International Workshop on Evaluation and Sustainable Management of Soil Carbon Sequestration in Asian Countries

27 September – 2 October, 2010, Bogor, Indonesia

Welcome and Opening Address

The Role of Organic Matter for Mitigation of Global Warming ; the Past, Present, and the Future

Kiyotaka MIYASHITA

National Institute for Agro-Environmental Sciences, Japan

Monsoon Asia Agro-Environmental Research Consortium (MARCO)

MARCO members:

Korea: •National Academy of Agricultural Science

China: • Institute of Soil Science
• Institute of Applied Ecology
• Cold and Arid Regions Environmental and Engineering Research Institute
• Inner Mongolia University

Laos: • National Agriculture and Forestry Research Institute

Thailand: • Department of Agriculture
• King Mongkut's Univ. of Technology

Malaysia: • Department of Meteorology

Indonesia: • Environmental Research Institute of South East Asia
• Bogor Agricultural University

Bangladesh : • Bangladesh Agricultural University

India: • National Physical Laboratory

Japan: • National Institute for Agro-Environmental Sciences
•Environmental Diplomatic Leader Education, University of Tsukuba

Conferences organized by MARCO

2006 Dec., Tsukuba: NIAES symposium “Evaluation and Effective Use of Environmental Resources for Sustainable Agriculture in Monsoon Asia: Toward International Research Collaboration.”

2007 Oct., Tsukuba: ESAFS-JSSSPN-NIAES-JIRCAS-NARO.NARC-FFTC International Symposium “New Challenges for Agricultural Science : Harmonizing Food Production with the Environment.”

2007 Oct., Tsukuba: NIAES-FFTC International Symposium 2007 “Invasive Alien Species in Monsoon Asia: Status and Control.”

2008 Oct, Tsukuba: MARCO-FFTC Workshop “A New Approach to Soil Information Systems for Natural Resources Management in Asian Countries.”

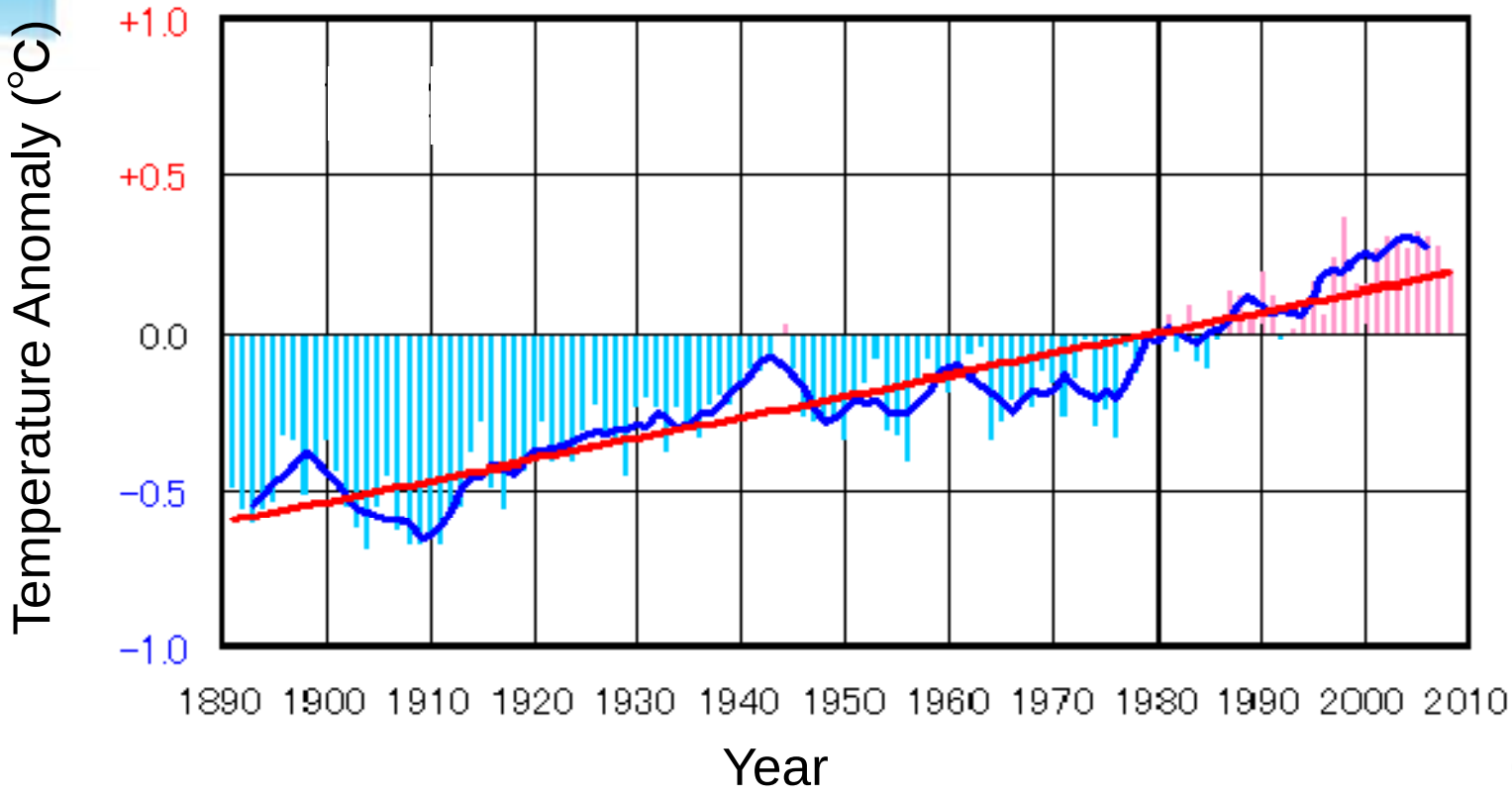
2009 Sept, Nanjing: MARCO Satellite Meeting: International Conference on the Environmental Impacts of Carbon and Nitrogen Cycles in Terrestrial Ecosystems in East Asia.

