

## Constraints on early stage rupture process of the 2011 Tohoku-oki earthquake from 1 Hz GPS data

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From the comparison of observed 1 Hz GPS data with simple forward computation that evaluates near and intermediate field terms, we put constraints on the early stage rupture process of the 2011 Tohoku-oki earthquake. Mainly based on the time difference in the onset of large eastward displacements at stations along the northern coast of the source region, we estimated that the first significant moment release started around 35 km west of the hypocenter determined by JMA. The moment release continues about from 20 s to 35 s after the initiation of the earthquake. Significant moment release around the hypocenter and in the near-trench region starts from 25 s and 35 s at earliest, respectively. Clear opposite motion that follows large eastward displacement observed at many stations is due to the intermediate S-wave term.

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