Slope analysis of active fault in volcanic areas using high-resolution DEM based on GIS

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The movement of active faults due to inland earthquakes often involves surface displacement. In Japan, where many active faults are distributed, fault displacements are often accumulated and reflected on the current topography. For example, in a region where right-lateral strike-slip faults are distributed, it is possible to observe river topography systematically right-lateral strike-slip from the fault. Japan has many volcanoes as well as active faults, but in volcanic areas it is difficult to find evidence of fault activity accumulation in the terrain, and it is difficult to find fault traces on the surface. In this study, we performed geomorphological analysis using high-resolution DEM based on GIS in the southern part of Iwate prefecture where many volcanic rocks are distributed, and examined the relationship between river topography and active faults. The target area is mainly covered by Miocene to Pleistocene volcanic rocks. In this area, despite significant earthquakes occurring since 1896, there is little apparent surface displacement. An Mw 6.9 earthquake with surface displacement occurred in 2008 in this area. In this study, basic topographical measurements such as slope, aspect, dispersion of altitude, and stream density and stream-power indices were analyzed using 5mDEM in the target area. As a result, it was found that the SPI value tends to be higher in the area where surface displacement was observed in 2008. It is necessary to clarify the relationship between fault activity and topography by increasing the target area and conducting watershed analysis using SPI and other indices.