Forecasting Aftershocks from Multiple Earthquakes: Lessons from the Mw=7.3 2015 Nepal Earthquake

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The Omori decay of aftershocks is often perturbed by large secondary events which present particular, but not uncommon, challenges to aftershock forecasting. The Mw = 7.8, 25 April 2015, Gorkha, Nepal earthquake was followed on 12 May by the Mw = 7.3 Kodari earthquake, superimposed its own aftershocks on the Gorkha sequence, immediately invalidating forecasts made by single-mainshock forecasting methods. The complexity of the Gorkha rupture process, where the hypocentre and moment centroid were separated by some 75 km, provided an insurmountable challenge for other standard forecasting methods. Here, we report several modifications of existing algorithms, which were developed in response to the complexity of this sequence and which appear to provide a more general framework for the robust and dependable forecasting of aftershock probabilities. We suggest that these methods may be operationalised to provide a scientific underpinning for an evidence-based management system for post-earthquake crises.