

# Mechanisms and Pathways for Modeling the Impacts of Chronic and slow-onset Events on Human Migration:

Climate variability, observations, and perceptions

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HEGS 2049657



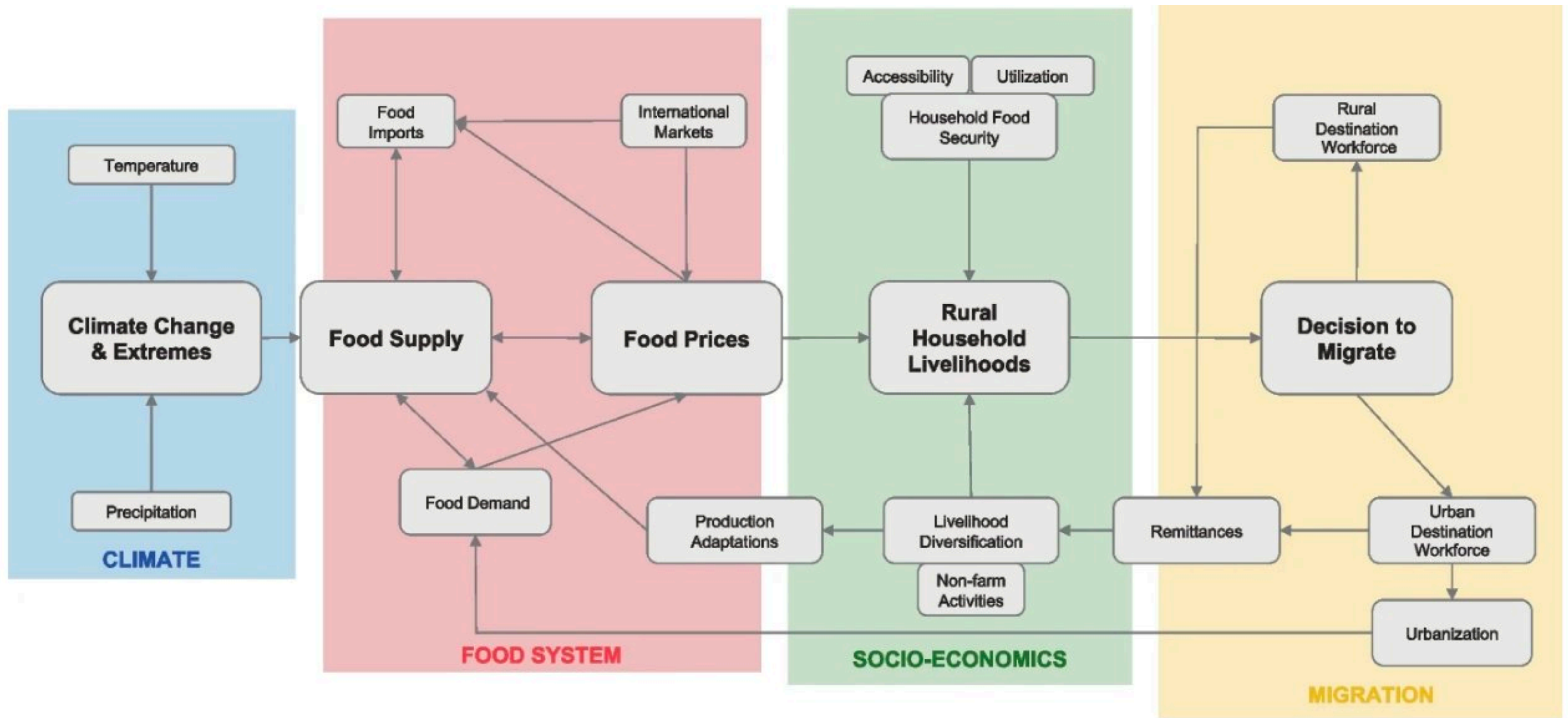


Talia Anderson  
Ph.D. candidate (May 2024)

