



**Hydrographical and Coring-Results  
from the Hermes 3 Cruise  
in the Gulf of Lion (NW Mediterranean)**

**Aug. 6-25, 2006**

Xavier Durrieu de Madron  
Centre de Formation et de Recherche sur l'Environnement Marin  
CNRS - Université de Perpignan, France

CoNISMa - Polytechnic University of Marche, Italy

September 2006

# HERMES (HERMES 3 Cruise)

## Summary

The primary objectives of the seabed sampling were to investigate the biodiversity of benthic communities and sediment characteristics along two canyons and the adjacent open slopes (which were used as control stations) in the Gulf of Lions. Due to persistent bad sea state conditions, linked to strong Tramontane wind (> 30 knots), only stations deeper than 1000 m within the axis of the Cap de Creus Canyon and on its southern open-slope were sampled. Cores were sub-sampled for biological, sedimentological and chemical analysis.

## Scientific crew

<b>X. Durrieu de Madron</b> *	<b>CEFREM, University of Perpignan</b>
G. Saragoni	CEFREM, University of Perpignan
<b>R. Buscail</b> *	<b>CEFREM, University of Perpignan</b>
S. Bianchelli	CoNISMa Ancona, Polytechnic University of Marche
M. Molari	CoNISMa Ancona, Polytechnic University of Marche
B. Lecroq	Dept of Zoology and Biology. University of Geneva
A. Covazzi	CoNISMa Ancona, Polytechnic University of Marche

# Conductivity/Temperature/Pressure/ Light transmission data Processing Comments

Author: X. Durrieu de Madron

## 1. Hydrographic Data Acquisition

3 deep CTD casts were completed using the Seabird 911Plus CTD probe. Six data channels (pressure, temperature, conductivity, elapsed time, light transmission, and altimetry) were measured at a data rate of 24 Hz and averaged every second during the data acquisition. Light transmission was measured with a 25 cm optical pathlength Cstar transmissometer.

CTD casts were performed from the surface down to ~ 1 m above the bottom. The raw binary data were then converted into engineering units using the laboratory calibration coefficients, generating pressure series data sets.

## 2. Processing of profiles

A low-pass filter was used to compensate for the different time response of the sensors and to remove the salinity spikes. A ship-roll and minimum probe velocity filter ( $< 0.05$  m/s) was applied to each cast to disallow pressure slowdowns and reversals. After filtering, the downcast portion of each cast was pressure-averaged and sequenced into 1 decibars pressure intervals. Recorded surface values were rejected only when it appeared that the drift was caused by sensors adjusting to the in-water transition. The 0-decibar level of some casts was then extrapolated considering homogeneous thermohaline characteristics in the first meters of the water column. Near bottom values of beam attenuation coefficient were rejected when the measurement appear to be contaminated with the impact of the CTD frame with the seabed.

The one decibar pressure, temperature and conductivity data were used to compute the following hydrographic parameters depth, potential temperature ( $\theta$ ), salinity, potential density anomalies ( $\sigma_\theta$ ). Temperature is ITS-68, salinity is PSS-78, density is calculated based on the equation of state of seawater (EOS80; Fofonoff and Millard, 1983).

## 3. References

Fofonoff N.P. and Millard R.C. 1983. Algorithms for computation of fundamental properties of seawater. UNESCO report 44, 15-24.

## CTD STATION DESCRIPTIONS

### HERMES 3

R/V THETYS II 6 Aug 2006 - 25 Aug 2006

Cast	Station	Date	Local Time (UT+2)	Latitude	Longitude	Maximum Sampling Depth (m)	Distance above Bottom (m)
1	HERM3_01 [CS2400]	16 Aug 2006	15:00	42°N 05.310	004°E 39.880	2294	35
2	HERM3_02 [CS2500]	16 Aug 2006	19:30	41°N 39.980	004°E 25.530	2535	1
3	HERM3_03 [MIN2400]	19 Aug 2006	06:30	40°N 29.910	003°E 01.840	2393	2

# Sediment Cores Processing Comments

Author: R. Buscail

## **1. Sediment Cores Acquisition and processing**

Sediment samples were collected along the axis of the Cap de Creus canyon and its southern open-slope (Figure 1) with a multi corer (tube of 80 cm long and 10 cm diameter). Three deployments were performed at each station. Each core was sub-sampled using thin walled PVC tubing, which was then extruded and sliced in different layers (0-1, 1-3, 3-5, 5-10, 10-15 cm). Two deployments of the multi corer were generally reserved to collect samples for macrofauna. Sediment samples were also collected in an additional deep station in the southern Balearic Basin (30 nm north of Minorca).

