



Prof Sally A Gibson

FGS, F. MinSoc, AGU, EAG

PROFESSIONAL SUMMARY

My research is focused on the inner workings of our planet and how processes operating in its deep interior influence those at its surface. This work encompasses a wide range of topics, including mantle and volcanic rocks that span an age from 3.5 billion years to less than one year. The advancement of knowledge made by my research group has been accomplished by combining detailed field observations in remote parts of Africa, South and North America, Russia plus volcanic islands in the Atlantic and Pacific Oceans with analytical studies of volcanic rocks, geophysical and numerical investigations. This rigorous approach has allowed my research group and collaborators to address provocative and timely scientific questions related to global geodynamic processes. Recently, we have conducted an extensive campaign focused on the cycling of volatiles, and we are now expanding our efforts to investigate the origins of critical metals through our new REE-LITH project.

PROFESSIONAL EXPERIENCE

2018 – Professor of Petrology & Geochemistry, Dept of Earth Sciences, University of Cambridge, UK

2012 – 2018. Reader in Petrology & Geochemistry, Dept of Earth Sciences, University of Cambridge, UK

2001 – 2012. University Senior Lecturer, Dept of Earth Sciences, University of Cambridge University

1995 – 2001. Lecturer, Dept of Earth Sciences, University of Cambridge, UK

1992 – 1995. NERC Senior Research Assistant, Dept of Geological Sciences, University of Durham, UK. 'Cretaceous plume-lithosphere interaction & alkalic magmatism in Brazil and Paraguay'

1989 – 1991. NERC Senior Research Assistant, Dept of Geological Sciences, University of Durham, UK. 'Continental basaltic and basalt-related magmatism' (Oligocene-Quaternary magmatism of the Rio Grande rift and surrounding region, USA)

PROFESSIONAL SOCIETIES

2014 – Present: Member of the European Association of Geochemistry

1996 – Present: Member of the Mineralogical Society of UK & Ireland

1990 – Present: Member of the American Geophysical Union

1985 – Present: Fellow of the Geological Society of London

OTHER APPOINTMENTS & AFFILIATIONS: UNIVERSITY OF CAMBRIDGE

2019-2022: Faculty of Physics, Chemistry & Astronomy Promotions Panel

2019 -: Faculty of Earth Sciences & Geography Promotions Panel

2015 – 2016; 2018-2019: Acting Director, Sedgwick Museum of Earth Sciences

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EDUCATION

PhD

University of London (Kingston)
1985-1988

BSc (Spec Hons)

University of Sheffield
1982-1985

LEADERSHIP

President, Mineralogical Society of UK & Ireland (2023-2025)

Chair, Volcanic & Magmatic Studies Group (2018-2022)

Acting Director, Sedgwick Museum, University of Cambridge (2015 & 2018)

LA-ICP-MS Lab Manager, University of Cambridge (2002-)

PRIZES & AWARDS

2017: Harold Wilson Memorial Lecture, Ulster Museum, Belfast

2014: Hallimond Lecture Prize for outstanding contribution to mineralogy & petrology, Mineralogical Society of UK & Ireland

2008: Sedgwick Prize for field research, University of Cambridge

2002: Pilkington Prize for teaching, University of Cambridge

CURRENT AWARDS

NERC: REE-LITH project (£1 million)

NSF_NERC: Galapagos (\$1.5 million)

ARC: Williams Ridge (Kerguelen)

SUPERVISION & EXAMINATION

Principal supervisor of 17 PhD students (all completed in <4 years).

Principal supervisor of 16 MSci students (>50% awarded 1st).

External examiner of 21 PhD theses (England, Wales, Scotland, N. Ireland, Eire, Netherlands, Brazil and Finland)

Senior Examiner of undergraduate exam committees at the University of Cambridge

EDITORIAL BOARDS

2018 – present: Editorial Review Board, *J. Petrology* (Invited)

2015 – 2018: Editorial Review Board, *Geology* (Invited)

1999 – 2008: Editor, *Journal of the Geological Society of London*

PANEL MEMBERSHIP

2018-2021: Icelandic Centre for Research Funds (RANNIS) panel for Maths & Physical Sciences

2012– Present: Scientific Advisory Board, Cambridge Arctic Shelf Project (Invited)

