

# Nature and the Grand Challenge

**Michael White**

# Why is Nature interested?

- Most uncertain process? in climate models
- Uncertainties in climate sensitivity
- Lack of major progress
- Seemingly intractable problems
- No clear way forward

# Prior publications

NATURE|Vol 451|17 January 2008|doi:10.1038/nature06594

**YEAR OF PLANET EARTH** FEATURE

## Small-scale cloud processes and climate

Marcia B. Baker & Thomas Peter

**Clouds constitute the largest single source of uncertainty in climate prediction. A better understanding of small-scale cloud processes could shed light on the role of clouds in the climate system.**

# Aerosol - climate interactions

Vol 461 | 1 October 2009 | doi:10.1038/nature08281

nature

REVIEWS

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## Untangling aerosol effects on clouds and precipitation in a buffered system

Bjorn Stevens<sup>1,2</sup> & Graham Feingold<sup>3</sup>

It is thought that changes in the concentration of cloud-active aerosol can alter the precipitation efficiency of clouds, thereby changing cloud amount and, hence, the radiative forcing of the climate system. Despite decades of research, it has proved frustratingly difficult to establish climatically meaningful relationships among the aerosol, clouds and precipitation. As a result, the climatic effect of the aerosol remains controversial. We propose that the difficulty in untangling relationships among the aerosol, clouds and precipitation reflects the inadequacy of existing tools and methodologies and a failure to account for processes that buffer cloud and precipitation responses to aerosol perturbations.

# Mechanisms of cloud formation

Vol 466 | 12 August 2010 | doi:10.1038/nature09314

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LETTERS

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## Precipitation-generated oscillations in open cellular cloud fields

Graham Feingold<sup>1</sup>, Ilan Koren<sup>2</sup>, Hailong Wang<sup>3</sup>, Huiwen Xue<sup>4</sup> & Wm. Alan Brewer<sup>1</sup>

# CLAW

## REVIEW

doi:10.1038/nature10580

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# **The case against climate regulation via oceanic phytoplankton sulphur emissions**

P. K. Quinn<sup>1</sup> & T. S. Bates<sup>1</sup>

# Clouds and local forcings

LETTER

doi:10.1038/nature12002

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## July 2012 Greenland melt extent enhanced by low-level liquid clouds

R. Bennartz<sup>1</sup>, M. D. Shupe<sup>2</sup>, D. D. Turner<sup>3</sup>, V. P. Walden<sup>4</sup>, K. Steffen<sup>2,5</sup>, C. J. Cox<sup>4</sup>, M. S. Kulie<sup>6</sup>, N. B. Miller<sup>6</sup> & C. Pettersen<sup>6</sup>

# Clouds, mixing and climate sensitivity

ARTICLE

doi:10.1038/nature12829

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## Spread in model climate sensitivity traced to atmospheric convective mixing

Steven C. Sherwood<sup>1</sup>, Sandrine Bony<sup>2</sup> & Jean-Louis Dufresne<sup>2</sup>



# Six papers in six years!

- No lack of interest
- We'd like to publish more
- Not many submissions on the topic

# Prior failures

- Three attempts to commission a review
  - All failed
- Unclear conceptual approach?
- Or more technical/computational?

# How can Nature help

World View

Comment

Original research

Review