

Landslides triggered by the 1596 Keicho Bungo earthquake in Kitsuki, Beppu, and Yufuin, Oita Prefecture, Kyushu, Japan

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Most studies on the 1596 Keicho Bungo earthquake concern only tsunamis in surrounding coastal areas of Beppu Bay. Both data collection and calculation of tsunami height based on fault models are limited to the inside and mouth of the bay. It is well known that this earthquake generated not only tsunamis but also strong ground motion in the land areas of Bungo, old name of Oita Prefecture. Collection of historical documents on this earthquake conducted by the Earthquake Research Institute, The University of Tokyo shows landslide of slope of Mt. Takasaki and collapse of Yuzuhara-Hachiman Hai-den, which means worshippers' hall.

The aim of this study is to collect data on the earthquake in the documents of the lord family "daimyo-ke" that ruled Bungo in the period right after the occurrence of the earthquake and to estimate earthquake size and source location, and associated natural phenomena. These families are Hosokawa, Matsui, Nakagawa, Kinoshita, Saeki-Mouri, Kurushima, and Inaba. Nakagawa entered Bungo in 1594, Hosokawa, Matsui, and Inaba in 1600, Kinoshita, Saeki-Mouri, and Kurushima in 1601. Matsui was a vassal of Hosokawa and not "daimyo-ke". However, both sho-gun and Hosokawa gave Matsui "daimyo-ke" status and Matsui was the lord of the castle Yatsushiro, Kumamoto.

We have found two records in the documents of Matsui (Yatsushiro Municipal Museum). Here we report on one of the records, a letter sent from Hosokawa Tadaoki to Matsui Yasuyuki on April 22, Keicho 6 (Japanese Calendar) (1601) (Toritsu, personal communication, 2014), about five years later the earthquake. According to Tadaoki, the fief of Hayami-gun, present Kitsuki, Beppu, and Yufuin, yield 60,000 koku. He ordered Yasuyuki to consider damage of about 5,500 koku due to earthquake and reduce land tax in the fief. In the letter no mention was made about earthquake date. We assume the earthquake in the letter is the 1596 Keicho Bungo earthquake.

Using a list of annual rice production of every village in Hayami-gun including Yufuin (1601) (documents of Matsui), we have tried to identify the villages which suffered from destructive landslides. These are Takasu (Kitsuki-City Katano), Yashiro (Hiji-Town Manai Yashiro), Tsujima (Hiji-Town Toyooka), Hamawaki, Tateishi, Tsurumi, ButsusANJI, Baba, Yatsukawa, Wakamiya-Hachimansha, and Kozennin, where abbreviation of "old name (present name)" is adopted. The landslides near coasts may enter Beppu Bay, and generate tsunamis.

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