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Interactive comment on "Lignin oxidation products in soil, dripwater and speleothems from four different sites in New Zealand" *by* Inken Heidke et al.

Anonymous Referee #2

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The manuscript by Heidke et al. deals with the origin, transport and potential use of lignin oxidation products (LOPs) in speleothems as a paleoenvironmental proxy. The authors performed a thoughtful study of LOPs in soils (at different depths), dripwater and carbonate speleothems from several caves of New Zealand. The methodological approach seems reasonable, although I agree with the authors (page 15, lines 5 -10) that the sampling/elution method should be optimized for future studies. The role of filtering should be tested, as well as the principles of organic matter incorporation into calcite need to be evaluated in laboratory. The manuscript is well written and will be of interest for a specialized audience.

I have a general comment about the origin of organics in speleothems. The authors consider that all the LOPs in the speleothems comes from the soils over the studied caves. However, how other sources of organic matter could impact the concentration/nature of organics in speleothems? This may include compounds of fossil origin, like coal strata in the bedrock (e.g. Gázquez et al., 2012) and organic matter introduced by animals (bat guano). If possible, the authors should discuss whether these sources (or others) could have an impact on the characteristics of LOPs in speleothems.

References: Gázquez F., Calaforra J.-M., Rull F., Forti P. and García-Casco A. 2012. Organic matter of fossil origin in the amberine speleothems from El Soplao Cave (Cantabria, Northern Spain). International Journal of Speleology, 41(1), 113-123. Tampa, FL (USA). ISSN 0392- 6672. DOI: http://dx.doi.org/10.5038/1827-806X.41.1.12

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