



SCAR Sub-Group

ADMAP

SG / SC

GS

Person Responsible:

Graeme Eagles

XXXVII SCAR Delegates Meeting

India, September 2022

Antarctic Digital Magnetic Anomaly Project (ADMAP)

2020-22 Report

Summary

Report Author(s)

Graeme Eagles (Germany), Fausto Ferraccioli (Italy), Detlef Damaske (Germany)

Summary of activities from 2020-22

The ongoing COVID pandemic severely curtailed activities of the ADMAP group in the 2020-22 reporting period. The main achievements were ongoing fieldwork and a number of new publications.

Meetings: The ADMAP group did not meet formally or informally in the 2020-22 period owing to restrictions related to the COVID pandemic. Online discussions have been continuing on ideas related to the concept of an ADMAP3 compilation, and future fieldwork programmes that might require international cooperation.

Fieldwork:

- PGMRE (Russia) completed ~12000 km of new airborne acquisition in Queen Mary Land in 2020, 2021, and 2022.
- Chinare (China) completed ~10000 km of new airborne acquisition in Princess Elizabeth Land in 2019/20.
- The ITGC project (BAS/LDEO) completed ~9000 km of new airborne acquisition in the Thwaites Glacier region in 2019/20.
- The BGR (Germany) completed ~11000 km of new airborne acquisition in northern Victoria Land in 2018/19/20.
- Shipborne acquisition was undertaken by Chinese, Japanese, Russian and Spanish vessels, totalling around 25000 line kilometres.

Publications:

Members of the group led, or were involved in, the preparation and publication of over 25 new publications in international peer reviewed journals. Highlights are included in the relevant section below.

Summary Budget 2021 to 2024

	2021	2022	2023	2024
	Spent	Allocated	Request	Request
(US\$)	0	3250	3250	3250

Progress to date

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
ADMAP	Ongoing data acquisition in Antarctica
ADMAP	Diverse publications using and/or building on ADMAP2 data compilation and newer, not yet compiled, data.

Sub-group Cash Flow

(Since previous report to Delegates in 2020)

Sub-group	Allocation	Amount spent		
		2020	2021	2022
ADMAP	3250	0	0	0

Future plans

Planned activities in 2022 to 2024

Sub-group	Planned activity
ADMAP	EGU splinter meeting 2023
ADMAP	SCAR/OSC group meeting 2024

Planned use of funds for 2022 to 2024

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2023	EGU splinter meeting travel/attendance support	1625	NN	
2023	Support for ADMAP scientist to attend meeting or workshop in 2023	1625	NN	
2024	SCAR/OSC group meeting travel/attendance support	1625	NN	
2024	Support for ADMAP scientist to attend meeting or workshop in 2024	1625	NN	
Total		6500		

Any additional detail on funds usage and desired results/outcomes

Percentage of the budget to be used for support of early-career researchers

2022: 50%

2023: 50%

2024: 50%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2022: not known yet

2023: not known yet

2024: not known yet

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Primary Language	Email	Date Started
Chair	Graeme	Eagles	Alfred Wegener Institute	Germany	English	Graeme.Eagles@awi.de	2016
Co-chair	Fausto	Ferraccioli	National Institute of Oceanography and Applied Geophysics	Italy	Italian	fferraccioli@ogs.it	2016
Co-chair	Detlef	Damaske		Germany	German	d.damaske@t-online.de	2014

(Please identify early-career researchers with * in first column)

Other members

First Name	Last Name	Affiliation	Country	Primary Language	Email
Golynksy	Alexander	VNIIO	Russia	Russian	sasha@vniio.nw.ru
Young	Duncan	UTIG	USA	English	smudog@gmail.com
Kim	Hyung Rae	KOPRI	Korea	Korean	kimhr@kongju.ac.kr
Ghidella	Marta		Argentina	Spanish	mghidella@gmail.com
Ruppel*	Antonia	BGR	Germany	German	Antonia.Ruppel@bgr.de
Golynsky*	Dmitry	VNIIO	Russia	Russian	dmitry.a.golynsky@gmail.com

(Please identify early-career researchers with * in first column)

Additional information (optional)

Notable Papers

1. Ebbing et al., 2021. East Antarctica magnetically linked to its ancient neighbours in Gondwana. *Scientific Reports*, 11, 5513.

