Report on EuroGOOS Coastal Modelling WG in 2014

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Goals and Objectives:

According to the ToR the goals and objectives of the Coastal Modelling WG are:

1. maintain a link between international efforts (with particular attention to the GODAE OceanView Coastal Ocean and Shelf Seas Task Team) and ongoing coastal modelling activities in Europe;
2. maintain a continuous link between global/regional and coastal ocean operational activities at European Level, identifying the requirements to fill the gap between the different scales for a proper downscaling;
3. monitor research activities associated with coastal and shelf seas at European Level;
4. promote actions aimed at coordinating research associated with coastal and shelf seas activities;
5. identify coastal modelling requirements in terms of numeric and codes;
6. address the issue of data assimilation in coastal areas;
7. identify common protocols in coastal ocean model nesting and define a strategy for future works;
8. address the issue of model validations and routine observations in coastal areas;
9. create a roundtable of recognized experts from different coastal ocean disciplines (physical and biogeochemical numerical modelling, data assimilation, remote and in-situ observations, validation and operational activities);

Main Achievements during the first 2 years

In the framework of EuroGOOS a Working Group on the Shelf Seas and Coastal Modelling has been established in 2012.
The round table of experts (WG members) has been created.
The first WG meeting have been organized in Bologna (17 Dec 2012). During the meeting the ToR have been revised, WG priorities and future steps defined. The round table of experts in the different coastal modelling disciplines identified the necessity to draft a *shared document* (SD) on the relevant processes that can serve for the characterization of the "Coastal Ocean State" and how they are modelled or parameterized.
During 2013 the Coastal Modelling WG has been represented and actively participated to the discussion at:

- the SAWG Meeting (Cork April 2013);
- EuroGOOS Executive Directors Board meeting (Copenhagen Oct 2013);
- Coastal Ocean and Shelf Seas-Task Team (COSS-TT) meeting (Lecce Jan 2013)

The WG members started to draft the SD. The rationale behind this action is to collect info about local/regional actual practices in the different Institutions comprehending the largest number of cases to ensure generality of the research outcomes

Some test areas have been selected (listed in the Appendix-A) with the corresponding sub-set of processes typical of each area. Physical and relevant processes common to all the coastal areas considered have been identified

Main Achievements during the last year

1. Participation to COSS-TT in Puerto Rico, where the WG activities have been presented
2. Further elaboration of the SD. In Appendix A two tables extracted from the Shared Document are included. The first Table Illustrates the processes characterizing the European Coastal Regions connecting them with relevant scales and Events. The second Table lists for all the selected regions the occurrence of common processes setting the priority in the modelling developments.

Plan for the next year

1. Organization of the second meeting;
2. Participation to COSS-TT annual workshop;
3. Finalize the SD.

Challenges and problems

It is very challenging to excite WG members for an active participation. Some financial support would benefit the WG meetings Organization. The possibility to have dedicated sessions during EGU general assemble should be considered.

Appendix-A

Scales/Regions Relevant Processes and Events

Scales / Areas	***Relevant Processes***	***Events***	
All	*Transport: wind or buoyancy driven*	*Upwelling / Downwelling / storm surge*	*Straits outflow*
	Tides Tidal mixing	*Residual transport*	
	Inertial mixing	*?*	
	Interaction Baroclinicity + bathymetry		,
	Light penetration		*Water column constituent*
	Biogeochemical	*Anoxia / algal bloom*	*Details needed*
	Gravity Waves / trapped waves / internal waves; wave breaking	*Sea level set up*	*Charnock Coeff*
	Air sea processes	*Water Mass Formation and spreading*	*Air-Sea processes parameterizations*
Mesoscale submesoscale	*Horizontal and Vertical Turbulence*		
	Instabilities	*forward and inverse turbulence cascade*	by eddies and shear straining
Bottom BL	*Friction*		*Sea bed type*
Shelf	*Slope currents*		
ROFI	*Horizontal and Vertical Turbulence/ Instabilities*	*River Plume*	
	Sediment dynamics		*Sinking and transport*

Common Processes/events Dynamics

	Rivers	Wind	Tide	Characteristics	Sea-Ice	Others / Dynamics
N.Adriatic	X	X	X	Large buoyancy Gradients		Non local water masses
German Bight	X		X			Estuarine Turbidity maximum /Kelvin waves / Inverse Estuarine / Wave Current interaction /
Spitzberg	X	X		Steep Topography	X	
Skagerrak				Very steep topography Two Layer ROFI flow/ Large density gradients	X	Temperature / Inversion
La Manche and Bay of Biscay	X	X	X	Large tidal currents and heights Amphidromic point near the coast Internal wave generation Complex front at western end		Complex residual flows due to double coastline and Dover Straits restrictions
Irish Sea	X	X	X	Cold pool gyre/ strong density gradients and temperature inversion (JH?). Tidal straining, heaps circulation		Complex topology restricts flow into/out off region. Many regions of mudflats (Liv Bay etc.)
Shelf South of Crimea		X		Synoptic coastal upwelling/downwelling.		Coastal Trapped waves/ Positive negative water setup
NW Shelf Black Sea	X			episodic algae bloom events / Subduction		fresh water discharge is crucial for the vertical distribution of oxygen (hypoxia)
Bosporus				Complex Geometry		Slope Currents / Vertical horizontal Mixing
Baltic	X	X		High-saline bottom inflow events / Anoxic bottom-water (ecosystem) / Near-zone mixing (fresh water; maybe under ROFI) / High-saline bottom inflow events	X	Small-scale processes (deformation radius 7 km in open Baltic waters; 1.5 km in Gulf of Finland and transition zone) – eddy resolving important
Balearic Sea	X	X		Slope currents interactions. Meso&submeso scale dynamics, eddy-mean flows interactions. Water Masses formation and spreading.		Meteo-tsunamis, atmosphere-ocean trapped resonant waves, Runoffs, complex topography, vertical mixing, intense episodes/extreme events, and ecosystem response. Shelf/open ocean exchanges, instabilities, canyons.

Table 1