Matthew D. Tankersley

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Dear Dr. Heagy,

I am writing to express interest in the recently advertised postdoctoral position "Computational geophysics for mineral exploration and mining" at the UBC Geophysical Inversion Facility. A little bit about me; I am from Colorado, USA, and received my undergraduate degree in Geology from Colorado College in 2018. I then moved to Wellington, New Zealand, in 2019 to begin my Ph.D. in Geophysics at the Antarctic Research Centre at the Victoria University of Wellington. I submitted my Ph.D. thesis two weeks ago and will defend in the coming months.

During this Ph.D., I used airborne gravity and magnetic data to investigate the Earth beneath the floating Ross Ice Shelf in Antarctica. The first section of my Ph.D., attached in my email to you, used airborne magnetics data and a depth-to-source technique to identify the contact between magnetic basement rock and overlying non-magnetic sediments. This research and the underlying code and Jupyter Notebooks were published open-access in *Geophysical Research Letters* (`https://doi.org/10.1029/2021GL097371`). The second section of my thesis involved developing a non-linear geometric gravity inversion, written in Python. I used this inversion with airborne gravity data and seismic constraints to recover a model of bathymetry, as well as spatially variable uncertainty, beneath the Ross Ice Shelf. If you would like any more details on this inversion or the implementation of it for the Ross Ice Shelf, I am happy to share my submitted thesis with you.

In general, my main research interest lies in the use of large-scale geophysical exploration to better understand the natural world. While many geophysical techniques involve an element of non-uniqueness, I believe when combined with appropriate geologic knowledge and constraints, and by systematically addressing uncertainties, these techniques can provide valuable insights into the underlying geology. I am interested in a variety of applications of geophysical exploration, including geothermal potential, mineral resources, and cryosphere

investigation.

While I haven't worked extensively with EM data, I would be very excited to incorporate a new tool into my repertoire. I believe my knowledge of inversion theory, my experience coding in Python, both independently and in a collaborative setting (my contributions to Fatiando packages), and my commitment to conducting open-source research makes me well-suited for this postdoc. Additionally, I think my past experiences and collaborations could bring interesting opportunities for using EM data to study the sub-ice environment of Antarctica.

Thank you for taking the time to review my application. I look forward to hopefully meeting with you to further discuss my qualifications for this postdoc. If you have any questions, please feel free to email me at matt.d.tankersley@gmail.com.

For letters of reference, please feel free to use the below contacts:

- Dr. Huw Horgan, Ph.D. Primary Supervisor: huw.horgan@slf.ch
- Dr. Fabio Caratori-Tontini, Ph.D. Secondary Supervisor: fabio.caratori.tontini@unige.it
- Dr. Christine Siddoway, Collaborator: csiddoway@coloradocollege.edu

Sincerely,

Matt Tankersley