Theme Session B
The science and tools for the management of networks of Marine Protected Areas

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Networks of Marine Protected Areas (MPAs) are effective and consensual tools to protect the marine environment in the face of biodiversity loss, pollution, overfishing and climate change. MPAs provide a buffer against acute and diffuse environmental disturbances, by protecting different levels of biological organization (genes, species and habitats) and of ecological processes (biogeochemical cycles, trophic web flows, reproduction and population replenishment). Networks of MPAs are a fundamental part of larger frameworks of ecosystem-based management, integrated ocean governance and coastal zone management, which are emerging under the general designation of Ecosystem-Based Marine Spatial Planning.

Although the theoretical basis and rationale for setting networks of MPAs already exists, operational principles and guidelines described in binding agendas present a variable mix of ecological criteria and management approaches. This is partly related to important knowledge gaps on habitat characterization, extent of ecologically significant population units, life cycle data, genetic variability and trophic interactions. An increased understanding of spatial patterns and processes will play a central role in integrated ecosystem assessments, marine spatial planning and determining the influence of human activities on marine species and habitats. Seascape ecology is an emerging tool that focuses on the spatial patterns, processes, and ecological functions associated with marine species and communities, by quantitatively analysing their spatial distributions in the context of dynamic environmental forcing, allowing insights into the multi-scale processes that drive species distributions and biodiversity.

In many instances, understanding of the effects of the MPAs themselves is obstructed also by poor design and monitoring, which affects the perception of benefits by scientist, managers, policy makers and the public. A further level of complexity is brought about by the various levels of organization and their empowerment within existing political frameworks, and on the decision mechanisms, scientific expertise and biogeophysical setting pertaining to each level of organization and spatial scale.

This session intends to address the issues described above. Papers are welcome on the following topics, across biogeographic regions and management frameworks:

- Theoretical and modeling approaches to define and implement representative and resilient networks of MPAs
- Development and validation of species distributions and habitat models as surrogates for biological and ecological processes
- Identification of movement corridors and connectivity among regions, and its implications for management
- Approaches for addressing the effect of environmental change on species distributions and/or community structure through the implementation of MPAs and dynamic ocean management

- Application of seascape ecology to ecosystem-based management and assessing the effect of human activities, such as renewable energy and mariculture, on marine habitats and species
- Mending the fences: interactions between networks of MPAs and other uses of the marine environment
- Design, implementation and management of MPAs at large spatial scales: high seas, deep-sea and transnational MPAs and MPA networks
- MPAs in practice: use of Before/After designs, Control/Impact designs and No-take zones to assess the effectiveness of MPAs
- MPAs in practice: social science and culturally appropriate guidance in MPA designation
- MPAs in practice: socioeconomic impacts of MPAs and MPA networks