Interactive comment on "Spatial-and temporal-patterns of global soil heterotrophic respiration in terrestrial ecosystems" *by* Xiaolu Tang et al.

Anonymous Referee #2

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Heterotrophic respiration (RH) is a large component of the terrestrial carbon flux. There are large uncertainties in RH estimates, especially at the global scale. The study developed the global RH dataset using the RF method and RH observations. Overall, this manuscript is well written and interesting. The global dataset is valuable for global terrestrial carbon study. It is publishable after some modifications. RH is affected by numerous factors, including litter and soil carbon stocks, soil water content, soil temperature, and soil and litter properties. In this study, RH was estimated using the RF method driven by soil temperature, precipitation, and soil water content, soil organic carbon content. During the period from 1980 to 2016, soil carbon content might changes significantly due to the factor that the increase of productivity driven by CO_2

fertilization would induce the increase of litter input into soils. Without consideration of temporal variation of soil carbon content might induce uncertainties in the temporal trends of RH. Figure 1 shows that the number of sites used to train the RH model is limited and they are unevenly distributed. These sites are mainly located in America, Western Europe, and China. In Russia, Africa, Australia, Southwestern Asia, only data from few sites are available. It would be great if the uncertainty map of estimated RH can be provided. Double check the unit in Line 183.

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