

Accepted Manuscript

New geophysical data from a key region in East Antarctica:
Estimates for the spatial extent of the Tonian oceanic arc super
terrane (TOAST)

Antonia Ruppel, Joachim Jacobs, Graeme Eagles, Andreas
Läufer, Wilfried Jokat



PII: S1342-937X(18)30081-9
DOI: doi:[10.1016/j.gr.2018.02.019](https://doi.org/10.1016/j.gr.2018.02.019)
Reference: GR 1946

To appear in:

Received date: 27 September 2017
Revised date: 9 January 2018
Accepted date: 14 February 2018

Please cite this article as: Antonia Ruppel, Joachim Jacobs, Graeme Eagles, Andreas Läufer, Wilfried Jokat , New geophysical data from a key region in East Antarctica: Estimates for the spatial extent of the Tonian oceanic arc super terrane (TOAST). The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Gr(2018), doi:[10.1016/j.gr.2018.02.019](https://doi.org/10.1016/j.gr.2018.02.019)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

New geophysical data from a key region in East Antarctica: estimates for the spatial extent of the Tonian Oceanic Arc Super Terrane (TOAST)

Antonia Ruppel¹, Joachim Jacobs^{2,3}, Graeme Eagles⁴, Andreas Läufer¹, Wilfried Jokat⁴,

¹*Federal Institute for Geosciences and Natural Resources (BGR), Stilleweg 2, 30655 Hannover, Germany.*

²*University of Bergen, P.O.Box 7800, 5020 Bergen, Norway.*

³*Norwegian Polar Institute, Fram Centre, 9296 Tromsø, Norway.*

⁴*Alfred Wegener Institute (AWI), Helmholtz Centre for Polar and Marine Research, Am Alten Hafen 26, 27570 Bremerhaven, Germany.*

Corresponding author: Antonia Ruppel, Antonia.Ruppel@BGR.de, Tel.: +49 5116433223

Abstract

Within Antarctica, eastern Dronning Maud Land (DML) represents a key region for improving our understanding of crustal fragments that were involved in the amalgamation and breakup histories of Rodinia and Gondwana. An aerogeophysical survey was flown during the austral summers 2013/14 and 2014/15 to explore the largely ice-covered region south and east of Sør Rondane. Here, we present 40000 new line kilometer of aeromagnetic data gathered across an area of ca. 295000 square kilometers with a 10 km line spacing. Magnetic domains, major lineaments, locations, and depths of magnetic source bodies are detected from total field data, their tilt derivative, pseudo-gravity, and analytical signal transformations, and from Euler Deconvolution maps. These data are integrated with exposure information from the Sør Rondane, Belgica and the Yamato mountains in order to identify the eastern spatial extent of a major juvenile Early Neoproterozoic crustal province, the Tonian Oceanic Arc Super Terrane (TOAST). Magnetic data reveal a characteristic pattern with NW-SE trending elongated magnetic anomalies to the south of Sør Rondane. This area is interpreted as the eastward continuation of the distinct SE DML Province and therefore of the TOAST. Major curvilinear magnetic anomalies of several hundreds of kilometers length dissect the region south and southwest of Sør Rondane. These may represent boundaries of individual oceanic arc terrane or alternatively major Pan-African shear zones. A significant change of the magnetic anomaly pattern ca. 800 km inland of Sør Rondane may indicate the southern minimum extent of the TOAST. Magnetic anomalies of varying size, amplitude, and orientation suggest a complex transitional area between the Belgica and Yamato Mts., which appears to separate the TOAST from an Indo-Antarctic craton to the east. The new data suggest that the TOAST is comparable in size with the Antarctic Peninsula and therefore represents a significant piece of Neoproterozoic crustal addition. It originated at the periphery or outboard of Rodinia and is a remnant of the Mozambique Ocean.

KEY WORDS: Airborne magnetics, subglacial geology, Tonian Oceanic Arc Super Terrane (TOAST), Sør Rondane, eastern Dronning Maud Land

Download English Version:

<https://daneshyari.com/en/article/8913183>

Download Persian Version:

<https://daneshyari.com/article/8913183>

[Daneshyari.com](https://daneshyari.com)