Geophysical Research Abstracts, Vol. 8, 03185, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03185

Ice core computer dating using pattern recognition of globally synchronous volcanics

R. C. Bay (1), N. E. Bramall (1), E. Castellano (2), P. B. Price (1), R. A. Rohde (1), R. Udisti (2)

(1) Physics Department, University of California, Berkeley, CA 94720 (2) Department of Chemistry, University of Florence, Italy (bay@berkeley.edu)

Identification of unique chemical and isotopic anomalies in ice now permits precision cross-dating between cores. Glaciological modeling can agree closely with true time when used to interpolate between control ages. With its ability to reveal faint ash layers that would otherwise escape detection, our borehole-scanning optical dust logger expands the record of correlated volcanic events and complements searches relying on ice core sulfate studies. These advances have enabled us to apply pattern recognition analysis to discriminate wide-spread volcanic depositions, presumably from singular explosive incidents, which we find to be causally related (>99.5%) to Last Glacial abrupt cooling phases. In developing this relationship over the past 50 ka, we found long sequences of volcanic fallout events simultaneously deposited not only across Antarctica but also in Greenland at the 3-sigma confidence level. Such high significance is achievable in large part because of the precision and statistical independence of existing dating analyses, allowing for a blind Monte Carlo comparison. The striking agreement we demonstrate between West Antarctic, East Antarctic, and Greenlandic volcanic records indicates that current timescales are often consistent within one or two centuries, considerably better than even the dating scientists themselves had anticipated.