and sediments from different marine and estuarine locations, and isoprene degradation measured by gas chromatography. Several isolates were obtained from these enrichments and bacterial communities were analyzed by DGGE and 454-pyrosequencing of 16S rRNA genes. Isoprene was degraded in samples from several temperate and tropical sites, showing that marine isoprene biodegradation is a global phenomenon. Sequence analysis from DGGE gels and isolates growing on isoprene revealed Actinobacteria, Alphaproteobacteria and Bacteroidetes as widespread groups of marine isoprene-degraders. This is the first report showing the potential for isoprene degradation in marine and coastal environments. The discovery of isoprene's missing marine sink will enable more robust predictions of the flux of this abundant and climate-altering hydrocarbon.

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DIATOM FLOATATION AT THE ONSET OF THE SPRING PHYTOPLANKTON BLOOM

We have used a new type of sediment trap to test the buoyancy properties of diatoms during the triggering phase of the Spring Phytoplankton Bloom (SPB). Diatoms shifted from a sinking pattern before the bloom, while their populations were not growing, to a neutrally buoyant pattern during bloom development, when calm conditions prevailed, light was abundant and phytoplankton were growing actively. This shift was mainly due to the upward motion of centric diatoms during the growth phase. Our field experiment confirms laboratory experiments and field observations showing that diatoms, the paradigm of sinking phytoplankton, approach neutral buoyancy when conditions are adequate for growth. Thus, diatoms float opportunistically, a fact that is overlooked in most phytoplankton dynamics and SPB models that are used to predict the impact of climate change on pelagic ecosystems.

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CHANGES IN TEMPERATURE AND PRECIPITATION REGIMES ALTER THE ORGANIC CARBON DYNAMICS IN FRESHWATER ECOSYSTEMS

1. Global change is increasing both surface temperature and hydrologic cycle activity. Such changes in the temperature and flow regime may have major implications in freshwater ecosystems, and in particular, in the role of river networks in the global C cycle. 2. Main goals of this study were: (i) to study the interplay between flow and thermal regime on the stream organic C dynamics, and (ii) to explore the relative role of lotic and lentic compartments in the processing of organic C in the river network. 3. Organic C dynamics (transport, retention and evasion after processing) were simulated in different scenarios resulting from the combination of 3 flow regimes, 3 temperature regimes and 3 different configurations of the river network (33 = 27 scenarios). 4. Results indicate that increasing variability of flow regime reduced the ratio processed / exported organic C from river networks, that changes in both regimes increased the relative contribution of lentic habitats to the entire river network in terms of organic C processing, and that the changes in the flow regime were the most relevant.

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MOLECULAR MECHANISM UNDERLYING THE PLASTIC RESPONSE OF SEA URCHIN LARVAL FEEDING STRUCTURE TO FOOD AVAILABILITY

Climate change is broadly producing disconnects between predator and prey cycles. For marine benthic invertebrates, spawning is often timed to coincide with phytoplankton blooms. Observed phenotypic plasticity in feeding structure may help sea urchin larvae to cope with changes in food availability caused by timing mismatches. We hypothesize that sensors in the arms of pre-feeding sea urchin larvae can initiate ectoderm/mesenchyme signaling to adjust the size of the feeding apparatus (length of arms) to optimize expected food intake versus expenditure of maternal energetic stores. We are interested in identifying the molecular mechanism by which the environmental stimulus is translated into changes in mineralization rate and cell proliferation in the larval arms. A screen of pharmaceuticals targeted to known sea urchin neurotransmitters revealed that dopaminergic neurons are involved in regulating arm growth in pre-feeding larvae. Perturbation of dopaminergic function recapitulated phenotypic differences observed in larvae reared in high and no/low food treatments. Microarray analyses and timed gene knockout studies will further identify and test the role of transcription factors and signaling molecules involved in translating food availability into feeding structure outgrowth.

