

Deformation field and tectonics of eastern Asia based on GPS observations

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East Asia is the largest field of plate convergence and deformation in the world. Although it is well known that its cause is due to the collision of Indian sub-continent to north, the mechanism of deformation of Chinese continent is not well known. Recent GPS measurements have clarified the velocity field of the area in unprecedented accuracy and in detail which provide us with much information to help us understand the mechanism of deformation of the region. We have conducted modeling of such deformation due to the so-called block-slip deficit inversion. This presentation first reviews the recent results on the tectonics of the region using space geodesy.

We then try to revise the velocity field of the region and re-analyze the field using the block-slip deficit model. Particular interests are paid to the Amurian plate and the Sichuan-Yunnan block rotation.

Statistical tests fail to conclude that the hypothetical Amurian plate is independent of the surrounding blocks. Yet, change of data set suggests that it is independent. Since the south boundary of the Amurian plate is yet to be determined, the clear conclusion of the existence of the Amurian plate seems to be the open question to be solved in the future extensive studies.

Another magnificent characteristic velocity field is the crustal rotation along the Sichuan-Yunnan tectonically active region. A lot of GPS observations have been conducted in this region, though its density is not like Japanese GEONET. We are conducting a cooperative project with Geological Institute, China Earthquake Administration, of permanent GPS observations along the Xianshuihe fault area. If the velocity field by GPS is obtained along these faults, we are able to estimate the expected maximum magnitude of earthquake using the knowledge of repeat interval of earthquakes and the time of the last event. Our preliminary results (e.g. Iwakuni [2004]) suggest that a M7 class earthquake is expected at a certain segment of the Xianshuihe fault. We would like also to argue why such magnificent rotation is occurring in the Sichuan-Yunnan tectonic zone.