

## *Submission of time series stations data into NOAA / NCEI*

### Data submitted

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TEMP: Temperature in °C. Measured with a Sea-Bird SBE3 Oceanographic Temperature Sensor.

S: Salinity measured on discrete samples with a Guildline Autosol Salinometer 8400B.

O2: Dissolved oxygen concentration in  $\mu\text{mol/kg}$ . Measured on discrete samples by the Winkler method with visual end point detection.

SI, PO<sub>4</sub>, NO<sub>2</sub>+NO<sub>3</sub>: Silicates, Phosphates, and Nitrates+ Nitrites concentrations in  $\mu\text{mol/kg}$ . Measured on discrete samples by Flow Injection Analysis on a SEAL autoanalyzer AA3.

DIC: Dissolved Inorganic Carbon in  $\mu\text{mmol/kg}$ . Measured on discrete samples by coulometry with a UIC Inc CM-5010 coulometer.

TA: Total Alkalinity in  $\mu\text{mol/kg}$ . Measured by an open-cell potentiometric titration with a Metrohm titrator 888 Titrando.

### Methodology

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Methodology for O<sub>2</sub>, SI, PO<sub>4</sub>, NO<sub>2</sub>+NO<sub>3</sub> and DIC measurements is described in Olafsson et al., 2010, and has not changed over the years, except we now use a Seal AA3 autoanalyzer for the nutrients.

We have started to measure TA in the year 2014 following the protocol described in the Guide to best practices for ocean CO<sub>2</sub> Measurements - SOP3b (Dickson et al., 2007).

### Data Quality

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Nutrients: As described in Olafsson et al, 2010 we participate in the Quasimeme laboratory performance scheme where we analyze samples of unknown concentrations twice a year. Quasimeme then rates the lab's performance with z-scores but we prefer to use differences between our measured value and the certified value for our control charts (Fig 1). Our results are made available to databanks (i.e. ICES) receiving our monitoring data. In addition, we run a reference material (Daniel et al., 2012) every time nutrients samples are measured.

