



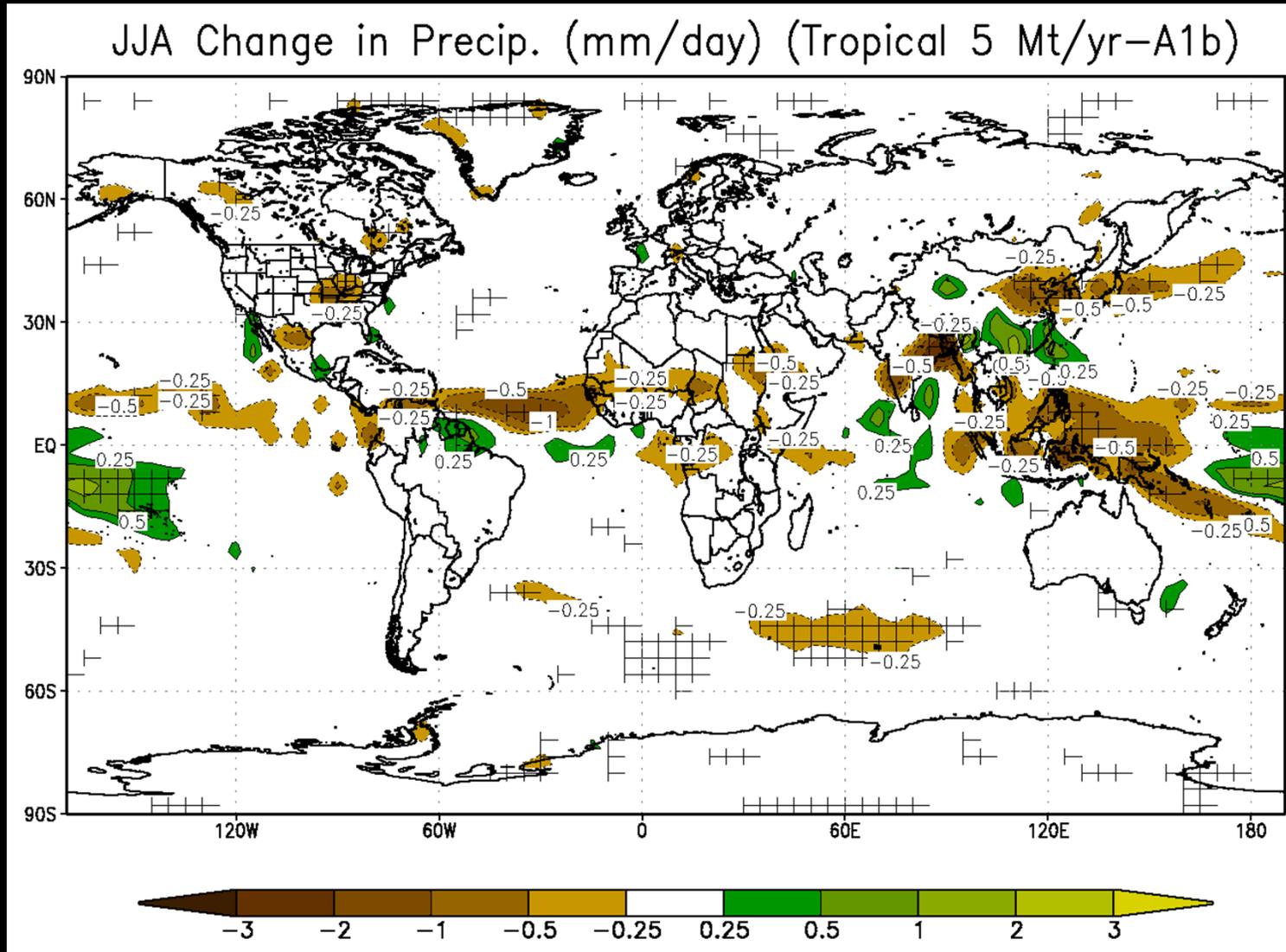
Impacts of Stratospheric Sulfate Geoengineering on Rice in China