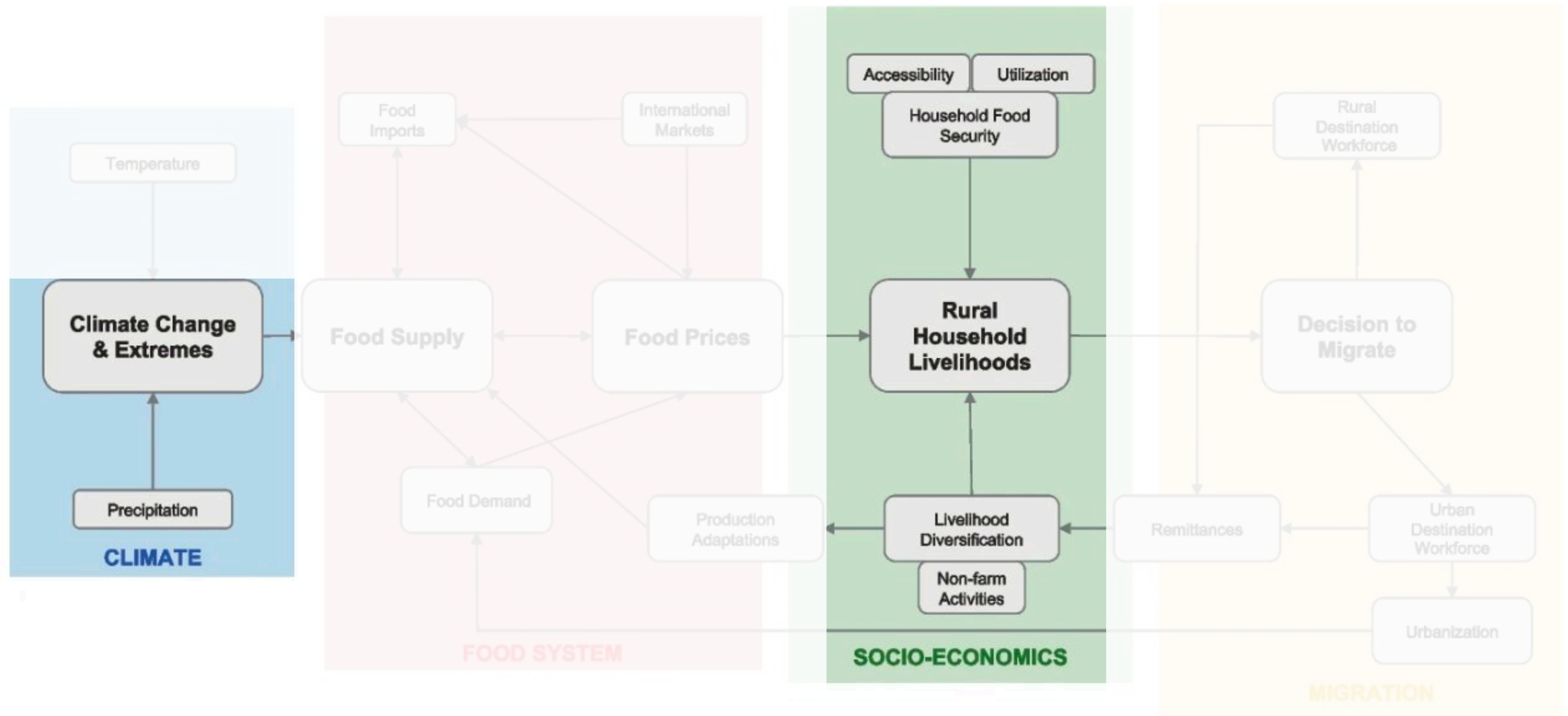


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