



Tree-ring based lahar reconstruction on the slopes of Volcán Popocatépetl (México)

M. Stoffel and M. Bollschweiler

Laboratory of Dendrogeomorphology, Department of Geosciences, Geography, University of Fribourg, Fribourg, Switzerland (markus.stoffel@unifr.ch/ Fax: +41 26-3009746 / Phone: +41 26-3009015)

Lahars are volcanic mudflows consisting of a mixture of eruptive material, loose sediment and water. They typically occur when volcanic activity is suddenly melting up snow, ice or firn above the snowline and they may easily reach flow velocities trespassing 100 km/h. On the slopes of the active Volcán Popocatépetl (México), lahar activity has repeatedly been reported in the recent past, namely in April 1995, July 1997 and January 2001. During these events, individual surges flew down the Huiloac Gorge reaching the settlements Santiago Xalitzintla and San Nicolás de los Ranchos located some 21 km away from the crater. As a result of the existing hazards and due to the considerable damage potential there is a big need for the local administration and engineering consultants to obtain detailed information on previous events (frequency, magnitude, flow heights or flow speeds) in order (i) to realistically estimate the reach and flow paths of potential future events and (ii) to plan appropriate mitigation measures.

Tree-ring analyses have regularly been used to date past activity of various geomorphic processes such as debris flows, landslides or snow avalanches. In contrast, dendrogeomorphological investigations on previous volcanic activity are almost completely missing so far. Therefore, it is the aim of this feasibility study to (i) assess the potential of tree-ring series for the identification and analysis of past volcanic activity and (ii) to reconstruct previous lahar events through the identification and dating of growth disturbances in affected trees. The study is based on the analysis of spruce and pine trees (*Picea religiosa*, *Pinus hartwegii*, *Pinus ayacahuite*, *Pinus montezumae*) growing on

the slopes and in existing lahar channels of Volcán Popocatepetl. Preliminary results will be presented at the EGU meeting.