Coastal Research generates useful knowledge for different applications and different stakeholders. We have constructed five categories of such usefulness – the different categories are not independent of each other, but cover a wide range of applications.

The emphasis on utility does not imply that all coastal science, or should, be "useful".

Making sense

Understanding of complex phenomena, and its use for supporting societal framing and decision making. Examples are consequences of eutrophication, or the manifestation of natural system variations vis-a-vis anthropogenic climate change.

A significant constraint is that science is not the sole supplier of such understanding, but other knowledge brokers are active as well.

Marine Spatial Planning (MSP)

is the public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives specified through a political process. MSP is a normative approach for decisions about competitive use of sea space based on several knowledge domains. Contributions from social science support the understanding of structures, perceptions, interests and power balances of involved actors and the effected population.

Monitoring

the assessment of the current status of the coastal environment and short term trends based on observation and related data analysis. Making data and assessments available for intermediate or final users. Examples are routine analysis and short-term forecasts of current environmental states.

Hazard, risk and opportunities

Assessments for almost any kind of onshore and offshore operation. For the assessment of negative outlooks and positive perspectives comprehensive and homogeneous data are needed. We provide examples how coastal sea science may contribute to such assessments, particularly in cases where observed data are unavailable.

Scenarios

A tool in assessing consequences of possible future developments, sketching related uncertainties or identifying developments with predetermined properties. Examples we refer to in this paper comprise the development of coastal protection, dredging of waterways, or the expected impacts of climate change.

Potential future changes in wind wave climate are important for any offshore operation and/or coastal protection. This figure shows estimated changes in 30-year averages of annual maximum significant wave heights towards the end of the 21st century derived from simulations with the wave model WAM driven by different atmospheric projections (from different models using different initial conditions and greenhouse gas scenarios). While there is considerable variability (and hence uncertainty) among the signals estimated from the different realizations, a tendency for long-term average annual maximum significant wave heights to become higher can inferred for the eastern part of the North Sea (Grabemann et al. 2014, under review).