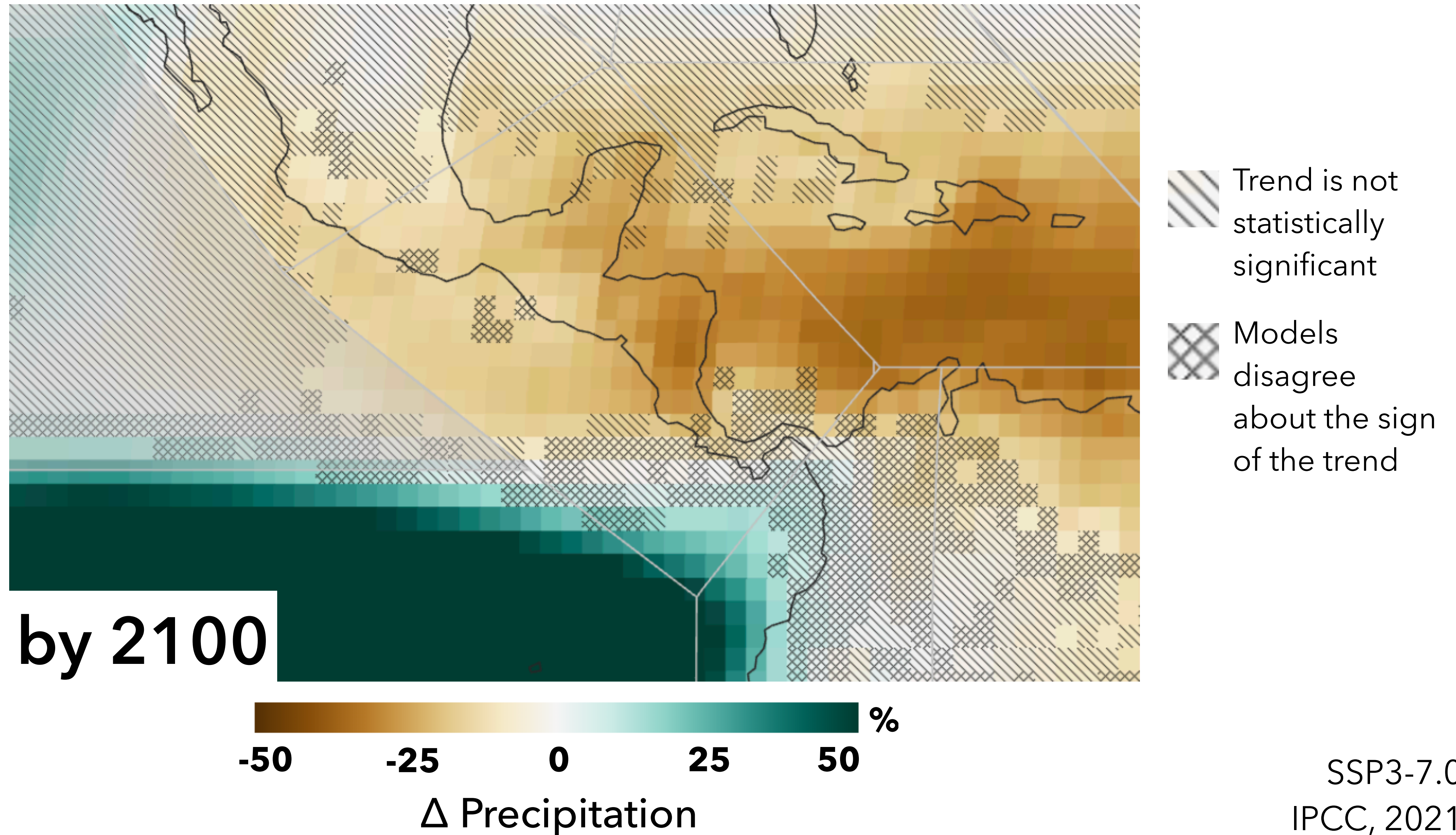
USA

