

Visualization of 3D crustal motions of Japan

KATO, Tadayoshi^{1*}, HARADA, Yasushi¹

¹School of Marine Science and Technology, Tokai University

After 3.11 earthquake in Tohoku, Japanese people realize that they do not know much about crustal deformation in Japan continuously occurring and they do not know how to prepare for big earthquakes. One of the reasons of this problem is that crustal deformation is so slow that people can not understand how Japan is continuously deforming. The GPS observation is one method that can detect this kind of slow motions, and the Geographical Survey Institute of Japan(GSI) has about 1400 GPS stations over Japan to observe Japanese crustal deformations. If those deformations are easy to understand, people could prepare much better for big earthquakes in the near future.

However, time series plotting or vector arrow figures of the GPS data are sometimes not easy to understand the three dimensional deformation with time. In this study, we created 3D animation for Japanese crustal deformation using GPS data obtained by GSI, and make it easier for people to understand the Japanese crustal motions. The GSI already had created 3D animation of Japan for horizontal motion of only limited time and area, whereas we can make animations for three dimensional deformation of any given time and area if the GPS data are available. The newly created animations helped to understand the detailed crustal deformation in Japan.

We compared our results to a 100 years leveling data of Japan and the geological data for about two million years. In spite of time differences, a lot of similarities can be seen on the pattern of deformation of Japan, and amount of crustal motions were comparable between GPS data and leveling data.

By watching these animation, we hope people to understand how earth's crust is moving, and how Japan is deforming with earthquakes.

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