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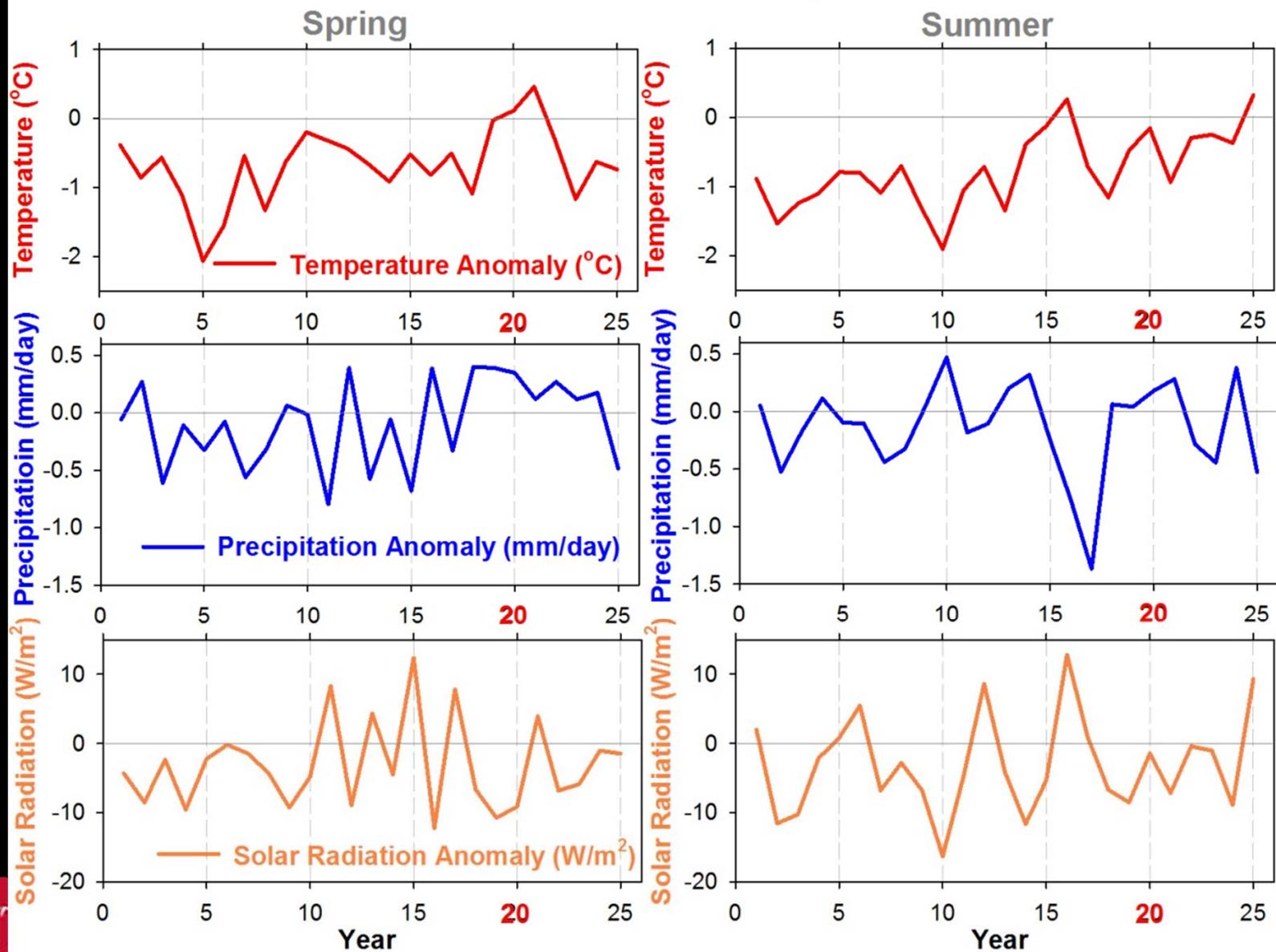
How does stratospheric sulfate geoengineering affect food supply in China?



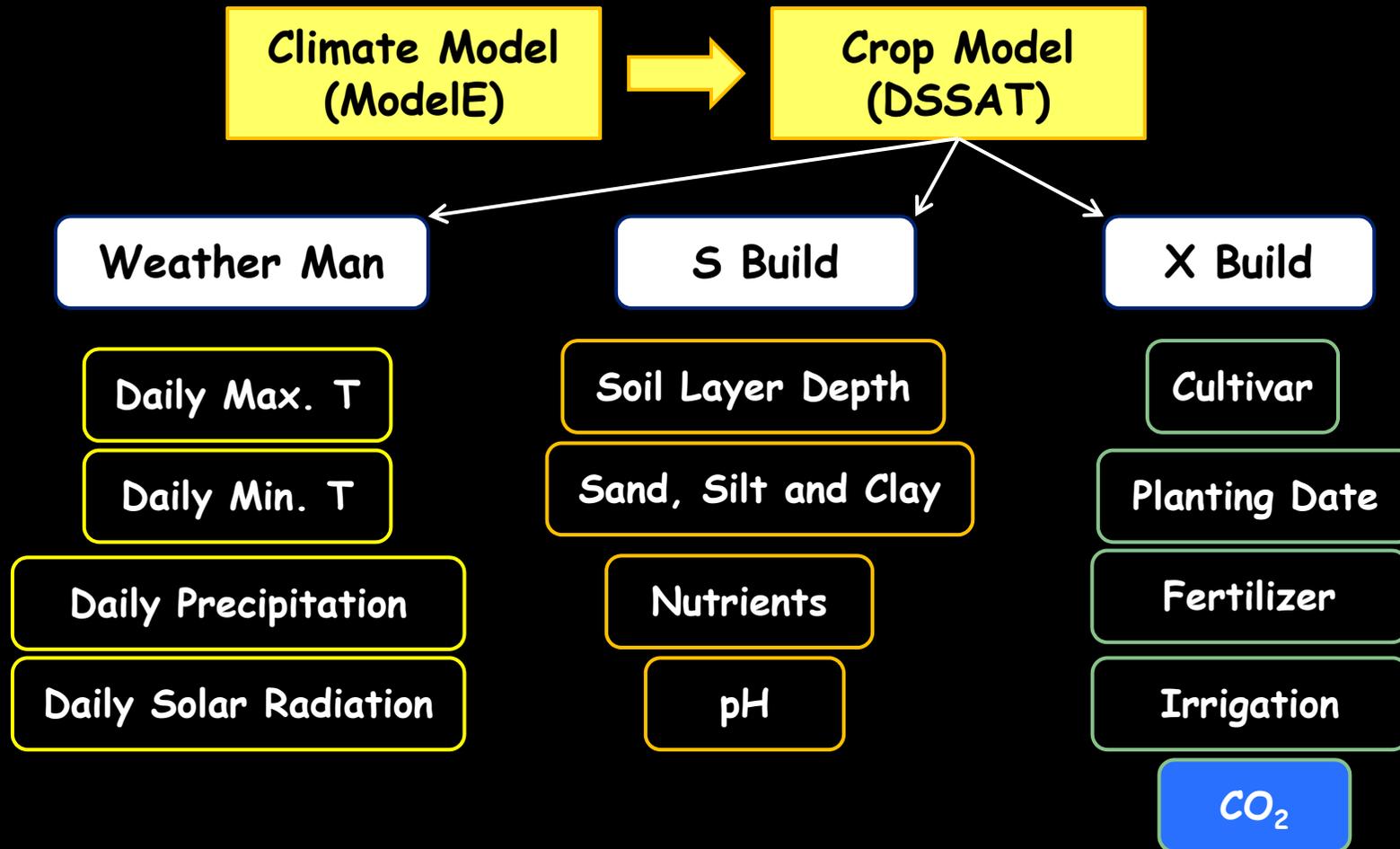
⊞ = significant at the 95% level (Robock et al., 2008)

