

## ***Interactive comment on “Origin, distribution, and characteristics of Archaeological Dark Earth soils – A review” by Michael O. Asare et al.***

**Anonymous Referee #1**

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### GENERAL COMMENTS

The review aimed to investigate about the distribution, evolution, and properties of archaeological dark earth (ADE), by additionally, i) providing an overview of different types of ADEs and their distributions, ii) describing their physical-chemical properties, and iii) identifying main questions for the future development in terms of new research activities.

Along the entire paper authors extensively used words such as "seems", "probably", etc. I can understand caution, but I think that the lack of courage in presenting their own ideas make your paper less attractive and lacking in novelty. If you have done a review on a specific subject, you must also be able to give your own motivated and convinced opinion.

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Paragraph 2 is a little bit boring. In its present form it is just a list of ABE present around the world. Authors contribution in terms of new ideas and novelty, totally missing. Yes, you are writing a review, but you must be brave enough to add your personal idea in the context of exposed items.

**SPECIFIC COMMENTS** - Abstract: there are no reference about which are main aims and scope of your review. Please add; - Abstract: honestly is badly organized. Authors started talking about that ABE is a "layer" (?) of anthrosol (I think you mean that ABE can usually be classified as Anthrosols according to FAO-WRB), passing for its origin and development till to its concentration in macro- and micronutrients. I don't see any logic organization. I would suggest starting for the classical scheme: background, aims and scope, main outcomes and conclusions. Otherwise, it is hard to be easily following it. - Acronyms and terms: please note that rather using "archaeological dark earth (ADE)" it should be netter using "archaeological black earth (ABE)"; - Acronyms and terms: please note that rather writing "Archaeological Black Earth (ABE)" it should be better using "archaeological black earth (ABE)". The capitalization of the first letter in acronyms explanation was an odd, indeed overwhelmed, conception; - Introduction (lines 44-46): really confused, please rewrite and simplify it...suggestion "Human-influenced historical events, such as plants and animals' domestication or metallurgy, have been responsible for changes in natural landscapes"; - Introduction (lines 47-51): vide supra...suggestion "Many human activities are responsible for soil alteration; a blatant example is the creation of dark cultural horizons, mainly termed as archaeological black earths (ABE). They usually belong to anthropogenic soils, classified as Anthrosols (REF.) or termed as HAHT (human-altered and human-transported) soils (Soil Survey Staff, 2015). ABE formation consisted in a deliberate and/or unintentional accumulation of layers as consequence of settlement activities, wastes deposition, charred residues, bones, shells, and biomass ashes from prehistoric up to recent times. Such anthropogenic soils are usually characterized by higher concentrations in macro- (N, P) and micronutrient (EXAMPLES), that determines a difference in terms of main physical-chemical properties in comparison to neighboring (natural) soils"; -

Introduction (general comment): please always avoid the use of group of references after every sentence. Better using max 2 references after every important statement; - Line 52: "ADEs are physically characterized by black, dark brown, or dark grey color", please add a reference; - Line 57: delete "probably"; - Line 82: "Amazonian Dark Earth, African Dark Earth, European Dark Earth" please *vide supra*; - Lines 99-102: "Terra preta is found on a variety of soil types such as Acrisols, Arenosols, Cambisols, Ferralsols, Latosols, Luvisols, Nitisols, and Podzols classified according to World Reference Base (WRB) for Soil Resources (Lehmann et al., 2003b)" badly organized sentence. Suggestion: "According to Lehmann et al. (2003) terra preta is found on a variety of soil reference groups such as Acrisols, Arenosols, Cambisols, Ferralsols, Latosols, Luvisols, Nitisols (WRB, 2015); - Lines 103-104: please explain the reasons why of such an important outcome; - Lines 104-105: "and located in some geographical regions from which surrounding areas can be observed (Sombroek, 1966)"...ambiguous and unclear sentence. What you mean?; - Line 133: please be more specific. Add some quantitative comparison, otherwise it's too generic statement; - general comment: please, when you refer to a specifically historical period the beginning and the end must be indicated; - line 178: since the two "hypotheses" are completely complementary, why not suggesting that TP are formed by a unique combination of factors rather than two "hypotheses"? You must write something new, not only reporting already existing ideas; - lines 188-191: too vague sentence. Be more specific by a deeper investigation of such important questions; - lines 195-202: please specify which kind of genetic horizon could be related to proposed classification (Ap, O, L?); - lines 203-207: again, too much generic sentence. Please add some quantitative outcomes. You talk about fertility, generally stating that it is higher in TP soils. How much higher? Can you specify N, P or micronutrients concentrations in TP vs natural surrounding soils?; - line 212: again (*vide supra*) ...no Cation Exchange Capacity but cation-exchange capacity...be consistent along the whole paper; - line 218: which kind of nutrient? How much? Why?; - lines 219-220: I know Brazil, but most of readers probably not...so why do you think that they could be knows what "Greenhouse Facilities of Embrapa Amazônia Occidental"

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means? - lines 222-236: again.... too much generic. Comparisons are made from a qualitative point of view only. Some examples in terms of quantitative comparisons must be reported. Additionally: Have such studies demonstrated a significance difference between TP vs natural soils? Because, if it was merely a speculative observation it must be ignored; - lines 237-239: thanks for pH and CEC values...the first quantitative outcome reported in your review!; - paragraph from 3.2 till to 3.4: please, add some quantitative results...statement such as "store 200–300% more organic carbon than their surrounding soils" are not enough. Indeed, as previously underlined, I need to know if such a comparison was of statistical significance, otherwise you must ignore it; - paragraph 4: I don't understand the reasons why for such a paragraph. In most of its parts it replies already previously reported matters. Additionally, what about the authors' opinion on such specific items? This paragraph has an intriguing title, but the content is characterized by a total loss in terms of novelty and new ideas; - Discussion: I don't understand the reasons for separating P3 from P5. I strongly suggest authors combining the two sections avoiding redundancy. This could improve paper readability and attractiveness; - Conclusions: too long. Be more focused on novelty aspects only. Please avoid punctuation, is a review paper not a technical report.

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