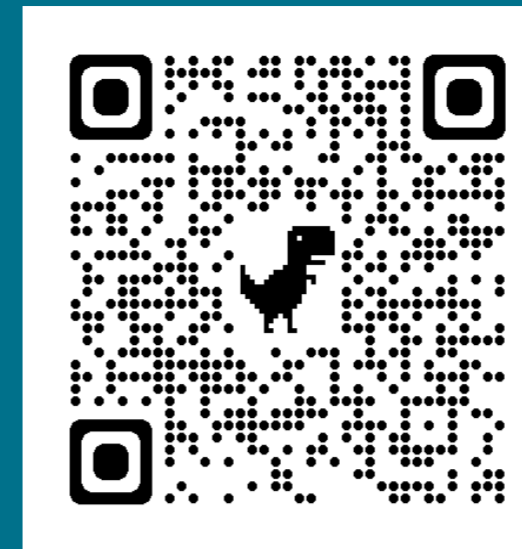


Isotopic Atlas of Australia

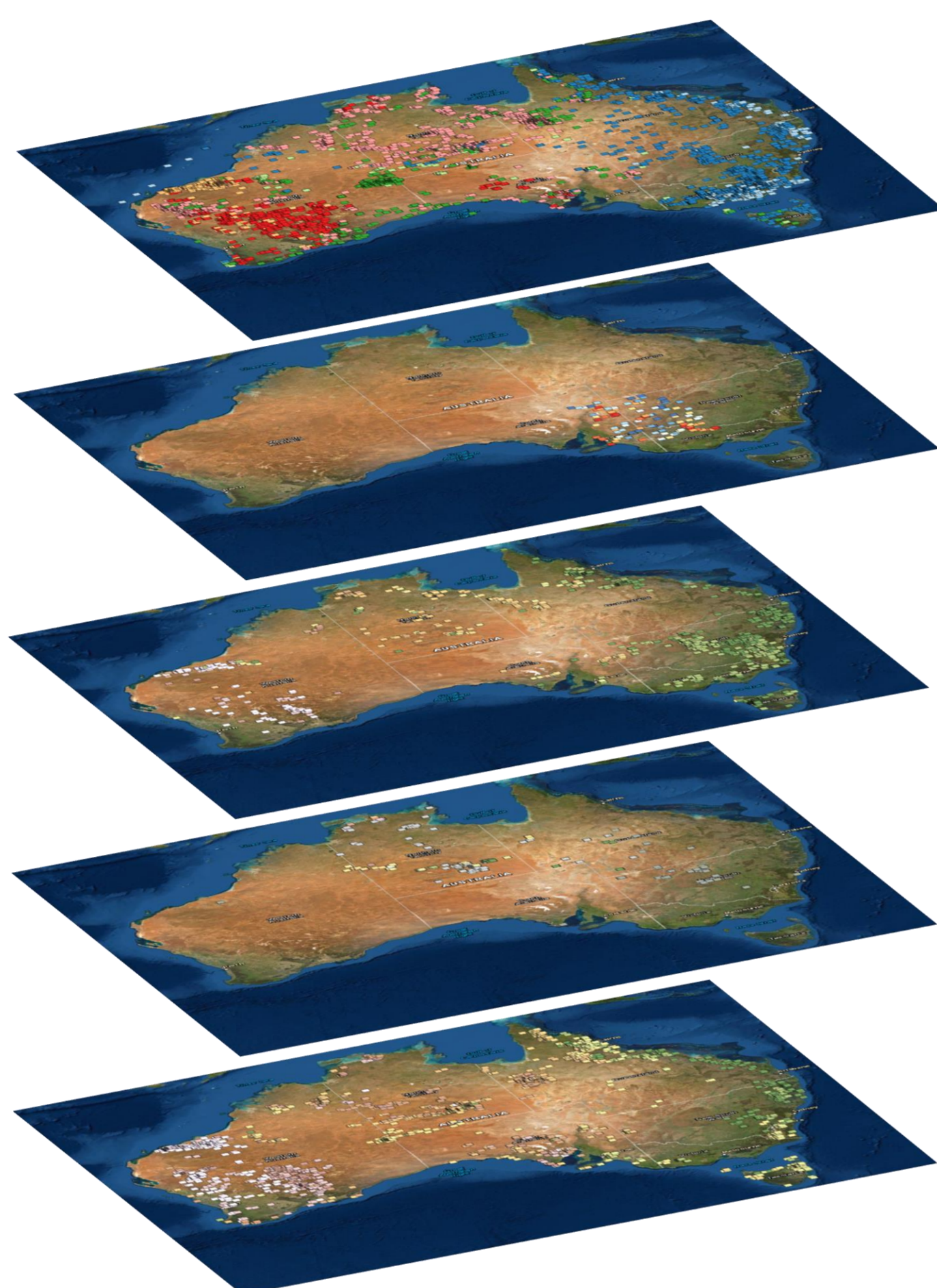
— An Update



Jones, S.L., Cumming, G.V., Waltenberg, K., Everard, J.L., Vicary, M.J., Duncan, R., Bodorkos, S., Champion, D.C., Huston, D.L., Meffre, S.J., Bottrill, R.S., Waugh, S., Fraser, G.L.