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NEMATODES VS MACROFAUNA ASSEMBLAGES ALONG AN ESTUARINE GRADIENT (MONDEGO ESTUARY, PORTUGAL)

The spatial distribution of the nematodes and macrofauna communities in the subtidal sediments along the estuarine gradient in the Mondego estuary was studied. The main purpose was to see if both nematodes and macrofauna assemblages were able to simultaneously characterise a priori defined estuarine stretches. Spatial distribution of nematode assemblages followed the estuarine gradients, allowing distinguishing: the freshwater and oligohaline sections, characterised by the presence of freshwater nematodes, low density and diversity; the Mesohaline section, where density and diversity were also low and the Polyhaline and Euhaline sections, with the highest density and diversity. Significant differences in macrofauna density were also obtained; the highest values were obtained in the euhaline and mesohaline areas. The euhaline stations presented higher species richness, while the freshwater section registered the lower values. The Shannon-Wiener index revealed significant differences between estuarine sections, in both estuaries, and community assemblages. From the management point of view, knowing the behaviour of both communities (nematodes and macrofauna) along the estuarine gradient gave interesting clues, namely regarding the cost and effort effectiveness of ecological quality status assessment in transitional systems.

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ASEXUAL PROPAGATION INFLUENCING JELLYFISH BLOOMS?

Mass occurrences of medusae can be found increasingly all over the world's oceans. The subjects of most studies on reasons for the blooms are the medusae. Different amounts of medusae are produced in the process of strobilation. This process is dependent on different factors (e.g. Chen and Ding 1983, Hernroth and Gröndahl 1985, Holst 2008, Loeb 1973, Stampar et al. 2008). But there is another factor which does not get the appropriate attention in research yet, the basis for the production of strobilae: the polyps. Polyps are able to enlarge their populations by many types of asexual reproduction using smallest amounts of tissue. The scyphozoan species *Sanderia malayensis* for instance shows a variety of types of asexual reproduction previously unknown. These new findings recently enabled the establishment of a new classification of asexual reproduction in Scyphozoa (Adler and Jarms in preparation). *Sanderia malayensis* is distributed in the indo-pacific region, but keeps spreading out to its temperature boundaries. Using its special abilities in asexual reproduction, *Sanderia* ensures both its survival and dispersal very effectively. Due to global warming, we have to face further dispersal of the species beyond indo-pacific regions and more mass occurrences as already seen e.g. in the Yangtze-estuary in 2004 (Xian et al. 2005).

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PERIODIC FLOODING RESTRAINS LOCAL SUCCESSION OF MICROPHYTOBENTHOS IN FLOODPLAIN LAKES

Periodic flooding of river floodplains and connectivity of floodplain lakes and rivers is suggested to interfere with the succession of microphytobenthos. To analyse this we: 1. studied the impact of flooding on the relationship between irradiance level (depth) and microphytobenthic community composition; 2. sampled three lakes with different connection-disconnection patterns; and 3. studied seasonal variation in community composition in one floodplain lake subjected to several flooding events. Shortly after flooding and subsequent connection of floodplain lakes, microphytobenthic communities showed a uniform species composition. Disconnection of the lakes was followed by a succession of species according to local environmental conditions. However, assemblages were often set back before outgrowth of local species or divergence of community composition became prominent. It is therefore concluded that flooding and the associated connection-disconnection regime of floodplain waters overrule the selective effects of local environmental parameters.

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HIERARCHY RESPONSES TO CLIMATE CHANGE? THRESHOLDS AND REGIME SHIFTS IN LAKES

With growing concerns of present global warming, we examined potential lake ecosystem responses, natural hierarchy responses, and possible shifts among abiotic and biotic system components. Specifically, we analyzed decadal data collected from Müggelsee, a lake in Berlin, Germany, for climate induced abiotic and biotic changes, their timing and type, and classified them as abrupt permanent, gradual permanent, abrupt temporary, or monotonic. We further categorized parameter changes as a function of system hierarchy, including lake physics (ice, temperature, stratification), nutrients, plankton, and levels of integration (i.e. species, taxonomical groups, total plankton). Contrary to current theory, data suggests abrupt responses did not occur in a hierarchy-dependent manner, nor was a clear pattern observed among taxonomical system based categories. Abrupt permanent changes were the most prominent response pattern observed, suggesting they may be driven by surpassed thresholds, as noted in previous case studies. Gradual changes coincided with affected abiotic parameters spanning an expansive time range. Nevertheless, the complexity of response patterns at the single system level manifested clear chronological regime shifts in abiotic and biotic parameters in spring and, to a lesser extent, in summer.