2009 Oct, Tsukuba: MARCO Symposium 2009 “Challenges for Agro-Environmental Research in Monsoon Asia.”

2010 Sept, Tsukuba: MARCO/GRA Joint Workshop on Paddy Field Management and Greenhouse Gases.

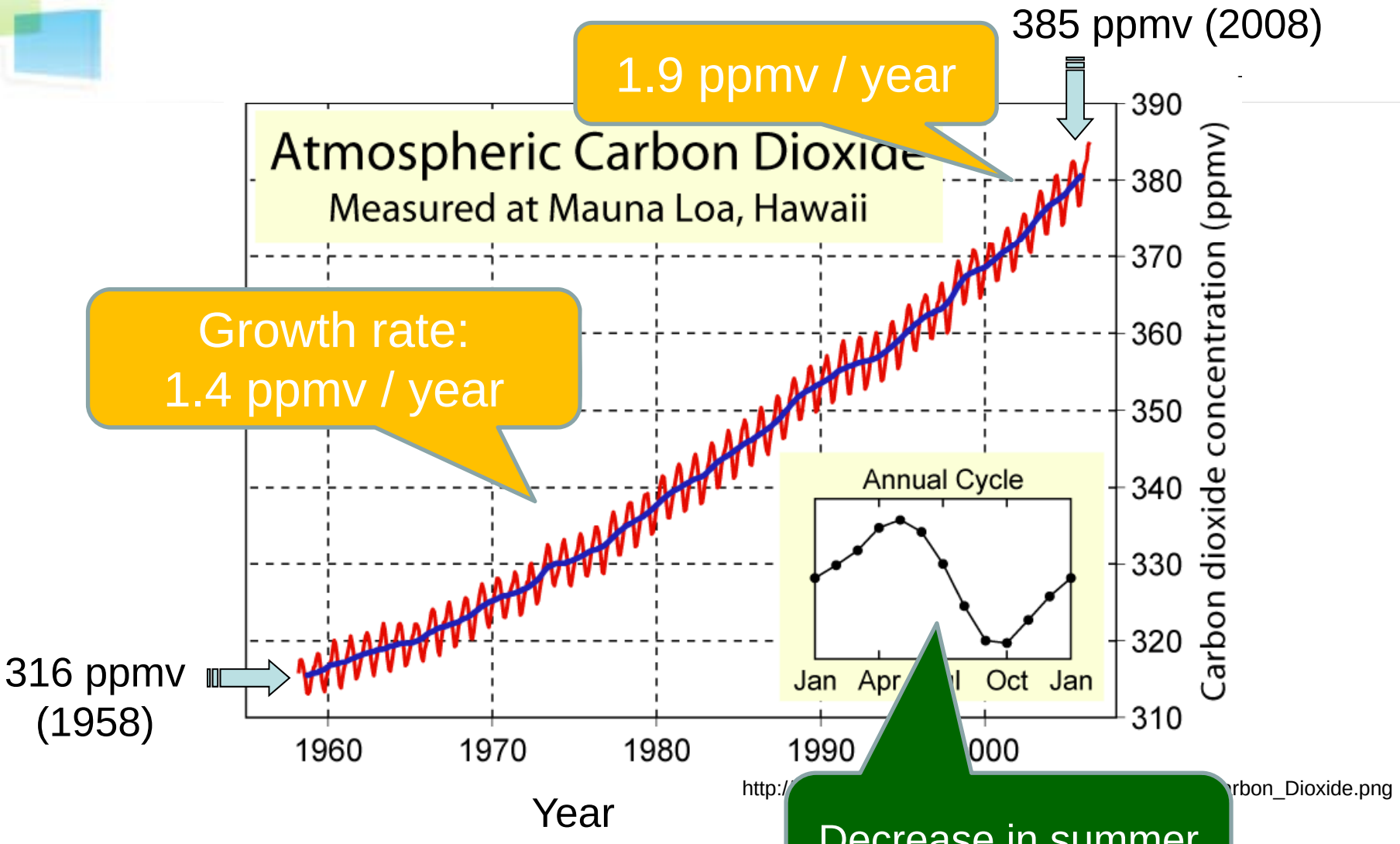
2010 Sept., Bogor: MARCO-FFTC International Workshop on Evaluation and Sustainable Management of Soil Carbon Sequestration in Asian Countries.

