minute) of a given oyster type. However, significant difference did exist between the filtration rates of oysters collected from the two different types of lagoon; oysters collected from the closed lagoon had a significantly greater mean filtration rate across all salinity levels than oysters collected from the open lagoon (3.485 ppm/min, open lagoon; 6.567 ppm/min, closed lagoon). This may indicate the presence of two distinct sub-types of C. tulipa.

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ALTERNATE TROPHIC PATHWAYS SUPPORT ENHANCED BATHYPELAGIC BIOMASS OVER A MID-OCEAN RIDGE SYSTEM

A classic paradigm of oceanic ecology is that pelagic animal biomass decreases exponentially with depth. Results of a muti-year study of the distribution and ecology of the pelagic fauna over the northern Mid-Atlantic Ridge (MAR), from Iceland to the Azores, revealed that water column biomass maxima can occur at deep meso- and bathypelagic depths (>750 m). Further, topographic association of the deep-pelagic fauna occurs at some locations. For example, bathypelagic fish abundance and biomass maxima were observed within the benthic boundary layer (<200 m above the bottom) during the 2004 *G.O. Sars* MAR-ECO expedition. Results of a pelagic food-web model over the MAR suggest that alternate trophic pathways contribute significantly to this deep biomass maxima. Consumption of decapod crustacea and gelatinous zooplankton represented major portions of the total consumption by pelagic fishes. Stable isotope analysis of 63 species, from zooplankton to large benthic predators, suggest short food chains and high trophic efficiency may account for enhanced deep-pelagic biomass.

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REGIME SHIFTS IN LOCAL STORMINESS, SEA LEVEL VARIATIONS, CURRENTS AND WAVE CONDITIONS IN THE EASTERN BALTIC SEA

The paper presents a statistical analysis of sea level data obtained from the Estonian tide gauges over the period 1842-2009, the results of hydrodynamic modelling experiments with a 2D model, an analysis of wind data from coastal stations over the period 1966-2008 and a corresponding wave hindcast. After adjusting the sea level time series to take into account regional post-glacial land uplift, the mean sea level series exhibit upward trends of 1.5-2.8 mm/yr. The trend is positive both in local storminess and annual maximum sea levels (3-11 mm/yr). There are climate change induced site-dependent changes in current patterns and upwelling occurrences. The significant wave heights exhibited the last high stage in 1980-95 and a slightly decreasing overall trend. As a result of northward shifts in cyclone trajectories along the so-called North Atlantic storm track, annual maximum waves have increased along the windward coast of West Estonia, but decreased on the northern coast. The implications of hydrodynamic regime shifts may apply on biotic component via physical disturbance and turbidity effects, as well as through changes in thermohaline and nutrient regime.

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QUANTIFYING THE INFLUENCE OF SEA WATER CHEMICAL AND BIOLOGICAL FACTORS ON AIR-SEA FLUXES OF TRACE GASES IN THE GULF OF MAINE, USA

Perturbations to atmospheric composition and associated radiative forcing can affect sea surface temperature, salinity, acidity, and biological productivity, and changes in sea water parameters can alter the composition of the atmosphere by influencing the exchange of trace gases between the ocean and the atmosphere. A quantitative understanding of the factors influencing air-sea exchange of trace gases is important in identifying potential climate feedback cycles and improving climate models. As part of an interdisciplinary effort to examine the changing coastal ocean, paired surface sea water equilibrator-headspace samples and ambient air samples, collected seasonally from 2005 to 2007 in the Gulf of Maine, USA, were analyzed on a GC/ECD/FID/MS system and were used to calculate air-sea fluxes of trace gases. Compounds measured included halocarbons (methyl halides, chloroform, bromoform), sulfur compounds (OCS and DMS) and biogenic compounds (isoprene and monoterpenes). Quantitative relationships between trace gas fluxes and ocean chemical and biological parameters (CDOM, chlorophyll A, pH, pCO_2, pO_2) were examined. The influence of these factors on the daily, seasonal and inter-annual variability in air-sea fluxes of the investigated trace gases will be discussed.

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DISTRIBUTION AND TROPHIC ECOLOGY OF BATHYLAGUS EURYOPS (TELEOSTEI: MICROSTOMATIDAE) ALONG THE NORTHERN MID-ATLANTIC RIDGE

The distribution and trophic ecology of many deepwater fishes in the North Atlantic are well documented, particularly for commercially important species. However, few studies based on large-scale latitudinal and vertical gradients have been performed. In June 2004, the MAR-ECO (Census of Marine Life) research expedition aboard the R/V G.O. Sars sampled the deep-pelagic fauna over the northern Mid-Atlantic Ridge with the objective of quantitatively assessing the nekton associated with the ridge from Iceland to the Azores. Catch data revealed Bathylagus euryops to be the biomass dominant species and ranked 3rd in total abundance. Generally considered to be a relatively stable and homogenous environment, the deep sea contains a diversity of habitats that are often related to changes in topographic features and associated hydrography. In this paper, we explore the distribution of B. euryops as a function of depth, ridge section, and hydrographic region over a mid-ocean ridge system. Furthermore, trophic analyses revealed that gelatinous zooplankton represent a significant component of the diet of B. euryops, emphasizing that ecosystem processes of the northern MAR differ from 'typical' open ocean patterns.

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