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Recurrence intervals between earthquakes strongly depend on history

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We study the statistics of the recurrence times between earthquakes above a certain magnitude M in California. We find that the distribution of the recurrence times strongly depends on the previous recurrence time τ_0. As a consequence, the conditional mean recurrence time $\hat{\tau}(\tau_0)$ between two events increases monotonically with τ_0. For τ_0 well below the average recurrence time τ, $\hat{\tau}(\tau_0)$ is smaller than τ, while for $\tau_0 > \tau$, $\hat{\tau}(\tau_0)$ is greater than τ. Also the mean residual time until the next earthquake does not depend only on the elapsed time, but also strongly on τ_0. The larger τ_0 is, the larger is the mean residual time. The above features should be taken into account in any earthquake prognosis.