

ICE-CORE RECORDS OF CLIMATE CHANGE FROM A SOUTH AMERICAN AND SOUTH-CENTRAL NORTH AMERICAN SITE PROVIDE EVIDENCE OF GLOBAL LINKAGE

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Ice cores can be used as a proxy indicator of paleo-air temperature and can provide accurate information on the rate and magnitude of climate change. Until 1991, ice-core records from the continental United States were not available for paleoenvironmental reconstruction and comparison. During the 1991 and 1998 field seasons, two 160-meter ice cores, each containing about 250 years of record, were obtained from Upper Fremont Glacier, Wyoming, in the Western United States. Both cores were collected at an elevation of 4,000 meters above sea level. The delta oxygen-18 profile from the 1991 core indicated a -0.91 permil shift to lighter values between 107.5 and 150 meters below the glacier surface, which corresponds to the latter part of the Little Ice Age. Numerous high amplitude oscillations in this section of the core probably reflect increased seasonality or better preservation of the annual signal as a result of the cooler temperatures during the Little Ice Age. An abrupt decrease in the large amplitude oscillations at 107.5 meters indicates a sudden termination of the Little Ice Age; probably on the order of 10 years or less on the basis of correlations with known volcanic events identified in the 1991 core. Common features in the delta oxygen-18 profiles of the Upper Fremont Glacier and Quelccaya Ice Cap cores from Peru indicate a global paleoclimate linkage between these high-altitude sites. Statistical correlations for the 1991 and 1998 cores will be addressed to further validate the proposed global change linkages between Upper Fremont Glacier and the Quelccaya Ice Cap.