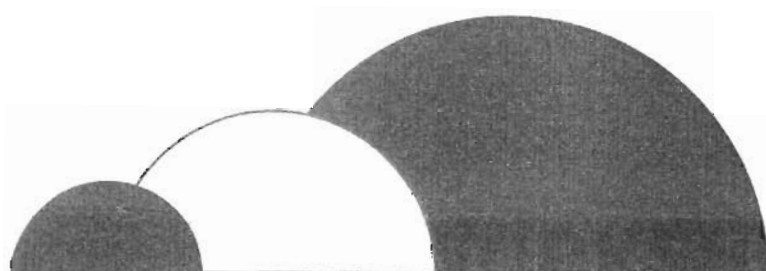


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# *Epitome*



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weight increment; photographic survey) or were obtained in lab after tank culture. Data comparison is mostly prevented by inhomogeneous data units (the photographic survey provides a measure of surface increment, whilst the staining technique provide data on the thickening of the thallus) and selection of different target species (Foster, 2001).

The second issue is related to the estimate of shelf surface covered by living corallines, in order to obtain a regional quantification of their role on a global scale. For this purpose, geophysical survey associated with groundtruthing seems a promising tool (Sanè Schepisi et al., 2004).

Some pilot investigations on tank growth estimates of *Lithophyllum stictaeforme* (Areschoug) Hauck and *Mesophyllum lichenoides* (Ellis) Lemoine, collected from the coralligenous of the Ligurian Sea, yielded preliminary data of 10-60 µm/yr thickening for *Mesophyllum lichenoides* and 21-80 µm/yr for *Lithophyllum stictaeforme*, and marginal elongation of 1290-3260 µm/yr for *Mesophyllum lichenoides* (Basso & Rodondi, 2007). Further investigation with tank cultures is in progress.

Experiments at sea started on April 2007. Several thalli of common coralligenous species have been collected along the western rocky coast of Bonassola (SP) at 6 m depth. Samples have been Alizarin-S stained (0,25 g/l for 24h) and cemented at the same place of collection. Water temperature and PAR (Photosynthetically Active Radiation) measurements are recorded regularly during the experiment.

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Canals M. and E. Ballesteros, 1997 - Production of carbonate particles by phyto-benthic communities on the Mallorca-Menorca shelf, Northwestern Mediterranean Sea. Deep Sea Research II - 44:611-629.

Foster M.S., 2001 - Rhodoliths: between rocks and soft places. J. Phycol., 37, 659-667.

Sanè Schepisi E., Abdelahad N., Basso D., Chiocci F. - Rhodolith facies distribution on the Pontine Islands shelf. - 4th Annual conference IGCP Project 464 Continental shelves during the last glacial cycle: knowledge and applications. Roma, Aug. 28-31/2004.

## W10-92 Poster Bellafiore, Debora

10.1474/Epitome.02.0092.Geotitalia2007

### VECTOR PROJECT - LINE 5 - ACTIVITY 2 - HYDRODYNAMICS AND CLIMATOLOGY

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Key terms: Climatology; state of the art; timeseries

In this work results during the first year of activity of VECTOR PROJECT, Line 5 CLIVEN, Activity 2 - Hydrodynamics and Climatology - are presented. This activity is concerned with a climatological characterization of the Venetian Lagoon and the nearby coastal areas. The hydrodynamics is the focus of the project that tries to connect and compare former studies. The state of the art of knowledge and monitoring in the Venetian area is presented and new results from statistical analysis and numerical modeling are discussed.

The first step consisted in cataloging the spatial and temporal coverage of hydrodynamical variables (water levels, meteorological data, waves, currents, temperature and salinity, solid and suspended transport, river discharges and bathymetry) in the study area considering former data analysis and adding new elaborations. The meteorological data, in particular wind speed and direction, have been taken as the topic of study. Three locations have been chosen, the CNR oceanographic platform, 15 km offshore in front of the lagoon, Lido, a barrier island, and Tesserà Airport, in the Venetian inland. This choice allows us to characterize longitudinally the venetian area. The examined period spans from 1972 to 1987 with a good temporal data coverage. The main directions and the averaged wind speed values have been computed in the three stations, identifying two main patterns, one coming from NE, Bora wind, and the other from SE, Scirocco wind. The wind speed signal shows an averaged attenuation going inland.

