Carbon sequestration in China's ecosystems, 1981-2000

Jingyun Fang
Department of Ecology
Peking University

Feb. 14, 2008

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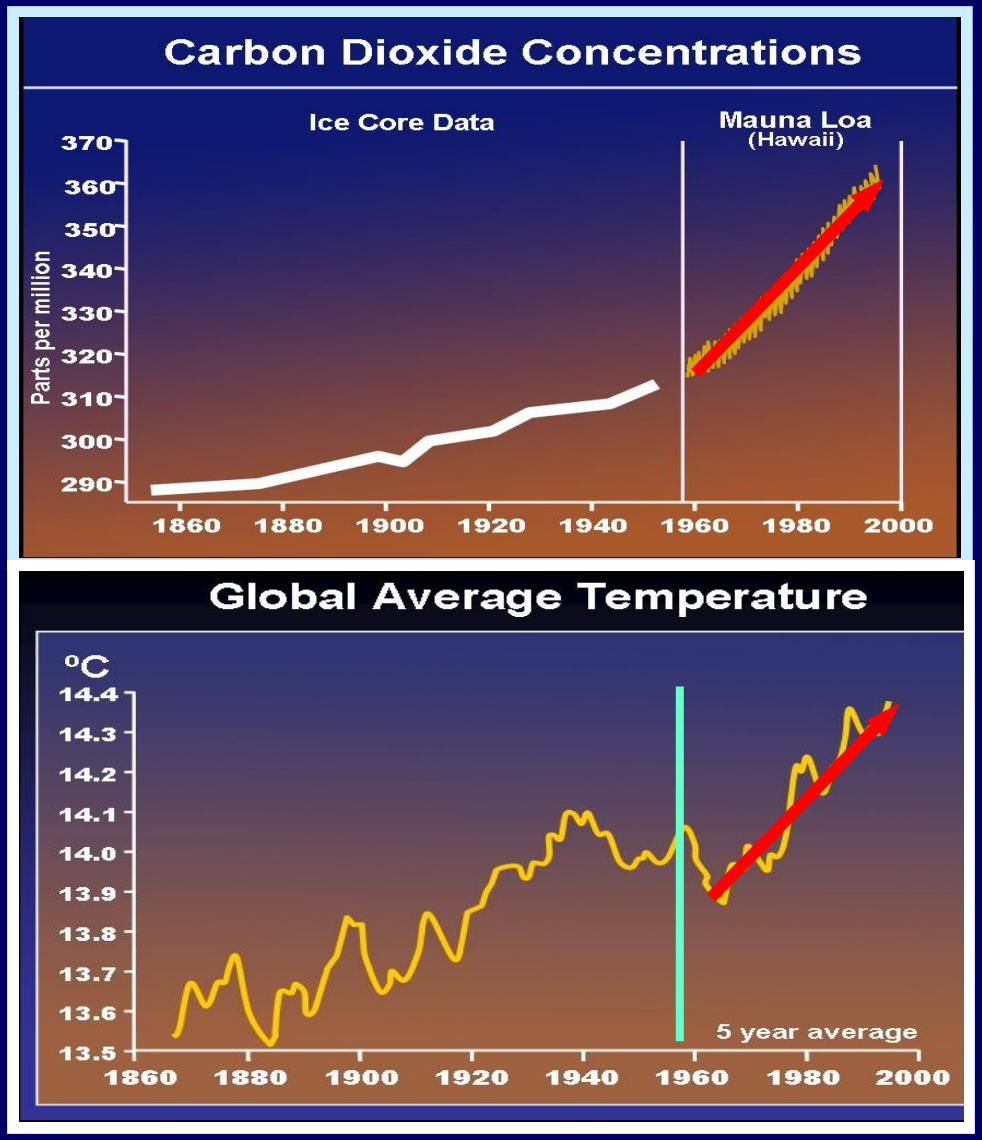

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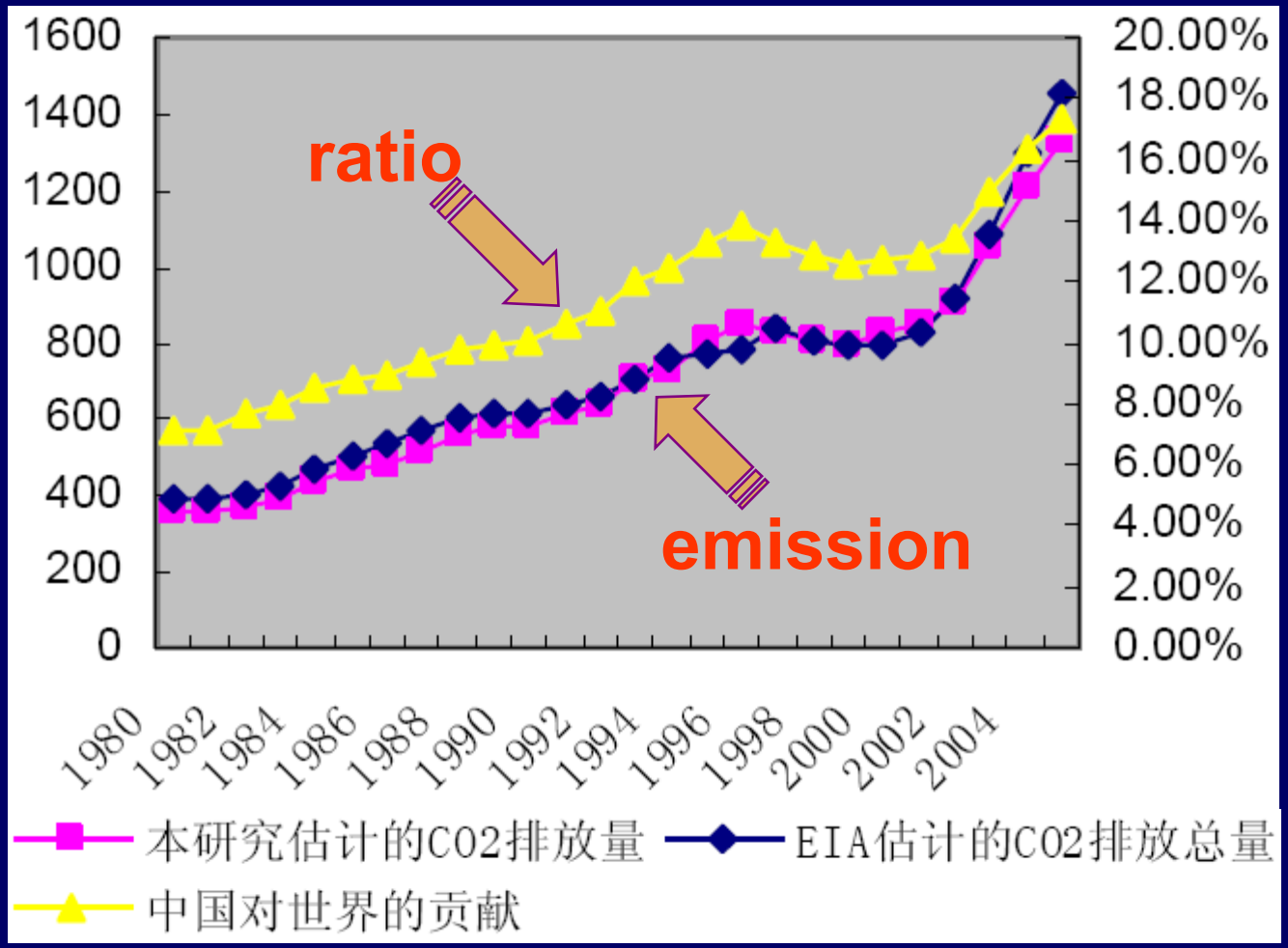

