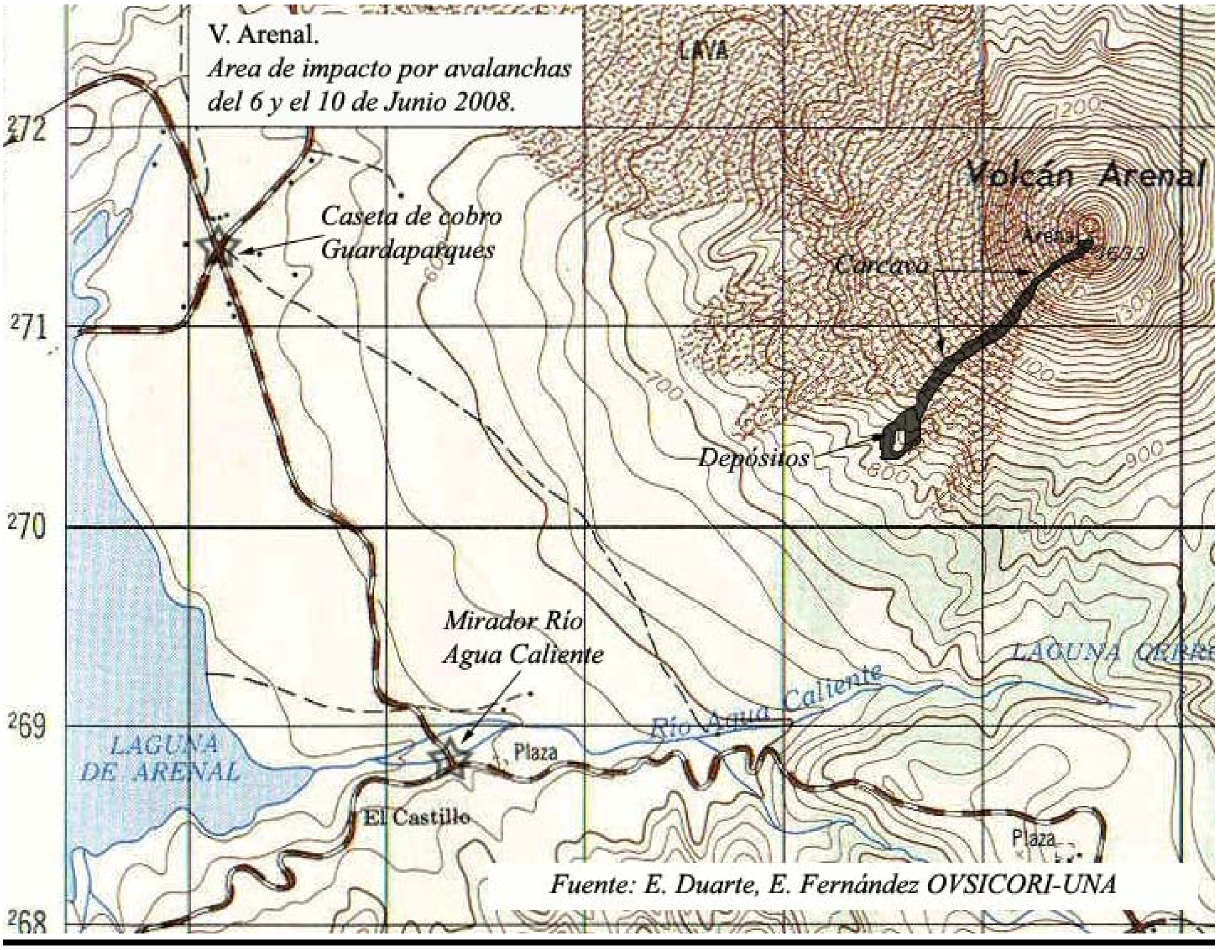
Observatorio Vulcanológico y Sismológico de Costa Rica. OVSICORI

Fieldreport, June 11th, 2008.
Incandescent avalanches and deposits towards SW of Arenal volcano.

