

Additional Reading

Chapter 14

A more complete documentation of the literature related to lahars is given below:

- Arattano, M. and Marchi, L. (2000). Video-derived velocity distribution along a debris flow surge. *Physics and Chemistry of the Earth (B)*, **25**(9), 781-784.
- Berger, C., McArdell, B. W., Fritschi, B. and Schlunegger, F. (2010). A novel method for measuring the timing of bed erosion during debris flows and floods. *Water Resources Research*, **46**, W02502, doi:10.1029/2009WR007993.
- Berti, M. and Simoni, A. (2007). Prediction of debris flow inundation areas using empirical mobility relationships. *Geomorphology*, **90**, 144-161.
- Berti, M., Genevois, R., Lahusen, R. G., Simoni, A. and Tecca, P. R. (2000). Debris flow monitoring in the Acquabona watershed in the Dolomites (Italian Alps). *Physics and Chemistry of the Earth (B)*, **25**, 707-715.
- Björnsson, H. (1975). Subglacial water reservoirs, jökulhlaups and volcanic eruptions. *Jökull*, **25**, 1-14.
- Capra, L. and Macías, J. L. (2002). The cohesive Naranjo debris-flow deposit (10 km³): a dam breakout flow derived from the Pleistocene debris-avalanche deposit of Nevado de Colima Volcano (México). *Journal of Volcanology and Geothermal Research*, **117**, 213-235.
- Carrivick, J. L. (2006). 2D modelling of high-magnitude outburst floods: an example from Kverkfjöll, Iceland. *Journal of Hydrology*, **321**, 187-199.
- Carrivick, J. L. (2007). Modelling coupled hydraulics and sediment transport of a high-magnitude flood and associated landscape change. *Annals of Glaciology*, **45**, 143-154.
- Cheng, D. C.-H. (1984). Further observations on the rheological behavior of dense suspensions. *Powder Technology*, **37**, 255-273.
- Cheng, D. C.-H. and Richmond, R. A. (1978). Some observations on the rheological behavior of dense suspensions. *Rheologica Acta*, **17**, 446-453.
- Christen, M., Bartelt, P. and Kowalski, J. (2010a). Back calculation of the *In den Arelen* avalanche with RAMMS: interpretation of model results. *Annals of Glaciology*, **51**, 161-168.
- Christen, M., Kowalski, J. and Bartelt, P. (2010b). RAMMS: Numerical simulation of dense snow avalanches in three-dimensional terrain. *Cold Regions Science and Technology*, **63**, 1-14.
- Contreras, S. M. and Davies, T. R. H. (2000). Coarse-grained debris flows: hysteresis and time-dependent rheology. *Journal of Hydraulic Engineering*, **126**, 938-941.
- Costa, J. E. (1988). Floods from dam failures. In *Flood Geomorphology*, ed. V. R. Baker, R. C. Kochel and P. C. Patton. New York: Wiley, pp. 439-462.
- Cronin, S. J., Neall, V. E., Lecointre, J. A. and Palmer, A. S. (1996). Unusual "snow slurry" lahars from Ruapehu volcano, New Zealand, September 1995. *Geology*, **24**, 1107-1110.
- Dinehart, R. L. (1999). Sediment transport in the hyperconcentrated phase of the March 19, 1982 lahar. In *Hydrologic Consequences of Hot-Rock/Snowpack Interactions at Mount St. Helens Volcano, Washington, 1982-84*, ed. T. C. Pierson. United States Geological Survey Professional Paper 1586, 37-52.
- Dorava, J. M. and Meyer, D. F. (1994). Hydrologic hazards in the lower Drift River basin associated with the 1989-1990 eruption of Redoubt Volcano, Alaska. *Journal of Volcanology and Geothermal Research*, **62**, 387-407.