2010 Nov., Tsukuba: MARCO-FFTC International Seminar on Enhancement of Functional Biodiversity Relevant to Sustainable Food Production in ASPAC.



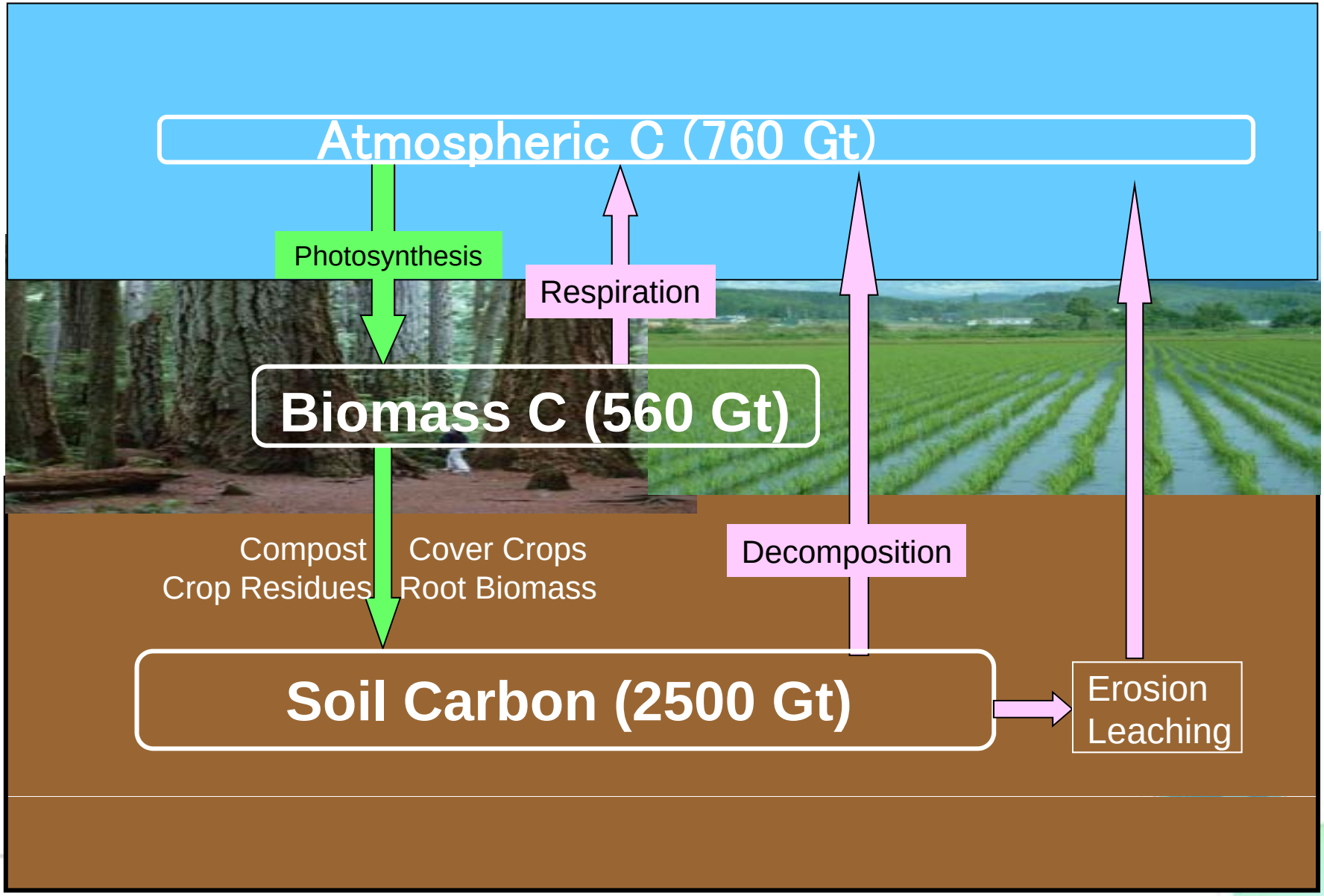
（気象庁）

Global surface temperature increased 0.74 ± 0.18 ℃ during the 20th century. (IPCC)

