

Tectonics of Asia and western Pacific and the role of GPS network

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In order to investigate dynamics in Asia and the western Pacific region, a GPS permanent array, named as WING, has been constructed since 1995 under OHP or other projects. Obtained velocity field portrays the displacement rate field in the area. In addition, other researchers have conducted various campaign observations. We have synthesized those velocity fields to find various detailed tectonic features in the area. A simple elastic plane stress models have been applied, too. Considering the importance of clarifying tectonics in the region, much denser GPS array is necessary. GPS permanent arrays in the area are also expected to contribute to atmospheric researches, so that the GPS networks may be considered as the global fundamental infrastructure for earth sciences.

In order to investigate crustal deformations in Asia and in the western Pacific region, a continuous GPS tracking network has been constructed since 1995 under OHP or other projects. The network was named as Western Pacific Integrated Network of GPS (WING). Including otherwise established sites, data from 38 stations were used for baseline analysis. Obtained results portray the displacement rate field in the western Pacific and eastern Asian region.

In addition to our efforts to establish permanent GPS array in the western Pacific region, other researchers have conducted various campaign observations. We have synthesized those velocity fields under the unified kinematic reference frame of Kotake(2000). The obtained velocity fields will provide us with fundamental information to help understand complicated tectonic process in the region.

Results suggest that; 1) acute eastern bend of velocities in the north of Tibet, 2) eastward propagation of displacements are bent toward south in the northeastern corner of India, and 3) the southward motion in the Yunnan area seems to collide with the Sunda block in the south of the Red River fault. A simple elastic plane stress models have been applied, too.

Considering the importance of clarifying tectonics in the region, we should promote further to have much denser array of GPS observations in the area. The results obtained may have to be compared with other numerical simulations including three-dimensional structure of the whole mantle, so that we may have more insight about dynamic environments of driving fragmented blocks in the Asia-western Pacific region.

GPS permanent array in the area are also expected to contribute to atmospheric researches, as well as other areas, through estimating the water vapor contents at GPS sites. This suggests us that the GPS networks may have to be considered as the global fundamental infrastructure for earth sciences.