- Fairchild, L. H. (1987). The importance of lahar initiation processes. In *Debris Flows and Avalanches: Process, Recognition, and Mitigation*, ed. J. E. Costa and G. F. Wieczorek. *Geological Society of America Reviews in Engineering Geology*, **7**, 51-62.
- Fairchild, L. H. and Wigmosta, M. (1983). Dynamic and volumetric characteristics of the 18 May 1980 lahars on the Toutle River, Washington. *Proceedings of the Symposium on Erosion Control in Volcanic Areas, Japan Public Works Research Institute Technical Memorandum*, 1908, 131-153.
- Hall, M. L., Mothes, P. and Janda, R. J. (1998). The enormous Chillos Valley lahar, an ash-flow generated debris flow from Cotopaxi Volcano, Ecuador. *Bulletin of Volcanology*, **59**, 233-244.
- Hodgson, K. A. and Manville, V. (1999). Sedimentology and flow behavior of a rain-triggered lahar, Mangatoetoe Stream, Ruapehu volcano, New Zealand. *Geological Society of America Bulletin*, **111**, 743-754.
- Hungr, O. (1995). A model for the runout analysis of rapid flow slides, debris flows, and avalanches. *Canadian Geotechnical Journal*, **32**, 610-623.
- Hungr, O. and Evans, S. G. (1996). Rock avalanche runout prediction using a dynamic model. In *Landslides*, ed. Senneset. Rotterdam: Balkema, 233-238.
- Hsu, L., Dietrich W. E. and Sklar, L. S. (2008). Experimental study of bedrock erosion by granular flows. *Journal of Geophysical Research*, **113**, F02001, doi:10.1029/2007JF000778.
- Iverson, R. M. and Lahusen, R. G. (1993). Friction in debris flows: inferences from large-scale flume experiments. In H. W. Shen, S. T. Su and F. Wen (Eds.) *Hydraulic Engineering '93*. American Society of Civil Engineers.
- Iverson, R. M., Lahusen, R. G. and Costa, J. E. (1992). *Debris-flow flume at H.J. Andrews Experimental Forest*. United States Geological Survey Open-File Report 92-483.
- Janda, R.J., Scott, K. M., Nolan, K. M. and Martinson, H. A. (1981). Lahar movement, effects, and deposits. In *The 1980 Eruptions of Mount St. Helens*, ed. P. W. Lipman and D. R. Mullineaux. United States Geological Survey Professional Paper 1250, 461-478.
- Jituosono, T., Shimokawa, E. and Tsuchiya, S. (1996). Debris flow following the 1994 eruption with pyroclastic flows in Merapi volcano, Indonesia. *Journal of the Japanese Society of Erosion Control Engineering*, **48**, 109-116.
- Johnson, A. M. and Rahn, P. H. (1970). Mobilization of debris flows. *Zeitschrift für Geomorphologie Supplementband*, **9**, 168-186.
- Kaitna, R. and Rickenmann, D. (2007). A new experimental facility for laboratory debris flow investigation. *Journal of Hydraulic Research*, **45**, 797-810.
- Kataoka, K. S., Urabe, A., Manville, V. and Kajiyama, A. (2008). Large-scale breakout flood from an ignimbrite-dammed river: aftermath of the Numazawako eruption (BC 3400), northeast Japan. *Geological Society of America Bulletin*, **120**, 1233-1247.
- Kelfoun, K. and Druitt, T. H. (2005). Numerical modelling of the emplacement of Socompa rock avalanche, Chile. *Journal of Geophysical Research*, **110**(B12202), doi:10.1029/2005JB003758.
- Lavigne, F. and Thouret, J.-C. (2002). Sediment transport and deposition by rain-triggered lahars at Merapi Volcano, Central Java, Indonesia. *Geomorphology*, **49**, 45-69.
- Lavigne, F., Tirel, A., Le Floch, D. and Veyrat-Charvillon, S. (2003). A real-time assessment of lahar dynamics and sediment load based on video-camera recordings at Semeru volcano, Indonesia. In *Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment*, ed. D. Rickenmann and C.-L. Chen. Rotterdam: Millpress.
- Li, J., Yuan, J., Cheng, B. and Luo, D. (1983). The main features of the mudflow in Jiang-Jia Ravine. *Zeitschrift für Geomorphologie*, **27**, 325-341.