Background

Historically, isotopic data are collected at the individual sample level on local- to regional-scale features and are dispersed among decades of both published and unpublished individual academic literature, university theses and geological survey reports, in disparate formats and with widely varying levels of detail. Consequently, it has been difficult to visualise or interrogate the collective value of age and isotopic data at continental-scale. Geoscience Australia's (GA) continental-scale Isotopic Atlas of Australia (Fraser et al., 2020), breaks this cycle of single-use science by compiling and integrating **multiple radiometric age and isotopic tracer datasets** and making them publicly accessible and useable through GA's Exploring for the Future (EFTF) Portal (Figure 1).



Geochronology:
U–Pb, K–Ar, Ar–Ar, Rb–Sr, Re–Os, Sm–Nd,
Fission Track

Isotopes:
Rb–Sr

Pb–Pb

Lu–Hf

Sm–Nd

Figure 1. Geochronology and Isotopic layers currently available in GA's EFTF Portal (based on publications: Champion, 2013; Fraser et al., 2020; de Caritat et al., 2022; Huston et al., 2019; Jones et al., 2018; Waltenberg et al., 2021).

Geochronology coverage

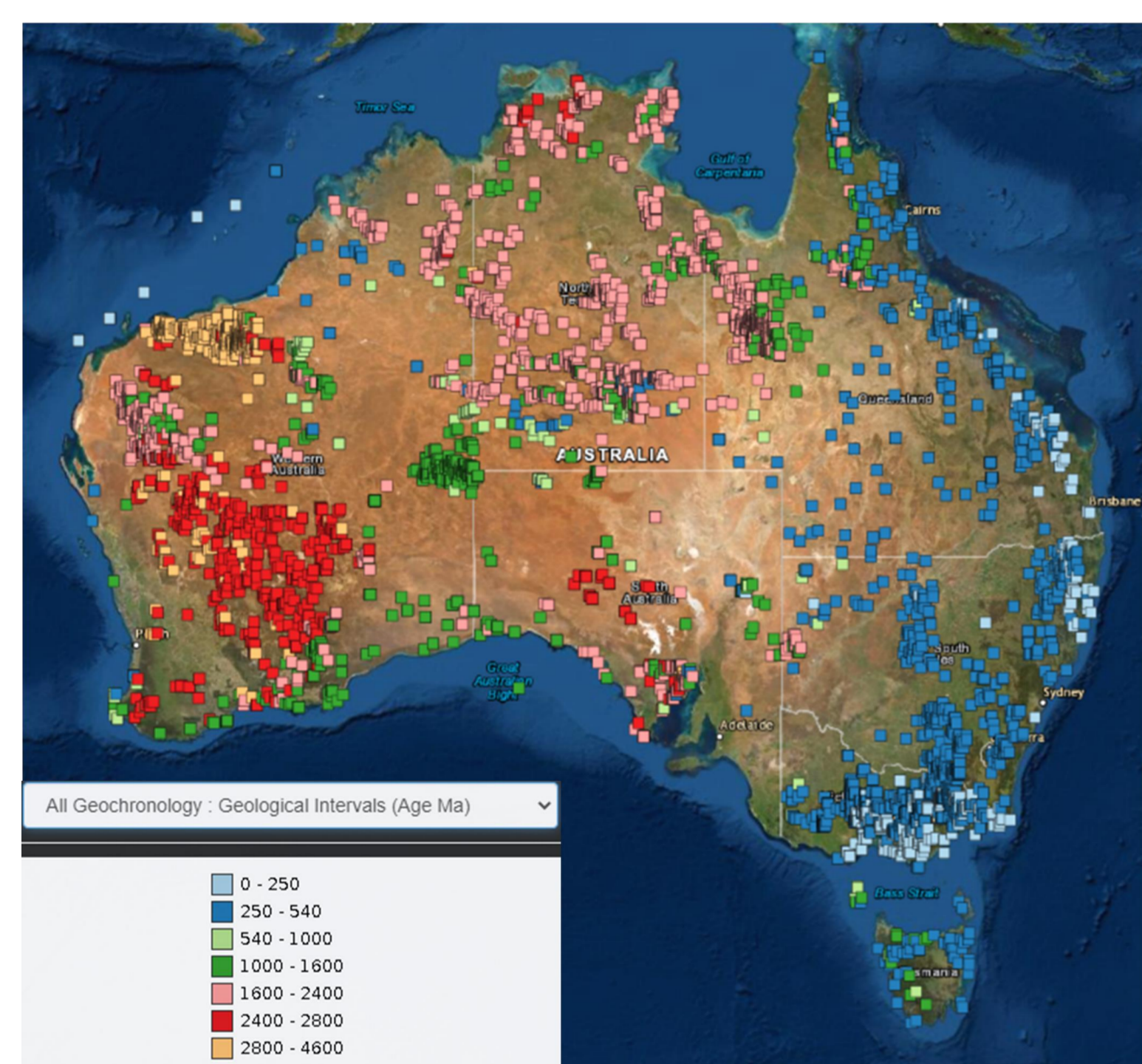


Figure 2. Interpreted geological ages available in GA's EFTF Portal.

