Online Resource 2: Captions for Animations accompanying "The 2022 Chaos Canyon landslide in Colorado: insights revealed by seismic analysis, field investigations, and remote sensing"

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Online Resource 2 (OR2_AnimationCaptions.pdf): Captions for SHALTOP simulations

Online Resource 3 (OR3_Main28June2022_Coulomb_delta29p5.mp4): Best fitting SHALTOP simulation using the Coulomb rheological law for the main 28 June 2022 landslide. This simulation uses a single friction angle of $\boldsymbol{\delta}$=29.5° and corresponds to Figure S5. Animation shows the evolution of flow thickness over time.

Online Resource 4 (OR4_Remobilization_Hayashi1992_mean_Coulomb_delta23.mp4): SHALTOP simulation of a remobilization of the entirety of the Chaos Canyon landslide deposits using the Coulomb rheological law with an effective friction coefficient (μ) estimated using the mean H/L value for a volume of 2.1 million m^3 from the relationship derived by Hayashi and Self (1992) for subaerial non-volcanic landslides, μ=0.42 ($\boldsymbol{\delta}$=22.8°). This simulation corresponds to Figure S6b in Online Resource 1.

Online Resource 5 (OR5_Remobilization_Hayashi1992_plus2std_Coulomb_delta28.mp4): Same as Online Resource 6 but low mobility scenario estimated using an effective friction coefficient 2 standard deviations below the mean using data compiled by Hayashi and Self (1992) for subaerial non-volcanic landslides, μ=0.52 ($\boldsymbol{\delta}$=27.5°). This simulation corresponds to Figure S6a in Online Resource 1.

Online Resource 6 (OR6_Remobilization_Hayashi1992_minus2std_Coulomb_delta19.mp4): Same as Online Resource 7 but the high mobility scenario in which the effective friction coefficient was estimated using 2 standard deviations below the mean μ=0.35 (δ=19.2°). This simulation corresponds to Figure S6c in Online Resource 1.

Online Resource 7 (OR7_Remobilization_matchHayashiHL_muI_delta11.mp4): Alternate SHALTOP simulation of a remobilization of the deposits where the *μ(I)* rheology was tuned until the runout distance achieved an H/L value equal to that predicted for this landslide volume by Hayashi and Self (1992), H/L=0.42. This was achieved for friction angles of $\boldsymbol{\delta}_1$=11°, $\boldsymbol{\delta}_2$=21° and a mean particle size of 1 m. This simulation corresponds to Figure S7a in Online Resource 1.

Online Resource 8 (OR8_Remobilization_Lucas2014_mean_delta18.mp4): Alternate SHALTOP simulation of a remobilization of the deposits where the Coulomb rheology law was utilized with the effective friction angle estimated by Lucas et al. (2014) of $\boldsymbol{\delta}$=18° (μ=0.32). This simulation corresponds to Figure S7b in Online Resource 1.

Online Resource 9 (OR9_Remobilization_Corominas_debrisflow_mean_delta12.mp4): Alternate SHALTOP simulation of a remobilization of the deposits where the Coulomb rheology law was utilized with the effective friction angle estimated as the H/L ratio by Corominas (1996) for debris flows H/L=$\boldsymbol{\delta}$=12° (μ=0.21). This simulation corresponds to Figure S7c in Online Resource 1.