A speed correlation analysis between the three datasets has been applied to define quantitatively whether a common wind pattern is present in the lagoon.

The correlation increases for low wind periods, which can be linked with low direction variability phenomena. Lido and CNR platform, spatially close, are well correlated. Finally a comparison with a former study, done on Lido wind dataset in the period 1923-1930 (Crestani, 1930), has been performed. The average of monthly averaged speed values have been computed, for each month, and these values have been compared with Crestani's ones. The results show the same trend in both datasets, except for the winter months where an attenuation (negative derivative) in the more recent measurements is registered. The values computed in the present work are systematically underestimated and this could be due to a real signal attenuation during the last century or to different calibrations of the instruments.

The last topic in this activity is connected with numerical modeling, which will be applied, in the next year, to reproduce extreme events in the past and future scenarios from a climatological point of view.

A 3D finite element model, SHYFEM, created and developed at ISMAR-CNR, in Venice, will be applied using historical forcings, boundary and initial conditions that are already available.

## W10-93 Poster Boldrin, Alfredo

10.1474/Epitome.02.0093.Geotitalia2007

### PARTICULATE MATTER AND ORGANIC CARBON DOWNWARD FLUXES IN THE SOUTHERN ADRIATIC SEA

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Key terms: Particulate Organic Carbon; Downward particle flux; Carbon export; Southern Adriatic

Particulate matter in deep sea areas, is mainly related to autotrophic

production processes occurring in the upper layer of water column, supported by the seasonal mixing, upwelling phenomena and deep convection events. In these environments, productivity may be estimated by the amount of organic matter that falls out from the photic zone and the downward fluxes measured by sediment traps represent a good tool to have continuous information on biological production processes occurring in the photic layer. In addition, organic matter changes qualitatively and quantitatively while sinking through the water column with several implications on biogeochemical cycles.

Here the results obtained during the first year of the VECTOR Project, are discussed. The main objective is to characterize the particulate organic matter in the water column and study the sinking processes in the southern Adriatic Sea.

Data on total suspended matter (TSM), particulate organic carbon (POC) and the carbon stable isotope delta13C of particulate organic carbon in the water column have been collected during 3 oceanographic surveys, carried out in November 2006, February and April 2007, along the Bari-Dubrovnik transect. From November 2006 to April 2007, the export of particulate matter below the photic zone (150 m depth) and near the bottom has been estimated through the downward particle fluxes measured with automated sediment traps, in a station located in the centre of the South Adriatic Pit (1200 m depth). The particulate material was collected at sampling intervals of 7 - 15 days.

The preliminary results of the first year of activity, concerning the particulate matter distribution and origin along the water column and the vertical particle fluxes measured in the first 6 months of deployment, are here presented. To evidence possible changing in biogeochemical cycles in the last 10 years, data obtained have been compared with similar information available in the same area and collected since 1994.

## W10-94 Orale Brunet, Christophe

10.1474/Epitome.02.0094.Geotitalia2007

### COMPARATIVE FUNCTIONAL DIVERSITY OF THE PHYTOPLANKTON COMMUNITY FROM THE SOUTH ADRIATIC AND SOUTH TYRRHENIAN SEAS: A PIGMENT STUDY

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Key terms: Picoplankton; Pigments; functional diversity

Results on photosynthetic and photoprotective pigments of phytoplankton analyzed by HPLC from the South Adriatic and South Tyrrhenian seas are presented. The aim of this study is to compare between the two sites the functional diversity of the algal community using pigments analyzed by HPLC. Phytoplankton pigments are biomarker molecules for many biological or ecological processes, as the community structure in term of algal groups, size and succession, the physiological and photoacclimative state of cells, the degradation processes related to senescence of algae or grazing by zooplankton. The two sampled sites correspond to the stations sampled in the framework of the Italian project VECTOR, from the South Adriatic (AM) and Tyrrhenian (TM) seas. Four campaigns have been carried out from November 2006-May 2007. Samples for pigment analysis by HPLC had been taken at 5 to 7 depths, mainly - but not only - covering the euphotic zone of these two stations. Size Two algal size classes were investigated: the picoplankton (< 3µm diameter) and the nano- + micro-plankton (> 3µm) thanks to fractionated filtration on-board of the water samples. Results highlight the presence of different algal composition and functional traits of the community between the two sites, in agreement with the different trophism of the water masses.

