



One Mother Two DADs: the two fault-related avalanches of Iriga, Philippines

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Volcanic rock-slidedebris avalanches are low-frequency, high-volume events generated by volcanic sector collapse that begins as a rock-slide and progressively disintegrates on steep edifice slopes. They are linked to edifice instability and a triggering mechanism, related either to a volcanic event, extreme rainfall or tectonic movement. The case of the Iriga debris avalanche with a volume of 1.5 km² and runout length of about 10 km has long been associated with a non-volcanic trigger. We revisit the debris field of Iriga avalanche to investigate its causal mechanisms and determine its time of occurrence. The absence of a soil layer between the pyroclastic flow (PF) deposit and hummocks, the mixture of the PF deposit with avalanche-related lava blocks, and hummocks comprised of PF deposits may indicate an eruptive event close in timing with respect to the debris avalanche. Also, a previously unidentified debris avalanche field in the west-northwest sector of Iriga volcano was identified. This debris avalanche is older than the more obvious debris avalanche field in the southeast sector, which is associated with a well-formed horseshoe-shaped amphitheatre crater. Both events are organised around a characteristic sigmoid structure- a negative flower structure caused by a major strike-slip fault that cuts the cone in two. The remaining structures on the cone and the avalanche structure are consistent with a fault movement related origin, and possible associated gravity spreading. Iriga serves as a textbook example of fault related volcanic landsliding that can be applied to other potential at risk volcanoes in strike-slip environments, such as Mayon.