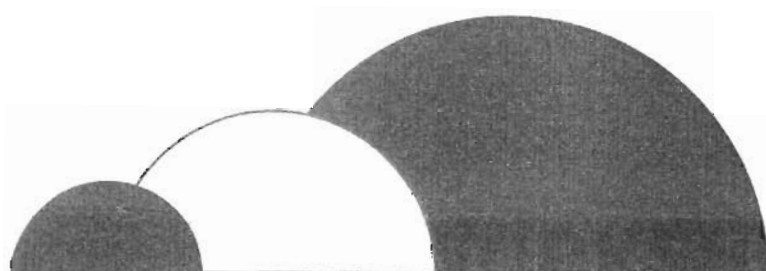


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# *Epitome*



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# **F I S T**

Federazione Italiana di Scienze della Terra

## W10-100 Poster Caroppo, Carmela

10.1474/Epitome.02.0100.Geoitalia2007

**PICOPLANKTON DYNAMICS IN THE MAR PICCOLO OF TARANTO (NORTHERN IONIAN SEA)**

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*Key terms: heterotrophic picoplankton; picophytoplankton; Mar Piccolo*

Picoplankton has been reported to include not only pico-sized, heterotrophic

bacteria but also, often to a considerable extent, < 2 μm pigmented organisms, i.e. cyanobacteria, prochlorophytes, and small pigmented eukaryotes (Li et al., 1992; Sherr and Sherr, 1994). Small autotrophs constitute significant fraction of the total primary production in many systems where they are superimposed on the classical pathway based on the larger phytoplankton. Algae liberate a variety of monomeric and polymeric organic compounds (Fogg, 1983; Jütner, 1981) which constitutes a major source for the heterotrophic bacteria. Heterotrophic bacteria play a vital role in nutrient cycling and food-web structure being responsible for the organic matter hydrolysis. In this study we determined autotrophic and heterotrophic picoplankton abundances over an annual cycle in the Mar Piccolo of Taranto. A monthly sampling was conducted in two stations and water samples were collected at 0.5 m below the surface by using a 5 - l Niskin sterile bottle. In order to estimate the picoplankton abundances, water samples were preserved with formaldehyde (2%) and kept at 4 °C until they could be counted. The cell counts were made using a Zeiss Standard AxioPlan microscope equipped with a halogen (Hg 100) light. Results evidenced that picoplankton abundances were comparable to those of other coastal environments subjected to anthropogenic pollution (e.g. Coffin e Sharp 1987; Mageri et al., 1992; Acosta Pomar e Giuffrè, 1996; Caroppo, 2002).

## W10-101 Orale Catalano, Giulio

10.1474/Epitome.02.0101.Geoitalia2007

**FEASIBILITY OF A CARBON BUDGET ALONG THE TRANSECT NEW ZEALAND - ROSS SEA FROM DATA COLLECTED DURING THE ITALIAN ANTARCTIC EXPEDITIONS (VECTOR - TASK 9.2)**

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*Key terms: Carbon cycling; key parameters; box model; biological pump; Ross Sea*

The objectives of this budget are both the thermodynamic disequilibrium of the CO<sub>2</sub> between atmosphere and ocean and the fluxes of carbon between its different reservoirs in the water column down to the sediment.

As such exercise, limited to the carbon fluxes in the water column, has been successfully performed for the Ross Sea applying a box model technique and utilizing the data collected by the researchers of several Italian institutes and universities who have participated to Italian Antarctic cruises from 1987 to 2001 (Catalano et al., accepted). This attempt has been carried out in the frame of the book on Carbon and nutrient fluxes in continental margins: A global synthesis ( Liu, Atkinson, Quinones, Talae-Mc Manus, eds.) which aims to evaluate the role of the continental shelf pump, that is the weight of the processes of coastal areas and shelves, toward the export of carbon into the deep ocean.

The budget of carbon for the Ross Sea has been calculated taking as independent variables: temperature and salinity for the hydrological properties of the water column and water masses, the pattern of the currents for the water exchange with the open ocean through the continental shelf edge, the primary production for the carbon sequestration in the upper layer, both the nitrate drawdown and the sediment traps for the downward settling of particulated matter, the microbial community respiration for the carbon regeneration in the deep layer and, finally, the burial rates for the carbon sedimentation at the sea floor. All the other quantities, necessary to balance the budget, have been derived from these.

