

## Verification of the damage caused by the Tonankai Earthquake by overlaying the aerial photo taken by U.S. Forces and DEMs

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Recently, aerial photos taken by the U.S. Forces over the mainland of Japan in the last period of the Pacific War II were found at the U.S. National Archives and Records Administration. It was revealed that the photos of damaged areas of Tonankai Earthquake occurred in December 1944 existed among them. The Tonankai Earthquake has been regarded as the 'hidden disaster', because the actual conditions of the damage caused by this earthquake have been scarcely recorded under the news blackout of the then Japanese military government. It must be important information for earthquake researches and disaster mitigation if we can succeed to clarify the real conditions of the earthquake damage through analyzing these photos.

We obtained the photos over the city of Owase in Mie Prefecture taken on three days after the event and carried out the photo interpretation, photogrammetric process and production of orthophoto images. We overlaid various geographic data such as the modern 2-meters resolution DEMs acquired from LiDAR survey by GSI, 1:2,500 scale city planning base maps by the Owase City and the 10-meters resolution DEMs of past topography derived from the photos on the orthophoto images using GIS. Then we investigated how much damage conditions are grasped from the aerial photos and analyzed the relationship between the extent of damage and past and present landforms.

From the aerial photos, we succeeded the interpretation of the damage conditions in detail, such as the extent of the area where houses were severely destroyed by the tsunami, fishing boats thrown upon the land and changes of coast landforms. By comparing these results with the on-site photos taken by a reporter on a local paper, we identified the photographed places on GIS and verified the damage conditions interpreted from the aerial photos. Judging from the shapes of the destroyed houses, it seemed that the heavy damage at the southern part of the city was caused by the water current from the land toward the sea. By overlaying the large-scale maps and DEMs with the photo interpretation results, we confirmed that the heavily damaged area mostly corresponded with the area lower than 3 meters above sea level. In addition, it was revealed that the landform of southern part of the city shows a shallow valley, indicating that the concentration of outgoing seawater current caused the severe damage.