Corrected parts are highlighted with blue fonts in the text.

Anonymous Referee #2

1. In the abstract, on line 2 change "performed" to "planned", because this paper does not describe any muon radiography measurements.

Corrected.

2. On line 10, change "boreholebased measurement" to "borehole-based water gauge measurement"; this distinction is necessary because some groups are developing borehole-based muon detectors.

Corrected.

3. In the abstract and introduction, please state the geographical location (town? country?) where the test takes place.

"located in Shizuoka Prefecture, Japan." was added.

4. In Section 2 there are statements made about muon detectors that are specific to the authors' detector design and choice of PMT. It needs to be clear that the problems being solved are not general. Specifically on pg 721, line 20: Insert "Our" before "Conventional" (plastic scintillator is not the only way to detect muons underground).

Inserted.

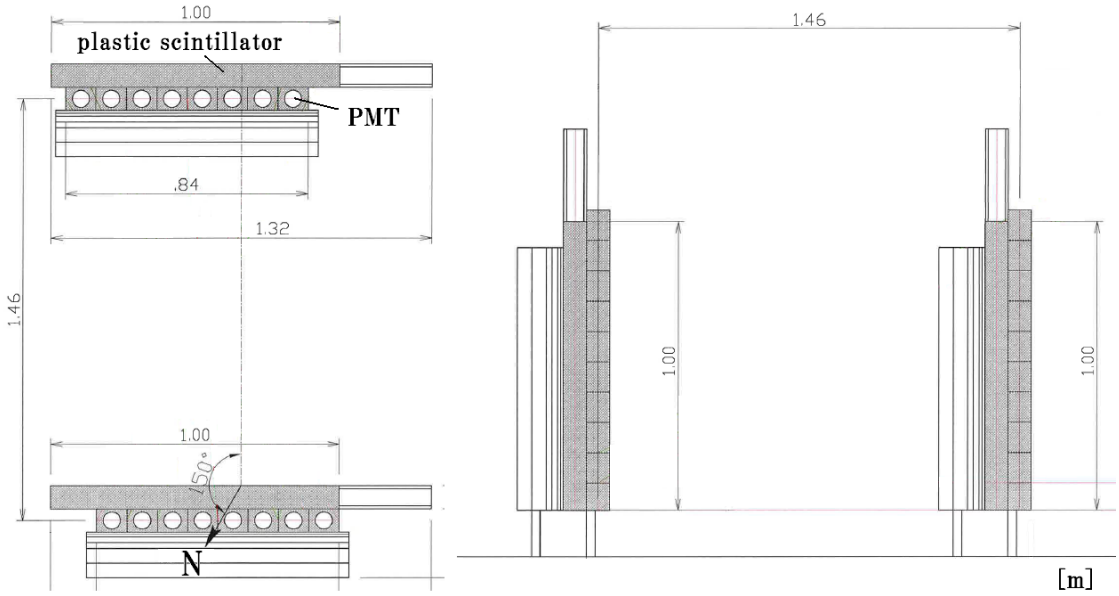
6. On pg 721, line 22: state the PMT model number and make it clear that the long HV cable requirement is specific to the authors' choice of PMT – there are other PMTs where compact HV supplies eliminate the need for long HV cables.

The HV power supply and long HV cable requirement is specific to our choice of PMT (Hamamatsu R7724) while there are other PMTs where compact HV supplies eliminate the need for long HV cables.