2012– 2014: Scientific & External Relations Committee, Geological Society of London (Invited)

OTHER APPOINTMENTS & AFFILIATIONS: UNIVERSITY OF CAMBRIDGE

2016. Senior Part II Examiner, Department of Earth Sciences

2012 – 2017: Careers Officer, Department of Earth Sciences

2010 – 2013: Faculty Board & Degree Committee, Department of Earth Sciences & Geography

2010 – Present: Manager of Earth Sciences geochemistry and sample preparation laboratories,

2010 – Present: Honorary Curator of Petrology, Sedgwick Museum (Invited)

2001 – 2015: Course Co-ordinator, 1B Geological Sciences B

2001 – Present: Manager of Laser-Ablation Inductively-Coupled-Plasma Mass-Spectrometry laboratory, Department of Earth Sciences

1997 – Present: Member of numerous Appointment Committees and Advisory Groups

SYNERGISTIC ACTIVITIES EXTERNAL TO UNIVERSITY OF CAMBRIDGE (SINCE 2007)

2023-2025: President, Mineralogical Society (Invited)

2019-2025: Awards Nominations Panel, Geological Society of London

2018-2019: Vice President, Mineralogical Society (Invited)

2018 – 2021: Chair, Volcanic & Magmatic Studies Group, *Geological Society of London* (Invited)

2018 – 2022: External Examiner, *University of Bristol*

2024 & 2025: 2017: Session Convenor, EGU (Vienna)

2017: Session Convenor, AGU (New Orleans)

2017: Session Convenor, Goldschmidt (Paris)

2017 & 2008: Co-Scientist, Universities of Cambridge & Quito joint expedition to Galápagos

2015: Session convenor, EGU (Vienna, invited)

2014: Conference organiser, Deep Earth Processes, *Geological Society of London* (Invited)

2013 – 2015: External examiner, *Open University*

2013: Session convenor, IAVCEI (Japan, invited)

2011: Conference Organiser, Volcanic and Magmatic Studies Group, *Geological Society of London*

2010 – 2013: Geoconservation Committee, *Geological Society of London* (Invited)

2010 – Present: UK Universities Teaching Consortium for Earth Sciences (Invited)

2010 – 2013: Professional Committee, *Geological Society of London* (Invited)

2010-2013: Member of Council, *Geological Society of London* (Elected)

2009 – Present: Trustee, CASP (formerly known as Cambridge Arctic Shelf Project)

2007 - 2010: Charles Darwin Bicentenary exhibit, Sedgwick Museum of Earth Sciences

2007 & 2008: Principal Scientist, Universities of Cambridge & Idaho joint expedition to Galápagos

REGULAR CONTRIBUTIONS

I regularly give oral presentations at national/international conferences (e.g. *AGU*, *EGU*, *Goldschmidt*), review large grant proposals for NSF, CNPq, grant council for Eire, and review for high-ranking international scientific journals (e.g. *Nature*, *Geology*, *Earth Planetary Science Letters*, *Journal of Petrology*, *Science*)

INTERESTS

Travelling
Photography
Hill walking
Yoga

COMMITMENT TO EQUALITY, DIVERSITY AND INCLUSION

In my various positions within the *Mineralogical Society of the UK & Ireland* and the *Geological Society of London*, I actively showcase leadership that fosters excellence among others. This includes serving on awards panels for major scientific societies and modernising award criteria to encompass all contributions made by individuals and teamwork. I have been a member of the Council for both the *Mineralogical Society of the UK & Ireland* and the *Geological Society of London*, where I have led significant surveys of society members and authored related reports aimed at promoting equality, diversity, and inclusion. Additionally, I have played a key role in establishing new awards to honour the achievements of early-career researchers, such as the VMSG Zeiss Award and the VMSG Emeleus Grant, and in implementing mentoring programs. Furthermore, I have collaborated with international learned and professional societies to develop Code of Conduct policies.

OUTREACH & PUBLIC ENGAGEMENT

While serving as Acting Director of the Sedgwick Museum I worked with colleagues to host outreach and educational events in the Museum (e.g. Science Festival). I also served on the University of Cambridge Museums syndicate. I continue to participate in activities of the Sedgwick Museum via my role as Honorary Curator of Petrology and by serving on the Sedgwick Museum Strategy Board.

