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Projection of magnitudes of past aftershocks to the largest possible magnitude of next aftershocks

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We combine Omori law, Gutenberg-Richter law and Vere-Jones's statistics of extremes to forecast the largest magnitude of aftershocks after time t based on magnitudes and times of the aftershocks that occurred prior to time t. Use of the average parameter estimates may result in significant overestimation of the forecasted magnitude. Instead, we apply Monte-Carlo approach to simulate posterior distributions of the Bayesian estimates of parameters and thus find the overall distribution of the expected largest aftershock magnitude. To evaluate results we introduce a criterion, probability gain. This criterion compares the actual realization of a set of forecasts relative to the forecasts based on the magnitudes of the mainshocks only. Applying our approach to the aftershock sequences of more than 300 worldwide mainshocks of magnitude 6.5+ we demonstrate at high probability gain for times larger than 1 day after the mainshocks. The research was supported by Russian Science Foundation (Project 16-17-00093).