Assessment of shallow seated landslide size and magnitude characteristics: An example from Northeastern Turkey

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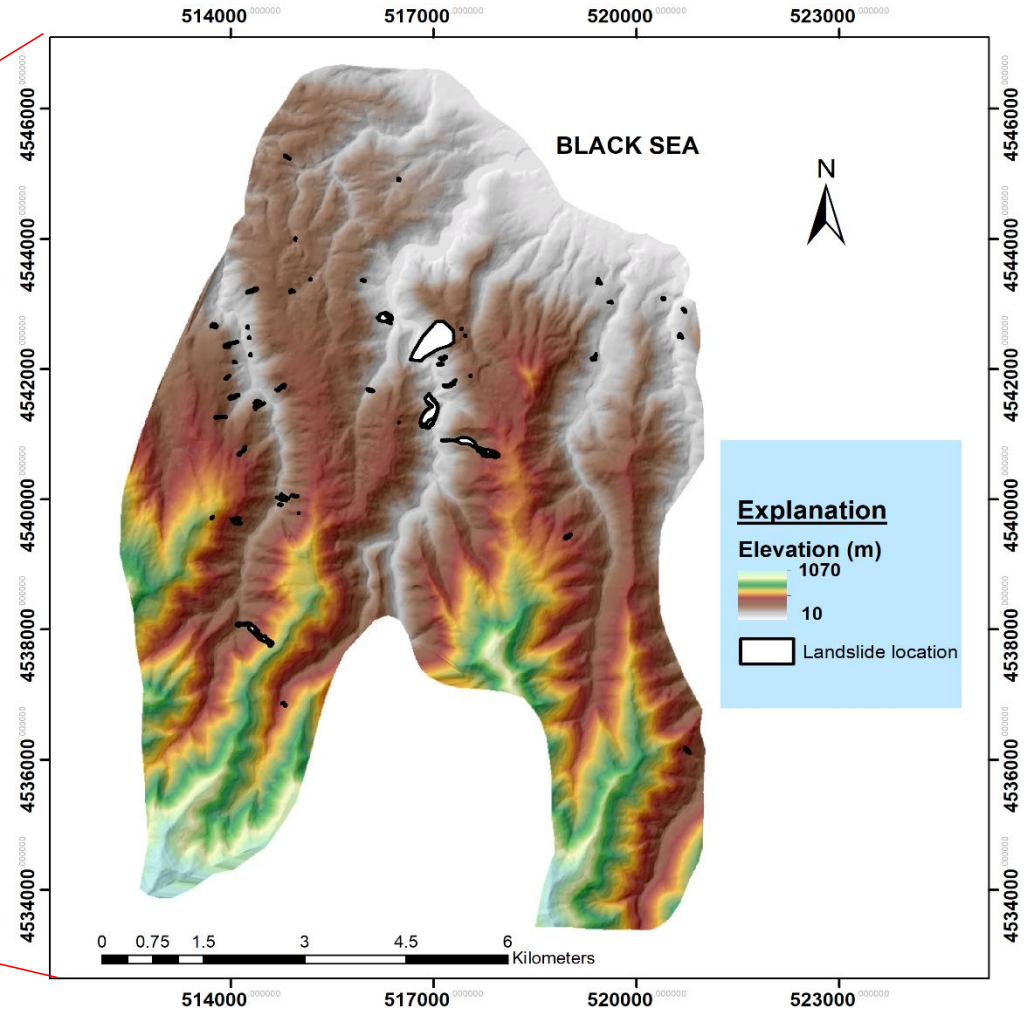
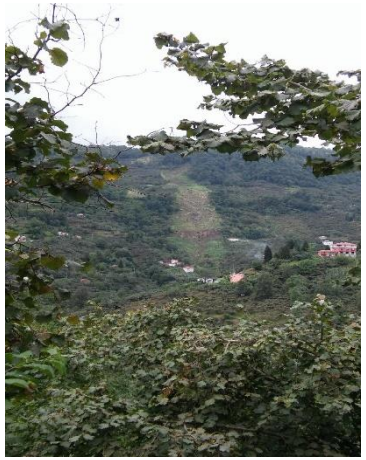
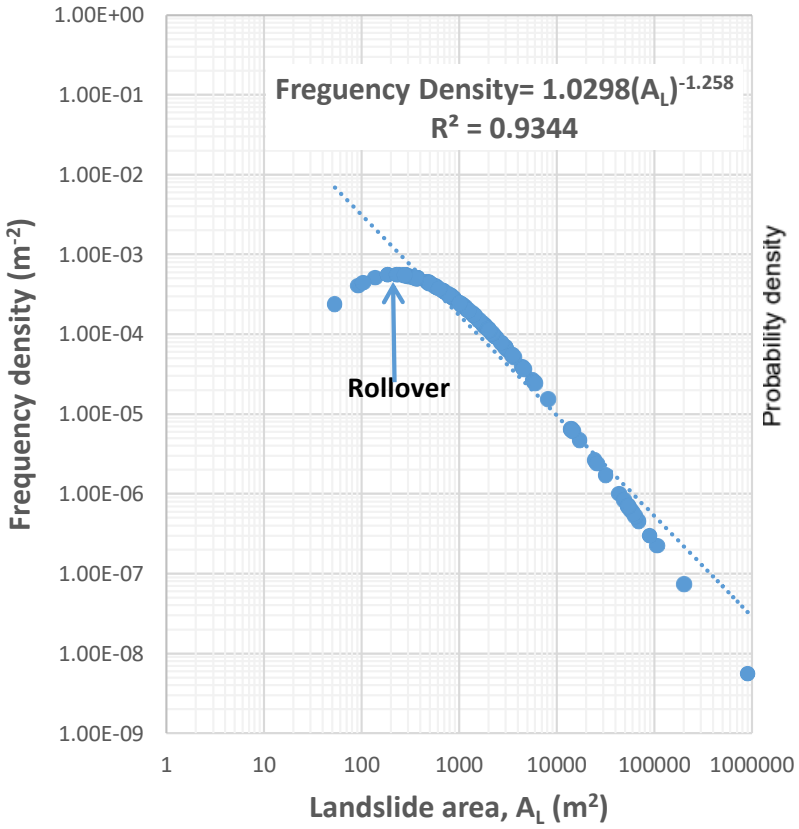
- **Purpose of the study:** Landslides occurred in the Northeastern part of Turkey are generally classified to be shallow seated landslides or earthflow type based on Varnes (1984) classification. These landslides are occasionally seen in the weathered Eocene or Upper Crateceous aged volcanic and volcano-clastic rocks. Although there are considerable studies both directly on these landslides in point of mapping and hazard assessment, there is no any studies concerning size and magnitude characteristics of them. By considering this point, an assessment of size and magnitude characteristics of shallow seated type landslides at an area where is one of most landslide prone area of Turkey was carried out.
- **Study Area:** The investigation area is totaly covered by Eocene aged volcano-clastic lithology, and the weathering is widespread due to the climatical conditions in the area. The extend of the area is 140 square kilometers. In the area, 120 landslides were mapped by a multiple image interpretation that is from the years of 2000 to 2019.
- **Material and Method:** Google Earth images were used. In the area, the area (A_L) of the landslide mapped differs from 53.28 m^2 to 902,809 m^2. The landslide size data was analyzed by an R code based script, namely LStats provided by Rossi and Malamud (2014).

