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Fault model of 1596 Keicho Bungo Earthquake around Beppu Bay, Kyushu, Japan

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<Introduction> Oita Prefecture is reviewing on damage estimation by earthquake and tsunami from Nankai Trough Earthquake, Earthquake in Beppu Bay and Suonada Earthquake in Seto Inland Sea. Members of Intellectual Committee for Disaster Prevention Counter-measure Committee of Oita Prefecture are Keiji Takemura, Kenji Satate, Yoshito Hirai, Kazuro Hirahara, Noboru Chida, Muneharu Kudo, Tomotaka Iwata, Kenji Kikuchi, Takanori Iwao, Junko Murano. This presentation is concentrated on the 1596 Keicho Bungo Earthquake when it occurred on fourth of September in 1596 in Beppu Bay. Hatori (1985) estimated tsunami heights around the Bappu Bay on the basis of historical documents and field evidences, and magnitude 6.9. Ishibe and Shimazaki (2005) estimated the source of tsunami by 1596 Keicho-Bungo Earthquake.

<Height of 1596 Keicho-Bungo Tsunami> There are 18 historical records on earthquake and tsunami accompanied by 1596 Keicho-Bungo Earthquake in this review. Tsunami heights are estimated at the sites of Kitsuki (Hachiman-Natamiya Shrine), Beppu-mura, Nishi-Oita (Okinohama), Fuchu, Saganoseki (Seki-Jinja) on the basis of description of historical records and field survey. Each tsunami height is 6m, 4-5m, 4-5m, 4-5m and 4-6m respectively, and used as an evidence by simulation.

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In and around Beppu Bay, Median Tectonic Line (Hoyo-strait segment), East part of Beppuwan-Hijiu Fault zone (including Beppu Bay Central Fault), East part of Beppu Graben Nanen Fault (including Asamigawa Fault and Funai Fault etc) are distributed. Recent activity of Beppu Bay Central Fault is correspondent to the 1596 Keicho-Bungo Earthquake by the active fault survey using sonic survey and stratigraphy of sediment (Okamura et al., 1992 etc). Firstly, tsunami height is simulated by independent activity of fault system in Beppu Bay. (1) in the case of activity East part of Beppuwan-Hijiu Fault zone by the Headquarters for Earthquake Research Promotion, (2) Beppu Bay Central fault and Kitsuki-oki Fault system of East part of Beppuwan-Hijiu Fault zone. As a result, calculation by independent activity of each fault in Beppu Bay is not obtained the tsunami height by historical records as indicated by Ishibe and Shimazaki (2005). Afterwards, we checked the following third model (3) .(3) Two cases of Simultaneous activity of Median Tectonic Line (Hoyo-strait segment), East part of Beppuwan-Hijiu Fault zone (including Beppu Bay Central Fault), East part of Beppu Graben Nanen Fault (including Asamigawa Fault and Funai Fault etc) First case is all together activity of three fault system, and the simulated tsunami height is concordant with that of historical record except for the data at Kitsuki (Hachiman Natamiya shrine). Second case is the time difference ((about 8 minutes)) activity in the order from activity of Median Tectonic Line (Hoyo-strait segment) at first and secondly East part of Beppuwan-Hijiu Fault zone (including Beppu Bay Central Fault), East part of Beppu Graben Nanen Fault (including Asamigawa Fault and Funai Fault etc) The simulated tsunami heights are satisfied with them at the whole site recorded by historical document by this simulation. In the future, Oita Prefecture will have plan to adopt <time difference activity model> for estimation of tsunami height and making map showing areas with the potential for flooding from tsunami, and draw up the damage prediction.

Reference:

T. Hatori(1985) Field Investigation of the 1596 Bungo Tsunami along the Coast of Beppu Bay, Kyushu. Bulletin of the Earthquake Research Institute, University of Tokyo, 60, 429-438.

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Keywords: 1596 Keicho-Bungo Earthquake, tsunami, Beppu Bay, fault model