Sediment samples will be analyzed for biological analyses (biochemical composition of organic matter, prokaryote C production, enzymatic activities, bacterial, meio- and macrofaunal abundance, biomass and diversity), for sedimentological analyses (radioisotopic dating  $^{210}\text{Pb}$ , grain size analysis, porosity and specific surface) and for chemical analyses (isotopic, organic and mineral (metals) characterization of sediment).

Some analyses such as bacterial production and enzymatic activities (for the top 1 cm) were immediately performed on board after the samples collection. For all the other analyses sediment samples were processed on board and stored until the analyses in the laboratory.

Total nitrogen, total and organic carbon concentrations (TN, TC and OC, respectively) were measured on homogenised, precisely weighed samples in an automatic CN-analyzer LECO 2000, after acidification with 2N HCl (overnight, at 50°C) in order to remove carbonates prior to the analyses of organic carbon (Cauwet et al., 1990). Calcium carbonate content was calculated from mineral carbon using the molecular mass ratio ( $\text{CaCO}_3:\text{C} = 100:12$ ). Extensive testing at CEFREM showed long-term precision for TOC and TN of about 2% and for TC of 0.3%.

Total amino acids (AA) were assayed by a colorimetric method on the fraction hydrolyzed by 6N HCl for 16 h at 110°C. Absorption of the products resulting from the amino acid-ninhydrin reaction was measured at 570 nm using a Beckman spectrophotometer (precision of 15%) (Stevenson and Cheng 1970).

Total lipids were measured by a colorimetric method after extraction with a 2/1 (V:V) chloroform-methanol mixture. Absorption of the products was measured at 520 nm with a Beckman spectrophotometer (precision of 10%) (Barnes and Blackstock, 1973).

Total sugars (SUG) were measured by colorimetry (anthrone-sulfuric acid). Absorption of the products was measured at 625 nm using a Beckman spectrophotometer (Brink et al, 1960).

## **3. Benthic traps**

A set of three baited benthic traps for mega-faunal investigations was deployed for period of 24 to 60 hours at different depth along the Cap de Creus Canyon axis and its southern open slope (Figure 1). Six deployments were performed, 4 in the the Cap de Creus Canyon and 2 in the Southern open slope, respectively.

#### 4. References

Barnes H. and J. Blackstock (1973). Estimation of lipids in marine animals and tissue : detailed investigations of the sulfovanilin method for total lipids. *Journal of Experimental Marine Biology and Ecology*, 12 : 103-118.

Brink R.H., Dubach P. and Lynch D.L. (1960). Measurement of carbohydrates in soil hydrolyzates with anthrone. *Soil Science*, 89 (3) : 157-166.

Cauwet G., Gadel F., De Souza Sierra M.M., Donard O. and M. Ewald (1990) Contribution of the Rhône river to organic inputs to the northwestern Mediterranean sea. *Continental Shelf Research*, 10 (9-11), 1025-1037.

