

Title: Temperature and salinity profiles of sea ice cores sampled during the Southern Ocean Seasonal Experiment (SCALE) spring cruise in 2019.

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Description:

Abstract

Temperature and salinity profiles of sea ice cores extracted from in situ sea ice floes and lifted pancakes were measured in the Atlantic sector of the Antarctic Marginal Ice Zone during the Southern Ocean Seasonal Experiment (SCALE) spring cruise in 2019 (www.scale.org.za) aboard the SA Agulhas II.

A total of twenty two sea ice cores (cores) were sampled during the spring cruise. Fourteen cores were collected overboard on a consolidated floe that was accessed via a personnel carrier suspended by the ship's forward crane. Eight cores were collected from four unconsolidated floes at two stations (2 floes per station) that were lifted aboard the ship via a net that was attached to the ship's aft crane and placed on the helideck for sampling. Temperature profiles of all cores were sampled from the bottom of each core in 0.05 m intervals to the top of the core immediately after extraction. The bottom temperature (ice/ocean interface) of the cores were recorded at 0.025 m from the bottom of the core. Snow temperature was measured by inserting the temperature probe into the snow layer. The temperature was recorded using a temperature probe and is reported in °C. Salinity profiles were obtained by cutting the cores using a bandsaw in a cold laboratory at -10 °C. The cores were cut into approximately 0.1 m segments, starting from the bottom of the core. These segments were allowed to melt in a fridge at 4 °C. Snow samples were collected and treated in the same manner as the core segments. The salinity of the meltwater was read using a salinometer onboard the vessel. Salinity values are reported at the depth of the top of the segment in the core in PSU. The resolution of the salinity profiles are lower than the resolution of the temperature profiles for the same core due to the volume of melt water required for the tests that needed to be run on the core, including salinity.

Although sampling of the core occurred from the bottom of the core to the top of the core, the data are reported as the top of the core (snow/ice interface) being 0 m (depth=0 m).

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Cruise: VOY-040(SCALE2019-SPRING) (URL: <https://scale.org.za/>)

Station(s): VOY-040-MIZ2
VOY-040-MIZ3
VOY-040-MIZ5
VOY-040-MIZ6
VOY-040-MIZ7
VOY-040-MIZ8

Position(s): VOY-040-MIZ9
-59.32 S; 0.06 E
-58.98 S; 0.01 E
-59.33 S; 06.61 E
-59.36 S; 08.15 E
-59.36 S; 10.89 E
-58.54 S; 17.93 E
-58.44 S; 21.99 E

Date: 2019-10-24
2019-10-25
2019-10-28
2019-10-29
2019-10-30
2019-11-01
2019-11-03

Method(s): Overboard coring
Brash floe lifting via aft crane, on deck coring

Parameters: Station Number (Station)
Date/Time of station (Date/Time)
Latitude of station (Latitude)
Longitude of station (Longitude)
Ice type (Ice Type)
Core ID(Core), Pancake identifier A/B/C/D
Depth of ice from ice/snow interface [m], ice/snow interface = top (Depth)
Temperature of ice [°C] (t)
Salinity of ice [PSU] (sal)

Keywords: sea ice cores, Antarctica, temperature, salinity, brash ice