

# Available data from South African Voyages in the Southern Ocean

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This document provides an overview of data produced during South African voyages in the Southern Ocean aboard the *R/V S.A. Agulhas II* and is accompanied by a .xlsx file that contains the metadata and links to the published datasets. Each voyage has a dedicated sheet within the .xlsx file.

This document will be updated, and a new version published as more data becomes available. Please refer to the most recent version on [https://zenodo.org/communities/scale\\_south\\_africa/](https://zenodo.org/communities/scale_south_africa/)

**This is a data curation document only. Any use of the data mentioned in this document should reference the original dataset and authors.**

## 1. South African voyages in the Southern Ocean

Table 1. Voyages in the Southern Ocean aboard the *R/V S.A. Agulhas II*.

Voyage	Dates	Report
Winter 2017	28/06/2017 – 13/07/2017	<a href="https://doi.org/10.5281/zenodo.7038073">https://doi.org/10.5281/zenodo.7038073</a>
SANAE58/Weddell Sea Expedition 2019	07/12/2018 – 15/03/2019	<a href="https://doi.org/10.17863/CAM.58103">https://doi.org/10.17863/CAM.58103</a>
SCALE Winter 2019	18/07/2019 – 07/08/2019	<a href="https://doi.org/10.5281/zenodo.5906324">https://doi.org/10.5281/zenodo.5906324</a>
SCALE Spring 2019	12/10/2019 – 20/11/2019	<a href="https://doi.org/10.5281/zenodo.5906324">https://doi.org/10.5281/zenodo.5906324</a>
SCALE Winter 2022	12/07/2022 – 31/07/2022	<a href="https://doi.org/10.5281/zenodo.7902557">https://doi.org/10.5281/zenodo.7902557</a>

## 2. Data

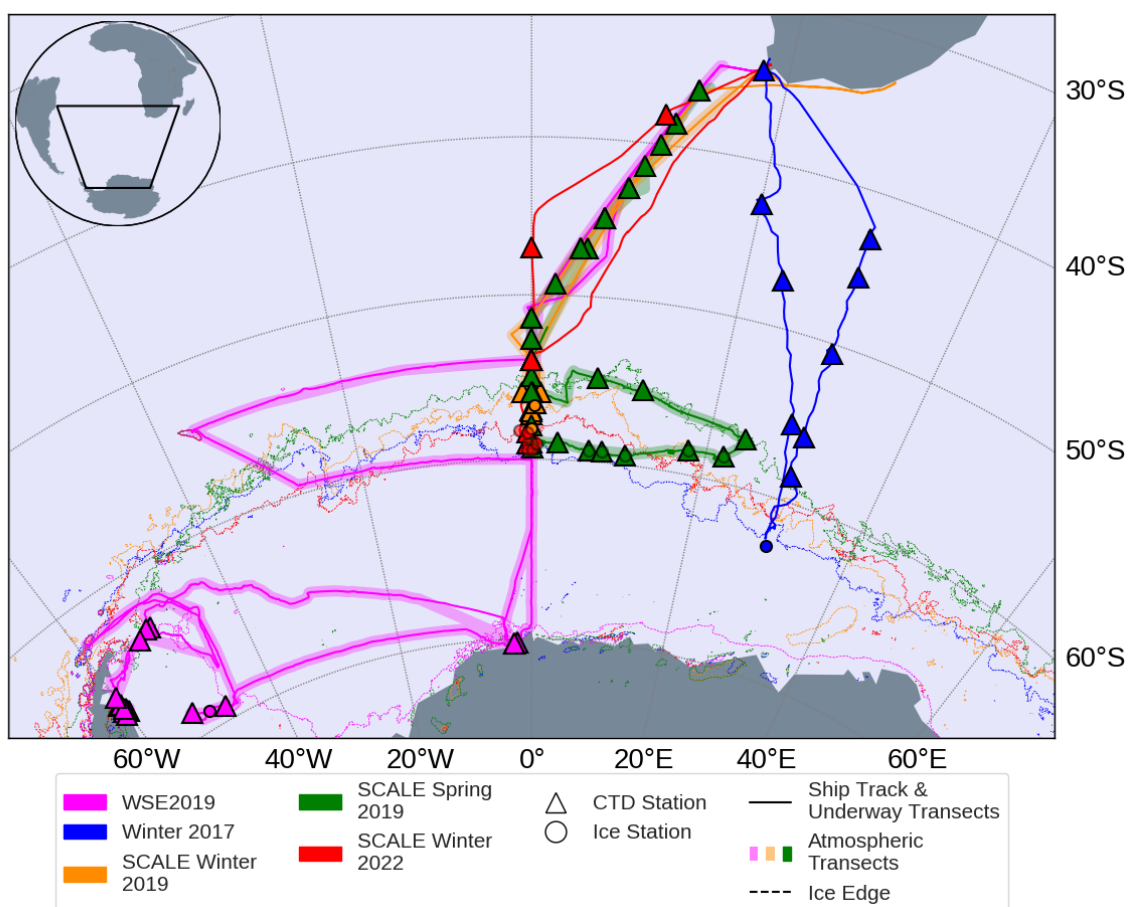


Figure 1. Map of data generated during South African cruises in the Southern Ocean aboard the R/V S.A. Agulhas II from 2017 - present. Ocean data are indicated by the triangles, sea-ice data by the circles and atmospheric data by the thick shaded lines. The solid lines indicate the ship track during the voyage as well as the continuous surface ocean measurements from the vessel underway system. The symbols and lines are coloured according to the voyage. The AMSR-2 satellite-derived location of the sea ice edge during each voyage is indicated by the correspondingly coloured dashed lines (Spreen et al., 2008).

