

Imperative to Understand Changes in Western Mountain Watersheds and Ecosystems: the CIRMOUNT program.

Western mountain watersheds and their ecosystems present a large challenge and an important opportunity to study the sensitivity of watersheds and ecosystems to climate changes. In recent decades, spring snow accumulation, snowmelt and streamflow timing in river basins of western North America have changed in response to warmer winters and springs. With few exceptions, all western mountain glaciers have been shrinking over the past century and the rate of shrinkage has accelerated over the past few decades. Along with these hydrologic changes, there have been noteworthy impacts on mountain ecosystems. During the period of extensive drought in western North America since the late 1990's, millions of hectares in the upland landscapes of the Southwestern United States have been affected by forest dieback and severe fire activity. The recent series of unusually warm years, has allowed the mountain pine beetle to expand its range into high elevation, whitebark pine ecosystems with devastating consequences. Since the mid-1980s, there has been a dramatic increase in the area burned in wildfires in mountain forests of the western United States, with mean annual area burned nearly three and a half times higher compared to the preceding one and a half decades. Despite these dramatic consequences, processes and feedbacks related to energy, water and biogeochemical fluxes are not well understood and many of the linkages between physical and biological systems are not well understood. Improved observation networks and collaboration within and across earth science and social science disciplines are needed to address these scientific issues and translate them to decision and policy makers. The Consortium for Integrated Climate Research in Western Mountains (CIRMOUNT) is a self-organized team of scientists which is organizing their efforts and seeking support is to improve knowledge of high-elevation climate systems and to better integrate physical, ecological, and social sciences relevant to climate change, ecosystem response, and natural-resource policy in western North America.