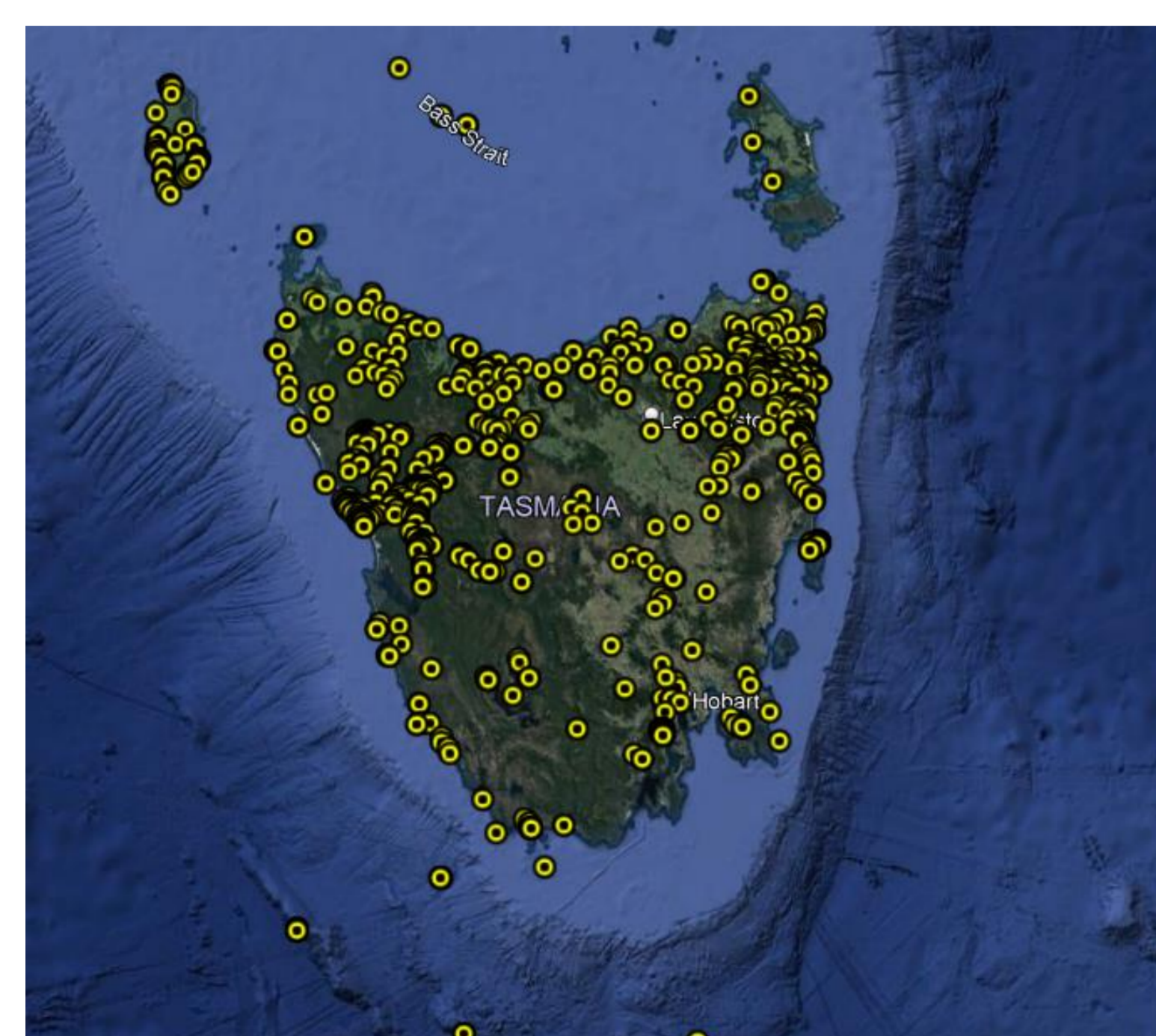


Figure 3a. Map showing data points in an updated geochronology compilation for Tasmania; to be added to the EFTF Portal (Jones et al., in press).

