THE POSEIDON REFERENCE TIME-SERIES STATIONS OF THE EASTERN MEDITERRANEAN SEA

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1. INTRODUCTION

Monitoring the marine environment apart from being a challenge for the scientific community has been acknowledged as a top most priority to support policy making and environmental management. In a dynamic and continuously changing marine system, important issues such as eutrophication, overfishing, climatic change and natural hazards require the long term tracking of key variables. The Mediterranean Sea although has long been considered as a single functional climatic, ecological, economic and social system, in reality it displays a great variability. The Greek seas are characterized by a complex morphology as a result of the geologic history of the eastern Mediterranean and the recent geodynamic processes. This complex morphology together with the narrow shelf and the particularly deep basins create a unique ecosystem characterized as an important area of dense water formation (following the Adriatic Sea) [1], while abrupt changes in its hydrology and dynamics have affected the entire eastern Mediterranean.

2. THE POSEIDON SYSTEM

Responding to the need of marine observations the Hellenic Centre for Marine Research (HCMR) has established a Monitoring, Forecasting and Information System for the Greek Seas named POSEIDON (http://www.poseidon.hcmr.gr) [2]. Considering both the variability of the system and the need for high frequency information a mixture of platforms was chosen, ranging from coastal buoys equipped with few basic met-ocean sensors to open sea stations with an extensive list of sensors targeted to both physical and biochemical process and their coupling at various time scales. Two multi-parametric deep water observatories currently operate: the Poseidon E1-M3A mooring operating in the Cretan Sea since 2000 [3-5], and the recently (February 2007) deployed Poseidon Pylos mooring site that operates in the SE Ionian Sea. These two systems recently became parts of an integrated network of deep European observatories developed in the framework of EuroSITES (http://www.eurosites.info/) project (EU-FP7) that will coordinate the European contribution to OceanSITES.

Parameter	Depths measured (m)	Sensor(s) used	E1M3A	PYLOS
Wind speed/dir.,	Surface	Young 04106	*	*
Air Pressure,	Surface	Vaisala PTB 220A	*	*
Air temperature,	Surface	Omega	*	*
Wave Height, direction, period	Surface	Fugro OCEANOR Wavesense	*	*
Pyranometer PSP,	Surface	Eppley	*	
Radiometer PIR,	Surface	Epply	*	
Relative humidity,	Surface	Vaisala HMP 45A	*	
Precipitation	Surface	Young 50203	*	
Radiance	Surface	Satlantic ocr-507-r10w	*	
Irradiance	Surface	Satlantic ocr-507-ricsw	*	
SST, SSS surface,	Surface (1m)	Aanderaa 3919A	*	*
Currents	5-50, 10 bins of 5m	Nortek Aquadopp 400 kHz	*	
Currents	1m	Nortek Aquadopp 400 kHz		*
Temperature	20, 50, 75, 100m 250, 400, 600, 1000m	Seabird 16plus-IMP C-T Seabird 37-IM C-T	*	*
Salinity	20, 50, 75, 100 250, 400, 600, 1000m	Seabird 16plus-IMP C-T Seabird 37-IM C-T	*	*
Pressure	250m	Seabird 37-IM C-T-P	*	
Turbidity	20, 50, 75, 100m	Wetlabs flntus-rt	*	
Dissolved Oxygen	20, 50, 75, 100m	SBE43	*	
Chl-a	20, 50, 75, 100m	Wetlabs flntus-rt	*	
PAR	20, 50, 75, 100m	Licor LI-193	*	
Pressure	1670m	Paroscientific 43K-101		*
Temperature	1670m	Seabird 16plus		*
Salinity	1670m	Seabird 16plus		*

Table 1. Configuration of buoys

2.1. Poseidon-E1 M3A buoy

The E1-M3A observatory of the Cretan Sea is oriented towards air-sea interaction studies, biochemical processes in the euphotic zone and variability of intermediate and deep water mass characteristics. Its payload (Tab. 1) includes a) an extended set of meteorological sensors including those for relative humidity and precipitation, b) a series of radiometers including multispectral sensors for radiance and irradiance, c) optical and biochemical sensors (chl-a, turbidity, PAR, DO) in the upper 100m and d) sensors for physical parameters (T, S) in the upper 1000m. The antifouling methods that have been used for the recently upgraded E1-M3A observatory under the POSEIDON-II project, were based on the experience of the early deployments [3-5] of the system and have significantly improved the quality of the data.

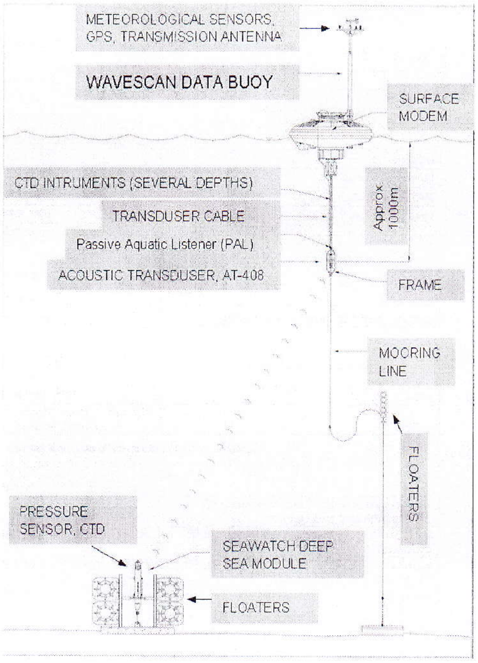

Figure 1. Outline of the Poseidon-Pylos observatory. The seabed platform is at a depth of 1670m.

2.2. Poseidon-Pylos buoy

The Pylos observatory of the Ionian Sea (Fig. 1) is equipped with standard meteorological sensors hosted by the surface buoy and CTs for the upper 1000m of the water column. An autonomous seabed platform transmitting data to the surface buoy through hydro-acoustic modems is also tested for the first time in the Mediterranean Sea. The platform has been originally developed for Tsunami detection based on the design of the DART system but has been expanded to host a SBE16 for salinity and temperature measurements.

The planed upgrades of the system include the introduction of pCO2 and pH sensors to support climate variability related studies. The first pCO2 sensor was introduced in the E1-M3A observatory (1m depth) in July 2009 delivering for the first time such a time-series in the Aegean Sea and allowing a pre-operational assessment of these systems. An ongoing upgrade of the Pylos site aims to extend the capabilities of the seabed platform. A new platform with increased energy autonomy and an expandable central processing system able to host new sensors including DO, turbidity, CO2 and pH will be developed during the next 2 years under the POSEIDON-III project.

3. REFERENCES

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