MEXICO

CENTRAL AMERICAN  
DRY CORRIDOR

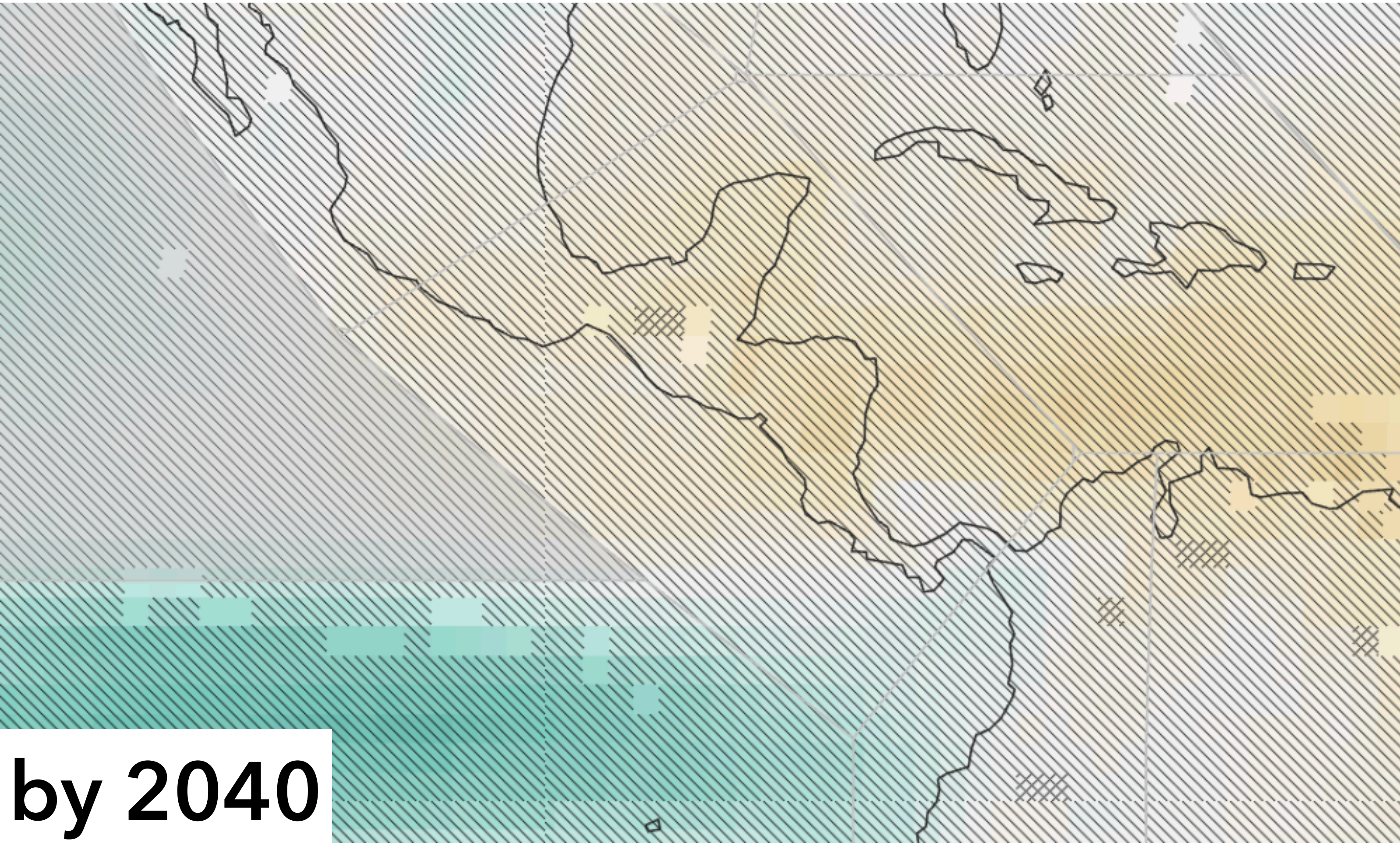


# Hotspot for expected future drying





In the coming decades, **the drying signal in Central America is projected to be smaller than natural variability** even under a high emissions scenario



