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Tsaoling Landslide-1999, Taiwan

- Slip surface is too gentle about 14° to generate a landslide, even if there were an earthquake tremor.
- Slaking of shale is inferred to be one of the major causes of the intermittent retrogressive development of landslides (Chigira et. al., 2003).

Excessive settlement of Ataturk dam

- As the reservoir level started to rise, weathered vesicular basalt used in the rock-fill section of the dam started to slake seriously (Cetin et. al., 2000).

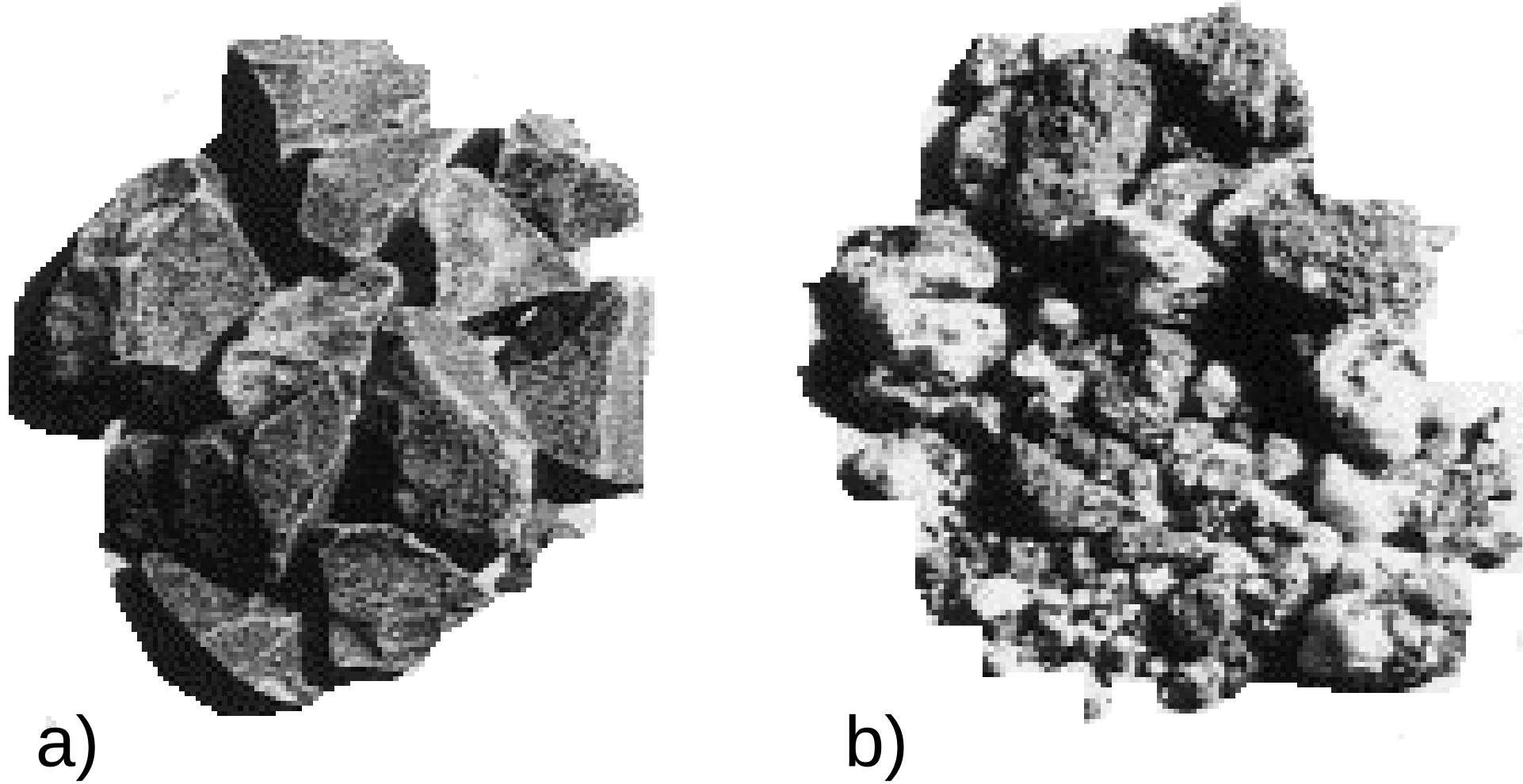


Fig. 2 Basalt rock a) sound b) Slaked after slake durability test

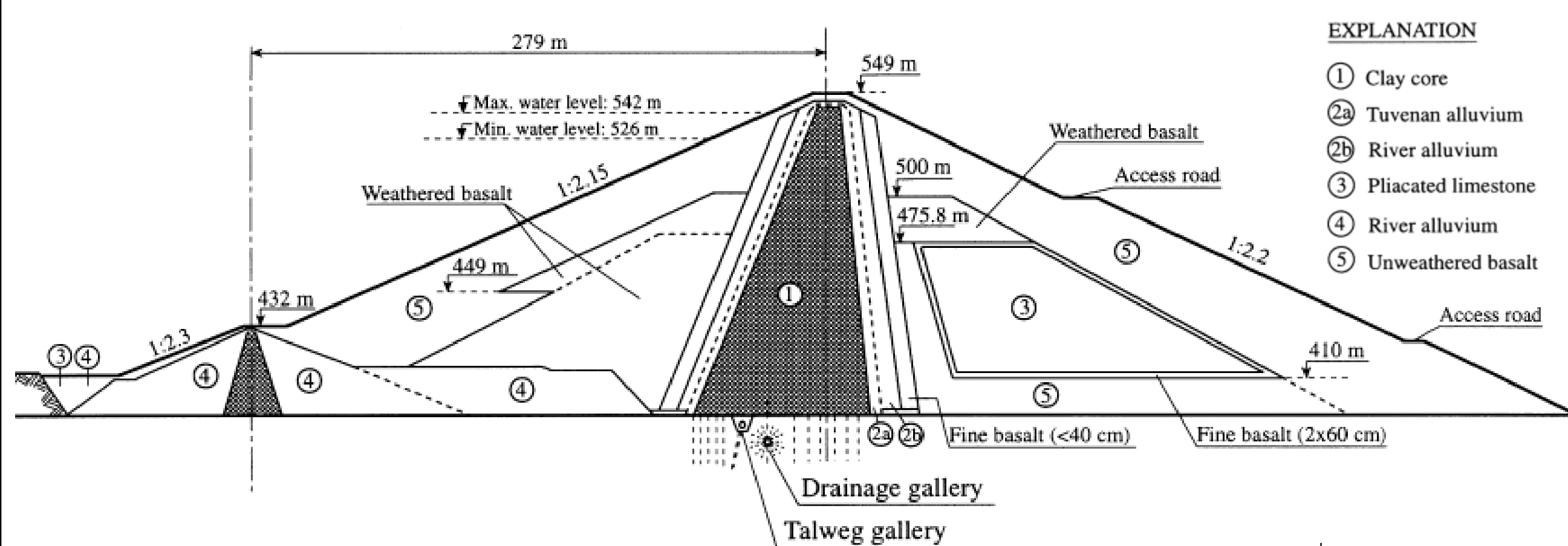


Fig. 3 Cross-section of Atratuk dam, Turkey

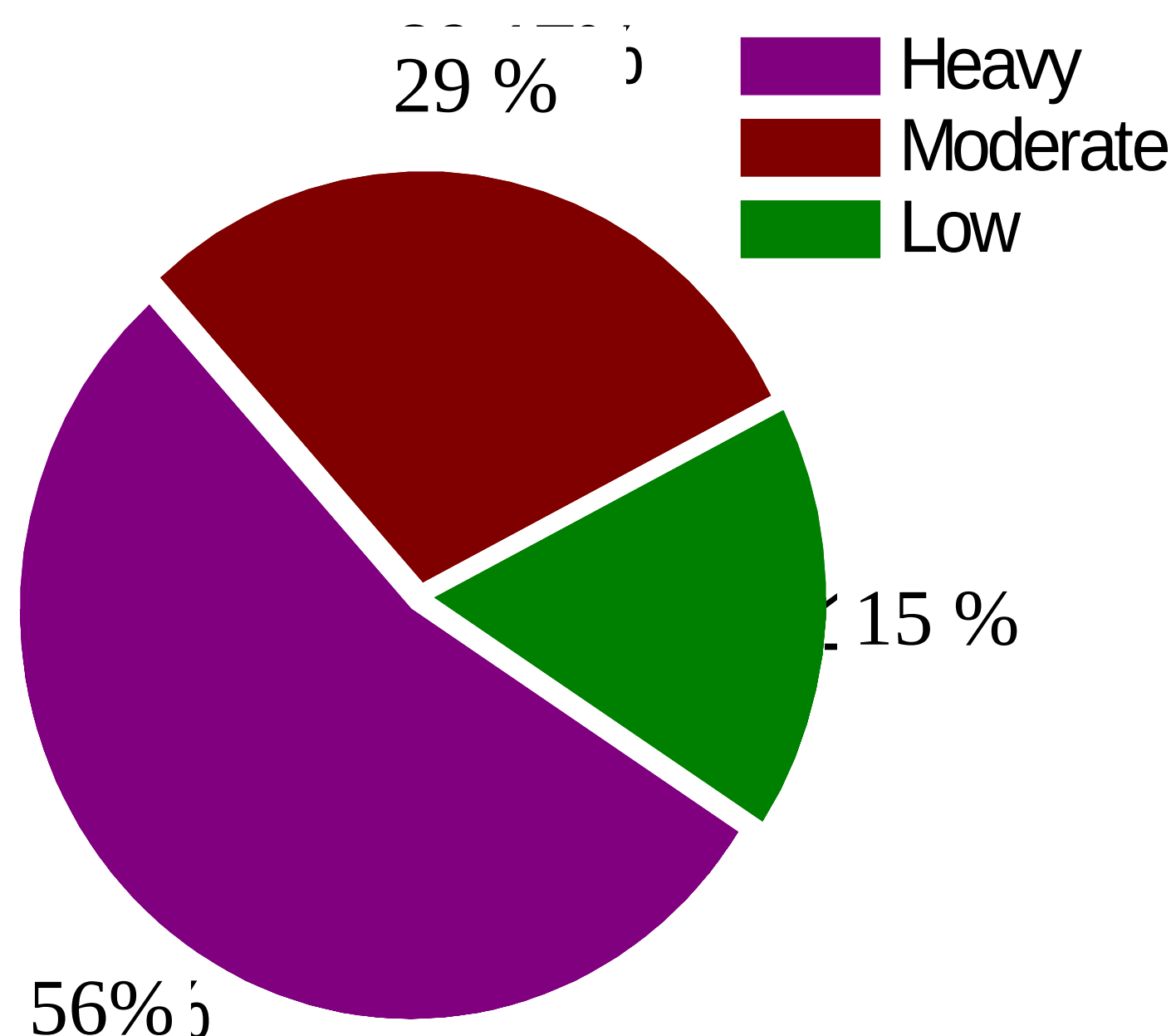


Fig. 6 Landslides in soft sedimentary formation classified by rainfall intensity (Huang et al, 2011 etc.)

About 40 % of total rainfall induced landslide occur in soft sedimentary rock formation (Fig. 5) . Out of these landslides, about 15 % of rainfall induced landslides is found to occur due to light rainfall (Fig. 6).

Landslides occurred on 11 Nov, 2009 just after 4 days moderate rainfall followed by 2 years long drought in **Kilimanjaro area, Tanzania** (Fig. 7).

