



Climate Changes in the Last 1500 Years Their Impact on Pacific Islands



Honolulu, December 3, 2007 - Rapid environmental changes befell the Pacific Islands around A.D. 1300, according to evidence presented at the interdisciplinary workshop “Climatic Changes in the Last 1500 Years: Their Impact on Pacific Islands,” hosted by the IPRC at the East-West Center on November 13–14, 2007. The years around AD 1300 mark the transition in the Northern Hemisphere between the Medieval Warm Period, about A.D. 750–1250, and the Little Ice Age, about A.D. 1350–1850. Were the environmental changes in the Pacific caused by these large-scale climate changes or the result of human activities? This was among the questions the workshop participants sought to answer.

Scientists at the workshop presented such varied proxy data as coral skeletons from the central tropical Pacific, ice cores from South America and the Himalayas, lake sediments, and biostratigraphic layer and tree rings from the Pacific islands to answer this question. These natural archives provide rich information and permit the reconstruction of the spatial and temporal features of Pacific climate over the last 1500 years.

One of the most intriguing changes in rainfall was detected in lake sediments on Christmas Island and Washington Island. Today Christmas Island is arid and Washington Island, only 3 degrees further north, receives much rainfall as it lies under the intertropical convergence zone (ITCZ). Sediment layers from Washington Island show that during the Medieval Warm Period it was as arid as Christmas Island is today.

This extreme shift from dry to wet climate on Washington Island but not Christmas Island can be explained by a northward shift of the ITCZ. The picture emerging from these proxy records, moreover, is that during the Medieval Warm Period, the tropical Pacific resembled a 'permanent' La Nina state, with lower sea surface temperatures in the central and higher sea surface temperatures in the western tropical Pacific than today. Computer climate simulations for the Medieval Warm Period and the Little Ice Age support these two major changes in the tropical Pacific climate. Especially the teleconnections between the tropical SSTs (La Niña state) and the well-documented droughts in western North America appear in simulations as robust features.

Participants debated the possible forces that drove these climate shifts. Although changes in incoming solar radiation and volcanic eruptions are widely believed to be the cause of past climate changes in the tropical Pacific, the computer model solutions imply that intrinsic climate variability and forcing from the Atlantic and the Indian Ocean are just as important as solar radiation and volcanic activity.

The workshop promoted lively dialog and forged partnerships among scientists in such diverse fields as anthropology, archaeology, history, climatology and paleoclimatology. Such partnering is bound to advance knowledge of the forces that drive our climate system.

The workshop culminated in a public lecture, "Abrupt Climate Change: Past, Present, and Future," by world renowned glaciologist Lonnie Thompson from Ohio State University. Thompson, whose years of research on glaciers took him to some of the world's remotest regions and highest mountains, received the distinguished National Medal of Science for his work that provides explicit evidence of global climate change.



Lonnie Thompson during the workshop.

Besides the IPRC, NOAA's Integrated Data and Environmental Applications (NOAA IDEA) Center was host to the workshop. Support also came from NOAA's Climate Program Office (Climate Change Data & Detection). Workshop organizers were Henry Diaz from the NOAA/OAR Environmental Systems Research Laboratory and Oliver Timm from the IPRC.