Faults Model in the Eastern Margin of the Japan Sea based on the Asymmetric Profiles of the Fault Related Folds

Yasuhira Aoyagi[1]; Shintaro Abe[1]

[1] CRIEPI

We propose an evaluation method of fault parameters under oceanic ridges viewing the asymmetric profiles regarded as fault-related folds. The evaluation procedure consists of three steps as follows: (1) Surface displacement patterns are calculated for various fault parameters, including fault width, dip, top depth based on the dislocation theory in a half space, (2) Oceanic ridges are extracted using topographic data, and their topographic profiles are investigated, and (3) Cross correlations between the observed topographic profile and the calculated displacement patterns are calculated, and the resulted best fitting conditions are taken as the optimized fault parameters. As a result of calculation of surface displacement, an increase of fault width makes the uplift zone wider without change of height, while an increase of dip angle makes uplift higher without change of width. Asymmetric profiles are found in any cases of this calculation, where hanging wall side is gentle and footwall side is steeper. On the other hand, the topographic analysis in the eastern margin of the Japan Sea shows many asymmetric ridges whose eastern slopes tend to be steeper. A lot of active faults have been found by seismic reflection surveys at the base parts of the steeper sides. We can find good cross correlation between the topographic profiles and the surface displacement pattern for most oceanic ridges. Finally, we construct a fault model synthesizing same type of fault parameters along a ridge. This fault model will be used in a seismic and tsunami hazard assessment.