## W10-95 Orale Buia, Maria Cristina

10.1474/Epitome.02.0095.Geotitalia2007

### CAULERPA RACEMOSA VAR. CYLINDRACEA IN THE GULF OF SALERNO: FROM THE MOLECULE TO THE ECOSYSTEM

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Key terms: gulf of Salerno; Caulerpa racemosa; ecosystem

The occurrence of the green macrophyte *Caulerpa racemosa* represented by its invasive variety *cylyndracea* has been recorded in the gulf of Salerno since the mid-1990s. At that time the bottom surface covered by the alga was estimated to be one of the largest in the Western Mediterranean Sea. The structure and functioning of the algal populations and their role in affecting soft-bottom communities in the gulf of Salerno are now being investigated at three levels: population genetics, plant ecophysiology and effect on macrofaunal abundance and diversity.

In order to assess the genetic potential of the species in surviving and adapting in the newly colonized areas and to clarify the modalities of colonizing new biotopes, ninety samples have been collected by scuba diving. A standardized sampling design which will allow comparing results with other areas within the Mediterranean distribution of the species was followed. Genomic DNA has been extracted from each single thallus and polymorphic microsatellite markers will be utilized as molecular markers. Results will allow inferring about the genetic polymorphism underlying the morphological plasticity of this species. Gene flow within the Gulf of Salerno and among distinct localities will be related to dispersal vectors and marine currents regime.

As highlighted by our previous research, *C. racemosa* var. *cylyndracea* exhibits a remarkable plasticity also of its photosynthetic traits with respect to major environmental variables. In the present study, the response to temperature, irradiance level and photoperiod is being investigated, and results so far obtained provide new insights into the acclimation capabilities of the alga. This may have important implications about how the local climate may affect its spread potential.

Although characterized by a marked seasonal variability, the broad distribution of the alga on soft bottoms of the gulf has been confirmed by surveys conducted along selected transects in the Northern and middle gulf, seemingly enhancing the habitat complexity of the bottoms which *Caulerpa* stands

occupy. How this affects the diversity and structure of local macrofaunal assemblages is the object of a further research line. Preliminary data on major taxa such as polychaetes indicate that *C. racemosa* may act as an engineering species impacting the structure of soft-bottom communities.

Authors indicated as et al.:

Scipione M.B., Zupo V.

## W10-96 Orale Burca, Mihai

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### ESTIMATION OF THE PHYSICAL PUMP FUNCTIONING IN THE NORTHERN ADRIATIC SEA

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**Key terms:** Northern Adriatic Sea; monthly climatology; mixed layer depth

In the framework of the VECTOR project ("Vulnerabilità delle Coste e degli ecosistemi marini italiani ai cambiamenti climatici e loro ruolo nei cicli del carbonio mediterraneo") the vertical mixing efficiency is studied in the shelf area of the Northern Adriatic Sea. In this relatively shallow area (depths are < 50 m) two major competing buoyancy forces are at work: fresh water discharge and winter cooling. The latter induce formation of the dense water, which consequently spreads toward the south.

The study zone has been spatially divided into cells of 12' x 12' degrees longitude-latitude. On the basis of available temperature (T) and salinity (S)

data, collected by various projects, a corresponding density ( $\sigma_t$ ) profiles have been calculated. Monthly climatological profiles were then determined in each cell for each of the three parameters. They were subsampled at regular depths every 2 m from surface down to 20 m, and every 5 m from 20 m down to the bottom. The climatological profile of the three parameters consists of the mean value, the number of data used, and variance at each subsampled depth. The

horizontal distribution of the mean monthly T, S, and  $\sigma_t$  are presented at four selected depths, 2, 5, 10 m and bottom.

