Crustal deformation of the 2016 Kumamoto earthquake sequence (3) - Small displacement linear surface ruptures detected by ALOS-2 SAR -

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We constructed and analyzed the ground surface displacement associated with the 2016 Kumamoto earthquake sequence using satellite radar interferometry images of the Advanced Land Observing Satellite 2. The radar interferogram generally shows elastic deformation caused by the main earthquakes but many other linear discontinuities showing displacement are also found. Approximately 230 lineaments are identified (Fig. 1), some of which coincide with the positions of known active faults; however, there are much fewer known active faults than lineaments. In each area, the lineaments have a similar direction and displacement to each other, therefore, they can be divided into several groups based on location and major features. Since the direction of the lineaments coincides with that of known active faults or their conjugate faults, the cause of the lineaments must be related to the tectonic stress field of this region. Most of the linear surface ruptures are not directly related to the main earthquake but whose slip was probably triggered by the main earthquake or aftershocks.



Fig. 1 Linear surface ruptures detected by InSAR images

Several dozens of linear surface ruptures are found in the northwest of the outer rim of Aso caldera (Fig. 1 and 2). In this group, the ruptures generally have a WNW- ESE direction and typical dip-slip displacements. The largest up-down displacement gap of more than 30 cm is found in the southern part of

this area. This rupture group is also further divided into two groups, whereby the northwest group mainly shows dip slip where the south side moves downward, and the southeast group mainly shows the north side moving downward (Fig. 2). The displacement is saw-tooth in shape and, interestingly, the direction of the saw-tooth pattern differs between the two groups (Fig. 2 and 3).



Fig. 2 Linear surface ruptures and active faults in northwestern Aso caldera



Fig. 3 Cross sections of hipass-filtered upward displacement and topography **Reference** Fujiwara *et al.* (2016): Small-displacement linear surface ruptures of the 2016 Kumamoto earthquake sequence detected by ALOS-2 SAR interferometry, Earth Planets Space, 68: 160, doi:10.1186/s40623-016-0534-x.