

SCAR FELLOWSHIP 2005-06

Name: Verónica Fuentes

Host Institutes:

Alfred Wegener Institute, Bremerhaven, Germany.

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Trip made within the SCAR fellowship:

- October - December 2006: from Germany to Rimouski, Canada (**Institut des Sciences de la Mer de Rimouski, Université du Québec à Rimouski**) - to work on the samples analyses, under the supervision of Prof. Emilien Pelletier.

Amount of fellowship: US\$ 5,000 (in February 2006 the money was transferred to a German bank account and converted into € 4,044)

Overview of activities

Title of the research project: Effects of ice and sediments on Carbon and Nitrogen dynamics along a latitudinal gradient in the Western Antarctic Peninsula

The idea of the project started when I got the possibility to take advantage of the sampling performed during a cruise from Canada to Antarctica carried out during 2006 on board the "Sedna IV" sailing ship (<http://www.sedna.tv>), in a project that had both scientific and media-oriented objectives. The SCAR fellowship contributed to support, in part, the science of this unique opportunity since many of the scientific samples collected in this expedition were analyzed during my stay in Canada by the end of 2006.

In addition, since I was invited to participate in a winter cruise to Antarctica onboard the German research vessel "Polarstern", I considered this expedition a great opportunity to get more data that could be compared with the ones obtained from the Sedna expedition. Consequently, I decided to include the Polarstern expedition samples into my SCAR project.

The objective of the project as defined in the proposal was **to gain insight into the energetic pathways and trophic structures of different marine Antarctic ecosystems in a latitudinal gradient, in relation with differences in ice cover and the effects of glacial melting.**

In each environment, particulate materials from particulate organic carbon (POC) to zooplankton was analyzed by means of stable carbon and nitrogen isotopes and the quantification of (POC) and nitrogen (PON), photosynthetic pigments, and total suspended particulate matter (TPM).

This study has provided data that constitute a baseline for the studies that are being carried out in the frame of the International Polar Year and the project CLicOpen (Eol: 193, <http://www.ipy.org/development/eoi/proposal-details.php?id=34>), which aims to study the effects of glacial melting as a direct response to climatic changes on all levels (from organisms to communities) on marine coastal ecosystems. In this sense this SCAR project has contributed with very valuable information concerning the carbon sources and trophic pathways in different environments affected by different levels of glacial melting and/or sea ice retreat.

As one of the most important aspects of my stay in Rimouski I want to emphasize the fact that this visit gave me the opportunity to be in a very well equipped laboratory where I learned several very innovative and useful techniques such as the preparation of the samples for different isotopes measurements, fatty acids and heavy metals. Additionally I was trained on the interpretation of all these data.

Progress against prior work plan:

All the samples (more than 200) were prepared during my stay in Canada but until now not all the samples could be analyzed through the isotopes analyzer machine. A synthesis of the most important stable isotopes results (from the samples measured until today) can be seen in the table I.

What were the planned milestones and deliverables?

Results will be presented at conference talks and papers in progress, and will also be included in the data base of the ClicOpen project.

Allocation of SCAR funds

After I got the confirmation for my SCAR Fellowship I was invited to participate in an Antarctic cruise on board the ice-breaker Polarstern. I accepted the offer because I considered it, in agreement with my project's supervisors a great opportunity to enrich my SCAR project. For this reason, the allocation of funds (table II) differs from the initial budget submitted as part of my application. Full documentation of all entries in Table 1 is available upon request, as are all invoices.

Future Work Plan

Presently I am compiling of the information coming from the different samples: Jubany station (which are also part of my Doctoral Thesis); SEDNA mission and Polarstern expedition. I am waiting from the results of the last samples that still need to be measured for stable isotopes content.

The work will continue with the analysis of the whole set of results to compare the stable isotopes values from different areas affected by different conditions of glacial melting or sea ice retreat. Some of the results will also contribute to the better understanding of the krill overwintering strategies. Moreover, using the stable isotopes values will be possible to characterize the feeding preferences of this key species in each environment.

Future reports (confirmed):

- Zooplankton mortality events in Antarctic coastal areas: a relation with global change?. *Fuentes V., Schloss I. and Esnal G.*
- The importance of zooplankton as food source for larval Antarctic krill, *Euphausia superba* during winter. Meyer B. and Fuentes V.

Both talks will be given during the 4th International Zooplankton Production Symposium that will be held in May 2007 in Hiroshima, Japan.