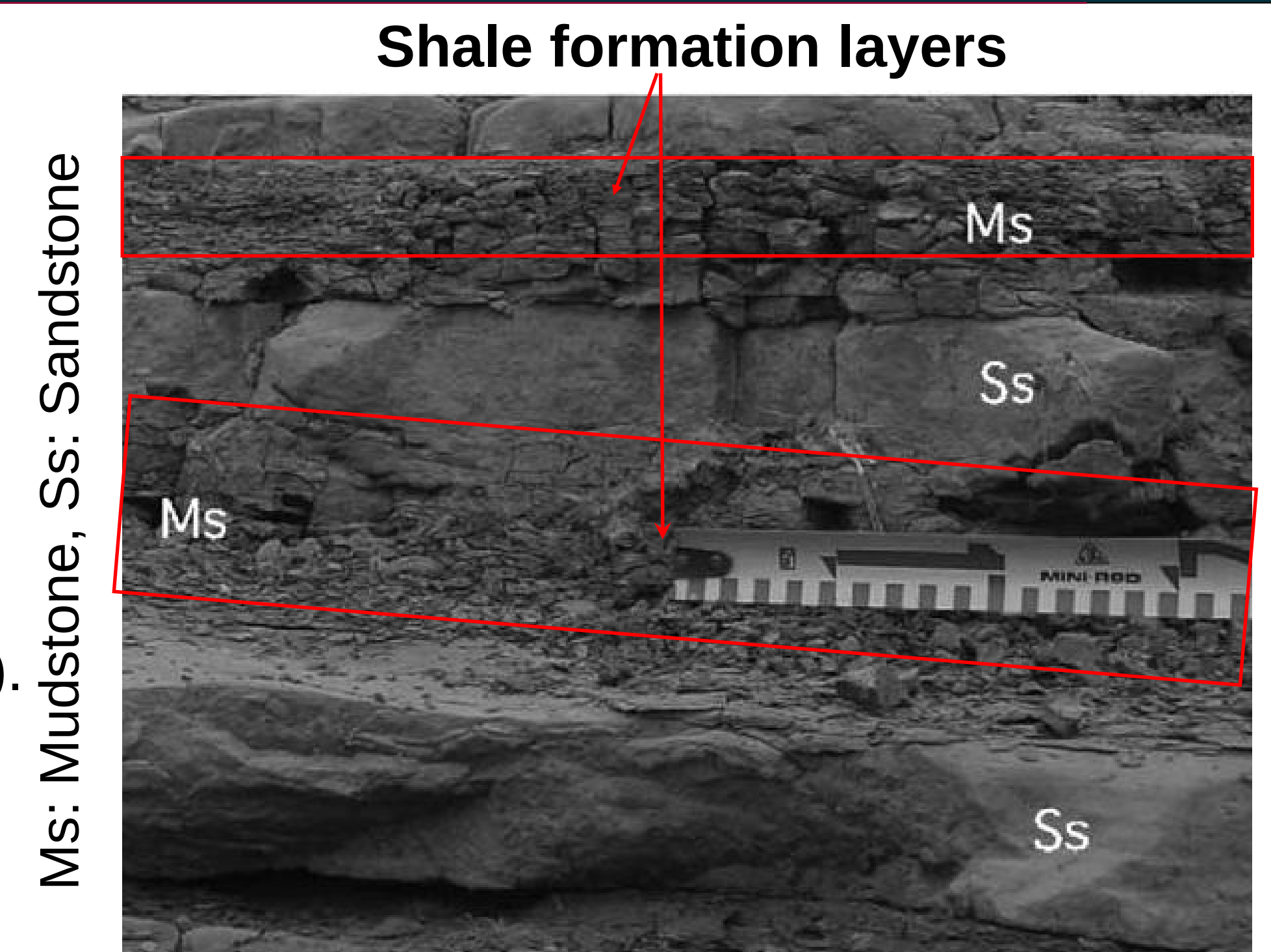


Fig.1 Shale intercalated with sandstone which is fragmented but sandstone is not.

Slope instability along Bandung-Majalengka Highway, Indonesia

- Serious landslides problems are seemed to occur along highway due to slaking of grey massive clay stones