In 2005, ca. 17% of global emissions from China

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-- to examine how much carbon can be sequestrated by China's terrestrial ecosystems between 1981-2000, using three independent approaches, e.g. inventory data/statistics, process modeling, and atmospheric inversion.

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forest, grassland, shrubs, crops, and soils

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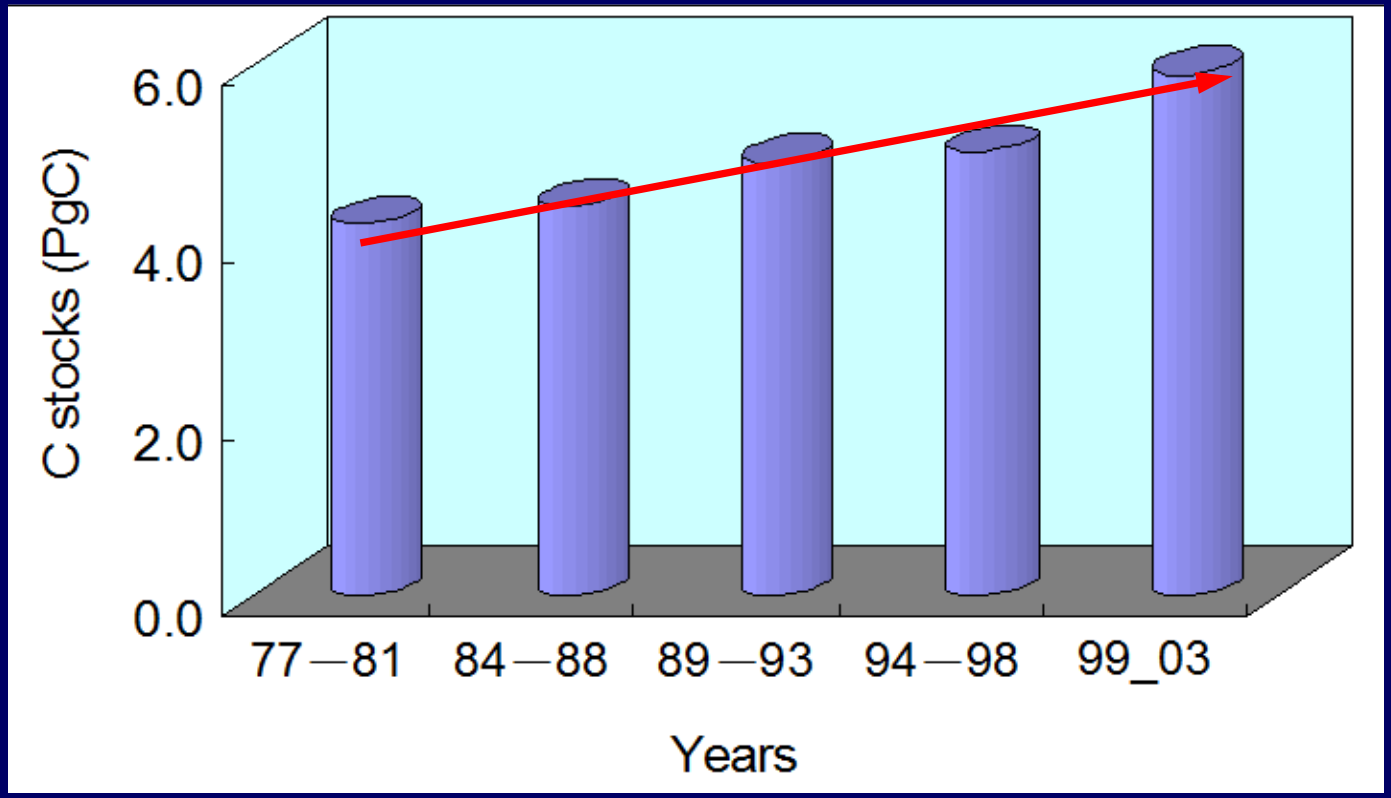