Climate forcing from Geoengineering in China

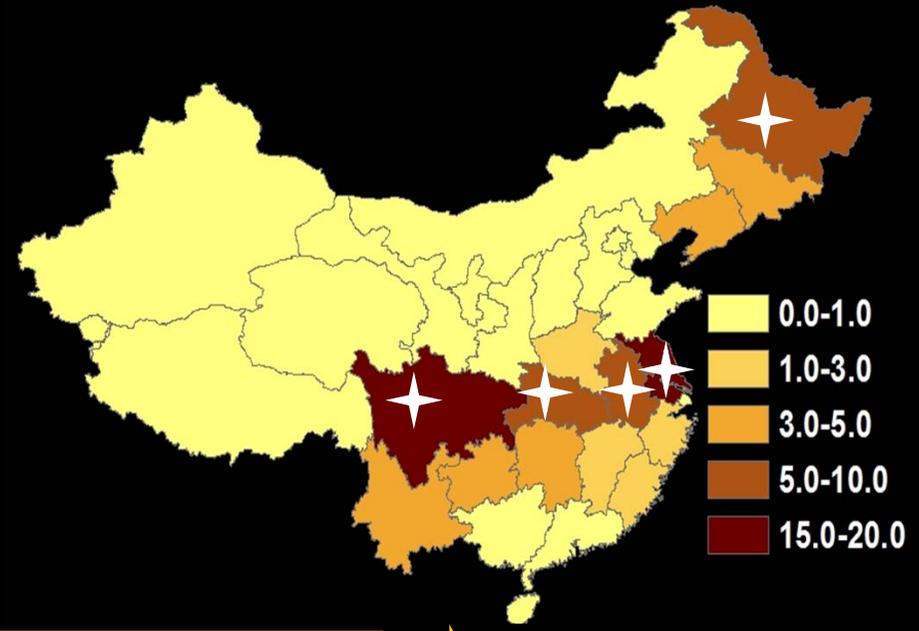
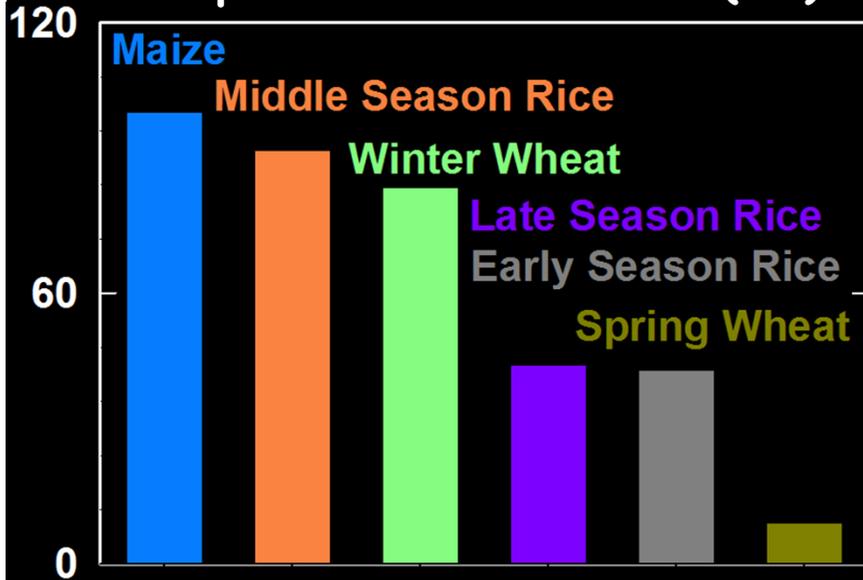
Climate Anomalies (5 Tg-SO₂ - A1B)



How does stratospheric sulfate geoengineering affect food supply in China?



