Part A:

Mesozooplankton respiration and excretion during the CD-110 leg B cruise

A. Isla de la Roz and R. Anadón

Universidad de Oviedo

During the CD-110B cruise, onboard respiration and excretion measurements were done on three stations (N3100, O3100 and P200), which were all affected by a poleward current, characterised by warm, high-salinity waters. In addition to these stations, samples for gut content analysis were taken at stations U1000 and V110.

PO_4 and NH_4 measurements were done with an "Alpkem Corporation" auto-analyser (thanks to X. Alvarez-Salgado, IIM), and O_2 measurements were performed following Winkler´s method, using a Titrino DMS 716.

RESULTS

Respiration data from station O3100 were not taken into account, because of the anomalous values obtained, perhaps due to methodological mistakes.

On stations N3100 and P200 respiration rates were similar to those obtained in spring at the same area.

The excretion rates were also similar to the rates measured during spring.

Respiration and excretion data are positively correlated with body size measured as nitrogen content.

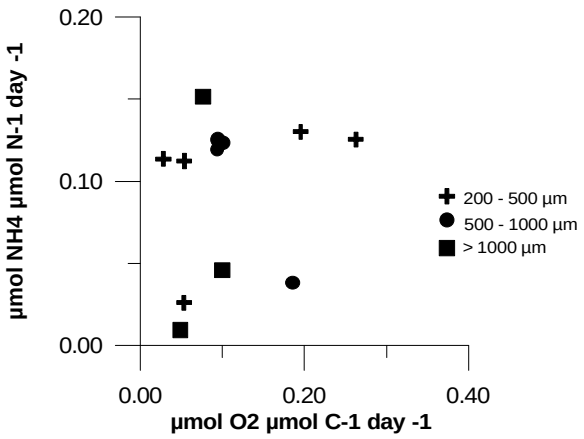
Station P200 is the only one at which we have available data both on mesozooplankton NH_4 excretion and primary production, therefore we can estimate the contribution of NH_4 excreted by mesozooplankton to the requeriments of N by phytoplankton.

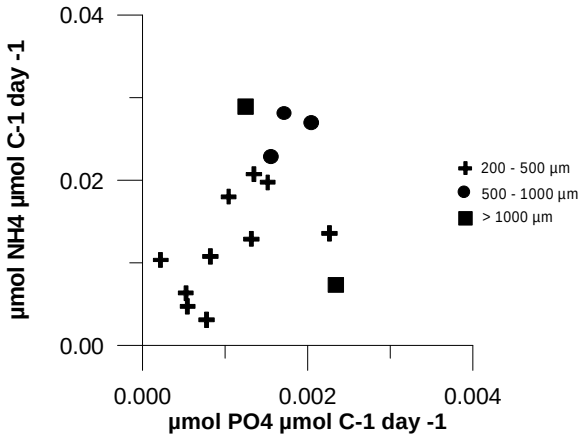
Nearly 8% of the total N uptake by phytoplankton is supplied by the excretory activity of mesozooplankton. (Tab. 1)

	N req	N zoo	N sup	N sup / N req (%)	N sup / N zoo (%)
200 - 500 µm	9016,48	2282,73	145,14	1,61	6,36
500 - 1000 µm	9016,48	2233,95	273,23	3,03	12,23
> 1000 µm	9016,48	2986,57	294,40	3,27	9,86
∑		7503,24	712,77	7,91	9,50

(Table 1). Ammonia excreted by mesozooplankton and its potential contribution to primary production on station P200. Nitrogen required (N req, µmol N m^{-2} d^{-1} , assuming a C/N ratio of 6.625),zooplankton biomass (N zoo, µmol N m^{-2}), and nitrogen supplied (N sup, µmol NH_4 m^{-2} d^{-1}).

NH_4 excretion is correlated with PO_4 excretion, but no with respiration.





