

# ***Interactive comment on “Climate Induced Speleothem Radiocarbon Variability on Socotra Island from the Last Glacial Maximum to the Younger Dryas” by Steffen Therre et al.***

**Anonymous Referee #2**

Received and published: 10 January 2020

The manuscript of Therre et al. presents a new study where radiocarbon and U-Th dates were combined to reveal DCF variability in a speleothem from a Moomi cave on Socotra Island. The record covers last glacial to early Holocene time period with two well defined hiatuses. Very high DCF values during the last glacial are interpreted as a consequence of significant contribution of aged soil organic matter and almost completely closed system dissolution conditions. DCF record exhibits overall decrease from last glacial to the onset of Younger Dryas event. To explain this long-term decreasing trend as well as relatively large variability DCF results were paired with other speleothem proxies (growth rate, Mg/Ca,  $d^{18}\text{O}$ ,  $d^{13}\text{C}$  and  $d^{234}\text{U}_{\text{unit}}$ ) from the same specimen and interpreted in terms of past climate changes and its influence on carbon

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soil dynamics at this site. The manuscript is well organized. The introduction, methodology and results sections provide enough information and are mostly well written. The results are clearly presented and well discussed leading to conclusions worth of publication. There is however some space for improvement in clarity of the text and I would suggest that a native English speaker improves it before it is accepted for publication. A few line by line comments are provided below.

Throughout the manuscript: I find using a term “reservoir age” together with “DCF” confusing. At places you consider them as synonyms at others not. Either make a clear distinction between the two terms or stick to the one. DCF is more often used in speleothem-based studies so I would advise choosing it over reservoir age for clarity.

Lines 59-60 Please consider rewriting this sentence. As stated above the whole manuscript would benefit if a native English speaker improves it.

Line 164 Which part of the procedure was replicated? All the steps including subsampling, or only <sup>14</sup>C measurements? Please clarify.

Line 168 Please replace word „absolute“ with U-Th modelled.

Line 196 Add word „at“ or „since“ before  $\sim 11$  kyr BP.

Line 198 Add word „of“ between factor and 2.

Lines 200-207 I find discussion related to the changes in the width of the stalagmite irrelevant in this manuscript and hard to follow. Please consider removing it from the manuscript.

Line 286 What do you mean by secular variability? Please rewrite here and later in the text.

Line 298 Please remove citations of Griffiths et al. and Lechleitner et al. here as the cave sites in these two studies are not located in temperate climate zones.

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