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Extracting energy from waves and tides – what are the consequences for ecosystems, physical processes and other sea users

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The development of a new wave and tidal energy extraction industry is seen as an important mitigating action for climate change, helping to meet global energy demands whereas reducing greenhouse gas emissions. Developments for wave and tidal energy extraction currently exist more in potential than in actuality, but there is huge impetus from political, environmental and commercial interest groups for rapid growth of the marine renewable energy sector over the immediate future. The emergence of a major new industry in the marine environment has unknown consequences for ecosystems and the physical processes upon which they depend.

The question of the extent to which marine renewable energy extraction can coexist with healthy ecosystems, and with the human activities which depend on the services provided by these ecosystems, is thus an urgent one. Progress in addressing this question will be underpinned by a sound scientific understanding of two issues: first, the dependence of ecological processes upon exploitable kinetic energy resources; and second, the consequences for physical processes of extracting this marine energy. Advances in these two crucial areas are necessary both to identify potential impacts and to be effective in designing any mitigating measures. It is also important that this knowledge is transferred to marine spatial planning processes in the form of practical guidelines and solutions. Ultimately, we need the capacity to weigh the consequences of marine energy extraction against the consequences of climate change which the development of the industry is designed to mitigate.

Papers are welcome on all aspects of ecological, environmental and socio-economic consequences of wave and tidal energy developments:

- marine energy as an ecological factor and an economic resource
- detecting ecological responses to kinetic energy extraction against a background of climate change
- consequences of wave and tidal energy extraction for coastal and hydrographic processes
- collision risks posed to seabirds and marine mammals by wave and tidal energy extraction devices
- the role of kinetic energy in biological productivity in marine systems, and the consequences of its extraction
- intersection of essential fish habitat and exploitable marine energy resources
- the creation of new ecological space by tidal and wave energy extraction devices
- spatial management strategies to optimize benefits and trade-offs between marine renewable energy developments and other sea users

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