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Fang et al. 2007

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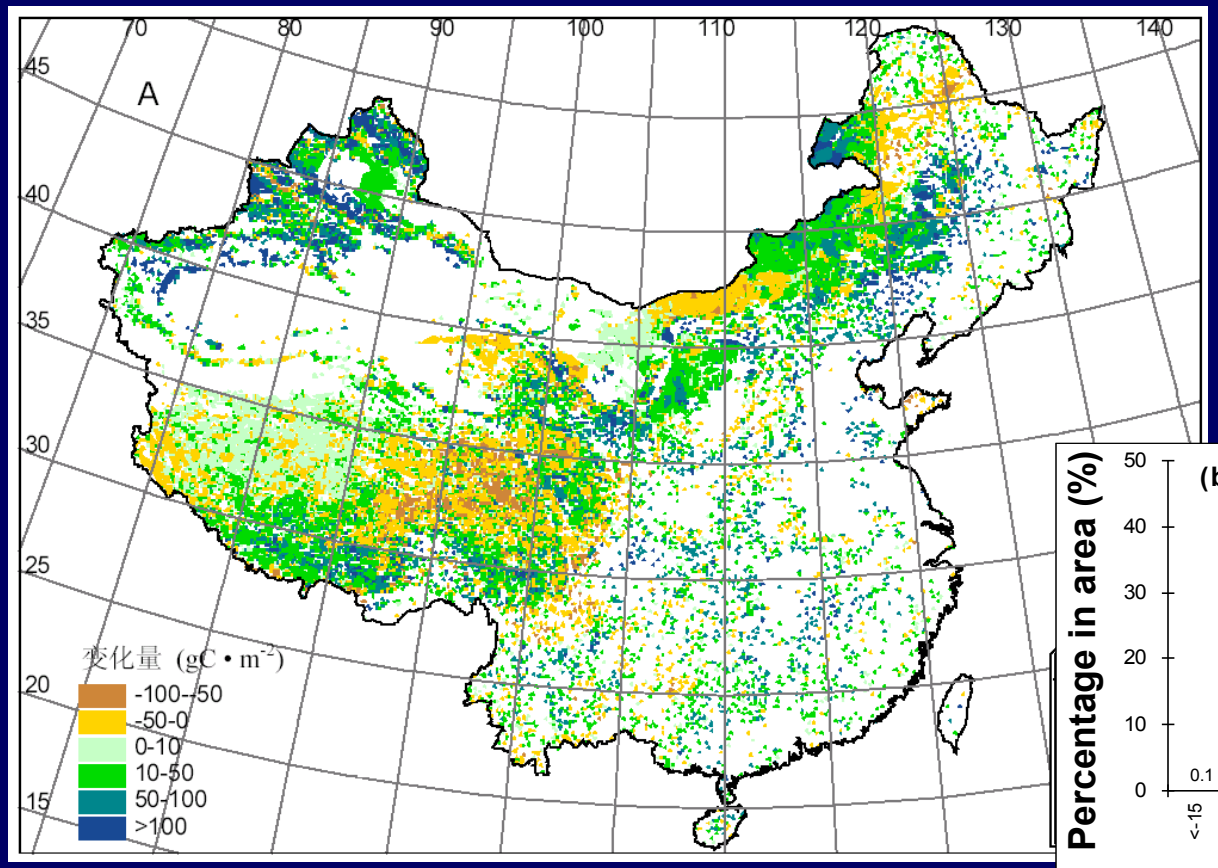

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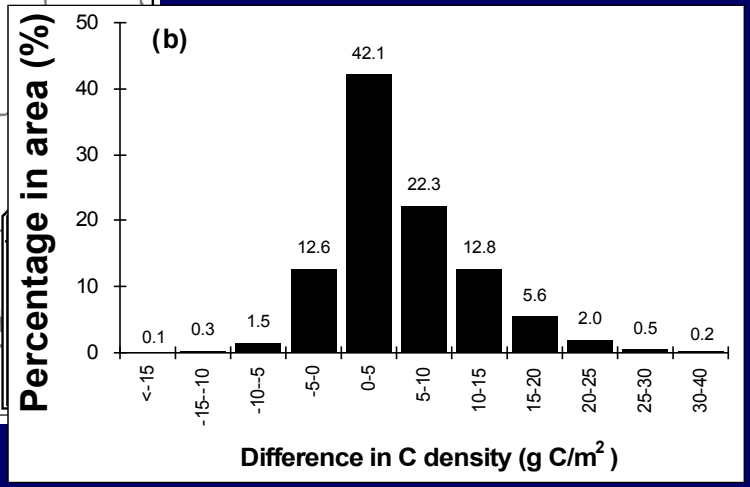

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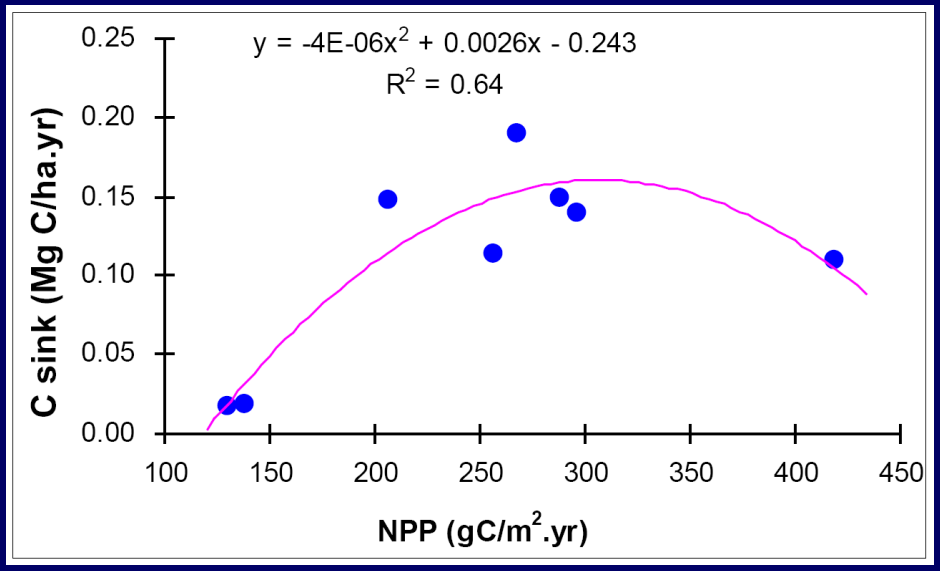

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$$y = -4.0 \times 10^{-6}(NPP)^2 + 0.0026(NPP) - 0.243$$

Carbon sink per area for shrubs:

