

Policy Shifted the Functional Relations of Coupled Human and Natural Systems on the Mongolian Plateau

Jiquan Chen

(many co-authors)

Landscape Ecology & Ecosystem Science (LEES)

CGCEO/Geography

Michigan State University



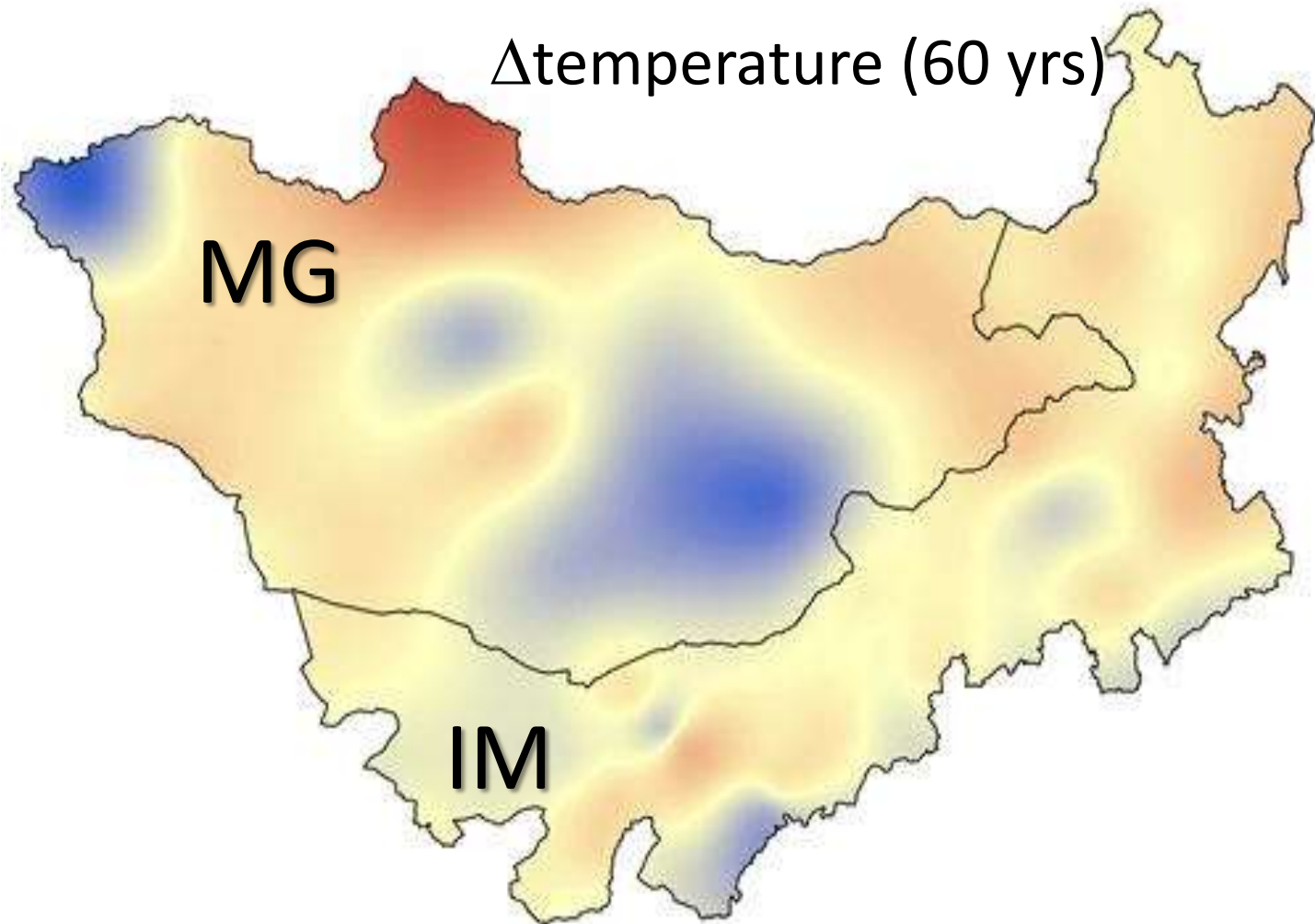
AGU 2014



Mongolia Plateau

- High latitude ($>40^{\circ}\text{N}$), high elevation ($>1000\text{ m}$)
- Nomadic culture
- Two contrasting societies (IM & MG)
- The center of atmospheric activities in East Asia for the Monsoons
- How does policy shift alter the function of human and natural systems on Mongolia Plateau?

