

HIGH-RESOLUTION NATURAL RECORDING SYSTEMS: INTERCOMPARISONS OF
THE RESPONSE TO INTERANNUAL CLIMATIC VARIABILITY

Timothy Baumgartner
(CICESE)

Lonnie Thompson
(Institute of Polar Studies)

Joel Michaelson
(UC-Santa Barbara)

Andrew Soutar
(Scripps Institution of Oceanography)
and

Richard Casey
(University of San Diego)

Abstract

The goal of this work is to examine the properties of recording mechanisms which are common to continuously recording high-resolution natural systems in which climatic signals are imprinted and preserved as proxy records. These systems produce seasonal structures as an indirect response to climatic variability over the annual cycle. We compare the proxy records from four different high-resolution systems: the Quelccaya ice cap of the Peruvian Andes; composite three ring growth from southern California and the southwestern United States; and the marine varve sedimentation systems in the Santa Barbara basin (off California, United States) and in the Gulf of California, Mexico. An important focus of this work is to indicate how the interannual climatic signal is recorded in a variety of different natural systems with vastly different recording mechanisms and widely separated in space. These high-resolution records are the products of natural processes which should be comparable, to some degree, to human-engineered systems developed to transmit and record physical quantities. We therefore present a simple analogy of a data recording system as a heuristic model to provide some unifying concepts with which we may better understand the formation of the records. This analogy assumes special significance when we consider that natural proxy records are the principal means to extend our knowledge of climatic variability into the past, beyond the limits of instrumentally recorded data.