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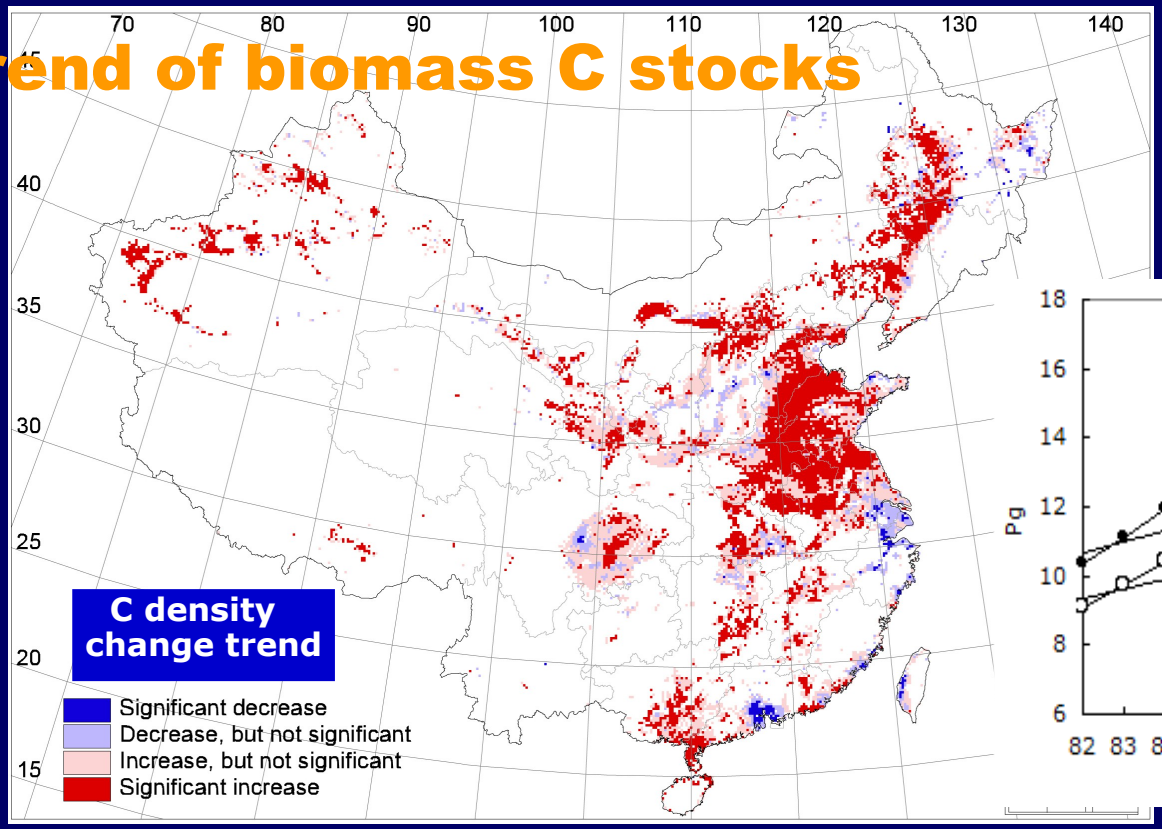

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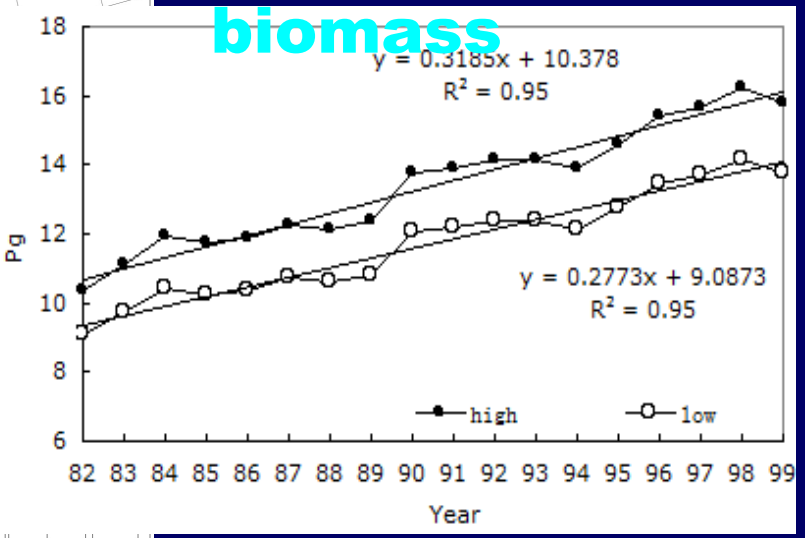

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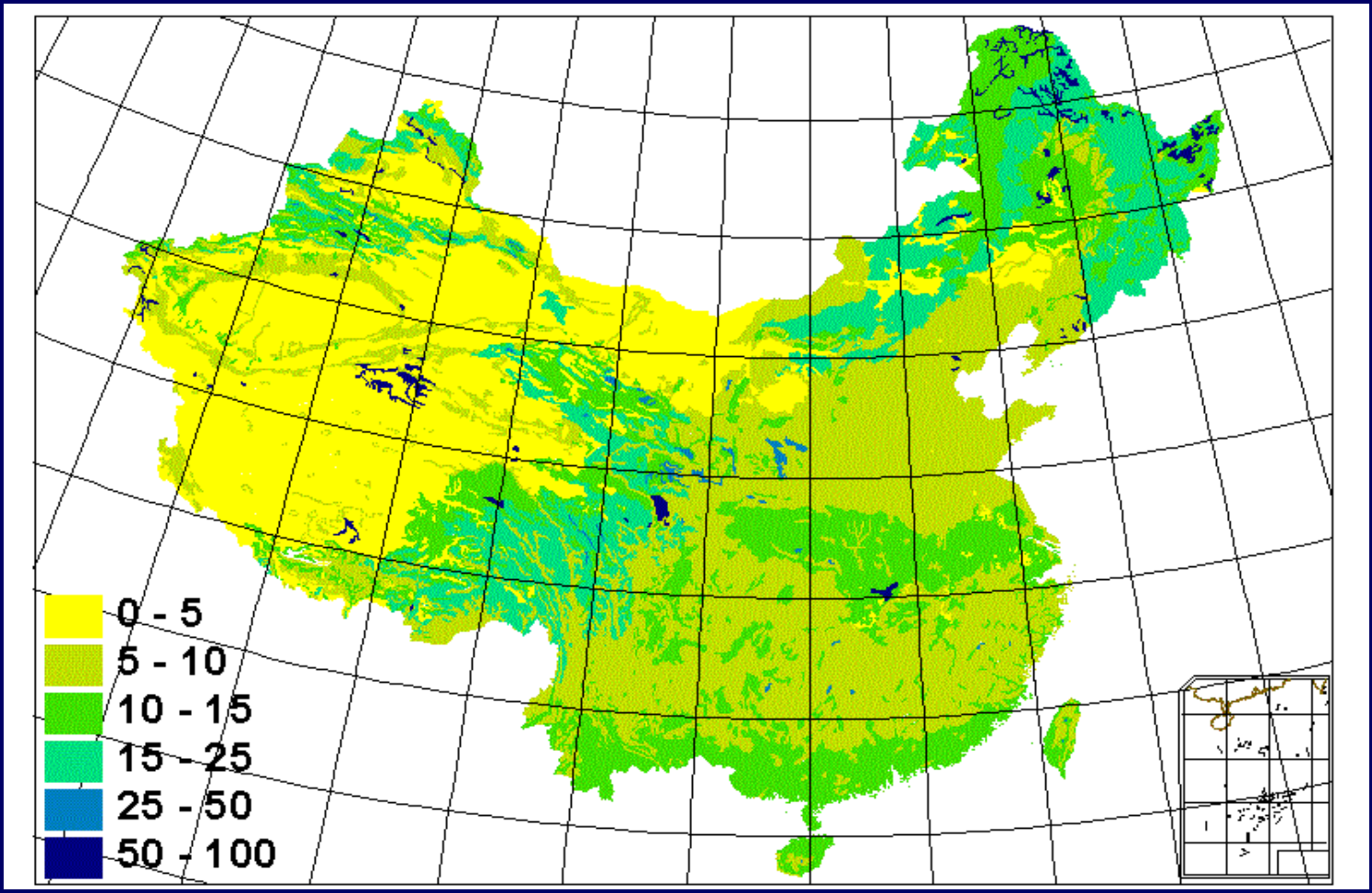