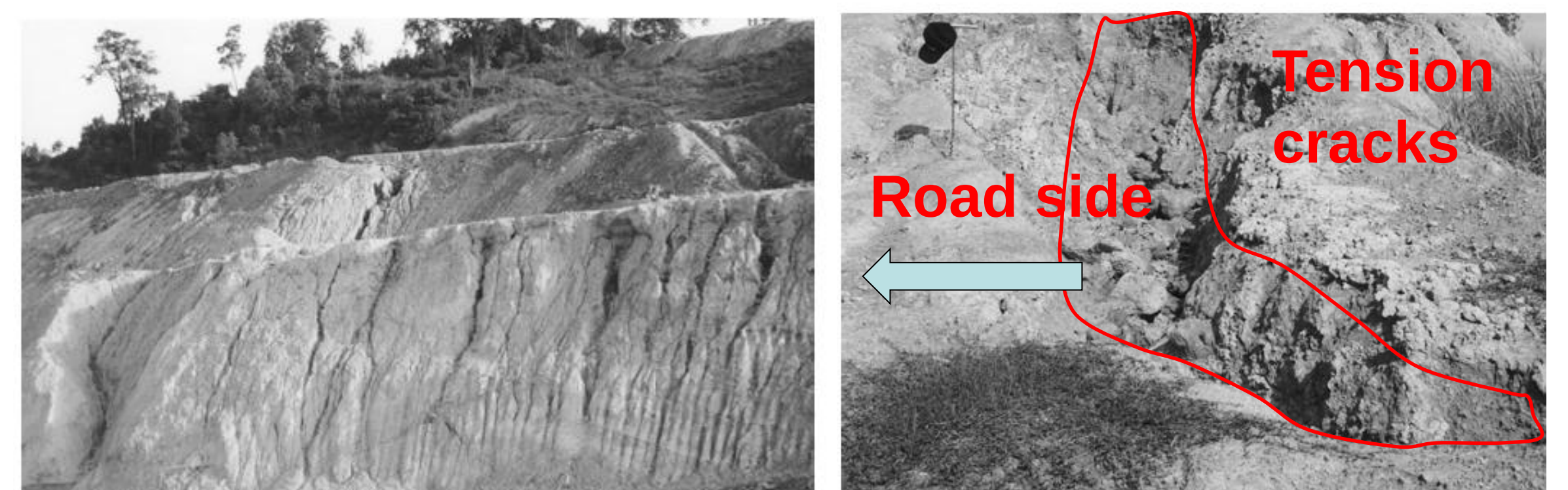


Fig. 4 Excessive erosions of slopes(right) and large tension of crack in the upper surface (left) due to slaking

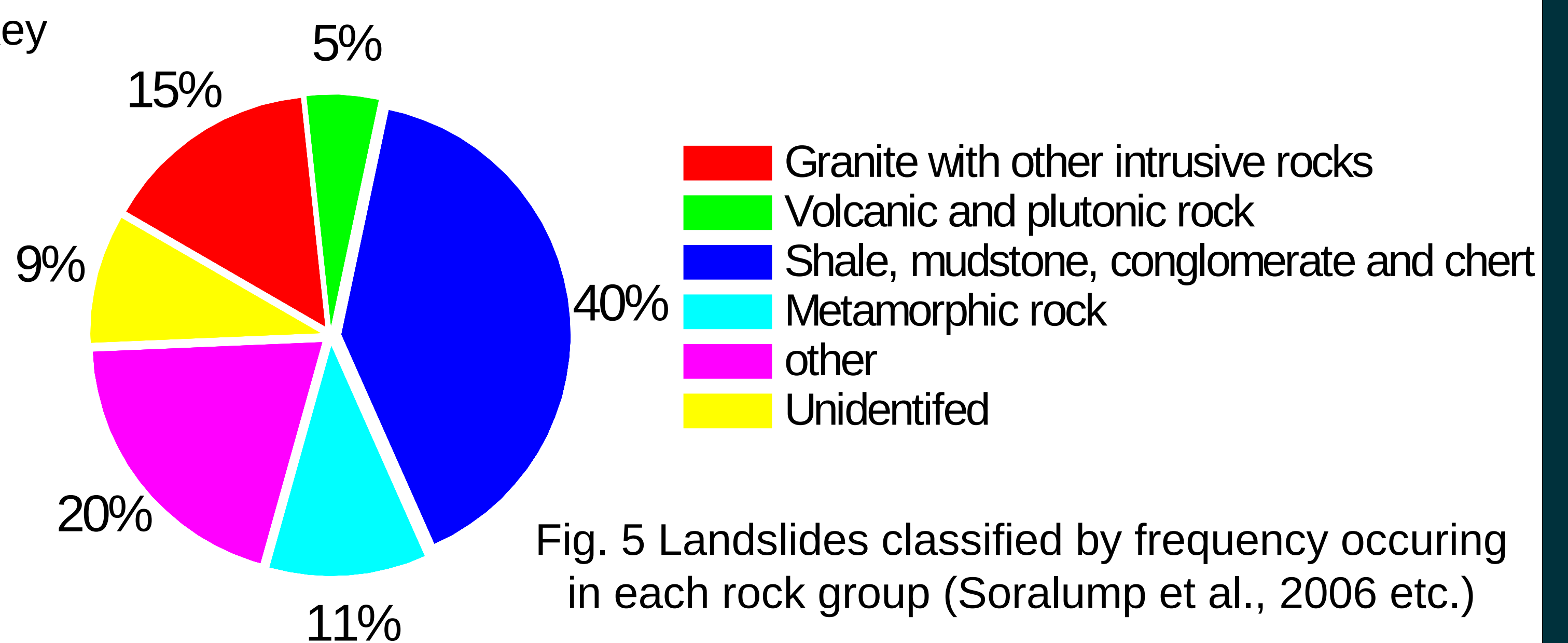


Fig. 5 Landslides classified by frequency occurring in each rock group (Soralump et al., 2006 etc.)

