

Seismicity before and after the 2016 Kumamoto earthquake sequence

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We present the significant seismicity during the 2016 Kumamoto earthquake (Yano & Matsubara, 2017) and compared them with the background seismicity over 10 years due to JUICE catalog (Yano, Takeda, Matsubara, & Shiomi, 2017) in which all inland shallow hypocenters were determined by NIED Hi-net are re-determined by hypoDD.

We have investigated the detailed seismicity in the area of for the 2016 Kumamoto Earthquake sequence for significant activity by comparing before and after the mainshock. We relocated aftershocks of the largest earthquake with magnitude (M) of 7.3 occurred on April 16, 2016 following the second largest earthquake with M 6.5 on April 14, 2016. A total 5,272 events contain in three different subgroups; 1) events ($M > 0$) during a period between M 6.5 event and the M 7.3 event, 2) events ($M > 0$) after the M 7.3 event to April 19, 3) otherwise event ($M > 3$) from April 19 to April 27, 2016.

The double-difference method (hypoDD; (Waldhauser & Ellsworth, 2000)) using cross-correlation of waveform data as well as the ordinal differential picking time was adopted in this study. Waveforms obtained at excellent coverage of station distribution from multi-organizations such as NIED Hi-net, JMA, Kyushu university, and Kagoshima university are adopted for preparing both cross-correlation of their waveform data and ordinal differential picking time data for differential travel times used by hypoDD.

The relocated earthquake distribution is shown in the figure. The result reveals sharper lines and confined clusters. Particularly for this study area, the hypocenter distributions are easily traceable along the known active fault traces such as the Hinagu fault range while the Futagawa fault range shows more complicated shapes than the Hinagu fault. Orientations of these planes agree the strike direction of the focal mechanisms estimated from the first motion P phase arrivals determined by the NIED Hi-net.

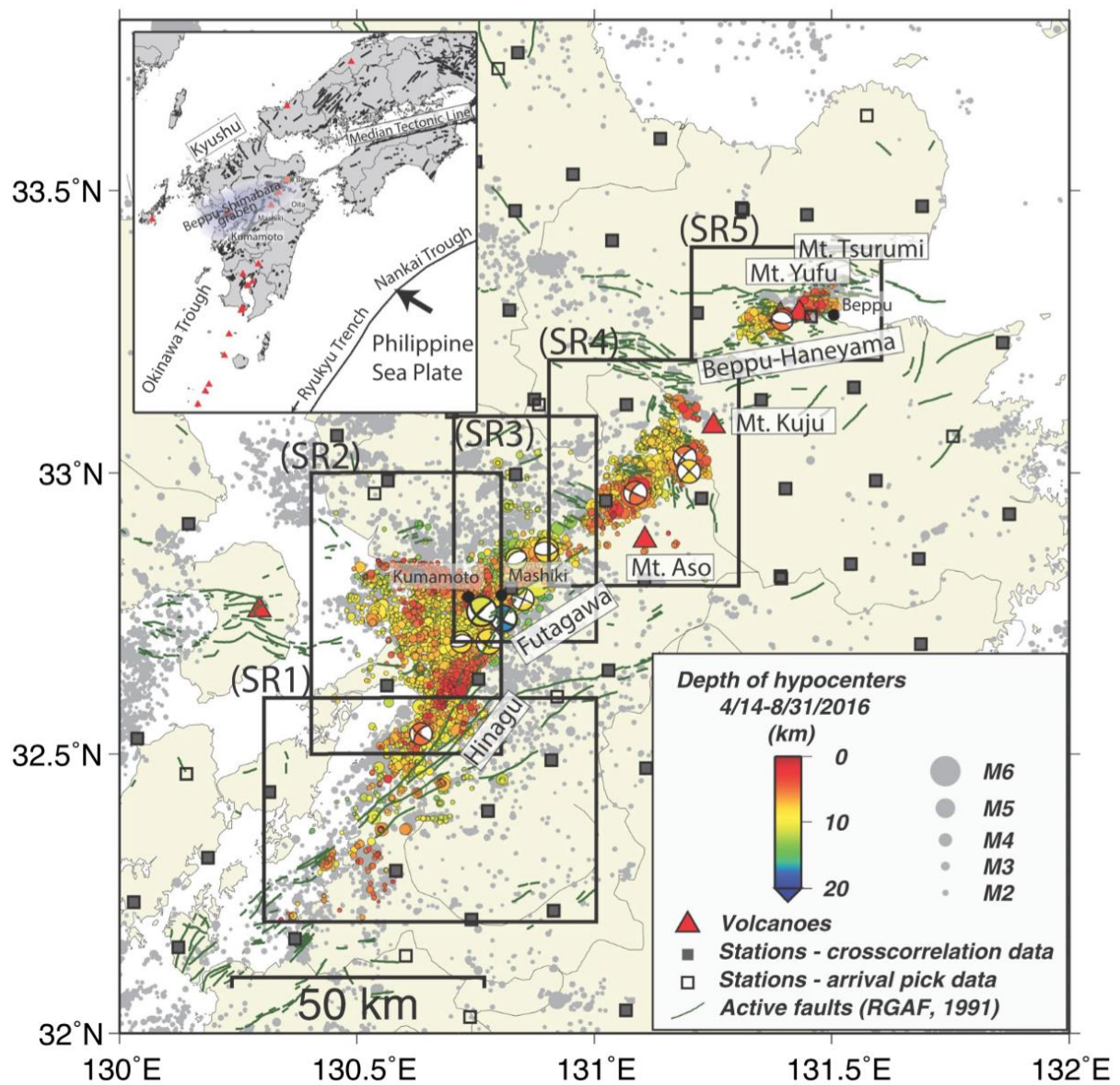


Figure 1. Map of epicentral distribution relocated using hypoDD and station distribution (Yano & Matsubara, 2017)

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