Geophysical Research Abstracts
Vol. 13, EGU2011-3837, 2011
EGU General Assembly 2011

The Anomalous Winter of 1783-4: Was the Laki eruption really to blame?

Rosanne D'Arrigo (1), Richard Seager (), Jason Smerdon (), Allegra LeGrande (), and Edward Cook ()

(1) Lamont-Doherty, Tree-Ring Lab, Palisades, United States (rdd@ldeo.columbia.edu, 845 365 8152), (2) Lamont-Doherty, Palisades NY, USA (seager@ldeo.columbia.edu), (3) Lamont-Doherty, Palisades NY, USA (jsmerdon@ldeo.columbia.edu), (4) Goddard Institute of Space Studies, New York (legrande@giss.nasa.gov), (5) Lamont-Doherty, Palisades NY USA drdendro@ldeo.columbia.edu

The multi-stage eruption of the Icelandic volcano Laki beginning in June, 1783 is speculated to have caused unusual dry fog and heat in western Europe and cold in North America during the 1783 summer, and record cold and snow the subsequent winter across the circum-North Atlantic. Despite the many indisputable impacts of the Laki eruption, however, its effect on climate, particularly during the 1783-4 winter, may be the most poorly constrained. Here we test an alternative explanation for the unusual conditions during this time: that they were caused by a combined negative phase of the North Atlantic Oscillation (NAO) and an El Niño-Southern Oscillation (ENSO) warm event. A similar combination of NAO-ENSO phases was identified as the cause of record cold and snowy conditions during the 2009-10 winter in Europe and eastern North America. 600-year tree-ring reconstructions of NAO and ENSO indices reveal values in the 1783-4 winter that are second only to their combined severity in 2009-10. Data sources and model simulations support our hypothesis that a combined, negative NAO-ENSO warm phase was the dominant cause of the anomalous winter of 1783-4, and that these events likely resulted from natural variability unconnected to the eruption of Laki.