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Landslides triggered by the October 8, 2005, Kashmir Earthquake

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The October 8 2005, magnitude 7.6 Kashmir earthquake, triggered several thousand landslides. These comprise mainly shallow failures of rock avalanche type, although translational and rotational landslides, shallow rockslides and debris flows also occurred. In addition, a sturzstrom comprising more than 1,000,000 cubic meters was initiated, that buried 4 villages and blocked streams to create two lakes. Landsliding occurred throughout a region, stretching more than 50 km from earthquake epicenter, but failures were highly concentrated, associated with six main geomorphic-geologic-anthropogenic settings. These settings included natural failures in: 1) highly fracture carbonate rocks comprising the lowest beds in the hanging wall of the likely earthquake fault (the Main Boundary Thrust; 2) Tertiary mudstones and siliclastic rocks along antecedent drainages that traverse the main structure (the Hazara Syntaxis); 3) steep (more than 50 degrees) slopes comprising Precambrian and Lower Paleozoic rocks; 4) steep (more than 50 degrees) lower slopes of fluvially undercut Quaternary fanglomerates; and 5) in ridges and spur crests. The sixth setting, occurred as consequence of human action, associated with highway construction. Extensive fissuring is present along many of the valley slopes and together with the freshly mobilized landslide debris constitutes a potential hazard in the coming snowmelt and monsoon season. This study supports the view that earthquake triggered landslides are concentrated in zones associated with the geology, geomorphology, topography and human

factors.