

Salinity and Density Sampling during MOSAiC

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In this document we describe how, where, and why you should take salinity and density samples. Comments and feedback for improving this document are very welcome.

At AWI and on Polarstern we are operating an Optimare Precision Salinometer to measure salinity samples. With measuring conductivity, we aim at checking and improving the calibration of the CTD conductivity sensors. This is done to check/finalize the calibration of the supplier and has the advantage of monitoring whether transportation and handling had an adverse effect on the sensors.

As we want to compare the measurement from the water sample to the CTD sensor reading, we need to make sure that both are actually containing information about the same water mass. The stronger the vertical gradients are (large and small scale), the more the two measurements will differ. Note that the sensors are measuring water at the location of the lower end of the bottles (see picture). Furthermore the bottles are 20cm to 1m apart from the sensors. Accordingly, a water sample should be taken in a well-mixed water mass without strong gradients.

In the post processing, you can check the vertical gradient dT/dp and dC/dp , for confirming the usability of a given sample. If the gradients were too large, you might want to discard the sample and exclude it from the data set used for correction of your conductivity calibration. DT/dp should be smaller than 0.5mK/dbar. Another challenge is the stratification in the 1m high water samplers. Stratification does develop rapidly in bottles, so it matters how fast samples are extracted and from which position (height) in the bottle they are taken.

- ➔ Take samples from homogeneous layers only
- ➔ Take samples in two different depths, if possible
- ➔ Get your sample from the rosette into your little glass bottle as quickly as possible.
- ➔ Take 2 samples from each water sampler. That means you end up with 2 samples from each depth.



Taking the sample

Rinse the bottle 3 times (fill to $\frac{1}{4}$ or $\frac{1}{3}$, close, shake, empty)

Fill the bottle until 2-3cm below cap

Rinse the rubber-lid again!

Close the bottle with rubber lid

Clean bottle outside with fresh water

Secure the rubber lid with alu-cap

Continue on the next page for density!

Samples for density

Density samples are taken only in the bottom boundary layer. Otherwise they are taken the same way as samples for salinity. These samples should be brought back to land and measured in the lab. You only need to label them. Please do not write on the glass but fill in the little protocol for density and tape it on the glass.

- ➔ Take a sample from bottom layer only
- ➔ Get your sample from the rosette into your little glass bottle as quickly as possible.
- ➔ Take 2 samples from that water sampler, so that you have 2 samples from the bottom boundary layer.

There is a suggestion for a label in the document *Label_density.pdf*
Print and tape to bottle.