On the differences of source areas between 1703 Genroku earthquake and 1923 Taisho Kanto earthquake from the detailed examination of seismic intensities

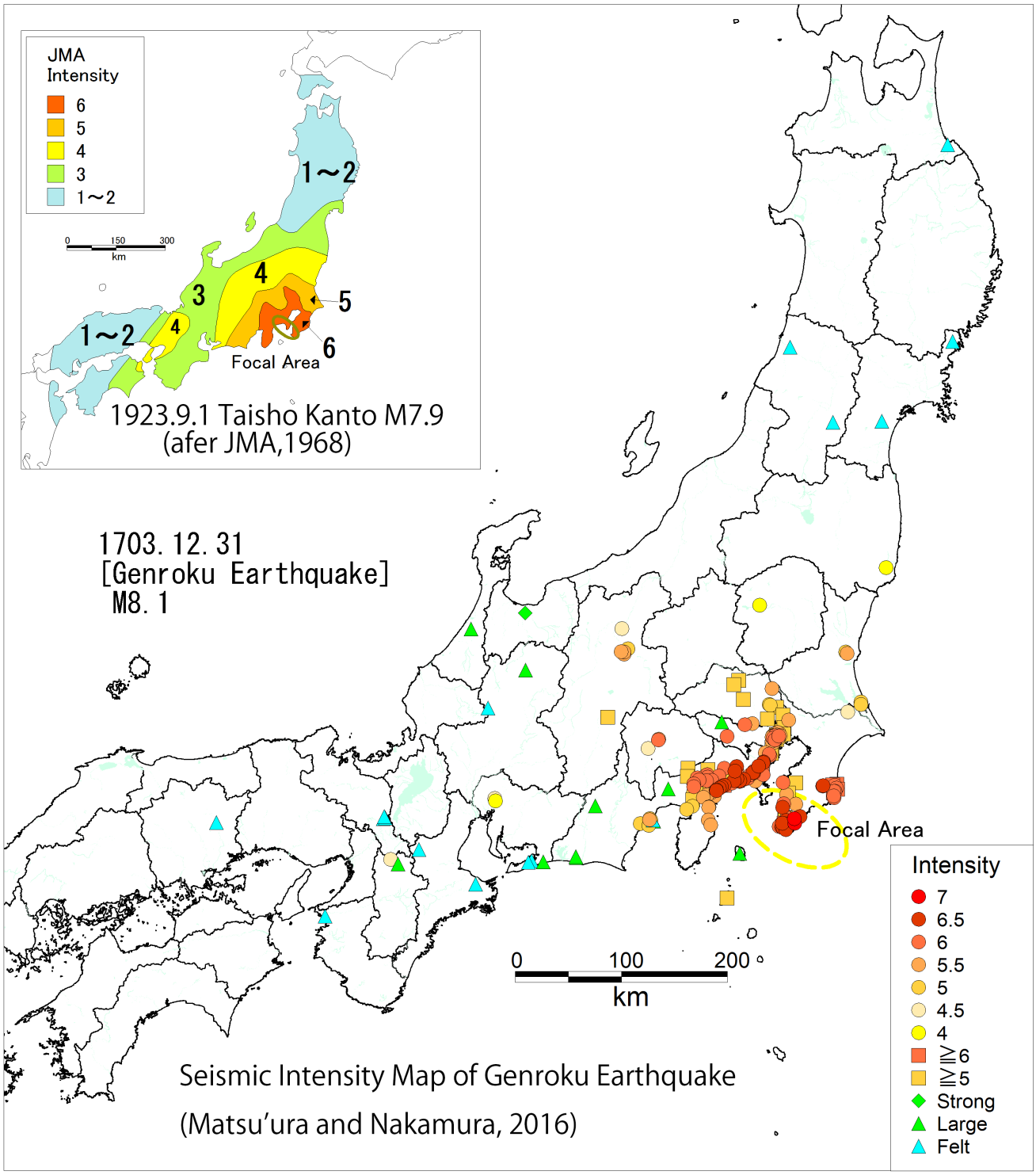
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We have examined the whole known historical documents on the Genroku earthquake, other than those related to small houses of bannermen in Edo city. The M8.1 Genroku earthquake occurred at the midnight on December 31, 1703 on the plate boundary along the Sagami Trough. It has been widely believed that the Taisho Kanto earthquake at noon on September 1, 1923 of M7.9, occurred in the western part of the source area of the Genroku earthquake. However, we found that the westernmost part of the 1923 Taisho Kanto focal area, where the Izu peninsula is colliding to the Honshu Island, did not move at the time of Genroku. The seismic intensities of the Genroku earthquake are evidently smaller than those of the Taisho earthquake in the western Japan (Fig. 1). This feature is also apparent even in the existing intensity maps of the both events.
At the time of 1923 event, in Osaka branch of the Bank of Japan, piled up money boxes fell down to the floor. The intensity at the Osaka Meteorological Observatory was 4 at the time of Taisho. However, we have not yet found a historical material, which shows that the Genroku event was felt in Osaka. The 1923 event was followed by many M7-class aftershocks, including the large intra-plate earthquake in 1924 at Tanzawa. After the Genroku event, historical materials only recorded a conflagration in Edo city a few days later, but no strong aftershocks were noted.
The source area of the Taisho Kanto earthquake consists of the plate-boundary type part, which is the western half area of the Genroku earthquake, and the intra-plate type in the westernmost part in Kanagawa Prefecture, which generated strong short-period waves. Taisho event was felt strong in the western Japan. In the Genroku earthquake, the area off the southeastern part of Boso peninsula moved and caused the devastating tsunami disaster along the Sotobo area in Chiba Prefecture. Not only the tsunamis but also the strong motions of both earthquakes are very different from each other. These are not the similar events, nor the characteristic earthquakes. We should mind these differences to plan the disaster mitigation for the next large earthquake in the southern Kanto district.

Keywords: Genroku earthquake, Taisho Kanto earthquake, Sagami trough, Collision of the Izu Peninsula, detailed analysis of historical materials

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