

SEQUENCE OF SIX M7-SIZED EARTHQUAKES IN THE NORTHEASTERN JAPAN PRECEDING TOHOKU-OKI EARTHQUAKE MARCH 11, 2011

Deasy Arisa^{1*}, Kosuke Heki¹

¹Department of Natural History Sciences, Faculty of Science, Hokkaido University

A sequence of M 7-class interplate earthquakes and postseismic slips following each of these earthquakes occurred along the Japan Trench before the occurrence of the giant earthquake on March 11, 2011. Several calculations of the earthquakes in northeastern Japan area including 2003 to 2011 M7-sized earthquakes are conducted to analyze the plate deformations on the Northeastern Japan. The analyzing processes include the measurement of the coseismic jumps of six M7-sized events occurring in October 31, 2003; August 16, 2005; May 8, 2008; July 19, 2008; March 14, 2010 and March 9, 2011. The postseismic slips which continuously occur following the earthquakes (some earthquakes in Miyagi, Fukushima, Iwate and Ibaraki) are also calculated. Both coseismic and postseismic slips are believed to closely relate to 3.11 Tohoku-oki earthquakes. Two mathematical models are used in the calculation and followed by the parameter adjustment using Okada formula to obtain the best parameter of the plate displacement. The parameter adjusted in Okada formula are included the length of displacement/rupture area, together with width, depth, dip angle, and dislocation length and rake angle. These parameters are then used to calculate the seismic moment and magnitude moment based on geodetic approach. These calculations revealed that the total moment released by these slips was much larger than the coseismic ones. These seismic moments will lead us to the conclusion about characteristic of coseismic and postseismic deformations in the Northeastern Japan area which differs from our understanding about the postseismic process that the postseismic deformation and slip are smaller than the coseismic deformations.

Keywords: Interplate earthquakes, Postseismic, Coseismic, Deformation, Slip, Seismic moment