

Conferences and Meetings

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Intercoast on Sylt - Workshop on Ecological Comparisons of Sedimentary Shores

The workshop had the aim to compare the ecology of sandy and muddy shores from all over the world. It was intended to proceed from studies devoted to the analysis of contingent details on a local scale to an integration of knowledge under a global perspective on the ecology of sedimentary shores. This approach may greatly advance our insight and may give more power to our judgements and recommendations for decisionmaking in Integrated Coastal Management (ICM). The workshop was attended by 75 scientists from 15 countries, and it was held from 11th – 15th October 1999 on the island of Sylt. The 16 formal lectures presented will be published as a volume in the book series Ecological Studies of Springer-Verlag in 2001. The program included a dry walk along the beach and across the dunes with the wind, a mud walk towards the low waterline, and some general discussions and good meals.

The sands and muds of the sea shore are a lively place. It is a fringe where sediments, seawater and light combine to nurse an incredible variety of life. Yet sedimentary shores are inherently unstable. Harsh physical conditions come together with a plenitude of food. Organisms have adapted along various canalized pathways to these challenges and potentials.

Between distant coastal regions, evolutionary history has generated rather different sets of species. Similarity of life forms is most apparent at exposed beaches. Here a cascading view might be appropriate, outlining a globally valid scheme of the biotic system with many regional modifications

which in turn show various local expressions. In terms of species richness, the sandy beach macrofauna is dominated by crustaceans, bivalves and polychaetes. Biomass is usually dominated by anomuran decapods (*Emerita*) and bivalves (*Donax* and *Mesodesma*). Compared were beaches from North America, South Africa, Chile, Spain and Australia.

At more sheltered, biologically transformed coastal habitats, different species with their different biologies may entail divergent flows of energy and matter. In these cases, similar causes may generate very different effects. The sum of local biota adds up to regional biota, and their sum constitutes the global biotic system of sheltered sedimentary shores. Physical processes that concentrate nutrients in the coastal ecosystems create the potential for high primary productivity that ultimately enables benthic suspension feeders to form dense assemblages such as beds of bivalves, vermetid gastropods, and sabellid and serpulid polychaetes. Mussel beds in Europe and North America are highly dynamic and fractal geometry can reveal predictable patterns in their complex spatial configurations. The polychaete *Nereis diversicolor* and the clam *Macoma balthica* are versatile in being either suspension or deposit feeders, depending on food availability.

The best known disturbers of coastal sediments are lugworms like *Arenicola marina*. However, also grey whales, walruses, rays, flamingoes and many ducks create feeding pits which may enhance sediment erosion considerably. Biogenic stabilisation of sediments is often accomplished by extracellular polymeric substances (EPS) of microbial mats. Seagrass beds are in decline all over the world. This is often indirectly caused by human activities as it was the case with a more than 1000 km² loss of seagrass in NE Australia. At the edge of saltmarshes, marine invertebrates such as *Corophium volutator* and *Nereis diversicolor* may often prevent plants from growing up, and they inhibit the accumulation of sediment which, however, is essential to keep up with a rise in sea level.

Tropical and subtropical tidal flats provide a rich species and habitat diversity, exemplified from Australia, Central America and NW Africa, while biomass of benthic macrofauna is often lower than in the Wadden Sea. In a warm temperate tidal lagoon

Harvesting clams by raking
tidal sediments near the
island of Hainan in
southern China



of southern Portugal, the detritus food chain was fueled by intertidal beds of the cordgrass *Spartina* and the eelgrass *Zostera*, while in the Wadden Sea near Sylt a phytoplankton based food chain is essential for most intertidal communities.

Backgrounding this variety in favour of abstract, universal processes may end in a mudbath of conclusions useless for practical purposes. Sedimentary shores are subject to different climates, wave exposures and tidal ranges, are composed of a wide range of grain sizes, and vary from short steep slopes to almost flat expanses of mud and sand. This global laboratory provides convergent biotic traits as well as singular expressions of life without apparent parallels. From isolated shores some otherwise common functional guilds or taxa are occasionally absent. Human exploitation often

truncated the upper end of the size spectrum of seashore organisms. Pollution and eutrophication have altered diversity and abundances of species. Transoceanic shipping and aquaculture have distributed some species well beyond their natural ranges. Entire habitats have been lost or their areal shares distorted in coastal ecosystems by transforming the coasts to various human needs. The comparative approach to the biota of such sedimentary shores on a world-wide scale turned out to be a thriving research endeavor promising new knowledge relevant to solve urgent coastal issues.

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