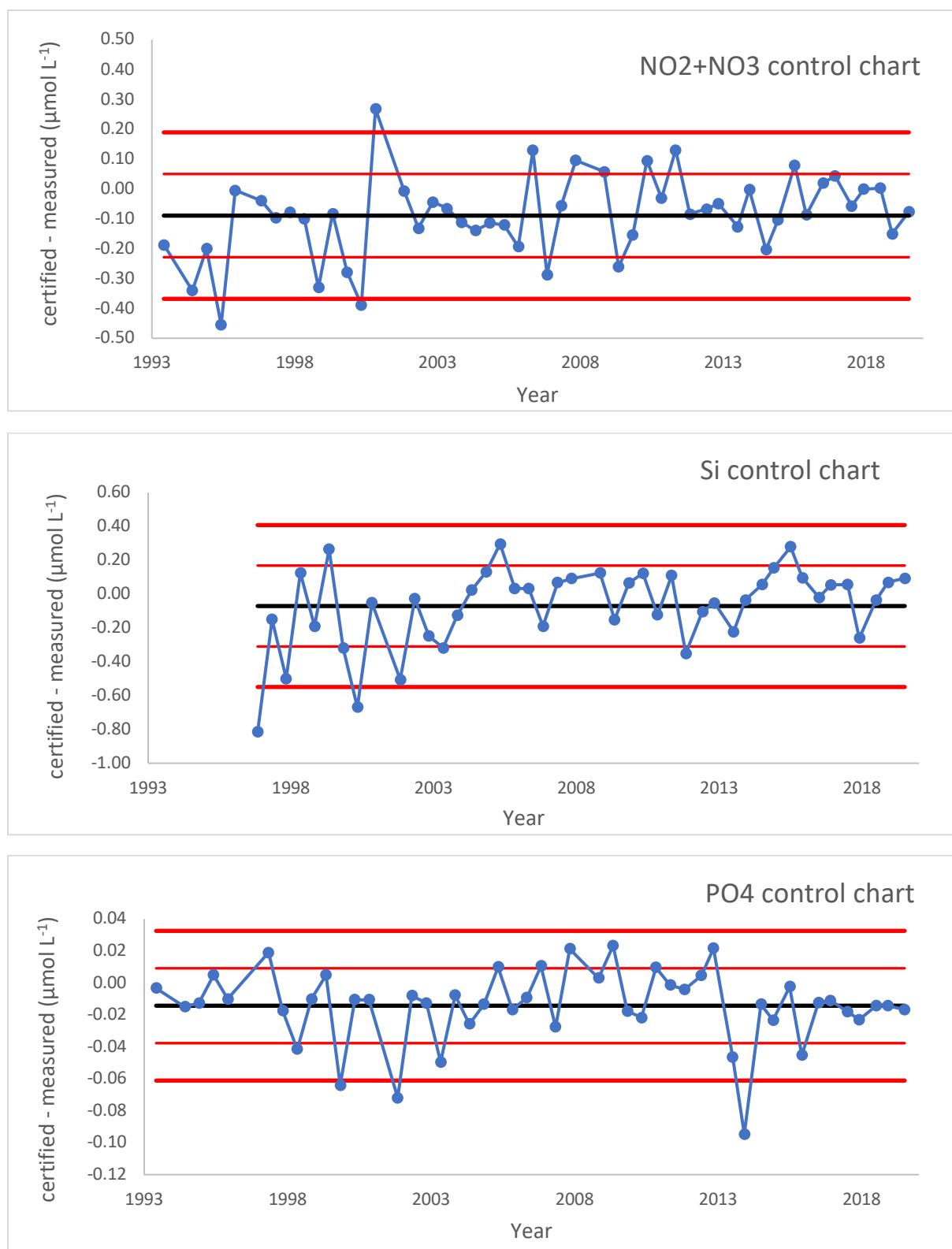


Fig 1. Difference between QM certified value and measurements in blue. In black: average difference, in red:  $\pm 1$  SD and  $\pm 2$  SD.

Salinity: We use standard seawater from OSIL with every time series profile measured.

DIC and TA: As described in Olafsson et al., 2010, we use CO<sub>2</sub> in seawater reference material (SRM) from A. Dickson's lab with every time series profile analyzed. For control charts (Fig 2 and Fig 3) we use the difference between our measured value and the SRM value.

