

## Theme Session M

### Ecological consequences of reduced body size of organisms in the future ocean

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Both physiological studies and empirical data have suggested that the reduction of individual body size of marine organisms may result from warming temperatures. In the case of commercial fish, smaller body sizes may also result from fishing, either by selective removal of large species or by selection of genotypes. The impacts of synchronous, cross-taxa shifts toward smaller body sizes would be amplified through the foodweb affecting productivity, trophodynamics and ultimately the biogeochemistry of the ocean. This thematic session will present and discuss current knowledge of the causes and consequences of smaller body sizes for marine ecosystems, from the local to regional and basin scales. For instance, a shift to smaller primary producers and bacteria would favour the prevalence of microbial foodwebs, with lower transfer of matter and energy to upper trophic levels, including fish. The capacity of the biological pump for exporting carbon to deeper ocean layers and sediments would be reduced because smaller planktonic organisms produce smaller organic particles that sink at low speeds with smaller fractions of carbon reaching the sediments. The retention of most of primary production in the upper ocean combined with higher temperatures would favour the respiration of a larger fraction of biogenic fraction than in the present ocean, thereby reducing the role of the ocean as a CO<sub>2</sub> sink. At the other end of the size spectrum, coordinated declines in body size of individual fish could lead to synchronous declines in fisheries yields.

The aim of the session is to integrate physiological and ecological knowledge across different taxa or trophic levels to produce new insights into a future ocean. Papers are welcome on the following topics:

- experimental and empirical studies identifying factors contributing to reductions in body size
- field data illustrating reductions in the body size of marine organisms at all spatial and temporal scales
- model predictions of the impacts of smaller body sizes on ecosystem functioning
- examples of interactions between different factors leading to reductions in body size