On June 11th, 2008 the SW flank of Arenal volcano was visited to document deposits from pyroclastic flows occurred on June 6th and June 10th events (Map 1).



Map 1. General location of sector affected by avalanches during June 2008.

Two researchers from OVSICORI-UNA visited the distal fan of deposits. It was possible to assess, from this point, extension of affected area, nature of deposits, speed of avalanches and subsequent secondary effects. Similarly, it was possible to collect solid samples, for later analysis, as to estimate depth of such deposits.

The fan of deposits (130x200m) widens at 900asl along the area where the steep hill changes suddenly to flatter areas (Fig.1a and 1b).

Fig. 1a. View from 2.5 km SW of the summit, towards the final fan of materials.

Fig 1b. Drawing shows the total affected area by avalanches.

At least two main lobules were emplaced at the end of a previous cavity left by prior lava flows. Such tongues of chaotic material maintain metric blocks with temperatures around 500°C. Their thickness vary between 3 and 4 m containing heterogeneous blocks within a gray, sandy matrix. Coarse materials combine preexistent material, incorporated from the outer eroded walls and juvenile heterogeneous material coming from atop (Fig.2).

Fig. 2. Succession of two lobules according to their arrival.

Sections of the NW outer wall, next to distal deposits, show burns from previous incandescent blocks affecting the area since march 2007. This correlates with prior reports mentioning minor vegetation ignition at least twice last year. Several patches of dwarf , scattered vegetation are now semi carbonized and slowly regenerating. The fact of such burned patches explain the reach of previous blocks and their capacity to move greater distances due to the smoothness of the SW flank. A important section of the wall, besides the deposits, was incorporated with the rolling material after partial collapse and due to direct impact from initial avalanches(Fig.3).

Fig. 3. Sector showing topographical changes due to the arrival of avalanches to the lower areas.

The sampled sector contains ~10% of metric blocks (2-3m in size), 20% blocks less than 1 m in size. Most of them are juvenile, derived from the decomposition of the out coming lava flow, although initially angular they show pretty rounded sides due to the downhill rolling. The rest of deposits show a matrix well combined with angular pieces of all sizes. Differently from other similar events, observed in other sectors, no reddish or severely altered pieces are noticed. Very few blocks with plastic texture or bread crust type are visible.

Margins of materials deposited at the end are carpeted by a fine layer of several cms of fine ashes. On the S and SW sides such lane is only few meters wide while on the opposite side (N and NW) such lane shows several tenths of meters dispersed horizontally. This effect is due to the prevailing winds blowing during the traveling of flows.

The upper and intermediate sections affected cross some 600m, from near the summit and over a steep flank (60 degrees). A carcave of (80x60m aprox.) was formed starting from some 1200masl and up (Fig. 4).

