FICHE META\_INFORMATION\_PARAMETRES

(à remplir par le responsable du paramètre)

#### 

### Nom du DATASET / Data SET NAME

*Data set Name (list of the measured parameters):*

**From the 28/04/2015 to the 22/05/2015**

Si(OH)4 - silicic acid concentration

BSi - Biogenic silica concentration

PBSi - Biogenic silica production rate

DBSi - Biogenic silica dissolution rate

Vmax - maximum specific rate of silicic acid uptake

PDMPO specific uptake

### PROJET-ETUDE / *PROJECT TITLE*

*Campaign NAME* : GreenEdge – ICECAMP – 2015 *LEG :*

*Date* *begin :*

*Date end :*

*Chief Scientist*:

*Address :*

Université Laval

UMI Takuvik

1045 avenue de la médecine

Québec, QC, G1V0A6, Canada

### OPERATION *(if Relevant)*

*Sampling method :*

***Water****: Niskin bottle 5 depths:1.5 m; 5 m; 20 m; 40 m; 60 m*

*pumping for the under ice water: 0 m*

***Ice*** *two different snow cover:*

*- high snow (~20 to 30cm)*

*- low snow (~10-15cm),*

*two depth in each ice core: 0-3 cm and 3-10 cm. + 0-1 cm*

*Dilution with filtered seawater to promote melting of the ice*

***Sediment traps****: 24 h deployment*

*Station number-Cast number:*

*Operation code :*

### **RESPONSABLE SCIENTIFIQUE du paramètre / *PI of the parameter***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nom / *name* | adresse /*address* | téléphone / *phone number* | fax /*fax number* | adresse mél /*email address* |
| **Leynaert Aude** | laboratoire des sciences de l'environnement marin LEMAR  UMR 6539 UBO/CNRS/Ifremer/IRD  Institut Universitaire Européen de la Mer (IUEM)  Technopole Brest Iroise  Rue durmont d'Urville  29280 Plouzané | **00 33 (0) 298498657** | (0033)(0)29849 8645 | aude.leynaert@univ-brest.fr |
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### DATASET contact

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nom / *name* | adresse /*address* | téléphone / *phone number* | fax /*fax number* | adresse mél /*email address* |
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|  |  |  |  |  |

### INFORMATION GEOGRAPHIQUES */ GEOGRAPHIC INFORMATION*

*Predefined site (if relevant):*

*Location:*

*LATITUDE:*

*LONGITUDE*

### DESCRIPTION DES INSTRUMENTS / INSTRUMENTS DESCRIPTION *(if Relevant)*

**For Si(OH)4 analysis**

*Instrument Type: autoanalyser technicon*

*Manufacturer: SEAL-BRAN+LUEBBE*

*Model: AA3*

*Instrument Features / Calibration:*

**For 32Si activity counting**

*Instrument Type: Wallac**1414 LSC*

*Manufacturer: Perkin Elmer*

*Model: 1414003*

*Instrument Features / Calibration:*

**For PDMPO uptake**

*Instrument Type: Fluorometer*

*Manufacturer: turner design*

*Model: Trilogy*

*Instrument Features / Calibration:*

### DESCRIPTION DES PARAMETRES */ PARAMETERS DESCRIPTION*

# Ce qui a été collecté, mesuré et comment / *How was the parameter collected and measured (include references for analytical methods)?*

For **Si(OH)4** and **BSi** stocks, samples were collected at all depths (0m, 1.5 m, 5 m; 14 or 20 m, 40 and 60 m) and in all ice sections. BSi will be measured also in the sediment trap samples.

**PBSi** and **Vmax** were performed at 3 depths in the water (0m, DCM or 5m, 20m) and in the 0-1 cm ice sample.

Samples for **PDMPO** have been collected at one or two of the depth sampled for PBSi.

For **DBSi**, samples were collected at the first 3 depths (0m, 1.5 m, 5 m), in the 0-1 cm ice sample, and in the sediment traps

*Protocols and Analytical procedure: (briefly, could be a short recall to a published reference):*

For Si(OH)4, BSi stock, and BSi dissolution rate:

Water is filtered on Nuclepore polycarbonate membranes (0.6 µm pore size, 47 mm diameter).

The filtrate, for Si(OH)4 determination, is kept at 4°C in 15 ml falcon PC tube until analysis.

Filters for BSi and DBSi analysis, are dried at 60°C and kept at room temperature.

**Si(OH)4 and BSi:**

Si(OH)4 measurement is carried out by standard automated colorimetric methods (Strickland and Parsons, 1972) on a Technicon Auto Analyzer.

