Interactive comment on "Generation of a global fuel dataset using the Fuel Characteristic Classification System" *by* M. L. Pettinari and E. Chuvieco

Anonymous Referee #1

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Plants live or dead and their residues are the combustible materials that funnel wildland fires. The diversity of plants or even of vegetation types prompted the need of reducing them to a number of sizable classes, i.e. fuel types, that could be manageable for a number of practical uses in relation to fire modelling. Pettinari and Chuvieco present here a world classification of fuels using the Fuel Characteristics Classification System. The approach is not novel, and has been previously applied to other areas, including a full continent, by various authors including those of this paper. A main problem with this approach is that, while promising, validation for the various purposes that is supposed to be utilized for, are, for the most part, still wanting. Presenting a global map of fuels when the support for even those most common fuel types for which this

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approach was initially developed, is premature. Validations are needed for each of the specific purposes that such an approach is supposed to be of use. Extending the approach to the global fuels without specifically validating it at least in a representative number of fuel types in each biome is problematic since, if used in the future, it could provide results that may not be warranted. Moreover, fuel types are developed in a very deterministic way, without providing a range of values that would arise using the main combination of species. Such calculations could provide a very much needed uncertainty range. This, at a minimum, would provide a basis for assessing the validity of this product. As a validation exercise, the authors related their product for one of the variables they computed (e.g. biomass) using other products independently derived. While their results are more or less comparable, this cannot be considered as a true validation. Actually, some of the papers they cite did such a validation against true ground data and highlighted the differences between the various products and the true ground data. Having a global fuels map is something very much needed, but the basis of such map need to be firm, and to achieve that, real validations are needed. Without that, being this exercise a notable one, it falls short of the rigor that it is needed to be accepted as a true progress in this field. I can but encourage the authors to use existing database to test their results against field data, at a minimum in a number of representative sites and, at a minimum as well, for at least one of the main purposes for which this product is supposed to be used. After this is made the paper may be subject to critical review.

Minor comments The paper is generally well written and to the point. However, I recommend the authors to give to read to a professional native speaker of English, to eliminate some of the minor errors that inevitably slip through. Following are some minor comments. P2 20: The justification of the significance of fire for the Earth system needs an appropriate reference. The figure provided about fires being significant in 30% of the land-surface is misleading, because it refers to grid-cells where fires occur. Please, reword for clarity. 23: "..natural history" is unclear. Is man included? Please, reword for clarity. 24: "…altering vegetation succession by damaging some

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plant types while promoting others,.." is unclear. What is meant by altering vegetation succession? What is meant by damaging? Do you mean that fires have altered vegetation composition and that, as a consequence, vegetation succession pathways are altered? Please, clarify this sentence. P3 1: You need not to be exhaustive, but I would add CO, as this is an important fraction of emitted gases during fire. 3-4: You confront vegetation characteristics and fuels as if they were different things, which they are not. Please, reword for clarity. 7-8: "...based on their fuel elements." Not really. Based on the various fuels characteristics, which includes various elements. Please, reword for clarity. 10-11: The reference you provide for Mediterranean ecosystems is misleading, since this refers to study done at a particular area, which may or may not fully represent such ecosystems. Please, reword for clarity. 20-21: "fuel behavior"? Do you mean, "fire behavior". Please, clarify. P4 14: "relied in the use" Reword to "on the use" 28: "we created.." This is not correct, since the authors are different. Please, reword. The sentences that follow in this paragraph would also need to be reworded to avoid this misunderstanding. P5 24: "... allow running FCCS.." Unclear what is meant here. Please, clarify. P9 5: "...spread can occur.". Provide reference. P10 15: ".. variables populated.." Unclear. Please, reword. P11 19-20: A critical point here is to determine the validity of the RS methods to assess biomass. The paper cited indicates that there are large discrepancies between RS (you use both approaches used in that comparison) and ground-based methods. It is unclear how these discrepancies so fundamental can be reconciled.