

## Geomorphic and geologic features of the Holocene catastrophic rock avalanche in Yabusawa Valley, Akaishi Range, Japan

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To determine the cause and age of thick gravel layers called the Yabusawa Gravel (YG) in the northern face of Mount Senjo (3033 m ASL), we reinvestigated geology and geomorphology of the YG. Although the previous authors considered that the YG was of glaciofluvial or of landslide origin, there is no clear consensus as to the origin and age of the YG.

The YG consists of poorly-sorted thick angular clasts of sand stone, mud stone, and hornfels, forming a geomorphic feature like fluvial terraces along Yabusawa Valley. On the outcrop walls of the YG, rock clasts clearly exhibit jigsaw crack structures, although specific sedimentary facies reflecting fluvial processes such as lamination and imbrication are not observed at all. A lithotype of rock clasts in the YG is almost restricted to single geology at a given outcrop locality. Surficial topography of the YG has hummocks and levee-like terrain. A mountain ridge and valley side slopes adjacent to the YG have ridge-top linear depressions, untiscarps, and valley bulging, suggesting deep-seated gravitational slope deformation. Terrestrial cosmogenic nuclide dating of sandstone fragments obtained from three localities on the depositional surfaces of the YG shows 10.3-8.4 ka, 10.0-8.1 ka, and 9.4-7.6 ka (in <sup>10</sup>Be scale). On the basis of these facts, we concluded that the YG was produced by catastrophic rock avalanche (rock slide) in the early Holocene. The previous authors emphasized degradation of mountain permafrost for landslide occurrence, we invite attention to paleoearthquakes caused by nearby active faults or convergent plate margins as well as early Holocene pluvial climate and long-term gravitational rock deformation.

Keywords: Rock avalanche, Deep-seated gravitational slope deformation, Terrestrial cosmogenic nuclide dating, Holocene