

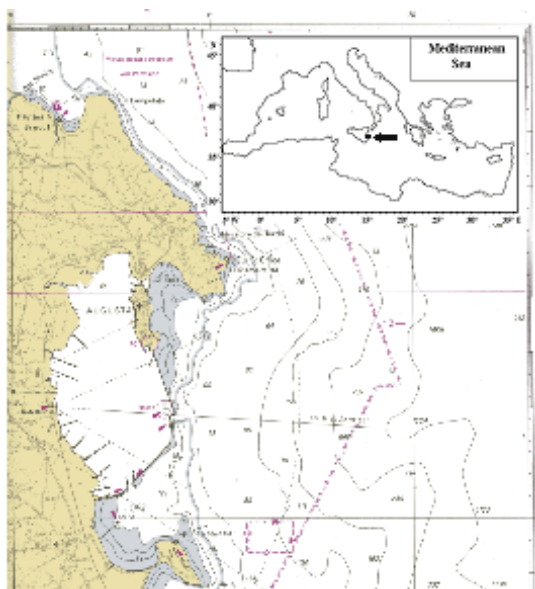
---

## RADA DI AGUSTA LAGOON - ITALY

---

F. Azzaro, M. Azzaro, A. Bergamasco and S. Giacobbe  
*Istituto Ambiente Marino Costiero - Talassografico -  
CNR, Spianata S.Raineri, 86 - 98122 Messina, Italy*

The “Rada di Augusta” is a wide natural bay which covers about 30 Km of the eastern coast of Sicily). Augusta Bay (Lat. 37,21°N - Long. 15,23° E) is situated between Capo Santa Croce and Punta Magnisi. In the past years, part of the bay has been walled up with breakwaters to form a vast harbour basin communicating with the sea through two narrow inlets (east and south, Fig. 1).



**Figure 1:** Map of the studied area and location of sampling station.

The bay is about 8 Km long and 4 km wide. The surface area is 23.5 km<sup>2</sup> and the mean depth is 14.9 m corresponding to a the total volume of approximately 3.5 x 10<sup>8</sup> m<sup>3</sup>.

Owing to its nature, a coastal marine environment with a low water turnover, and to the intense human activities, the Augusta Bay is a complex area where heavy industrialization and dense urbanization coupled with a low water turnover have promoted a very high state of degradation which can be essentially ascribed to these two activities (Fig. 2).

The first kind of pollution is mainly due to hydrocarbons from the petrochemical refining plants (Sciacca and Fallico, 1978; De Domenico *et al.*, 1994). The second kind of pollution that leads to a semipermanent condition of eutrophication is related to urban waste waters (70,000 inhabitants) reaching the bay after only a partial treatment. A high contribution of N and P comes also from industrial (production of fertilizers) and agricultural activities (Azzaro, 1993).

This basin has already been studied for several years because of various eutrophication phenomena (Andreoli *et al.*, 1987; Decembrini *et al.*, 1993; Magazzù *et al.*, 1995).

The Augusta Bay is a complex area where heavy industrialization and dense urbanization have promoted a very high state of degradation (Sciacca and Fallico, 1978; De Domenico *et al.*, 1994). Owing to its nature, a coastal marine environment with a low water turnover. This basin has already been studied for several years because of various



**Figure 2:** The Augusta Bay

eutrophication phenomena (Andreoli *et al.*, 1987; Decembrini *et al.*, 1993; Magazzù *et al.*, 1995).

**LaguNet** (<http://www.dsa.unipr.it/lagunet/>) is a scientific observational network studying the fluxes of nutrients and other contaminants from lagoon catchments to the near coastal environment. The objectives of LaguNet are to support and encourage co-operation of research groups studying lagoons, wetlands and saltmarsh systems situated along the Italian coast and to evaluate the application of the LOICZ (Land Ocean Interactions in Coastal Zones, a core project of IGBP) biogeochemical flux model and typology classification to such sites.

The methodology has been applied by LOICZ to approximately 170 coastal environments worldwide; it is based on a mass balance approach and provides important information on the flux of nutrients and ecosystem functions; the approach used is applicable to a majority of coastal ecosystems with data that are normally available from conventional monitoring campaigns. In this way it is possible to compare and to group aquatic systems having different characteristics based on properties related to biogeochemical cycles and to the ecosystem functions that result from these processes.



**Figure 3:** LaguNet sites around the Italian peninsula

On the basis of this experience and considering the paucity of LOICZ sites in the Mediterranean and Southern Europe it was decided to apply this methodology to a series of Italian coastal

environments where sufficient data are available (Figure 3).

#### Contact Persons

F. Azzaro, M. Azzaro, A. Bergamasco and S. Giacobbe

IAMC – Talassografico Messina- CNR  
 Spianata S. Raineri 86  
 98126 Messina  
 Italy  
 E-mail: [azzaro@ist.me.cnr.it](mailto:azzaro@ist.me.cnr.it) ;  
[bergamasco@ist.me.cnr.it](mailto:bergamasco@ist.me.cnr.it)

#### References

Andreoli, C., Ferito, V., Geraci, C., Guglielmo, L., Magazzù, G., Nicoletti, G., and Zerbo, G. 1987. Ciclo annuale di osservazioni chimico-fisiche e biologiche in un ambiente costiero eutrofizzato. *Mem. Biol. Mar. Ocean.* **16**,49-77.

Azzaro, F. 1993 Concentrazioni di nutrienti nella Baia di Augusta (Sicilia) - Atti I Workshop "Risorsa mare: un Progetto per il Mezzogiorno. Salvaguardia e valorizzazione delle acque costiere del Salento". Lecce 8 luglio 1991, 93-108.

Decembrini, F., Azzaro, F., Magazzù, G. (1993) - Studio delle condizioni trofiche della Rada di Augusta per il monitoraggio automatico dei fenomeni di eutrofizzazione. Atti I Workshop "Risorsa mare: un Progetto per il Mezzogiorno. Salvaguardia e valorizzazione delle acque costiere del Salento". Lecce 8 luglio 1991, 109-127.

De Domenico, L., Crisafi, E., Magazzù, G., Pugliesi, A., and La Rosa, A. 1994 Monitoring of Petroleum Hydrocarbon Pollution in surface water by a direct comparison of fluorescence spectroscopy and remote sensing techniques. *Mar. Pollut. Bull.*, **10**, 587-591.

Gordon, D.C. Jr., Boudreau, P.R., Mann, K.H., Ong, J.E., Silvert, W.L., Smith, S.V., Wattayakorn, G., Wulff, F., and Yanagi, T. 1996. LOICZ Biogeochemical Modelling Guidelines *Loicz Reports & Studies* N° 5. Second Edition, Loicz Texel, The Netherlands, vi +96 pp..

Magazzù, G., Romeo, G., Azzaro, F., Decembrini, F., Oliva, F. and Piperno, A. 1995 Chemical pollution from urban and industrial sewages in Augusta Bay (Sicily). *Wat. Sci. Tech.* Vol. 32, No. 9-10, 221-229.

Sciacca, S., Fallico, R. 1978 Presenza e concentrazione di sostanze inquinanti di origine industriale nella Rada di Augusta (Siracusa). *Inquinamento*, **20**, Vol.6.

Talassographic Report 1992 Sistema integrato per il monitoraggio automatico della Rada di Augusta. Istituto Sperimentale Talassografico (CNR), *RAPPORTI*, **6**, 1-120.