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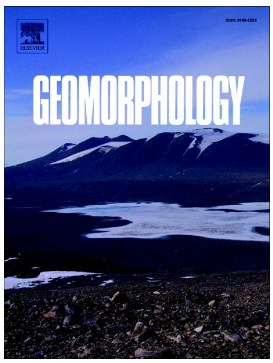

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PII: S0169-555X(18)30222-8
DOI: doi:10.1016/j.geomorph.2018.05.025
Reference: GEOMOR 6412

To appear in: *Geomorphology*

Received date: 30 January 2018
Revised date: 24 May 2018
Accepted date: 26 May 2018

Please cite this article as: Yu-Feng Wang, Qian-Gong Cheng, Qi-Wen Lin, Kun Li, Hu-Feng Yang , Insights into the kinematics and dynamics of the Luanshibao rock avalanche (Tibetan plateau, China) based on its complex surface landforms. Geomor (2017), doi:10.1016/j.geomorph.2018.05.025

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Insights into the kinematics and dynamics of the Luanshibao rock avalanche (Tibetan Plateau, China) based on its complex surface landforms

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Abstract

Complex topographic features on the surfaces of rock avalanche deposits have been regarded as important indicators for understanding avalanche kinematics and dynamics. Based on a combination of remote sensing data and in-situ observations of surface landforms, including toreva blocks, transverse and longitudinal ridges, ridges separated by conjugate troughs, and hummocks, a giant Holocene rock avalanche on the Tibetan Plateau is recognized. This work aims to understand the kinematics of this event. In planview, the tongue-shaped rock avalanche exhibits a clear sequential distribution of various landforms. The translation zone (II) is characterised by toreva blocks originating from extension. In subzone III-1 of the accumulation zone (III), compression-related transverse ridges are well developed. Longitudinal ridges resulting from lateral velocity differences due to radial spreading are present in the front part of subzone III-1. Farther down, ridges separated by conjugate troughs (generated by a combination of compression and radial spreading) are common in subzone III-2. Subzone III-3 is characterised by abundant scattered hummocks with circular to oval shapes. Based on the distributions of these landforms, this rock avalanche is proposed to have mainly experienced a motion featuring laminar flow with radial spreading in its distal and marginal

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