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Seismotectonics of the Gagua Ridge area from OBS data

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Gagua Ridge, located on the east of Taiwan Island, is generally considered an inactive ridge. This ridge is a N-S trending tectonic feature and separates two oceanic basin of different ages, which are the Huatung Basin in the west and the West Philippine Basin in the east respectively. On 26 April 2010, a Mw=6.9 event, characterized by a strike-slip mechanism, occurred in the east of the Gagua Ridge. The distribution of background earthquakes shows low seismic activity in the vicinity of the mainshock. A network of OBSs was deployed around the mainshock for 21 days. The network contains part of the West Philippine Basin and of the Gagua Ridge. In total, 1,711 earthquakes were determined. Most of the earthquakes occurred near the mainshock and few earthquakes scattered near the Gagua Ridge. Relocated hypocenters, which are relocated by hypoDD software, are clustered and aligned to the NW-SE direction. It indicates that the area is dominated by a sinistral strike-slip mechanism. In West Philippine Basin, two main geological structures, oriented NE-SW and NW-SE, were recognized from bathymetry map. The two features are associated with the first spreading event in West Philippine Basin and an old oceanic fracture zone. Since the trending of the cluster in our study is different from the strikes of the two features in the West Philippine Basin, the seismicity seems not to be linked to the reactivation of the former structures. Magnetic anomaly shows a NW-SE trending anomaly in the east of Taiwan Island, was suggested a present-day transform margin. The cluster is located on the SE end of boundary of the anomaly and the trending of the cluster is consistent with the orientation of the anomaly, which is parallel to the direction of Eurasia-Philippine relative motion. Therefore, we suggest that the presence of the sinistral strike-slip fault may reflect the different stress states in each side of the fault and form a stress transform boundary.