The CAPE Holocene Project

The first task identified by CAPE was to define the spatial and temporal patterns of environmental change in the Arctic during the Holocene. With a rich and diverse set of proxy data available in a continuous, or near-continuous time series, the Holocene offers possibilities for paleoenvironmental reconstruction at a level of precision unavailable for earlier periods. The Holocene includes the interval of instrumental and written records, thus allowing a firmly-based calibration of proxy data in terms of climate variables, and it overlaps with the period of rapidly increasing CO2 content in the atmosphere, a significant feature to be evaluated when predicting future climate change.

A wide range of terrestrial and marine proxies exist as time series for the Holocene. Our goal was to synthesize these time series to characterize the Earth’s surface in the Arctic at 1 ka time slices through the Holocene. On land, reconstructions were based primarily on paleovegetation data (pollen and macrofossils) interpreted in terms of a limited number of vegetation types. Other surface characteristics include the distribution of lakes and glacier ice, and paleo-shorelines. Additional terrestrial paleoenvironmental data are available less commonly from ice cores and tree rings, and diagnostic changes in isotope data in lakes, aerial plankton, diatoms, and various other faunal and floras. Key marine characteristics are the seasonal and permanent sea ice distribution, sea surface temperature (SST), water mass type (e.g. Polar versus Atlantic/Pacific) and dominant currents.

CAPE Holocene Meeting Regional Coordinators

REGION 1: FENNSCANDIA
Terrestrial: Sheila Hicks, U. of Oslo, Norway
Marine: Morten Huld, U. of Tromso, Norway

REGION 2: EUROPEAN ARCTIC
Terrestrial: Valeri Astakov and Andrei Andreev
Marine: Yarema Musatov

REGION 3: WESTERN SIBERIA
Terrestrial: Dmitri Bobyleva and Olga Borisova, Arctic & Atlantic Institute, St. Petersburg
Marine: Vladimir Zarikov and Yarema Musatov,
Russian Institute of Arctic Geology, St. Petersburg, Russia

REGION 4: CENTRAL SIBERIA
Terrestrial: Hans Hubbert
Marine: Heidi Kassens

REGION 5: EASTERN SIBERIA
Terrestrial: Yevgenia Markova and Nikolai Romanov
Marine: Heidi Kassens

REGION 6: FAR EAST RUSSIA
Terrestrial: Anatoly Luchinin
Marine: Yarema Musatov and Glen Jones

REGION 7: ALASKA
Terrestrial: Linda Brubaker, U. Washington, WA, USA
Marine: Peter Barnes, USGS, Menlo Park, CA, USA

REGION 8: WESTERN CANADIAN ARCTIC
Terrestrial: Les Cunynar
Marine: Steve Blasco, Geol. Survey Canada, Atlantic, Dartmouth, NS, Canada

REGION 9: CENTRAL CANADIAN ARCTIC
Terrestrial: Glen MacDonald, UCLA, CA, USA and Konrad Gaigeo, U. Laval, Quebe, Canada
Marine: Art Dyke, GSC Ottawa, Ottawa, Ontario, Canada and Peta Modie, GSC Atlantic, Dartmouth, NS, Canada

REGION 10: EASTERN CANADIAN ARCTIC
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REGION 11: GREENLAND
Terrestrial: Ole Bennike, DGI, Copenhagen, Denmark
Marine: Rudeger Stein, AWI, Bremerhaven, Germany

REGION 12: ICELAND
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Marine: Aslaug Geirsdottir, Univ. of Iceland, Iceland
The consensus of the participants at the Lammi meeting was that major strides were achieved in the synthesis of the terrestrial data. Particularly encouraging was the development of a consensus scheme to characterize Arctic vegetation by a limited number of biomes (see Table), and the real-time visualization of these reconstructions for the entire Arctic. The marine synthesis was less complete. It was hampered by more complex, multi-proxy datasets, and less comprehensive spatial coverage. The history of sea ice variations, the single most important marine surface parameter remains elusive, although promising data are emerging using marine dinoflagellates as sea-ice proxies. However, few high-resolution Holocene records for the Arctic have been developed.

A follow-up meeting will be held within the next 18 months, and a journal issue dedicated to the regional compilations and pan-Arctic synthesis will be a final product. For more detailed information, please visit the CAPE Homepage at: http://www.ngdc.noaa.gov/paleo/cape/TOC.htm.

Two new CAPE projects will be initiated within the next 18 months:
1) A high-resolution synthesis of the last 1ka to 2ka, addressing seasonal to decadal climate change,
2) Synthesis of the Last Glacial Maximum (LGM), ca. 25ka to 10ka.

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