

## Review of the paper entitled: A strontium isoscape in inland southeastern Australia

by Patrick de Caritat, Anthony Dosseto and Florain Dux

1. The article contains a very important data set. The use of the data will be of great value for a number of applications such as forensic science to determine the origin of wine for example, the sourcing of airborne dust in marine cores as well as in ice cores in Antarctica, determining the origin and possibly quantity of sediment loads from different catchments like attempted in the paper by Gingele, F.X. & De Deckker, P. (2005). Clay mineral, geochemical and Sr-Nd-isotopic fingerprinting of sediments in the Murray-Darling fluvial system, SE Australia. *Australian Journal of Earth Sciences* 52, 965-974. And finally, it has the potential to determine the extent of migration of early Australians by studying the Sr isotopic composition of human bones. Unveiled in archaeological sites.
2. This is a significant data set and very thorough. However, no mention is made of the paper by De Deckker (2020). Airborne dust traffic from Australia in modern and Late Quaternary times. *Global and Planetary Change* 184, Article 103056, 19 pp. The Sr isotopic data provided in that paper could be included in the data currently being assessed. Hence the data set is not complete as is.
3. The data set is definitely of high quality.
4. The figures are adequate provided they can be enlarged. I am wondering as to whether it may be possible to use a program like google map and click on one site [a cross in the case of the figures] and obtain directly from the data set, the location, description of the site and the raw Sr data? Is it asking too much?
5. By reading the article and downloading the data set, my answer is YES to the question: "would you be able to understand and (re-)use the data set in the future?"
6. **Rating: 1 for excellent**

### Additional comments:

Line 12: is the word 'coarse' really correct? This is the clay-size fraction (e.g. <2 $\mu$ m).

Line 29: after Madgwick et al., (2019) add: 'Dust sourcing in ice core' and add a reference or 2 such as Revel-Rolland, M., et al. (2006). Eastern Australia: A possible source of dust in East Antarctica interglacial ice. *Earth and Planetary Science* 249, 1-13. and De Deckker (2020). Airborne dust traffic from Australia in modern and Late Quaternary times. *Global and Planetary Change* 184, Article 103056, 19 pp. but there are many others.

Line 35. Perhaps add the reference of De Deckker, P. (2020) op. cit.

Line 56. Mention also that the fluctuating ENSO signals strongly affects rainfall variability over the years.

Line 62: Really, the Murray River starts much higher near Charlotte Pass with the Snowy River and its mouth is not near Victor Harbour by Goolwa instead! Also after 'Southern Ocean' add in brackets "(Southeast Indian Ocean sector)" to be more precise as the Southern Ocean commences below the Subtropical Convergence.

Line 70 give the range of altitudes from the Flinders Ranges. At present it is a bit misleading as 139 m asl is not representative

Line 77: add: 'plus aeolian dust input'

Line 79: replace 'lack' with 'absence'

Line 220: can you postulate on the origin of the sediments??

Line 235, Perhaps quote some of the values listed in De Deckker (2020) op cit.

Line 245: you should check the following article on Lake Frome east of the Flinders Ranges and quote some of the isotope data from it as it also gives values for groundwaters for the Great Artesian Basin. W. J. Ullman & K. D. Collerson (1994) The Sr-isotope record of Late Quaternary hydrologic changes around Lake Frome, South Australia, Australian Journal of Earth Sciences, 41:1, 37-45, DOI: 10.1080/08120099408728111

Somewhere near line 255: you should mention the possibility of contamination in areas where fertilizers are used as their Sr isotopic composition is well known but can affect some of your results. Fertilisers can be transferred down to the depths of your sampling. Check Martin CE & McCulloch MT 1999. Nd-Sr isotopic and trace element geochemistry of river sediments and soils in a fertilized catchment, New South Wales, Australia. GCA 63 (2), 287-305.

Line 350 caption. It would be nice in the top figure to list the number of analyses carried out for each boxplot. Concerning the bottom figure, it is a pity in a way to plot a box for each of the single samples for Bancannia and St Vincent as they only represent a single sample.

Line 397: Would you consider reiterating the possible uses of your data such as I mentioned earlier in my comments?

**In summary:** an excellent data set, something that was lacking for Australia. Can the same be done using Nd isotopes as a combination of both Sr and Nd isotopes would be a much more formidable tool.

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