7. To better understand the problems on pg 722 lines 12-14 and 18-20, please consider

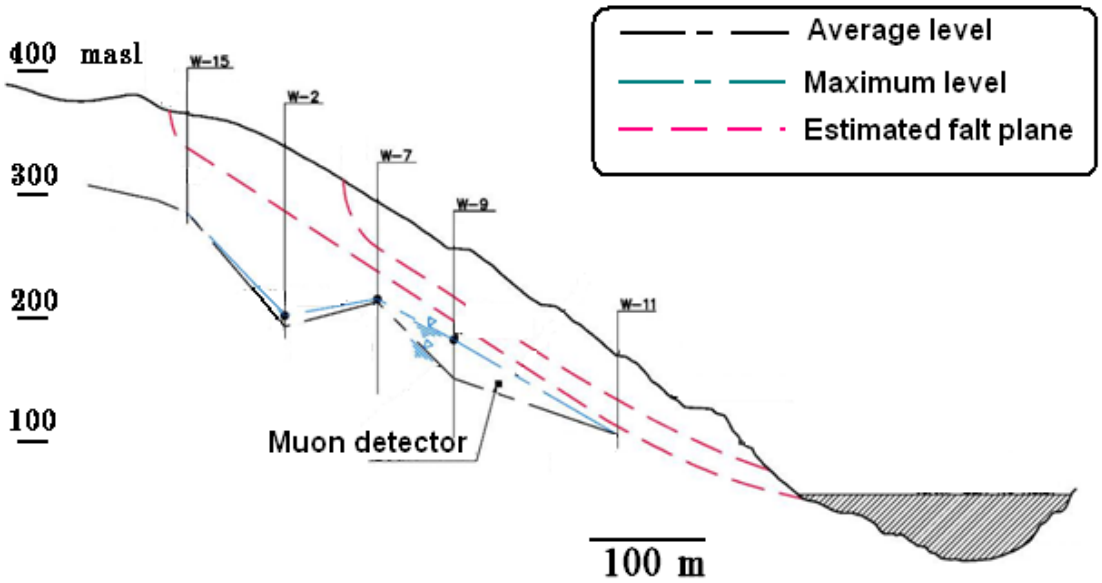
including a schematic of the detector design with dimensions.

The following figure was inserted.



8. Figure 2 needs a scale. The caption says there are lines that show the maximum and minimum water levels from 1999-2010, but I can't see them. Please make the description of all the lines clearer. Consider using a legend.

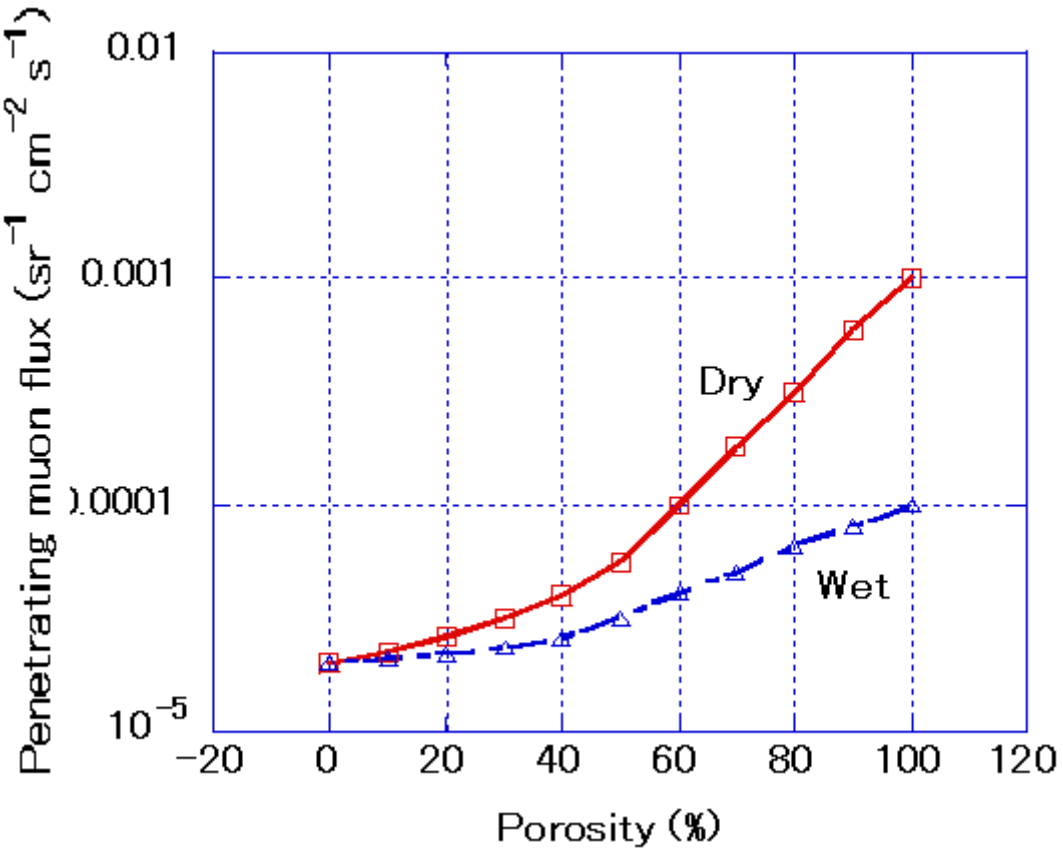
Corrected.



