

Relationships between the locations of historical/archaeological monuments and topographic factors in Japan and China in relation to human perception of natural hazards

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(1) Motivation: Locations of historical and archaeological monuments reflect activities and thinking of ancient people who built them as well as related environmental factors such as topography, water availability, and proneness to natural hazards (Hagiwara, 2018). Such relationships are expected to be stronger in the past when human control on nature was limited, and their analysis is useful to understand how ancient people interact with the environment. This research utilizes GIS and Digital Elevation Models (DEMs) to understand topography as well as surface hydrological conditions (Llobera, 1996; Oguchi and Saito, 1999; Wheatley and Gillings, 2002; Asada et al., 2008). Statistical analysis will be conducted to examine relationships between the ancient monuments and natural/social environmental conditions, the results will be interpreted based on geographical, historical and archaeological knowledge with special attention to natural hazards.

(2) Methods: Historical/archaeological monuments located in the whole of Japan as well as in and around Xi'an, China, are investigated. The locations of the monuments are determined using existing publications and databases. Topographic factors are extracted from DEMs and other environmental data are also utilized. Using the collected data, a series of geospatial analysis are conducted to understand the relationship between the locations of ancient monuments and their environmental settings especially topographic factors and related natural hazards such as flooding and debris flows.

(3) Data:

- “Top 100 ancient castles in Japan” Japan castle foundation
- “Kofun database” Japanese ancient tombs
- “Digital elevation model of Japan” Geospatial Information Authority of Japan
- “SRTM DEM data” U.S. Geological Survey

(4) Results: The results are interpreted based on not only geographical but also historical and

archaeological knowledge. The results are also compared both spatially (e.g., between Japan and China) and temporarily. Some cases of Japan were found to be associated with natural hazards. For example, although some ancient castles were located on the waterfront to strengthen their protective power, some measures were also taken to reduce the impacts of flooding. Moreover, locations of some megalithic tombs in piedmont areas have been selected to act as obstacles for debris flows to protect adjacent settlements.

(5) References:

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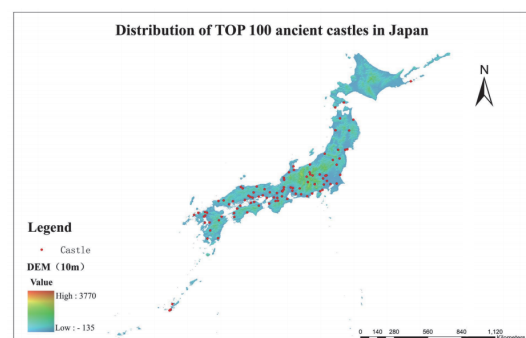


Figure1: Distribution of Japan's Top 100 castles