

SIT035-P05

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## Eastward inclination of the crust on the eastside of Tanna Fault and its tectonic meaning

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Suzuki (1971) proposes that there is an inclining of the edifice of Hakone Volcano to the east, citing as evidence the steep inclination angle of the eastern flank vis-a-vis the western flank as well as a larger valley density on the eastern flank. While it is not uncommon that a volcano should deform due to its own weight, it is rather unusual to hear that an edifice might incline in a particular direction.

While it is true the geographical map around Hakone Volcano does display denser contour lines on the eastern flank, what is notable here is that the difference in the complexity of the geography is not only seen in the area of the Hakone caldera, but can be found also in the regions to the north and south of the volcano. On a map obtained using digital altitude data this can be clearly seen in the average inclination angle in each mesh zone. In this paper it is argued that the boundary of geographic complexity noted here marks the location of Tanna Fault. We then go on to consider the tectonic significance of this finding.

Kuno (1936) noted that motions of Tanna Fault in the past had dip slip components as well as dextral strike slip components which together caused the crust on the western side of the fault to rise and to move southward as compared to the crust on the eastern side. The motion of the fault observed in the 1930 M7.3 Northern Izu Earthquake showed the same characteristics observed in the accumulated slip displacements during several tens of thousands of years as noted by Kuno (1936). Further, Tsuboi (1932), who analyzed crustal deformation caused by the Northern Izu Earthquake, estimated that the land that had been displaced at the occurrence of the earthquake was in fact the western side of the Tanna Fault. The assertion is supported by the fact that almost all aftershocks occurred on the western side of Tanna Fault (Yoshida and Hamada, 1991). It is further suggested by the fact that the villages suffering heavy damage were located in greater numbers in a westerly direction.

We believe that the above-described differences in the geographical features between the lands on the eastern and western sides of Tanna Fault, in addition to the characteristics of the crustal deformation accompanying the Northern Izu Earthquake, imply that the area around Ashigara plain, bound in by the Kozu-Matsuda Fault, Kannawa Fault, Hirayama Fault and Tanna Fault, has been undergoing buoyant subduction associated with the motion of the Philippine Sea plate. The movement at the GPS stations at the northern boundary of the Izu Peninsula and the surrounding area in recent years seems to accord with this proposal.

Keywords: Tanna fault, Hakone volcano, inclination, Philippine Sea plate, buoyant subduction