

## Red sed auditorium

### Session 2.1 Coastal marine benthic biodiversity and ecosystem process under uncertain environmental futures

Chairs : Martin Solan; Dave Paterson; Dave Raffaelli; Piran Whit.

16:30 – 16:45 THE ROLE OF MACROFAUNA IN THE FUNCTIONING OF A SEA FLOOR: IS THERE ANY SEASONAL, DENSITY OR FUNCTIONAL IDENTITY EFFECT?

Braeckmand Ulrike; Vincx Magda, Marine Ecology, Ghent University, Belgium.

Provoost Pieter, Ecosystem studies, NIOO-CEME, Yerseke, The Netherlands.

Gribsholt Britta, Department of Biology, Marine Biological Laboratory, Helsingor, Denmark.

Middelburg Jack; Soetaert Karlina, Ecosystem studies, NIOO-CEME, Yerseke, The Netherlands.

Vangansbeke Dirk, Vanaverbeke Jan, Marine Biology, Ghent University, Ghent, Belgium.

To assess the effects of density declines and species loss on benthic ecosystem functioning, we investigated the importance of three different functional groups of macrobenthos in the benthic processes of the Belgian Continental Shelf. As macrobenthic activity depends on temperature and food availability, we performed two mesocosm experiments: before sedimentation of the phytoplankton bloom and after. Single – species treatments of key-species belonging to three different functional groups (*Abra alba*, *Lanice conchilega* and *Nephtys* sp.) were added to microcosms at three density levels (average natural - lower - very low) to account for possible density declines. Oxygen and nutrient fluxes as well as bioturbation were measured. Both before and after phytoplankton bloom, *L. conchilega* had more pronounced influences on benthic respiration and nutrient release than *A. alba* and *Nephtys* sp.. *A. alba* appeared to be a more effective bioturbator than *Nephtys* sp.. Moreover, ecosystem functioning (as benthic respiration, nutrient fluxes and bioturbation) seems to be related to animal densities. Therefore, a decrease in densities (due to anthropogenic or natural disturbances) may have implications for ecosystem functioning rates at the study area.

16:45 – 17:00 MARINE BIODIVERSITY-ECOSYSTEM PROCESSES UNDER UNCERTAIN ENVIRONMENTAL FUTURES.

Bulling Mark; Hicks Natalie; Solan Martin, Oceanlab, University of Aberdeen, Scotland.

Paterson David, Gatty Marine Laboratory, University of St. Andrews, Fife, Scotland.

Raffaelli Dave, Environment Department, University of York, York, England.

The biological composition and richness of most of the Earth's major ecosystems are being dramatically transformed by anthropogenic activity. Marine environments are particularly vulnerable to such changes. Extensive use has been made of experiments involving randomly assembled communities with varying numbers of species to assess the effect of biodiversity loss on ecosystem processes. However, few of these studies have incorporated the extinction driver as an integrated part of the experimental design. Therefore the relationships found between biodiversity loss and the effects on ecosystem processes have lacked real world context. Here, we investigate empirically the effect of current and two likely future scenarios of temperature and atmospheric CO<sub>2</sub> levels on the relationships between species richness and ecosystem processes in a benthic marine system. Communities of varying richness levels of functionally contrasting macrofaunal species are exposed to factorial combinations of temperature and CO<sub>2</sub> levels in a mesocosm experiment, and levels of bioturbation and nutrient flux measured as ecosystem processes.

17:00 – 17:15 THRESHOLDS OF HYPOXIA FOR MARINE BENTHIC COMMUNITIES.

Vaquer-Sunyer Raquel; Duarte Carlos, Coastal Ecology, IMEDEA, Spain.

Hypoxia is a mounting problem affecting the world's coastal waters with severe consequences for marine life, including death and catastrophic changes. Hypoxia is forecasted to increase due to the combined effects of the continued spread of coastal eutrophication and global warming. A broad comparative analysis across a range of contrasting marine benthic communities showed that hypoxia thresholds vary greatly across marine taxa, and that the conventional definition of 2 mg O<sub>2</sub> L<sup>-1</sup> to designate waters as hypoxic is well below the empirical sublethal and lethal O<sub>2</sub> thresholds for most groups tested. These results imply that the number and area of coastal