



Institute for Governance & Sustainable Development

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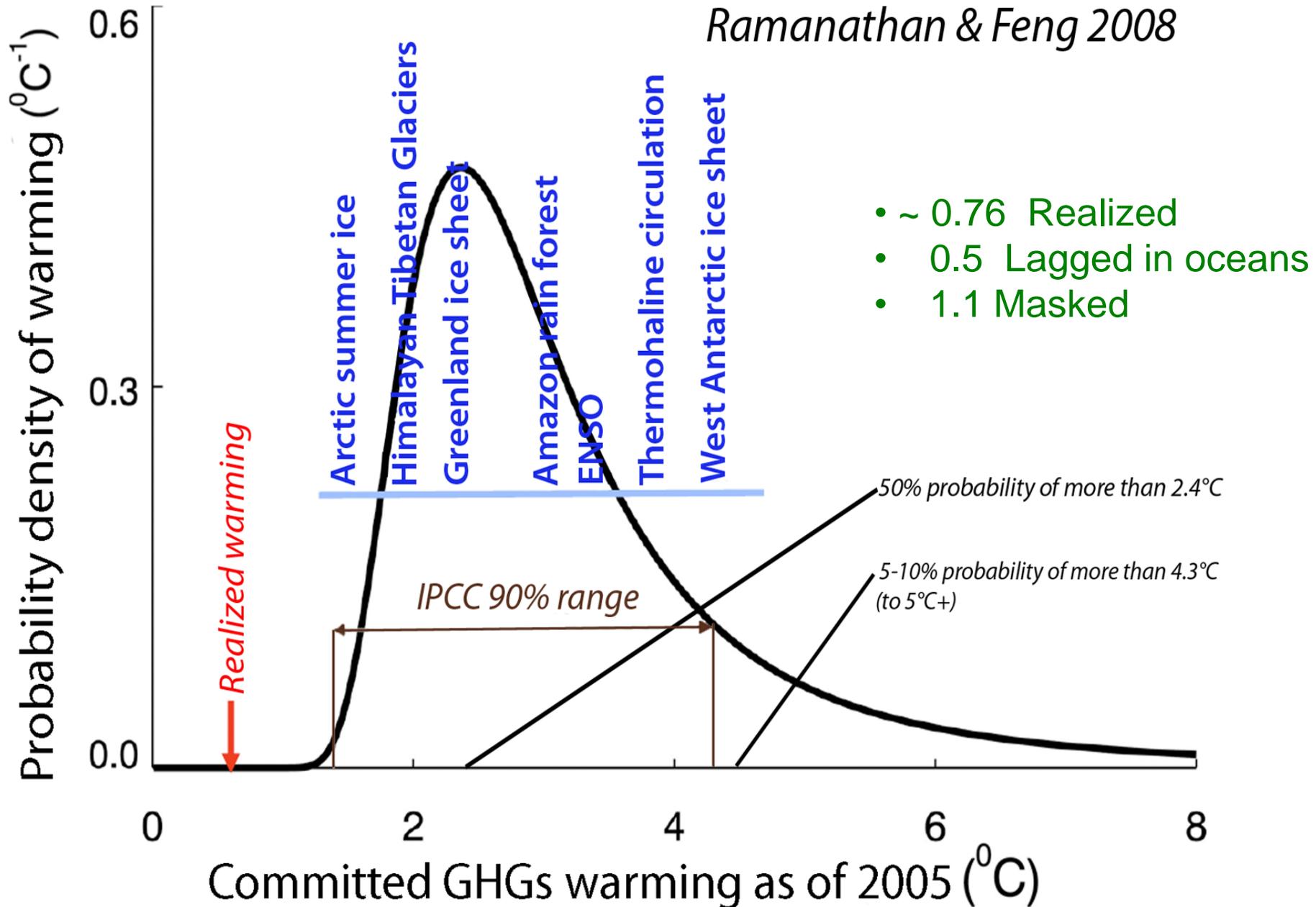
**INECE**

**Policies to Promote Fast Deployment  
of Carbon Negative Biochar to Draw  
Down CO<sub>2</sub> Concentrations**

**Xiaopu Sun**

# Committed Warming as of 2005

Ramanathan & Feng 2008



# Rivers Originating in Hindu-Kush-Himalaya-Tibetan Glaciers



[NEXT](#)

# Impacts of Climate Change on China

- Glacier melting
- threat to water supply for agricultural and human consumption;
- Extreme weather events;
- .....

