Topography of late Quaternary in the Tonami plain and activity of the Tonami-heiya fault zone, Toyama Prefecture

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The purpose of this research is to restudy the late Quaternary topography and activity of the Tonami-heiya fault zone, and to discuss the geomorphological development of the Tonami plain in the western part of Toyama Prefecture, central Japan.
The Holocene alluvial fans and flood plains formed by the Sho and Oyabe Rivers spread out in the Tonami plain from the central through the northern parts. Along the foot of the surrounding mountains and hills, higher, middle and lower terraces of late Pleistocene-Holocene in age are distributed. These terraces have been displaced, even during the Holocene time, by the reverse dip-slip activities of Tonami-heiya fault zone in a sense of upheaval in the mountains side.
We examined stratigraphic cross section utilizing borehole data and morphologically analyzed 5m-DEM in order to elucidate the fault trace of the Isurugi fault which belongs to the Western Tonami-heiya fault zone. As the results, the northern segment of Isurugi fault seems to run along the northeastern foot of Hodatsu hill and extends underground through the lower-most Oyabe River into the Toyama Bay. Consequently its total length reaches about 30 km. In the southern segment, a continuous fault scarplet was recognized to cut across the lower dissected fans. The slip-rate of Isurugi fault is estimated to be 0.31-0.64m/kyr. As for the Eastern Tonami-heiya fault zone, the mid-Holocene and later activities along Horinji and Takashozu faults were also identified from previous studies by trench excavation surveys (AIST, 2012, Toyama Pref., 2000).
In the Hokuriku region, reverse faulting and related folding with strike in a NE-SW direction have occurred during the late Quaternary. In this process, the upheaval of mountains and hills as well as the subsidence of plain were reactivated and have continued. Then, the hinge line of block movement due to the activities of the Tonami-heiya fault zone is revealed to have shifted from the mountain side into the plain side within the Holocene time. In conclusion, the Quaternary folding and faulting associated with the crustal warping at a wavelength of about 20 km is currently in progress, causing both the subsidence of Tonami plain and the upheaval of surrounding mountains and hills.

References

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