

Global Croplands and Agricultural Systems AD 1000 to AD 2000

Mats Widgren, Ulf Jonsson, Bill
Doolittle, Janken Myrdal, Bill
Woods

Historical reconstruction of croplands:

Kees Klein Goldewijk

Navin Ramankutty

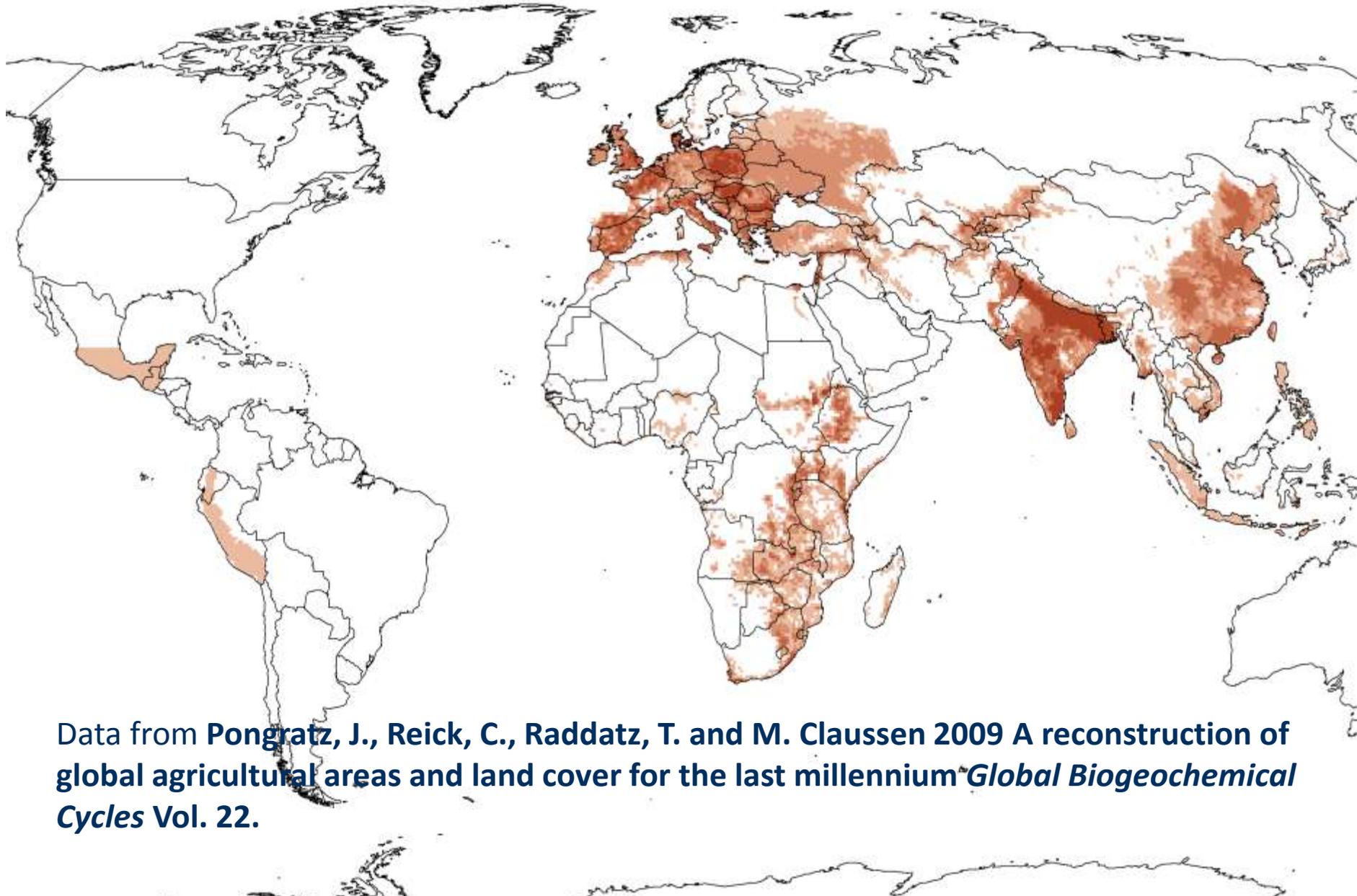
Julia Pongratz

Erle C. Ellis

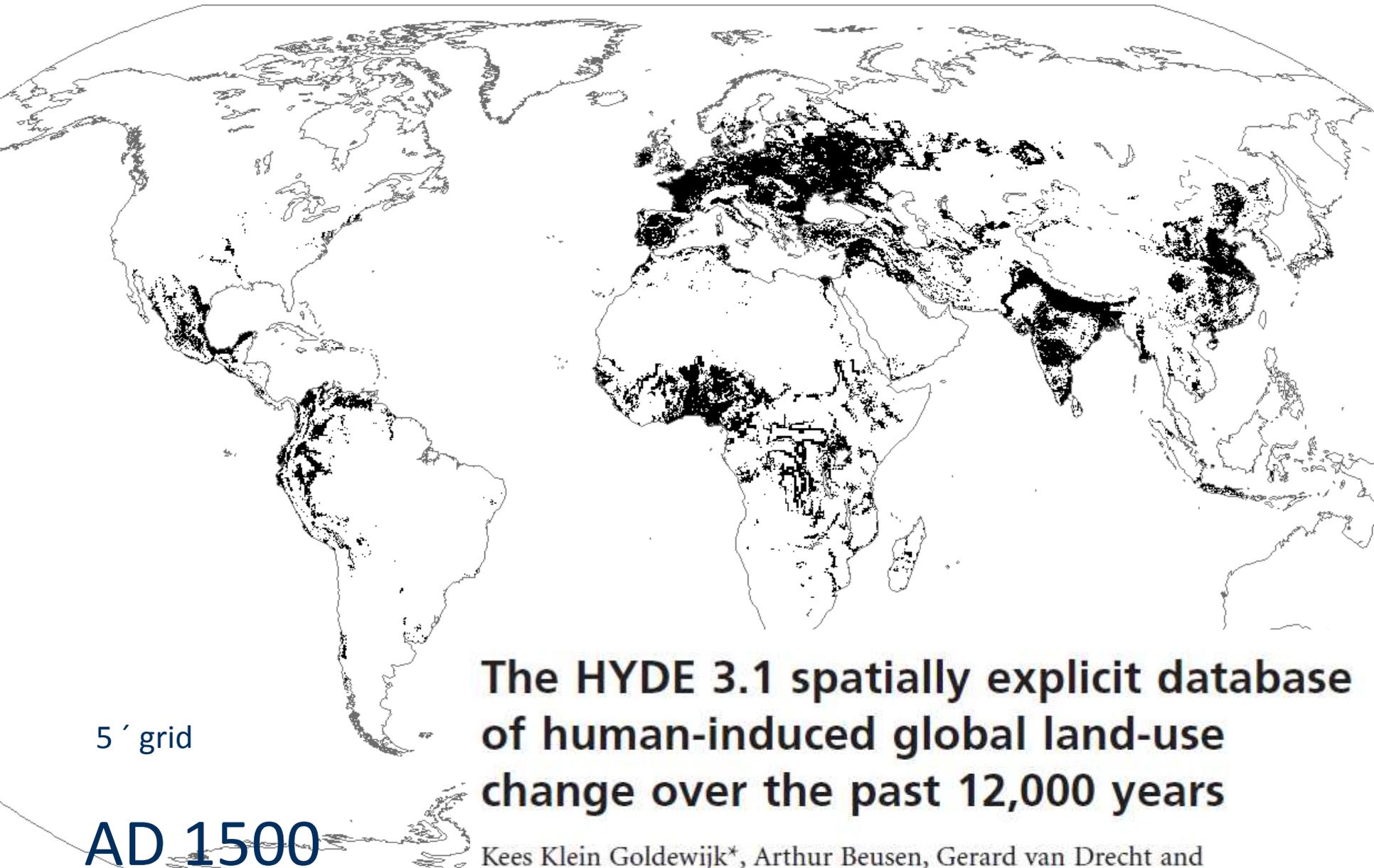
Backcasting from 2000 land cover

Population estimates

Cropland distribution AD 1500 according to Pongratz et al. 2009



Data from **Pongratz, J., Reick, C., Raddatz, T. and M. Claussen 2009 A reconstruction of global agricultural areas and land cover for the last millennium** *Global Biogeochemical Cycles* Vol. 22.



