

# Characteristics of roundness of cobble–pebble deposited on refreshed gravel bar affected to typhoon 1721 in Tama River, central Japan

\*Takako UTSUGAWA<sup>1</sup>, Masaaki Shirai<sup>1</sup>

1. Dept. of Geog., Tokyo Metro. Univ.

Fluvial clastic sediment grains are abraded (rounded) as a result of alternating succession of angulation and rounding during transport process. Roundness, a shape parameter evaluating the smoothness of particle outline, has been utilized to estimate the depositional environment and the transport–depositional processes of gravel–sand. It is general that as the fluvial gravel is finer, the roundness becomes lower (more angular). Difficulty of rounding accompanying with the grain size reduction may have been caused mainly by (i) the finer grain tends to be irrefragible; i.e., high durability (Kodama 1994) and/or inactive collision among grains, and by (ii) the input of pristine and angular grains produced from coarser grains as a result of breaking and abrasion (Utsugawa and Shirai 2017). Relationship between riverine environment (e.g., dunes and current marks observed on gravel bar) and grain size distribution commonly has been studied, however, relationship between the environment and roundness of gravels has been studied insufficiently.

We examined the relationship between the riverine environment and the roundness of gravels deposited on refreshed gravel bar in Tama River affected to Typhoon 1721 occurred on October 2017.

Cobble (64–128 mm in long axis) and pebble (16–32 mm in long axis) of sandstone, one of dominant lithology, were obtained from the two sites (bars) in the middle reaches of Tama River. Distance between the upper and the lower bars is ca. 600 m. At each bar, lines were set perpendicular to usual river flow direction from near the river. Approximately 50–55 gravels of each size fraction were randomly extracted from 1 m × 1 m square along the lines and the roundness based on the Krumbein roundness chart (Krumbein 1941) and the three axes of gravels were measured.

The upper gravel bar was divided into the high-water level riverbed and the usual riverbed. Near the river, i.e., on usual riverbed, cobbles (average roundness: 0.58) were rounded than pebbles (average roundness: 0.52–0.53) at both upper and lower gravel bars. While, at the upper bar, the roundness of both grain size fraction were almost similar values on the high-water level riverbed. This tendency might be that breaking and abrasion mechanisms acting on gravels are different at between those high-water level riverbed and usual riverbed. Therefore, the representing roundness of gravels measured at usual riverbed can be obtained in a gravel bar. This conclusion is reasonable to Shirai et al. (2018) examined at the middle reaches of Sagami River.

## References

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