

## ***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***

**Anonymous Referee #2**

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This discussion paper is disingenuous in terms of the title and abstract so much so that I feel that it is either a deliberate attempt to discredit the work of Edixhoven et al. 2014 or highlights the authors considerable lack of knowledge about the Edixhoven et al. 2014 paper. Whichever is correct, the discussion paper should be rejected due to untrue statements leveled at the Edixhoven et al. 2014 paper.

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The title indicates that the discussion paper is discussing the work of Edixhoven et al. 2014 alone. And the abstract only references Edixhoven et al. although provides the unhelpful comment "and related papers".

There are several key points where the criticism is evidently not related in any way to the Edixhoven et al. 2014 paper or factually accurate. As such and given the title of the paper I cannot see how this article can be accepted.

The only way to make this article acceptable (with substantial revision) would be if the title and abstract were completely rewritten to reflect the body of the article.

Factually untrue statement (Abstract): "The present paper identifies and discusses basic conceptual errors of the paper by Edixhoven et al. and related papers that predict a short or mid-term phosphorus 15 scarcity. These include the non-acknowledgment of the dynamic nature of reserves (which depends on price, technology, and innovation for exploiting low-grade deposits, etc.), the mixing of finiteness and staticness of the ultimate recoverable resources (i.e., phosphorus that may be mined economically in the long-term future), the improper use of the Hubbert analysis (which, e.g., simply uses the USGS estimates of reserves as 20 a substitute of an estimate of ultimate recoverable resources)"

As the paragraph is currently written, the authors are claiming that Edixhoven et al. make all of these errors. This is demonstrably false (see below). Second, the paragraph fails to provide references for the "and related papers".

Claim 1: Edixhoven et al. does not acknowledge the dynamic nature of reserves.

This claim is false, as demonstrated by the direct quote from Edixhoven et al 2014 paper: "However, reserves are dynamic, in the sense that ongoing exploration, economic developments, and technical advances may promote occurrences to resources and resources to reserves."

Claim 2: That Edixhoven et al. confuses finiteness and staticness of ultimate recover-

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able resources.

Edixhoven et al. refers mainly to reserves and resources. At no point in Edixhoven et al. is the term ultimate recoverable resources used.

Claim 3: That Edixhoven et al. use Hubbert analysis.

Hubbert analysis is not used in any part of Edixhoven et al. paper.

page 37 Section 3:

"The authors worry about the depletion of phosphate reserves and quote 15 scenarios (they refer to Rosemarin et al., 2011) in which the reserves are considered static and the reserve / consumption ratio decreases to 48 years"

This is factually untrue. Edixhoven et al. discusses the Rosemarin et al paper in the background section in a neutral tone. It does not "worry" in any way and highlights two flaws in Rosemarin et al's work one of which is that they use a static reserves. On four separate occasions Edixhoven et al. emphasise that reserves are dynamic (pg 492 first column 6th line from the bottom, 494 first column 11th line from bottom, pg 495 second column line 10, pg 504 first column 10th line from bottom).

Section 4.1 and appendix A These sections talk about Hubbert Curves. Given the title of this comment indicates it is meant to be comments about Edixhoven et al. 2014 paper, it is surprising and unusual (to say the least) to see a discussion on Hubbert curves as Edixhoven et al 2014 does not use nor even mention Hubbert curves.

similarly in the conclusion: "The Hubbert Curve analyses on global reserves, which suggest scarcity, are unacceptable applications of the Hubbert approach. They either 20 underestimate future reserves by more than a magnitude of factor 10 (in the case of curve fitting without a URR, i.e., modern Hubbert analysis), or they work with misunderstood estimates of URR"

Given the title is: "Comment on: "Recent revisions of phosphate rock reserves and

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resources: a critique" by Edixhoven et al. (2014) – Phosphate reserves and resources: what conceptions and data do stakeholders need for sustainable action?"

I can see no purpose for these section. Either the abstract and title need a major overhaul or these sections need to be removed.

Inaccurate quotes: several quotes are slightly incorrect: e.g. Section 4.2: "looking for guidelines which determine the appropriate drill hole distance" should be: "While we have not been able to obtain guidelines which determine the appropriate drill hole distance"

Also Section 4.2 "geological yardstick adopted in industry for measured reserves" is: "geologic yardstick generally adopted in industry for measured reserves"

Secton 5.4 "the increase of Moroccan reserves ...was ... due to simple restatements of ore resources as ore reserves" is actually: "This increase in Moroccan reserves... was... due to a simple restatement of ore resources as ore reserves" (also the quote is on page 504 not 497 as reported)

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

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