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GLACIER MONITORING SYSTEM IN COLOMBIA – complementing glaciological measurements with laser-scanning and ground-penetrating radar surveys

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Colombia (South America) has six small glaciers (total glacierized area of 45 Km2); their geographical location, close to zero latitude, makes them very sensitive to climate changes. An extensive monitoring program is being performed since 2006 on two glaciers, with international cooperation supports. This presentation summarizes the results of glacier changes in Colombia and includes the latest results obtained within the CATCOS Project – Phase 1 (Capacity Building and Twinning for Climate Observing Systems) signed between Colombia and Switzerland, and within the Joint Mixte Laboratory GREAT-ICE (IRD – France), with the application of LiDAR technology and GPR-based ice thickness measurements at Conejeras Glacier.

Conejeras Glacier (Lat. N. 4° 48′ 56"; Long. W. 75° 22′ 22"; Alt. Max. 4915m.; Alt. Min. 4730m. Area 0.2 Km2) is located on the north-western side of Santa Isabel Volcano. This glacier belongs to global glacier monitoring network of the World Glacier Monitoring Service (WGMS-ID: 2721). The surface mass balance is calculated monthly using the direct glaciological method. Between April 2006 and May 2014, Conejeras Glacier showed a cumulative loss of -21 m w.e.

The CATCOS Project allowed to improve the glacier monitoring system in Colombia with two main actions: (1) a terrestrial laser scanner survey (RIEGL VZ-6000 terrestrial laser scanner, property of Universities of Lausanne and Fribourg); and (2) ice thickness measurements (Blue System Integration Ltd. Ice Penetrating Radar of property of IRD).

The terrestrial laser-scanning survey allowed to realize an accurate digital terrain model of the glacier surface with 13 million points and a decimetric resolution. Ice thickness measurements showed an average glacier thickness of 22 meters and a maximum of 52 meters.