

A QUESTION OF SCALE – THE REGIONAL SCIENCE APPROACH

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The basic processes in marine biology, chemistry and geophysics are universal, but the scale – globe, ocean, regional sea, lake – is of crucial importance for the functioning, human impact and management of aquatic ecosystems.

The Baltic Sea can be used as an example of how scale-dependent regional characteristics determine system functioning. Biodiversity of the Baltic Sea is low, and food webs are short. Due to the high inflow of fresh water and long residence time, salinity is low creating a unique brackish water chemical environment. The spatio-temporal scales of Baltic Sea hydrodynamics, which are small compared to those of the oceans, have their impact on the horizontal and vertical movement of elements and production.

There are 85 million people living along the shores and catchment area of the Baltic Sea. Human impacts on the system are manifested in the semi-enclosed Baltic Sea with a vast catchment bringing economics, cultural issues and social sciences into the picture. The influence from developed areas (towns, industrial areas, ports, etc.) or economic sectors (transport, energy, agriculture, forestry, etc.) on coastal areas is crucial to properly understand and manage the Baltic Sea and its surroundings. The same applies to impacts of human activities occurring in the catchment as far as a clear cause-and-effect linkage to the environmental problems of the Baltic Sea can be demonstrated.

A regional approach is crucial for understanding and managing marine systems in a holistic way. Given that the environmental management of seas and oceans is regionally organised within UNEP's Regional Seas Programme, Regional Seas Conventions (HELCOM, OSPAR), the EU's Marine Strategy Framework Directive and Common Fisheries Policy, the regional level is the only functioning scale for linking science and policy. In the global context the challenge of linking science and policy is addressed by the Large Marine Ecosystems Programme. Within the European Union appropriate science funding and governance structures to support a regional science approach are under development: in the Baltic Sea the funding cooperation has been institutionalized through the establishment of the 'Baltic Organisations Network of Funding Science EEIG' – BONUS EEIG and starting the BONUS Baltic programme under Article 185 of the EC treaty. The regionally structured ERANET, SEASERA, is developing corresponding governance mechanisms in other regional European seas – the Mediterranean, Black Sea and North Atlantic.