Properties of glacially modified waters at the 79 North Glacier

1. Motivation
The floating tongue of the 79 North Glacier experiences significant thinning, triggered by warming Atlantic Intermediate Water (AIW) in the subglacial cavity.2 AIW is modified by mixing with subglacial runoff and basal melt water1. Alternation of the hydrographic properties due to increased melting might affect the overall shelf circulation1.

2. Data and Method
Hydrographic measurements taken during the R/V Polarstern cruise in 2016 are analysed.3 An Optimum Multiparameter Analysis5 based on potential temperature, salinity and dissolved oxygen quantifies the melt water content.

3. Hydrographic Properties
Glacially modified AIW (coloured) differs from other shelf stations (grey) by higher potential temperatures. All glacially modified AIW measurements fall into a mixing triangle of AIW, subglacial runoff and basal melt water.

4. Melt water content 2016
Glacial melt water content exceeds 3.6% at 90-100 m and decreases to 0.73% at 250-260 m (overall mean 2%). Highest concentrations of melt water are found at Dijmphna Sund.

5. Outlook: Melt water content 2017
Glacially modified AIW found in 2017 reveals lower subglacial runoff. An overall warming of the AIW rises the question how the AIW end-member must be adjusted.

References
2 Wilson, N. J. and Straneo, F.: Water exchange between the continental shelf and the open ocean measured with CTD/Large volume Watersampler-system during POLARSTERN cruise PS100 (ARK-XXX/2), PANGAEA, doi: 10.1594/PANGAEA.871025.

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