



INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

Documenting, understanding and projecting changes in the hydrological cycle in the American cordillera (CRN2047)

Fresh water is becoming increasingly scarce in a warming and more crowded world. Better data are needed for effective management of threatened water supplies from many of the Americas' mountain regions. This project examines hydrological cycles in several basins in Bolivia, Chile and Argentina as well as in the Western Cordillera of North America.

Goals

- Provide and validate climate and runoff data for the past 300 years and identify causes of variability
- Document and model the shrinking of glaciers and how this modifies downstream water flow
- Assess how changing water supply impacts on economies and livelihoods; identify what this might mean for future water management, for policies and institutions

First results

- Long-term variation seen in a 700-year record of tree-ring widths allowed reconstruction of the rainfall variability in the high Andes. One major drought period, in the 14th century, had critical social impacts: open pre-Inca villages in lowlands were abandoned in favor of fortified sites, with evidence of local warfare starting during the driest years in the tree-ring record (1314-1315); two major droughts followed in the same century.
- There is a slight trend of declining regional streamflow in Chile during the past one hundred years, and there were two major climate regime changes: in 1945 average annual rainfall dropped by 31%, to recover only in 1977 (by 28%). These sudden variations coincide with well-known shifts in the atmospheric circulation over the North Pacific (the Pacific Decadal Oscillation). Expected future oscillations, superimposed on the trend towards less rainfall, may have major impacts on water availability.
- In some critical zones, adaptation to climate change will be more pressing and more challenging than in others. A drought severity index for the southern Andes (35.5°-39.5°S), for example, indicates higher drought risk in 1920-2002 than in the reconstructed 1346-1919 record. If continued, this trend would certainly threaten agriculture and hydroelectric power production.

Principal investigator and lead agency

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Links to other IAI projects

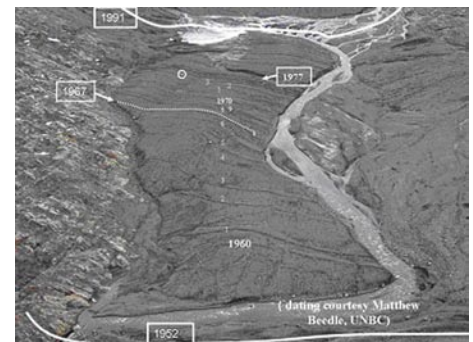
This project collaborates with the *Small Grant Projects for the Human Dimensions Climate change and irrigated agriculture* (SGP-HD003) and *Coming down the mountain: understanding the vulnerability of Andean communities to hydroclimatologic variability and global environmental change* (SGP-HD-04).

Project web page: page not available by now

List of publications: <http://iaibr.l.jai.int/bs?publications/CRN2047.pdf>



Coring Lake Sediments Jasper, Canada, February 2007



Annual Moraines at Castle Mountain Glacier, Cariboo Mountains, British Columbia, Canada



Preparing to sample 1500 year old logs exposed (beneath fallen tree) in Rio Frías, Argentina