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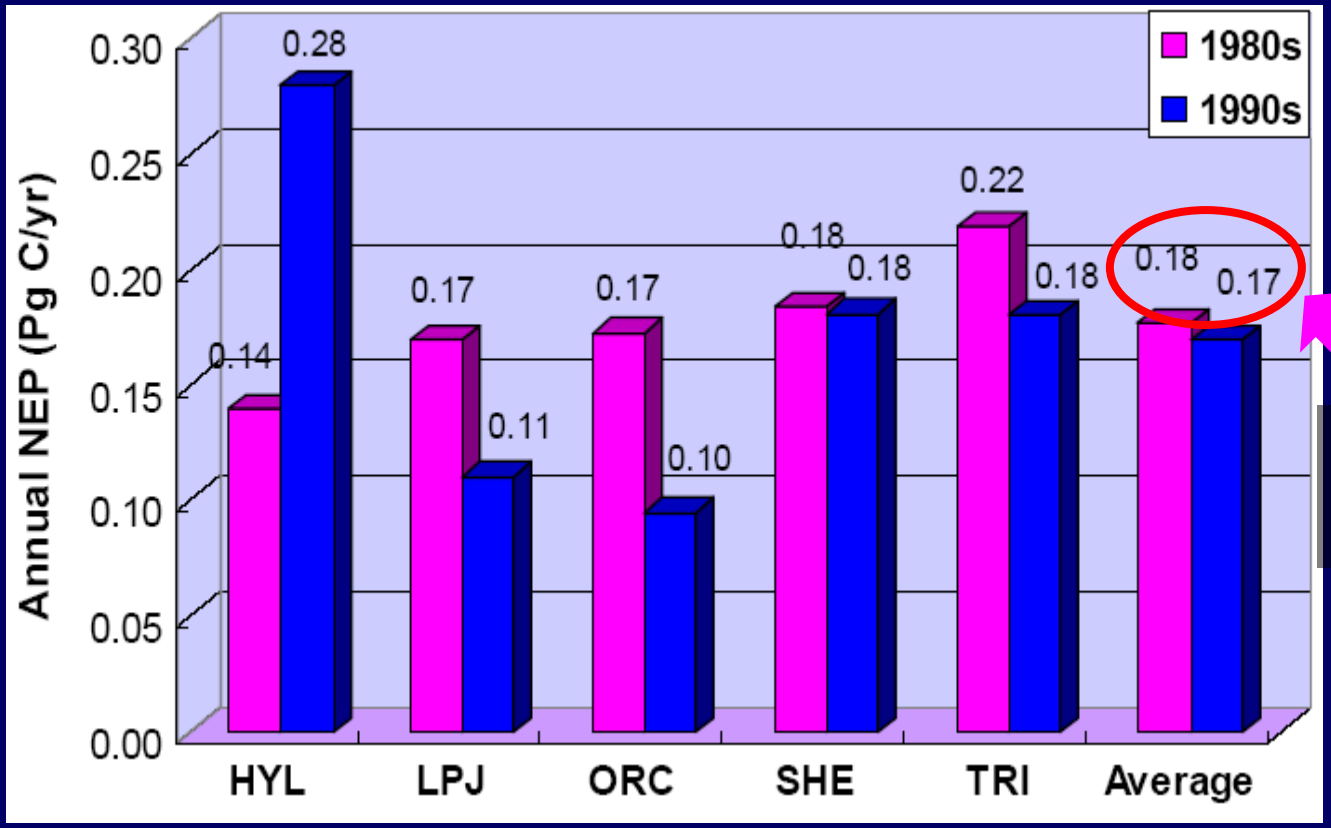

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Eecosystem C sinks in China, using different approaches

Method	Category	Period	C balance (Tg C/yr)
Inventory data	Vegetation	1981-2000	105.2
	Soil	1981-2000	75.4±11
	Subtotal		180±11
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Different approaches generate a quite consistent estimate of 173-228 TgC/yr. Total ecosystem C sink over the 20 yrs: 3.5-4.6 Pg C

how many industrial emissions can be offset by ecosystems in China ? 26-34%

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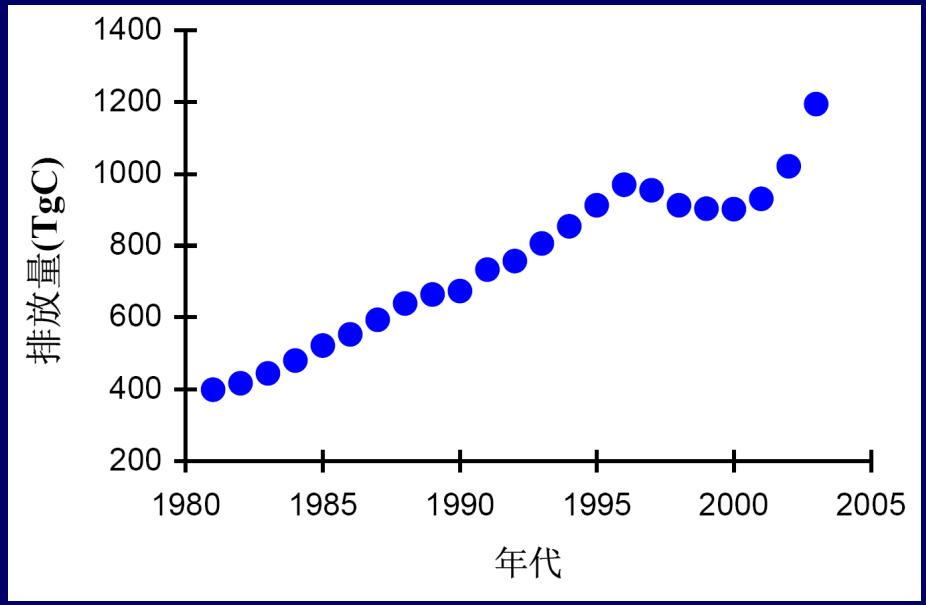