Two contrasting macrosystems: Inner Mongolia (China) vs Mongolia



List of Variables

GDPP:	Gross domestic production per capita (\$.person ⁻¹)
POPD:	Population density (# km ⁻¹)
NPP:	Net primary production (Mg ha ⁻¹ year ⁻¹)
EVI:	Enhanced vegetation index (0-1)
Albedo:	Reflection (%)
T:	temperature (°C)
P:	Precipitation (mm)
LCC:	Land cover change
LSKD:	Livestock density (# km ⁻¹)

Major Policy Shifts

Inner Mongolia

WTO 2001: China became a member of the World Trade Organization

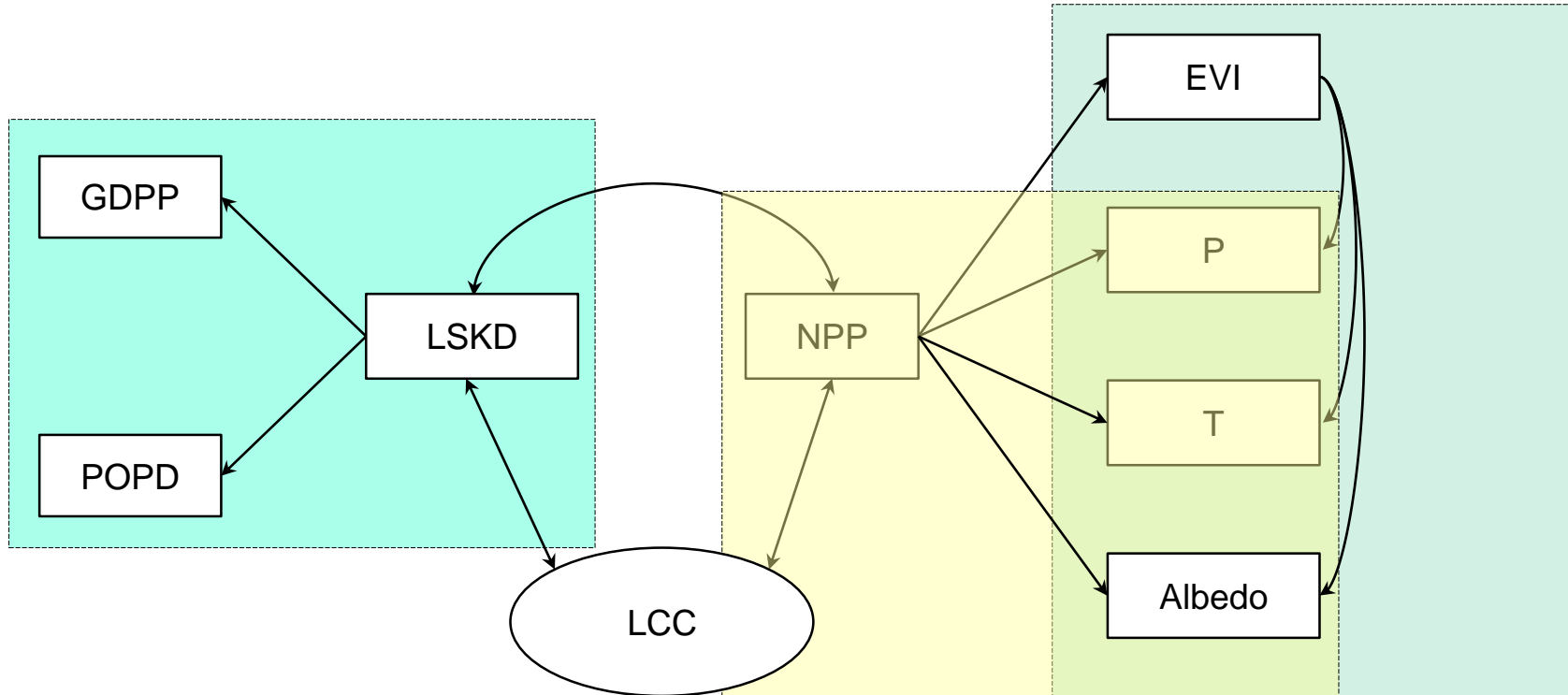
GFG 2001?: Grain for Green

Mongolia

CSU 1991: Collapses of the Soviet Union

Atar 1995: XX

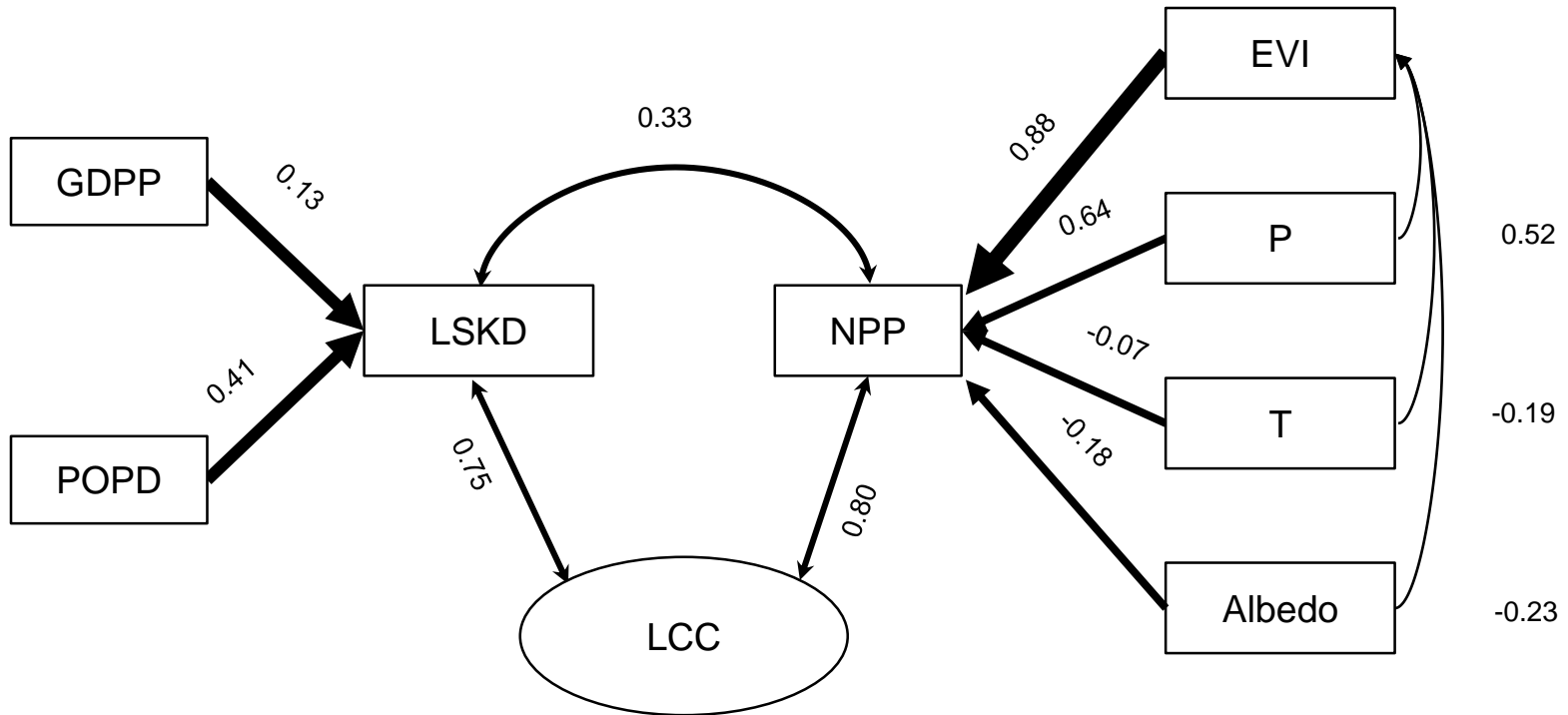
Hypothesis: Structural Equation Modeling (SEM)