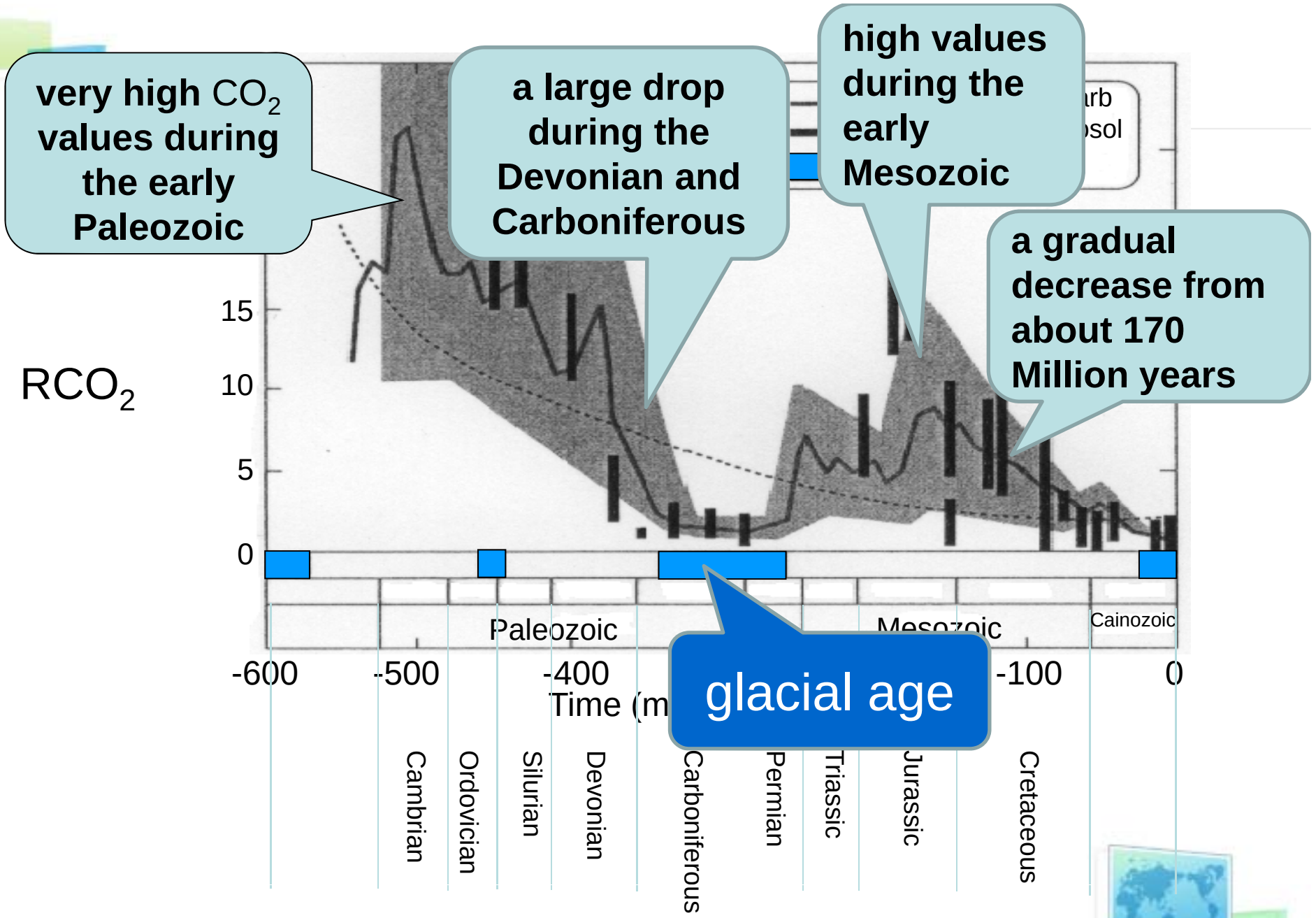


The rapid rise of atmospheric

Soil is a major sink of carbon on the Earth



Biosequestration of carbon in soil has had a great effect on the climate

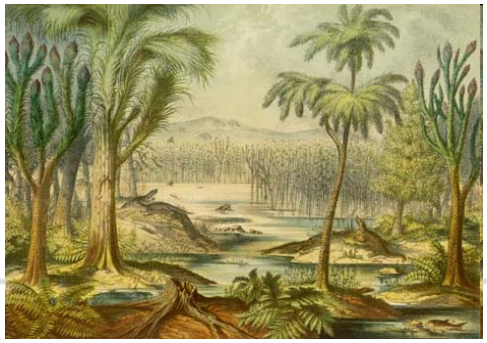


A huge carbon sequestration during Carboniferous

Biosequestration during Devonian and Carboniferous

A huge amount of CO_2 was captured by biomass, and sequestered in soil and under water. Coal deposit

- The Devonian and the early part of the Carboniverous period was mostly warm, which brought about the wide spread of forests.
- Lowlands were developed extensively, due to the lowering of sea levels.
- A large quantity of wood was buried during the periods.



http://tukimoto.com/gallery

- Plants acquired the ability to produce lignin, in particular the bark-bearing lignin.

- Microorganisms had not developed the ability to degrade lignin.

- Very high biomass production, wide distribution of anaerobic condition, and invention of lignin by plant, brought about the record sequestration of carbon.

http://www.kochi-u.ac.jp

A carbon sequestration after the last glacial period
(10,000 years ago)

- Carbon was sequestered as peat and soil organic matter.
- In peat formation, because of anoxic and acidic conditions, microbial decomposition is repressed.（World peat lands contain 180 to 455 Gt of carbon）
- Soil organic matter is stabilized (resistant to degradation) through humification and complex formation with metals.
- The atmospheric CO_2 level would have been much higher than the current level without it.

Soil Carbon in Asia

- Huge amount of carbon is stocked as biomass of rainforest, tropical peat, and soil organic matter. (Tropical peat lands, mostly found in South East Asia, contain 50 to 70 Gt of carbon.)
- Paddy field is suit for carbon sequestration.

- Growth rate of GDP and GDP per capita in the next decade will be higher in Asia than in other regions.
- Demand for agricultural production and pressure for land use change will increase.