A common term is used to refer to a group of variables in a specific dataset. Any extra variables are listed accordingly. Note: methods for the collection and processing of the data are available in the published works (section 3) and with the published datasets.

Table 2. Variables associated with the common term used in the .xlsx document.

Common Term	Variables Associated
BGC	Chlorophyll (Chl-a) Ammonium (NH <sub>4</sub> ) Nitrate + Nitrite (NO <sub>3</sub> +NO <sub>2</sub> ) Nitrite (NO <sub>2</sub> ) Phosphate (PO <sub>4</sub> ) Silicate (Si) Nitrate (NO <sub>3</sub> )
Ocean Physics	Temperature Salinity Oxygen Isotopes ( $\delta^{18}\text{O}$ ) Oxygen

Sea ice Physics	Temperature Salinity
Sea ice Crystal Structure	Ice texture classification Cross polarised images
Atmospheric NO <sub>3</sub> <sup>-</sup> isotopes	Nitrate concentration (NO <sub>3</sub> <sup>-</sup> ) Nitrogen isotopes (δ <sup>15</sup> N-NO <sub>3</sub> <sup>-</sup> ) Oxygen Isotopes (δ <sup>18</sup> O-NO <sub>3</sub> <sup>-</sup> and Δ <sup>17</sup> O-NO <sub>3</sub> <sup>-</sup> )
Inorganic aerosol species (Fine (<1μm) and coarse (>1μm) modes)	Chloride Sulphate Phosphate Sodium Potassium Magnesium Calcium Nitrate Ammonium
Aerosol precursor gasses	DMS Ammonia
Meteorological data	SLP Wind direction Wind speed Air temperature Humidity

### 3. Publications

Table 3. Publications associated with the data presented in this document.

Publication	Data used	
	Voyage	Variables
Skatulla, S., Audh, R.R., Cook, A., Hepworth, E., Johnson, S., Lupascu, D.C., MacHutchon, K., Marquart, R., Mielke, T., Omatuku, E. and Paul, F., 2022. Physical and mechanical properties of winter first-year ice in the Antarctic marginal ice zone along the Good Hope Line. <i>The Cryosphere</i> , 16(7), pp.2899-2925.	SCALE Winter 2019	Ice core physics Ice core texture
Johnson, S., Audh, R.R., de Jager, W., Matlakala, B., Vichi, M., Womack, A. and Rampai, T., 2023. Physical and morphological properties of first-year Antarctic sea ice in the spring marginal ice zone of the Atlantic-Indian sector. <i>Journal of Glaciology</i> , pp.1-14.	SCALE Spring 2019	Ice core physics Ice core texture Ice core BGC ( $\delta^{18}\text{O}$ only)
Burger, J.M., Granger, J., Joyce, E., Hastings, M.G., Spence, K.A. and Altieri, K.E., 2022. The importance of alkyl nitrates and sea ice emissions to atmospheric $\text{NO}_x$ sources and cycling in the summertime Southern Ocean marine boundary layer. <i>Atmospheric Chemistry and Physics</i> , 22(2), pp.1081-1096.	WSE2019	Atmospheric $\text{NO}_3^-$ isotopes
Burger, J.M., Joyce, E., Hastings, M.G., Spence, K.A. and Altieri, K.E., 2023. A seasonal analysis of aerosol $\text{NO}_3^-$ sources and $\text{NO}_x$ oxidation pathways in the Southern Ocean marine boundary layer. <i>Atmospheric Chemistry and Physics</i> , 23(10), pp. 5605-5622.	WSE2019 SCALE Spring 2019 SCALE Winter 2019	Atmospheric $\text{NO}_3^-$ isotopes
Zhou, L., Booge, D., Zhang, M., and Marandino, C. A.: Winter season Southern Ocean distributions of climate-relevant trace gases, <i>Biogeosciences</i> , 19, 5021–5040, <a href="https://doi.org/10.5194/bg-19-5021-2022">https://doi.org/10.5194/bg-19-5021-2022</a> , 2022.	SCALE Winter 2019	Aerosol precursor gasses
Altieri, K. E., Spence, K. A. M., & Smith, S. (2021). Air-sea ammonia fluxes calculated from high-resolution summertime observations across the Atlantic Southern Ocean. <i>Geophysical Research Letters</i> , 48, e2020GL091963. <a href="https://doi.org/10.1029/2020GL091963">https://doi.org/10.1029/2020GL091963</a>	WSE2019	Aerosol precursor gasses