

## ***Interactive comment on “Reconstructions of biomass burning from sediment charcoal records to improve data-model comparisons” by J. R. Marlon et al.***

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The first issue raised by the Reviewer deals with an important topic - the use of multiple records for the same site - and we appreciate the request for clarification. It is true that the GCD sometimes contains multiple metrics for quantifying charcoal from the same site. This issue was considered carefully at the time the database was constructed, and it was determined that multiple types should be retained whenever available because different quantification techniques and measurements can reflect burning at different spatial scales (for example when microscopic and macroscopic particle size classes are included), or different types of fuels burned (for example when herbaceous and

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woody particles are tallied separately). As a result, individuals synthesizing data from the database have the choice of selecting one record to be representative of each site, or of using all the data from a single site, depending on the research question. For those wishing to select just one record from each site, there is a field in the table containing the metadata for the sites (the Site table) that specify the preferred (“PREF”) units and refer to the most commonly used metric. For example, for sites that contain both macroscopic and microscopic particle measurements, the preferred units would be macroscopic, and for counts versus areas, counts would be retained instead of area measurements. In most cases, the long-term trends in the different measurement types are very similar. Unfortunately, in the absence of local calibration data (which is not stored in the GCD), it is impossible to determine which records are most reliable when multiple options exist.

P2112-13: Agree to remove repeated references. P10117: Agree to add “of” here: “...be of tectonic. . .” P11111: Agree to refer to table 3. P11127: Agree to refer to figure 2. P14122: Agree to fix: “...again fitted to the pooled. . .” (-ted added) P1919: Agree to remove of from: “compared of paleofire trends. . .” P2615: Agree to correct the space in wrong place: “. . .high levels of burning overt he. . .”

Table 2: The question here is what are the size categories? The charcoal particle size categories span a large range, from a few microns to large visible pieces over 500 micrometers in size. In general, particles are considered either microscopic, which is typically less than 100 micrometers in size, or macroscopic, which is typically greater than 100 micrometers in size. Also, some records are analyzed chemically, for black carbon for example, but there are few of these records currently in the database.

Figures 9 and 10 were intended for the Supplement and we agree that they can be merged into a two-panel figure, and the units added back to the small size definition.

Supplementary figures should be reordered. -500-500 BP should read -60-500 BP.