Crop Production in China (Mt)

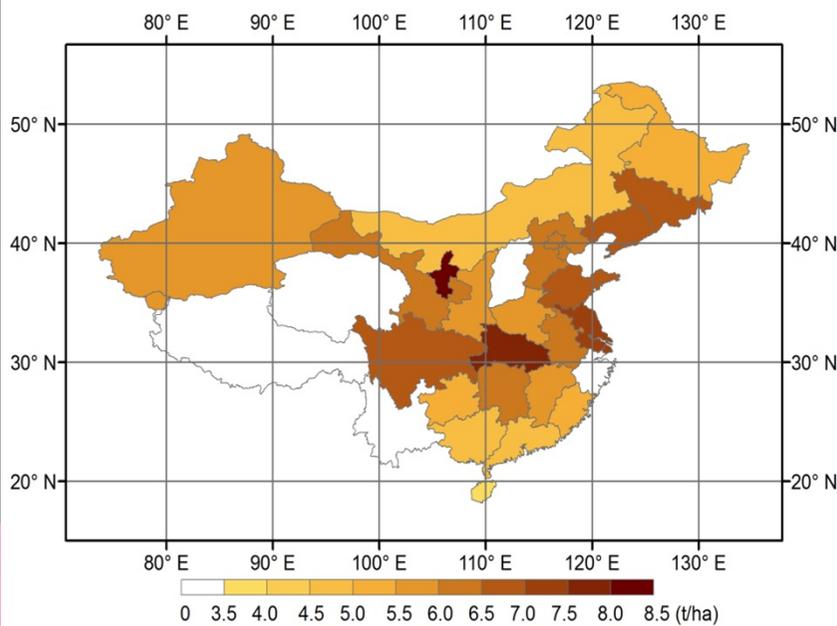


Observations

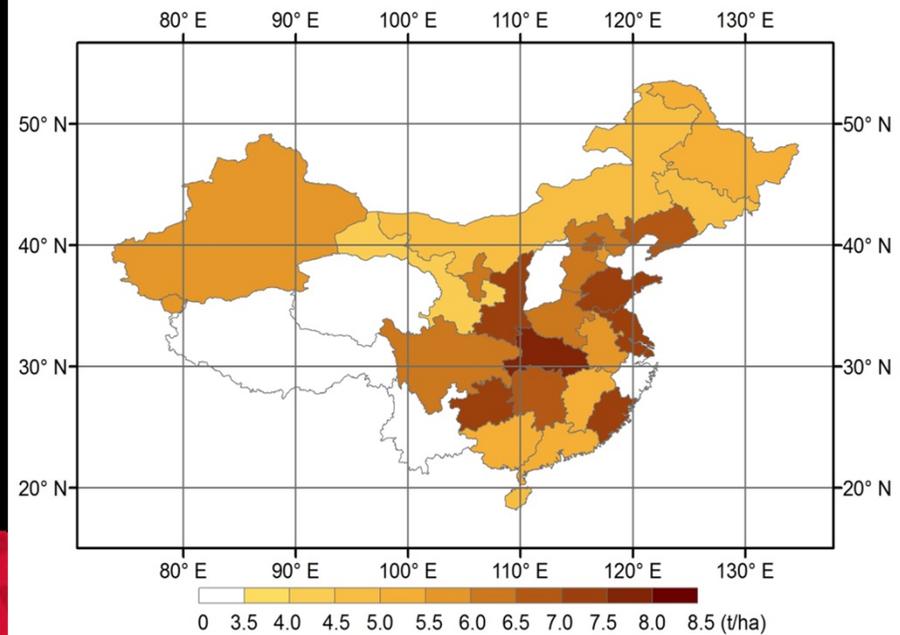
Model Evaluation for Rice

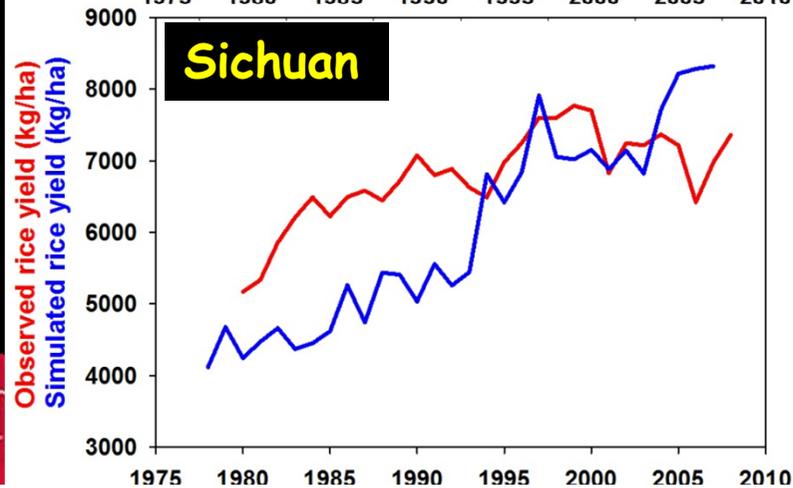
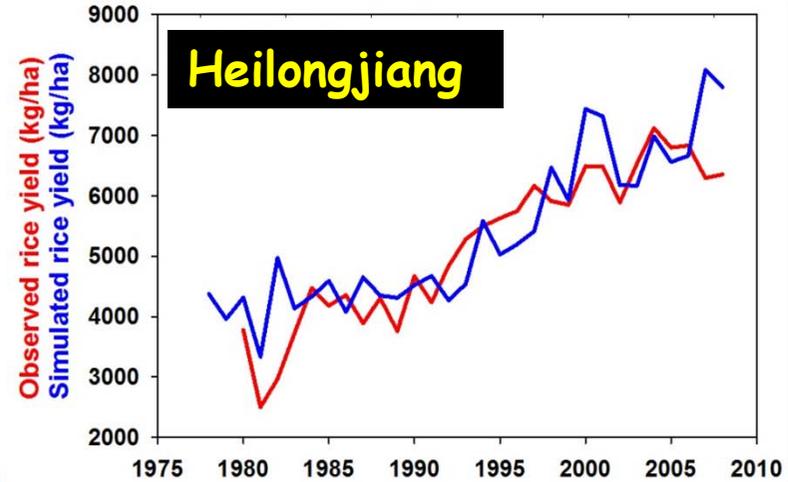