My research on Charles Darwin as a geologist—particularly his observations during the HMS Beagle voyage and in the Galapagos—has provided me with a distinctive opportunity to connect with a wide range of public audiences. This engagement has encompassed both historical and contemporary perspectives on the contributions and discoveries of scientists. Activities have included presentations and related events, such as Pint of Science, an Oxbridge Alumni trip to the Galapagos, and Sutton Trust Summer Schools.

MEDIA

March 2025. Mapping Earth's minerals with seismic waves. Podcast

<https://www.thenakedscientists.com/articles/interviews/mapping-earths-minerals-seismic-waves>

March 5th 2025. Why rare earths matter to Donald Trump and the west Financial Times.

<https://www.ft.com/content/65ee2baf-58ab-42e7-997b-7114c8920a91>

March 2025. <https://www.cam.ac.uk/research/news/new-global-map-promises-to-better-pinpoint-vital-rare-earth-deposits>

October 2024. Skills & techniques. Convenor of presentation by Matt Streets (Rawwater). Transition from academia to industry.

<https://www.youtube.com/watch?v=3eCWBUCs3w&t=2759s>

July 2020. Addressing inequalities in the VMSSG community. A series of virtual discussion meetings – <https://www.youtube.com/watch?v=tjulJcVndqY>

January 2021. Addressing inequalities in the VMSSG community. Monitoring and measuring EDI

<https://www.youtube.com/watch?v=vyYk58jraRw>

July 2016. <https://www.cam.ac.uk/research/features/fingerprinting-rare-earth-elements-from-the-air>

PEER REVIEWED PUBLICATIONS

[95] **Gibson, S.A.**, Jackson, C.G. & Crosby, J.C., (subjudice). The role of C-O-H-F-Cl fluids in the making of Earth's continental roots. *Nature Communications*

[94] **Gibson, S.A.**, Jackson, C.G., Tollan, P & Hermann, J. (submitted). Incorporation of volatiles (H & F) in olivine and pyroxene in continental keels.

[93] Geist, D.J. & **Gibson, S.A.** (submitted). Charles Darwin, Volcanologist.

[92] Davison, F., Lebedev, S., Xu, Y., **Gibson, S.A.**, Civiero, C., Fulla, J., (sub-judice). Reconciling seismic and thermos-chemical models of cratonic lithosphere.

[91] S.H., Shu, Q., Pearson, D.G., **Gibson, S.A.** (sub judice). East meets West: The trace of the Mesoproterozoic Kibaran event in the mantle lithosphere beneath eastern Tanzania.

[90] Heckel, C., Woodland, A. & **Gibson, S.A.** (2025). Cretaceous thinning of the Kaapvaal craton and diamond resorption: key insights from a highly-deformed and metasomatized ilmenite-dunite xenolith. *Lithos* <https://doi.org/10.1016/j.lithos.2024.107901>

[89] Chagas de Melo, B., Lebedev, S., Celli, N.L., **Gibson, S.A.**, de Laat, J.I. & Assumpção., M. (2024). The lithosphere of South America from seismic tomography: Structure, evolution, and control on tectonics and magmatism. <https://www.sciencedirect.com/science/article/pii/S1342937X24003071#f0095>

