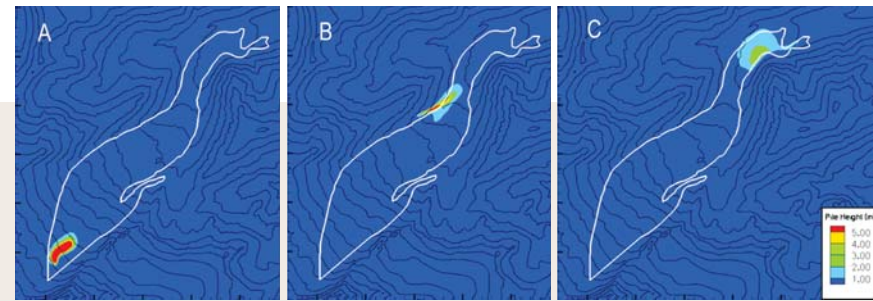
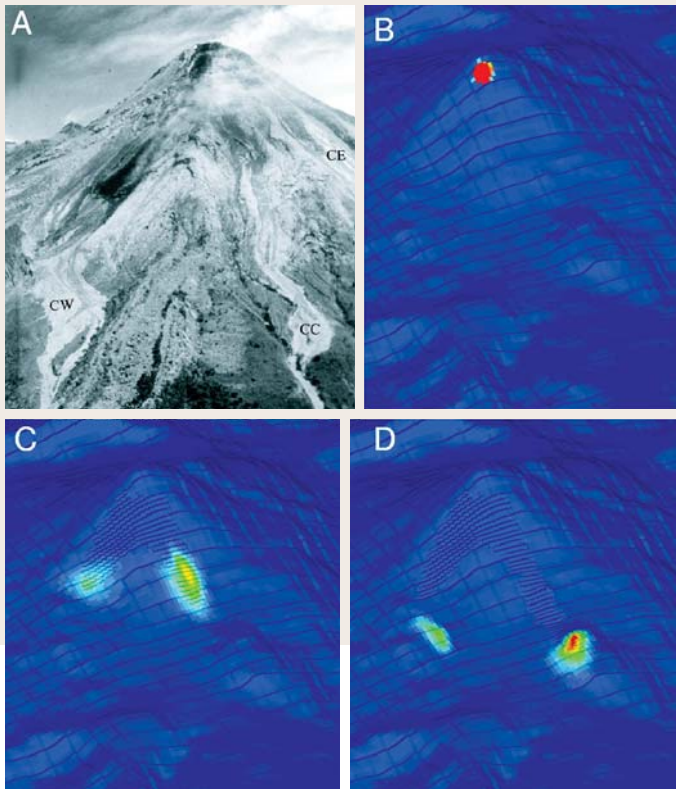


MODELING AVALANCHES AND PYROCLASTIC FLOWS

A. Deposits of the April 16, 1991, Colima pyroclastic flow show up as lighter areas in the Cordoban West (CW), Cordoban Central (CC) and Cordoban East (CE) gullies. B. Initial position of the dome collapse material in the simulation. C. The flowing granular mass propagates downslope. D. Final position of the material in the simulation corresponds to flat areas in the slope.



Computer simulation depicting three stages in the movement of the 1963 Little Tahoma Peak avalanche. The white line shows the mapped boundary of the actual flow. A. Beginning stage of avalanche at base of cliff. B. Middle stage of flows passing over the glacier. C. Terminal stage of flow abutting against a terminal moraine.

The safety of millions of people living near unstable hillsides and active volcanoes depends on our ability to predict the flow path, flow thickness, and area covered by rock avalanches and pyroclastic flows of various sizes and physical properties. In cooperation with a larger group of scientists (grant ACI 01-21254), researchers are using new computer code that treats very large avalanches and mud flows much like a flood surge of water across the terrain. By specifying the starting volume and basic properties of the flows, erosion and deposition can be monitored through its course. This geophysical mass-flow model is evaluated by comparing simulation results with laboratory experiments, published data on the 1963 Little Tahoma Peak avalanche, Mount Rainier, and recent information on pyroclastic flows at Colima Volcano, Mexico. Model results show strong similarities in terms of velocity history, location of run-up areas, run-out length and aerial distribution of the Little Tahoma Peak deposit (top), and the April 16, 1991, pyroclastic flows of Colima (left). Such simulations have applications to planning for reduction of disasters related to natural hazards.

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