Geodesy, active tectonics, and seismic risk in the Basin and Range, western US

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Abstract: Dense, high-precision GPS-geodesy networks provide an unprecedented picture of the ongoing surface deformation of the western United States. These data can be used to infer strain accumulation in the continental crust, and this serves as a proxy for assessing potential seismic hazard. In the vicinity of rapidly-slipping plate boundary faults, such as the San Andreas fault, strain accumulation rates predicted from geodesy are similar to strain release rates determined from historic earthquakes and paleoseismic studies on these faults, and the faults appear to exhibit both characteristic recurrence intervals between earthquakes and characteristic slip magnitudes. In more slowly deforming intracontinental regions, such as the Basin and Range of Utah and Nevada, strain accumulation rates on faults derived from geodesy are less easily related to historic and paleoseismic earthquake catalogs. Long-term (10s of thousands of years) earthquake chronologies on faults in this region exhibit significant temporal variability in earthquake recurrence intervals and slip magnitudes. At least some of this temporal variability may be ascribed to climatic fluctuations that impact near-surface stresses imposed by mountain glaciers and pluvial lakes. Such variability provides an inherent uncertainty in the assessment of local and regional seismic hazard throughout the interior of the western US.

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****** Everyone is invited – refreshments will be served ******
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