Really, the Italian data set had the same some gaps which it has been necessary to fill with data made available by American colleagues in the frame of past and present collaborations (US-JGOFS and ROAVERRS).

Although the budget that we have obtained must be considered still coarse, the editorial board has recognized it as the first attempt of synthesis carried out for the Ross Sea and accepted its conclusions.

What I think important of this work it is to put in evidence that all the partners involved have shared both their data and their own expertise in a well defined work plan, making in this way possible this attempt. The task 9.2 of VECTOR was born just thinking to this experience.

Now taking into account all that, we must realize that after several months from the start, and in spite of the efforts done, we are still lacking of the inventory of the Italian data available for the region of interest. I wish to underline that this step is absolutely not evadible and we cannot even think to prosecute without fulfilling it, beyond the possible data gaps that we shall meet which are still to be identified.

In this first phase I do not want to resort to foreign data, but just for comparison, I wish to underline the difference with the US cruise routines: in the Palmer cruise in the Ross Sea of November-December 2006, which I participated to, many data of general interest such as navigation, meteorological, underway (surface temperature and salinity, fluorescence, primary productivity, pCO<sub>2</sub>) and the CTD casts were already made available in real time through ship intranet and usable by participants.

Reference:

Catalano, G., Budillon, G., La Ferla, R., Povero, P., Ravaioli, M., Saggiomo, V., Accornero, A., Azzaro, M., Carrada G.C., Giglio, F., Langone, L., Mangoni, O., Cristina Mistic, C. & Modigh, M. (accepted). The Ross Sea. In: K.K. Liu, L. Atkinson, R. Quinones, & L. Talae-Mc Manus (eds.), Carbon and nutrient fluxes in continental margins: A global synthesis, Global Change, The IGBP Series, Springer, Berlin.

## W10-102 Poster Cavallo, Rosa Anna

10.1474/Epitome.02.0102.Geoitalia2007

**POTENTIALLY PATHOGENIC VIBRIOS AND MICROBIAL POLLUTION INDICATORS IN MAR PICCOLO OF TARANTO (LINEA 4 ATTIVITA' 5.2)**

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*Key terms: Vibrio; Microbial pollution indicators; Mar Piccolo of Taranto*

Vibrios are gram-negative, curved, halophilic, nonspore-forming bacteria, autochthonous inhabitants of the marine and estuarine environments. Some *Vibrio* species are pathogenic for fish and shellfish as well as for humans. By contrast to several enteric pathogenic bacteria flowing into the water through sewage, vibrios are normal residents in coastal waters and their number depends on environmental parameters. Several studies have demonstrated that the occurrence of vibrios is not related to the presence of the microbial pollution indicators. In this framework we studied the dynamic of vibriaceae potentially pathogenic as well as the density of the microbial pollution indicators over annual cycle in water, sediment and mussel samples collected in the Mar Piccolo of Taranto. Results evidenced the prevalence of *V. alginolyticus*, *V. mediterranei* and *V. splendidus* II in the samples examined. Among these vibrios *V. alginolyticus* is considered a potentially pathogenic specie responsible of episodes of diarrhea or cutaneous infections, in particular for frail people. Microbial pollution indicators densities were high in the mussels, low in water samples and zero in the sediments.

## W10-103 Poster Cavallo, Rosa Anna

10.1474/Epitome.02.0103.Geoitalia2007

**INTERACTIONS (RELATIONSHIPS) BETWEEN BACTERIA AND PHYTOPLANKTON IN THE MAR PICCOLO OF TARANTO (IONIAN SEA). (LINEA4 ATTIVITA' 5.7)**

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*Key terms: heterotrophic bacteria; phytoplankton; Mar Piccolo of Taranto*

Several studies have already been carried out to characterize heterotrophic bacteria and phytoplankton communities in ocean sites and in different coastal areas of temperate, tropical and polar zones. Mar Piccolo of Taranto (Ionian Sea) is a semi-enclosed basin subject to pollution and receives a considerable amount of sewage and industrial waste.

