

Time series modeling of the postseismic deformation after the 2011 Tohoku earthquake

*Shunsuke Miura¹, Mako Ohzono²

1. Department of Earth and Environmental Sciences Graduate School, Yamagata University, 2. Faculty of Science, Yamagata University

Time series of the postseismic deformation is often explained by superposition of the logarithmic and exponential time evolutions, which assumes the afterslip and the viscoelastic relaxation, respectively. For the 2011 Tohoku-oki earthquake (M9.0), eastern side of GNSS network is well explained by superposition of those functions (e.g., Tobita, 2015). Miura and Ohzono (2015) also explained postseismic time evolution using F3 daily solution at the 93 GEONET sites in wide region of Tohoku for four years after the earthquake. The estimated time constants of the horizontal component of afterslip and viscoelastic relaxation are ~7 days and ~2500 days, respectively. The vertical displacement has large signal of viscoelastic relaxation along the east coast of the study area. Focusing on spatial distribution of the estimated each signal for four years, we compare our result with other postseismic models. Our result of afterslip estimation shows large horizontal displacement of 100cm at Yamada in eastern part of Iwate. Around this site, from Kwai2 to Rifu in fore-arc relatively large displacements (< 80 cm). This pattern roughly agrees with other result of afterslip modeling (e.g., Silverii *et al.*, 2014; Yamagiwa *et al.*, 2014). On the other hand, some sites that have clear signal are not explained by the previous studies. The vertical displacement pattern, which shows obvious trend in the time series, may be cannot explained by the model. Although the maximum signal of the viscoelastic relaxation is smaller than that of the afterslip, it distributes more extensive region including back-arc side. This uniform displacement pattern will be mostly explained by simple viscoelastic model.

Keywords: postseismic deformation, tohoku earthquake