Annual C by industrial emission, 1981 — 2003

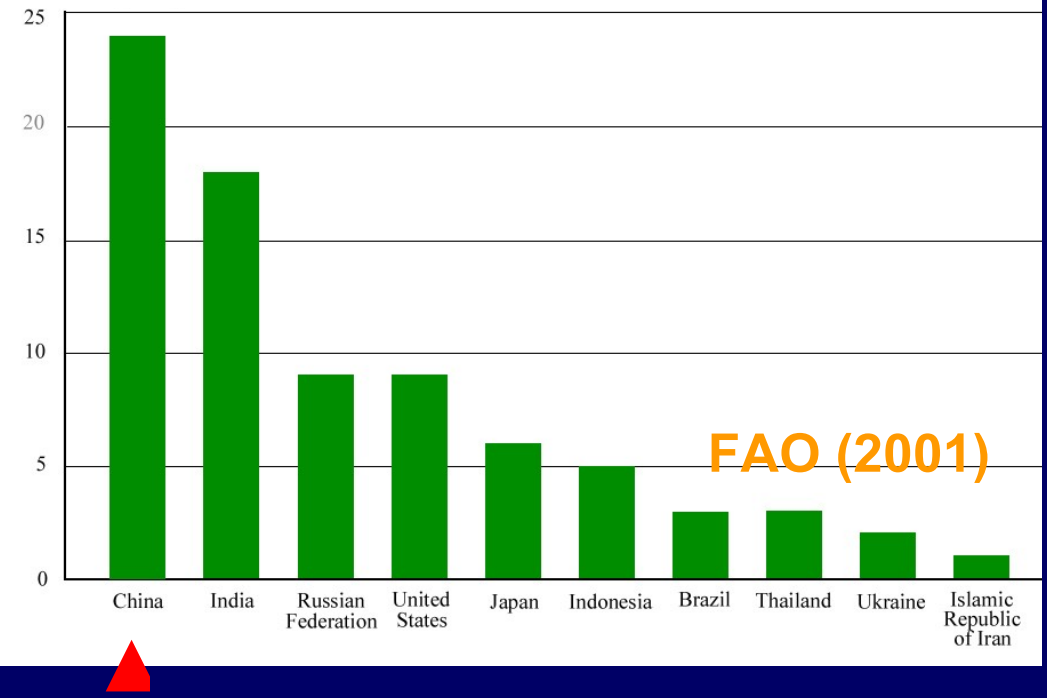
(5) Why a large C sequestration?

- large-scale reforestation
- changes of energy consumption structure and vegetation recovery
- intensive agriculture practices
- regional climate changes

(i) Reforestation and afforestation

China is the largest country with planted forests, about 1/5 of total global plantations (FAO, 2001)

Countries with the largest proportion of the world's forest plantations, 2000



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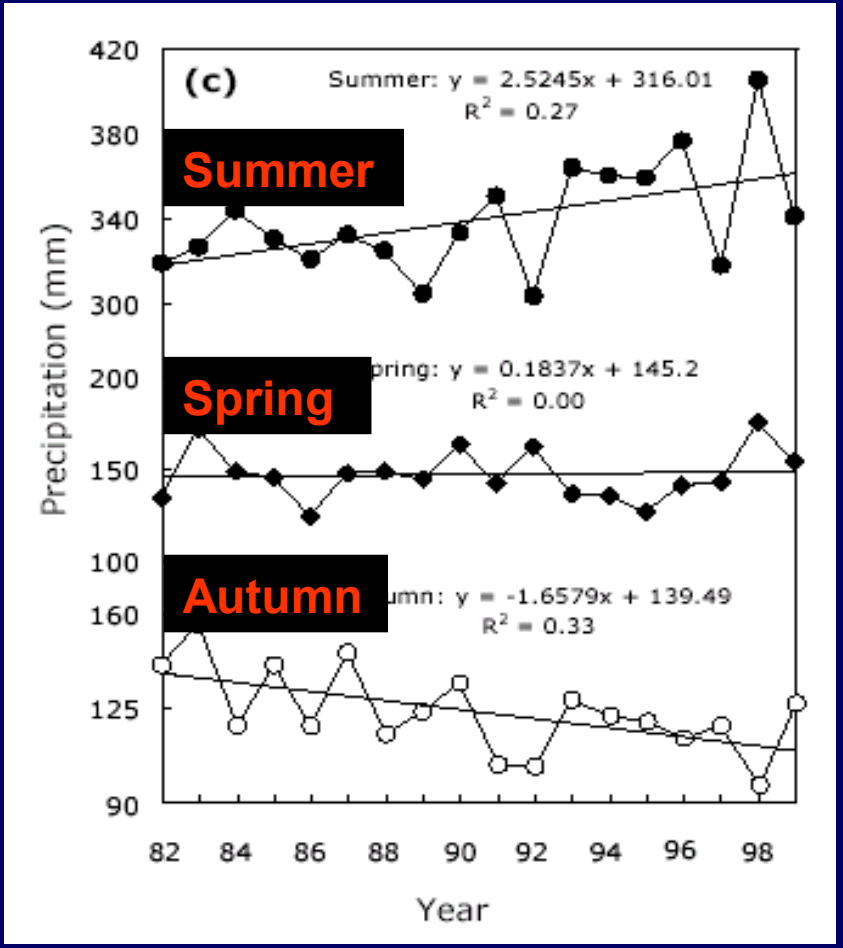

4. Summary

- Three independent approaches produce a consistent estimate of national net C sink of 0.17-23 Pg yr^{-1}, which is about 26-34% of China's cumulated fossil emissions over the study period.

- This large C sink is caused by afforestation, shrubland recovery, change in agricultural practices, and the effect of climate change.