Magnetic-led study for understanding shared tectonic and geological structures within Gondwana.

2. Dziadek et al., 2021. High geothermal heat flow beneath Thwaites Glacier in West Antarctica inferred from aeromagnetic data. *Communications Earth & Environment*, 2, 1-6.

Magnetic-led study revealing detailed heatflow determinations for the climatically sensitive Thwaites glacier catchment region.

3. Jordan et al., 2022. An embayment in the East Antarctic basement constrains the shape of the Rodinian continental margin. *Communications Earth & Environment*, 3, 1-8.

Magnetic-led study of pre-Gondwana tectonic structures in Antarctica.

4. Tankersley et al., 2022. Basement topography and sediment thickness beneath Antarctica's Ross Ice Shelf. *Geophysical Research Letters*, e2021GL097371.

Magnetic-led study of depth to bedrock beneath a region of extended crust in West Antarctica, now covered by thick sediments.

5. Kim et al., 2022. New Magnetic Anomaly Constraints on the Antarctic Crust. *Journal of Geophysical Research, Solid Earth*, 127, e2021JB023329

Presentation of a pendant to the ADMAP2 compilation that uses satellite-derived measurements to adjust long-wavelength lithospheric field components and fill remaining gaps.

6. Fremant et al., 2022. British Antarctic Survey's Aerogeophysical Data: Releasing 25 Years of Airborne Gravity, Magnetic, and Radar Datasets over Antarctica. *Earth Sci. Data Discussions*, 1-49.

Presentation of a comprehensive, FAIR, online collection of BAS-acquired magnetic and related airborne geophysical data from the last 25 years.

7. Aitken, A. R. A., et al., 2020, A Magnetic Data Correction Workflow for Sparse, Four-Dimensional Data, *Journal Of Geophysical Research: Solid Earth*, 125, 10, e2020JB019825, 10.1029/2020JB019825

Presentation of a workflow for processing magnetic anomaly or similar data acquired in sparse networks.

8. Li, L., et al. 2022, Sedimentary basins reduce stability of Antarctic ice streams through groundwater feedbacks, *Nature Geoscience*, 10.1038/s41561-022-00992-5

Magnetic-involved study of the effects of intracontinental and continental-margin sedimentary basins on ice stream stability.

9. Golynsky, A.V. et al. 2022. Compiling ship and airborne measurements for the Antarctic's second-generation magnetic anomaly map. *Russ. J. Earth. Sci.*, Vol. 22, № 3, ES3007, 21p. <https://doi.org/10.2205/2022ES000801>

A presentation of yet-to-be compiled magnetic profiles with a look towards an ADMAP3 compilation.

10. Eagles, G. & Eisermann, H. 2020. The Skytrain plate and tectonic evolution of southwest Gondwana since Jurassic times. *Scientific Reports*, 10, 19994.

Magnetic-led study of the South American and East Anarctic conjugate margins and offshore basins with a plate tectonic model for interpretation of plate motions during Gondwana breakup.

Direct support from outside organisations received for your activities

(Numbered list with values indicated if direct cash support. Please restrict in-kind support to substantive in-kind support only)

Major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR

(Numbered list of substantive collaborations)

Within SCAR

1. Connecting Geology and Geophysics
2. Geodetic Infrastructure of Antarctica
3. RINGS

Outside SCAR

1. [IGCP-628: Geological map of Gondwana](#)
2. [ESA & 3D Earth](#)
3. [4D Antarctica](#)
4. [International Lithosphere Programme](#) (upcoming focus on East Antarctica)
5. [Antarctic Resolution](#)

Outreach, communication and capacity-building activities

(Brief highlights of any activities undertaken since the last report to SCAR Delegates in 2020).

Contributions to equality, diversity, and inclusion (EDI)

(Any specific actions the group has undertaken to advance EDI within the group and/or within SCAR)

SCAR fellowship reviewers

First Name	Last Name	Email	Principal Expertise
Graeme	Eagles	Graeme.Eagles@awi.de	Plate Kinematics
Detlef	Damaske	d.damaske@t-online.de	Aeromagnetism