Date: Thursday, 29/Sep/2016

9:00am - 10:15am | **Black Sea 4 - EO and Modelling - Chairs: Vandenbulcke L., Mateescu R.**

9:00am - 9:15am

Copernicus Black Sea Monitoring and Forecasting Centre

Atanas Palazov[1], Giovanni Coppini[2], Stefania Ciliberti[2], Veselka Marinova[1], Luc Vandenbulcke[4], Tomas Lovato[2], Elisaveta Peneva[5], Marilaure Grégoire[4], Joanna Staneva[3], Emin Oszoy[6], Violeta Slabakova[1]

[1]Institute of Oceanology, Bulgarian Academy of Sciences, Bulgaria; [2]Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Italy; [3]Helmholtz-Zentrum Geesthacht, Institute for Coastal Research, Germany; [4]Université de Liège, Belgium; [5]Sofia University "St. Kliment Ohridski", Bulgaria; [6]Istanbul Technical University, Turkey

Copernicus Black Sea Monitoring and Forecasting Centre (BS-MFC) is an element of the Copernicus Marine Environment Monitoring Service (CMEMS). BS-MFC aims to provide regular and systematic information about the physical state of the ocean and marine ecosystems for the Black Sea. The BS-MFC products will include analysis, 10 days forecast and reanalysis. The BS-MFC products describe waves, currents, temperature, salinity, sea level and biogeochemistry. The BS-MFC approach is composed of four main activity blocks: 1) interfaces with the external data providers; 2) processing of information by the numerical models and the data assimilation systems and quality control of the information produced; 3) dissemination and archiving, together with the local Service Desk and 4) cross-cutting activities such as communication and training. The first two groups of activities are performed by the Production Units (PUs) while the third is performed by the Dissemination Unit (DU) and the Archiving Unit (AU). The BS-MFC infrastructure will have three PUs, Physics, Biogeochemistry and Waves, one unique DU, AU and Backup Units for all principal elements. This is a technologically advanced and resilient configuration of the system that should provide an efficient and robust solution in cases of incidents.

9:15am - 9:30am

Operational Forecasting of the Black Sea: Merging Model Simulations and Satellite Products

Luc Vandenbulcke, Arthur Capet, E. Ivanov, Aida Alvera-Azcarate, Marilaure Gregoire

Liège University, Belgium

In the frame of past EU projects (e.g. SESAME, HYPOX, PERSEUS), a three dimensional coupled circulation-biogeochemical model of the Black Sea has been developed in order to simulate the multidecadal variability of its physical and biogeochemical properties (1960-2010). Model simulations have been used in order to investigate the impact on the physical structure and ecosystem functioning of climate and eutrophication and to provide recommendations for the management of the Good Environmental Status of Black Sea waters.

One of the main findings, and challenging outcome, of these investigations is that the deoxygenation process is an ongoing process in the Black Sea both on the northwestern shelf and in the deep sea, with distinct mechanisms. The model and observations show that seasonal hypoxic events occurs each year in the northern part of the shelf. In the deep sea, observations evidences that the oxygenated layer has shallowed by ~50m since 1960.

Since April 2016, the model is used in the frame of the Copernicus Marine Environmental Monitoring Service (CMENS) in order to deliver operational forecasts for the Black Sea biogeochemistry (Black Sea Monitoring and Forecasting project, BS-MFC). Satellite data like SST and SSH have already been used to validate the model physics. Other satellite observations (ocean colour products) will be used for model validation and will also be assimilated in the next version of the model in order to improve the accuracy of predictions.

However, due to the lack of in-situ data, the quality of ocean color products is very difficult to assess, which prevents a sound validation of model predictions and their use for assimilation. It is important that the satellite chlorophyll products take adequately into account the specificities of Black sea waters and atmosphere. The advent of ARGO chlorophyll data will offer an ideal frame to assess the quality of the satellite ocean colour products.

9:30am - 9:45am

Short-Range Forecast of Dynamic Fields and Pollution Transport in the Easternmost Black Sea

Avtandil Kordzadze, Demuri Demetrashvili

I. Javakhishvili Tbilisi State University, M. Nodia Institute of Geophysics, Georgia

Development of in-situ and remote sensing methods and effective data-computing systems promoted creation of the Black Sea Nowcasting/Forecasting system for the last decade. One of the parts of this system is the easternmost Black Sea regional forecasting system, which provides 3 days' forecast of main hydrophysical fields – the current, temperature and salinity with 1 km spacing in the easternmost Black Sea and in accidental situations – also the forecast of oil and other polluting substances. The regional forecasting system involves a high-resolution regional baroclinic model of the Black Sea dynamics of the Institute of Geophysics (Tbilisi, Georgia) and 2D and 3D advection-diffusion models of impurity's dispersion. The regional model of sea dynamics is nested in the basin-scale model of the Black Sea dynamics of Marine Hydrophysical Institute (MHI, Sevastopol) with applying one-wave nesting, which provides forcing of basin-scale processes on the regional processes via the open boundary. Advection-diffusion models use the current field forecasted by the regional model of sea dynamics. All required input data are provided from MHI in the near real time mode via Internet. The splitting method is used to solve the problems included in the regional forecasting system. Comparison of the prognostic dynamic fields with measurements derived from satellite data showed the ability of the forecasting system to reproduce really regional dynamic processes in the easternmost Black Sea. Calculations carried out in different locations of hypothetical sources at real circulating modes show a significant role of dynamic processes in formation of the spatial-temporary distribution of pollution.