5' grid

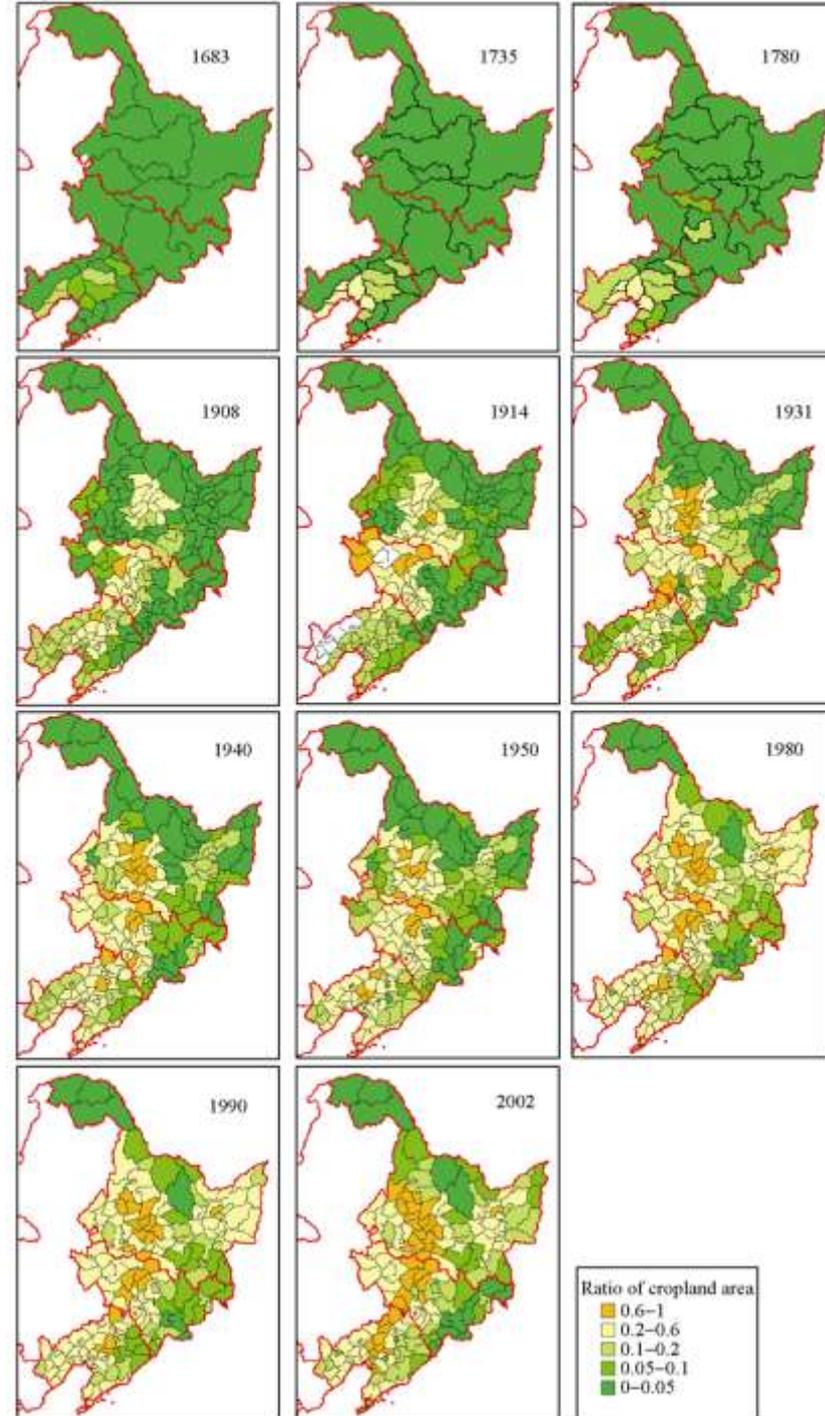
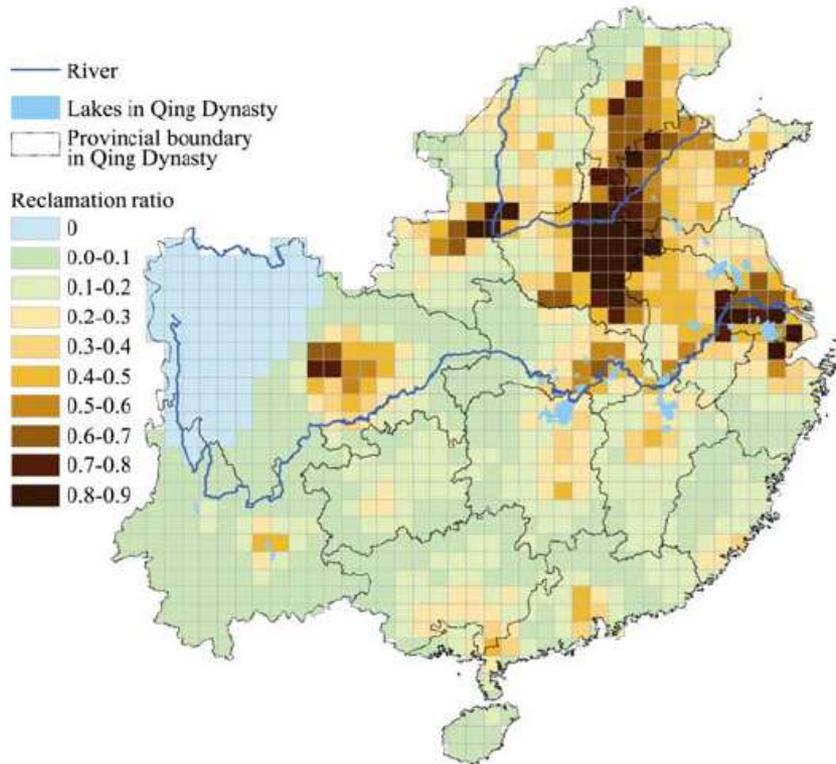
AD 1500

The HYDE 3.1 spatially explicit database of human-induced global land-use change over the past 12,000 years

Kees Klein Goldewijk*, Arthur Beusen, Gerard van Drecht and
Martine de Vos

Quantitative historical records: "The Chinese Model"

ethods.



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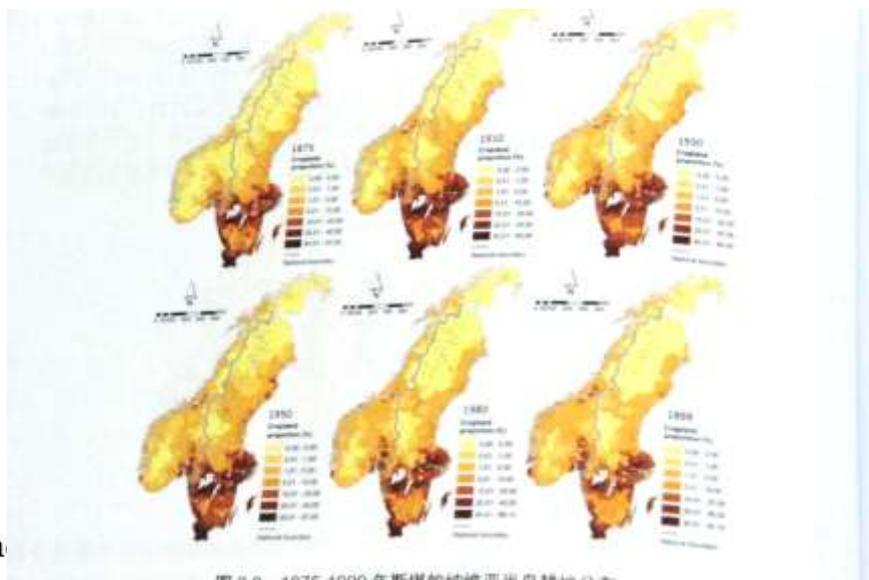
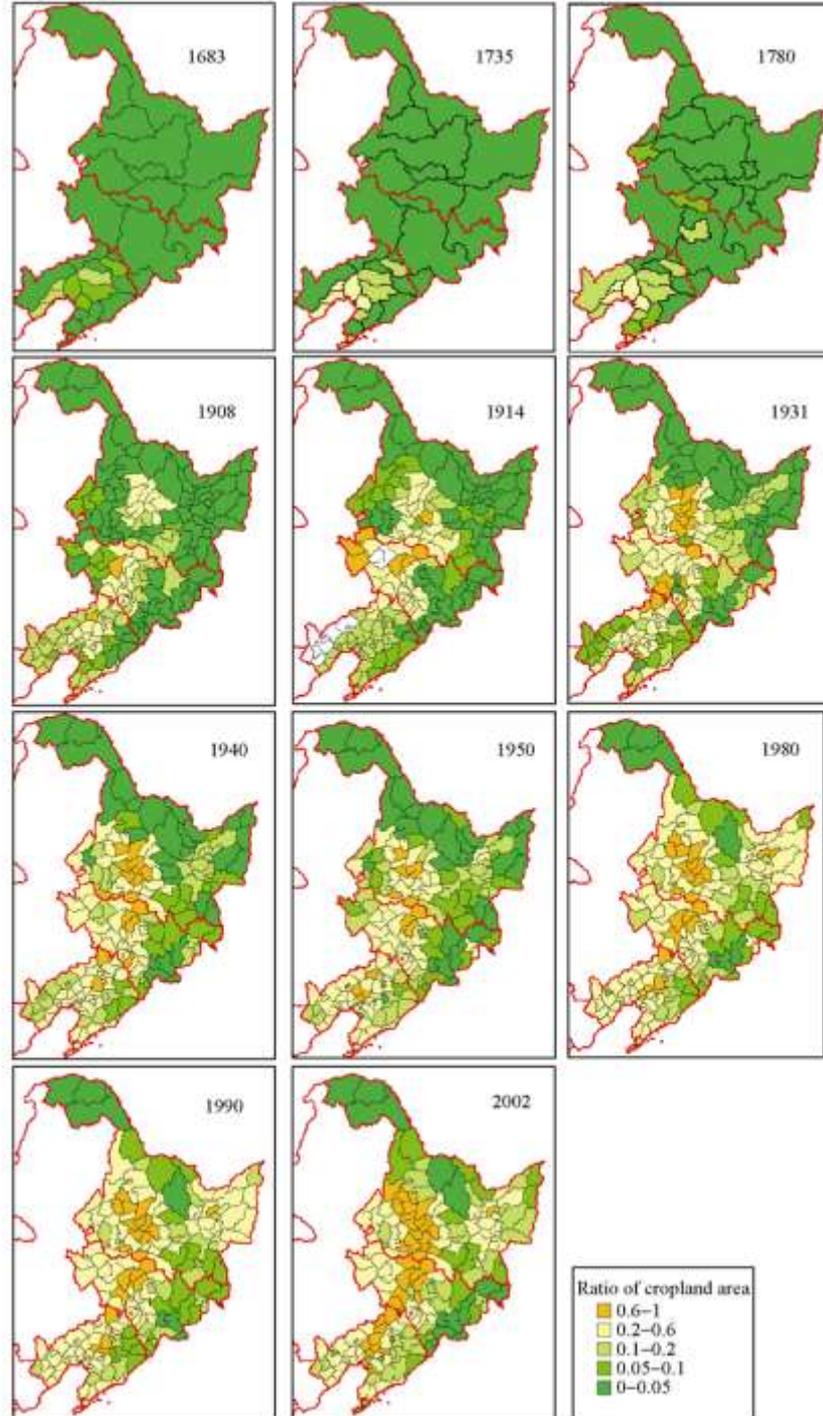
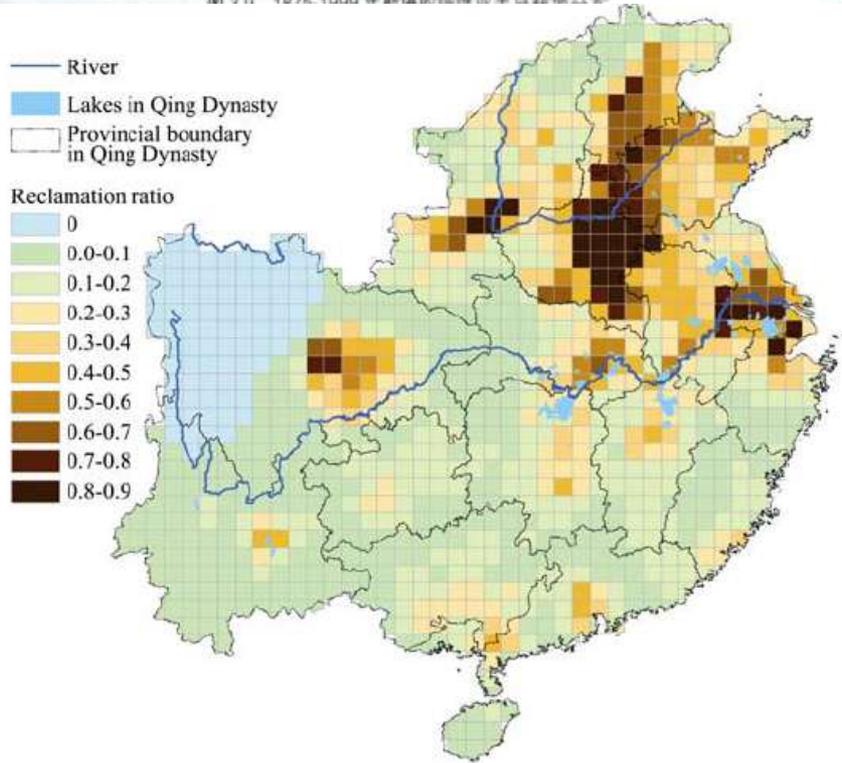
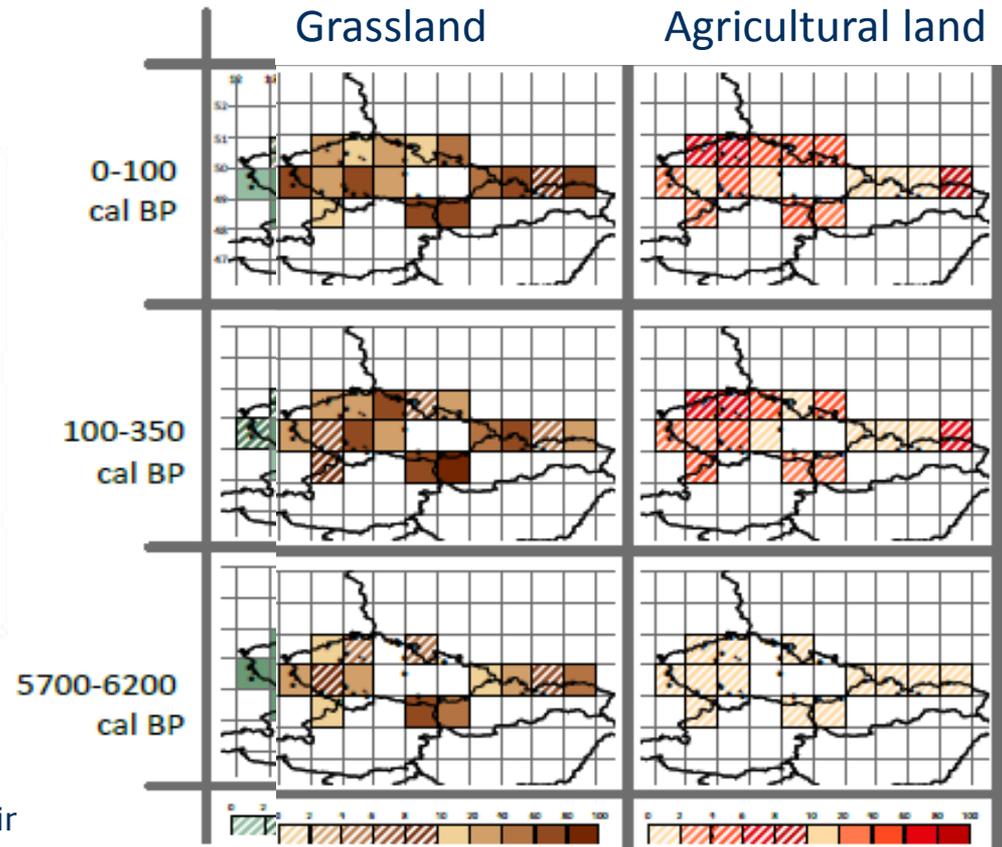
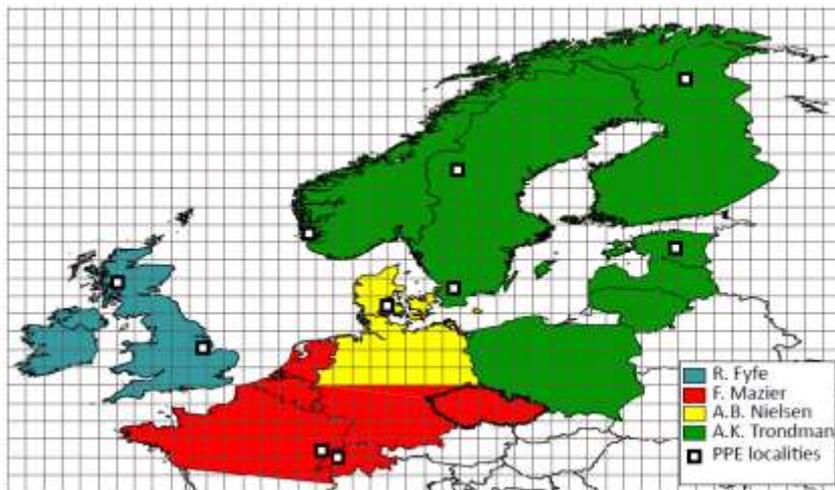


