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Climate of the Past Discussions

Interactive comment on "Life and death in the Chicxulub impact crater: A record of the Paleocene-Eocene Thermal Maximum" *by* Vann Smith et al.

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All PETM papers are interesting by default as this is an unique time interval that it is not found easily. Smith et al present the PETM record of a core drilled at the Chicxulub crater. The manuscript presents enough data that support that the PETM is present indeed and mainly focuses on the palynological content of the PETM including both marine and terrestrial palynomorphs. The dinoflagellate record shows the classical Apectodinium spike that is seen at the PETM across the world, mainly in tropical settings. The terrestrial record shows an abundance of fungal spores and a pollen-spore assemblage that is a mixture of tropical and mid-temperate taxa, that is expected given

the paleolatitude of the site. There is no evidence of a collapse of the vegetation during or following the PETM. Unfortunately, the late Paleocene record is missing as organic matter did not preserved, therefore, it is impossible to evaluate the actual change on late Paleocene floras due to the PETM. Nevertheless, this is the only PETM of the Gulf Coast-northern Caribbean region and a valuable addition to our global understanding of the PETM that is in need of many more sites, in particular those with a terrestrial signal. Paper is short, well written and of interest for the broad audience of CP.

I have several comments on specific items as follow:

1. Because δ13C values of bulk sediments can be affected by the total organic carbon of a sample (Wing et al 2005 Science); you need to apply the Wing residuals method to the δ13C record. And in this site, this seems to be evident. The discussion, then, needs to follow the pattern of the residual rather than the raw δ13C values.

2. Line 185: include the TEX of the marine core in Jaramillo et al 2010 (28-31C for the late paleocene to 31-34 for the early Eocene), that is useful to take into account as the early eocene temperature in your core is slightly cooler than the PETM. Furthermore, the core is the closest to your site with tropical TEX86 marine data (caribbean of Colombia). I feel awkward asking you to use data from one my papers, but you cited the paper already and perhaps missed the TEX86 data.

3. Line 235: relating the high abundance of fungal spores to humid forest and grasslands is a large assumption. It could be a simple taphonomic effect as fungal spore wall are often thicker than pollen walls and tend to preserve better in deep waters and/or when rates of weathering are higher. Can you discard fungal spores being a taphonomic signal?

4. Line 240: grasses are also very common in aquatic settings (e.g. floating grass-islands in amazonas river), and aquatic grasses are probably the source of low quantities of grass pollen rather than savannas. Extensive savannas are only seen in Miocene and younger strata, therefore, there is a need for additional evidence if you

are proposing savannas at the PETM, even more even more when your “grass” record consists of a single grain in a single sample (607.1 m) 5. Liliacitides variegatus in the PETM? That is hard to believe. It must a reworked taxon as it became extinct in the Cenomanian

Hope to see it published soon Carlos Jaramillo

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