**EXPERIMENT TO TEST VINDTA MEASUREMENTS PRECISION AS A FUNCTION OF SALINITY**

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**Purpose**

To confirm that the precision and accuracy of the VINDTA in measuring total alkalinity and dissolved inorganic carbon is independent of salinity.

**Materials**

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment** | **Notes** | | |
| VINDTA 3C | N/A | | |
| pH Flow-Through Cell | PyroScience, model PHFTCR-PK8 - incorporated in the VINDTA | | |
| Wadden Sea water | Lab underway tap | | |
| MilliQ water | N/A | | |
| **Chemical technical name** | **% solution** | **Volume of bottles** | **Nb of bottles** |
| Hydrochloric Acid | 0.3 | 50 mL | 6 |
| Hydrochloric Acid | 3 | 100 mL | 2 |
| Cathode solution | 100 | 3.75 L | 3 |
| Anode solution | 100 | 0.5 L | 3 |
| Potassium iodide | 100 | 250 mg | 1 |
| Potassium chloride | 100 | 500 mg | 1 |
| Phosphoric acid | 85 | 1.0 L | 2 |
| Acetone | 100 | 1.0 L | 4 |
| Soda lime | 100 | 1.0 kg | 1 |
| Magnesium perchlorate | 100 | 500 g | 1 |
| Certified reference material | 0.1 | 500 mL | 10 |
| Sodium chloride | 100 | 5 kg | 4 |

**Methods**

1. **Lab analysis**

The following analysis routine will be followed:

1. Junks x 5 (or until steady)
2. CRM1 x 2
3. Samples x 20 - 24
4. CRM2 x 2

Samples will be Wadden Sea water, using MilliQ water for dilution to reach wanted salinities. The following salinities will be tested: 35, 30, 25, 20, 15, 10, 5 and 0. The rinsing solution for the VINDTA will be adjusted to the salinity of the sample.

For one sample, there will be a value for TA, DIC and pHT, averaged from 3 duplicates.

1. **Post-analysis data calibration**

Post-titration, data will be calibrated depending on the salinity of the sample, i.e. the appropriate dissociation constants for seawater (Lueker et al, 2000) and/or brackish water and freshwater (Cai and Wang, 1998) will be used.

**Control treatment**

Total alkalinity will be calculated from measured pH­­T and DIC using CO2SYS.

**Data interpretation**

A scatter graph will be used to plot TAmeas­ vsTAcalc. A linear regression will be applied, and the R­2 compiled. A t-test will be performed to determine if TAmeas­ differs significantly from TAcalc.