Verification of deformational feature and its potential tsunamigenesis along the East Ishigaki Fault, southwest Ryukyu Islands

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According to the recent result of the 14C dating of the onshore tsunami boulders in Yaeyama Islands, southwest Ryukyu Islands, this area was hit by large scale tsunamis from the side of the Ryukyu Trench about 200, 500, 1,100, 2,000, 2,400, 3,750, and 4,350 years ago. In fact, 'officially' identified underwater active faults which might cause these tsunamis are located in the southwestern Ryukyu Islands. The length of these faults is some 30-50 km which may generate M7-8 class earthquakes. One of these faults is located off the east coast of Ishigaki Island and is tentatively named as 'East Ishigaki Fault.' This fault was surveyed in 2005 during the NT05-04 cruise by R/V NATSUSHIMA and ROV Hyper-Dolphin. The research cruise revealed that (i) the main fault ranges from 24 38'N, 124 23'E to 24 22'N, 124 40'E with the length of about 44km, (ii) it is not a continuous fault but consists of 5 fault segments, (iii) the southernmost and northern segments show a sign of recent activity and may cause the 1771 Yaeyama Tsunami. On the Ishigaki Saddle northeast of the main fault a sub-fault was also observed by precise topographic survey. A slump ranging about 50 km2 on the fault was also observed at 24 32.5'N on the sub-fault. These results suggest that some, not all, segments might slip and generate a tsunami in 1771. However, it is difficult to explain the tsunami disaster on this occasion by a couple of fault segments. The slump on the sub-fault might also generate a considerable tsunami height on the 1771 event.