- [88] **Gibson, S.A.**, Crosby, J.C., Day, J.F., Stuart, F., DiNicola, L., Riley, T.R.R. (2024). Systematic behaviour of $^3\text{He}/^4\text{He}$ in Earth's continental mantle. *Geochimica, Cosmochimica Acta*. <https://doi.org/10.1016/j.gca.2024.09.009>
- [87] Hoffmann, H., Day, J.A., Rhodes, R., Grieman, M., Humby, J., Rowell, I., Nehrbass-Ahles, C., Mulvaney, R., **Gibson, S.A.** & Wolff, E. (2024). Laser Ablation - ICP-MS measurements for high-resolution chemical ice core analyses with a first application to an ice core from Skytrain Ice Rise (Antarctica). *The Cryosphere*. egusphere-2023-3071
- [86] **Gibson, S.A.**, McKenzie, D.P. & Lebedev, S., (2024). The distribution and generation of carbonatites. *Geology* <https://doi.org/10.1130/G52141.1>.
- [85] Heckel, C., Woodland, A., J. Linkens, **Gibson, S.A.** & H-M. Seitz (2023). Sheared peridotites from Northern Lesotho: Metasomatism-Induced deformation and craton destabilization. *Journal of Petrology*, 64, 1–29 <https://doi.org/10.1093/petrology/egad076>.
- [84] Jackson, C.J. & **Gibson, S.A.** (2023). Build-up of multiple volatiles in Earth's mantle: Implications for craton stability. *Earth & Planetary Science Letters* doi.org/10.1016/j.epsl.2023.118134.
- [83] **Gibson, S.A.** & McKenzie, D.P. (2023). On the role of Earth's lithospheric mantle in global volatile cycles. *Earth & Planetary Science Letters* doi.org/10.1016/j.epsl.2022.117946.
- [82] Hole, M.J., **Gibson, S.A.** & Morris, M.C. (2022). Slab window related magmatism as a probe for pyroxenite heterogeneities in the upper mantle. *Geology* 51, 268-272. <https://doi.org/10.1130/G50687.1>.
- [81] Heckel, C., Woodland, A., J. Linkens, **Gibson, S.A.** & H-M. Seitz (2022). Sheared peridotites from Kimberley (Kaapvaal craton, SA): record of multiple metasomatic events accompanied with deformation. *Journal of Petrology* <https://doi.org/10.1093/petrology/egac096>. Editors Choice.
- [80] Lloyd, J., Gibson, S.A., Bagard, M.L., Deady, E., Horák, J., Pendrowski, H., Cooper, F., Kelly, L.C., Lord, O., Scarlett, J. & Murphy, K., 2022. The Mineralogical Society of the UK & Ireland Equality, Diversity & Inclusivity Report. <https://doi.org/10.31223/x5008f>. The Mineralogical Society of the UK & Ireland Equality, Diversity & Inclusivity Report. <https://doi.org/10.31223/x5008f>.
- [79] Halldórson, S.A., Hilton, D.R., Marshall, E.W., Ranta, E., Ingavason, A., Chakraborty, S., Gunnarsson Robin, J., Rasmussen, M.B., **Gibson, S.A.**, Ono, S., Scarsi, P., Abebe, T., Hopp, J., Barry, P.H. & Castillo, P.R. (2022). Evidence from gas-rich ultramafic xenoliths for Superplume-derived recycled volatiles in the East African sub-continental mantle. *Chemical Geology* doi.org/10.1016/j.chemgeo.2021.120682.
- [78] Gleeson, M.L.M. & **Gibson, S.A.**, Stock, M.J. & EIMF (2021). Constraints on the behaviour and content of volatiles in Galápagos magmas from melt inclusions and nominally anhydrous minerals. *Geochimica, Cosmochimica Acta*. <https://doi.org/10.1016/j.gca.2021.11.005>
- [77] Gleeson M.L.M., Soderman, C., Matthews, S., Cottaar, S. & **Gibson, S.A.** (2021). Geochemical constraints on the structure of the Earth's deep mantle and the origin of the LLSVPs. *Geochemistry, Geophysics, Geosystems*. doi/10.1029/2021GC009932.
- [76] Gleeson, M.L.M. & **Gibson, S.A.** (2021). Insights into the nature of plume-ridge interaction and outflux of H₂O from the Galápagos Spreading Center. *Geochemistry, Geophysics, Geosystems*, doi.org/10.1029/2020GC009560.