Acknowledgement

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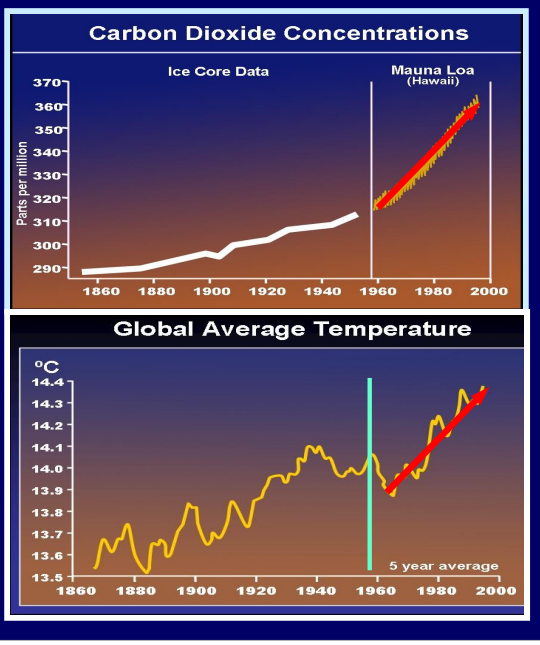

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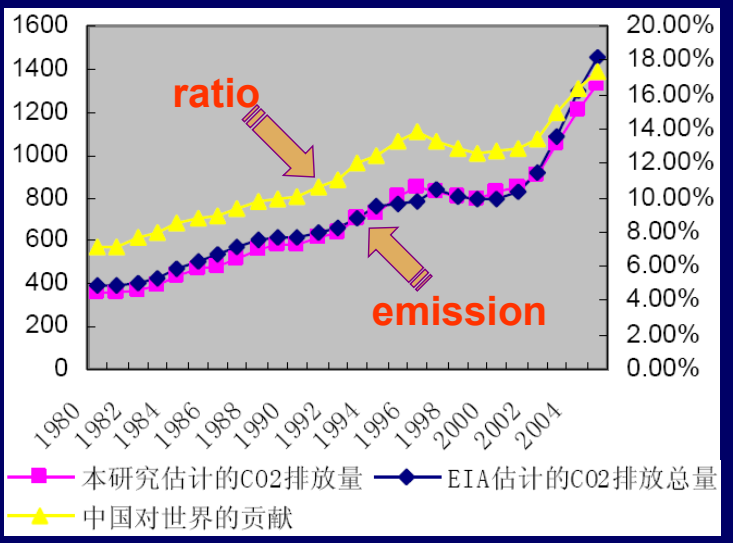

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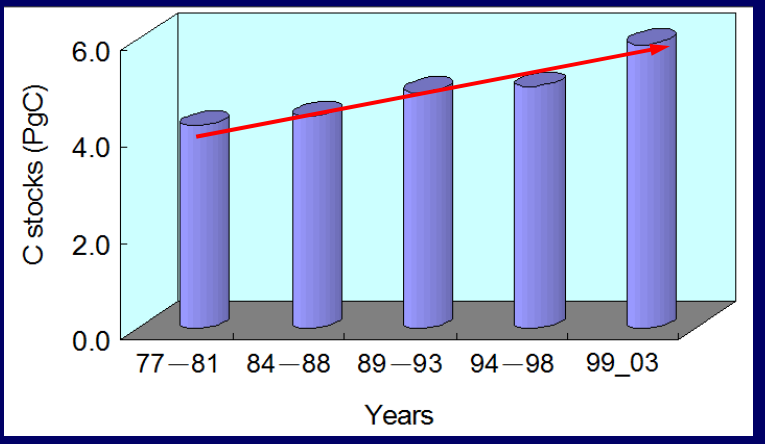

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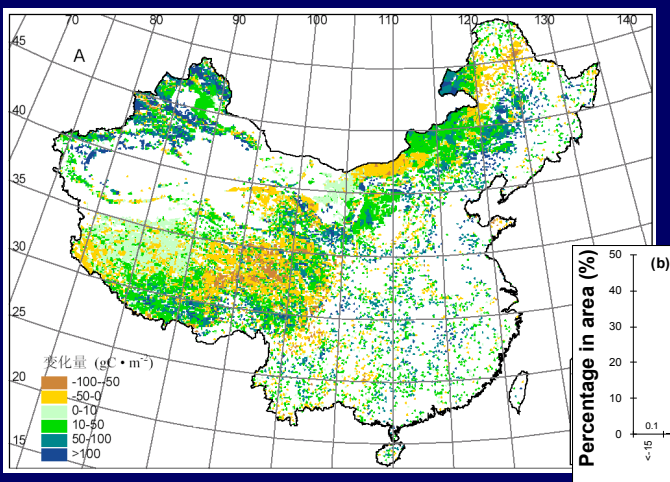

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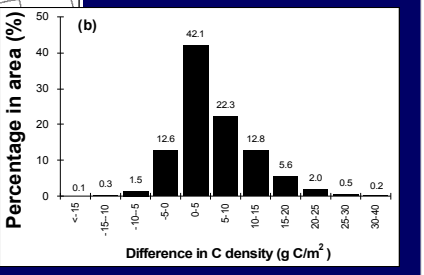

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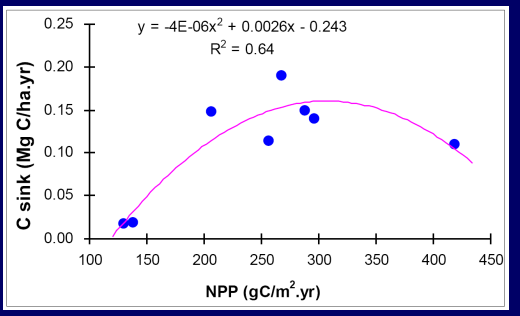

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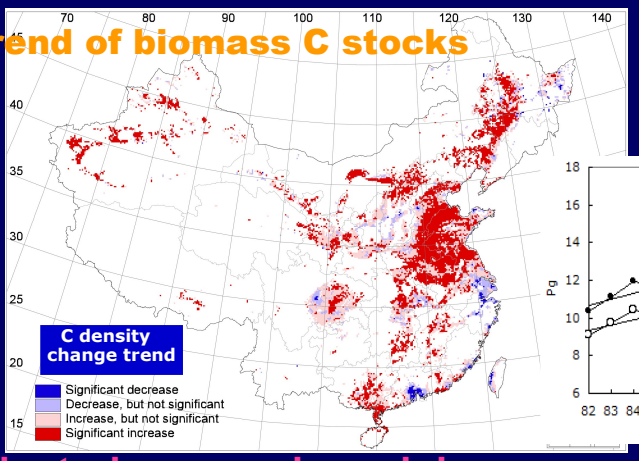

