

Report from 5 years Ocean Bottom Seismometer observations in Suruga Bay

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Suruga Bay is evaluated as the location of the next major event on the Tokai segment of the Nankai-trough, which hasn't ruptured since the 1854 M8.4 Ansei-Tokai Earthquake. Recently, moderate size earthquakes have occurred in the Suruga Trough axial region (M4.9 in 1994, M6.5 in 2009 and M6.2 in 2011), that resulted in a prominent excitation of seismicity in the area. Paradoxically, the routine seismic observation network on both sides of the bay is particularly sparse, which results to great uncertainty regarding the earthquake location accuracy inside the Bay. In order to address the location accuracy problem, a total of 2 sets of 6 OBSs have been deployed in rotation every three months inside the Suruga Bay from spring 2017 and an additional one from spring 2019 to a total of 7 stations. We combined our OBS stations with the routine seismic observation network stations surrounding Suruga Bay and accurately relocated the observed seismic activity inside the Philippine Sea (PHS) plate using a pseudo-3D determination scheme and station corrections retrieved from the RMS travel time residuals. Our combined processing of inland and OBS stations revealed a 25° northwest dipping 2~5 km wide zone on which the regional seismic activity occurs. Overall, the seismic activity is observed to be 5~10 km shallower than that reported by the routine networks data only, bringing the seismogenic layer in the area at shallower depths than originally estimated. The striking feature of the analyzed activity is the presence of a prominent strike slip component in the genesis mechanism of the events with their P-axis almost exclusively oriented towards the north. Major events on both sides of the bay in the past 100 years also display a similar strike slip mechanism which is evidence that the co-seismic stress field is the same as the intra-seismic period.