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Interactive comment on "Neogene Caribbean elasmobranchs: Diversity, paleoecology and paleoenvironmental significance of the Cocinetas Basin assemblage (Guajira Peninsula, Colombia)" *by* Jorge Domingo Carrillo-Briceño et al.

Anonymous Referee #1

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Carrillo-Briceño et al. present an interesting chondrichthyan assemblage from northern Colombia with interesting paleontological and geochemical results. The diversity of fauna is impressive and intended/potential scope interesting, but the manuscript in its current form lacks depth to make a compelling research study. I do not go into details in my review because I think these larger and broader issues need to be addressed before an in depth review.

The last paragraph of the introduction is as follows in quotations; I have inserted some thoughts related to these details afterwards.

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"A taxonomic revision is presented of the elasmobranch fauna collected in the Cocinetas Basin (Figs. 1–2), from the Jimol (Burdigalian), Castilletes (late Burdigalian–Langhian), Ware (Gelasian–Piacenzian) Formations, and two localities of the Patsúa Valley (Burdigalian–Langhian). " – The authors address this taxanomic revision in <10 lines per family within the results (p6-7) with many families containing more than one taxon. If there are revisions to the taxonomy (or even establishment of taxa or taxon), a more careful description of the specimens, previous taxonomic classification, justification for the changes, and discussion of the systematics are needed at the individual taxa level, either genus or species depending on the classification.

"The assemblage includes 30 taxa, of which 24 are new reports for Colombian Neogene deposits." Again, an assemblage description needs to be more careful and detailed with information on tooth morphology including but not limited to tooth shape, size, position, wear, etc.

"Additionally, paleoecological and paleoenvironmental interpretations based on the feeding ecology of extant counterpart species, as well as estimates of the paleosalinity using stable isotope compositions of oxygen in the bioapatite of shark teeth are discussed." There are no paleosalinity estimates given in this manuscript. There are oxygen isotope values that indicate lower salinity environments, but the authors do not give actual paleosalinity and only refer to broad and qualitative interpretations of environmental conditions. It is possible for the authors to use a paleosalinity model as established in the literature if they use estimates of temperature and freshwater oxygen isotope composition from the literature.

Next, the authors present the generalized diet for modern analogues to discern feeding ecology. However, the authors do not give specific species for modern analogues; many modern families referred to for the fossil specimens have a wide variety of diet and habitat preferences that cannot be easily summarized and condensed as they are in the current manuscript (P. 8 L 4-20). The modern analogues are not identified and furthermore, little to no justification for how and why the fossil taxa should follow

these modern ecological classifications. Further, if the modern analogues were named, I am almost certain that a careful and deeper search of the modern shark ecology research would yield more specifics on dietary preference, migration patterns, and other important aspects of ecology.

"The Cocinetas Basin represents a valuable window into dynamic changes in paleodiversity experienced by ancient Proto–Caribbean Neogene chondrichthyan faunas." I am sure this chondrichthyan assemblage can yield important information on Proto-Caribbean Neogene chondrichthyan fauna and environmental reconstruction. More detail on the paleontological descriptions and greater context for the stable isotope data are needed to strengthen the paleoecological and paleoenvironmental interpretations.

The authors have a substantial variation in the δ18O values from shark teeth. Given the range of Formations, lithology, and likely depositional environments, the results need to be better organized to reflect these differences. In addition, the paleoenvironmental reconstruction based on these oxygen isotope compositions must consider the habitat preference of the shark that is the basis of geochemical analysis. A shark's tooth mineralizes at a fairly fast rate below the epithelium but there is a delay until this tooth reaches the first series within the jaw where it is used and lost (and hence deposited into the fossil record). Therefore, for migratory sharks the δ18O value of a tooth may not represent the depositional environment. Parsing out details for modern analogues and their lifestyle can help the authors classify and interpret the variation in δ18O values. Two of the co-authors, Kocsis and Venneman, have published widely with stable isotope data from shark teeth. In many of their publications they use modern analogues quite carefully for paleoecological interpretation and paleoenvironmental reconstruction based on geochemical data.

More detailed treatment of paleontological and geochemical data for this chondrichthyan assemblage would strengthen this study. Currently, the goals of this study are not well served due to the qualitative and broad treatment of the data. The

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manuscript would also greatly benefit from a stronger “story” that gives more context and framework for its significance related to chondrichthyan paleoecology and evolution; environmental reconstruction; and paleoclimate implications.

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