- Lowe, D.R., Williams, S. N., Leigh H., Connor, C. B., Gemmell, J. B. and Stoiber, R. E. (1986). Lahars initiated by the 13 November 1985 eruption of Nevado del Ruiz, Columbia. *Nature*, **324**, 51-53.
- Magirl, C. S., Griffiths, P. G. and Webb, R. H. (2010). Analyzing debris flows with the statistically calibrated empirical model LAHARZ in southeastern Arizona, USA. *Geomorphology*, **119**, 111-124.
- Major, J. J. (1996). *Experimental Studies of Deposition by Debris Flows: Process, Characteristics of Deposits, and Effects of Pore-Fluid Pressure*. Ph.D. thesis, University of Washington, Seattle.
- Major, J. J. and Voight, B. (1986). Sedimentology and clast orientations of the 18 May 1980 southwest-flank lahars, Mount St. Helens, Washington. *Journal of Sedimentary Petrology*, **56**, 691-705.
- Major, J. J. and Yamakoshi, T. (2005). Decadal-scale change of infiltration characteristics of a tephra-mantled hillslope at Mount St. Helens, Washington. *Hydrological Processes*, **19**(18), 3621-3630.
- Major, J. J., Janda, R. J. and Daag, A. S. (1996). Watershed disturbance and lahars on the east side of Mount Pinatubo during the mid-June 1991 eruptions. In *Fire and Mud: Eruptions and Lahars of Mount Pinatubo, Philippines*, ed. C. G. Newhall and R. S. Punongbayan. Seattle: University of Washington Press, pp. 895-919.
- Major, J. J., Iverson, R. M., McTigue, D. F., Macias, S. and Fiedorowicz, B. K. (1997). Geotechnical properties of debris-flow sediments and slurries. In *Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment*, ed. C. L. Chen. American Society of Civil Engineers, Proceedings of First International Conference, pp. 249-259.
- Malin, M. C. and Sheridan, M. F. (1982). Computer-assisted mapping of pyroclastic surges. *Science*, **217**, 637-640.
- McDougall, S. and Hungr, O. (2004a). A model for the analysis of rapid landslide motion across three-dimensional terrain. *Canadian Geotechnical Journal*, **41**, 1084-1097.
- McDougall, S. and Hungr, O. (2004b). Dynamic modelling of entrainment in rapid landslides. *Canadian Geotechnical Journal*, **41**, 1437-1448.
- Mizuyama, T., Kobayashi, S. and Ou, G. (1992). Prediction of debris flow peak discharge. *Proceedings of the International Symposium Interpraevent*, Bern, pp. 99-108.
- Mothes, P. A., Hall, M. L. and Janda, R. J. (1998). The enormous Chillos Valley Lahar: an ash-flow-generated debris flow from Cotopaxi Volcano, Ecuador. *Bulleting of Volcanology*, **59**, 233-244.
- Mothes, P., Hall, M. L., Andrade, D., Samaniego, P., Pierson, T. C., Ruiz, A. G. and Yepes, H. (2004). Character, stratigraphy and magnitude of historical lahars of Cotopaxi Volcano (Ecuador). *Acta Vulcanologica*, **16**, 85-108.
- Okuda, S., Suwa, H., Okunishi, K. and Yokoyama, K. (1980). Depositional processes of debris flow at Kamikamihori Fan, northern Japan. *Proceedings of the Third Meeting of the IGU Commission on Field Experiments in Geomorphology*, Kyoto, Japan, 195-203.
- Pierson, T. C. (1981). Dominant particle support mechanisms in debris flows at Mt. Thomas, New Zealand, and implications for flow mobility. *Sedimentology*, **28**, 49-60.
- Pudasaini, S. P., Wang, Y. and Hutter, K. (2005). Modeling debris flows down general channels. *Natural Hazards and Earth System Sciences*, **5**, 799-819.
- Rickenmann, D., Weber, D. and Stepanov, B. (2003). Erosion by debris flows in field and laboratory experiments. In *Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment*, ed. D. Rickenmann and C.-L. Chen. Rotterdam: Millpress.
- Rodolfo, K. S., Umbal, J. V., Alonso, R. A., Remotigue, C. T., Paladio-Melosantos, M. L., Salvador, J. H. G., Evangelista, D., and Miller, Y. (1996). Two years of lahars on the western flank of Mount Pinatubo: initiation, flow processes, deposits, and attendant geomorphic and hydraulic changes. In