In preparation:

- Food web structure of different Antarctic coastal areas affect by global warming: a stable isotopes approach. Fuentes, V., Schloss, I., Pelletier, E. and St-Louis, R. In preparation.

Tabla I: Stable N and C isotopes from the different sampling locations measured until today. All are average values with standard deviation.

Stable Isotopes samples – SCAR project			
Samples Collected in Potter Cove (62°14'S, 58°38'W)			
Type of sample		$\delta^{15}\text{N}$ (‰)	$\delta^{13}\text{C}$ (‰)
Seston		3.86 (0.97)	- 25.64 (0.67)
Copepods	<i>Calanus propinquus</i>	4.9 (0.6)	-28.4 (1.2)
	<i>Metridia gerlachei</i>	4.2 (0.5)	-24.7 (3.1)
	<i>Oithona</i> sp	4.5 (0.5)	- 28.1 (1)
Euphausiids	<i>Euphausia superba</i>	3.5 (0.5)	-28.8 (2.2)
	<i>Euphausia superba</i>	3 (0.1)	-27.7 (1)
Salps	<i>Salpa thompsoni</i>	2.1 (0.4)	-32.9 (0.9)
Samples collected during SEDNA mission			
Location		$\delta^{15}\text{N}$ (‰)	$\delta^{13}\text{C}$ (‰)
Palmer Station (64° 46.3' S; 64° 03.4' W)	Seston	5.68 (0.8)	- 27.97 (1.3)
Paradise Bay (64° 53.5' S; 62° 51.9' W)	Seston	6.86 (1.48)	- 25.74 (3.24)
Charlotte Bay (64° 30.3' S; 61° 45.2' W)	Seston	to be measured at ISMER in June 2007	
Fish Island (66° 01.5' S; 65° 20.5' W)	Seston	to be measured at ISMER in June 2007	
Rothera Station (67° 32.9' S; 68° 21.8' W)	Seston	to be measured at ISMER in June 2007	
San Martin Station (68° 08.6' S; 67° 04.4' W)	Seston	5.84 (0.55)	- 25.25 (0.73)
Animal samples	Krill, amphipods, copepods	to be measured at ISMER in June 2007	
Samples collected during Polarstern expedition ANT XXIII-6			
Type of sample	Taxa	$\delta^{15}\text{N}$ (‰)	$\delta^{13}\text{C}$ (‰)
Seston samples north of the grid (60° 2.19' S; 3° 0.27' W)	to be measured at ISMER in June 2007		
Seston samples in the middle grid (63° 60.0' S; 2° 59.1' W)	to be measured at ISMER in June 2007		
Seston samples south of the grid (69° 1.5' S; 2° 53.32' W)	to be measured at ISMER in June 2007		
Krill north (ice edge)		3.94 (0.23)	- 29.3 (1.71)
Krill middle (complete frozen ocean)		2.81 (0.14)	- 31.69 (0.5)
Krill south (near continental shelf)		1.45 (0.22)	- 30.81 (1.39)
Copepods	<i>Metridia gerlachei</i>	3.63 (0.95)	- 29.2 (0.18)
	<i>Paraechaeta</i> sp.	4.79 (0.37)	- 27.9 (0.84)
	<i>Calanus propinquus</i>	2.39 (0.66)	- 31.95 (2.03)
Amphipods		3.63 (0.95)	- 31.54 (1.29)

Table II: Allocation of funds. SCAR fellowship 2005-06

SCAR Fellowship	5000 USD\$ (4,044 €)
funds spent	amount
Travel costs Buenos Aires – Rimouski and back.	round trip plane ticket Fly Buenos Aires – Montreal: 1325 US\$ +bus Montreal - Rimouski and back: 174,9 Canadian \$ (151,6 US\$) Total = 1476,6 US\$
Car rented in Canada (Rimouki – Montreal to pick up samples from SEDNA expedition). The amount include fuel	384,03 Canadian \$ (332,87 US\$)
Medical insurances	120 Canadian \$ (104.01 US\$)
Accommodation	900 Canadian \$ (800 US\$)
Food and others	1315,66 US\$
Post	58,45 US\$
Polarstern expedition	
Car rent in Germany (Carrying of samples and material)	102 € (137,49 US\$)
Round trip plane ticket Germany-Cape Town	700 € (934,92 US \$)
TOTAL	5160 US\$