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Precariously Balanced Rocks provide new constraints on long-term fault activity and seismic hazard in the Negev and along the Arava section of the Dead Sea Transform

Noam Ganz (1), Yaron Finzi (1), Ory Dor (2), Michael Tsesarsky (3), and Ramon Arrowsmith (4)

(1) Dead Sea and Arava Science Center, Mitzpe Ramon, Israel (ganzim1@gmail.com), (2) Ory Dor, Consultant, Geology for Planning and Design, Israel (ory@orydor.com), (3) Ben Gurion University of the Negev, Beer Sheva, Israel (michatse@bgu.ac.il), (4) Arizona State University, Tempe, Arizona (ramon.arrowsmith@asu.edu)

Precariously Balanced Rocks cannot withstand strong ground motion. If a strong earthquake occurs in their vicinity they are likely to break or topple. By evaluating the stability of PBRs and determining their age, it is possible to constrain the maximum PGA that has occurred at PBR sites during their life time. This methodology has been proven as effective in evaluating the maximal magnitude on faults and fault systems around the world, and has been applied to improve both deterministic and probabilistic seismic hazard analysis.
In the Negev desert, slender, in situ rock pillars constitute a particularly important subset of PPRs as their seismically induced motion may be amplified. Amplification occurs in pillars with a natural frequency of 1-10 Hz, corresponding to seismic wave frequency which is predominant away from the source rupture of earthquakes.
We present an interactive Negev-PBR database and online tools to perform stability analysis and initial evaluation of the natural frequency of rock pillars. The online interface will enable scientists to derive seismic implications based on various constraints. The data was used to constrain the maximum magnitudes along faults of the central Sinai-Negev shear zone and the Arava section of the Dead Sea Transform and to re-evaluate plausible regional ground shaking intensities. We infer that the maximum magnitude that occurred along the Negev faults in the past 1300 years is of magnitude M5, and that along the Central Arava section of the Dead Sea Transform the maximum magnitude is of M6.5-7. This suggests that historic earthquakes the occurred during the life span of the PBRs were probably not as strong as previously thought.