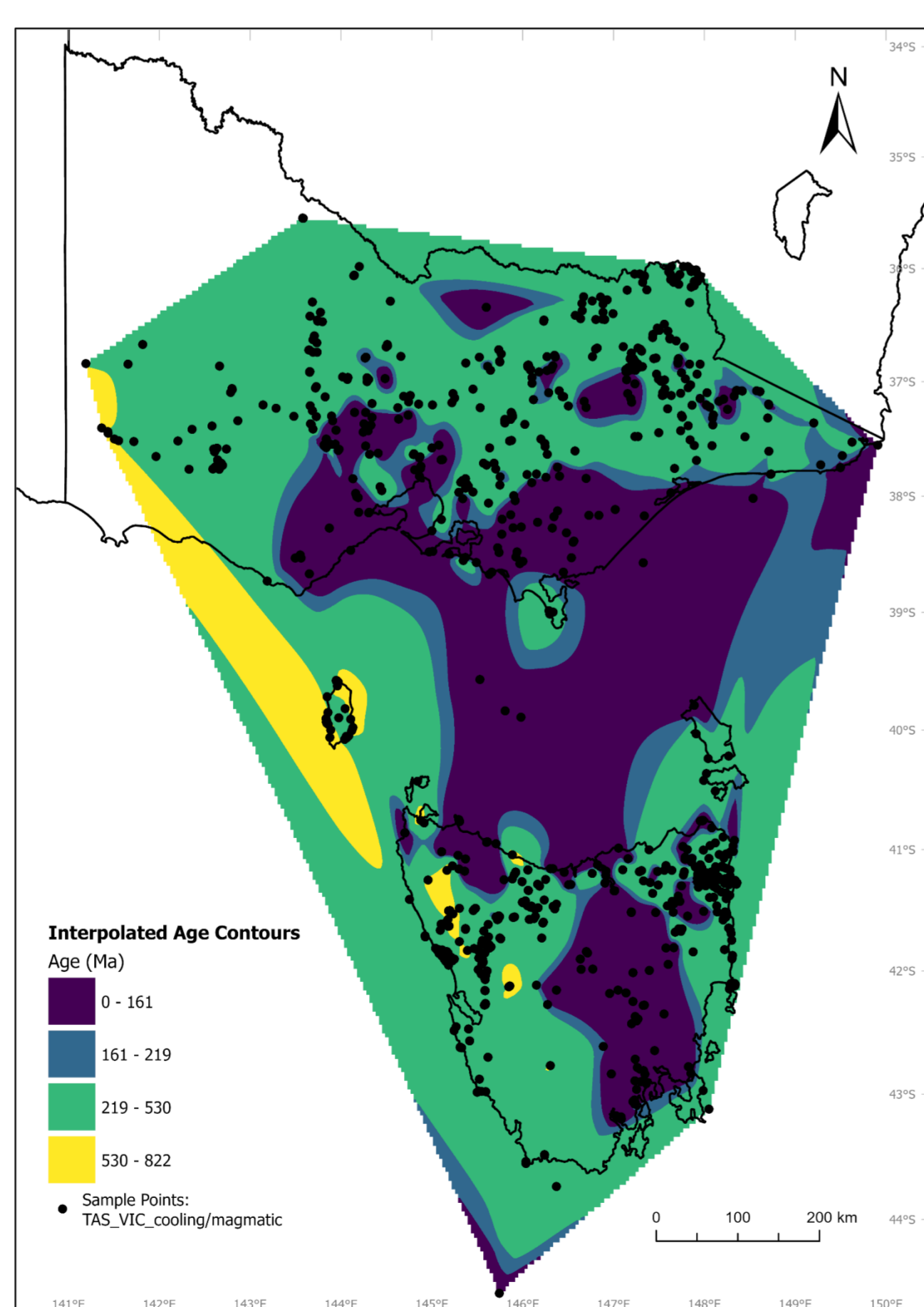


Figure 3b. Contoured age map interpolated from 1214 sample points using Ar/AR, fission track, K/Ar, Rb/Sr, Re/Os, Sm/Nd & U/Pb magmatic and cooling ages from the Victorian and Tasmanian compilations. Sample locations used in the interpolation of the contours indicated by black circles (Waltenberg et al., 2021; Jones et al., in press).