- Fire and Mud: Eruptions and Lahars of Mount Pinatubo, Philippines*, ed. C. G. Newhall and R. S. Punongbayan. Seattle: University of Washington Press, pp. 989-1013.
- Savage, S. B. and Sayed, M. (1984). Stresses developed by dry cohesionless granular materials sheared in an annular shear cell. *Journal of Fluid Mechanics*, **142**, 391-430.
- Schatzmann, M., Bezzola, G. and Minor, H. E. (2003). The ball measuring system – a new method to determine debris flow rheology? In *Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment*, ed. D. Rickenmann and C.-L. Chen. Rotterdam: Millpress, pp.387-398.
- Scott, K. M. and Vallance, J. W. (1995). Debris flow, debris avalanche, and flood hazards at and downstream from Mount Rainier, Washington. United States Geological Survey Hydrologic Investigations Atlas HA-729, 1:100 000.
- Scott, K. M., Vallance, J. W. and Pringle, P. T. (1995). *Sedimentology, behavior, and hazards of debris flow at Mount Rainier, Washington*. United States Geological Survey Professional Paper, 1547, 106 pp.
- Smith, G. A. and Lowe, D. R. (1991). Lahars: Volcano-hydrologic events and deposition in the debris flow-hyperconcentrated flow continuum. In *Sedimentation in Volcanic Settings*, ed. R. V. Fisher and G. A. Smith: Society of Economic Paleontologists and Mineralogists Special Publication, pp. 59-70.
- Suwa, H. (1988). Focussing mechanism of large boulders to debris-flow front. *Transactions, Japanese Geomorphological Union*, **9**, 151-177.
- Tecca, P. R., Galgaro, A., Genevois, R. and Deganutti, A. M. (2003). Development of a remotely controlled debris flow monitoring system in the Dolomites (Acquabona, Italy). *Hydrological Processes*, **17**, 1771-1784.
- Vallance, J. W. and Scott, K. M. (1997). The Osceola mudflow from Mount Rainier: Sedimentology and hazards implications of a huge clay-rich debris flow. *Geological Society of America Bulletin*, **109**, 143-163.
- Voight, B., Janda, R. J., Glicken, H. and Douglass, P. M. (1983). Nature and mechanics of the Mount St. Helens rockslide-avalanche of 18 May 1980. *Geotechnique*, **33**, 243-273.
- Waitt, R. B. (1989). Swift snowmelt and floods (lahars) caused by great pyroclastic surge at Mount St. Helens volcano, Washington, 18 May 1980. *Bulletin of Volcanology*, **52**, 138-157.
- Waitt, R. B., Pierson, T. C., MacLeod, N. S., Janda, R. J., Voight, B. and Holcomb, R. T. (1983). Eruption-triggered avalanche, flood, and lahar at Mount St. Helens: Effects of winter snowpack. *Science*, **221**, 1394-1397.
- Wang, Y. and Hutter, K. (1999). A constitutive theory of fluid-saturated granular materials and its application in gravitational flows. *Rheologica Acta*, **38**, 214-223.
- Whipple, K. X. and Dunne, T. (1992). The influence of debris-flow rheology on fan morphology, Owens Valley, California. *Geological Society of America Bulletin*, **104**, 887-900.
- Wolf, T. (1878). *Memoria Sobre El Cotopaxi y su Ultima Erupcion Acaecida el 26 de Junio de 1877 (Memoir of Cotopaxi and its Final Eruption of 26 June 1877)*. Guayquil: Imprenta del Comercio.
- Zanuttigh, B. and Lamberti, A. (2007). Instability and surge development in debris flows. *Reviews of Geophysics*, **45**, RG3006, doi:10.1029/2005RG000175.
- Zhang, S. (1993). A comprehensive approach to the observation and prevention of debris flows in China. *Natural Hazards*, **7**, 1-23.