



Making meaningful observations in supercooled water

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For the past 16 years, New Zealand researchers have been investigating interactions between the ice and ocean, principally in McMurdo Sound, western Ross Sea. During this time, the range and technical capability of oceanographic instruments has increased dramatically. However, none of the standard oceanographic equipment has been designed to incorporate process near the phase-change limit.

Here we document our experience teasing data from ocean that is near, and often below, freezing temperature, as a set of principles of operation. We discuss the difficulties routinely experienced, and suggest mitigation strategies for these. We also highlight some of the curiosities of working in crystal-laden water, and the surprising results that flow from detailed examination of these data.

Finally, we introduce the 'Supercool-ometer' – a modified SeaBird CTD that incorporates a heating chamber and second set of sensors designed to characterise the effects of ice formation (and/or melt) inside the instrument. We will outline the development to date of the supercool-o-meter and highlight results from recent deployments in significantly supercooled water.