

All an ecologist wants to know, but never can find

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Biogeochemists have long recognized the high potential of cross-system comparisons and the analysis of large oceanic databases to discover governing principles of system functioning. A classical example is the Redfield ratio and similar analyses along this line.

Cross-system comparisons are, in principle, also a promising approach for ecological studies. I will give examples from the study of macrobenthos. Based on published values, we recently drew up relations between macrobenthic biomass and system primary production, between benthic oxygen consumption, water depth and benthic biomass, between benthic feeding types and spatial distribution of biomass in systems. Using our own databases derived from government monitoring programmes, we derived statistical models predicting the occurrence of macrobenthic species in estuaries from physical characteristics. We are currently trying to generalize these predictions for other systems in the world.

From these examples, I want to discuss the characteristics that make a database useful for an ecologist. Problems in the intercomparison of ecological datasets may arise from differences in field and lab methodology and, probably more important, in taxonomic practices. A worldwide effort to standardize taxonomy for ecological applications is badly needed. Categorizing species by ecological rather than taxonomic characteristics would be very useful. Further, a major effort would be needed in the provision of physical and chemical metadata that are georeferenced at the same scale as the ecological data. Cross-references between hydrographic data (bathymetry, current structure, t-S characteristics), biogeochemical data (nutrients, oxygen, production and consumption rates) and ecological data (community composition) could provide the basis for large-scale analysis of functional relations of biodiversity on ecosystem functioning. National monitoring programmes often combine these different measurements and provide, to a varying degree, national data banks. Global integration of these data banks could be a goldmine for ecologists, but will involve major efforts from a group of ecologists.