
Comparing short-term and long-term fault slip-rates across Iran

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Abstract

Iran is a region of widespread active deformation, faulting, and earthquakes. Our knowledge of the rates and distribution of active faulting across Iran have arisen through complementary geodetic and geologic studies over the last fifteen years, and we are now at a point where most of the deforming regions are covered by relatively dense GPS networks, and where the long-term slip-rates and earthquake histories of many of the major strike-slip and reverse faults have been determined through field-based geomorphological and palaeoseismological studies. We present a comparison of fault slip-rates derived from geomorphological studies, and of decadal strain accumulation across those faults measured using GPS and InSAR. Our comparison indicates that the present-day strain accumulation across the major fault zones is consistent with the long-term Holocene (10 ka) and late Pleistocene (10-100 ka) average slip-rates. From our analysis it is not possible to say whether or not shorter variations in slip-rate and strain accumulation still occur, though any such variations must average out over periods of 10 ka. Comparison of the present-day fault slip-rates with cumulative bedrock displacements across the faults, and also with independent geological estimates of mountain building where available, allow us to comment on the timing of initiation of deformation in the various mountain ranges across Iran and its surroundings.

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