

***Interactive comment on* “Evaluation of positioning and density profiling accuracy of muon radiography by utilizing a 15-ton steel block” by H. K. M. Tanaka**

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The paper addresses the experimental determination of the resolution on density and angles achievable with muon tomography apparatus. I consider this as an important issue (see, for instance Lesparre et al., Geophys. J. Int. (2010) 183, 1348–1361 for a discussion concerning this subject) and that the paper is suitable for publication in GI.

English is not my primary language, consequently I shall not make comments on the writing style. Following are my comments:

Page 647 (lines 8 to 12): does the computation of the angular interval account for

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the thickness of scintillator strips? Is the relationship between θ_{int} and θ_{res} based on half-width maximum argument or something similar?

Page 647: does step 2 of the computations use an experimental differential flux of muons? If so, please mention which model is used.

Concerning the GEANT4 model: steel is not pure iron but is an alloy with a variable quantity of carbon (0.2% to 2.1% in weight). Does the Author know the composition of the steel blocks used in the experiments? Does this matter for the modelling with GEANT4? In other words, is it necessary to use the exact composition of steel instead of using pure Fe?

Page 649 (line 2): how is the standard deviation computed? Does the computation use Poissonian statistics (Lesparre et al., 2010)? If so, may we expect to significantly reduce the standard deviation by making measurements over a longer period? For instance, in Nagamine et al. (Proc. Japan Acad., 81, Ser. B 2005) "Probing the inner structure of blast furnaces by cosmic-ray muon radiography", an uncertainty of 0.2 g/cm³ is announced for a measurement period of 45 days. Could the Author give some comments about these results?

Is the low density found for the steel block (7.3 instead of 7.8 g/cm³) possibly attributable to background noise due to fortuitous events? Such events are likely to occur in a two-plane system as used in the experiments described in the paper.

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 643, 2012.

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