

## ***Interactive comment on “Anoxia and salinity changes: a new Permian catastrophe record” by Marlise C. Cassel et al.***

**Anonymous Referee #2**

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This paper by Cassel et al. focuses on the early Permian Irati Formation in Brazil. Authors try to determine and constrain potential anoxic episodes in several cores from this basin, and to link these events to other major known bio or geological Permian events known elsewhere. At a first view, the used dataset and analyses appear numerous and some interpretations valid. Some obtained information are maybe also important although local. Overall, I was highly disconcerted by the form of the text and the discussion/conclusion included in this work. In my opinion, the paper requires numerous significant modifications and additions. To be brief:

1- I fully understand that it is very difficult for some authors to write in English, but this text is not at all up to the level of a standard publication. There are too many mistakes and typos pervading the ms (thus I did not list them hereafter). It took me a very

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long time to read it (several times) and (try to) to understand ideas contained in many paragraphs and sentences. It is necessary that authors have their text corrected by a native-English speaker because, as it stands, very few passages are simply understandable by the reader.

2- Title, discussion and conclusion focus on major Permian extinction events, such as during the latest Permian, and link them to major geological events, such as the Siberian traps. However, the Irati Formation is not coeval to any of these events and thus, this link made by the authors is not understandable. None of the data shown in this work can be linked to any mass extinction. This is interesting to document that the Irati Formation potentially records anoxic conditions but they are local or regional and should be discussed with coeval events worldwide (if identified). Authors should also provide more biostratigraphical data allowing to constrain the age of this formation. Overall, the entire structure of the paper has to be changed.

3- Authors claimed that 23 cores were studied but data from only two sites are presented. Authors should provide data from these other sites with their corresponding environments as the reader can follow interpreted environmental fluctuations in space and time.

4- Authors should also provide true facies analyses with their corresponding interpretation in terms of depositional environments by providing pictures of thin sections or polished slabs: a few pictures of rock colors from one of the studied core is not enough to check authors' claims about depositional environments and anoxia, and throughout the entire basin. Also, authors should provide pictures of bioturbation or bioherms when they discussed them in the text. It can help the reader to follow authors' interpretations.

Overall, mainly based on the poor quality of the English and of the false links made between observed local/regional environmental changes and Permian extinctions, requiring a complete rewriting of the paper, I recommend to reject the paper.