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Interactive comment on "The Depth Limit for the Formation and Occurrence of Fossil Fuel Resources" *by* Xiongqi Pang et al.

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I find this manuscript is generally well written, structured, and illustrated. Some of the results are very interesting and thought-provoking. It puts forward the concept of "Active Source Rock Depth Limits (ASDL)", and try to characterize the vertical depth distribution of discovered reservoirs. A huge of data has been systematically compiled around the world, especially the six key basins in China. The use of four methods to characterize and corroborate the ASDL, including the possibility to be used around the world, makes it more convincing. The controls on the ASDL are also explored and a quantitative model was established to predict the results. The study is very meaningful in the way that it is the first systematic attempt to work on the relationship of depths and hydrocarbon reservoirs, especially on such a huge scale around the world, with

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Discussion paper

so much data. It brings this topic to our attention which should be studied before. The topic has great scientific values. It could help us to better understand why at a shallow depth there are no reservoirs in a basin whereas in some other basins, reservoirs are found in a much deeper layer. If proven, it will also help us to determine whether to drill a well to a certain depth.

During my reading of this MS, I had several questions or suggestions for the authors. If they could help with them, I would really appreciate it.

1. The ASDL was mostly established with the data of six basins in China, although data of basins around the world (IHS, 2010) were later used to verify the ASDL. Is it possible to incorporate some basins outside of China in the process of establishing the model? I totally understand this is totally a data issue and the authors may not be able to get enough systematic data of basin around the world as in China. However, this could be an improvement, if possible. 2. In section 3.3, the authors used the average values (heat value, depth, HI) of each basin to verify the model of ASDL, it is generally OK and understandable as there must be lots of data for each basin. However, is there still any possibility that some outliers may be present? If yes, how to explain them? 3. In section 3.4, the authors proposed the concept of Hydrocarbon Reservoir Depth Limit (HRDL), mentioning that “at some depth (Hydrocarbon Reservoir Depth Limit), the probability of drilling oil or gas reservoirs decreases to zero”, and talks a bit about the relationship between HRDL and ASDL. I think this is an important part as for a hydrocarbon reservoir to form, it requires both hydrocarbons from source rocks and reservoirs rock to accumulate. Unfortunately, very little was discussed on the HRDL in this point. If possible, could more details be added on this?

Personally, I am very attracted to this study and would like to continue to catch up with the progress. I also appreciate a lot the hard work and innovativeness of this study that the authors have put into.

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