in situ PRIMARY PRODUCTION

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Carbon absorption has been quantified according to the experimental protocol recommended by France-JGOFS-P.F.O. (1988) and precisely described in Moutin and Raimbault (2002). Samples were obtained with 12-l Niskin at 9 depths of sampling which were chosen according to the « in vivo » fluorescence profiles. Each sample (320-ml polycarbonate bottle, 3 light and one dark sample per depth) was collected before sunrise, inoculated with 150 µl of the ^{14}C working solution[a] just before sunrise, and then incubated *in situ* on a mooring line during 24 hours. After incubation, the samples were filtered on GF/F filters to measure net absorption (A_N mgC m^{-3}). Filters were immediately covered with 500 µl of HCl 0.5 M and stored for counting at the laboratory. Before each incubation, 3 samples were filtered immediately after inoculation for t_o determination, and 250 µl of sample was taken at random from 3 bottles and stored with 250 µl of ethanolamine to determine the quantity of added tracer (Q_i). At laboratory, samples were dried during 12 h under and extractor hood, 10 ml of ULTIMAGOLD-MV (Packard) were added to the filters and dpm was counted with a Packard Tri carb 2100 TR liquid scintillation analyser.

Net absorption A_N for dark and light bottles was calculated from :

$$A_N\ (mgC.m^{-3}.d^{-1}) = (dpm\text{-}dpm_{(to)})/(dpm_{(Qi)}*1280) * TCO2^b$$

Primary production rates PP were obtained from :

$$PP\ (mgC.m^{-3}.d^{-1}) = A_{Nlight} - A_{Nblack}$$

Integrated primary production IPP (mgC m^{-2} d^{-1}) has been calculated with trapezium method assuming (1) that subsurface (about 5 m) rates are identical to surface rates (not measured) and (2) that rates are zero at 20 m below the deepest sampled depth.

[a] Working solution : 12,5 ml ml of $NaH^{14}CO_3$ (5 mCi, 60 mCi/mmole, Amersham B260 + 10 mCi, 43,3 mCi/mmole, NEC086H005MC (Perkin Elmer)) was added to a solution containing 0.1475 g of Na_2CO_3 (Aldrich 20,442-0) per 230 ml of sterilized milliQ water. This solution was stored in15 ml septum glass flasks.

[b] TCO2 (mgC m^{-3}) was measured on a potentiometritic titration in a closed-cell (Edmond, 1970) at the SNAPO-CO2 (Service National d'Analyse des paramètres Océaniques du CO2 – LOCEAN – PARIS). For more informations, see T. Wagener.

Table 1 : IPP calculated for the 3 samgling days at the 3 long duration (LD) stations.

Station	LDA			LDB			LDC		
Day	D1	D3	D5	D1	D3	D5	D1	D3	D5
IPP ($mgC.m^{-2}.d^{-1}$)	195	346	262	433	507	365	152	151	341
IPP averaged ($mgC.m^{-2}.d^{-1}$)	267 ± 75			435 ± 71			215 ± 109		

