

Changes of In-Situ Stress after The 2011 off the Pacific coast of Tohoku Earthquake

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Abstract

In-Situ stress in Tohoku region was changed with the 2011 off the Pacific coast of Tohoku Earthquake. Therefore, in this study, I performed in-situ rock stress measurement. The measurement site is Kamaishi mine in Iwate prefecture. This study uses two types of measurement methods, which is the compact conical-ended borehole overcoring technique (CCBO) and successive measurement of borehole bottom strain. CCBO was performed three times which is one, two and three years after the 2011 Tohoku earthquake. Successive measurement of borehole bottom strain was performed in 2years which is period of two to four years after the earthquake.

All of principal stress at one year after the earthquake is bigger than before. After that, stresses get smaller as time passes and become same level stress of before the earthquake at three year after the earthquake. Speaking about stress direction, direction of maximum principal stress is North-South direction that is same result both before and after the earthquake. On the other hand, direction of intermediate principal stress changed to East-West direction, and direction of minimum principal stress changed vertical direction. This stress field is type of reverse fault.

While result of successive measurement of borehole strain doesn't agree with CCBO's result in minimum principal stress, maximum and intermediate principal stress are agree. This implies result of successive measurement is reliable. Furthermore, directions of principal stress have turned around westerly direction to easterly direction. This result matches the report of GPS (Kamaishi-950170) observation that Tohoku region moves toward hypocenter of the earthquake.