

Phytoplankton blooms provide the sole source of energy viz. particulate fluxes to the majority of deep sea communities. These communities are reliant on biogenic fluxes for growth, reproduction and recruitment. Productivity exerts controls on biodiversity and ecosystem function, with peaks in biodiversity occurring at intermediate water depths (~3000m). Environmental forcing has led to long term changes in community composition at the Porcupine Abyssal Plain and Pacific. In this study we aim to assess the role of productivity in biodiversity and ecosystem functioning in an abyssal (3000m) and continental slope (1200m) setting at two contrasting sites: the oligotrophic W. Mediterranean and the more eutrophic Galicia Bank. The approach will involve: (1) the use of stable isotopes and biomarkers to assess the quality and origin of the food source (2) biomarkers with both bulk and compound specific isotope analysis in order to assess the response of the fauna to the food source. We hypothesise that: (1) biodiversity will peak at abyssal sites and at Galicia Bank (2) productivity exerts greater control on ecosystem function at Galicia Bank. Preliminary results are presented.

#### **Session 2.4. Broad Scale Patterns And Sources Of Variation In Biodiversity-Ecosystem Functioning Relationships**

Chairs: Magda Vincx; Katja Philippart; Tasman Crowe; Steve Hawkins; Lisandro Benedetti-Cecchi

##### **THE IMPACT OF SEABED DISTURBANCE ON THE DIVERSITY OF MEIOFAUNA COMMUNITIES ? LINKING FIELD AND LABORATORY OBSERVATIONS.**

Schratzberger Michaela, Lowestoft Laboratory, Centre for Environment, Fisheries and Aquaculture Science, United Kingdom.

Lampadariou Nikolaos, Institute of Oceanography, Hellenic Centre for Marine Research, Iraklion, Greece.

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Vanden Berghe Edward, Rutgers University, Institute of Marine and Coastal, New Brunswick, USA.

Broad Scale Patterns And Sources Of Variation In Biodiversity-Ecosystem Functioning Relationships.

##### **CHANGES IN BENTHIC DIVERSITY AND ECOSYSTEM FUNCTION IN RESPONSE TO ORGANIC ENRICHMENT FROM FISH FARMING.**

Papageorgiou Nafsika, Kalantzi Ioanna; Apostolaki Eugenia; Sevastou Katerina; Karakassis Ioannis, Biology Department, University of Crete, Crete.

The benthic enrichment gradient was studied in four Mediterranean areas affected by fish farms. In every area the macrofauna species composition, abundance and biomass was determined at 6 sampling stations and a series of diversity metrics were calculated. For better understanding of the environmental change, in addition to the biotic indices, a number of geochemical variables (redox potential, labile and refractory organic matter, MD, sulfide concentration, Phosphorus concentration etc) and ecosystem processes (oxygen consumption, mineralization of nitrogen) were measured for every gradient. The nonparametric rank correlation analysis between all possible pairs of diversity, geochemical and ecosystem function variables in the data set showed a large number of significant positive or negative correlations. Furthermore, in order to study the combined effect of changes in sediment geochemistry and biodiversity metrics we used multiple stepwise regression using ecosystem function descriptors (O<sub>2</sub> consumption, N mineralization) as dependent variables. This analysis resulted in multiple regression models explaining a large proportion (60-90%) of the variability of the data. Our results indicate that ecosystem function changes considerably in response to both geochemical variables and biodiversity metrics.

##### **NEMATODE SIZE AND SHAPE FROM THE SHELF TO THE DEEP SEA: ADAPTATIONS TO BENTHIC ECOSYSTEM FUNCTIONING.**

Vanaverbeke Jan; Franco Maria; Steyaert Maaïke, Marine Biology Section, Ghent University, Belgium.

Lampadariou Nikolaos, Hellenic Centre for Marine Research, Heraklion, Greece.

Muthumbi Agnes, Department of Zoology, University of Nairobi, Nairobi, Kenya.

Vandepitte Leen; Vanden Berghe Edward, VLIZ, Oostende, Belgium,

Soetaert Karlina, NIOO-CEME, Yerseke, The Netherlands.

