Review of “A strontium isoscape of inland southeastern Australia” by de Caritat et al.

General comments

Each new Sr or other isotope dataset that is published is a valuable contribution to creating isotope maps of the world and in this case Australia. Collecting samples in the often remote Australian landscape and analysing Sr isotopes are both labour intensive activities and therefore the authors effort and making the data freely available is very much appreciated.

The quality of the analytical work seems excellent as can be expected from a collaboration of an experienced isotope lab with GA, so no concerns there.

Specific comments

P1L9: Disagree with “Ultimately…..” the way the sentence is written seems to imply that only the locally underlying parent material determines Sr isotope ratios in soil. Later the authors actually argue for other sources also contributing to the Sr signal mix so I suggest rewording this sentence.

P1L15: I question if reporting routine statistic parameters is very relevant for Sr isotope distributions as Sr distributions are not normal, always multimodal (in these kind of mapping surveys).

P1L28: I suggest referring to a good and critical discussion of Sr isotopes for proveniencing by Jane Evans as is nicely discusses its limitations 10.1080/00665983.2021.1911099

P2L30: I note that any reference to the recent work of Bataille on the global Sr map and Hoogewerff on the European Sr map is absent? Either of these publications would provide large datasets to compare the current data with. Also these data sets can be used to show the global or large scale distributions of Sr isotope values, maybe allowing to better underpin the later argument for the suggested bi-modality of the presented data?

P7L170-176, table 1and fig3: What is the evidence for bimodal, does bimodal make sense in the geological context? The CF curve shows several plateaux indicating more than 2 distributions and considering the paucity of measurements in some catchments I would be careful with reading too much in the descriptive stats and making decisions on sub-populations. I note that global data also shows a skewed population with a long RH tail, so how does this data compare with the global data, such comparison might be more relevant that using normal descriptive stats?

P10L225-233: Is there a contradictive argument here? At one place in discussion it is argued that wind-blown deposits are mostly quartz with low Sr isotope values but here it is suggested that radiogenic minerals are blown in?

P13/14 section 4.5 and Fig 6: if some samples are diluted by aeolian quartz and affecting/diluting the 1/Sr ratio, would it be useful to make an additional plot of 87Sr/86Sr versus Rb/Sr or Al/Sr to compensate for the quartz dilution?

P16 fig7B: I am somewhat concerned about the bias caused by very differencing sample numbers in each category, maybe giving a wrong impression of the distributions?

P17 section 4.6: I suggest exploring the relations with other element a bit more to find out if a regression or machine learning model could predict the Sr isotope data, or maybe this will be attempted in a separate paper?

P17 Conclusions: partly seem a somewhat repeat of stats that have already been mentioned twice, in abstract and discussion.

Technical corrections

P2 Fig1: seems small in publication, fig a has a lot of redundant place names?

P4 fig2 Are some colours missing in figure 2A map, most seems white?? And again seems small in publication

P7L174: are 4 digits relevant for summary stats like skewness and kurtosis?

P12 Fig4: too may digits in R^2? what is significance of 3rd and 4th decimals in intercept and/or R^2 if slope has only one digit? Slope would need more significant figures?

P14/15: maybe better to put n=x for each catchment in figure 7a, rather than as text?

P16 Fig 7a: personally, I would prefer a Violin plot as that shows the distributions in each catchment better (when there is enough data)

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