

## **Comments by Editor:**

Thank you for submitting your modifications to your manuscript. I have read with pleasure, in detail the manuscript and appreciate your efforts. However, I have included below a few more suggestions to improve the manuscript.

### **Comments by Editor (nhess-2018-192)**

#### **[Answers in blue]**

- Line 17-18. References shouldn't be included in an abstract. Please do include them but find better sections (like the introduction) to do so.

(2) The comment seems right to us and we introduce the change in the Introduction, lines 31-34.

(3) *“Landslides, one of the natural disasters, have resulted into significant injury and loss to human life and damaged property and infrastructure throughout the world (Varnes, 1996; Parise and Jibson, 2000; Dai et al., 2002; Guha-Sapir et al., 2004; Crozier and Glade, 2005; Kahn, 2005; Toya and Skidmore, 2007; Raghuvanshi et al., 2014; Girma et al., 2015).”*

- Line 32. Remove 'the' such that it reads: '...and loss to human life...'

(2) The comment seems right to us and remove 'the'.

(3) *“Landslides, one of the natural disasters, have resulted into significant injury and loss to human life.....”*

- Line 40. Start new paragraph after 'Fall et al., 2006).', (instead of starting this paragraph at line 42-43).

(2) Ok, now it is:

(3) *“..... areas, landslide hazard zonation (LHZ) techniques can be employed (Anbalagan, 1992; Guzzetti et al., 1999; Casagli et al., 2004; Fall et al., 2006).*

*Landslides are resulted because of intrinsic and external triggering factors. The intrinsic factors are mainly; geological factors, geometry of the slope (Hoek and Bray, 1981; Ayalew et al., 2004; Wang and Niu, 2009). “*

- Line 48. Replace ‘models’ by ‘categories’ such that it reads: ‘Within these categories, we want to highlight....’

(2) I accepted.

(3) *“Within these categories, we want to highlight the empirical .....*”

- Line 55. Replace ‘next’ by ‘following’ and move reference such that it reads: ‘During the following few decades, Fellenius (1936) introduced...’.

(2) Ok, now it is:

(3) *“During the following few decades, Fellenius (1936) introduced .....*”

- Line 66. Write out ‘MDE’.

(2) This is a misinterpretation from the Spanish, it should be DEM (Digital Elevation Model).

(3) *“.....in more extensive areas using GIS technology and ‘DEM’ (Digital Elevation Model) ...”*

- Line 66. Replace ‘software’ by ‘models like: ’

(2) Ok, it is now, as follows:

(3) *“.....models like: software TRIGRS, .....*”

- Line 70. Replace ‘They are widely..’ by ‘These are widely...’

(2) Ok, this has been changed

(3) *“.....These are widely.....”*

- Line 74-77. This sentence is hard to read. Maybe rewrite sentence ‘The idea of discretizing... of this model.’, to something like: ‘One of the achievements of the presented study is to discretize the potential slip mass

in the critical profile of the slope, once unstable areas have been detected through the HZD programs.’

(2) Ok, thank you.

(3) *“One of the achievements of the presented study is to discretize the potential slip mass in the critical profile of the slope, once unstable areas have been detected through the ‘HZD’ programs.”*

• Line 76. Write out ‘HZD’.

(2) Ok.

(3) *“.....the ‘LHZ’ (landslide hazard zonation) programs .....”*

• Line 77. Replace ‘This calculation tool....’ to something like: ‘The TS calculation tool is...’

(2) Thank you.

(3) *“The TS calculation tool is.....”*

• Line 78. Replace ‘...which others do not allow.’ To something like: ‘...which often other models do not accommodate for.’.

(2) thank you again.

(3) *“... which often other models do not accommodate for.....”*

• Line 79. I’m not sure that ‘ru’ is in ‘....Spencer ru we...’. Explain/correct.

(2) Ok. New wording and explanation introduced as follows:

(3) *“We use in our algorithm the hydrological variable ‘ $r_u$ ’ of Spencer, to consider the infiltration of rainfall in the calculation of stability of the considered slope.”*

• Line 82. Correct ‘... engineering for LAS year.’

(2) Ok, done.