# CO<sub>2</sub> lifetime I

IPCC (AR4 2007):

*While more than half of the CO<sub>2</sub> emitted is currently removed from the atmosphere within a century, some fraction (about 20%) of emitted CO<sub>2</sub> remains in the atmosphere for many millennia.*

James Hansen et al. (Phil. Trans. R. Soc. 2007):

*About one-quarter of fossil fuel CO<sub>2</sub> emissions will stay in the air “forever”, i.e. more than 500 years.... Resulting climate changes would be, from humanity’s perspective, irreversible.*

# CO<sub>2</sub> lifetime II

David Archer (JGR 2005):

*The mean lifetime of anthropogenic CO<sub>2</sub> is dominated by the long tail (fossil fuel carbon), resulting in a range of 30–35 kyr.*

H. D. Matthews & K. Caldeira (GRL 2008).

*While approximately half of the carbon emitted is removed by the natural carbon cycle within a century, a substantial fraction of anthropogenic CO<sub>2</sub> will persist in the atmosphere for several millennia.*

# CO<sub>2</sub> Cuts Alone Will Not Protect Climate

Ramanathan & Feng (PNAS 2008):

*“Even the most aggressive CO<sub>2</sub> mitigation steps ... can only limit further additions to the committed warming, **but not reduce the already committed GHGs warming of 2.4° C.**”*

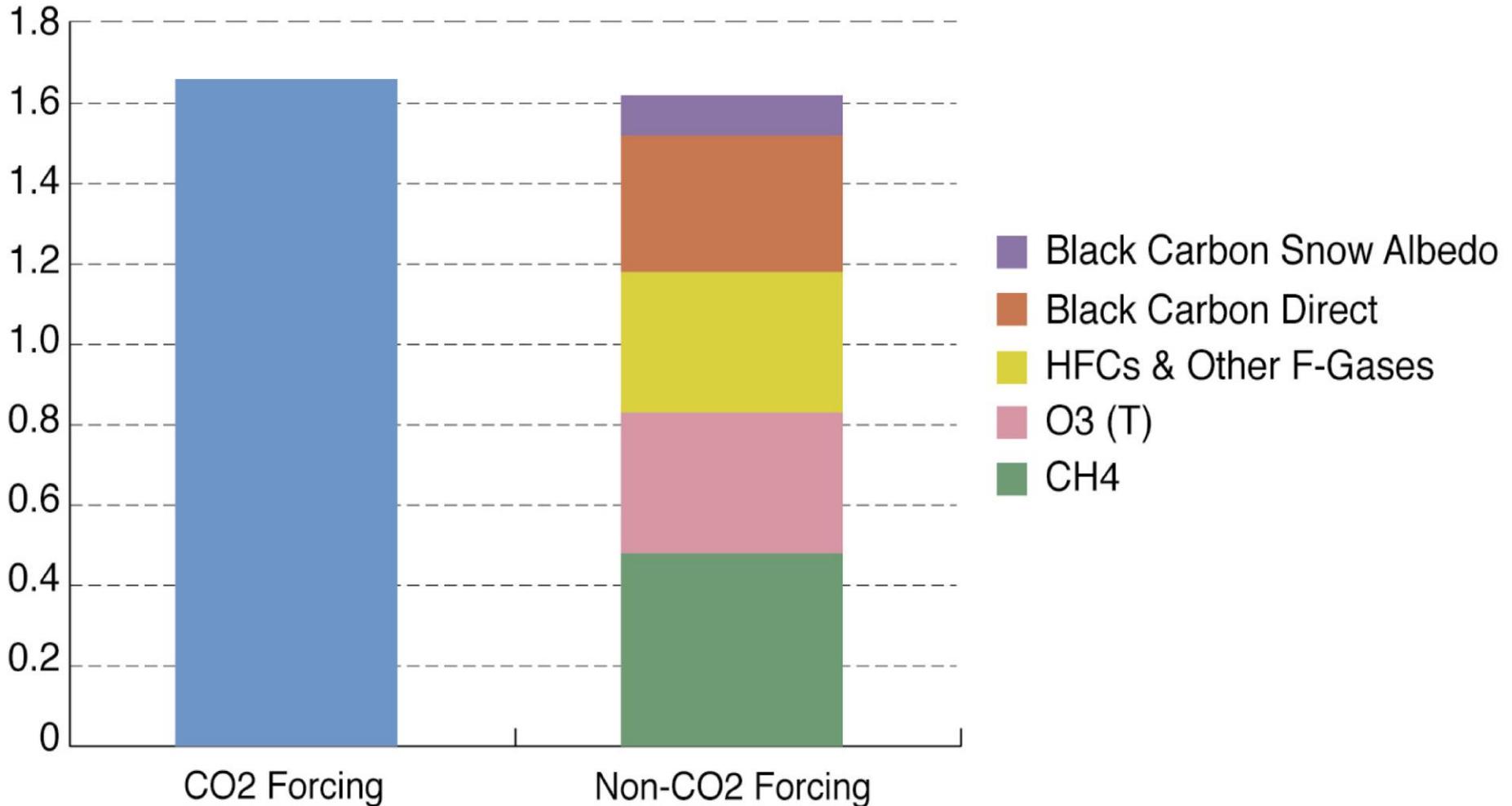
Solomon, et al. (PNAS 2009):