Mean annual salinity and temperature distributions in the surface layer are characterised by a front between fresher and colder waters in the east and saltier and warmer waters in the west, according to the thermohaline cyclonic circulation in the basin. At the monthly scale, both parameters show high variability. In particular, during December, January and February, east-west gradient of T and S is strongly evident, indicating colder and fresher waters confined along the western coast. During the warm season (May-July) the surface layer is more uniform in temperature, while the path of fresh water spreads eastward.

In the bottom layer the temperature distribution for the whole year ranges between 6.95 and 23.25 °C. The salinity distribution throughout the year is relatively uniform, ranging between 35.1 and 38.6, except downstream the Po River where it can drop down to 25.12. The temperature field during the winter period is characterized by colder water in the shallow coastal regions with respect to a warmer offshore area. On the contrary, during the summer season shallow near-shore waters are warmer than the rest of the basin, where the thermocline does not reach the bottom.

From individual density profiles in each cell, mixed layer depth (MLD) is computed using the difference criteria, with the density variation  $\Delta\sigma = 0.06$  kg/m<sup>3</sup>. Subsequently, the mean MLDs are calculated, and compared to the total bottom depth. The MLD evolution at monthly scale is mapped over the study region. Moreover, the MLD is analysed individually during several particular buoyancy forcing conditions, more and less favourable for vertical homogenization of the water column over the shelf.

## W10-97 Poster Busetti, Martina

10.1474/Epitome.02.0097.Geoitalia2007

### THE MORPHOLOGICAL AND SEISMIC STRATIGRAPHIC CHARACTERIZATION OF THE GRADO AND MARANO LAGOON (NORTHERN ADRIATIC)

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**Key terms:** Grado and Marano Lagoon; seismic stratigraphy; morpho-bathymetry

The Grado and Marano Lagoon, located along the Northern Adriatic coast, extends from the Tagliamento to the Isonzo Rivers for about 50 km, covering an area of about 160 km<sup>2</sup>. The lagoon is protected from the sea by the sand banks and 1 km northward, by islands distributed in an arch shape separated by mouths.

The lagoon probably formed about 5500 ys BP in the western part (Marano Lagoon), and further, about 1000 ys BP to East (Grado Lagoon). The development of the Grado Lagoon is probably related to the diversion of the Isonzo River from the area of Grado to its present position eastward. The present evolutionary trend at century scale, due to the actual transgressive regime, is constituted by progressive translation of the whole system of islands and sand banks toward the land.

The Grado and Marano Lagoon is a moderately anthropized system, still having the possibility of natural evolution. For this reason it has been chosen as one of the study sites where investigate the vulnerability of coastal environment induced by climatic and sea level changes.

To study the relationship between sea level rise and the response of the lagoon system, multi and single channel seismic profiles have been acquired from very high to intermediate resolution in order to investigate the Holocene and Pleistocene evolution of the area. Three profiles of multichannel intermediate resolution have been acquired from land to lagoon. Moreover morpho-bathymetric data have been collected in key areas.

## W10-98 Orale Cardin, Vanessa

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### DECADAL TREND OF THERMOHALINE PROPERTIES IN THE SOUTHERN ADRIATIC AND REMOTE FORCING

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**Key terms:** Adriatic Sea; deep convection; current field

Hydrographic observations conducted during the first year of the VECTOR project depict a change of a trend, if compare to what was observed during the past decade. The observations highlight the importance of the intermediate waters and confirmed the dominating prevalence of the highly saline Levantine Intermediate Water, which seems to have replaced the Cretan Intermediate Water after 2003 in the layer below 600m.

The open-ocean vertical convection has been considered as the most important mechanism in forming the Adriatic Dense Water (AdDW) which then becomes the prevailing component of the Eastern Mediterranean Deep Water (EMDW). This process takes place in the South Adriatic Pit in the centre of the cyclonic gyre (1). The extension of the vertical mixing, which rarely in the last 15 years has reached the bottom layer, varies on the interannual and decadal time-scales in response of the air-sea heat fluxes and the pre-conditioning vertical density structure (2).

