

README

This document provides an overview of the physical and mechanical sea ice data collected in the Antarctic marginal ice zone along the Good Hope Line by means of vertical ice cores extracted from solitary pancake ice floes and from consolidated pack ice during the SCALE Winter Cruise 2019 aboard the SA Agulhas II.

Ice sampling took place at consolidated conditions at station MIZ3A and unconsolidated conditions at MIZ1D as listed in the table below.

Station	Start Date & Time	Latitude	Longitude
MIZ3A	27 th July 2019 10:38am (UTC)	S 58.13783	W 0.00442
MIZ1D	28 th July 2019 9:15am (UTC)	S 56.80178	E 0.30262

The ice core data obtained are stored in separate spreadsheets for physical, elastic and uniaxial compression strength-related properties. The ice cores are labelled in general form as

M<station>-<property>-<core number>-<pack ice cluster/pancake floe>

where

- **station** ... 01: pancake collection at unconsolidated conditions at MIZ1D; 03: pack ice sampling at consolidated conditions at MIZ3A,
- **property** ... PHY: dedicated to measurement of ice temperature and salinity; US: dedicated to measurement of elastic ice properties via ultrasound; DE: dedicated to measurement of uniaxial compression strength of ice,
- **core number** ... the cores at each particular cluster or pancake floe have been sequentially numbered according to the order of collection,
- **pack ice cluster/pancake floe** ... at MIZ1D four solitary pancake ice floes (A, B, C, D) have been collected whereas at MIZ3A only one cluster of cores was extracted (cluster A)

Winter cruise 2019 physical data.xlsx: Containing all temperature and salinity data.

The temperature and salinity sheet tabs include:

- Name of the station,
- Date and time of collection,
- Latitude and longitude of station,
- Ice type,
- Core denomination,
- Core thickness,
- Ice core depth of segment.

In addition the 'Salinity' sheet tab includes:

- Salinity,
- Ice core segment length,
- Ice core depth to centre of segment.

In addition the 'Temperature' sheet tab includes:

- Temperature.

Winter cruise 2019 elasticity data.xlsx: Containing the Young's and shear modulus data measured by means of ultrasound using the PROCEQ Pundit PL-200 testing kit (Screening Eagle Technologies, Schwerzenbach, Switzerland with 250 kHz P- and S-wave transducers). Each sheet tab represents a core indicated by the above introduced core denomination.

All sheet tabs contain ultrasound data of solitary pancake ice floe and consolidated pack ice cores, including:

- Date of collection and reference of the core,
- Core section, where T stands for transverse,
- Test reference from the Pundit ultrasound testing device,
- Length, volume, mass and density of core section,
- P-wave and S-wave velocities per core section from the pundit ultrasound machine,
- Calculated Young's modulus, Poisson's ratio and shear modulus per core section.
- Photo of the entire core.

Winter cruise 2019 uniaxial compression data.xlsx: Containing the uniaxial compression testing graph data obtained using GCTS PLT-2W wireless unconfined compression testing device (GCTS Testing Systems, Tempe, USA). There are three sheets, one illustrating the segmentation of the cores, another containing solitary pancake ice data (M01) and a last one containing the consolidated pack ice data (M03). The compression data are presented and ordered in columns labelled by the respective core denominations.

More details and discussion of the results can be found in Skatulla et al. 2021 - "Physical and mechanical properties of winter first-year ice in the Antarctic marginal ice zone along the Good Hope Line".