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Interactive comment on “The enigmatic ichnofossil *Tisoa siphonalis* and widespread authigenic seep carbonate formation during the Late Pliensbachian in southern France” by B. van de Schootbrugge et al.

P. Leonide (Referee)

philippe.leonide@falw.vu.nl

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Dear Editor and authors,

Van de Schootbrugge and co-authors provide in this paper new and important interpretations of carbonate concretions of Upper Pliensbachian age (southern France), named *Tisoa Siphonalis*. This paper describes mainly these concretions from a geochemical point of view. Moreover, the authors add Computer Tomographic scanning in order to discuss and re-interpret *Tisoa Siphonalis* as resulting of abiogenic precip-

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itations. Firstly, the authors base their interpretation on high-resolution carbon and oxygen isotope measurements within the concretion. C-isotope values show a clear decreasing trend from the rim toward the center with very high negative values (-25.7‰ while O-isotope measurements show "normal" marine values (-1.8‰. The authors relate this isotope pattern (within the concretion) as arising from AOM and sulfate reduction at the sulfate-methane transition zone, place where the authors suggest these concretions have been precipitated. Secondly, the authors add isotopes analyses both on bulk carbonates and belemnites of the complete section studied in order to open the discussion about the link of the occurrence of these carbonate concretions and of Early Jurassic paleoenvironmental changes (especially during the T-OAE). Finally, the authors reinforce their abiogenic interpretation of Tisoan by providing high-definition Ct-scan images clearly showing the complexity of the inner structure of these concretions.

All the data presented in this paper strongly support the new interpretations, discussions and conclusions provided by the authors. The authors tried objectively to open the discussion on the origin of such concretions and their link to palaeoenvironmental changes, such as the T-OAE event, which is especially useful for the scientific community while these events are still subject to considerable debate. The entire manuscript is clearly organized, reads very well, and the figures nicely illustrate the main points in the text. Citations are abundant enough and background informations, especially of the previous interpretations of Tisoa Siphonalis, are very well detailed. However, It would also be interesting to see (in a so detailed paper) a microfacies description of such concretions in order to complete their descriptions. What the mud of these concretions is made of? Is this mud is homogeneous through the tubular concretion? Could it be possible that S.E.M. observations could help to improve the diagnostic of the genesis of these concretions? I totally agree with the other referee (Aurélien Gay) that for further studies, paragenesis and fluid inclusions analyses (if it's possible) should be considered.

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Finally, I also agree that this paper is essential for our scientific community and I therefore strongly recommend the manuscript to be published in its present form after some very minor technical corrections (typing errors, some references missing).

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