

## ***Interactive comment on “Recent revisions of phosphate rock reserves and resources: reassuring or misleading? An in-depth literature review of global estimates of phosphate rock reserves and resources” by J. D. Edixhoven et al.***

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This review addresses an important topic, although one that has received only limited attention in the past decade, in part I suppose because there was a general view that phosphate resources and reserves were more than adequate for the foreseeable future. The authors take issue with this premise, though somewhat obliquely through extensive criticism of some recent global reserve figures and the basis for those figures. They justify their concerns on a number of grounds and are especially critical of what they see as the granularity of the figures arising from the new approach taken by IFDC

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in particular and a somewhat simplified classification system. The authors point to the confusion that exists in terminology for example in the use of the terms “ore” and “concentrate” as well as the lack of clarity on whether reserves and resources are quoted are ore or concentrate or some other metric. All of this provides a basis for publishing the paper.

However as rightly pointed out by the reviewers- Scholz and Wellmer – there are some shortcomings that need to be addressed. In their extremely comprehensive set of comments and critiques, all very well documented and referenced, the reviewers address a wide range of points in the paper with which they take issue. These range from the matter of granularity, to the shortcomings of the Hubbert curves, the difficulties of translating reserve- resource figures from one country to another (given the arbitrariness of for example the diversity in the spacing of boreholes as a basis for reserves or resources) and so on. The reviewers are so thorough in their critique ( sometimes approaching demolition!) that I will not attempt to travel over the same ground again, other than to say that overall the comments are valid.

The response from Edixhoven et al is spirited! I have some sympathy for their comment that the reviewers appear to be wanting to change the scope of the paper. However here I think part of the problem lies with the titling of the paper as ...“an in depth review”. This it is not. The title would have been much better as “Recent revisions of phosphate rock reserves and resources: a critique” or some such more modest title that would not then raise expectations unduly and perhaps render it less liable for some of the criticism of the reviewers? Indeed I would not see it as a realistic aim of the paper as being able conclude that the revisions provide reassurance or are misleading, as suggested by the present title. It does neither and it should not expect to in a review such as this.

The more profound criticisms from the reviewers are for the most part addressed/considered/commented on by Edixhoven et al although this is not to say that are all accepted. Unfortunately, the discussion on IFDC takes on an almost personal

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tone, which does not necessarily help. But aside from that I think it is useful to have the original paper and the comments sitting side by side for this is a useful debate, given the importance of phosphate rock. A concern I have, is that whilst the debate here is one of great interest to the phosphate rock aficionados, it may leave some on the margins of the issue and particularly those lacking the background in minerals or energy or resources somewhat confused. Here, one or two diagrams would have been very helpful, starting with something as simple as the McKelvey Box for example – now superseded by much more elegant approaches of course. Diagrams to illustrate JORC and PRSM etc would have been valuable too – all basic stuff for those active in the field, but nonetheless very useful for those trying to understand the problem

So, the original paper of Edixhoven et al could have been better, it could have been clearer and I don't necessarily agree with everything it says, but it would be poor world where we only read papers with which we agreed! The topic does warrant an airing to stir up just the sort of discussion that it clearly has. But if there is to be any rewriting of it (and perhaps even illustrating?) I would certainly urge the authors to take the comments of Scholz and Wellmer fully into account. The paper should be published and it will not doubt be subject to healthy debate

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