

Is the Eastern-Boundary Fault of Sado Basin really nonexistent?

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[1] none

Watanabe et al. (2007) and Suzuki et al. (2008) pointed out the existence of a submarine active fault, the Eastern-Boundary Fault of Sado Basin (EBFSB), an easterly-dipping reverse fault as long as 50 km or more along the continental slope of Sado Basin around the source region of the 2007 Chuetsu-oki earthquake by means of geomorphological investigation; they considered the continental slope to be a tectonic relief. Tabuchi et al. (2008) showed that the EBFSB had been responsible for the Chuetsu-oki earthquake as a result of their study on static fault model of this earthquake. Ishibashi et al. (2008a, b) inferred that the MIS (Marine Isotopic Stage) 5e (ca. 125 ka) marine terraces with the altitude of 40 m facing the northern part of Sado Basin had been partly uplifted by the activity of the EBFSB and claimed that it had a seismic potential of M 7.5-class earthquake.

However, the Japanese Government's Nuclear and Industrial Safety Agency of METI and Nuclear Safety Commission approved the Tokyo Electric Power Company's report which claimed the EBFSB did not exist, in relation to the review of seismic safety of TEPCO's Kashiwazaki-Kariwa Nuclear Power Plant which suffered from the Chuetsu-oki earthquake.

In this paper I re-examine whether the EBFSB is really nonexistent from the viewpoint of pure seismotectonics.

The reasons for denying the EBFSB are: (1) The fault was not found out by marine acoustic profiling (reflection survey). (2) The continental slope is not tectonic relief because it is characterized by a progradational reflection pattern. (3) Uplifted marine terraces in the northern part are reasonably explained by the activity of the inland Kakuta-Yahiko fault.

But, we can argue against all these as follows: (1) Marine reflection survey, which observes only shallow seabed structure, cannot detect deep-seated submarine active faults. Actually, NISA reported that their careful marine reflection survey could not detect any fault in the source region of the Chuetsu-oki earthquake. (2) No realistic process of progradation in this particular area has been explained at all, and it is unreasonable that the continental slope was formed by progradation because it is very smoothly continuing as long as nearly 50 km. Even if progradation took place to some extent, it does not deny that the slope has a tectonic nature. (3) The height distribution of uplifted marine terraces in the region from the Kakuta-Yahiko fault to the coastline, which is almost flat, cannot be explained by the activity of the Kakuta-Yahiko fault alone; the combination of activities of the EBFSB and the Kakuta-Yahiko fault is necessary.

Thus, we can conclude that the EBFSB exists and it is an essential seismotectonic element in this region.