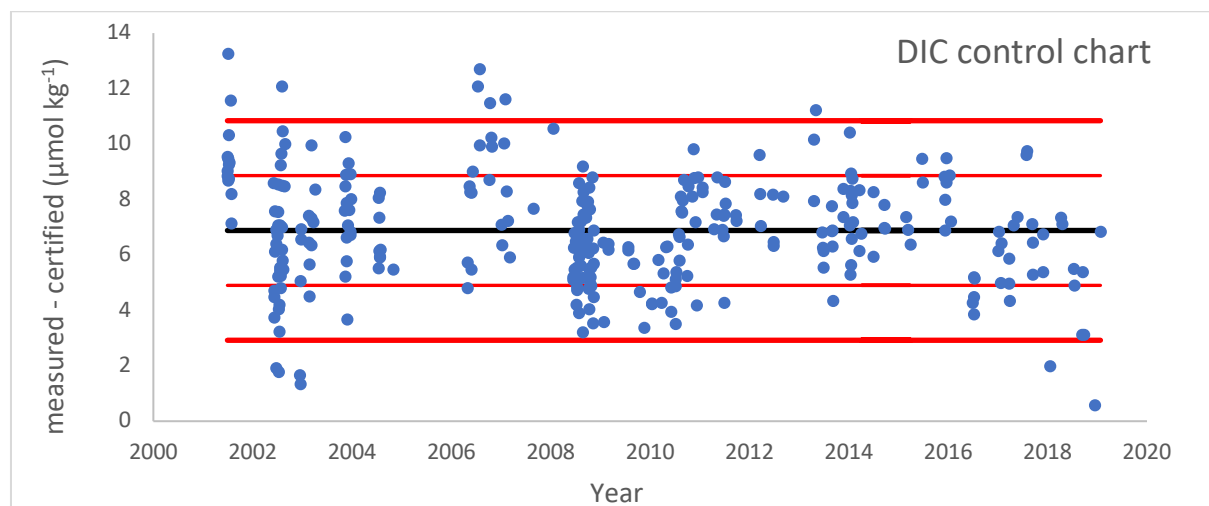


Fig 2. Difference between SRM determination and certified value in blue for DIC. In black: average difference, in red:  $\pm 1$  SD and  $\pm 2$  SD.

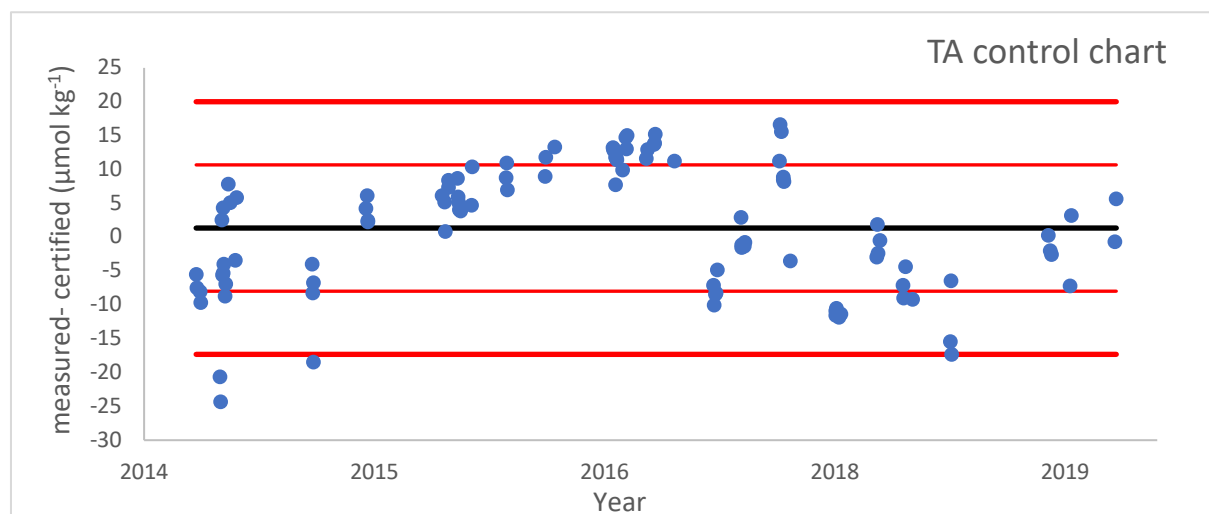


Fig 3. Difference between SRM determination and certified value in blue for TA. In black: average difference, in red:  $\pm 1$  SD and  $\pm 2$  SD. 19 different 0.1 M HCl batches were used to titrate the samples over this period.

## References

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- Daniel, A., K  rouel, R., & Aminot, A. (2012). Pasteurization: A reliable method for preservation of nutrient in seawater samples for inter-laboratory and field applications. *Marine Chemistry*, 128, 57-63.
- Dickson, A. G., Sabine, C. L., & Christian, J. R. (2007). *Guide to best practices for ocean CO2 measurements*. North Pacific Marine Science Organization.
- Olafsson, J., Olafsdottir, S. R., Benoit-Cattin, A., & Takahashi, T. (2010). The Irminger Sea and the Iceland Sea time series measurements of sea water carbon and nutrient chemistry 1983-2008. *Earth System Science Data*, 2(1), 99.