

Interactive comment on “Comment on: “Recent revisions of phosphate rock reserves and resources: a critique” by Edixhoven et al. (2014) – Phosphate reserves and resources: what conceptions and data do stakeholders need for sustainable action?” by R. W. Scholz and F.-W. Wellmer

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Received and published: 29 March 2015

Reply to M. Mew, 'Review on: the Scholz and Wellmer comments on Edixhoven et al. (2014) paper.

General comments

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Michael Mew is one of the most experienced phosphate consultants in the world with hand-on experience of the Moroccan phosphate fields.

We are very grateful for his review which supplements, specifies and embeds important arguments of our comment on the Edixhoven et al. paper (Edixhoven, Gupta, & Savenije, 2014).

On a general level, Mew's detailed comment elaborates that

- The critique at the IFDC 2010 that the IFDC (van Kauwenbergh, 2010) report presents a misleading picture of future P rock availability by Edixhoven et al. is unsubstantiated as elaborated in our comment
- The mixture of marketable phosphate rock with 30% P_2O_5 (PR-M) and phosphate-ore (PR-ore) is not valid for the Moroccan estimate of 50 Gt PR(-M) which are assessed in marketable P. The analysis of the various papers, annual reports of OCP document that “through geological prospecting over several decades, more than 85 G m^3 ore, which equates 85 G tonnes of PR-M” are identified, much of it is “profitable under today's economics.” (Mew, 2015, p. C9)
- The discontinuous upgrading from 5.7 to 50 Gt PR of Morocco (after decades of continuous geological investigation) is economically motivated if not caused by the quadrupling of the price (if we compare P rock prices before 2000 and after 2010).

We will incorporate suggestions and meticulous background documentation in the revision of the paper.

We also appreciate the input from the analysis of the OCP reports with respect to granularity and density of the drilling net. We appreciate that the differentiated view on the differential degree of granularity for strategic planning of mining (which excludes

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deposits for which an economic potential has been assessed with high probability) and a high granularity for those which are close to planning mining operations.

In detail we will consider:

1. Page C6, para 1: granularity M. Mew in agreement.
2. Page C6, para 2: international panel of experts: M. Mew in agreement
3. Page C6, para 3: PR-M and PM-Ore terminology: M. Mew good idea
4. Page C 6, para 4 + para 5 ff (page C7) : Reserve/consumption ratio early warning, M. Mew in agreement, but places less emphasis on reserve data “how much of it can be called ‘reserves’ is largely irrelevant to longevity calculations as essentially all is expected to be made available at some future point”.
5. Page C7, para 1: “This leads me to question the viability of the USGS position in dropping its Reserve Base category due to financial resources with which to recalculate deposit economics, whilst at the same time retaining a reserve estimate which also depends on the economics of the day”.

Comment Scholz + Wellmer: The USGS states in the Mineral Commodity Summaries, Appendix C, that it does not directly measure reserves; it collects information from a variety of publicly available sources which are examined and screened and does not check or investigate reserves and resources in the ground. This means the country and commodity specialists check publicly available data from companies and/or institutions if they are reliable. So they rely on the economic assumptions of these institutions.

This comment of Scholz and Wellmer applies also to M. Mew’s comment in the last paragraph on page C10. The cost data e.g. of CRU to which M. Mew refers

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to on page C11, 1.para, are not taken into account by the USGS because they are not publicly available and are expensive multi-client studies.

6. Discussion of Moroccan and OCP’s reserve on page C7- C10.: M. Mew’ conversion factor of 1 m³ of OCP ore equals more or less 1 tonne of PR-M (marketable concentrate) we will of course accept and correct our statements of Moroccan reserves. This has been implicitly involved in our text “IFDC suggested a conservative conversion factor of 2 and updated the Khouribga data in ..“ (Scholz & Wellmer, 2015, pp. 53. line 16-17).

Also his comment that the data of the UN IGCP project 156 (Northolt, Sheldon and Davidson, Volume 2, Phosphate Rock Resources, Page 310, Table 47.1), are preferable to Savage, British Sulfur corporation 1988 we will take into account.

Otherwise in general, M. Mew agrees with our analysis that there are reasons why the Moroccan reserves increased over the past.

7. Specific Comments p.C11-C12: We will of course take these mistakes into account and make the necessary corrections.

References

- Edixhoven, J. D., Gupta, J., & Savenije, H. H. G. (2014). Recent revisions of phosphate rock reserves and resources: a critique. *Earth System Dynamics Discussions*, 5, 1-41.
- Mew, M. (2015). Interactive comment on “Comment on: “Recent, revisions of phosphate rock reserves and, resources: a critique” by Edixhoven et al. (2014) -, Phosphate reserves and resources: what, conceptions and data do stakeholders need for, sustainable action?” by R. W. Scholz and F.-W., Wellmer Friedrich-W. *Earth System Dynamics Discussions*, 6, C4-C12.
- Scholz, R. W., & Wellmer, F.-W. (2015). Comment on: “Recent revisions of phosphate rock reserves and resources: a critique” by Edixhoven et al. (2014) –Phosphate reserves and

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resources: what conceptions and data do stakeholders need for sustainable action? *Earth System Dynamics Discussions*, 6, 31–80.
van Kauwenbergh, S. J. (2010). *World phosphate rock reserves and resources*. Muscle Shoals, AL: IFDC.

Interactive comment on *Earth Syst. Dynam. Discuss.*, 6, 31, 2015.