图 2.6 1875-1999 年黄河流域的降水变化



Quantitative treatment of pollen analyses: REVEALS

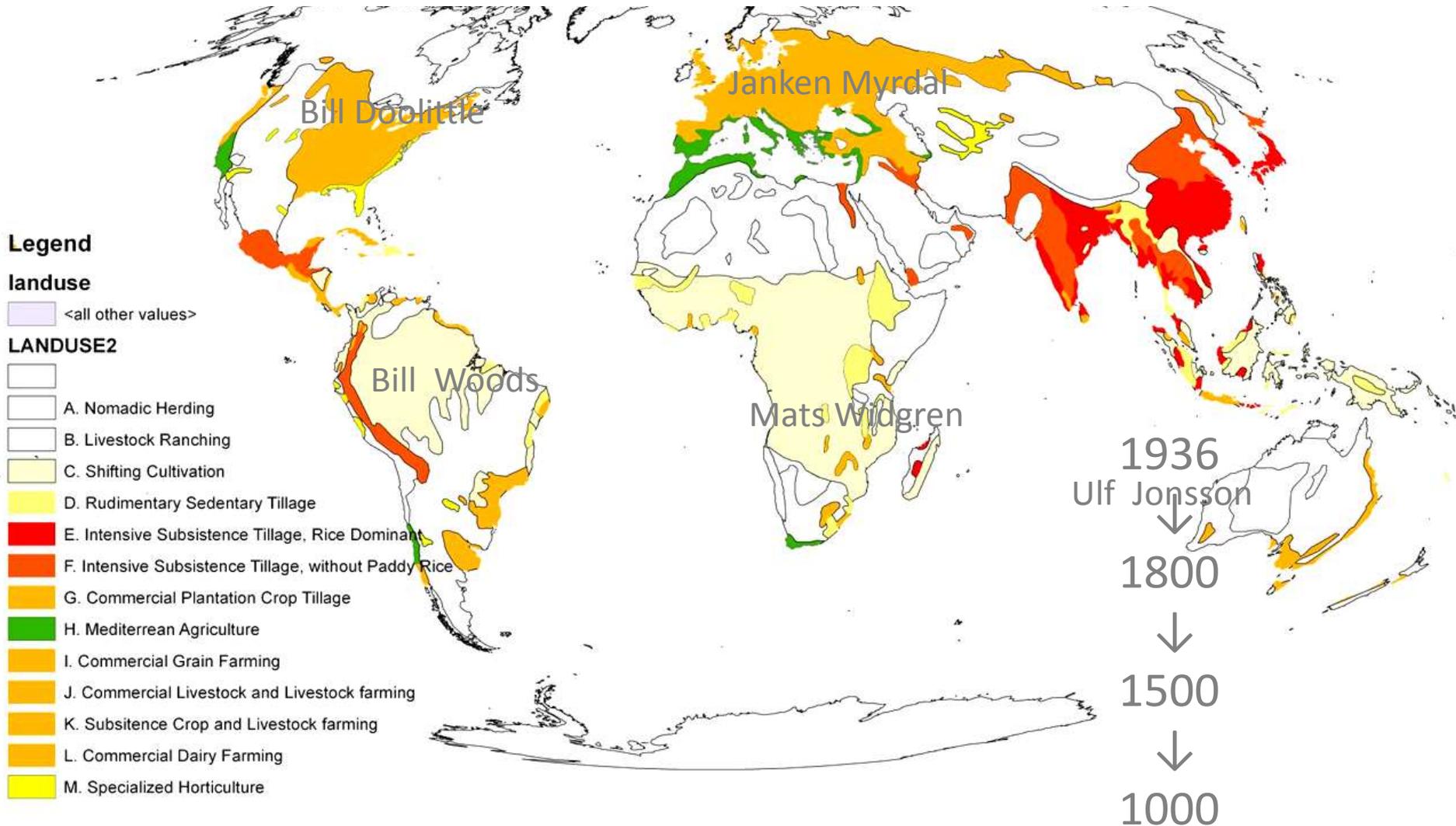
M.-J. Gaillard¹, S. Sugita² et al.: Holocene land-cover reconstructions for studies on land cover-climate feedbacks
Climate of the past, 6, 483-499, 2010



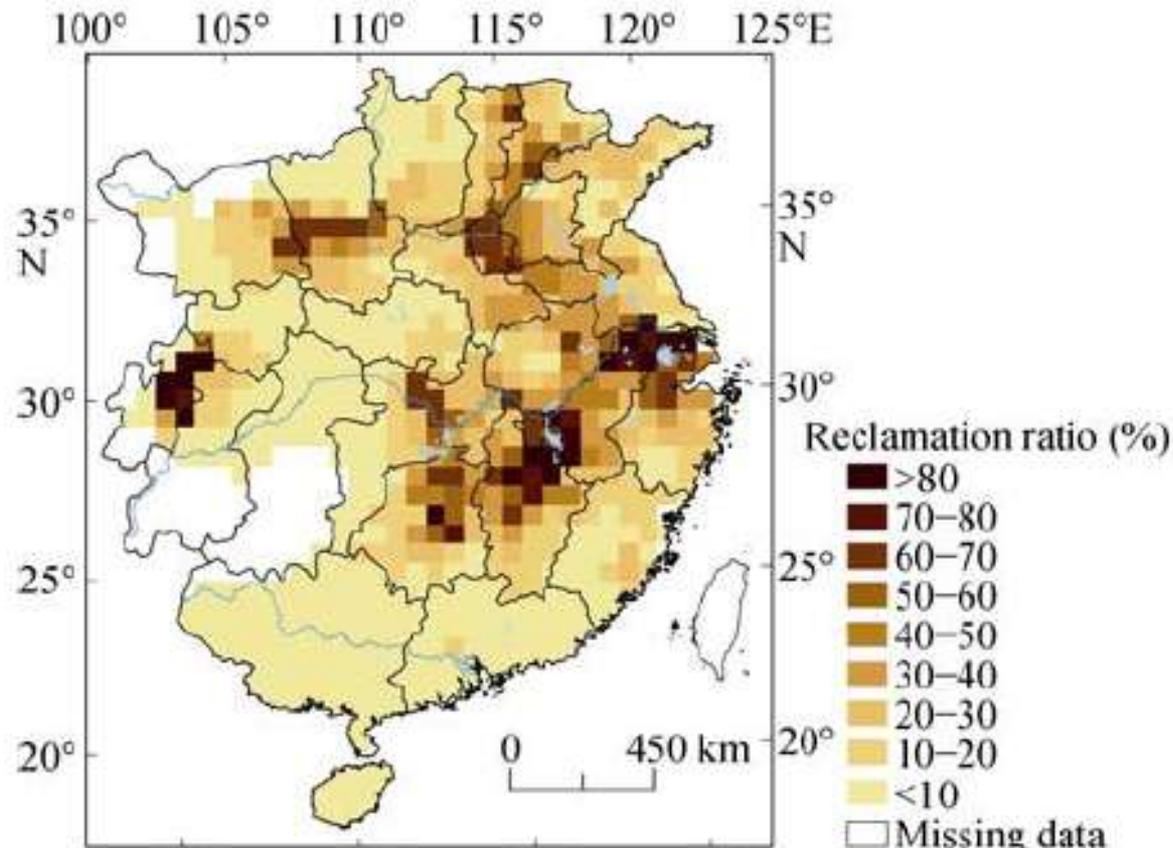
	DATA	SCALE	TIME	STRENGTH/ WEAKNESS
HYDE and other	Land cover 2000 + population reconstructions	World	12000	Falsely precise
CNEC	Quantitative historical data	Regions	3-400	Precise, empirical
REVEALS	Pollen analyses	Regions —> World	6000	Time- consuming
”Mapping global agriculture”	Qualitative data	World	1000	Not land cover