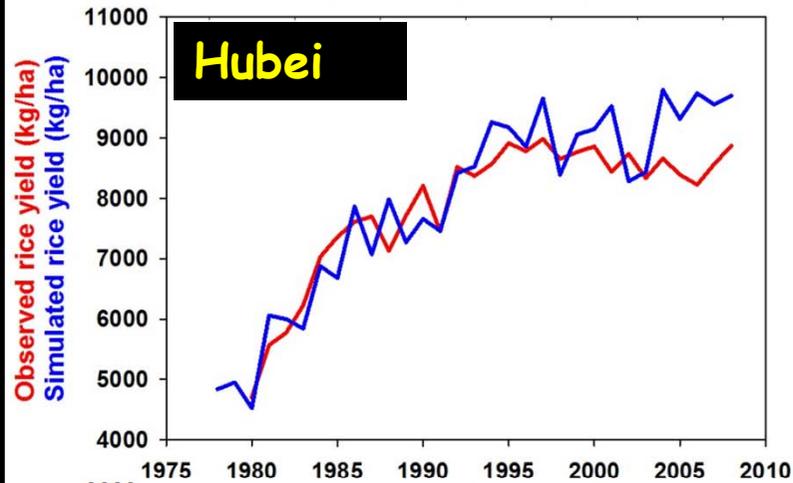
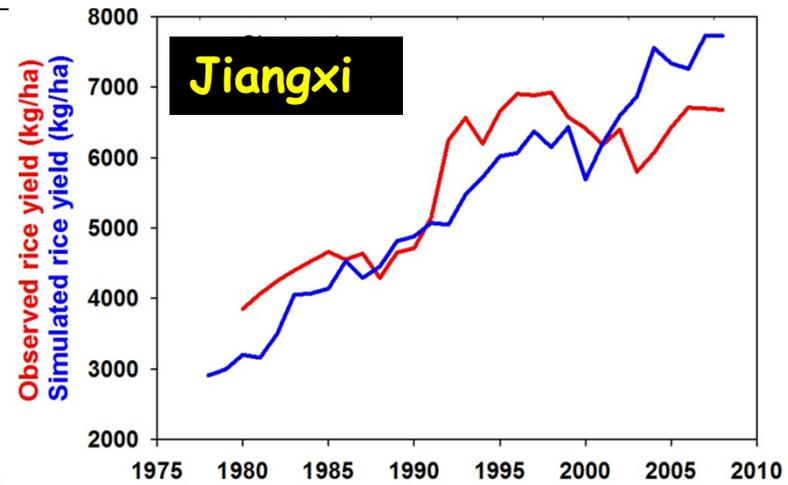
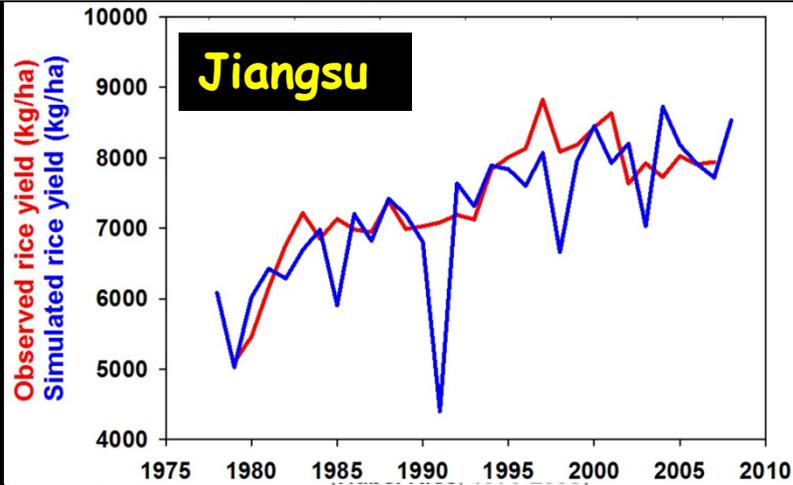
Simulations

Observed Rice Yield (average of 1978-2008) (t/ha)



Simulated Rice Yield (average of 1978-2008) (t/ha)