The O:N, N:P and O:P ratios indicate that the main substrate catabolized by mesozooplankton are proteins. (Tab. 2)

	O:N		N:P		O:P		Substrate
	Media	Error	Media	Error	Media	Error	catabolized
P 200	9,445	3,363	12,713	2,164	109,307	39,494	protein
N 3100	9,561	4,258	19,944	6,052	148,012	58,007	protein

(Table 2). O:N, N:P and O:P ratios by µmol

We are currently waiting for the results of gut contents analysis of mesozooplankton collected during the CD-110B cruise to estimate ingestion rates.

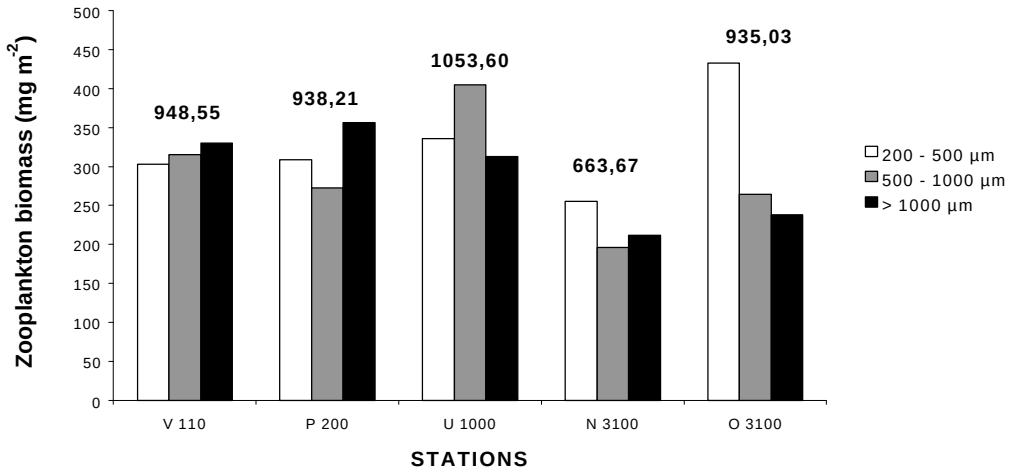
EXTRA CONTRIBUTION

Besides of NH_4 excretion and respiration rates, Univ. of Oviedo made measurements of zooplakton biomass and C/N analysis on stations N3100, O3100, U1000, V110 and P200, and PO_4 excretion on stations N3100, O3100 and P200.

Biomass

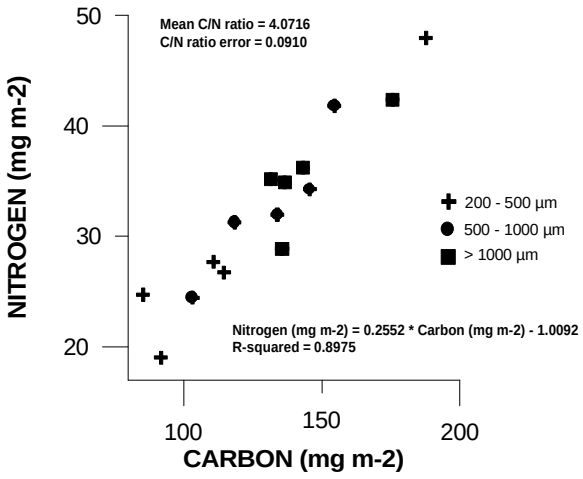
Biomass values obtained for all the stations were close to 1 g m^{-2}, except on N3100, where lower values values were ontained. although in the deeper stations dominate the fraction 200-500 µm.

There is an homogeneous distribution of the different size classes



C/N

The mean C/N ratio of mesozooplankton on CD-110B was lower than the C/N ratio obtained at the same area during spring, due to the higher N content in January, when the zooplankton is feeding actively, while in May there is a post-bloom phytoplanktonic situation, and therefore zooplankton is using their reserves.



PO_4

PO_4 excretion data have a similar pattern to those obtaind for NH_4 excretion, being correlated both of them significately.

NEAREST WORK

On the next cruise (WPII) we are going to repeat the experiments made on CD-110B, to compare summer and winter situations. Moreover, we will attempt to calibrate the role of mesozooplankton on DOC release.