Qualitative archaeological and historical data: Mapping global agricultural history

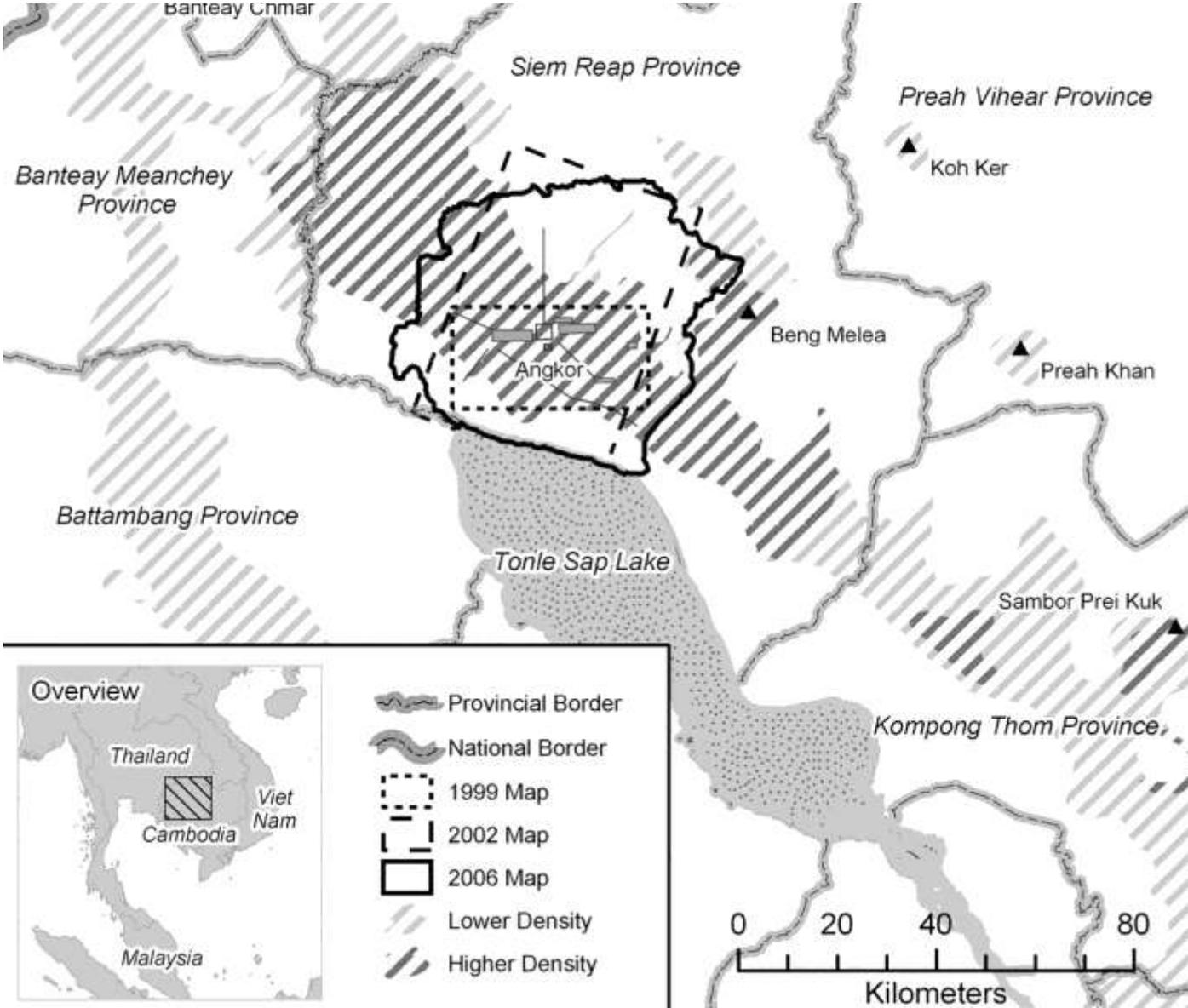


Historical statistics – where available

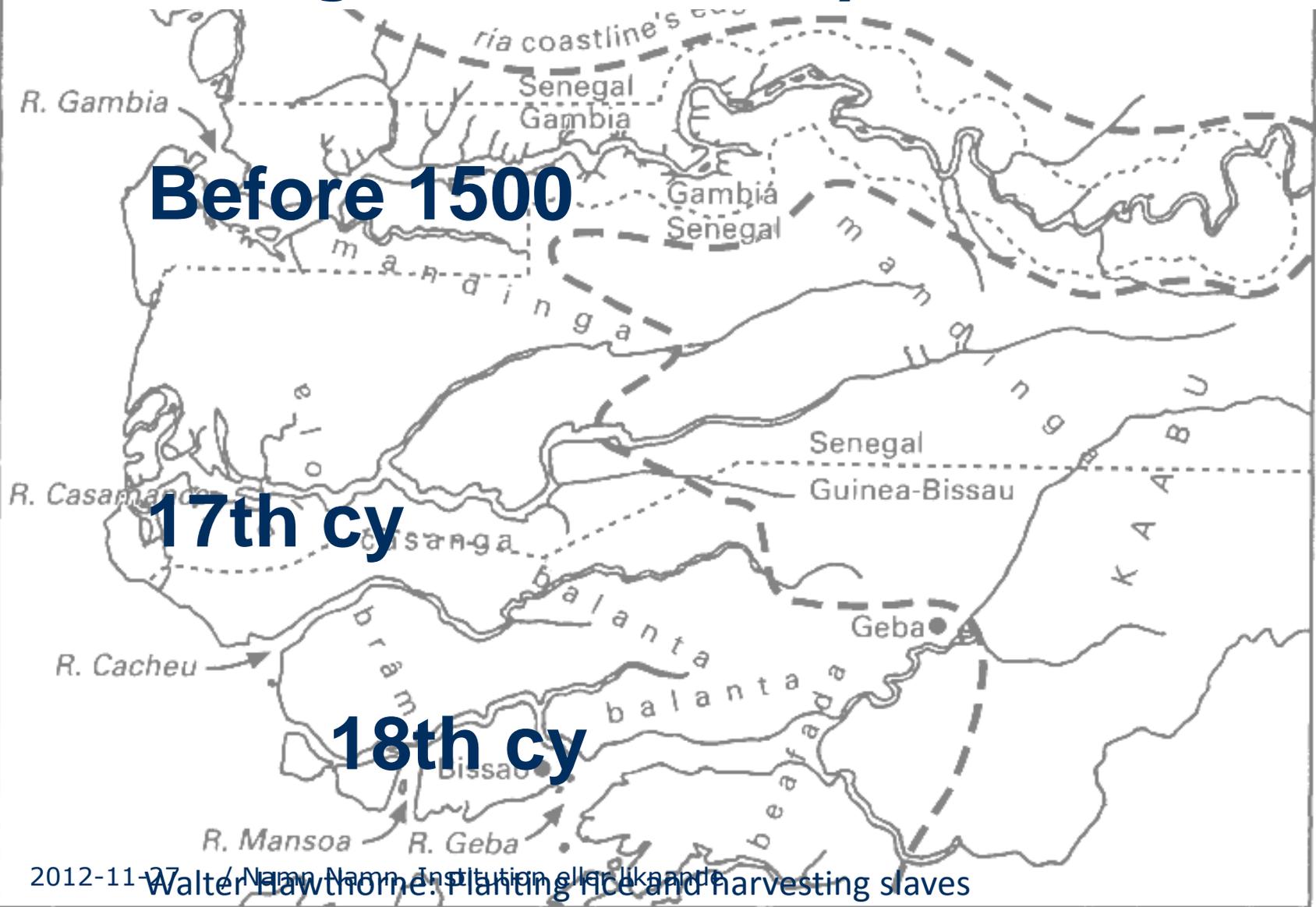


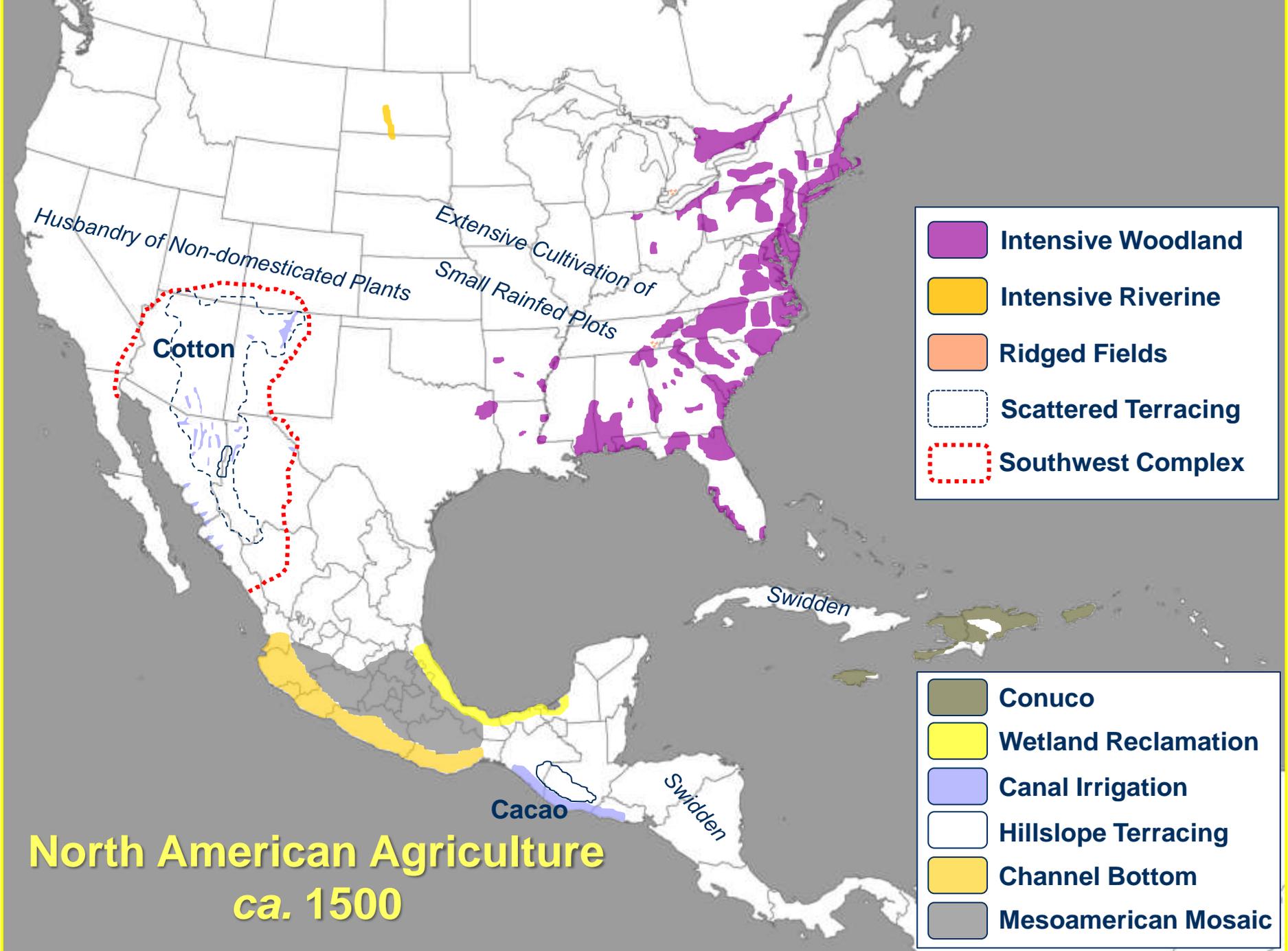
Reconstruction of cropland area and spatial distribution in the mid-Northern Song Dynasty (AD1004–1085)

