

Present and future climate science at Nature

Michael White

The present

new and important insights

What this means in practice

LETTERS

The Gamburtsev mountains and the origin and early evolution of the Antarctic Ice Sheet

Sun Bi¹, Martin J. Siegert¹, Simon M. Mudd¹, David Sugden¹, Shah Fahri¹, Cai Xianglin¹, Bing Yanjun¹, Yang Yanyan¹ & Li Yueshanjun²

Ice-sheet development in Antarctica was a result of significant and rapid glacial climate change about 3.6 million years ago¹. Ice sheets and glacial meltwater triggered reductions in atmospheric CO₂ concentrations that have been traced to the present-day level of 280 ppm. The meltwater, in turn, contributed to the development of the Antarctic Circumpolar Current, but its timing and glacial extent are still debated. Here we present a new model for the glacial extent of Antarctica based on the analysis of early glacial and subglacial development of a combined ice and meltwater system. Our new glacial reconstruction shows that ice sheets extended to the southern limit of the present-day ice divide, the Gamburtsev mountains, about 3.6 million years ago. This reconstruction is consistent with the timing of the Antarctic Circumpolar Current's formation and the onset of the ice divide. Our new glacial reconstruction shows that ice sheets extended to the southern limit of the present-day ice divide, the Gamburtsev mountains, about 3.6 million years ago. This reconstruction is consistent with the timing of the Antarctic Circumpolar Current's formation and the onset of the ice divide.

has formed a high plateau during this period. After 1.8 Ma the ice sheet, at least in higher mountainous parts of East Antarctica, maintained its presence and extent over the full glacial cycles of the last 100,000 years. The ice divide, which is now the 'ice gate' to the present-day ice divide, was formed during this period. The ice divide, which is now the 'ice gate' to the present-day ice divide, was formed during this period. The ice divide, which is now the 'ice gate' to the present-day ice divide, was formed during this period.

Discoveries

1 JULY 14 2010

LETTERS

Interior pathways of the North Atlantic meridional overturning circulation

Amy S. Bower¹, M. Susan Lozier¹, Stefan F. Geyer², & Chun W. Wong²

Abstract: The interior pathways of the North Atlantic meridional overturning circulation (MOC) are investigated using a combination of observational and modeling approaches. The MOC is shown to be a multi-cell system with a primary cell in the North Atlantic and a secondary cell in the South Atlantic. The primary cell is characterized by a deep return flow in the North Atlantic and a shallow return flow in the South Atlantic. The secondary cell is characterized by a deep return flow in the South Atlantic and a shallow return flow in the North Atlantic. The MOC is shown to be a multi-cell system with a primary cell in the North Atlantic and a secondary cell in the South Atlantic. The primary cell is characterized by a deep return flow in the North Atlantic and a shallow return flow in the South Atlantic. The secondary cell is characterized by a deep return flow in the South Atlantic and a shallow return flow in the North Atlantic.

1000

Fundamental revisions to our framework of understanding

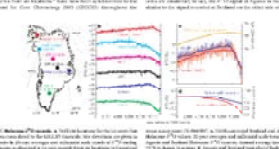
1 JULY 17 2010

LETTERS

Holocene thinning of the Greenland ice sheet

S. M. Vinther¹, S. L. Zachariasen², H. B. Clausen³, D. Dahl-Jensen⁴, S. J. Johnsen⁵, G. A. Fisher⁶, R. M. Koonen⁷, D. Raynaud⁸, V. Lipenkov⁹, K. Andriaman¹⁰, T. Blunier¹¹, S. O. Samssonson¹², J. P. Steffensen¹³

Abstract: The Holocene thinning of the Greenland ice sheet is investigated using a combination of observational and modeling approaches. The ice sheet is shown to have thinned significantly during the Holocene, with the most significant thinning occurring during the last 2000 years. The thinning is attributed to a combination of factors, including a decrease in ice extent and a decrease in ice thickness. The thinning is attributed to a combination of factors, including a decrease in ice extent and a decrease in ice thickness.



1000

Resolution of a controversy

1 JULY 20 2010

LETTERS

Satellite-based estimates of groundwater depletion in India

Matthew Rodhe¹, Isabella Veloso^{1,2}, & James S. Famiglietti¹

Abstract: Satellite-based estimates of groundwater depletion in India are investigated using a combination of observational and modeling approaches. The depletion is shown to be significant, particularly in the central and southern regions of the country. The depletion is attributed to a combination of factors, including a decrease in recharge and an increase in extraction. The depletion is attributed to a combination of factors, including a decrease in recharge and an increase in extraction.

1000

Startling findings with immediate relevance

1 JULY 20 2010

LETTERS

Greenhouse-gas emission targets for limiting global warming to 2 °C

Maths Meinshausen¹, Nicolai Meinshausen², William Hauser³, Sarah C. Raper⁴, Katja Weber⁵, Reto Knutti⁶, Daniel Frame⁷, & Malin R. Meyer⁸

Abstract: Greenhouse-gas emission targets for limiting global warming to 2 °C are investigated using a combination of observational and modeling approaches. The targets are shown to be significant, particularly in the industrialized countries. The targets are attributed to a combination of factors, including a decrease in emissions and an increase in absorption. The targets are attributed to a combination of factors, including a decrease in emissions and an increase in absorption.

1000

Important quantifications

LETTERS

Tropical cyclones and permanent El Niño in the early Pliocene epoch

Alamy V. Fedorin¹, Christopher M. Stouffer¹ & Kerry Emanuel²

Tropical cyclones also form in the eastern and equatorial oceans... (text continues)

Novel mechanistic insights

© 2010 Macmillan Publishers Limited. All rights reserved.

What we don't tend to publish

climate impacts
geoengineering
biofuels

Why?

unsurprising
case specific
speculative
no mechanistic advance

The future

Nature Climate Change
Nature?
the end of print?