Matthew D. Tankersley

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Objective: A recent Ph.D. graduate specialized in airborne geophysical analysis and inversion applied to the cryosphere, with a dedication to conducting open-source and reproducible science.

Education

Geophysics | *Ph.D.* September 2019 - October 2023

Airborne geophysical investigation beneath Antarctica's Ross Ice Shelf
Antarctic Research Center, Victoria University of Wellington, New Zealand

Geology | *Bachelor of Arts (with distinction)* August 2014 - May 2018

distinction in Geology (GPA 3.7) and a minor in Physics (GPA 3.9)
Thesis: "Aerogeophysical analysis of crustal structures under the Ross Ice Shelf"
Colorado College, Colorado Springs, USA

Publications

2022 **Basement topography and sediment thickness beneath Antarctica's Ross Ice Shelf**, *Geophysical Research Letters*
Matthew Tankersley, Huw Horgan, Christine Siddoway, Fabio Caratori Tontini, and Kirsty Tinto.
doi: 10.1029/2021GL097371
5 citations

2019 **Ross Ice Shelf response to climate driven by the tectonic imprint on seafloor bathymetry**, *Nature Geoscience*
Kirsty Tinto, Laurence Padman, Christine Siddoway, Scott Springer, ... Matthew Tankersley
doi: 10.1038/s41561-019-0370-2
104 citations

Selected Presentations

ORAL PRESENTATIONS

2023 **Progress towards an open-source geometric gravity inversion with stochastic uncertainty estimates**, *AGU Fall Meeting, San Francisco, CA, USA*

Addressing bathymetry uncertainty beneath the Ross Ice Shelf, *New Zealand-Australia Antarctic Science Conference, Christchurch, NZ*
Slides: `https://doi.org/10.6084/m9.figshare.24412021.v1`

2021 **Sediment thickness and basement depths beneath the Ross Ice Shelf from aeromagnetic data**, *New Zealand Antarctic Science Conference, Christchurch, NZ*

POSTER PRESENTATIONS

2023 **Gravity inversion as a method to recover sub-ice shelf bathymetry; applied to the Ross Ice Shelf**, *Scientific Committee on Antarctic Research, Instabilities & Thresholds in Antarctica, Trieste, Italy*
Poster: `https://doi.org/10.6084/m9.figshare.24117420.v2`

Antarctic-Plots: a Python package to help conduct Antarctic research,
1) Scientific Committee on Antarctic Research, Instabilities & Thresholds in Antarctica, Trieste, Italy
Awarded best poster
2) New Zealand-Australia Antarctic Science Conference, Christchurch, NZ
Awarded 2nd best poster
3) AGU Fall Meeting, San Francisco, CA, USA
Posters: `https://doi.org/10.6084/m9.figshare.21183931`

2022 **Revealing sub-ice shelf sediment basins with airborne magnetics**, *West Antarctic Ice Sheet Conference and Workshop, Estes Park, CO, USA*
Poster: `https://doi.org/10.6084/m9.figshare.21172042.v2`

Antarctic-Plots: a Python package to help download, visualize, and present Antarctic datasets,
1) West Antarctic Ice Sheet Conference and Workshop, Estes Park, CO, USA
2) The Future of Geodetic-Geophysical Observational Networks in Antarctica Workshop (SCAR-INSTANT), Fort Collins, CO, USA
Poster: `https://doi.org/10.6084/m9.figshare.21183931.v3`

Open-source Software Development

Invert4Geom: 3D geometric gravity inversions (`https://invert4geom.readthedocs.io/`)
Founder and core-maintainer
Antarctic-Plots: Functions to automate Antarctic data visualization (`https://antarctic-plots.readthedocs.io/`)
Founder and core-maintainer
Fatiando a Terra: Open source tools for geophysics (`https://www.fatiando.org`)
Contributor

Technical Skills

Programming Python, GMT
Python packages Pandas, Xarray, NumPy, SciPy, Dask, PyGMT, Matplotlib, Plotly, Pooch, Verde, Harmonica, Optuna, GeoPandas, Shapely
Markup Markdown, LaTeX, Curvenote
OS Linux, Windows
Other tools Geosoft Oasis Montaj, Jupyter Notebooks, git, GitHub, VS Code, Binder, ReadTheDocs, QGIS, LibreOffice Suite, Microsoft Office Suite

Field work

Geophysical field assistant | *Antarctica - Kamb Ice Stream* November 2019 - December 2019
- Worked within a team of 5 stationed in a remote field camp on the Ross Ice Shelf conducting an **active source seismic survey** and a **gravity survey**.
- Included training and extensive use of snowmobiles, Hagglund tracked vehicles, transport, wiring, and detonation of explosive charges, operation of a hot water drill for emplacing charges at a 20m depth, and deploying a 1 km array of geophones.
- Other duties included **planning and executing the gravity survey**, GNSS surveying the gravity and seismic stations, and setting up and maintaining camp infrastructure.

Geophysical field assistant | *Antarctica - Discovery Deep* December 2021 - Febuary 2022
- Similar to above but in a field camp consisting of just our team of 5. Additional survey methods included seismic surveying with a streamer of geophones and surface detonation of det-cord.
- Shared all duties of our self-contained camp (cooking, cleaning, camp safety etc.).

Marine Seismic Assistant | *RV Tangaroa - TAN2006* July 2020 - August 2020
- Worked aboard the RV Tangaroa conducting a **marine seismic** and **multibeam bathymetry** survey of the Chatham Rise, New Zealand.
- Duties included monitoring seismic data collection and pre-processing of multibeam bathymetry data.

Geologic Fieldwork | *Western USA* 2014 - 2018
- Over 100 days of geologic fieldwork throughout the Western USA during my undergraduate degree. This included geologic and structural mapping, stratigraphic profiles, and soil and rock sample collection.