DIC-Alk sampling protocol

Objective

Properly sampling seawater to measure and quantify two marine hydrological parameters: dissolved inorganic carbon (DIC or TC) and total alkalinity (TA), requiring a specific protocol.

Material

- Niskin bottle with tube
- Labeled 500mL glass bottles
- Apiezon L or M grease (small quantities)
- Syringe or spatula
- 100 µL micropipette and compatible eppendorf tips
- Elastics
- Serflex (optional)
- Saturated mercuric chloride solution HgCl2(s)
- Single-use nitrile glove
- Sampling sheet

Advice to prepare

- Be methodical and organized: remember that your work and the information you provide will be used by your colleagues for laboratory analysis. It's a team effort. Be clear, precise and understandable.
- Know the number of sampling points (=samples) to be collected per station.
- Pre-fill in the sampling form with:
    - name(s) of operator(s)
    - Niskin bottle number used
    - bottle/sample number
    - Station number or name
    - Sampling date
    - planned sampling depths

NB: Be sure to match a bottle number with a sample number and the corresponding in situ data (temperature, depth, sampling point coordinates, etc.).

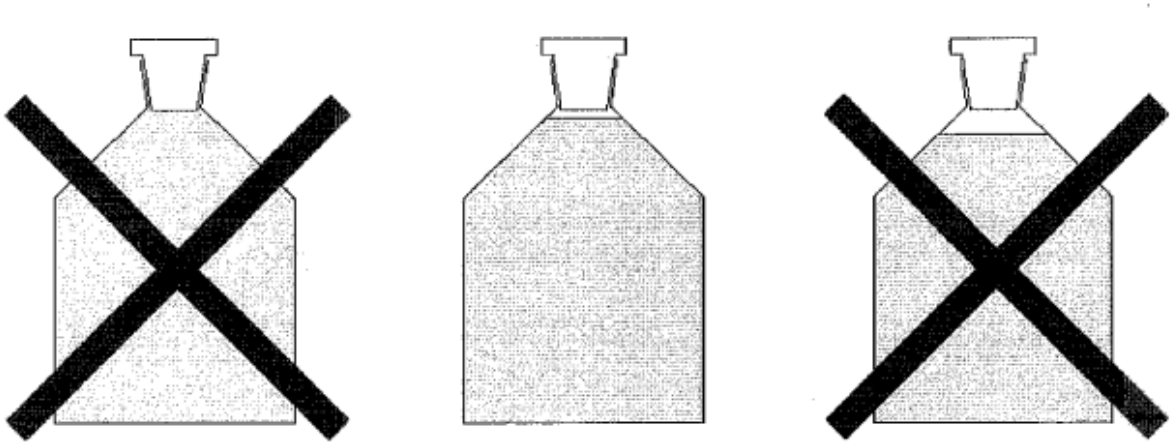
Prepare labels for each vial, indicating:

- Vial/sample number
- Date and time of sampling
- Sampling depth
- Parameter(s) to be analyzed

NB : Do not mix bottles and caps: 1 bottle/cap per sample.

Sampling protocol

1. For each sample, use the Niskin bottle to collect seawater at the desired depths.
2. Fill a 500mL bottle, taking care not to contaminate the water with the surrounding environment:
    a. Rinse the bottle and cap 3 times with a little of the seawater sampled.
    b. Insert the hose into the bottom of the bottle, so that the bottle fills from the bottom. Set the flow rate at a steady rate, neither too high nor too low, to avoid generating bubbles. Count the filling time.
    c. Allow the bottle to overflow for the same time as previously counted, so that the water removed has not come into contact with the ambient air (e.g. if the bottle has filled in 10s, then allow it to overflow for a further 10s).Retirer le tuyau avec précaution et ne laisser qu'une petite bulle d'air au bas du col rodé du flacon.



As little air as possible should be left in the vial, to avoid polluting the sample with the air bubble, as O2/CO2 gas exchange occurs. The vial must not be filled to the brim either, as there is a risk of bursting during transport due to the expansion of water under the effect of pressure and temperature. Air bubbles should not exceed 2-3mL in volume.

3. Close the bottle, taking care to:
    d. Using a syringe or spatula, apply three thin lines or a small dab of Apiezon grease to the edges of the cap.

e. Insert the plug into the ground collar, turning (as if screwing) to spread the grease sparingly around the plug and close.

4. Poison the sample to stop any biological reaction:
    a. Wear single-use nitrile gloves for this operation
    b. Remove cap
    c. Draw up 100µL of HgCl2 solution using the micropipette
    d. Insert the 100µL of HgCl2 into the vial without touching the sample.
    e. Close the vial with the appropriate cap and homogenize 2 times.
    f. Seal with a rubber band: wrap the rubber band around the neck of the vial 2 times and lock the cap with a 3rd turn on the top.
    g. Rinse bottle with demineralized water to remove all traces of external contamination.
5. Fill in the sampling form for each sample and any useful observations (e.g.: too much poison injected, use of a syringe instead of a micropipette for poisoning, broken cap, no rubber bands, etc.).

Conservation & Storage

- Store sample vials in an opaque box and keep in cold storage (<20°C) for the duration of transport to the analytical laboratory.