The aims of this work was to analyse the qualitative and quantitative composition of heterotrophic bacteria and phytoplankton communities and the interactions between these two planktonic components. Samples of sea-water were collected monthly from September 2006 to August 2007 in two stations of the Mar Piccolo at the surface and bottom layers. Among the Gram-negative bacteria, the predominant genus were *Aeromonas*, *Photobacterium* and *Pseudomonas*. Gram-positive bacilli were abundant at all sampling points. Among pigmented bacteria, *Flavobacterium* was predominant. As regards phytoplankton communities, quantitative data evidenced high abundance values in the spring time and they were characterized by the dominance of diatom and phytoflagellate groups. Dinoflagellates and coccolithophorids accounted only for low percentage values. During the sampling period, diatoms were dominant with high cell densities in the spring and were mainly represented by *Pseudo-nitzschia* spp., *Chaetoceros* spp., *Cylindrotheca closterium*, and *Thalassiosira* sp.. Indeed, phytoflagellates,

mainly represented by the undetermined forms < 10 μm and by cryptophytes, had a wider distribution over time.

As regards the interactions between bacteria and phytoplankton, our data must be considered preliminary, but they seemed to evidence that phytoplanktonic spring bloom could be probably responsible for the availability of organic matter for bacterial populations. But, further studies will evaluate whether the balance in time between the positive dissolved factors (nutrients from phytoplankton bloom) and the negative particulate factors (grazing) could be considered to be a major determinant of the temporal fluctuations of bacterial density in Mar Piccolo.

## W10-104 Poster Cecere, Ester

10.1474/Epitome.02.0104.Geoitalia2007

**WHY IS THE POPULATION OF THE INTRODUCED KELP UNDARIA PINNATIFIDA (OCHROPHYTA, LAMINARIALES) UNDERGOING A REGRESSION IN THE MAR PICCOLO OF TARANTO (SOUTHERN ITALY)-**CECERE Ester<sup>1</sup>, PETROCELLI Antonella<sup>1</sup>, ALABISO Giorgio<sup>1</sup>, RICCI Patrizia<sup>1</sup>

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*Key terms: global warming; introduced species; Mediterranean Sea; Undaria pinnatifida*

*Undaria pinnatifida* (Harvey) Suringar is a kelp native of Japan, China and Korea. Like all the Laminariales, it has a strongly heteromorphic, diplohaplontic life cycle, with an alternation between highly differentiated diploid sporophytes (the macrothalli) and microscopic haploid gametophytes (microthalli). In April 1998, *U. pinnatifida* sporophytes were observed for the first time in the Mar Piccolo of Taranto settled on a quay in the old city. In the years 2000-2001 and 2001-2002, the population dynamic and the phenology of *U. pinnatifida* sporophytes were studied to know the seasonal variation of recruitment, settling density and thallus length. It resulted that: 1) the population extended for about 100 m along the quay where thalli were settled from the upper sublittoral to the bottom (-1.5 m at most); 2) sporophytes were present from December throughout June; 3) the highest recruitment value was observed in February; 4) the maximum mean settling density was of 23 thalli/0.25 m<sup>2</sup>; 5) the highest length values was about 1 m. Successively, two surveys performed in 2003 and 2004 to check the possible

spread of *U. pinnatifida* in the basin, highlighted that it remained in the zone of the first collection even though numerous thalli were observed on floating wharves which had been positioned near the quay a short time before. After five years, in 2006-2007, a new study on the population of *U. pinnatifida* sporophytes was undertaken in the same zone, which outlined that: 1) currently, the population extends for 20 m along the quay where thalli were settled only in the upper sublittoral (-50 cm); 2) sporophytes were present from February throughout June; 3) the highest recruitment value was observed in March; 4) the maximum mean settling density was of 1 thallus /0,25 m<sup>2</sup>; 5) the highest length values did not exceed 40 cm.

Therefore, the above recent study pointed out that, in the Mar Piccolo of Taranto, *U. pinnatifida* population is undergoing a regression. This is in contrast with that occurred in other localities outside the Mediterranean basin (e.g. The Netherlands, Argentina, Australia, New Zealand), where *U. pinnatifida* spread quickly and showed an invasive behaviour to induce local researchers to try eradication experiments. Also in Venice, *U. pinnatifida* spread throughout the lagoon after its first finding at Chioggia in April 1992 and proved to outcompete local species.

