Supplementary Material

# Supplementary Figures and Tables

Immagine che contiene mappa

Descrizione generata automaticamente

**Supplementary Figure 1.** Geological map of the Seymareh landslide area. The geological data are provided by the National Iranian Oil Company (NIOC) at a scale of 1:100,000 (Setudehnia and Perry 1967, Takin et al. 1970, Macleod 1970). The traces of the geological cross sections shown in following supplementary figures are reported. The coordinate reference system is WGS84.



**Supplementary Figure 2.** Geological cross section n. 1.



**Supplementary Figure 3.** Geological cross section n. 2.



**Supplementary Figure 4.** Geological cross section n. 3.



**Supplementary Figure 5.** Geological cross section n. 4.

Immagine che contiene testo

Descrizione generata automaticamente

**Supplementary Figure 6.** Geological cross section n. 5.



**Supplementary Figure 7.** Geological cross section n. 6.



**Supplementary Figure 8.** Geological cross section n. 7.



**Supplementary Figure 9.** Geological cross section n. 8.



**Supplementary Figure 10.** Geological cross section n. 9.

Immagine che contiene testo

Descrizione generata automaticamente

**Supplementary Figure 11.** Geological cross section n. 10.



**Supplementary Figure 12.** Geological cross section n. 11.

Immagine che contiene testo

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**Supplementary Figure 13.** Geological cross section n. 12.



**Supplementary Figure 14.** Geological cross section n. 13.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | | | | | | |
|  | | **Total Debris** | **Asmari Formation Debris** | | **Pabdeh-Gurpi Formation Debris** | |
| **Area (km2)** | | **188.12** | **135.36** | | **52.76** | |
| **Maximum thickness (m)** | | **380** | **300** | | **380** | |
| **Volume (km3)** | | **43.97** | **35.76** | | **8.20** | |
| **Average thickness (m)** | | **233** | **264** | | **---------** | |
| **B** | | | | | | |
| **Morphometric Parameters** | | | | **Seymareh landslide dam** | | **Kashkan Landslide dam** |
| **The landslide dam volume, Vd (km3)** | | | | 43.97 | | 43.97 |
| **The catchment area, Ab (km2) (Report of Iranian Ministry of Energy)** | | | | 974.9 | | 2073 |
| **The maximum crest height of the landslide dam, Hd (m)** | | | | 380 | | 230 |
| **The landslide volume, Vl (km3) (Roberts and Evans, 2013)** | | | | 38 | | 38 |
| **The width of the dammed valley, Wv (km)** | | | | 12 | | 14 |
| **The local longitudinal slope of the channel bed, S** | | | | 0.0012 | | 0.011 |
| **C** | | | | | | |
| **Index** | **Landslide dam stability** | | | **Index values for Seymareh landslide dam** | | **Index values for Kashkan landslide dam** |
| **Blockage Index** | BI = 3 threshold ratio for formation lakes 4 > BI > 3 unstable dams  5 > BI > 4 uncertainties  BI > 5 stable and existing lakes | | | **7.65** | | **7.32** |
| **Dimensionless Blockage Index** | DBI < 2.75 stability domain  2.75 < DBI < 3.08 uncertain domain  DBI > 3.08 instability domain | | | **0.92** | | **1.03** |
| **Morphological Obstruction Index** | MOI > 4.60 formed dam 3 < MOI < 4.60 uncertain evolution MOI < 3 not formed dam | | | **6.5** | | **6.43** |
| **Hydromorphological Dam Stability Index** | HDSI > 7.44 stable dam  5.74 > HDSI < 7.44 formed uncertain evolution  HDSI < 5.74 unstable dam | | | **10.51** | | **9.22** |

**Supplementary Table 1.** Morphometrical parameters of Seymareh landslide dam.