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Assessing maximum magnitude of the later aftershocks

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Strong aftershocks after large earthquakes often pose a hazard comparable to the main shock. Significant part of the devastating aftershocks occurs within first hours after the main shock. The hazard of those aftershocks is intrinsically bounded to the main shock, because the danger of the construction collapses right after earthquakes is generally evident. The hazard assessment of later aftershocks is however an independent task. A feature of this task is a possibility to use the information about the early aftershocks, and not only parameters of the main shock. Here we concentrate on the estimation of the magnitude of the strongest later aftershock. We compare two basic approaches. The first is based on the Reasenberg-Jones model of the aftershock decay formed by an independent temporal decay of the number of aftershocks according to the Omori-Utsu law, and the magnitude-frequency distribution according to the Gutenberg-Richter law. The second approach is based on the “generalized” Omori law, the study of the decay of various physical characteristics of the relaxation process through aftershocks, such as total scalar seismic moment, total faults area etc. The decay of those characteristics generally follows a power law, similarly to the number of event obeying Omori law. The research is supported by the Russian Science Foundation (Project No. 16-17-00093).