- [75] Hernandez Nava, A., Black, B.A., **Gibson, S.A.**, Bodnar, R.J., Renne, P.R. & Vanderkluyzen, L. (2021). Reconciling early Deccan Traps CO₂ outgassing and pre-KPB global climate. *PNAS* 118, doi.org/10.1073/pnas.2007797118.
- [74] Leat, P.T., Ross, A., **Gibson, S.A.**, Ultramafic mantle xenoliths in the Late Cenozoic Volcanic rocks of the Antarctic Peninsula and Jones Mountains, West Antarctica. In: *The Antarctic Mantle*. Geological Society of London Memoir 56, <https://doi.org/10.1144/M56-2019-44>.
- [73] Moreau, L., Draily, C., Cordy, J., Boyle, K., Buckley, M., Gjesfjeld, E., Filzmoser, P., Borgia, V., **Gibson, S.A.**, Day, J., Beyer, R., Manica, A., Linden, M.V., de Grooth, M. & Pirson, S. (2021). Adaptive trade-offs towards the Last Glacial Maximum in North-Western Europe: a multidisciplinary view from Walou Cave. *Journal of Paleolithic Archaeology*, 4, <https://doi.org/10.1007/s41982-021-00078-5>.
- [72] **Gibson, S.A.** & Kavanagh, J. (2020). *Volcanic and Magmatic Studies Group Members Survey 2020*. <https://doi.org/10.31223/osf.io/c8twm>.
- [71] **Gibson, S.A.**, Engwell, S.E., Kavanagh, J. (2020). The Volcanic & Magmatic Studies Group Equality, Diversity and Inclusion Report 2020. <https://eartharxiv.org/rgxh7/>.
- [70] Gleeson, M.L.M., **Gibson, S.A.** & Stock, M.J. (2020). Upper mantle mush zones beneath low melt flux ocean island volcanoes: insights from Isla Floreana, Galápagos. *Journal of Petrology* 60, egaa094.
- [69] Ayalew, D., Pik, R., **Gibson, S.A.**, Yirgu, G. & Assefa, D. (2020). Pedogenic origin of Mezezo opal hosted in Ethiopian Miocene rhyolites. *Canadian Mineralogist* 58, 231-246 <https://doi.org/10.3749/canmin.1900059>.
- [68] **Gibson, S.A.**, Rooks, E.E., Day, J.A., Petrone, C.M., Leat, P.T. (2020). The role of sub-continental mantle as both “sink” and “source” in deep Earth volatile cycles. *Geochimica Cosmochimica Acta* 275. <https://doi.org/10.1016/j.gca.2020.02.018>.
- [67] Gleeson, M.L.M., **Gibson, S.A.** & Williams, H.M. (2020). Novel insights from Fe-isotopes into the lithological heterogeneity of ocean island basalts and plume-influenced MORBs. *Earth Planet Sci. Lett.* 535. <https://doi.org/10.1016/j.epsl.2020.116114>.
- [66] Jennings, E., **Gibson, S.A.** & MacLennan, J. (2019). Hot primary melts and mantle source for the Paraná-Etendeka flood basalt province: New constraints from Al-in-olivine thermometry. *Chemical Geology* 529. <https://doi.org/10.1016/j.chemgeo.2019.119287>.
- [65] Rasmussen, M.B., Halldórsson, S.A., **Gibson, S.A.** & Gudfinnsson, G.H. (2019). Olivine chemistry reveals compositional source heterogeneities within a tilted mantle plume beneath Iceland. *Earth Planet Sci. Lett.* 531. <https://doi.org/10.1016/j.epsl.2019.116008>.
- [64] Bernard, B., Stock, M.J., Coppola, D., Hidalgo, S., Bagnardi, M., **Gibson, S.A.**, Hernandez, S., Ramon, P. & Gleeson, M. (2019). Chronology and phenomenology of the 1982 and 2015 Wolf volcano eruptions, Galápagos Archipelago. *Journal of Volcanology & Geothermal Research* 374. <https://doi.org/10.1016/j.jvolgeores.2019.02.013>.
- [63] Shu, Q., Brey, G.P., Pearson, D.G., Liu, J., **Gibson, S.A.** Becker, H. (2019). Melting and metasomatism in Finsch peridotites (Kaapvaal craton): mutual constraints from petrology, major and trace elements (including HSEs) and multiple isotope systematics. *Precambrian Research* 331. <https://doi.org/10.1016/j.precamres.2019.105380>.

