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Japan Agency for Marine-Earth Science and Technology
International Pacific Research Center

Deepwater Formation in the North Pacific during the Last Glacial Termination - A New Scheme of Ocean Circulation-

International team scientists from Japan, USA, and Belgium reported a deepwater formation in the North Pacific during the early stages of the last glacial termination, from 17500 to 15000 years ago. Both sedimentary radiocarbon record and modeling simulation strongly suggest that the deepwater in the North Pacific was sinking extending to a depth of ~2500 m. The model simulations showed that the deepwater circulation originated in the North Pacific played an important role in global climate through the poleward oceanic heat transport and the North Pacific was a very active region of thermohaline flow during the last glacial termination.

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Authors: Y.Okazaki¹, A.Timmermann², L.Menviel²,
N.Harada¹, A.Abe-Ouchi^{1,3}, M.O.Chikamoto¹,
A.Mouchet⁴, and H.Asahi³
1. Research Institute for Global Change, Japan
Agency for Marine-Earth Science and Technology,
Japan
2. International Pacific Research Center, University
of Hawaii, USA
3. Atmosphere and Ocean Research Institute,
University of Tokyo, Japan
4. Université de Liège, Belgium

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http://www.soest.hawaii.edu/iprc/news/press_releases/2010/ice_age.pdf

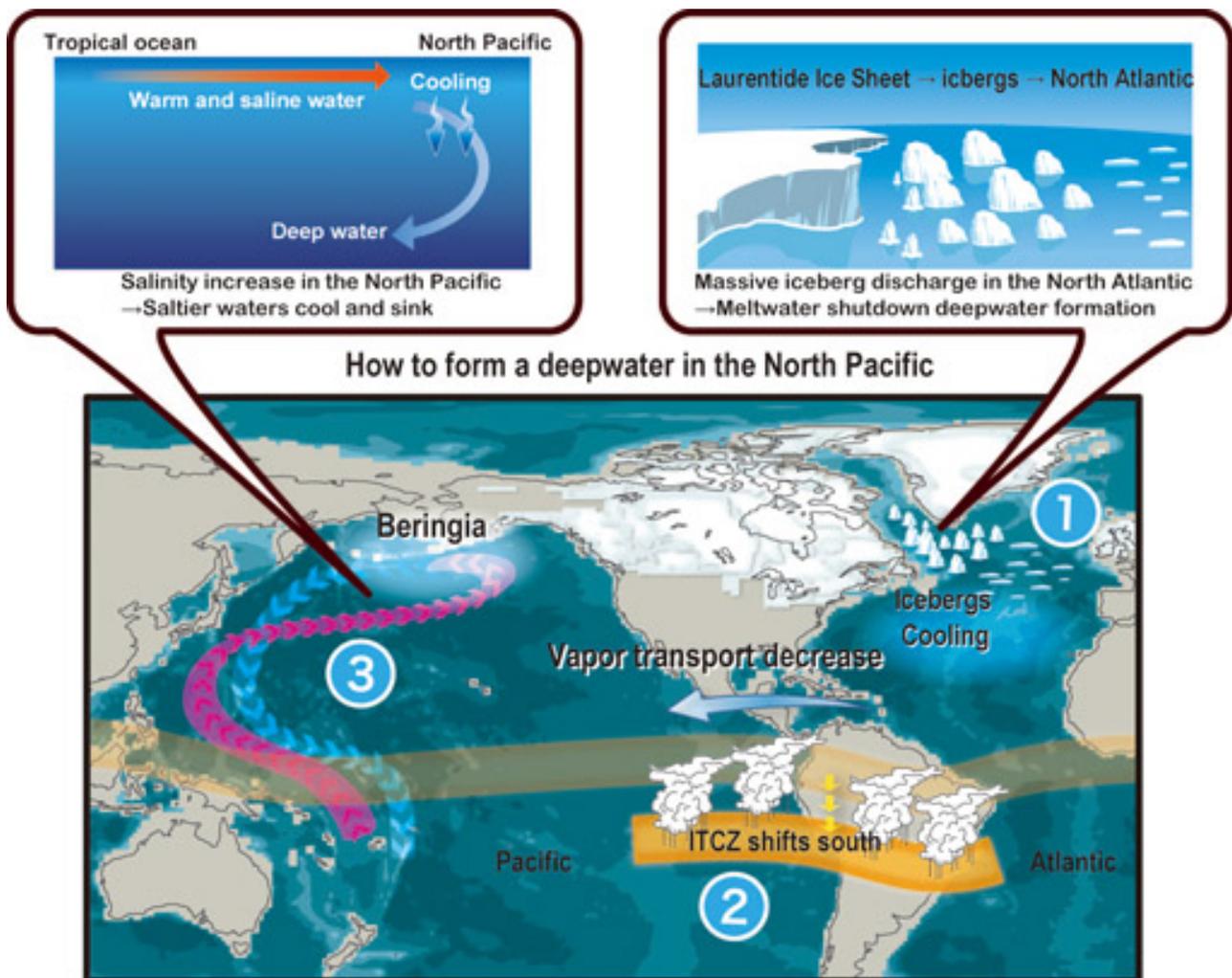


Figure 1. Schematic diagram for deepwater formation in the North Pacific during 17500 to 15000 years ago.

(1) A freshwater forcing by melting icebergs in the North Atlantic led to a significant cooling in the North Atlantic due to weakened heat transport from the tropical Atlantic to the northern North Atlantic by the weakened Gulf Stream. (2) By the North Atlantic cooling, Atlantic-Pacific vapor transport weakened and the Pacific Intertropical Convergence Zone shifted south, leading to a persistent reduction of precipitation and hence an increase of surface salinity in the North Pacific. (3) Shutdown of the Bering Strait (Beringia) helped for salinity built up in the North Pacific and started to sink a deepwater. Once the deepwater formation in the North Pacific initiated, poleward surface currents transport more saline subtropical waters into the North Pacific. Therefore, a deepwater circulation originated in the North Pacific established until revival of North Atlantic deepwater formation.

Contacts:

Japan Agency for Marine-Earth Science and Technology
(For the study)
Yusuke Okazaki
Paleoceanography Research Team

Environmental Biogeochemical Cycle Research Program
Research Institute for Global Change (RIGC)

(For Publication)

Toru Nakamura, e-mail: press@jamstec.go.jp
Manager, Planning Department Press Office

More info in:

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