The regression of *U. pinnatifida* population observed in the Mar Piccolo is probably due to the high temperature values of the basin seawater. In fact, a careful study carried out on the population of *U. pinnatifida* introduced in California, highlighted that temperature has a significant effect on survivorship of microscopic gametophytes and young sporophytes; in particular, temperatures below about 15°C seem to stimulate gametophyte development so affecting recruitment. In the Mar Piccolo, temperature drops below 15°C only from December throughout March. Especially in late summer-autumn, when the overwintering microscopic gametophytes undergo sexual reproduction, seawater temperature is indeed higher than 15°C (from 1996 to 2006 the mean temperature values recorded in September, October and November were 24.1 ± 0.4, 21.1 ± 0.5; 18 ± 0.5, respectively). In particular, in October an increasing trend is clearly detectable over the eleven year period 1996-2006 (R=0.66) which might have progressively affected *U. pinnatifida* recruitment, causing the observed population decline.

Therefore, it can be concluded that: 1) the concept of "invasive species" is not absolute, in that local environmental variables may heavily affect the success of an introduction; 2) the warming of the Mediterranean basin can limit the spreading of cold-temperate introduced species.

## W10-105 Orale Chiocci, Francesco Latino

10.1474/Epitome.02.0105.Geoitalia2007

### THE VECTOR PROJECT: OMBRONE RIVER DELTA'S AREA

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Key terms: Vector Project; climate change; delta

The Ombrone River delta and the facing marine area between Monti dell'Uccellina and the Bruna River mouth, is one of the 5 study areas within research lines 2 (Vulcost) and 3 (Varcost) of the VECTOR Project. The area has long been investigated through multidisciplinary studies (micropaleontology, sismostratigraphy, geomorphology etc), aimed to reconstruct the evolution of depositional systems during the last climatic/eustatic cycle.

One of the main objectives of the VECTOR Project is to analyse the most recent stratigraphic interval in order to define the possible sedimentary response to short-lived (at the scale of the last few millennia or centuries) changes in sedimentary supply and sea level. Supply fluctuations depend on the impact of climate on the drainage area and its effects on sediment yield. These data, once available, represent important constraints for evaluating the environmental response to possible rapid changes for the near future.

Analyses performed in the study area include:

- geomorphological analysis of the entire area;
  - detailed geomorphology of coastal ponds ("chiari" in the local terminology);
  - lithological analysis of the uppermost (few metres) interval of the coastal area and characterization of the dune-beach system evolution during sea level change and shoreline migration;
  - appraisal of the rainfall, the liquid capacities and the turbid outflow and the eventual recent variations;
  - identification and estimate of the frequency of storm and flood events based on sedimentologic and multi-proxy analyses (stable isotopes, heavy metals, foraminifers assemblages);
  - detailed seismo-stratigraphy of the highstand deposit in order to identify discrete subunits and/or key stratigraphic surfaces characterised by high-coreliability and relatable to depositional events detectable through other proxies;
  - identification of hyperpichnal flows based on morpho-bathymetry and sedimentologic analysis.
- The above analyses will be targeted to define the possible scenarios for the evolution of the coastal and deltaic environment within the next 25, 50 and 100 years.

## W10-106 Orale Conversano, Fabio

10.1474/Epitome.02.0106.Geoitalia2007

### TEMPORAL SERIES IN THE SOUTHERN TYRRHENIAN SEA: THE ACTIVITIES OF THE GROUP INVOLVED IN LINE 8 CARPEL (THE CARBON CYCLE IN PELAGIC AREAS OF THE MEDITERRANEAN) - ACTIVITY 2

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Key terms: Tyrrhenian Sea; Carbon cycle; Double diffusion processes

The oceanographic campaigns are part of the experimental activity envisaged within the VECTOR project (Vulnerability of the coasts and Italian marine ecosystems to climatic changes and their role in the carbon cycles of the Mediterranean) - Line 8 CARPEL (The carbon cycle in pelagic areas of the Mediterranean) - Activity 2: Temporal series in the Southern Tyrrhenian at a fixed station (39°30' N 13°30' E).

The general aim of the project is the study of the main processes controlling the seasonal and interannual variability of the carbon exchange between the atmosphere and the open sea environment and its possible segregation in the deep sea.

