Along the Nanakai-Suruga trough, southwest Japan, great Tokai and Nankai earthquakes have recurred every 100-200 years. Okamura et al. (2006) and others investigated tsunami deposits in the Ryujin-ike lagoon in Oita Prefecture and found 40 sand layers during the past 3300 years including eight remarkable thick layers. They inferred that the uppermost three thick layers had been deposited by large tsunamis from the “giant Nankai earthquakes” in AD 684, 1361, and 1707 which ruptured the Tokai and Nankai source regions simultaneously, and that “giant Nankai earthquakes” had recurred at about every 450 years.

In order to examine their claims, we carried out numerical tsunami simulation at the Ryujin-ike lagoon assuming various static fault parameters based on existing fault models of the 1707, 1854, and 1946 earthquakes.

We found that the tsunami waveform and its maximum height near the Ryujin-ike lagoon depend strongly on the southwesternmost fault slip and insensitive to fault parameters in the Tokai region. Therefore, we conclude that the large tsunamis near the Ryujin-ike lagoon suggested by thick tsunami deposits cannot be used to estimate the rupture length of “giant Nankai earthquake”. Moreover, the location and the slip amount of the southwesternmost fault have a trade-off, i.e. the smaller slip on nearby fault or larger slip at offshore location produce similar tsunami heights. This demonstrates a difficulty to infer correctly the causal fault of the large tsunami by means of tsunami height at single location.