Fault Zone Off the coast of Shimoda and Irozaki Fault Inferred from Geomorphic Analysis for Digital Water Depth Model of 50 m mesh and 150 m mesh

*Haeng-Yoong Kim[1], Shuichi Niida[1], Akihisa Kitamura[2]

1.Kanagawa Prefectural Museum of Natural History, 2.Shizuoka University

Izu Peninsula is located between Suruga Trough and Sagami Trough, and lies near and at the northern tip of the Izu-Bonin Arc. This Arc is currently colliding with the Central Japan Arc. And the great interplate earthquakes were frequently repeated at those subduction zones along Troughs, respectively. Instead, the inland large earthquakes were frequently occurred in Izu area due to the plate collision. To understand the collision tectonics, we made an anaglyph image and a figure of contour line from seafloor topography data of 150m mesh and the 50m mesh, and this study investigated a trace of the surface dislocation associated with faulting.
Irozaki Fault: An earthquake (Mw6.9) was occurred in 1974 from an inland active fault called Irozaki Fault, which was ruptured striking WNW-ESE at the southern tip of Izu Peninsula. However, the dislocation of the sea bottom is not clarified until now. Reefs, sea ridges and submarine valleys formed in the continental shelf are systematically offset right laterally in the sea part of east from the Irozaki fault when based on a contours map made of the 150m mesh. It is a dextral fault, coincident with the condition of fault offset in the inland. The sea gorge is blocked up associated with a drag of direction, and the gorge low land is expanded laterally along the fault trace. Irozaki fault, thus, extends to offing approximately 7-8km of Irozaki.
Fault Zone Off coast of the Shimoda (ITTL F2): We recognized three active faults lifting west, Faults a, b and c in order from west to east, cut the sea bottom of the Shimoda offing.
Fault a: Based on the DEM50 m mesh around Shimoda Port, we made a figure of contour line of the 2 m interval. There are Susaki Peninsula and the other submarine peninsula, jutting out into southeast in the north side and the south side of a submarine valley extending from the inlet of the Shimoda Port, respectively. In the neighborhood of tip of these peninsulas, the depth of the water is suddenly deepened. At Susaki Peninsula, the abrasion platform juts into the southeastern side from the shoreline. The submarine cliff of a drop of up to approximately 18m is observed on this abrasion platform. And it is divided into two steps of submarine terrace with depth of the water approximately 2-4m and 20-26m by the cliff. Also in the neighborhood of tip of the submarine peninsula of the south side, a submarine cliff of a fall up to approximately 16m is recognized at about 2 km point off a shoreline, and a submarine reef ridge is divided two steps. A small valley is formed in this cliff in our interpretation of the anaglyph image. And a low scarp of a 2m drop crosses the small submarine alluvial fan formed around and at the valley mouth. The resolution of topography data is not good, but may be caused by an active fault so as to be able to judge displacement, transformation because this low cliff develops in the direction at right angles to the valley. Fault to estimate in this study is more likely to be concordant with this dislocation model by Kitamura et al. (2015).
Faults B and C: We made a figure of contour line of the 10m interval from DEM150m mesh. A sea plateau is formed in and around the bent of the continental shelf slope of Shimoda offing approximately 10km. A water depth of the sea plateau is approximately 200-540m. On this sea plateau, the two flexure scarps, uplifting west, strike NNE-SSW in a parallel row. Fault length is approximately 26km each. Kim et al. (2012) assumed these two fault b and c in Shimoda offing (F2 of the ITTL), but we do make a redefinition for Fault Zone Off Coast of Shimoda involving Fault a. In addition, we judge that Irozaki Fault (WNW-ESE strike, High-angle dextral slip fault) has been formed in a conjugate relation with Fault Zone Off Coast of Shimoda (NNE-SSW strike, West dipping

reverse fault).
An address of gratitude: Tsunami mesh data of the Coast Guard Hydrographic & Oceanographic Department is used.

Keywords: Submarine Geomorophology, Izu Collision Zone, Irozaki Fault, Submarine Fault Zone Off Shimoda, Submarine Fault, ITTL

