The Consortium for Integrated Climate Research in Western Mountains – A Progress Report

CIRMOUNT (the Consortium for Integrated Climate Research in Western Mountains) is a collaborative, open, science consortium comprising agency and university scientists, natural-resource specialists, and program managers. It is dedicated to improving understanding of climate variability and change, and to enhancing the capacity to sustain western North American society.

CIRMOUNT goals are to 1) define regional vulnerabilities to climate variability and change in the unique landscapes that define western North American mountains; 2) measure and understand climate-driven changes in these regions; 3) develop information, products, and processes to assist natural resource decision-makers throughout the West; and 4) assist resource managers and others to respond to the scientific needs and challenges of western society for mountain resources.

CIRMOUNT's core topical scope and foci are the intersection of climate, water, society, ecosystems, and western North American mountains (Figure 1). CIRMOUNT has both disciplinary (monitoring; databases) and integrative (integrated research, decision-support) goals.

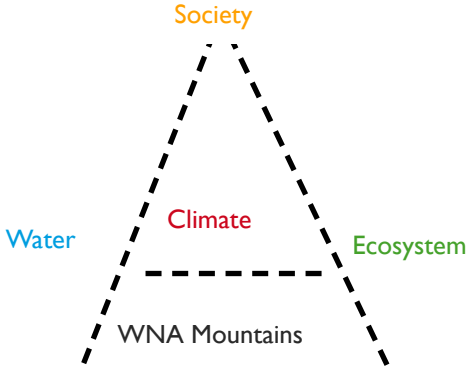


Figure 1. Key scope and foci of CIRMOUNT (WNA is western North America)

Background and Accomplishments

With the successful completion of the Mountain Climate Sciences Symposium (MCSS, Diaz and Millar, 2004), an ad hoc association of western United States climate science professionals established the Consortium for Integrated Climate Research in Western Mountains (CIRMOUNT) in 2004. Our goal was to promote and integrate understanding of the physical and ecological processes relating to climate in western North American mountain environments, and to improve communication of scientific findings to decision-makers.

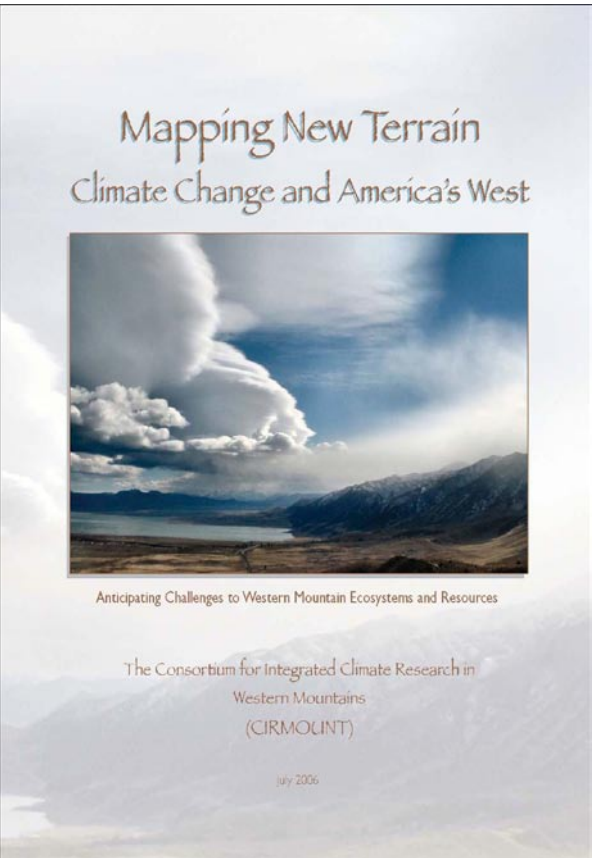
An important outcome from the MCSS meeting was the identification of critical questions related to ongoing and future climatic changes in the US West. They include the following:

- How are the vertically stacked ecosystems in the West changing as a result of climate change and variability?
- How can we best link climate, ecosystem and human processes?
- How can we overcome insufficient integration of disciplinary research in the region?
- How can we enhance the delivery of information and effective communication of important scientific findings that are relevant to western mountains decision-makers?

As a result of the MCSS and subsequent efforts by members of CIRMOUNT, a general audience publication highlighting key issues regarding climate change impacts on western United States (US) society was published and made available online (CIRMOUNT 2006). In this "Mapping New Terrain" publication, Consortium members reiterated the framework and motivation for their association: "… the growing recognition that the climate of the West is changing, and that impacts are rapidly emerging in the form of changes in streamflow patterns, plant phenology, ecosystem structure, wildfire regimes, and the like…" [by bringing together] "a group of scientists representing a wide range of disciplines … crossing traditional disciplinary lines, exchanging ideas, and coordinating research efforts, Consortium participants seek to identify the greatest threats to western mountains arising from climate change and to develop priorities for a research strategy that addresses those concerns."