Mongolia Plateau

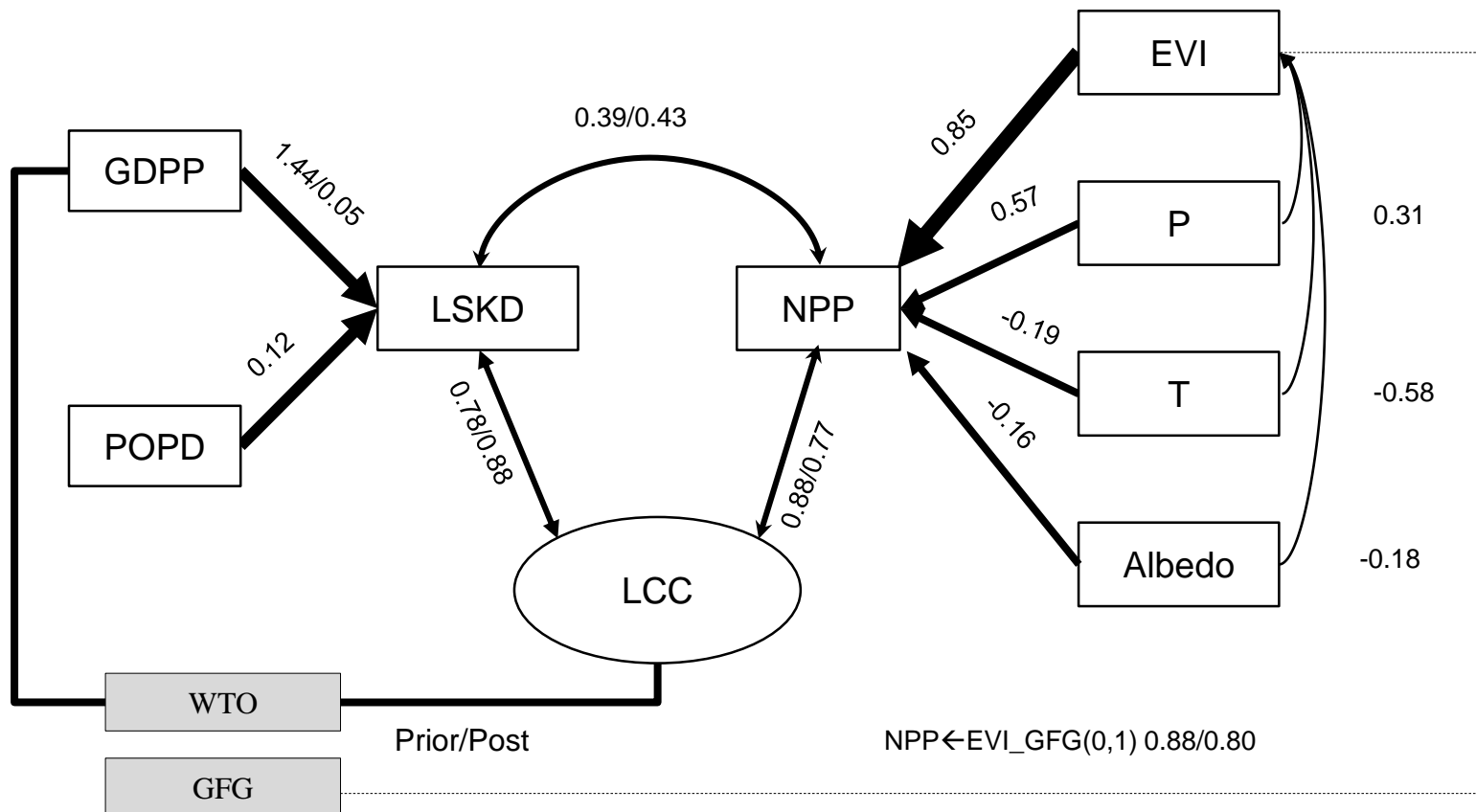
The Structural Equation Modeling of the CNH system