The specific objective of the campaign is to conduct process studies for the definition of the carbon cycle in the pelagic area of the Southern Tyrrhenian Sea. Particular focus will be given to the response of the pelagic populations to the abiotic forcing both in the surface layers as well as in the meso- and bathy-pelagic zones.

The activity plan of oceanographic campaigns, foresees hydrological sampling in 6 stations located along a section extending from the Gulf of Naples to the time-series station VECTOR (coordinates 39°30' N, 13°30' E) situated offshore on the bathymetry of 3500 m, a site affected by intense processes of deep vertical mixing and double diffusion.

The experimental activity of the group involved in line 8.2, conducted during the first year, will be presented.

## W10-107 Poster Conversano, Fabio

10.1474/Epitome.02.0107.Geoitalia2007

### MULTIDISCIPLINARY STUDY OF THE PELAGIC ENVIRONMENT OF THE SOUTHERN TYRRHENIAN SEA: THE CONTRIBUTION OF SZN TO VECTOR-LINE 8.2

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Key terms: Tyrrhenian Sea; Biochemical properties; Deep vertical mixing

The ecological laboratories of the Stazione Zoologica Anton Dohrn (SZN) are presently involved in the national program VECTOR aimed at studying the main processes controlling the seasonal and interannual variability of the carbon exchanges between the atmosphere and the open Mediterranean Sea, and its possible segregation in the water column.

In the frame of Line 8 CARPEL (The carbon cycle in pelagic areas of the Mediterranean), which started in February 2006 and will last for three years, an intense field activity is being carried out in the Southern Adriatic Sea and in the Southern Tyrrhenian Sea to investigate, on seasonal scale, the responses of the pelagic communities to abiotic forcing all along the water column from the surface to the meso- and bathy-pelagic areas. Our interests focus in particular on the southern Tyrrhenian Sea, which is still poorly studied in comparison with other Mediterranean regions, although it plays a key role in the complex dynamics of exchange between the eastern and western Mediterranean basins.

The activities in the Tyrrhenian Sea are performed at 6 stations along a transect from the Gulf of Naples to a fixed station (39°30' N, 13°30' E, about 3500 m depth), which seems to be affected by intense processes of deep vertical mixing and will become a long-term observatory.

The SZN contribution focuses on the analysis of the vertical and seasonal patterns of dissolved oxygen, nutrients, spectral light penetration and absorption properties of the water mass, phytoplankton pigment diversity, primary productivity and phytoplankton community composition and micro- and meso-zooplankton biomass and composition.

Preliminary integrated results of the surveys conducted in winter 2006-2007 and spring-summer 2007 will be presented and discussed. The integration of the different information allows to derive some hypothesis on the functioning of the trophic web, taking into account also the microbial food web, and its relationship with the physical and chemical environment.

## W10-108 Orale Conversi, Alessandra

10.1474/Epitome.02.0108.Geoitalia2007

### ANALYSIS OF PLANKTON AND CLIMATE VARIATIONS OVER 30 YEARS IN THE GULF OF TRIESTE: PRELIMINARY RESULTS

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Key terms: climate; zooplankton; Gulf of Trieste; ECMWF; time series

Understanding the impact of climate change on plankton populations is of major importance, as plankton constitutes the basis for higher trophic levels in the marine chain. In this study, in the framework of the national program VECTOR, we use the multi-decadal mesozooplankton abundance time series in the Gulf of Trieste to investigate its seasonal and interannual variability in relation to atmospheric and physical parameters. For the selection of atmospheric and physical parameters we have used the European Centre for Medium range Weather Forecast (ECMWF) ERA-40 and analysis data on a 0.5° X 0.5° grid over the Adriatic Sea; the Comprehensive Ocean Atmosphere Data Set (COADS) on 1° X 1° grid; and local data (Trieste, CNR-ISMAR Station, 45°38'34"N, 13°45'14"E), over the period 1970-2005. We have selected a few variables (SST, sea level pressure and wind stress) which are good candidates for proxies of marine circulation changes and are possibly related to changes in plankton productivity. Our preliminary analyses of the climate data show ECMWF underestimating wind speed in the Gulf of Trieste. With regard to biological variability, the comparisons of the interannual trends of the dominant copepod species indicate an overall change over the 30 year period.

## W10-109 Orale Cossarini, Gianpiero

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