In March of 2005 CIRMOUNT launched the first of a series of mountain climate conferences (MTNCLIM) near Yellowstone National Park, Montana to further its goals to enhance communication of the available information about climate change science, climate impacts, and policy-related issues. A second MTNCLIM conference was held in Mount Hood, Oregon in September 2006, and a third conference in June of 2008 in Silverton, Colorado. Abstracts and copies of the presentations given at these meetings, as well as for all other related meeting activity related to CIRMOUNT can be accessed via the Consortium's website: http://www.fs.fed.us/psw/cirmount/meetings/archives.shtml.

Other activities of the Consortium designed to foster interactions between mountain science researchers and highlight mountain science research include the convening of annual disciplinary sessions at the Fall Meeting of the American Geophysical Union (AGU). The first of these was held in December 2004 with the theme of "Climate Challenges to Mountain Water Resources and Ecosystems". The topics for the other three AGU Fall sessions were: „Extreme Events in Western Mountain Climate, Resources, and



CIRMOUNT 2006: "Mapping New Terrain"

Ecosystems" (2005); "Elevational Gradients and Mountain Climates, Resources, and Ecosystems" (2006); and "Climate Change in High-Elevation Mountain Environments" in 2007. Proposed for 2008 is, "Complexities in Mountain Climates, Ecosystem Response to Climate Change, and Resource Management".

With the launching of the Mountain Views Newsletter in 2007, CIRMOUNT took another tangible step toward the accomplishment of one its primary goals—to inform scientists, resource managers, and decision-makers of the latest developments regarding the dynamics of western climate, and the evolving natural and societal impacts associated with those changes. The newsletter is meant to be a clearinghouse for information about the state of regional and larger-scale climate patterns, and about climate- and related environmental and ecological-science activities bearing on western society. Current and past issues of the Newsletter can be downloaded from the CIRMOUNT website.

In addition to these communication activities CIRMOUNT has fostered, through focused working groups, interdisciplinary activities around a number of key climate issues. In 2004, CIRMOUNT launched the North American chapter of the international Global Research Initiative in Alpine Regions (GLORIA), a program that addresses responses of alpine flora to climate change. Nine multi-summit target regions are now installed, ranging from Alaska, through British Columbia, the Sierra Nevada, to the northern and central Rocky Mountains. An equal number of regions are planned for installation in 2008 and 2009. Similarly, the CIRMOUNT Mountain Climate Monitoring group has leveraged installation of long-term climate monitoring stations in several mountain ranges from Alaska to California. In addressing a CIRMOUNT goal to extend beyond its regional borders, an international effort resulted in the start-up of CONCORD, (Climate Change Science for the American Cordillera) in collaboration with the MRI. An initial meeting was held in Mendoza, Argentina in 2006 (see Diaz et al., 2006). One result from this effort is the development of CORFOR, the Cordillera Forest Dynamics Network, which was established in association with the Western Mountain Initiative, the MRI, and other international partners to establish and analyze standardized forest state measurements and trend information along the American Cordillera.

Future Directions

CIRMOUNT is organized as a grassroots initiative, with no program staff or direct support; a 15-member scientific core team serves as the ad-hoc coordinating body to a mailing list participation of over 700. Even without a formal institutional framework, we have galvanized widespread interest and support for integration of climate and climate impacts work on western mountains. We have been seeking funding for a program base, and in the meantime continue to promote consortium goals of research, coordination, and communication through many existing and new venues and projects. A strategic plan developed by CIRMOUNT members outlines a program vision and set of primary goals linked to the critical questions facing mountain environments under the impacts of climate change (http://www.fs.fed.us/psw/cirmount/publications/pdf/strat_plan_0407.pdf).

Current high-priority and near-term goals include the establishment of at least five new GLORIA Target Regions, installation of long-term climate monitoring (including sampling through elevational gradients) in key mountain regions presently lacking coverage and filling in gaps in the CORFOR forest plot transect. Intermediate range goals are to produce comprehensive mountain-climate issue papers, and to promote a coordinated climate policy relationship for western North American mountain regions with other federal agency programs, such as the NOAA RISA (Regional Integrated Synthesis and Assessment) program. A long range "dream goal" is for CIRMOUNT to develop a unified interdisciplinary research program for Western mountains, envisioned as a "Climate Change Science Program for Western Mountains."

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