Stress tensor inversion in focal area of the 2016 Mw7.8 Kaikoura earthquake, New Zealand

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We study spatio-temporal change of stress field of the 2016 Kaikoura earthquake in the northern area of South Island of New Zealand. Data from both the 51 temporary stations and 22 GEONET stations were used. Data collection was from March 2011 to December 2017. We derived focal mechanisms using HASH (Hardebeck and Shearer, 2002), By focal mechanism solutions of earthquake, we estimated stress fields of main shock of Kaikoura earthquake before and after. We used SATSI (Hardebeck and Michael, 2006] for stress tensor inversion. In our previous result (Sato, 2017 master's thesis in Tohoku University), there is possibility that on-fault aftershocks bias the result of stress tensor inversion. Therefore, by using Kagan angle between mainshock fault model and each focal mechanism, we remove aftershock on the faults, and perform stress tensor inversion. We use the fault model by Hamling et al. (2017). In a result, Kagan angles of many earthquakes are large, so this means that many aftershocks occurred off the fault plane. The results do not depend on threshold of Kagan angle. Obtained stress tensor inversion after main shock in areas near London Hill Fault and near Kekerengu fault are strike-slip fault type with SHmax orientation of ˜N115E, which is almost same as for before the Kaikoura earthquake (e.g., Sibson et al., 2012; Townend et al., 2012), and stress tensors before and after the mainshock didn't appear to change after the earthquake beyond the estimation error. However, in the area near the hypocenter of the main shock we still cannot get a stable stress tensor. Also we plan to obtain results of a stable stress tensor for before the main shock by increasing the number of focal mechanisms of earthquakes that we examine.