We investigated changes in nematode biomass, length and width from the shelf to the deep sea. While previous research indicated that food input and sediment grain size were important factors to explain nematode individual biomass, our results (based on more shelf data than ever before) indicate that sediment grain size is not. Food input is indeed an important factor, since it is at the basis of all biogeochemical processes. Mineralisation causes vertical oxygen gradients leading to adaptations in nematode width and length to optimize nematode survival in oxygen stressed sediments. In sediments where mineralisation is fast, shorter nematodes are dominant. Being short allows for a combination of maintained mobility and a faster reproduction needed to sustain the nematode populations in food poor habitats. A further decrease in length is always coupled with an increase in width irrespective of geographical area or depth. The increase in width allows for the storage of reserve substances and decreases the risk of being preyed upon. Therefore, nematode size and shape are influenced by ecosystem functioning rather than physical constraints and food input as such.

#### MARINE BIOFILM BACTERIA DEVELOPING ON TEST PANELS DYED BY SOME ANTIFOULING PAINTS IN THE MARINA OF IZMIR BAY, TURKEY.

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Kocuyigit Ali; Ozdemir Guven, Microbiology, Science Faculty, Izmir, Turkey.

Marine biofouling is a natural process which imposes important economical losses on many man-related activities such as marine transport. In this study, we have examined isolation of bacteria from the initial stage of biofilm that formed on coated with four different marine paints (triazine diamine, fluorine, zinc-oxide, copper-oxide) and one rustproof paint test panels that had been exposed to natural seawater in the marina of the Izmir Bay. The first results of the study were shown that there was bacterial growth on all test panels and was significant differences between panels when the viable counts compared. Twenty-six strains were isolated and 15 selected bacterial strains were identified. Phylogenetic analysis using 16S rDNA sequences indicated that the 15 strains belonged to 5 different genus (*Alteromonas*, *Pseudoalteromonas*, *Vibrio*, *Klebsiella*, *Exiguobacterium*)

#### ANTHROPOGENIC DISTURBANCE OF DEEP-SEA MEGABENTHIC ASSEMBLAGES: A STUDY WITH REMOTELY-OPERATED VEHICLES IN THE FAROE-SHETLAND CHANNEL, NE ATLANTIC.

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The effects of local-scale anthropogenic disturbance from seabed drilling on epibenthic megafaunal abundance, diversity and assemblage pattern were examined in three Faroe-Shetland Channel hydrocarbon fields at 420 m (Schiehallion), 508 m (Foinaven) and 600 m (Laggan) water depth with a range of disturbance regimes and faunal assemblages associated with water temperature. Remotely Operated Vehicle video allowed high-resolution assessment of assemblage patterns and disturbance extent. Disturbance was high within 50 m of the drill site where spoil was clearly visible on the seabed, with depressed abundances (individuals ha<sup>-1</sup>: Foinaven 1900; Schiehallion 2178; Laggan 244) and diversity ( $H' = 1.75$  Foinaven; 1.12 Schiehallion; 1.68 Laggan) from smothering effects. These effects extended to around 100 m from the drill site, although this varied with current regime and nature of drilling activity. Further from the drill site megafaunal assemblages were similar to background with increased diversity ( $H' = 2.02$  Foinaven; 1.77 Schiehallion; 1.98 Laggan) and abundance (individuals ha<sup>-1</sup>: Foinaven 16484; Schiehallion 5477; Laggan 9982). Responses of megafaunal assemblages were complex, controlled by differing effects to individual species often based on their motility.

#### THE RELATIONSHIP BETWEEN BIODIVERSITY AND FUNCTIONING OF SOFT SEDIMENT ECOSYSTEMS WITH VARIABLE REGIMES OF DISTURBANCE.

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The data presented here is an output of BIOFUSE, a MarBEF Theme 2 RMP. The composition (and biodiversity) of infaunal assemblages were manipulated within 2 soft sediment systems (Scotland and the Netherlands). Variable mesh sizes were buried within the sediment to produce infaunal assemblages of different diversity and structure within the test areas. These systems were monitored in order to observe how ecosystem properties changed as a function of these altered assemblages in response to varying levels of environmental stress, in this case organic enrichment. The level of enrichment or mesh size had no effect on the properties of the sediments, highlighting the resilience of these systems to disturbance and changes in diversity. This experiment is currently on going and further analysis is yet to be done. This data will be included in the final poster presentation.