

Rheological phenomena of Zebra fault in South Africa goldmine by the 2011 Tohoku earthquake's surface waves

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The 2011 Tohoku earthquake was a huge earthquake. We can understand again its magnitude by large dynamic-strain observations. In general, fresh rock rupture will relieve 10^{-4} strains at the source. On the other hand the 3.11 had unleashed more than 10^{-5} dynamic strains to almost all of Japan. After these strain state changes, it activated seismic swarm events of Japan. On the other hand, more than 10^{-7} dynamic strains had been also observed at the South Africa Republics distant from 14,000 km epicenter. Ritsumeikan university takes initiative of the projects 'Grant-in-aid : Multidisciplinary monitoring of preparation and generation of earthquakes at M2 sources in South African gold mines' and 'SATREPS: Observational Studies in South African Mines to Mitigate Seismic Risks'. In the project, we can come, we can see, we can observe at proximity micro-seismicity and/or strain field at 1-3 km depths of gold mine.

In this study, we analyzed dynamic strain records of 'Cooke4' mine, which caused by the 2011 Tohoku earthquake. Although static strain changes may be disturbed by mining activity, dynamic strain variations such as teleseismic waves and surface waves have been recorded clearly. We have estimated the strain field variations vicinity of zebra fault from two strain meter combination, and we obtained the result that dilatational strain in the fault and shear strain of both size of fault have changed by passing through the seismic waves. In presentation, we will discuss inactive fault vibration caused by teleseismic waves.

Keywords: Surface waves, Zebra fault, Dynamic strain, SATREPS