Geophysical Research Abstracts, Vol. 9, 00656, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00656


# Arctic warmth and icefield retreat in the Last Interglaciation: model-data comparisons

**B. Otto-Bliesner** (1), J. Overpeck (2), S. Marshall (3), G. Miller (4), and A. Hu (1)

(1) National Center for Atmospheric Research, Boulder, CO, USA, (2) University of Arizona, Tucson, AZ, USA, (3) University of Calgary, Alberta, Canada, (4) University of Colorado, Boulder, CO, USA (ottobli@ucar.edu / Fax: 303-497-1348 / Phone: 303-497-1723)

The NCAR-based Community Climate System Model (CCSM), when including changes in the Earth's orbit and tilt that intensified the amount of solar radiation received at high northern latitudes during the spring and summer months 130,000 years ago as compared to today, calculates summers 3 to 5 degrees Celsius warmer than today in the Arctic, especially over and near Greenland. Our simulated climate matches paleoclimatic observations that indicate that Arctic summers were warmer than today by up to 5 degrees Celsius. Using the physically based climate predicted by CCSM to force an ice-sheet model for the Western Arctic with ice-core constraints indicates that the Greenland Ice Sheet and the other circum-Arctic ice fields likely contributed about 2 to 3.5 meters of sea-level rise during the Last Interglaciation. The paleoclimate record indicates that sea level was 4 to 6 meters above its level today suggesting an additional contribution from Antarctica. Sea-level rise from melting polar ice sheets is one of the threats of future climate change. Using the same climate model and with one scenario of future greenhouse gas increase, Arctic summers are projected to become even warmer by year 2100 than they were during the Last Interglaciation. If Arctic summers warm to the levels of the Last Interglaciation, this research suggests that the Greenland and Antarctic ice sheets may start contributing increasingly to sea level rise.