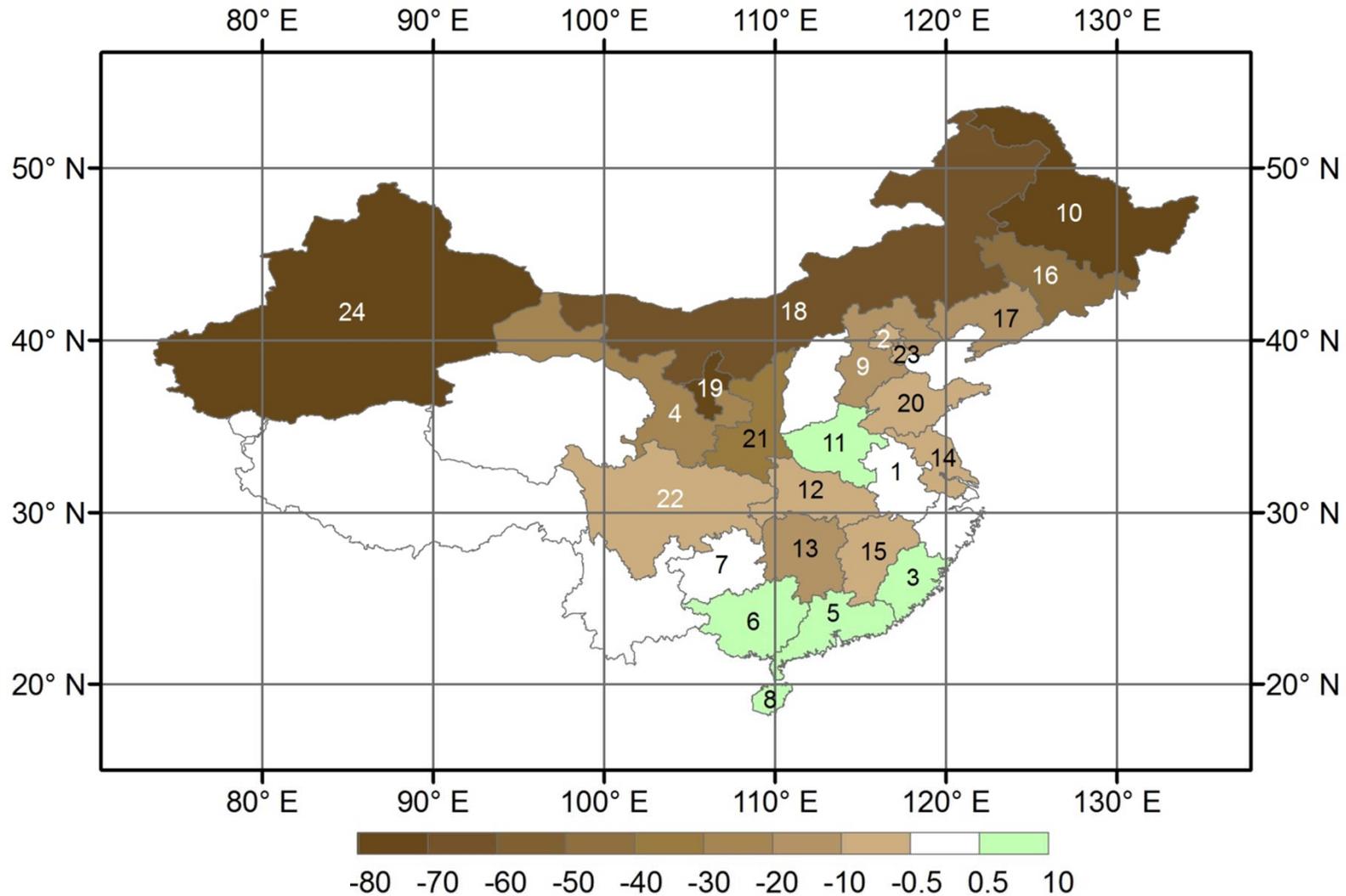
— Observation
— Reported fertilizer & Auto Irrigation