BSi analysis is performed using the double wet alkaline digestion method as described by Ragueneau et al. (2005).

**Biogenic silica production (PBSi) and maximum specific uptake rates (V):**

*(Tréguer et al., 1991, Leynaert et al. 1996, 2001)*

Incubations are done in polycarbonate bottles. 150 ml of seawater are inoculated with 40 000 dpm (665 Bq) of 32Si labeled-Si(OH)4 (Los Alamos National Laboratory). The 32Si used in this step is a daughter solution made from the stock solution (an aliquot is diluted in distilled water) in order to have 40000 dpm / 80 µl. Incubation bottles are then hung on a mooring and positioned in situ at the depth of sampling. After 24h incubation, each sample is filtered on Nuclepore polycarbonate membranes (0.6 µm pore) and rinsed with 10 ml of filtered sea water. The filtrate is stored in carboys for later elimination. The filter is placed in a 20 ml scintillation vial. 10 ml of scintillation cocktail (Ultima Gold XR) is added to each vial to count the 32Si activity by using a scintillation counter Wallac 1414 (Perkin Elmer).

Maximum (nutrient replete) specific uptake rates:

In order to determine the maximum silicic-acid uptake rates in nutrient replete conditions, parallel incubations were performed exactly in the same way as above, except that to prevent nutrient depletion during the incubation, silicic acid, nitrate and phosphate concentrations were increased in the bottles incubation by adding Na2SiO3, NaNO3 to 50 µmol L-1 and Na2HPO4 to 1.5 µmol L-1.

PBSi (nmol L-l h-1) is calculated from the final activity on the filter, the silicic acid concentration and the initial injected activity.

V (day-1)is calculated from the equation V *=* PBSi/BSi.

**BSi dissolution rate (DBSi):**

*(Moriceau et al. 2009)*

Filters with the BSi sampled were placed in a PC plastic bottle name batch in the following paragraph. Each batch contained 0.7µm filtered seawater in order to keep natural bacterial community. The volume of water was chosen to reach a final silicate concentration far from the solubility. Dissolution batches were then stored in the dark at 0°C, close to the in situ temperature -1.5°C. To measure the BSi dissolution rate, the increase of the silicate concentration in the water is followed during 15 to 21 days, and different models are used to fit the data. The statistics used to choose between models required a maximum amount of data. Sampling for silicate analysis were taken as regularly as possible, but more frequently in the first days when most of the dissolution occurred. The batch water was sampled every day during 7 days and then every second and third day. pH and O2 were monitored every day to insure that the general parameters did not evolved in the time course of the experiment.

**PDMPO total and specific uptake:**

250 ml seawater samples are incubated 24h with 0.125 µM PMDPO (final concentration). A first sub- sample is filtered onto black polycarbonate filter for microscopic analysis and single cell PDMPO uptake determination, while a second sub-sample is filtered and digested in 200 µL very diluted HF, neutralized with H3BO3 to assess total fluorescence using a Turner design Trilogy benchtop fluorometer. Protocols have been adapted from Leblanc and Hutchins (2005) and McNair et al. (2015).

*Units:*

Si(OH)4: µmol L-1

BSi: µmol L-1

Biogenic silica production rate: nmol L-1 h-1

PDMPO uptake in nmol PMDPO cell-1 (specific uptake) or per L-1 (total uptake)

*Sensor Precision:*

Si(OH)4 and BSi: 0.1µmol L-1

# Décrire quels types de données sont nécessaires pour vous compléter votre propre jeu de données **avant** envoi à la base de données, et estimer le délai avant la disponibilité de vos données pour la base de données / *Post-cruise data analysis/treatment required, and the time frame for this*

*Estimated Date of Delivery :* 2016 , 2017 for PDMPO analyses

### REFERENCES BIBLIOGRAPHIQUES

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2. Leynaert A., P. Tréguer, C. Lancelot, M. Rodier, 2001. Silicon limitation of biogenic silica production in the Equatorial Pacific. Deep Sea Research I, vol. 48, 639-660.
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Ragueneau, O., Savoye, N., Del Amo, Y., Cotten, J., Tardiveau, B. and Leynaert, A. 2005. A new method for the measurement of biogenic silica in suspended matter of coastal waters: using Si:Al ratios to correct for the mineral interference. Continental Shelf Research, 25: 697−710.

Tréguer P., Lindner L., Van Bennekom A.J., Leynaert A., Panouse M., Jacques G., 1991. Production of biogenic silica in the Weddell-Scotia Sea measured with 32Si. Limnology and Oceanography, 36(6) : 1217-1227.