(3) *“Limit equilibrium types of analyses for assessing the stability of earth slopes have been in use in geotechnical engineering for last years. “*

- Line 83. Add ‘packages’ so it reads: ‘....commercial software packages like....’

(2) ok, change done.

(3) *“.....commercial software packages like.....”*

- Line 86-87. ‘are still being studied..’. I’m not sure what you mean by ‘still being studied’. Are you studying them? Please better explain.

(2) Ok. New wording and explanation introduced.

(3) *“.....Currently there are other slope stability models based on the theory of limit equilibrium that are still in analysis and testing, as is the case with the SSAP software package (Borselli, 2012).”*

- Line 88-89. Rephrase so it reads: ‘Secondly, sometimes for commercial models, the introduction of parameters to perform calculations are not very interactive.’

(2) ok, change done.

(3) *“Secondly, sometimes for commercial models, the introductions of parameters to perform calculations are not very interactive.”*

- Line 107. Rewrite so it reads to something lie: ‘The above-mentioned software packages provide useful tools....’.

(2) ok, thanks.

(3) *“The above-mentioned software packages provide useful tools for determining.....”*

- Line 173. Double check, not sure what the word ‘FOS’ means in ‘the slope FOS (FS) can be .....’.

(2) ok, we have removed FOS. Now it is as follows:

(3) *“According to equations (4) and (5), the slope can be considered unstable if its value of the safety factor ‘Fs’ is lower than 1, .....*”

- Line 246-247. I’m unsure what you mean by ‘..., the value of N is entered into the user code, plus divisions of the sliding mass, more accuracy but greater need for computer capacity’. Could amount of detailed information maybe left out? I’m not sure if it adds anything to better explain the study.

(2) New wording and explanation introduced.

(3) *“It must be taken into account that the mass susceptible to sliding must be divided into a sufficient number of slices. This value is entered into our code through the parameter 'N'. In the application example of our algorithm, the sliding mass was divided into N = 500 slices, this value of N is entered into the code by the user, who decides the value of that parameter. The greater the number of slices in which we divide the sliding mass, the calculation will be more accuracy. N = 500 slice, we consider it a balanced value for an optimal calculation, which relates two fundamental parameters (computer calculation capacity / capacity accuracy).”*

- Line 249. Reword the Figure 2 header. Maybe to something like: Figure 2. Idealized cross section of a slope. In this example, the center...’.

(2) ok, done.

(3) *“**Figure 2.** Idealized cross section of a slope. In this example, the center .....*”

- Line 334. Change ‘other model’ to ‘other models’ (so plural).

(2) thanks.

(3) *“However, other models, .....*”

- Line 338. Replace ‘This model’ by ‘The TS model...’

(2) ok, thank you.

(3) *“The TS model can .....*”

- Line 343. Replace ‘Our model programme has another advantage...’ to ‘The TS model has an additional advantage...’

(2) Done.

(3) *“The TS model has an additional advantage: ..... ”*

- Line 374-377. Rewrite such that it reads to something like: ‘For this example, we used data of IGN, the Spanish National Geographic Institute(<http://centrodedescargas.cnig.es/CentroDescargas>), and downloaded bit map MTN25, that is a 1: 25000 topographic map in ETRS89 coordinates and UTM projection.’

(2) Done.

(3) *“For this example, we used data of IGN, the Spanish National Geographic Institute (<http://centrodedescargas.cnig.es/CentroDescargas>), and downloaded bit map MTN25, that is a 1:25000 topographic map in ETRS 89 coordinates and UTM projection.”*

- Remove line 380-382 ‘The map file...among others,’, and rewrite the rest of the sentence such that it reads: ‘Figure 8 shows the area of the case study.’

(2) Done.

(3) *“Figure 8 shows the area of the case study.”*

- Line 383-384. Rewrite so it reads something like: ‘From this map we obtained the topographic information to acquire all necessary profiles to study the landslide.’

(2) Done.

(3) *“From this map we obtained the topographic information to acquire all necessary profiles to study the landslide.”*

- Line 441. Rewrite 2nd sentence so it reads: ‘Rainfall data has been provided by the Meteorological ....’

(2) Done.

(3) *“Rainfall data has been provided by the Spanish Meteorological Agency (Station of Viñuela).”*