- [62] Black, B. & **Gibson, S.A.**, 2019. Deep carbon and the life cycle of Large Igneous Provinces. *Elements* 15 (5), 319-324. <https://doi.org/10.2138/gselements.15.5.319>
- [61] Gleeson, M. & **Gibson, S.A.**, 2019. Crustal controls on apparent mantle pyroxenite signals in ocean-island basalts. *Geology* 47 (4), 321-324.
- [60] Moreau, L., Ciornei, A., Gjesfeld, E., Filzmoser, P., **Gibson, S.A.**, et al., 2019. First geochemical fingerprinting of Balkan and Prut flint from Palaeolithic Romania: Potentials, limitations, and future directions. *Archaeometry* <https://doi.org/10.1111/arcm.12433>.
- [59] Jackson, C.G. & **Gibson, S.A.**, 2018. Preservation of systematic Ni and Cr heterogeneity in otherwise homogeneous mantle olivine: implications for timescales of post-metasomatism re-equilibration. *Lithos* 318-319. <https://doi.org/10.1016/j.lithos.2018.08.026>
- [58] **Gibson, S.A.** & Richards, M.A., 2018. Delivery of deep-sourced, volatile-rich plume material to the global ridge system. *Earth & Planetary Science Letters* 499, 205-218.
- [57] Dockman, D., Pearson, D.G., Heaman, L., **Gibson, S.A.** & Sarkar, C., 2018. Timing and origin of magmatism in the Sverdrup Basin, Northern Canada—implications for lithospheric evolution in the High Arctic Large Igneous Province (HALIP). *Tectonophysics* 742, 50-65.
- [56] **Gibson, S.A.**, 2017. 45th Hallimond Lecture: On the nature and origin of garnet in highly-refractory Archean lithospheric mantle: constraints from exsolved garnet in orthopyroxene from the Kaapvaal craton. *Mineralogical Magazine*. <https://doi.org/10.1180/minmag.2016.080.158>
- [55] Jennings, E., **Gibson, S.A.**, MacLennan, J. & Heinonen, J., 2016. Deep mixing of mantle melts beneath continental flood basalt provinces: Constraints from olivine-hosted melt inclusions in primitive magmas. *Geochim Cosmochim Acta*. <https://doi.org/10.1016/j.gca.2016.09.015>
- [54] Richards, M.A., Alvarez, W., Self, S., Karlstrom, L., Renne, P.R., Manga, M., Sprain, C.J., Smit, J., Vanderkluysen, L., **Gibson, S.A.**, 2016. Triggering of the largest Deccan eruptions by the Chicxulub impact. *Geol Soc America (response)*. <https://doi.org/10.1130/B31645.1>.
- [53] Weit, A., Trumbull, R.B., Keiding, J.K., Geissler, W.H., **Gibson, S.A.**, Veksler, I.V., 2016. The magmatic system beneath the Tristan da Cunha hotspot: insights from thermobarometry, melting models, and geophysics. *Tectonophysics* <https://doi.org/10.1016/j.tecto.2016.08.010>.
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- [51] **Gibson, S.A.**, Dale, C.W., Geist, D.G., Day, J.A., Brugmann, G., Harpp, K.S., 2016. The influence of melt flux and crustal processing on Re–Os isotope systematics of ocean island basalts: Constraints from Galápagos. *Earth Planet. Sci. Lett.* 449, 345-359.
- [50] Neave, D.A., Black, M., Riley, T.R., **Gibson, S.A.**, Ferrier, G., Wall, F., 2016. On the Feasibility of Imaging Carbonatite-Hosted Rare Earth Element Deposits Using Remote Sensing. *Economic Geology*, 641-665. <https://doi.org/10.2113/econgeo.111.3.641>
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- [46] **Gibson, S.A.**, Geist, D., Day, J.A. & Dale, C.W., 2012. Short wavelength heterogeneity in the Galápagos plume: evidence from compositionally diverse basalts on Isla Santiago. *Geochemistry, Geophysics, Geosystems*. <https://doi.org/10.1029/2012GC004244>.
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- [43] Herbert, S., **Gibson, S.A.**, Norman, D., Geist, D., Estes, G., Grant, T., Miles, A., 2009. Into the field again: re-examining Charles Darwin's 1835 geological work on Isla Santiago in the Galápagos archipelago. *Earth Sciences History*, 28 (1), 1-31.
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- [40] **Gibson, S.A.**, Thompson, R.N., Day, J.A., Humphris, S.E., Dickin, A.P., 2006. Timescales and mechanisms of plume-lithosphere interactions: ⁴⁰Ar/³⁹Ar geochronology and geochemistry of alkaline igneous rocks from the Paraná-Etendeka large igneous province. *Earth and Planetary Science Letters*, 1-17.
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