Oral | Symbol S (Solid Earth Sciences) | S-SS Seismology

[S-SS34_29AM1]Active faults and paleoseismology

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Geologic and historic information on seismic cycles and on the magnitude and source faults of past earthquakes is essential information to understand future large earthquakes. The study of past faulting and seismicity is an important issue for an interdisciplinary community of seismologists, geologists, geomorphologists, archaeologists, and historians.

10:30 AM - 10:45 AM

[SSS34-P27_PG]Revised fault model of the 1771 Yaeyama tsunami, southwest Ryukyu

3-min talk in an oral session

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The 1771 Yaeyama tsunami (Meiwa tsunami) has been the largest and devastating tsunami in the Ryukyu Trench since about 300 years. The maximum runup height was about 30 m and 12000 people were dead by the tsunami. Although this tsunami is important for estimating the maximum tsunami in the Ryukyu Trench, the fault model has been unsolved. Then we estimated the source fault model of this tsunami.(1) The maximum runup heights were 30 m near the southeast coast of Ishigaki Island, 15 m at Tarama Island, 15 m at Irabu Island, and 18 m at south coast of Miyako Island (Goto et al., 2011). The runup height at south coast of Miyako Island was estimated to 10.5 m from the old document "Kyuyo". However, folklore (Goto et al., 2011) and the inundation area estimated from the old document "Otoegaki" (Kato, 1988) showed the runup height were about 20 m.(2) Tarama Island is formed by the coral middle terrace at the height of 10-14 m. The tsunami reached at the villages (Nakasuji and Shiokawsa) which were located at the center-to-north of the Island. The estimated runup heights in these villages were about 15 m. Since the hill, whose height is 30 m, is located at the north of the villages, the tsunami will have inundated about 1.5-3.0 km from the south or east coast. Shimoji Island is also formed by the middle coral terrace at the height of 10-20 m. Although the Island was uninhabited at that time, the terrace was inundated by the tsunami, and the soil was stripped by the tsunami inundation, and cattle and domestic animals drown by the inundation (Shimajiri, 1988). These suggest that the wide area of the Tarama and Shimoji Island are inundated by the tsunami. Using these data, we re-construct the fault model of this tsunami. We employed intraplate earthquake and landslide (Miyazawa et al., 2012), interplate earthquake (Nakamura, 2009), and splay fault (Hsu et al., 2013) models. First, in the case of intraplate earthquake and landslide model, calculated runup heights were consistent with the observed ones. However, the calculated inundation area is limited within about 500 m from the shore at Tarama Island.In the case of splay fault model, we set the western part of fault at the 125.5E based on Hsu et al. (2013). The calculated tsunami heights were smaller than the observed in the Ishigaki Island. The inundation area is limited within 500 m from the shore at Tarama Island. Finally, we set the interplate earthquake model, which is revised the model of Nakamura (2009). We set the fault length, width, slip, and dip to 200 km, 70 km, 20 m, and 12 degrees, respectively (Mw8.6). In this case, the calculated runup heights were almost consistent with the observed ones except southeast coast of Ishigaki Island. The calculated inundation area is 1.5 km from the shore at Tarama Island. Then we added the local patch at the south of Ishigaki Island. The length, width, and slip of the patch is 40 km, 30 km, and 40 m (total Mw=8.7). Then we could reproduce the observed runup heights.