

## Preliminary Static fault model of the 2011 M9.0 Honshu Earthquake based on GPS data

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We estimate a static fault model of the M9.0 Honshu Earthquake on March 11, 2011. The analyzed data are 3-dimensional GPS displacement vectors, which we read from the published material by the Geospatial Information Authority of Japan (GSI).

[http://www.jishin.go.jp/main/chousa/11mar\\_sanriku-oki/p05.gif](http://www.jishin.go.jp/main/chousa/11mar_sanriku-oki/p05.gif)  
[http://www.jishin.go.jp/main/chousa/11mar\\_sanriku-oki/p07.gif](http://www.jishin.go.jp/main/chousa/11mar_sanriku-oki/p07.gif)

We invert surface displacement data to estimate the slip distribution on the curved plate interface as shown in Fig. 1. Fault slip responses are calculated assuming an elastic half space model, and the minimum slip constraint is applied in the geodetic inversion.

Fig.2 shows the estimated slip distribution. The maximum fault slip is about 10m, east off the Ojika Peninsula (~38.5N). The estimated slip area extends over about 400km in the North-South, and about 200km in the East-West direction. Assuming the rigidity of 40 GPa, the estimated seismic moment amounts to  $2.17 \times 10^{22}$  Nm, equivalent to Mw8.8. The current model explains about 96% of the observed GPS displacement.

Fig.3 and Fig.4 show comparison of observed (black) and calculated (white) data for horizontal as well as vertical components. The model is still preliminary and fails to reproduce vertical displacement pattern in the northern half. Because of the a priori constraint applied, the estimated seismic moment should be considered as the lower limit. We will continue effort to improve our model.

Fig. 1 Plate configuration

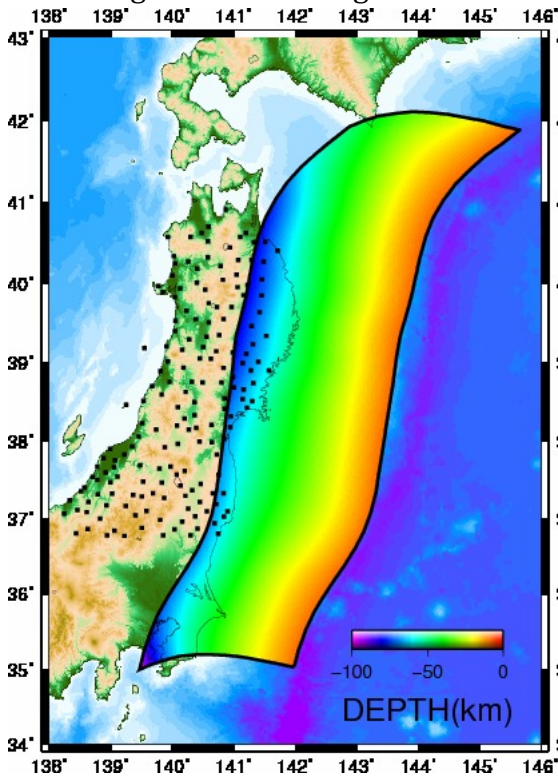


Fig.2 Slip distribution

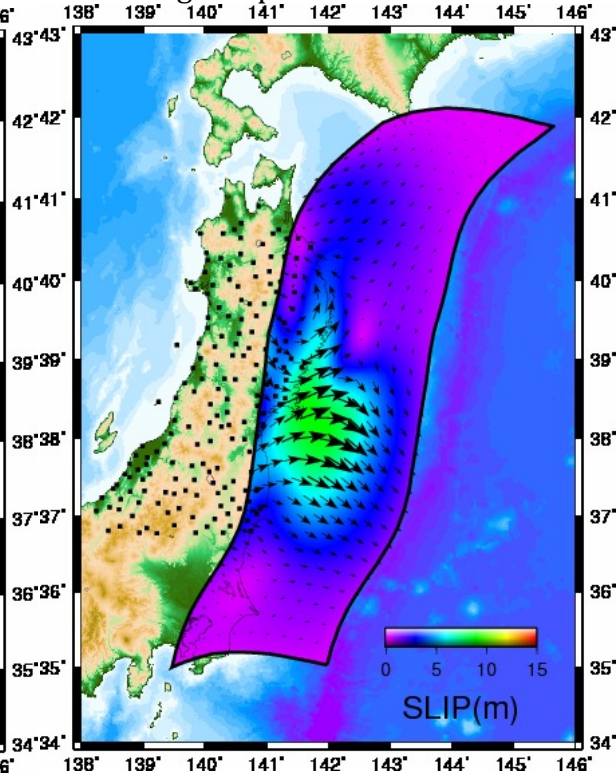


Fig.3 Horizontal displacement

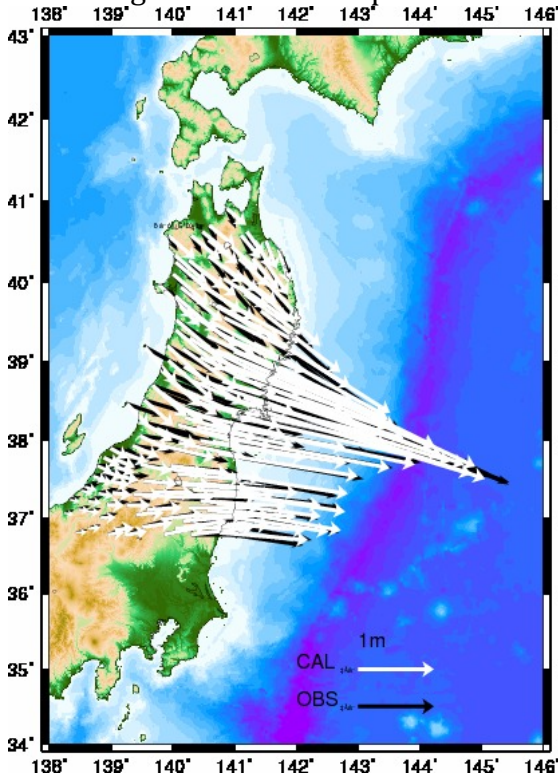


Fig.4 Vertical displacement