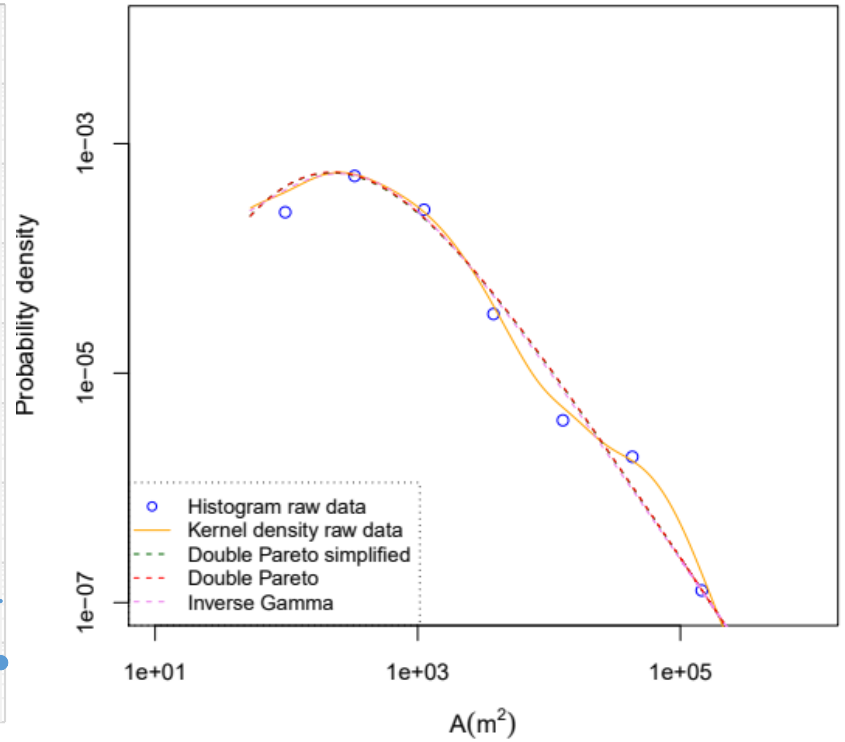




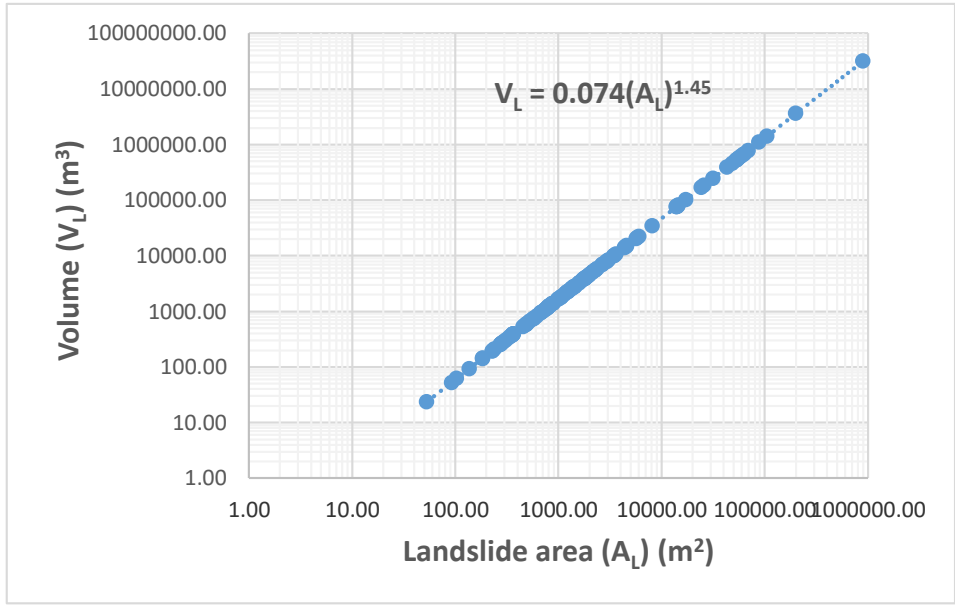
Field views of some of landslides



The power-law relation between landslide size and frequencies in the area.



Landslide size probability distribution in the area, estimated by Kernel density estimation.



Relation between the landslide volume and area.

Results

According to the one-sampled Kolmogorov-Smirnov tests, P-value of the estimation was calculated as 0.30. The distribution parameters α, β, and t were obtained as follows: 1.38, 5.0, and 1883.43.