Isotopic geochemistry examples

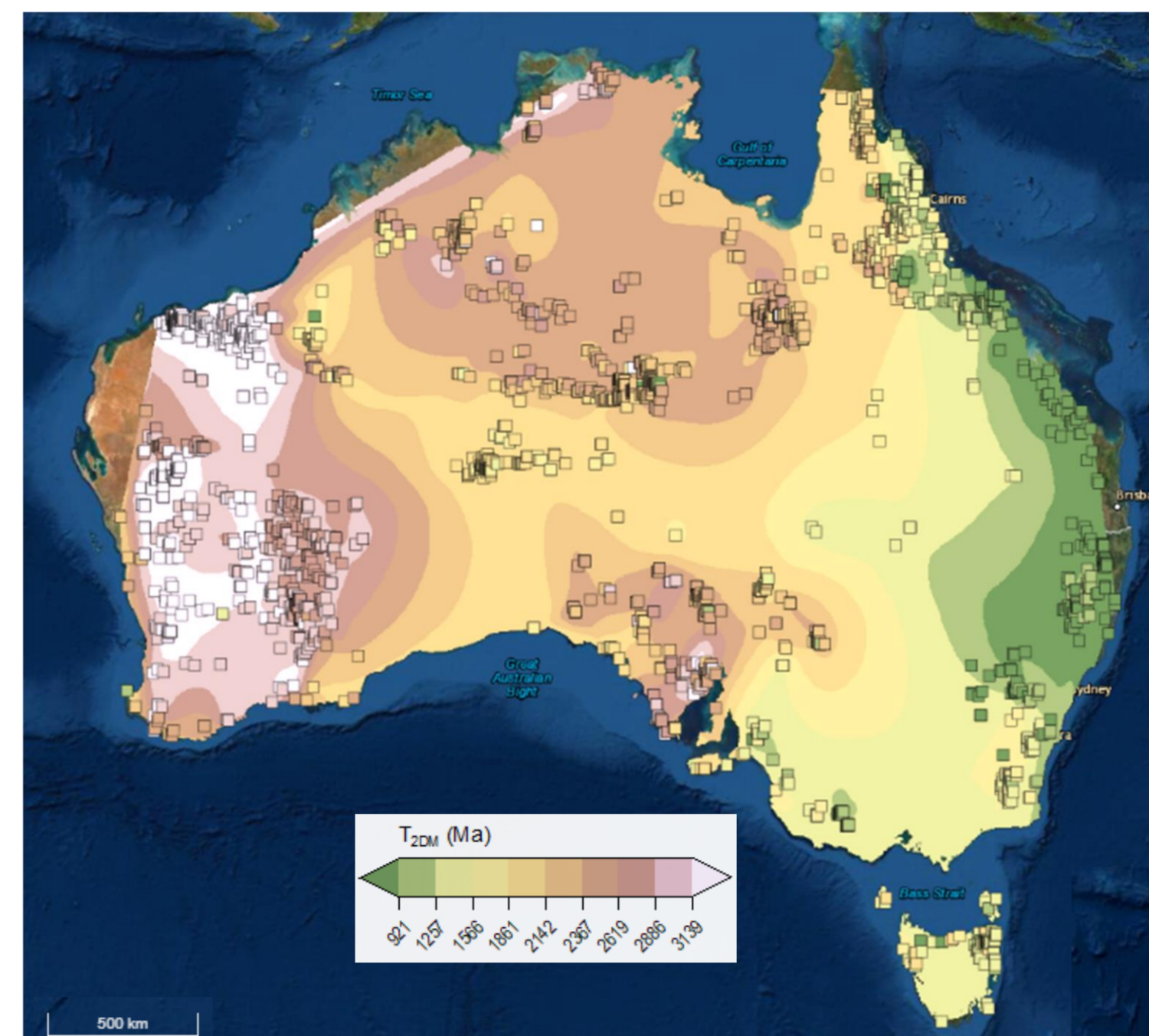


Figure 4. Map of Sm–Nd depleted mantle model ages from felsic magmatic rocks, and interpolated contours (Champion 2013)

