
A short introduction into ecological network analysis- first steps to model the relation between biodiversity and ecosystem function

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A detailed energy flow model consisting of 56 living and 3 non living compartments was assembled for the intertidal area of the Sylt-Rømø Bight. The model depicts the biomass of each compartment, carbon flow between the compartments, imports and exports, as well as an energy budget for each. The food web was analysed by means of network analysis which showed that about 17% of the total daily flow through the system is recycled through a complex cycling structure consisting of 1197 cycles.

Diversity of benthic communities contributes by different percentages to the cycling and represent separated food webs nested into the food web of the total system. Because of this uneven distribution of the cycling between the different communities the cycling structure of the carbon flow of the system is highly dependent on the community structure and the diversity of the total system.

Comparing several dimensionless system level indices calculated for the Sylt-Rømø Bight and its communities with those of other marine and estuarine ecosystems on a global basis, it showed that the energy is rather inefficiently transferred within the Bight and that most system level indices are lower than those for other coastal ecosystems.

However, flow diversity and food web connectance was higher in the present system. This study has revealed the Sylt-Rømø Bight to be a highly complex system whose energy pathways appear to be sensitive to perturbations especially on the community level.