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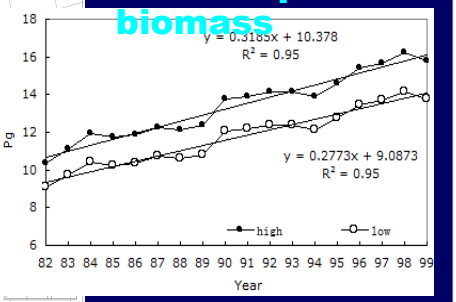

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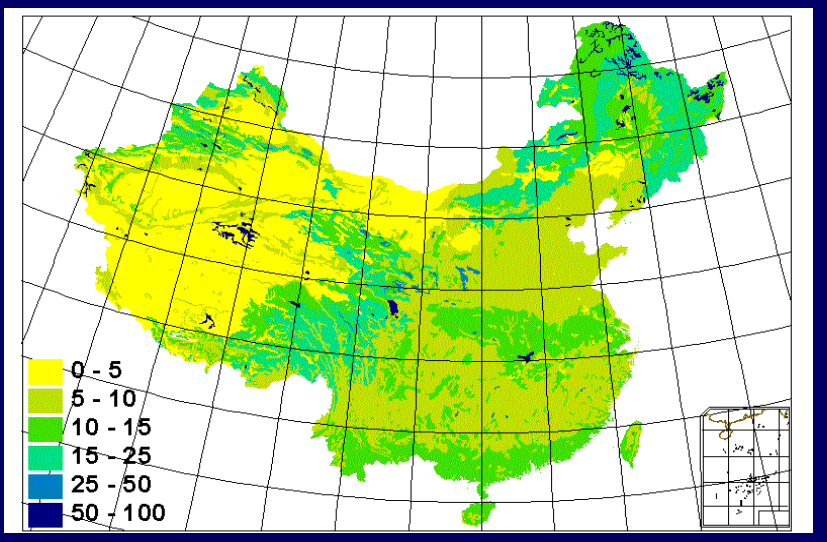

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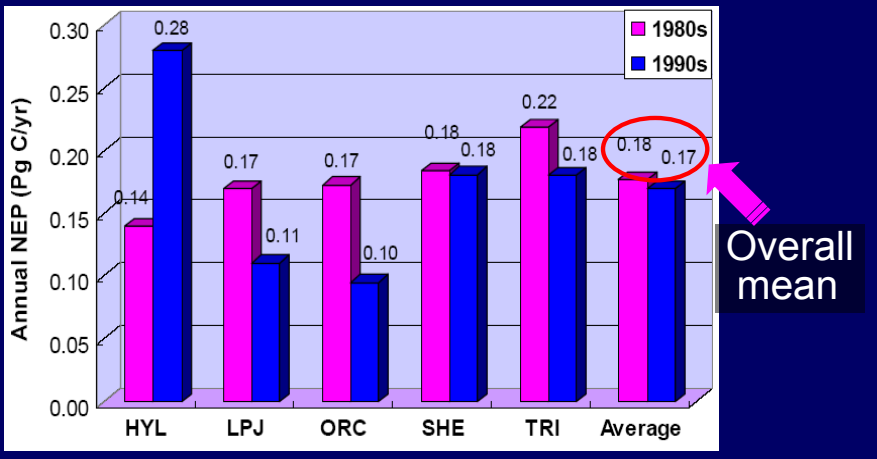

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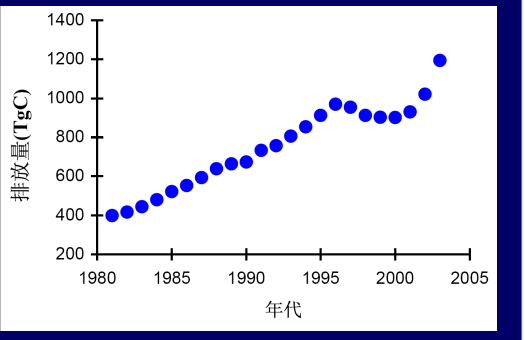

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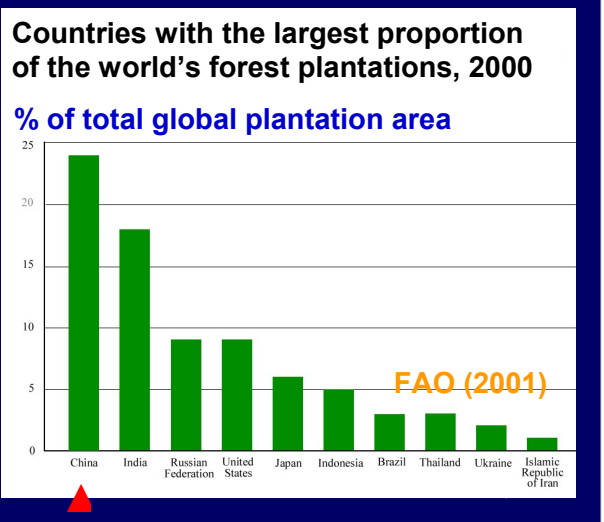

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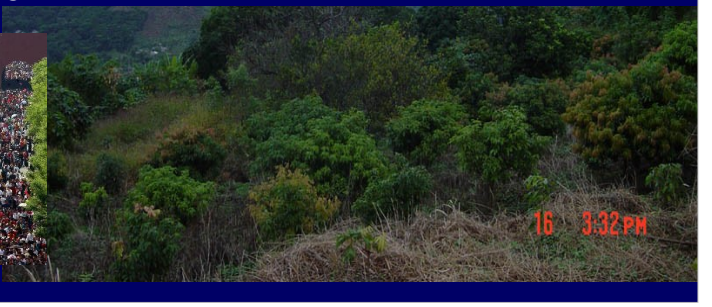

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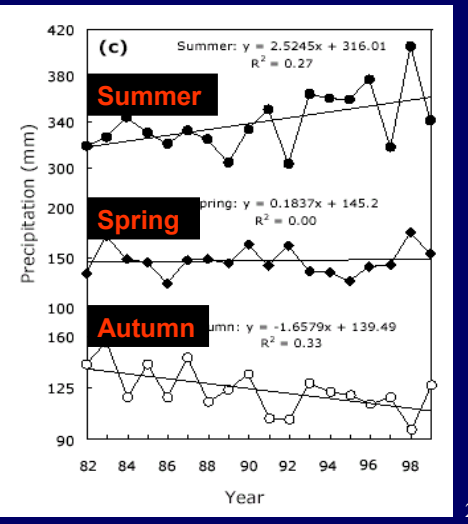

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