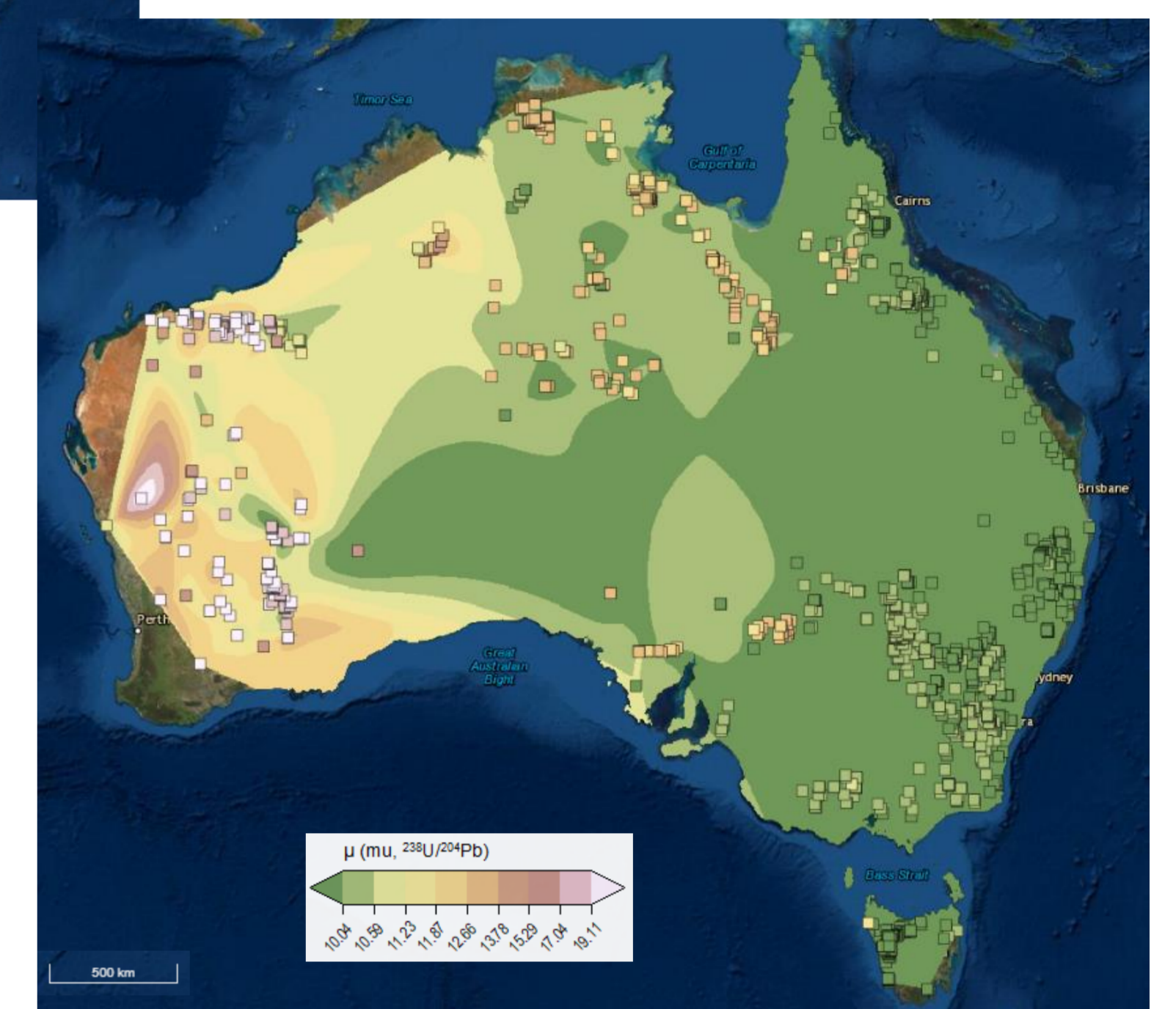


Figure 5. Map of μ ($^{238}\text{U}/^{204}\text{Pb}$) values from Pb isotopic analyses of galena & pyrite from mineral deposits and prospects, and interpolated contours (Huston et al., 2019).

