Title

*Updates to proxy data from Emerald Lake, Macquarie Island.*

Abstract

*The dataset comprises of updated proxy data from the Emerald Lake sediment record on Macquarie Island. Core scanning (ITRAX XRF) and multispectral data (SPECIM) originally published in Saunders et al. (2018) have been updated to the 2020 radiocarbon calibration curve.*

Funding source

*See Saunders et al. (2018) for original funding sources*

Keywords

*Radiocarbon dating; Macquarie Island, lake sediments*

Personnel

***Data collectors & analysts (ORCID code)***

*Stephen J. Roberts1 (0000-0001-5542-3703) – data collection and analysis*

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***Affiliations***

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Lineage/methodology

*A series of lake sediment cores dating back to c. 12.1 ka BP were extracted from Emerald Lake on the west coast of sub-Antarctic Macquarie Island. We applied three independent methods to reconstruct past changes in SHW intensity.*

*To reconstruct past sea salt aerosol inputs, we developed a method to track past changes in lake water conductivity (a function of sea salt aerosol input) using diatom-based inference models.*

*ITRAX XRF core scanning (XRFCS) analysis was used to track inputs of minerogenic aerosols into the lake, focusing on Ti as the most widely used indicator of allochthonous inputs*

*Cores were scanned using a Specim hyperspectral camera, which measures reflected optical properties between wavelengths from 400-1000 nm. The ratio of reflectance between 850 and 900 nm (R850/R900) was used as an additional indicator of minerogenic inputs*

*We have updated the age depth model in Saunders et al. (2018) and applied this update to these datasets. Recalibration and age depth models have been updated to 2020 calibration curves (Sh20) in the R package BACON v. 2.5 for Bayesian age-depth modelling (Blaauw and Christen, 2011).*

Instrumentation

*None – data reanalysis*

Quality

*Age data includes minimum and maximum 95% confidence interval ranges.*

Related datasets

*Chronostratigraphic data from the Fildes Peninsula, South Shetland Islands.*

*Compilation data from the Fildes Peninsula, South Shetland Islands.*

*Data from Kiteschsee Lake, Fildes Peninsula, South Shetland Islands, northern Antarctic Peninsula.*

*Chronological and sedimentological data from stratigraphic sections on Potter Peninsula, South Shetland Islands.*

*Chronological, geochemical and sedimentological data from a lake sediment record extracted from Lake L5 (Matias Lake) on Potter Peninsula, South Shetland Islands.*

*Chronological, geochemical and sedimentological data from a lake sediment record extracted from Lake L15 (GPS Lake) on Potter Peninsula, South Shetland Islands.*

Related URLs

Code is available on: <https://github.com/stever60/Macquarie_Island>

Temporal coverage

*Cores were extracted and data collected between November 2006 and 2013; data covers the last ~12,000 years*

Spatial coverage

*Macquarie Island*

Resolution

*N/A*

Location

*Fildes Peninsula, South Shetland Islands*

*Emerald Lake is located at 62° 13.243’ S, 58° 57.591’ W*

References

*Blaauw M and Christen JA. (2011) Flexible paleoclimate age-depth models using an autoregressive gamma process. Bayesian Analysis 6: 457-474.*

*Saunders, K.S., Roberts, S.J., Hodgson, D.A., et al., (2018). Holocene dynamics of the Southern Hemisphere westerly winds: possible links to CO2 outgassing. Nature Geoscience, 11 650-655.* [*https://doi.org/10.1038/s41561-018-0186-5*](https://doi.org/10.1038/s41561-018-0186-5)

Data structure and data format

*Age\_depth\_model folder – input and output txt and csv files for 2020 calibration age-depth modelling runs from the Emerald Lake record*

*Core\_data folder*

*Emerald\_Lake\_DCond.csv – inferred diatom conductivity data (updated to 2020 calibration/age model)*

*Emerald\_Lake\_ITRAX\_XRFCS.csv – XRF core scanning data (updated to 2020 calibration/age model)*

*Emerald\_Lake\_SPECIM.csv – multispectral core scanning data (updated to 2020 calibration/age model)*

Access constraints

*None after publication but a log in for reviewers to access an embargoed dataset is needed.*

Use constraints

*NERC-funded data, so the* [*Open Government Licence*](http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/) *applies.*