

## Possible recovery of slip deficit rate offshore of Iwate, northeast Japan

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Analysis of global positioning system (GPS) data shows an increase in westward ground velocity in Iwate, northeast Japan, from around early 2003. There are two candidates that cause this westward transient in Iwate. First one is the after slip of the September 2003 Tokachi-oki earthquake and the second one is a change in the slip deficit rate offshore of Iwate. With regard to the first candidate, the transients at many GPS sites do not coincide with the timing of the September 2003 Tokachi-oki earthquake and it is difficult for the afterslip model to explain westward transient motion in Iwate. In addition, time evolution of the westward transients in Iwate seems to be monotonous and different from that of the postseismic deformation which shows large movement immediately after the earthquake and gradually subsides. From these reasons, we assume that westward transients in Iwate from early 2003 are caused by a change in the slip deficit rate offshore of Iwate and estimate the spatiotemporal evolution of the slip deficit distribution on the plate boundary, applying a square-root filter to the time series of ground displacements from January 1999.

Our analysis of a time series of displacements shows that westward slip deficit rate increased, covering the source region of the 1994 Sanriku-oki earthquake from January 2003 after a roughly constant slip deficit rate offshore of Iwate for the period from January 1999 to January 2003. This latest change in westward slip deficit rate occurred 8 years after the 1994 earthquake, indicating that recovery of slip deficit rate was not yet finished for a period between 1994 and 2003. Although we could not find a plausible after-slip model of the 2003 Tokachi-oki earthquake that could explain the increased westward velocity in the Iwate area because of the reasons mentioned in the section of introduction, we cannot yet rule out such a possibility completely. At the very least, the accumulation of more data will enable us to elucidate whether the observed rate change in the westward motion in the Iwate area lasts or ceases over time. At present the westward transient is still continuing.