Mongolia Plateau

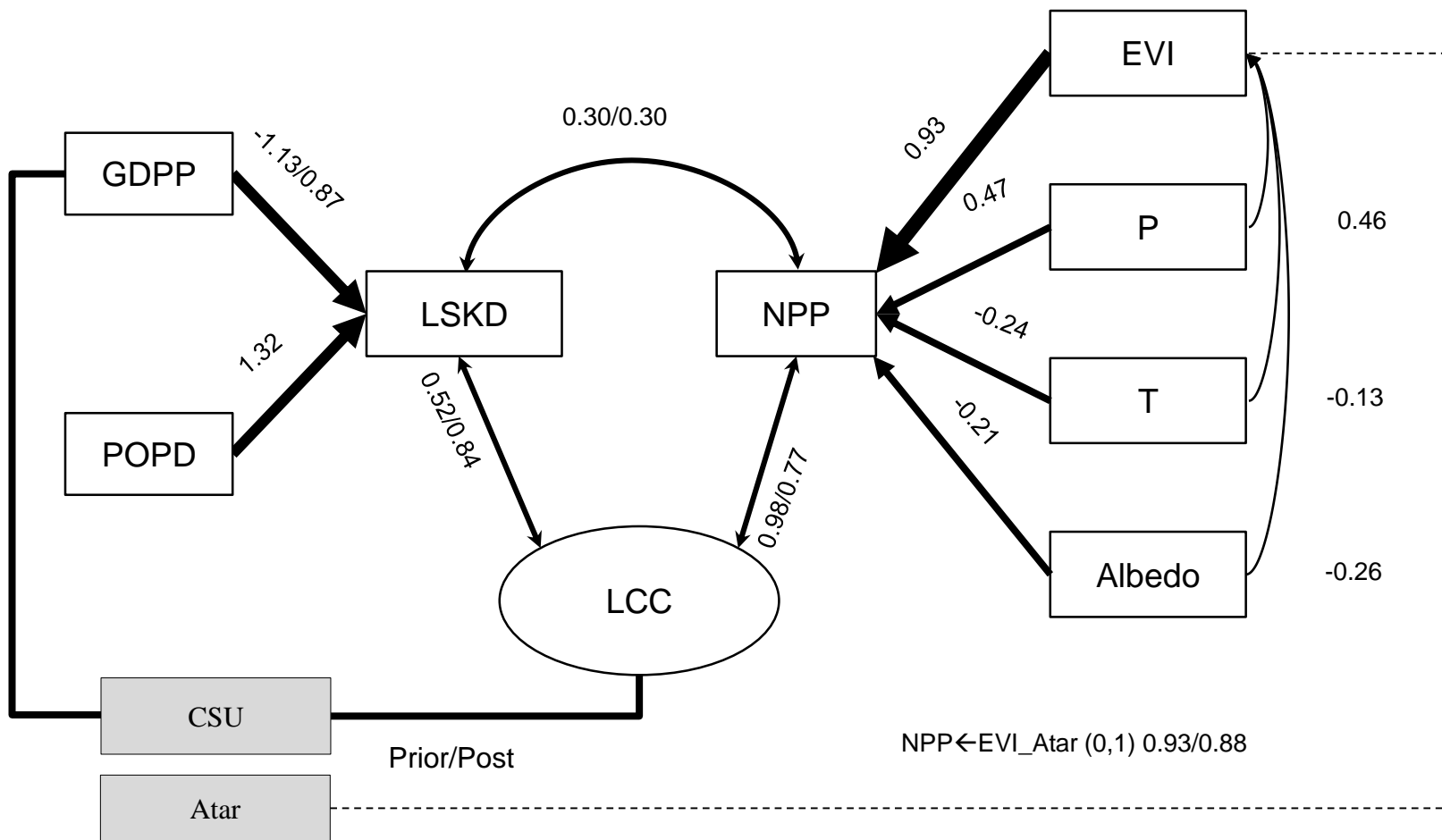
The Structural Equation Modeling of the CNH system





Mongolia Plateau

The Structural Equation Modeling of the CNH system



Take-home Messages

- 1) Human activities far exceeded the climatic effects in both Inner Mongolia and Mongolia, with similar consequences from policy shifts
- 2) Future efforts need to be focused on the coupled influences