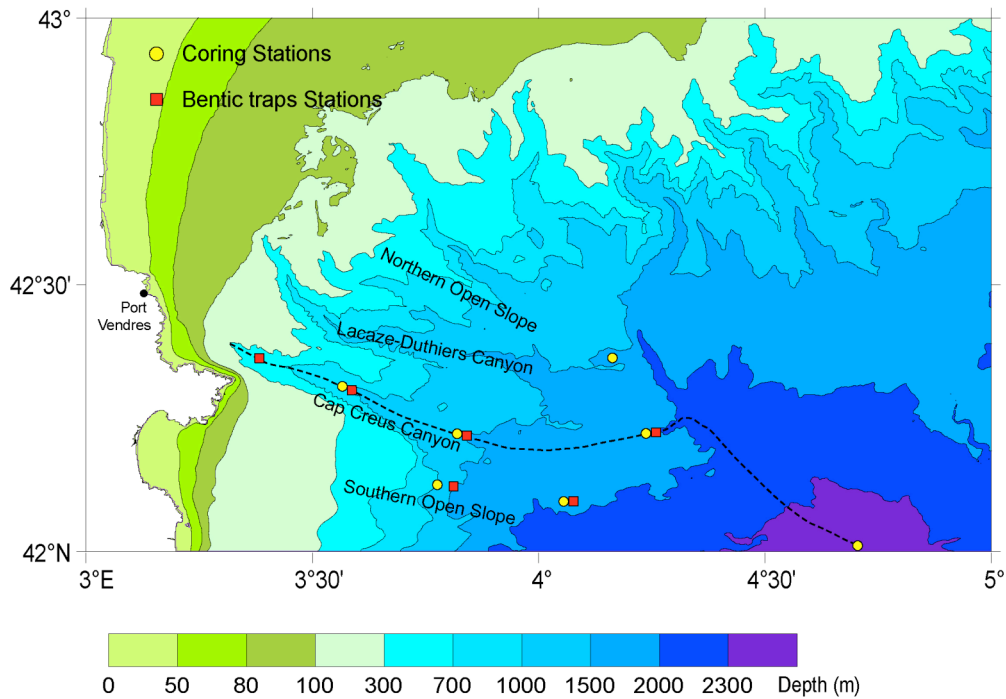


Figure 1 Position of the coring station and benthic traps deployments in the vicinity of the Cap de Creus Canyon

## CORING STATION DESCRIPTIONS

**HERMES 3**

**R/V TETHYS II 06 Aug 2006 - 25 Aug 2006**

Station	Corer	Date	Local Time (UT+2)	Latitude	Longitude	Seabed Depth (m)
<b>Cap de Creus Canyon</b>						
		22 Aug. 2006	07:39	42°N 18.490	003°E 36.499	950
CCC1000	Multi	22 Aug. 2006	08:39	42°N 18.542	003°E 36.684	949
		22 Aug. 2006	09:34	42°N 18.446	003°E 36.812	956
		20 Aug. 2006	17:09	42°N 13.320	003° 49.208	1502
CCC1500	Multi	20 Aug. 2006	18:06	42°N 13.287	003° 49.167	1500
		20 Aug. 2006	19:25	42°N 13.323	003° 49.168	1500
		18 Aug. 2006	13:00	42°N 12.930	004° 15.914	1880
CCC1900	Multi	18 Aug. 2006	14:15	42°N 12.896	004° 15.324	1880
		18 Aug. 2006	17:50	42°N 12.875	004° 15.274	1880
<b>Southern Open Slope</b>						
		22 Aug. 2006	11:24	42°N 07.477	003°E 46.725	1008
SOS1000	Multi	22 Aug. 2006	12:07	42°N 07.734	003°E 46.705	998
		22 Aug. 2006	12:49	42°N 07.757	003°E 46.743	1002
		22 Aug. 2006	14:51	42°N 06.925	004°E 02.495	1876
SOS1900	Multi	22 Aug. 2006	15:50	42°N 06.998	004°E 02.494	1876
		22 Aug. 2006	16:46	42°N 07.031	004°E 02.649	1876
<b>Sete Canyon</b>						
		23 Aug. 2006	05:28	42°N 04.658	004°E 40.320	2298
CS2400	Multi	23 Aug. 2006	06:26	42°N 04.699	004°E 40.261	2300
		23 Aug. 2006	07:26	42°N 04.684	004°E 40.149	2300
<b>Northern Open Slope</b>						
NOS1900	Multi	22 Aug. 2006	20:35	42°N 21.776	004°E 12.074	1529

**Minorca**

MIN2400	Multi	19 Aug. 2006	08:00	40°N 29.668	004°E 01.490	2400
		19 Aug. 2006	10:00	40°N 29.770	004°E 01.812	2400
		19 Aug. 2006	12:00	40°N 29.794	004°E 01.433	2400
		19 Aug. 2006	14:00	40°N 29.962	004°E 01.711	2400

### BENTHIC TRAPS DEPLOYMENTS DESCRIPTIONS

#### HERMES 3

#### R/V TETHYS II 06 Aug 2006 - 25 Aug 2006

Station	Deployment Time	Recovery Time	Latitude	Longitude	Depth (m)
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#### Cap de Creus Canyon

CCC450	9 Aug 2006 16:30	10 Aug. 2006 16:30	42°N 22.300	003°E 21.700	480
CCC1000	13 Aug. 2006 18:50	16 Aug. 2006 07:00	42°N 18.610	003°E 36.080	980
CCC1500	16 Aug. 2006 10:00	18 Aug. 2006 09:00	42°N 13.450	003°E 49.590	1480
CCC1900	18 Aug. 2006 12:00	20 Aug. 2006 07:00	42°N 11.910	004°E 15.360	1800

#### Southern Open Slope

SOS1500	20 Aug. 2006 10:50	21 Aug. 2006 20:00	42°N 07.830	003°E 51.640	1600
SOS1900	21 Aug. 2006 22:10	22 Aug. 2006 18:00	42°N 06.970	004°E 03.010	1900