9. The justification on pg 726 for muon radiography is purely qualitative. There needs to be a calculation or simulation to justify that muon radiography would be useful.

We added the following paragraph and one figure.

As shown in Fig. 6, the underground water level can rise by 20-30 m. It is known that such an event happens when over 100 mm /day of rain is observed in the local area, and completely saturates the porous media above the water table. Under such conditions, the average density of the surrounding rocks drastically increases. Fig. 7 compares the penetrating muon flux before and after saturating the porous rock for different porosity. The rock thickness was assumed to be 200 m, which is corresponding to a typical path length of the rock overburden at the observation site. The density of the non-porous rock was assumed to be 2.5 g/cc. As shown in Fig. 7, as the rock porosity increases, the muon penetrating flux decreases. If the rock porosity is 10%, the penetrating flux is reduced by 10% when it is saturated with water. Such reduction can be measured by our present observation system.



pg 720, line 4: change "in a the drainage tunnel drilled underneath an the estimated fault plane" to "in a drainage tunnel drilled underneath the estimated fault plane". (2 errors here)

Corrected.

pg 720, line 5: change "In order to suppress the moisture effect" to "In order to suppress moisture effects" (2 changes here)

Corrected.

pg 720, line 6: change "Cockcroft-Wwalton photomultiplier tubes (CW-MPT)" to "Cockcroft-Walton photomultiplier tubes (CW-PMT)" (2 errors here)

Corrected.

pg 720, line 22: change "magnituide" to "magnitude"

Corrected.

pg 721, line 8: change "mechanical flucture zone" to "mechanical fracture zone"

Corrected.

pg 721, line 9: change "Similar type" to "A similar type"

Corrected.

pg 722, line 8: change "leakage current increase" to "leakage current to increase"

Corrected.

pg 722, line 8: change "power suply" to "power supply"

Corrected.

pg 722, line 9: remove "strongly"

Corrected.

pg 722, lines 10-11: no need to define HV again.

Corrected.

pg 722, line 11: change "including that includes a" to "including a"

Corrected.

pg 722, line 22: only capitalize the first letter of "Hamamatsu"

Corrected.

pg 723, line 5: change "has a the" to "has a"

Corrected.

pg 723, line 16: "bore holes" to "boreholes"

Corrected.

pg 724, line 3: "bore hole" to "borehole"

Corrected.

pg 724, line 20: For "1500 VDC.The", insert space before "The"

Corrected.

pg 725, line 3: insert space between "38" and "days"

Corrected.

pg 725, line 16: remove "repaired"

Corrected.

pg 726, line 11: remove "by muon radiography." at end of sentence

Corrected.

pg 726, line 21: change "dries" to "dry"

Corrected.

pg 730, for the temperature column heading, add C to make it clear this is celsius, not fahrenheit

Corrected.

Anonymous Referee #1
In relation to monitoring the water table to assess landslide risk, I feel there should be some numerical calculations as to the accuracy expected in calculating the groundwater level from a particular muon detector for a particular time interval. If this is done, I think the paper is complete.

We added the following paragraph and one figure.

As shown in Fig. 6, the underground water level can rise by 20-30 m. It is known that such an event happens when over 100 mm /day of rain is observed in the local area, and completely saturates the porous media above the water table. Under such conditions, the average density of the surrounding rocks drastically increases. Fig. 7 compares the penetrating muon flux before and after saturating the porous rock for different porosity. The rock thickness was assumed to be 200 m, which is corresponding to a typical path length of the rock overburden at the observation site. The density of the non-porous rock was assumed to be 2.5 g/cc. As shown in Fig. 7, as the rock porosity increases, the muon penetrating flux decreases. If the rock porosity is 10%, the penetrating flux is reduced by 10% when it is saturated with water. Such reduction can be measured by our present

observation system.