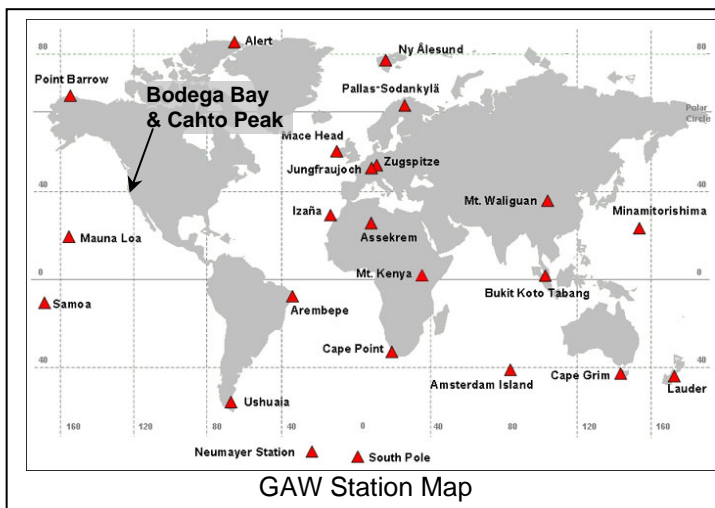


Paired Climate Monitoring Stations at Bodega Bay and Cahto Peak (Northern CA) by the Air Quality Research Center at the University of California, Davis

We propose to establish paired state-of-the-art climate monitoring stations at Bodega Bay and Cahto Peak in Northern California to provide essential baseline data for studying the impacts of Asian emissions and changing oceanic conditions on the air quality and climate of North America. The entire Earth's climate is warming; in fact, the recent 2007 IPCC assessment report points out that eleven of the past twelve years have ranked as the warmest on record since 1850. The rapid industrialization and desertification of Asia is leading to dramatic increases in air pollutant emissions from that continent. Frequently these emissions reach California, increasing the background amounts of key regulated pollutants, so that the gap between background levels and federal ozone and particulate matter standards is shrinking. Particles are known to be altering cloud dynamics and precipitation patterns, while increased black carbon and soil dust deposition to the surface accelerates melting of the already diminishing snow pack. Furthermore, changes in the global winds have begun to influence the ocean circulation along the coastal margin, and a rising tide of evidence suggests that continued changes could bring about dire consequences to marine ecosystems there and the vital fisheries they support. These climate shifts are likely to negatively impact water resources so crucial for energy and agricultural production, as well as marine and freshwater fisheries landings in California. Early detection and a better understanding of such adverse effects via careful climate monitoring will provide the best opportunity to curtail their impacts. Finally, the landmark Global Warming Solutions Act (AB32) legislation in California relies on accurate greenhouse gas emissions data for deducing greenhouse gas emission reductions, and our proposed sites can provide the necessary baseline data for such inventories.



The World Meteorological Organization (WMO) has established a network of stations, the Global Atmosphere Watch (GAW) network, around the world to monitor key chemical and physical properties of the atmosphere. Countries have voluntarily joined this network in an international effort to cooperatively monitor our planet's health. The figure above illustrates that there are currently *no GAW stations located along the Pacific Rim of the Americas let alone in the contiguous United States.*

The University of California, Davis is a leader in atmospheric and environmental science with over 60 faculty actively engaged in global climate and air quality research (<http://airquality.ucdavis.edu/>). Our research has documented intercontinental transport of Asian pollution for over 20 years, and the Bodega Marine Lab (BML) has been conducting pioneering research on coastal marine biology for over four decades. The proposed observatories at BML and Cahto Peak are part of the University of California's Natural Reserve System, a network of 35 regions across the state reserved for long-term study of relatively undisturbed ecosystems.

We propose to establish two GAW stations: one at the **Bodega Marine Laboratory**, located about 50 miles north of San Francisco, and another on **Cahto Peak** (1.3 km elevation) in the Mendocino Coast Range 100 miles NNW of Bodega Bay. The air at each location is representative of very distinct layers of the atmosphere. Measurements at BML observe air in the boundary layer; that is, the air closest to the Earth's surface that is most influenced by emissions from the ocean and its marine life as well as shipping traffic in the Eastern Pacific. Measurements at Cahto Peak, on the other hand, typically characterize the amount and chemical nature of air pollutants transported from Asia. We will instrument these facilities with cutting-edge technologies directed at understanding global and regional climate effects of intercontinental pollutant transport, atmospheric interaction with marine and continental ecosystems, and providing baseline measurements for verifying and tracking greenhouse gas emissions estimates.