Model Evaluation for Rice

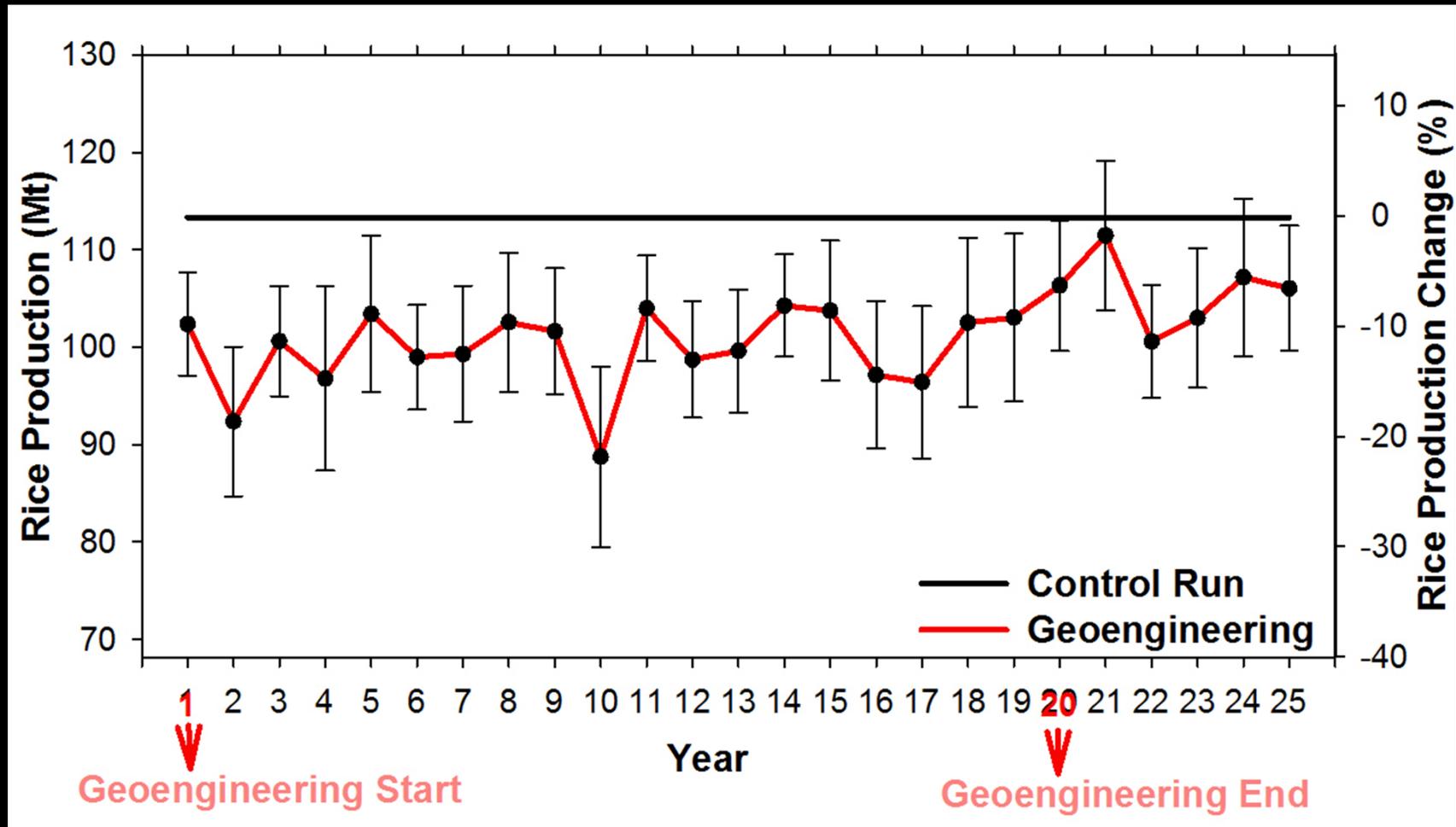
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Rice Yield Change after Geoengineering

