

Crustal deformation inferred from GPS Observation of the Atotsugawa Fault System in the northern Chubu District, central Japan

Yuki Matsuura[1]; Akira Takeuchi[1]

[1] Dept. Earth Sci., Toyama Univ.

The Chubu district is located between different geologic structures in Northeast Japan and Southwest Japan, and both active faults and volcanoes are densely distributed. The Niigata-Kobe Tectonic Zone (NKTZ) that runs through the northern Chubu district might control characteristics of faults and the significance of existence in the seismic and the geodetic time scale, and this argues for a new plate boundary.

Atotsugawa fault system (ATFS) is located on the northern edge of NKTZ. ATFS, the most active structure in the northern Hida region of central Japan, is composed of several right-lateral strike-slip faults such as the Atotsugawa and Ushikubi faults. Based on GPS geodetic data, Matsuura et al. (2003) divided ATFS and surrounding regions into four blocks, in a fractal relationship with a wider zone of strain concentration, narrower shear zones, and individual fault blocks in descending order.

In order to elucidate the relationship of ATFS with the zone of crustal strain concentration in detail, this study analyzed the GPS data of the northern Chubu district, with utilizing the software GAMIT.

The analytical results of the study are as follows.

- 1) The Mozumi and Miyagawa W areas shape like wedges between each constituent fault of ATFS and behave as rigid blocks. Moreover, the tendency to compression is shown in Miyagawa E area.
- 2) This region is divided into two blocks. The boundary runs in a SW-NE trend and turns to the north in the part that intersects with the Hida mountain region.
- 3) From the view point of profiling perpendicular to the ATFS trend, Takayama area south of the ATFS behaves as an elastic block and the Toyama area north of the ATFS seems as a rigid block.
- 4) This study area is divided into four domains, Toyama, Takayama, Joetsu, and Matsumoto areas, which are substantially correlative to active faults provinces.
- 5) It is possible to presume that the southern margin of the Toyama area as well as the entire Takayama area are included within NKTZ and that the northern margin of NKTZ is located along the boundary among the Toyama area and contiguous blocks to the south but not along the ATFS (Ushikubi fault).
- 6) The origin of elastic deformation detected in the Takayama area is likely to have a strong relationship with many shear zones geologically observed in the area.