Archaeological data



Written agricultural history





Husbandry of Non-domesticated Plants

Extensive Cultivation of Small Rainfed Plots

Cotton

Swidden

Cacao

Swidden

North American Agriculture ca. 1500

- Intensive Woodland
- Intensive Riverine
- Ridged Fields
- Scattered Terracing
- Southwest Complex

- Conuco
- Wetland Reclamation
- Canal Irrigation
- Hillslope Terracing
- Channel Bottom
- Mesoamerican Mosaic



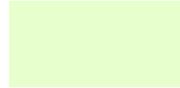
”Patchwork of gardens, orchards and managed forests”



Global_category



1 Pastoralism, ranching



2 Husbandry of nondomesticated plants



3 Extensive or undifferentiated farming



4 Permanent fields



5 Mediterranean complex



5 Meso-american complex



5 Mixed farming



5 Taro complex



6 Intensive farming



7 Intensive farming with rice

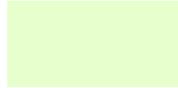


8 Oases

Global_category



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2 Husbandry of nondomesticated plants



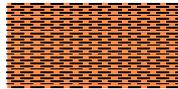
3 Extensive or undifferentiated farming



4 Permanent fields



5 Mediterranean complex



5 Meso-american complex



5 Mixed farming



5 Taro complex



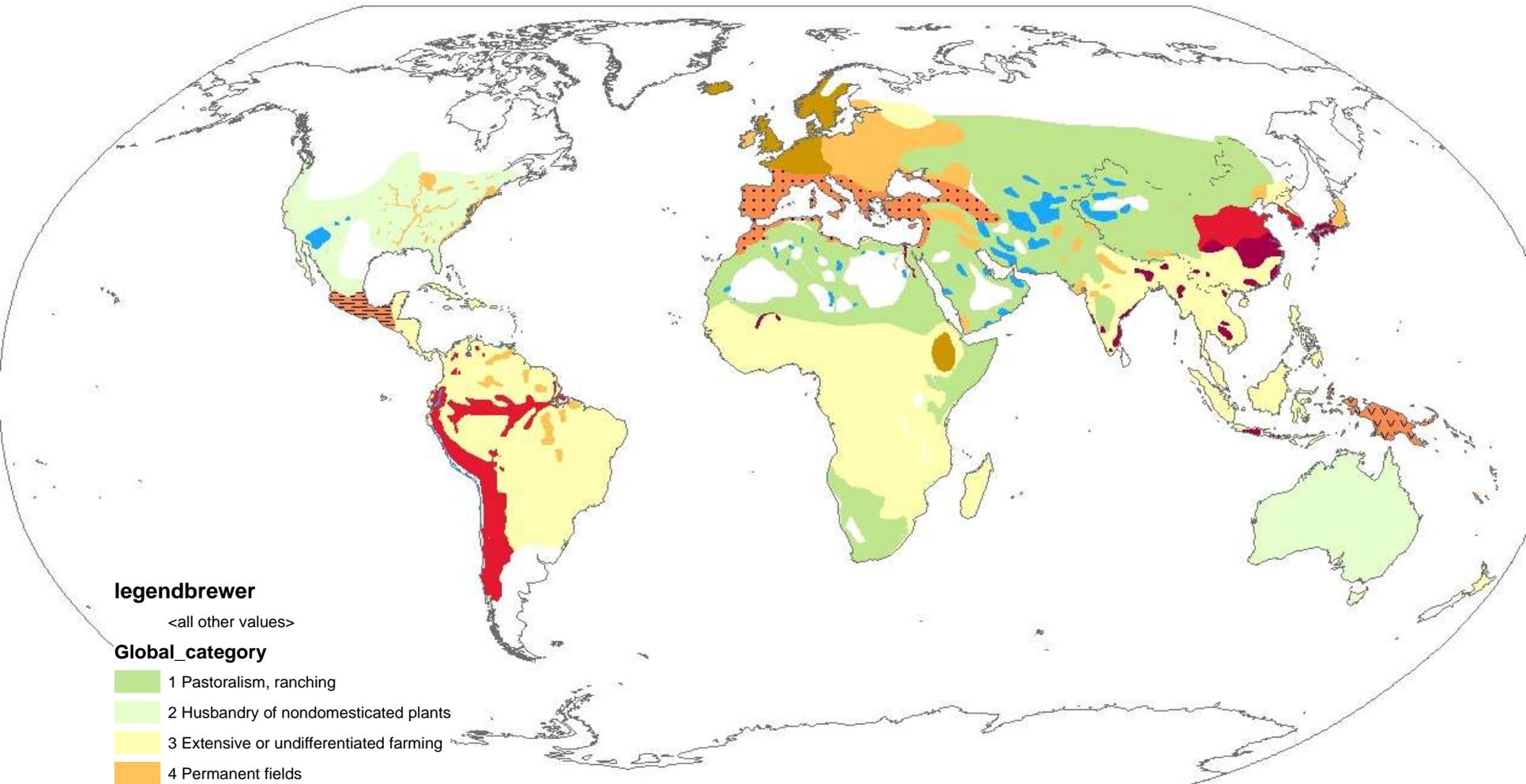
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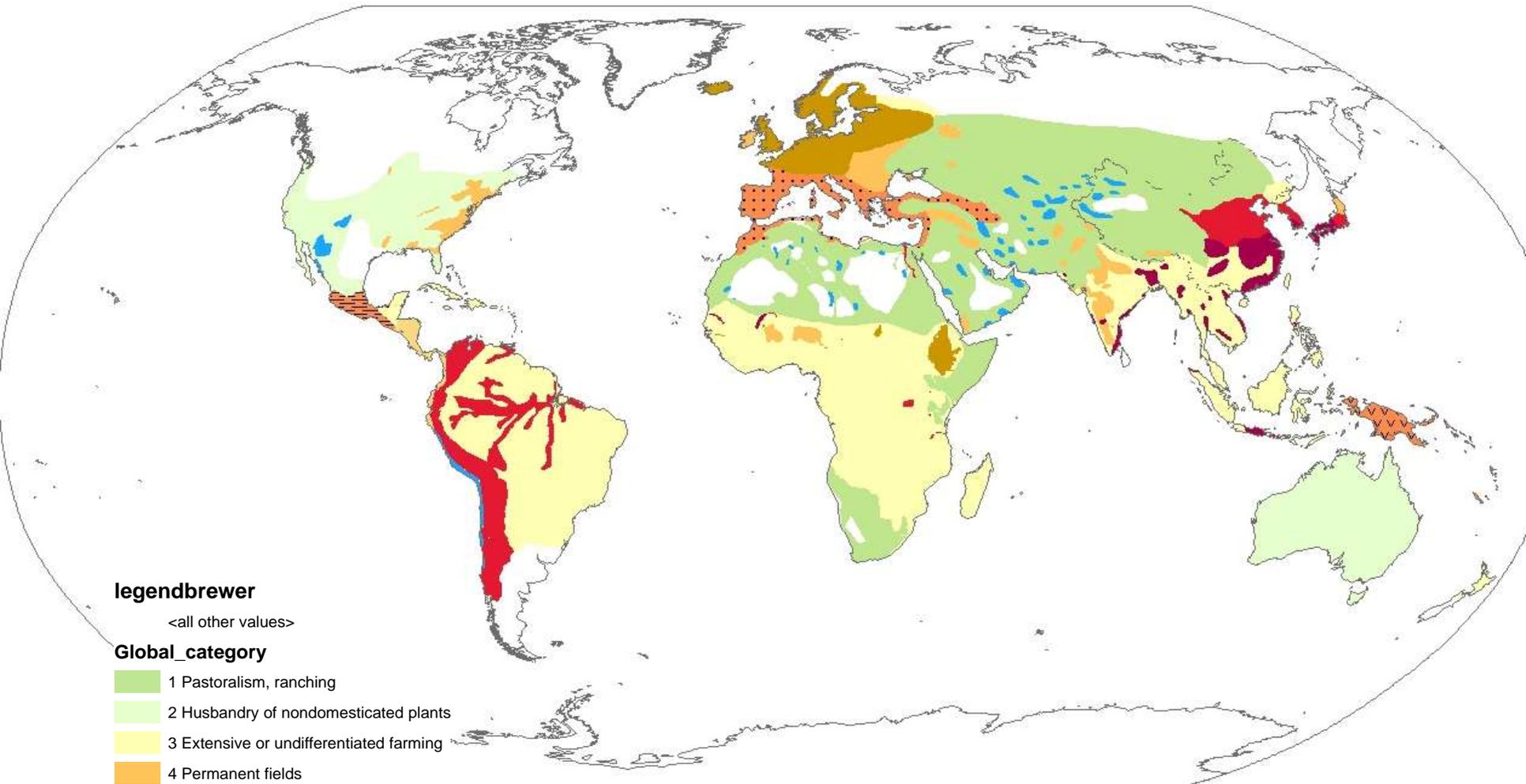
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AD 1000