Rice Yield Change (%) Average of the 2nd 10-year of geoengineering

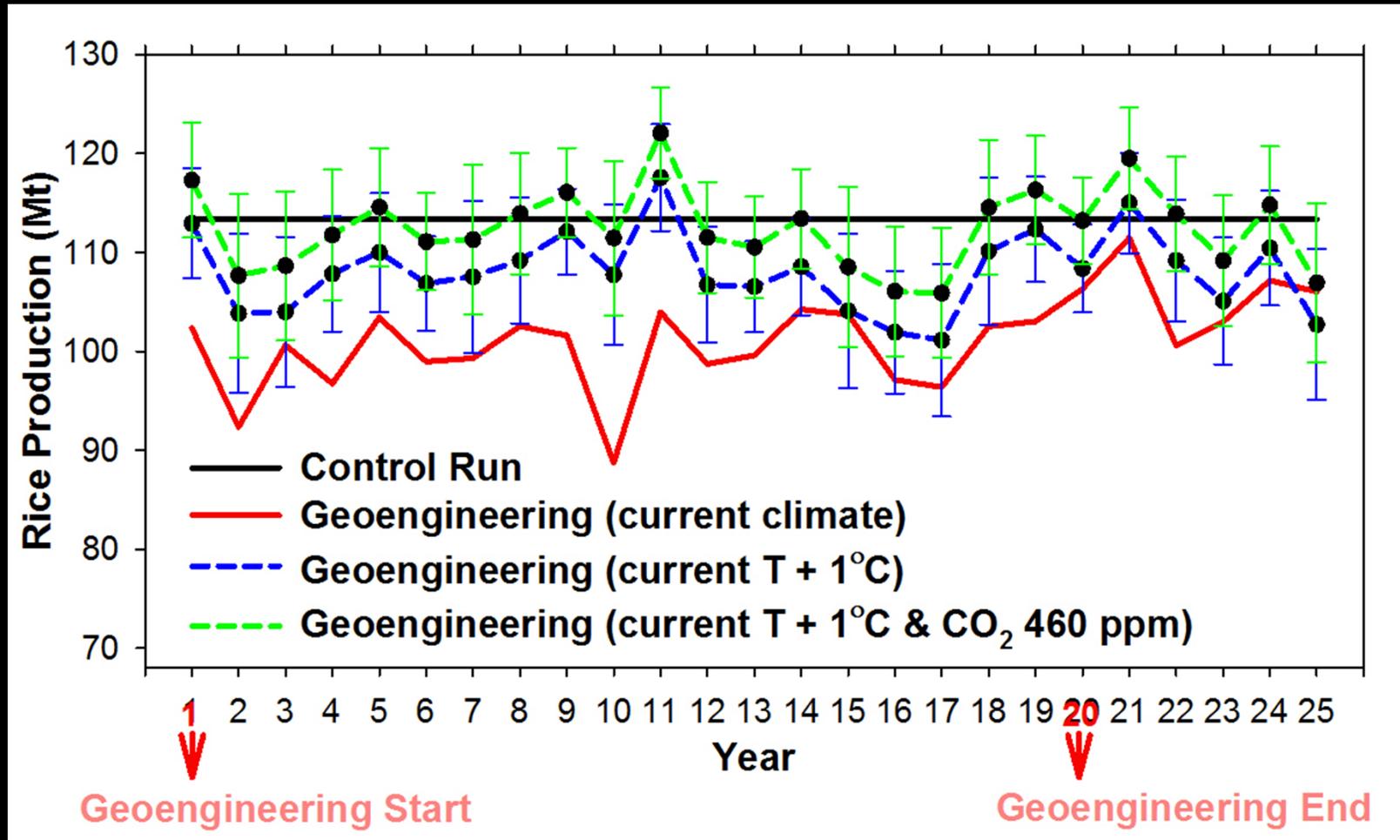


Rice Production Change after Geoengineering

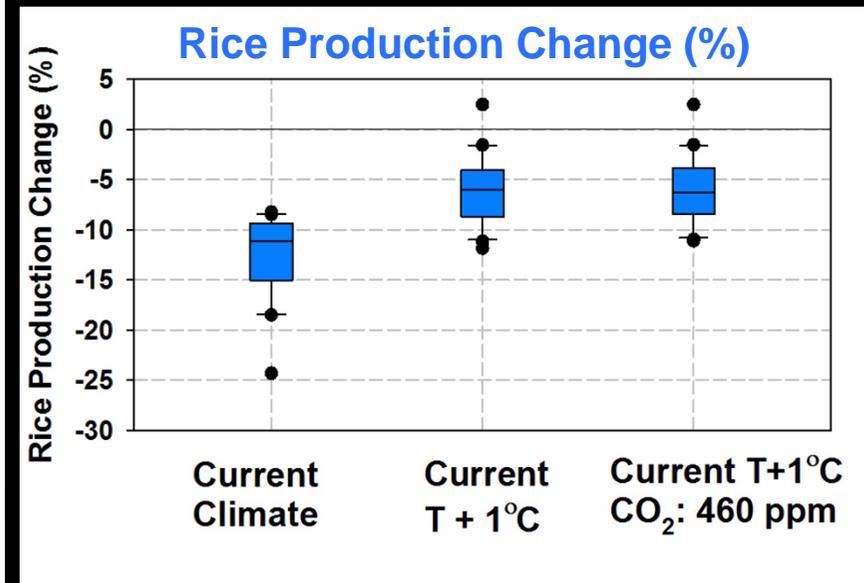
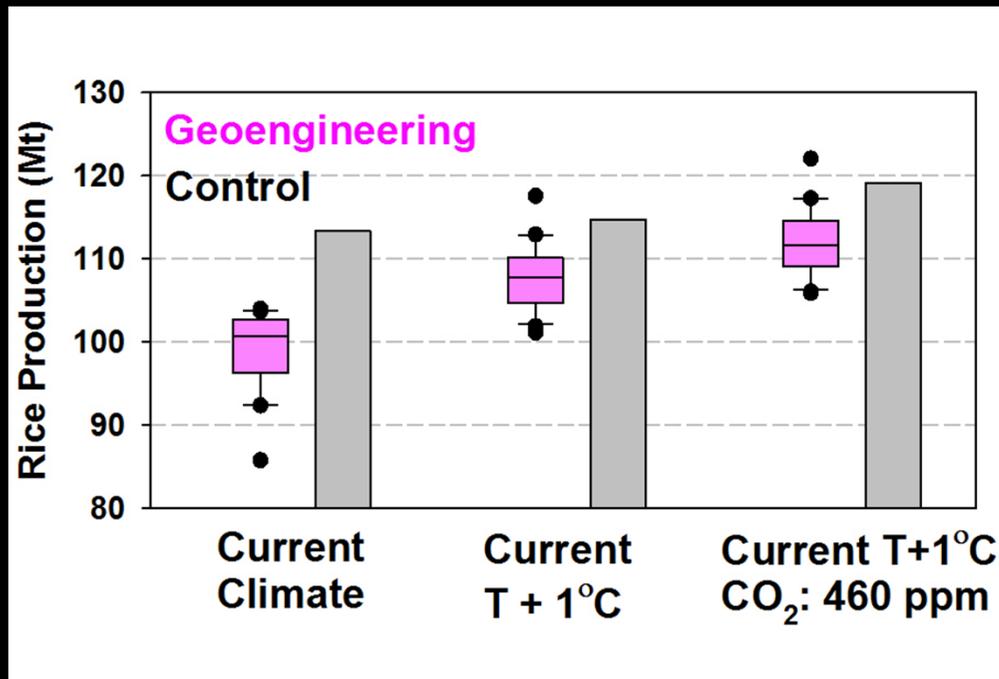


Will Geoengineering decrease rice production in China?

- Depends on when we start geoengineering



In a 1 °C warmer world,
geoengineering decreases rice production 50% less.



Preliminary results:

For one climate model and one crop model:

1. Geoengineering under current climate, rice production in China decreased $11\pm 3\%$ (13 ± 4 Mt) in response to a 5 Tg SO_2 per year stratospheric injection.
2. In a 1°C warmer world, the same geoengineering decreases rice production in China 50% less.