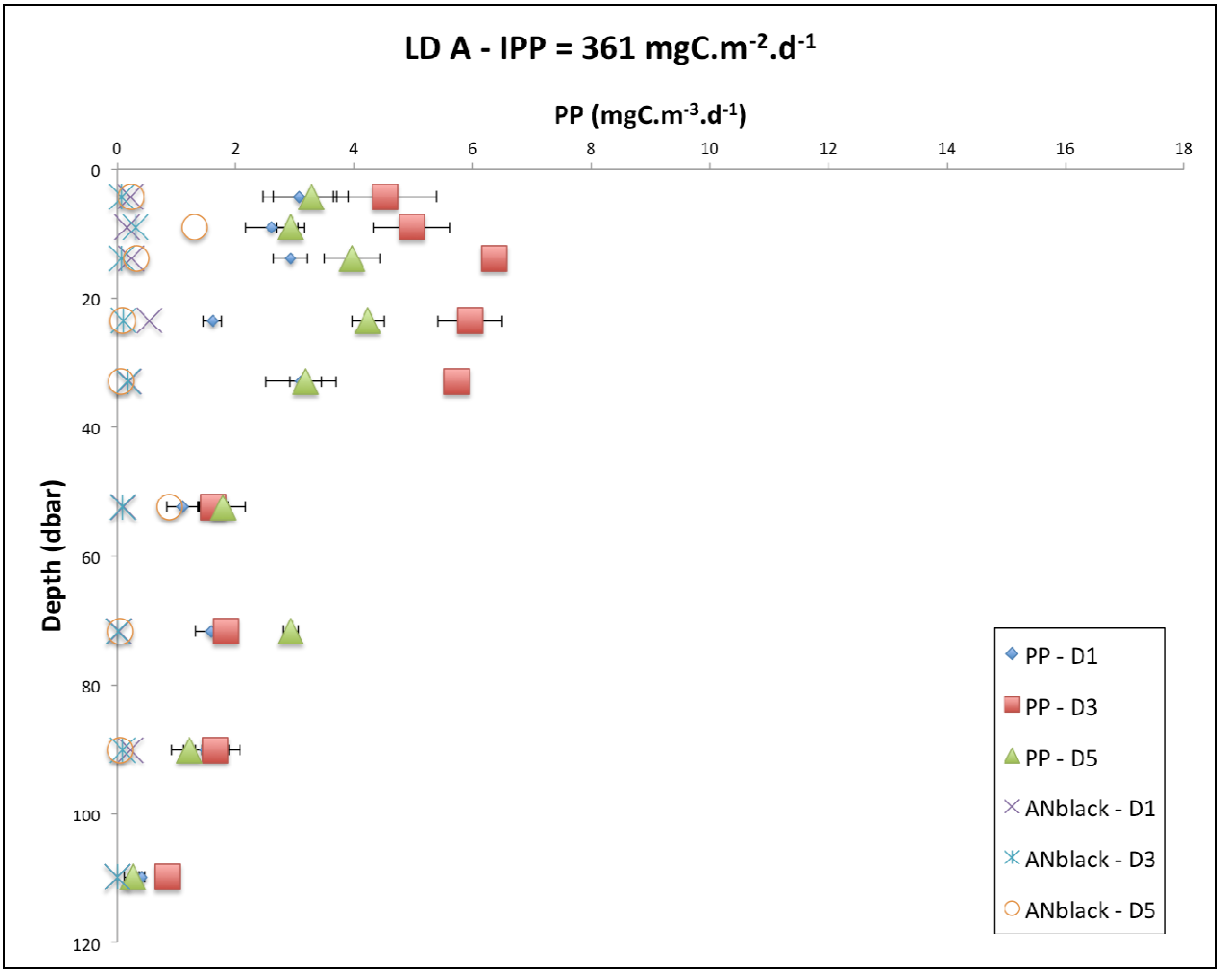

Figure 1 - Primary production rates and A_{Nblack} profiles at station LDA

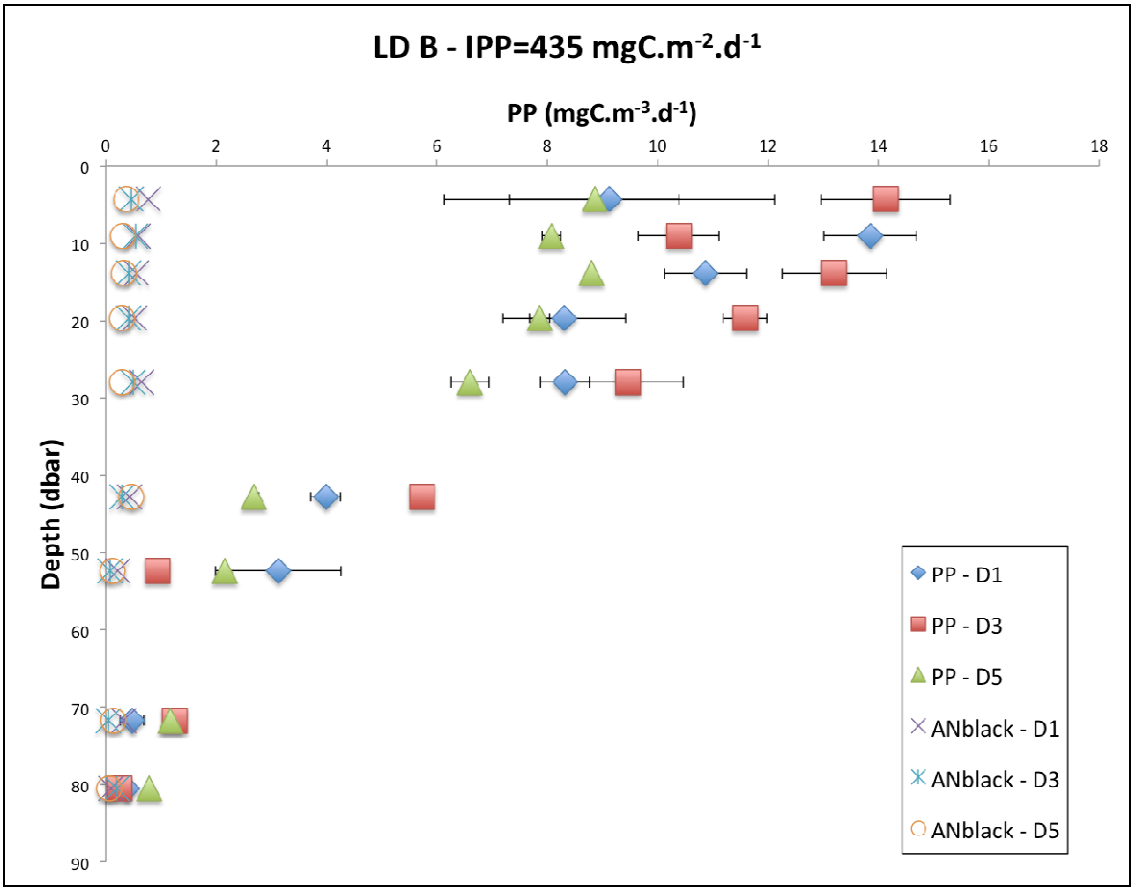

Figure 2 - Primary production rates and A_{Nblack} profiles at station LDB

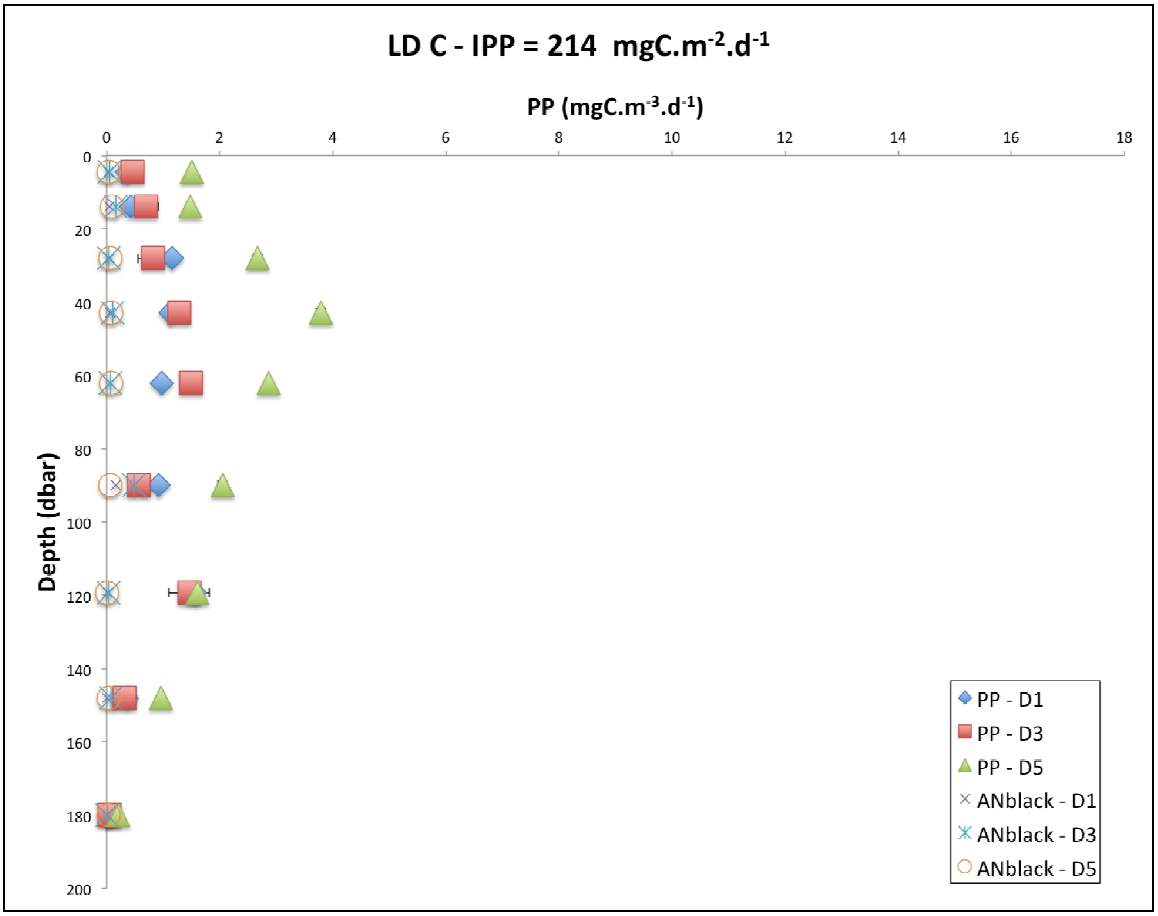

Figure 3 - Primary production rates and A_{Nblack} profiles at station LDC

Références :

Edmond J.M.. 1970. High precision determination of totration alkalinity and the total carbone dioxide contentof seawater by potentiometric titration. Deep Sea Research, 17, 737-750

JGOFS. 1988. Core measurements protocols : report of the core measurement working group. JGOFS report n°6, Joint Global Ocean Flux Study, SCOR 1-40.

Moutin, T., and P. Raimbault. 2002. Primary production, carbon export and nutrients availability in western and eastern Mediterranean Sea in early summer 1996. MATER Special Issue. Journal. of Mar. Syst. 33-34, 273-288