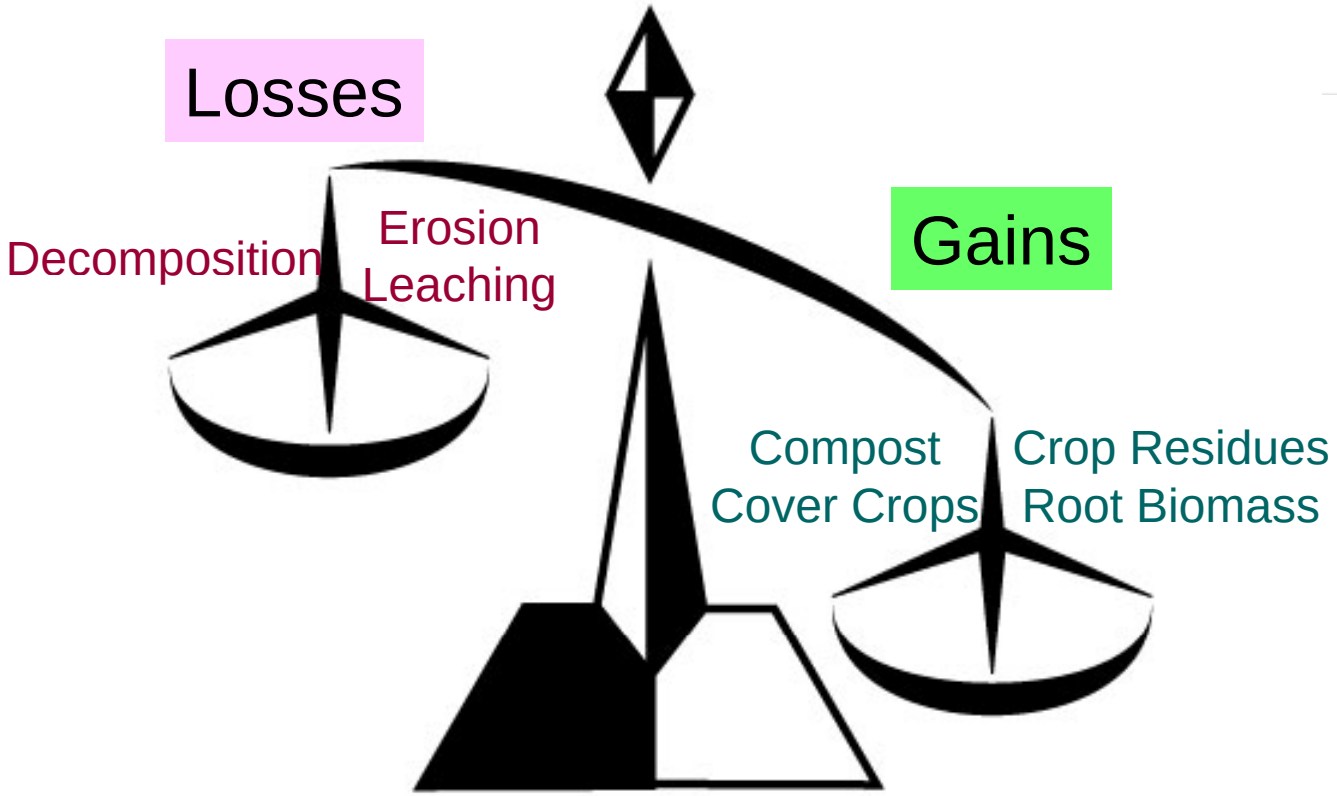
http://www.rish.kyoto-u.ac.jp/houga

http://www.aisa.ne.jp

http://gogoasia.exblog.jp/11132768/

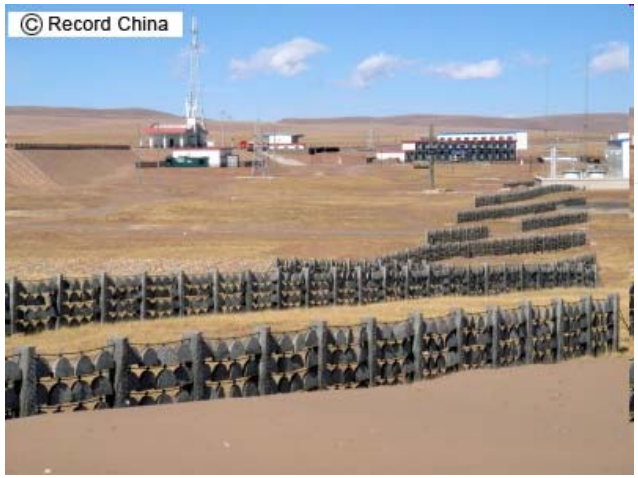
Agriculture must

- provide sufficient and safe food for the growing and richer populations
- produce renewable energy and more bio-based materials
- raise yield without increasing environmental impacts
- restore and maintain the environment



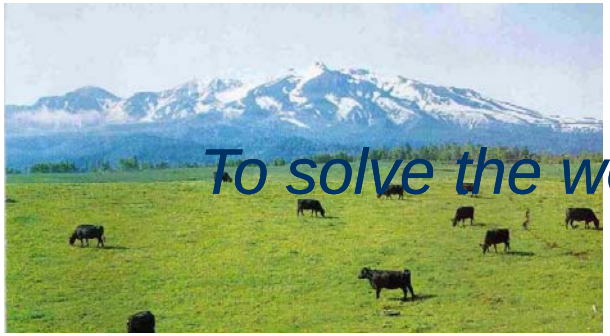
Soil Carbon Sequestration

Enhance soil fertility
Improve production
Reduce atmospheric CO_2 (mitigation)



Thank you for your attention
and a fruitful workshop

National Institute for Agro-Environmental Sciences, Japan (NIAES)



To solve the world's food and environmental problems