Estimating the Status of Designated and Voluntary Evacuation Shelters After a Disaster
-Basic Assessment Using the Case of Toyama Prefecture-

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This study examined a model for estimating the number of evacuation facilities opened, including self-organized shelters, based on information about evacuation centers collected by the research team during the 2011 Great East Japan Earthquake. While various geographical and social factors, as well as the psychological state of evacuees themselves, are assumed to influence this number, building a model that accounts for all these factors would make generalization difficult. Therefore, the model was deliberately constructed focusing solely on population. This model was analyzed using data from Iwate and Miyagi Prefectures, which were severely affected areas. The results indicated that, excluding constant terms, estimates could be calculated by multiplying the population by 0.03%. Applying this model to municipalities in Toyama Prefecture affected by the Noto Peninsula Earthquake revealed two key findings:
1) Municipalities in Toyama Prefecture experienced a maximum seismic intensity of 5+ (official announcement), lower than the Great East Japan Earthquake. Consequently, the actual number of evacuation shelters opened was smaller than the model-based prediction.
2) In some municipalities, contrary to the trend in 1), the actual measured values were larger than the estimated values.
However, it should be noted that the basic data collected at the Great East Japan Earthquake showed that "evacuations" were a mixture of emergency life-saving evacuations and sheltering for the sake of daily life. Furthermore, while the Noto Peninsula earthquake was similar to the Great East Japan Earthquake in that a tsunami warning was issued in addition to the earthquake, the number of evacuation centers opened in Toyama Prefecture was smaller due to the extent of the impact, and the results were seemed reasonable. Meanwhile, in municipalities where the actual measurements are higher than the estimated values, the reasons for this need to be carefully elucidated. This will enable the creation of more sophisticated variables for estimating the number of evacuation centers.

Keywords: Designated Evacuation Shelter, Voluntary Evacuation Shelter, 2024 Noto Peninsula Earthquake

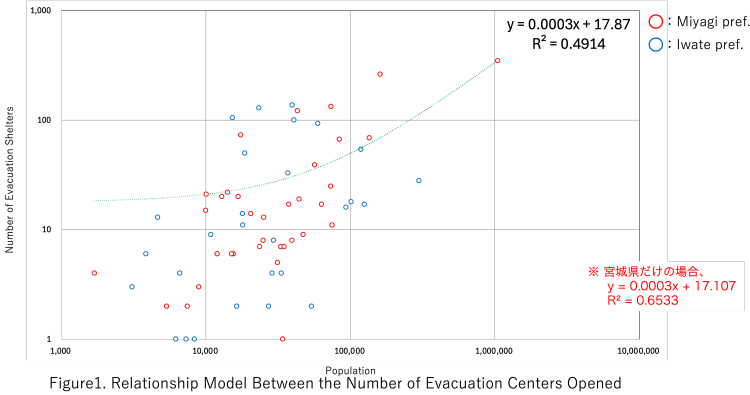

Figure1. Relationship Model Between the Number of Evacuation Centers Opened and Population at 2011 East Japan Earthquake

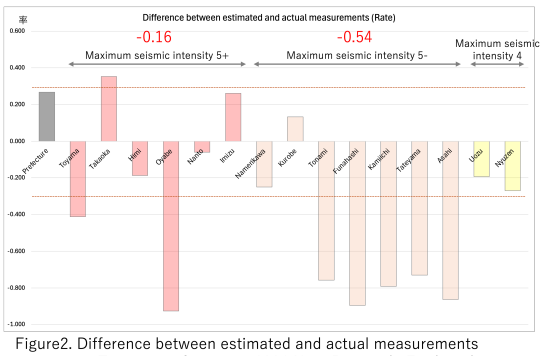

Figure2. Difference between estimated and actual measurements in Toyama prefecture at 2024 Noto Peninsula Earthquake

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