MODELING COASTAL ECOSYSTEM COMPLEX

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Classification of coastal ecosystem models

Model	Acronym
Biogeochemical	BGC
Species Distribution	SD
Population Connectivity	PC
Food Web	FW
Life History	LH
Between Habitat Interaction[1]	BHI
Coastal Ecosystem Mosaic[2]	CEM
Seascape Nursery[3]	SSN
Coastal Ecosystem Complex	CEC

Table. 1. Models components (green) and concepts (conceptual models) relevant to the CEC (yellow)

[1]Hori, M (2008), Plank. & Benth. Res., 3:53-63
[2]Sheaves, M (2009), MEPS, 391:107–115
[3]Nagelkerken, I (2015), Fish. Fish., 16:362–371

Development of ecosystem models: toward numerical through concept

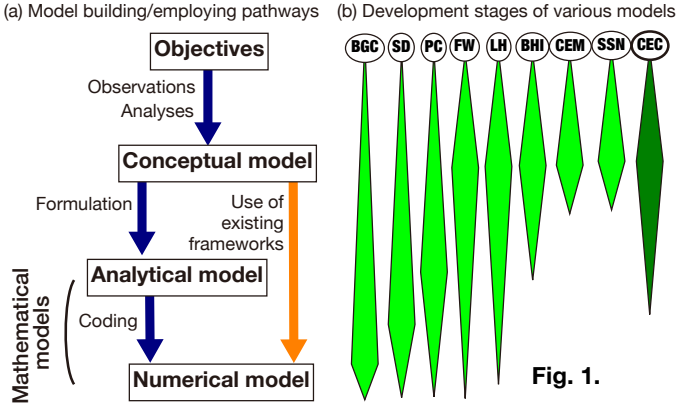

Fig. 1.

Coastal Ecosystem Complex (CEC)

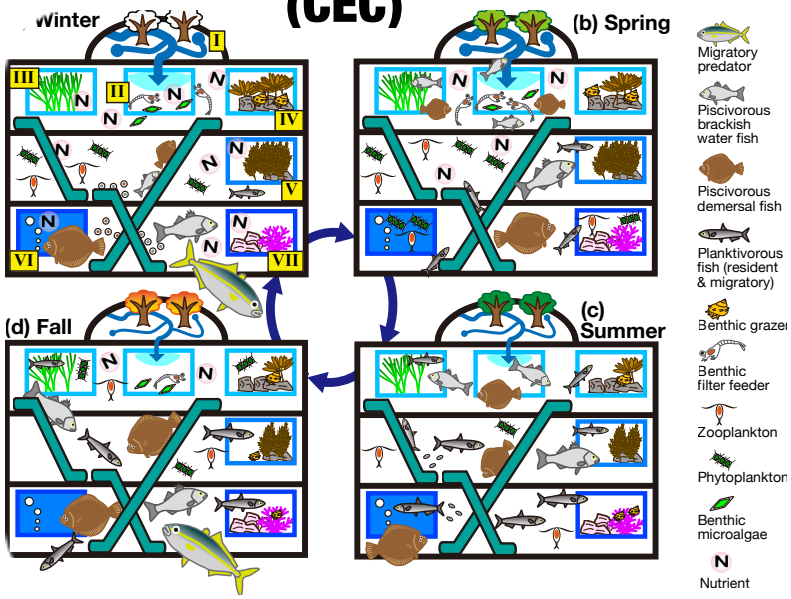

Fig. 0. Graphical model of a CEC for Tango Bay (Japan). The network consists of four levels including seven habitats: river (I), estuary with muddy/sandy bottom (II), seagrass bed (III), shallow seaweed meadow (IV), deep seaweed meadow (V), the water column (VI), and coralline algae at the offshore margin (VII).

Challenges

- **Direct representation of structural habitats and their functions**
- **Ontogenetic development from planktonic larvae to benthic/nektonic juvenile**
- **Recruitment variability that often significantly influences biomass fluctuations of living marine resources**

Four features for the CEC model

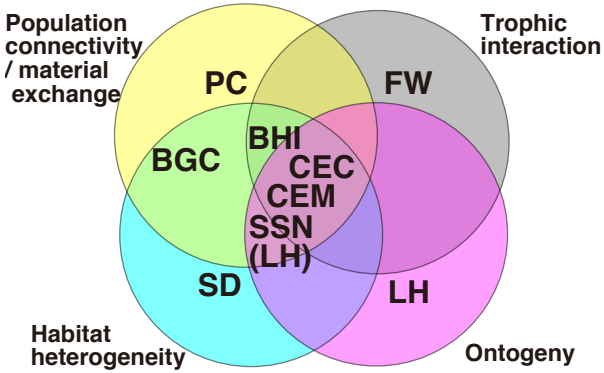

Fig. 2. Four important ecological features of the concept of the CEC.

Existing integrated model frameworks for the use of CEC

Model	PC	HH	OT	TI
BGC + IBM				
OSMOSE	1	3	1	3
NEMURO.FISH/SAN	1	3	1	3
Ecospace	1	1	2	1
Atlantis	1	1	2	1

Table. 2. Capability for the CEC model interns of the four ecological features (Fig. 2)
1 (excellet) > 2 > 3 (good) > 4 > 5 (bad)

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