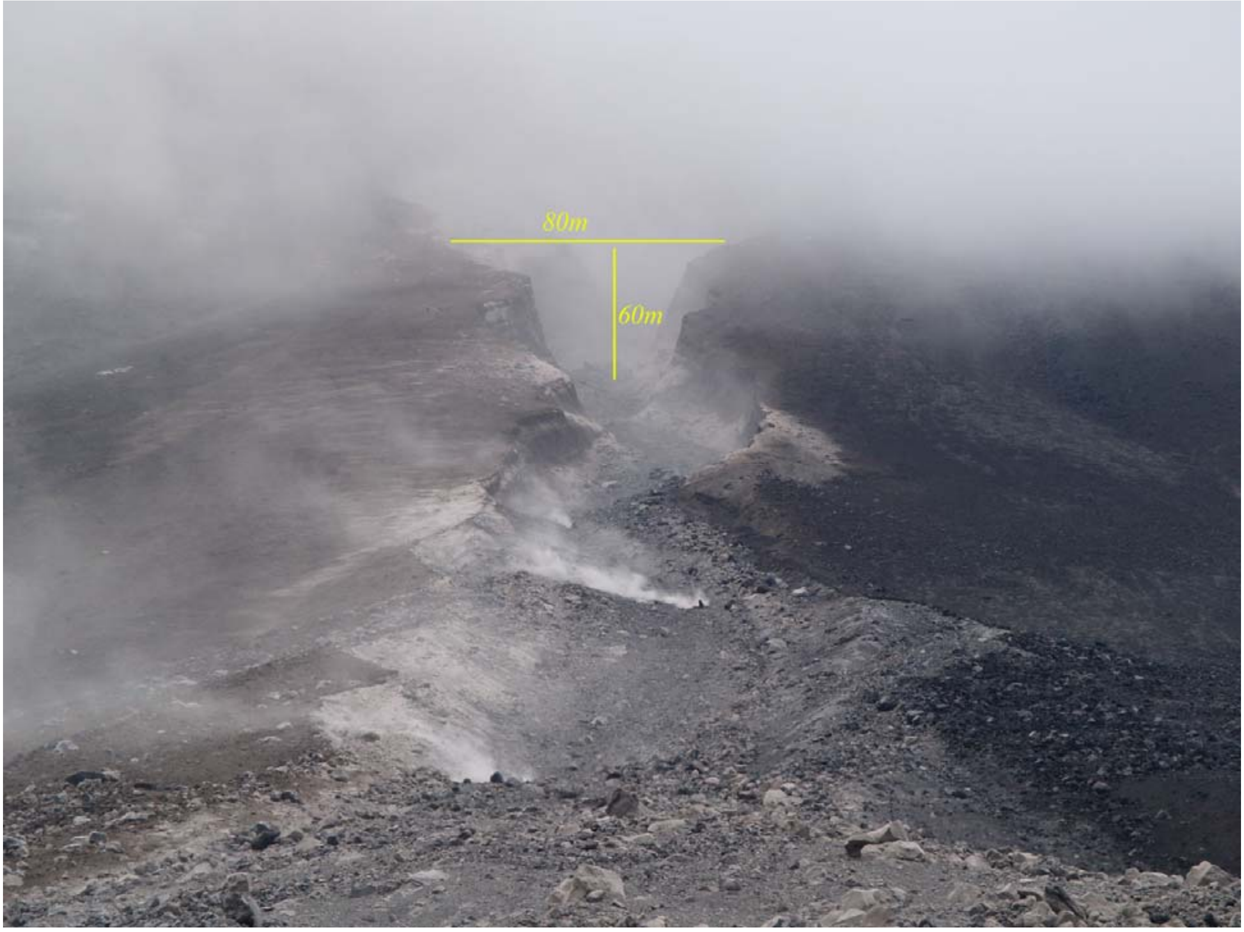


Fig. 4. General view of the carcave generated by the initial avalanches.

The greatest topographical impact was produced there where the carcave, scooped during the Friday 6th and Tuesday 10th, took place. Thru this avenue, later avalanches have been canalized. Between contours 900 and 1200 the fan of materials widens and earlier materials are rejuvenated by smaller avalanches of finer material, light gray in color. Enormous blocks, collapsing from the lava front cross this fan down to the most distal areas.

Up, near the summit a dark moving mass is observable corresponding to the new blocky and voluminous lava flow, slowly descending. Although slow the front pushes a important mass of incandescent material that will probably continue moving in that direction. In several similar occasions these lava flows have taken several months for their total displacement (Fig. 5).

Collapsing materials expand and pulverize along the path thru the carcave, generating important ash columns. During fieldwork several smaller avalanches were observed, providing immense blocks that rapidly reduce their size due to the hammering and fractioning against the walls and other rough at the bottom of the ditch. Some of such blocks arrived to the end part of the fan with temperatures ranging from 800 to 1000 °C.

Moreover, during sampling it was possible to verify the quick cracking of big blocks due to termic shock. A heavy shower accelerated that process while producing, simultaneously, a steam bath effect due to the contact of cold water with the hot surface of materials.

Our visit included video graphic and photographic documenting of deposits and nearby affected areas.

Fig. 5. General view of carcave occupied by avalanche and lava flow on the top.

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