Functionality examples in the EFTF Data Portal

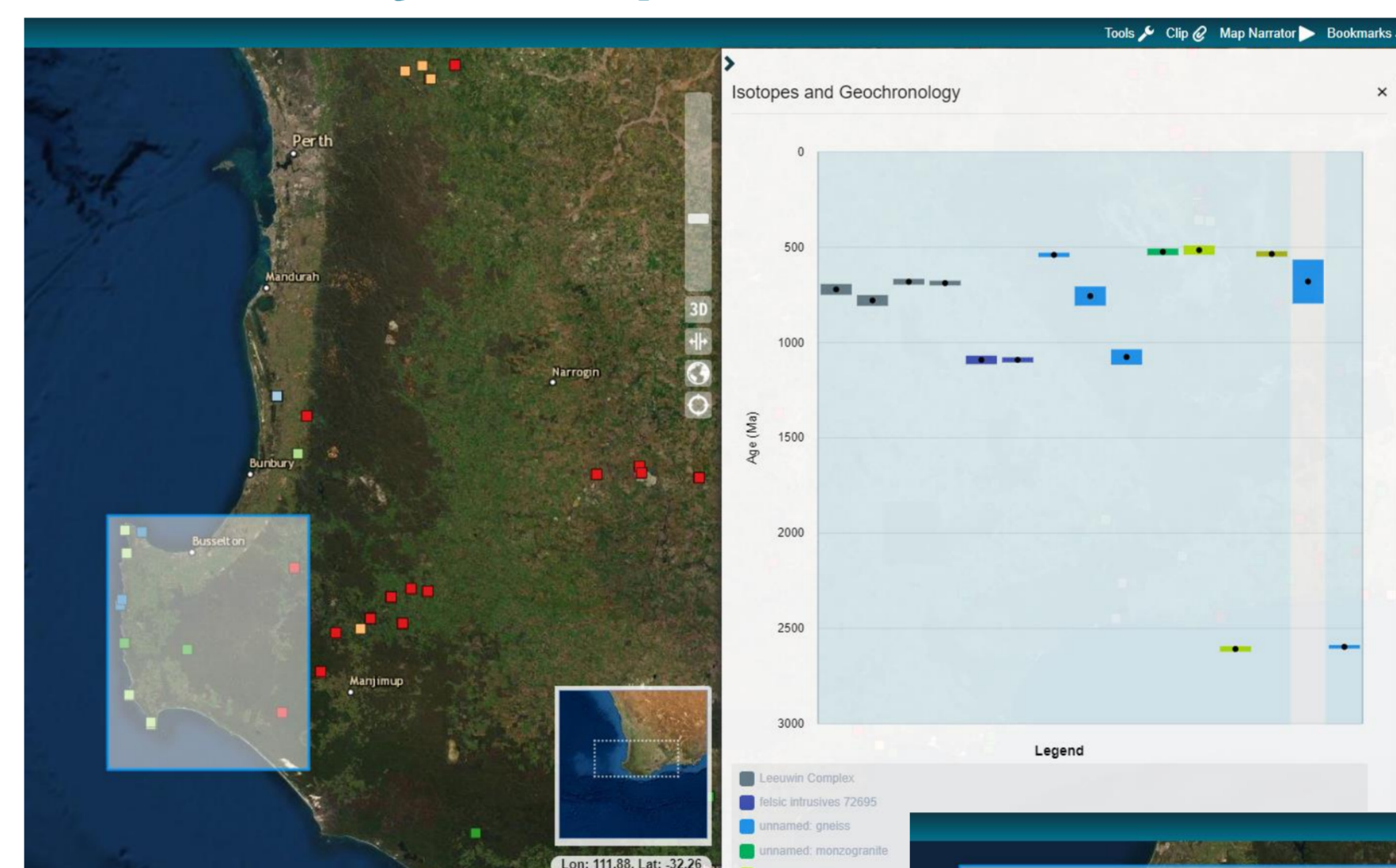


Figure 6. Area search returning plot of age v's geological interpretation, and related information.

