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Interactive comment on "A new theoretical interpretation of Archie's saturation exponent" *by* Paul W. J. Glover

G. Heinson (Referee)

graham.heinson@adelaide.edu.au

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An interesting and worthwhile paper on the importance and calculation of Archie's Law saturation exponent. I have little background in this area of pertrophysics other than accepting the well-known and simple empirical relationship between resistivity, pore fluid, porosity and saturation. Glover explains both the mathematics in a careful manner and also the context for developing such a theoretical approach.

The argument about estimated reserves is both dramatic and perhaps a bit ambit, but it does provide a good reason why a redefinition might matter. Of course, any thing connected with such large reserves and value will have a significant effect as a small percentage.

Line 29 starting "Since..." seems to be missing part of the sentence.

The sentence from Line 82 - 86 is quite long and could be re-phrased.

The flow of logic is reasonably well presented. I'm a bit confused on Line 125 that Equation 1 and 4 are mentioned, but Equation 4 does not get defined until line 155. The example for a two-phase system from Line 130 is good in highlighting a simple case.

The sentence on Line 176 "By contrast..." could be rephrased. My take is that the exponent is related to the fractional volume of pores filled with the fluid rather than being a related to the whole rock. There is a bit of confusing sentence structure.

The conclusions are a nice summary of the paper, but need the paper to make sense of the equations. Thus, they could not really be read stand-alone. Not sure if this is a problem.

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