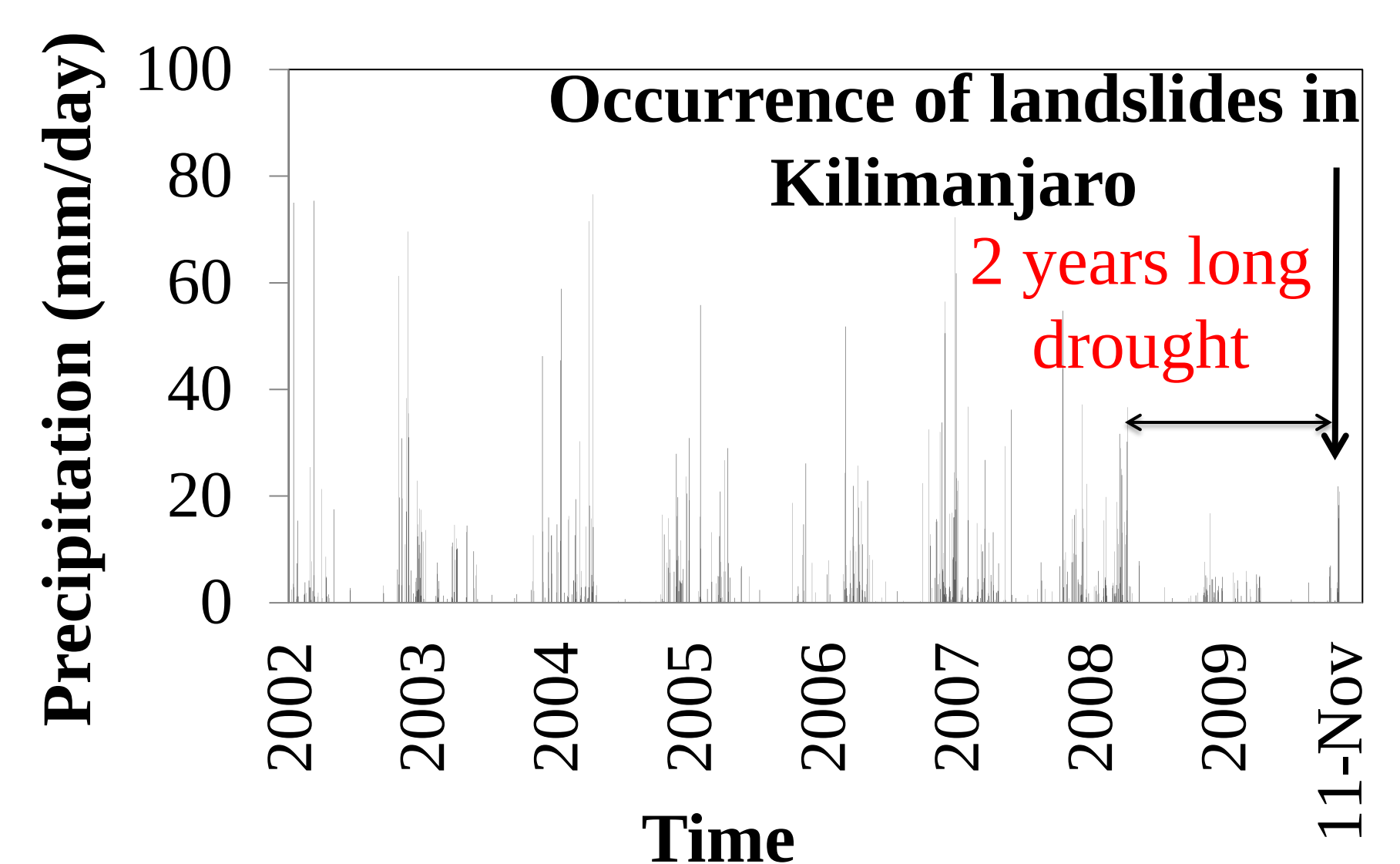


Fig.7 precipitation by TRMM

➡ These type of engineering failure have demonstrated that conventional method typically used in geotechnical engineering practices are not adequate for determining the stability of slakable geomaterials.