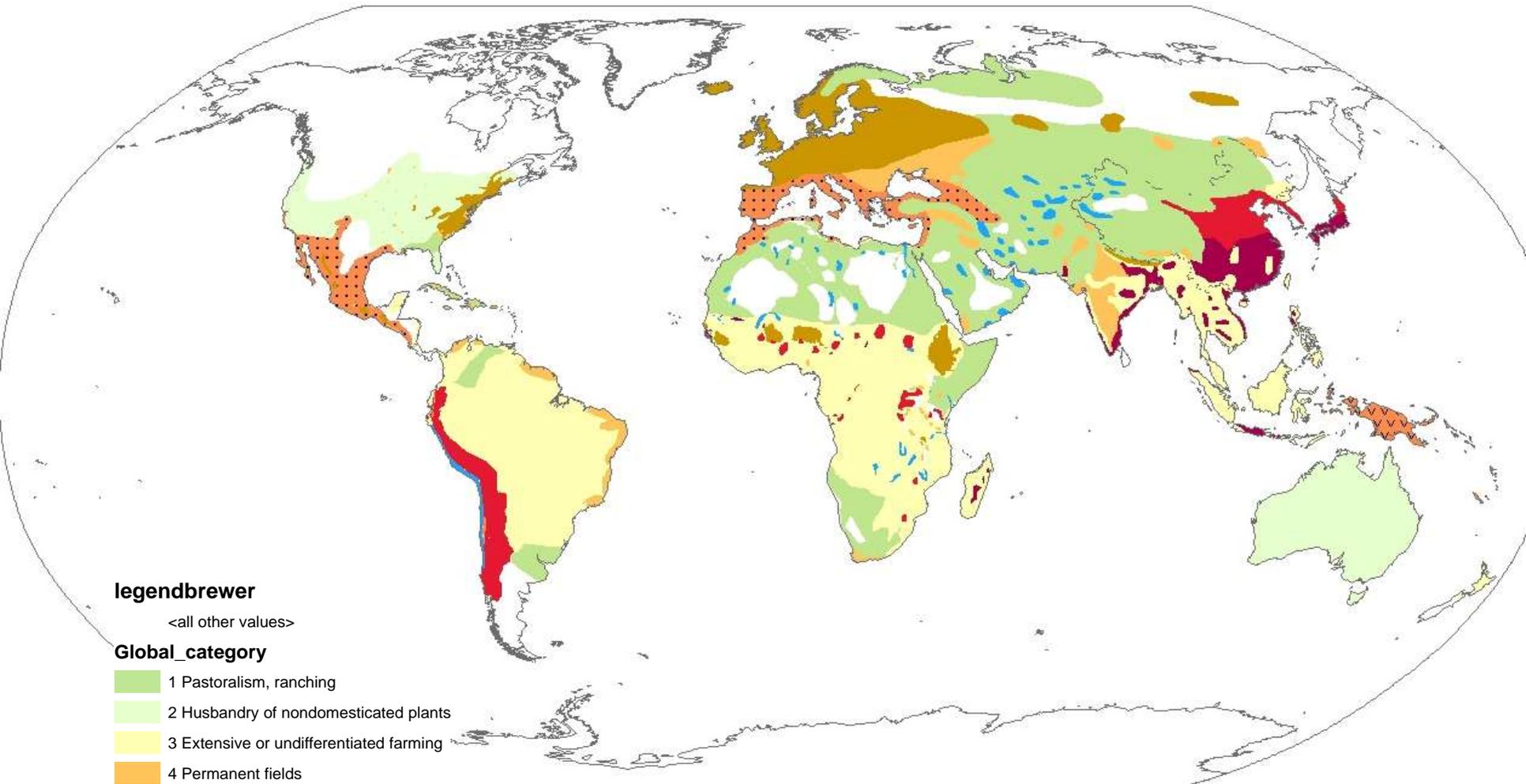
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AD 1500



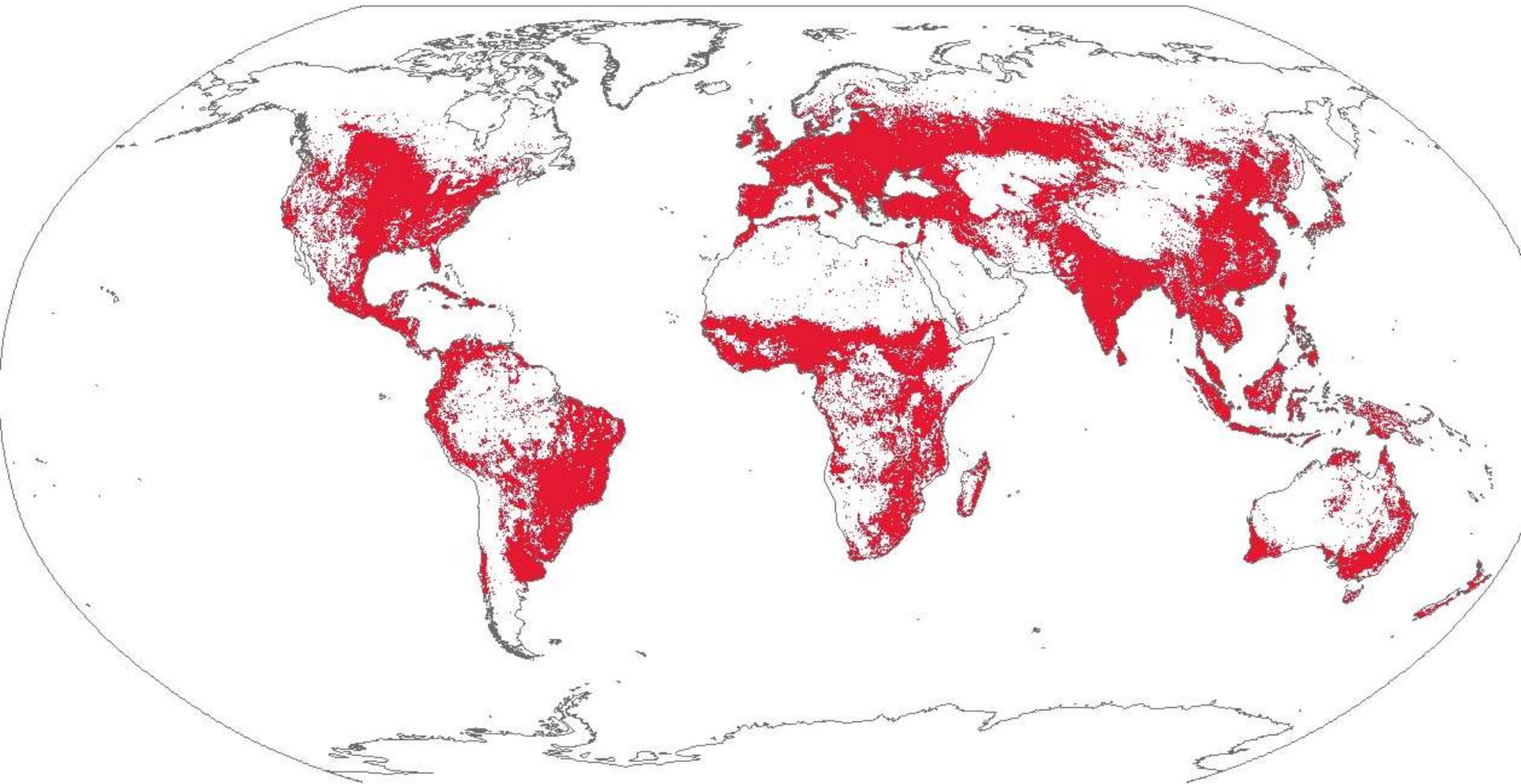
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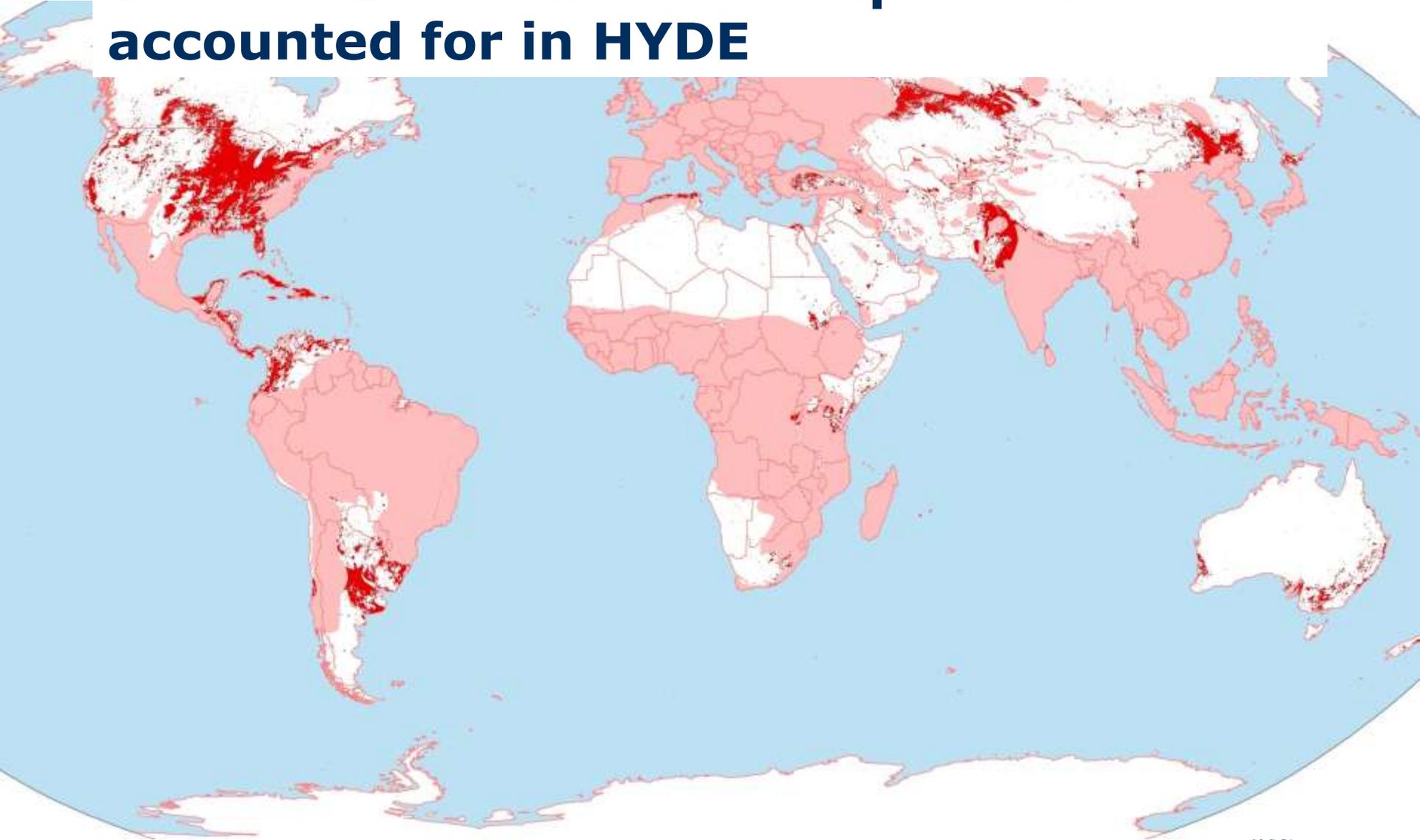
AD 1800

