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Intermittent freeze-melt pattern detected at the base of the Ronne Ice Shelf

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High salinity shelf water (HSSW) is a water mass that drives melting at the Ronne Ice Shelf, entering the sub ice shelf cavity at the western end of the ice front. To monitor the rate of ice shelf basal melting along the path of assumed HSSW inflow, a phase-sensitive radar (ApRES) was deployed and it sampled autonomously for over two years. Although the site is found to melt on average, the data show evidence of freezing occurring intermittently throughout the observed time period. Here we systematically investigate oceanographic processes that could give rise to these observations. Further, we address the question of whether ApRES can be used to quantify the rate of basal freezing.