*“Climate change that takes place due to increases in carbon dioxide concentrations is **largely irreversible for 1,000 years after emissions stop.**”*

Cao & Caldeira (ERL 2010):

*“If anthropogenic CO<sub>2</sub> emissions are halted at the middle of this century without any direct removal of atmospheric CO<sub>2</sub>, there is **a slight trend of continued warming for about 100 years, and then surface temperature declines at a slow rate of about 0.02° C/century.**”*

# Non-CO<sub>2</sub> Radiative Forcing (RF) is 50% of Warming



# Good News: Fast Actions Can Help Offset Committed Warming from CO<sub>2</sub>

- Short atmospheric lifetime
  - Black Carbon - days to weeks
  - Tropospheric Ozone - hours to days
  - Methane - 10-12 yr.
  - HFCs - most less than 15 yr.
- Reductions in these emissions immediately protect climate

# More Good News: biochar bio-sequestration

- Up to 3+ Gt CO<sub>2</sub>/yr from agricultural waste
- Up to 20-35 Gt CO<sub>2</sub>/yr by 2100
- Return to safety of 350 ppm within decades

# Existing National Policy Supports on Biochar Research and Deployment

- **USA**

*American Power Act of 2010;*

*Clean Energy Partnerships Act introduced in 2009;*

*Water Efficiency via Carbon Harvesting and Restoration (WECHAR) Act of 2009;*

*Food and Energy Security Act of 2008;*

*Food and Energy Security Act of 2008;*

*Harvesting Energy Act of 2007*

# Existing National Policy Supports on Biochar Research and Deployment

- **Australia**

The Minister for Agriculture, Fisheries and Forestry announced \$1.4 million funding to Australian Commonwealth Scientific and Research Organization for the biggest biochar research project in Australia's history on 21 May 2009;

- **New Zealand**

The New Zealand Government announced in its *Sustainable Land Management and Climate Change Plan of Action* a \$10 million investment by November 2010 on Bioenergy and biochar research and development.

# International Policies on Biochar Research and Deployment

- UNFCCC negotiation
- World Bank development strategy
  - World Development Report 2010 :  
Development and Climate Change

# Biochar Policies Development Needed

- Local enabling policies
- Pilot projects
  - (forest & agricultural waste, fire prevention...)
- Biochar cookstoves for Developing countries
  - cobenefits on air protection, public health, especially women and children and energy efficiency;
- CDM methodology

# Summary: Policy Principles

- Fast-action solutions: speed matters
  - top down + bottom up
- Borrow existing structures
  - Start and strengthen

Lay down the tracks and  
get ready to go to scale

Conclusion:

CO<sub>2</sub> cuts *essential but not sufficient*

Fast-Action non-CO<sub>2</sub> cuts can buy time  
(40 years of CO<sub>2</sub> emissions)

And carbon negative strategies can return to the  
safety of 350 ppm

Start, Strengthen

# Thank you!

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