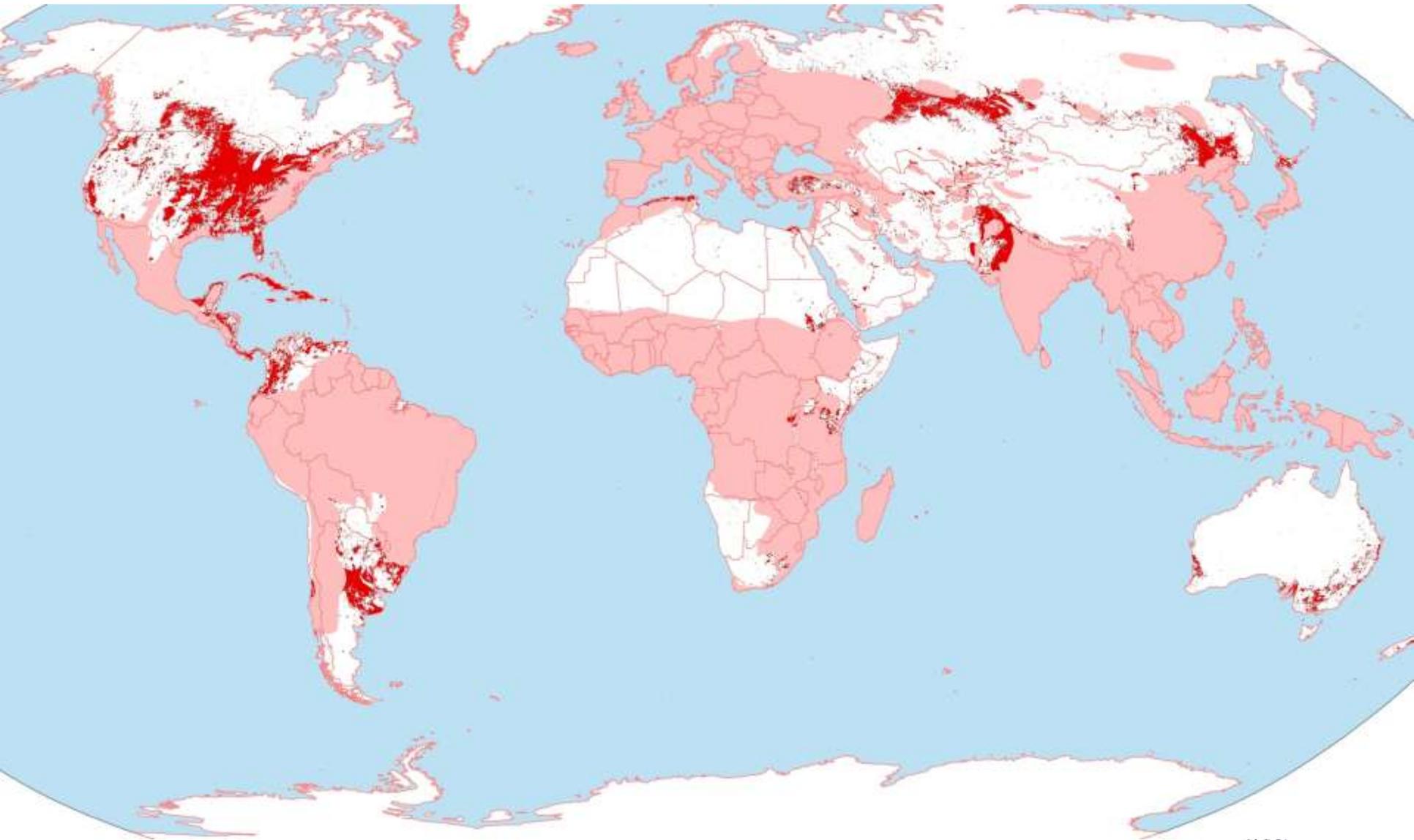


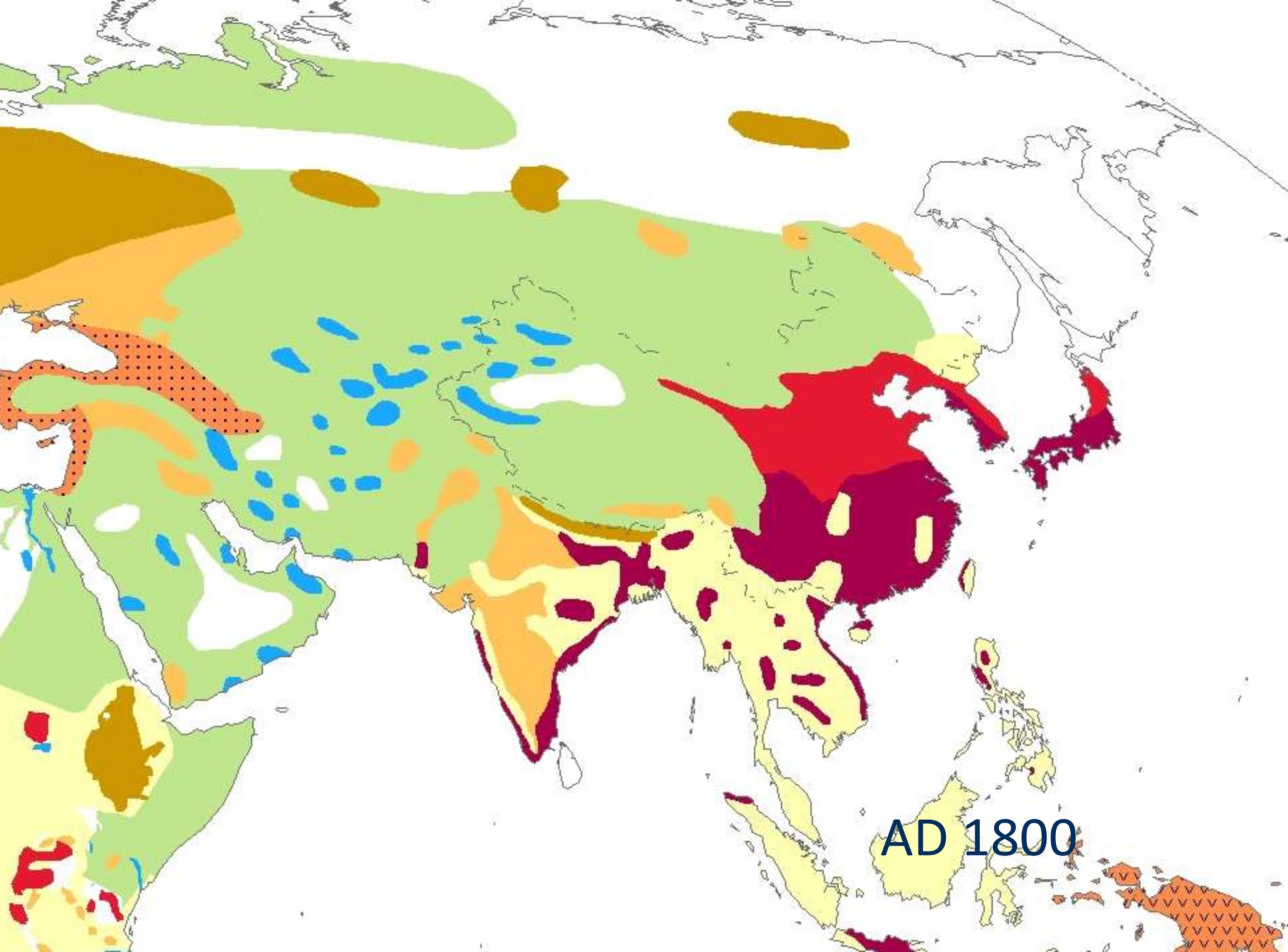
Land cover

AD 2000

1800 to 2000 dramatic expansion not accounted for in HYDE

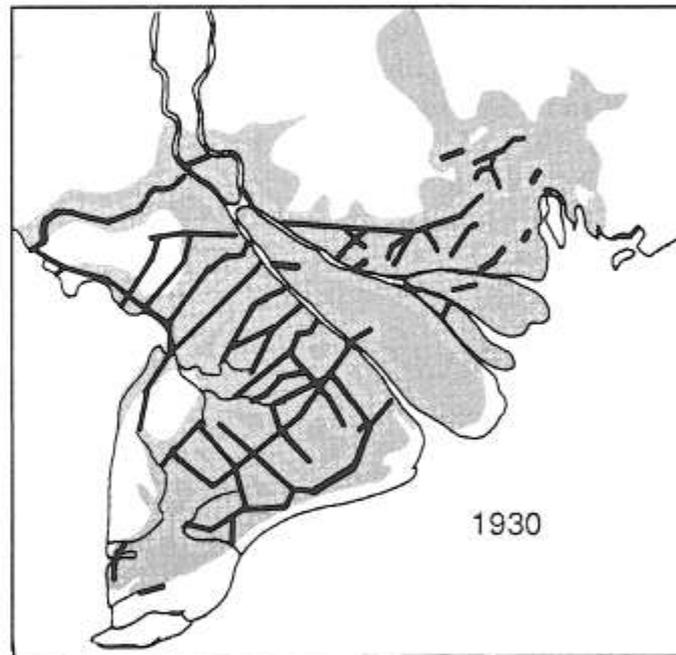
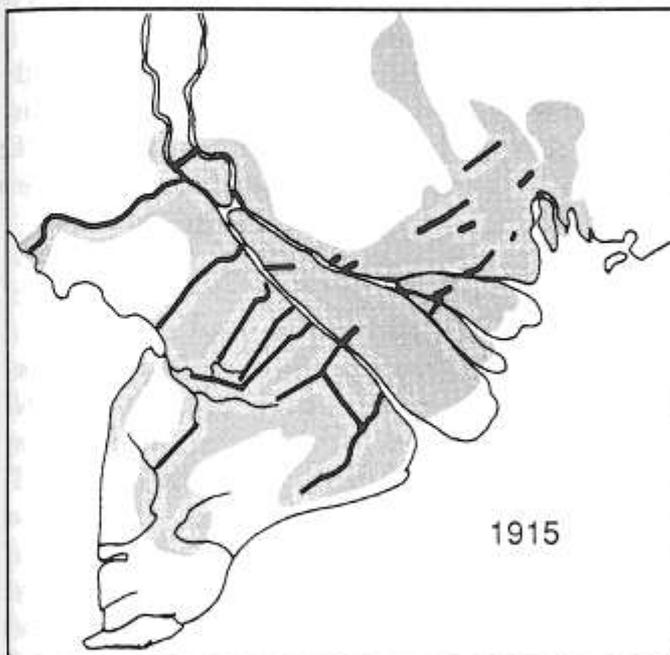
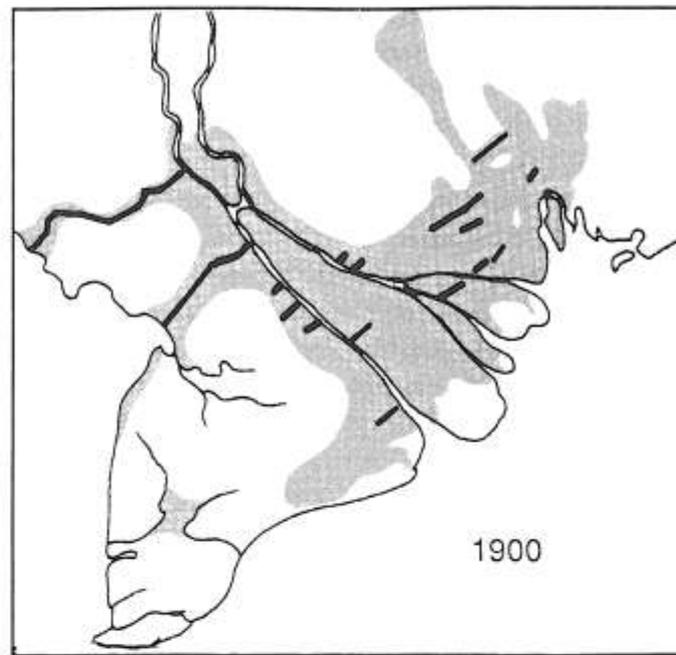
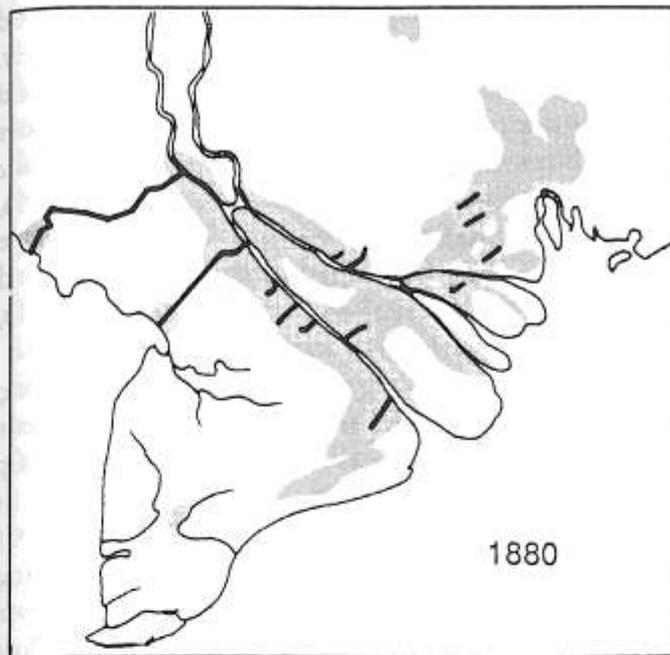