In the last decade (1997-2007) in the South Adriatic Pit, the average temperature of the water column in the layer between 200 and 800m has increased in average by about 0.5 °C. This increase, although weaker, started already in 1991. During the last decade, the maximum average temperature was reached in 2003 a value of 13.7°C, much higher than 12.9°C as observed in 1997. After 2003 a decrease in the deeper layers temperature is observed. In parallel, an increase in average salinity by about 0.12 has also been documented (being more intense after 2003) but maintaining this tendency also until 2006 and then showing slight decrease. The increase in temperature and salinity resulted in a decrease in density between 1997 and 2003 indicating that the influence of temperature prevailed in determining the density and that the lighter water filled up the deep layers of the South Adriatic Pit. After 2003 the densest water of the last decade occupied the layer between 200 and 800 m probably due to extremely high salinity.

The deep layer considered the one below 800 m depth (Otranto Sill depth) shows that before 2006, was filled by the ADW (Adriatic Deep Water) from local origin characterised by higher temperature and salinity, while afterwards the deep layers seem to be prevalently ventilated by dense waters coming from the northern Adriatic. This fact is confirmed by the decrease in both temperature and salinity.

After 2003, the intermediate layer in the Pit shows strong changes in its well-known characteristics, previously filled by the Levantine Intermediate Water (LIW), evidenced by the intermediate salinity maximum (S > 38.76). Presently in this layer of the area a new warmer water mass with even higher salt content is present and could be traced back in the Ionian/Cretan Sea. This water mass can be responsible for the recent increase in ventilation of the Adriatic since it provides a source of salt needed to intensify the convection process.

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2. Cardin, V. and Gacic M., 2003. Long-term heat flux variability and winter convection in the Adriatic Sea. Journal of Geophysical Research, J.Geophys. Res., 108, C9,8103.

## W10-99 Poster Caroppo, Carmela

10.1474/Epitome.02.0099.Geoitalia2007

### CYANOBACTERIAL DIVERSITY AND POTENTIALLY TOXIC SPECIES IN THE MAR PICCOLO OF TARANTO (NORTHERN IONIAN SEA)

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**Key terms:** cyanobacteria; toxic species; Mar Piccolo

Marine cyanobacteria are found in all the oceans of the world, in a variety of forms which may differ among seasons and geographical locations (Schopf, 1996; Golubic et al., 1999). Illuminated coastal sediments normally host cyanobacterial communities (Golubic et al., 1999), so that benthic cyanobacteria are also sporadically found in the water column, because of physical processes such as wave action. Only a few cyanobacterial forms occupy pelagic environments, since they are represented almost exclusively by the two picoplanktonic genera *Synechococcus* (Waterbury et al., 1979) and *Prochlorococcus* (Chisholm et al., 1988; Urbach et al., 1992).

On the basis of these considerations, we focussed our study in Mar Piccolo of Taranto (Northern Ionian Sea) to assess, over an annual cycle the culturable filamentous cyanobacterial abundances and taxonomy. Furthermore the presence of the potentially toxic cyanobacterial species was also monitored.

The seawater samples were concentrated 200 times by filtration on a 0.45  $\mu$ m pore size membrane filter and were plated on solid seawater-enriched medium (De Philippis et al., 1993). The cultures were incubated at 26  $\pm$  2 °C under

white fluorescent light at a photosynthetic photon flux abundance of 20  $\mu$ mol photon m<sup>-2</sup> s<sup>-1</sup> (Kana & Glibert, 1987). The isolated cyanobacteria were identified according to Komárek & Anagnostidis (1999; 2005) and Castenholz (2001).

Results evidenced that, in addition to the typical picoplanktonic *Synechococcus*, the culture techniques allowed us to isolate and identify cyanobacteria belonging to the oscillatorian genera *Geitlerinema*, *Leptolyngbya*, *Oscillatoria* and *Spirulina*. Even if these filamentous morphotypes represent a minor fraction of the total cyanobacterial community, their importance could be related to their contribution to the phytoplankton diversity.

Among the cyanobacterial species, the presence of a potentially toxic species *Oscillatoria nigro-viridis* must be underlined, taking into account the intense musselculture activities which take place in the Mar Piccolo of Taranto.