

Collaboratory for the predictability study of the aftershock sequence following the 2011 off the Pacific coast of Tohoku earthquake: A preliminary result

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An earthquake forecast testing experiment in Japan, launched on 1 November 2009, is carried out as part of the international “Collaboratory for the Study of Earthquake Predictability (CSEP).” The 11 March 2011 off the Pacific coast of Tohoku earthquake with magnitude 9.0 occurred in the testing region “All Japan” which covers the whole territory of Japan including about 100 km offshore and down to a depth of 100 km. It provides a good opportunity to test the registered forecast models in the one-day class applied to the “All Japan” against the observed aftershock sequence of this earthquake. To avoid any bias, the CSEP testing is performed after a delay that allows for manual revisions of earthquake locations by the network operators. This procedure warrants a stable catalog for testing. In Japan, this delay is several months and thus does not allow for testing operational earthquake forecasting which relies on low-latency data for forecast generation. Introducing the preliminary determined catalog available immediately after the 2011 Tohoku earthquake, will be a first step to move from testing only scientific earthquake forecasts to testing operational earthquake forecasts. Such operational forecasts may in the future be used for guidelines for civil protection during increased aftershock hazard. Here, we present the recent progress of the CSEP experiment in Japan. The special focus is to discuss strategy and preliminary results of testing against the aftershock sequence of the 2011 Tohoku earthquake, using a mixture of the JMA catalog with final solution, the JMA preliminary determined catalogs, and the NIED catalog of Hi-net automatically located events. This test comprises several variants of space-time clustering models: HIST-ETAS5pa, HIST-ETAS7pa, ETAS, ERS, and ETES.