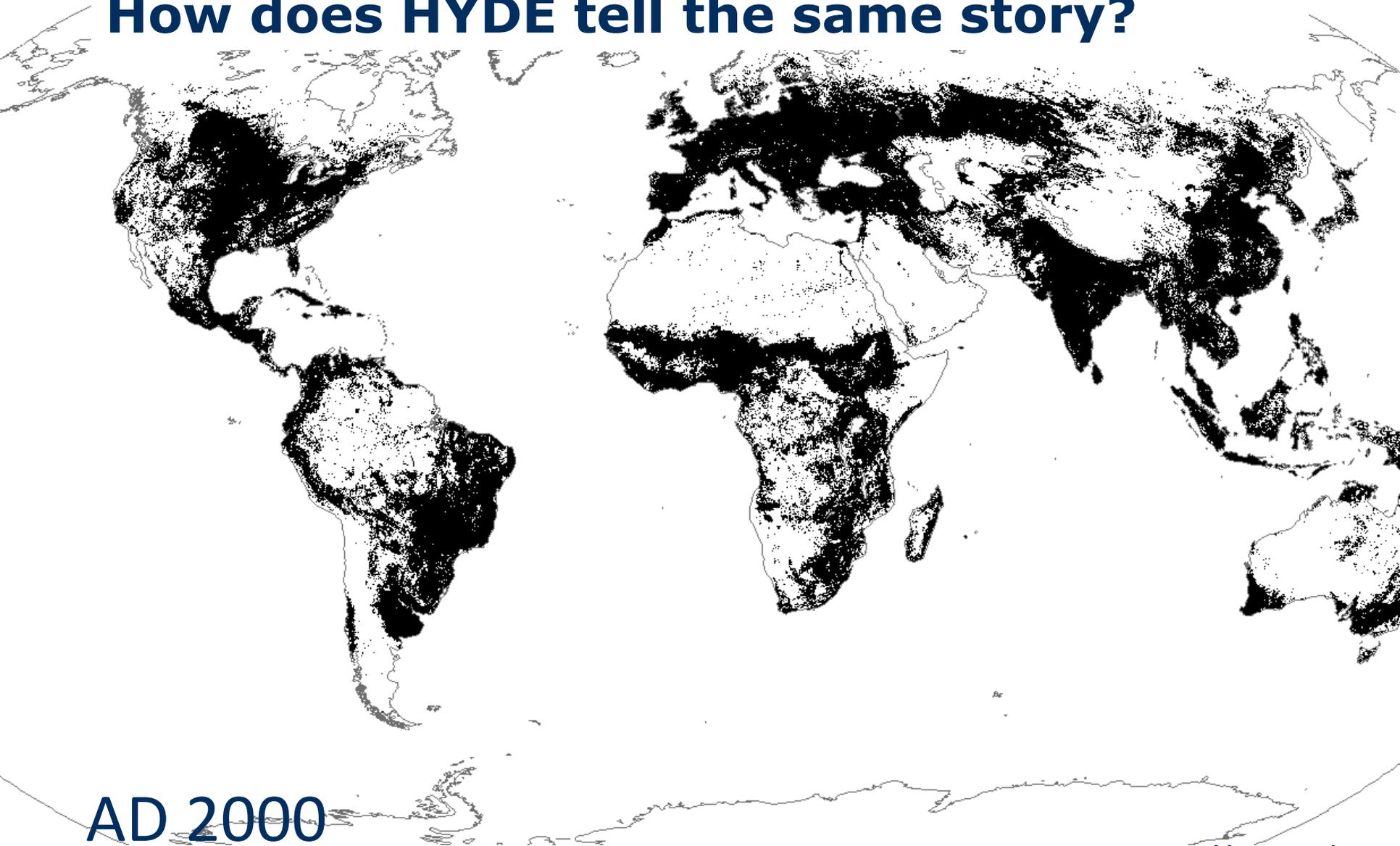


AD 1800

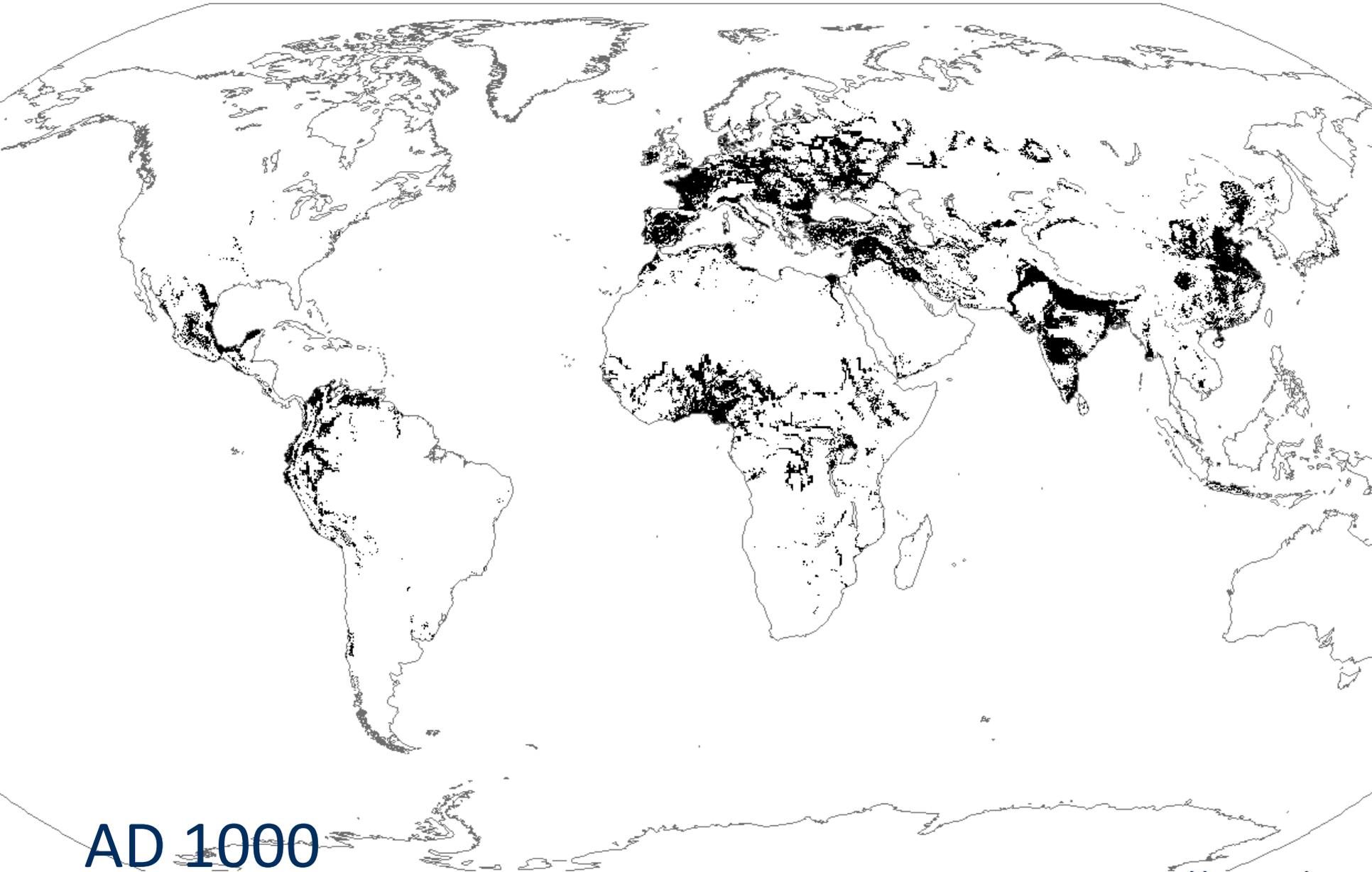
Committee, 1988). The those farther from the usually avoided. In the low two east-west parallel water from the Mekong, er by the government or The most recent is the he Mekong with the Vam s scheme is being used to ate soils and has resulted opping patterns which are hemes, involving small- e water control enabling ccessive crops and rice- nvestigated (Puckridge, ng the South China Sea and in the saline parts of ures fitted with sluices to are being built and the s is being considered. e Cambodian Delta was nes, the cultivated area ne rate as the population e developed were the e Bassac, and several nage works. In the Prey rth-south lake divided by r for irrigation in the dry mbankments with sluices ose. Delta development is nent more risky in the raphy is undulating, the rought more likely. me, a network of canals, e constructed by forced ng conditions. The main t covered an area of



How does HYDE tell the same story?



AD 2000



AD 1000

Main differences to the backcasting

- Precolumbian farming in the Americas ignored by backcasting
- Expansion in eastern Russia and NE China concentrated to late 19th century and later – not a slow process as in HYDE
- Outer rice deltas colonised only in the late 19th century