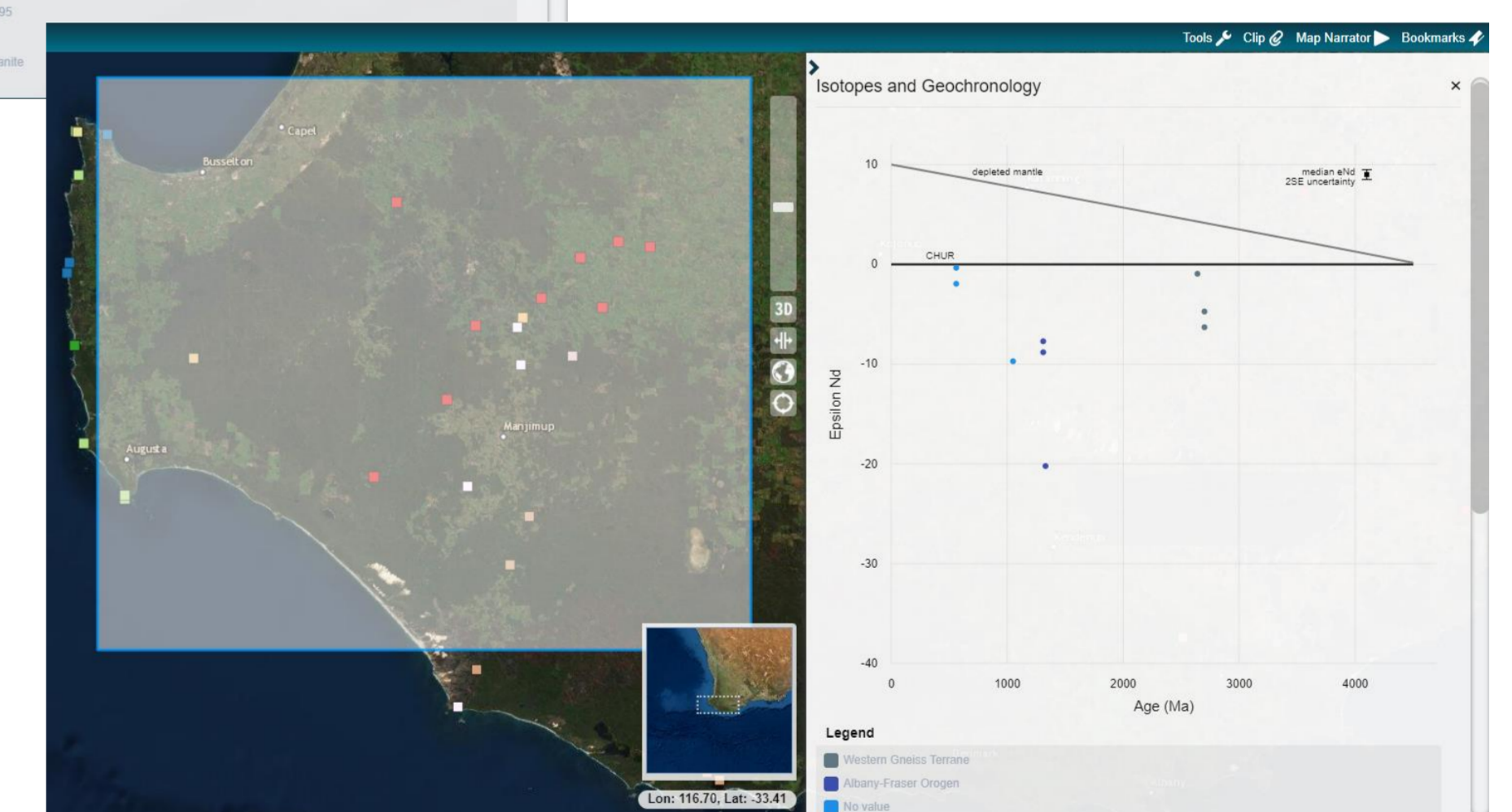


Figure 7. Area search returning age v's ϵNd plot and related information.

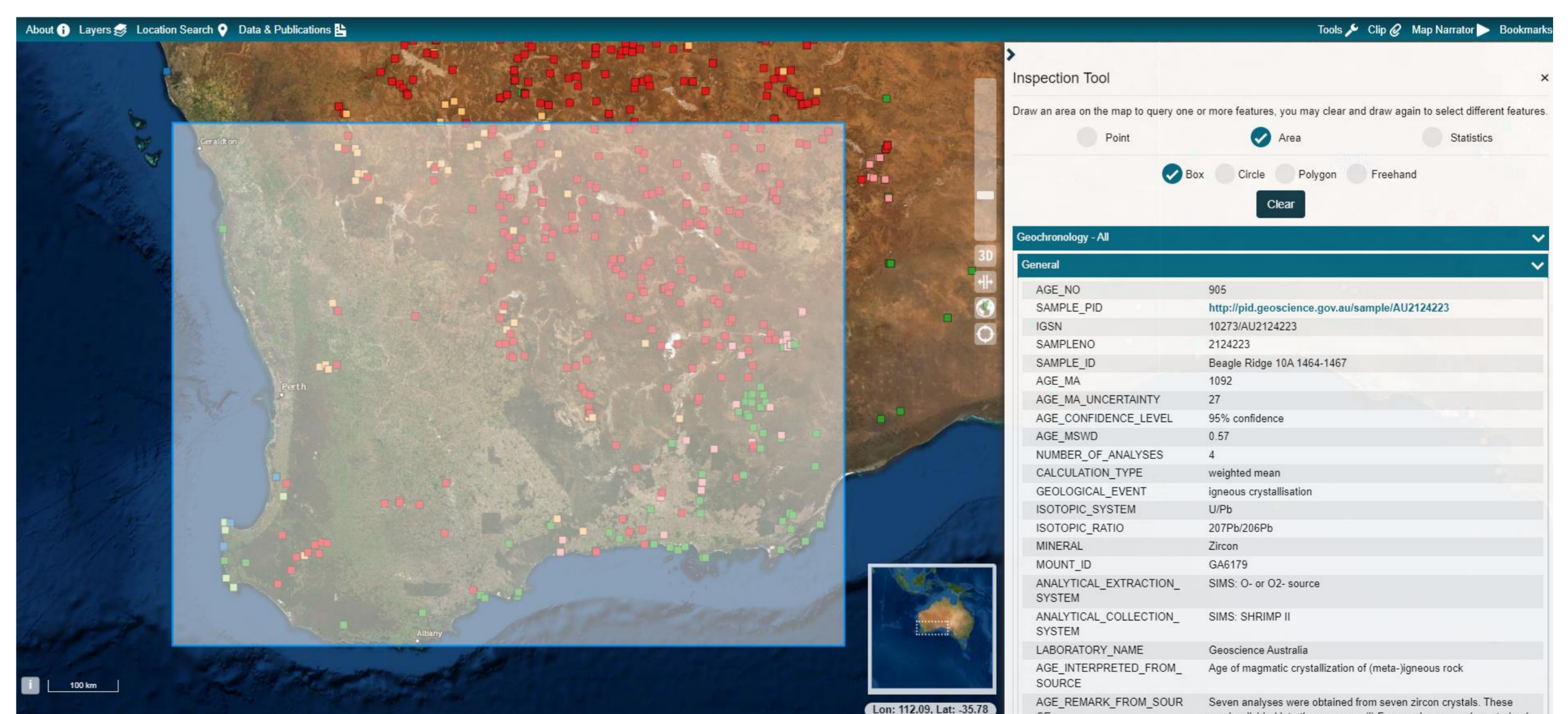
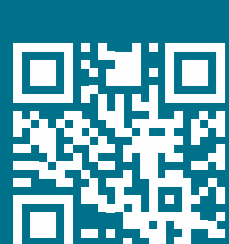


Figure 8. Area (or spot) search with returning information on the compiled data, including original publication.

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