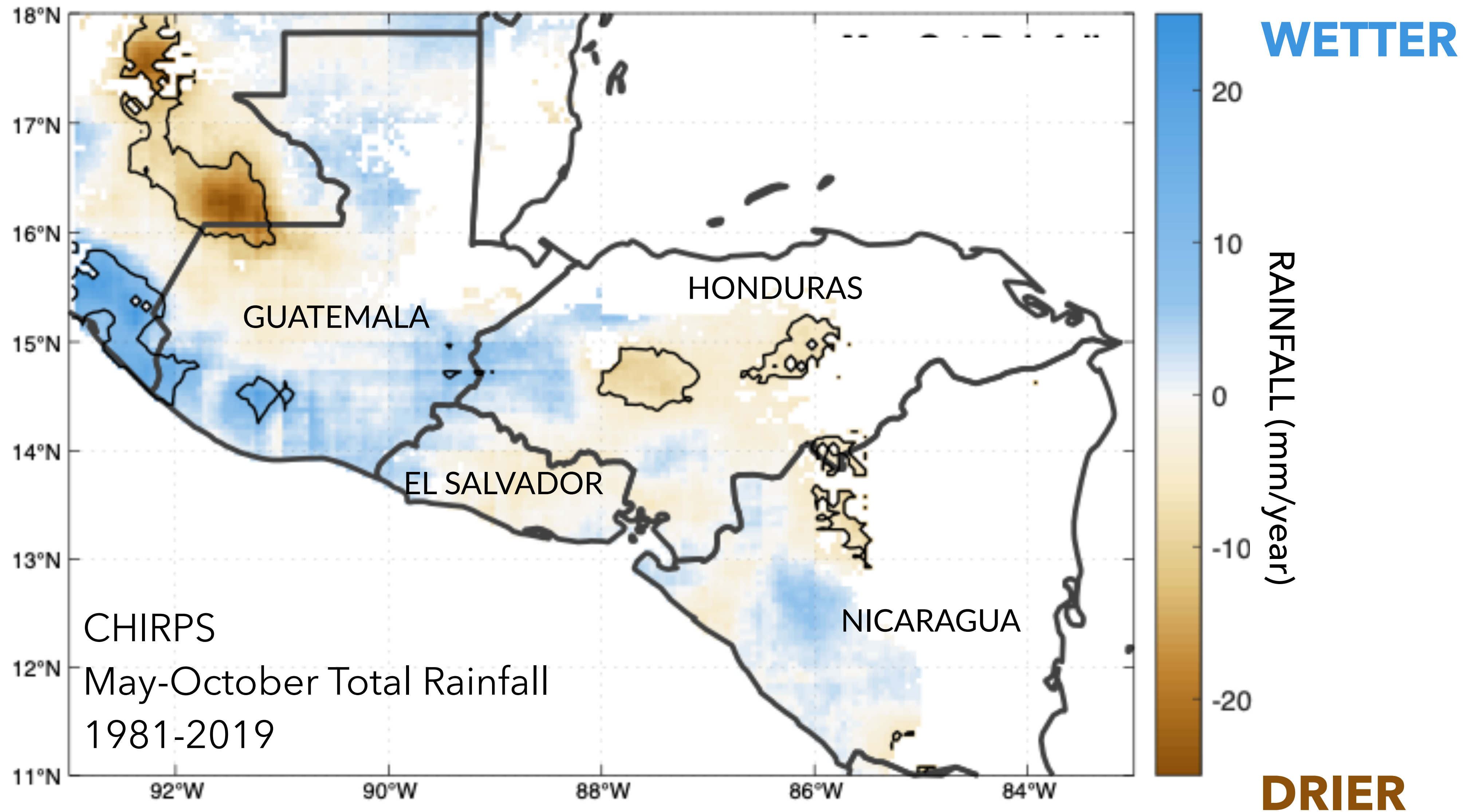
by 2040



-  Trend is not statistically significant
-  Models disagree about the sign of the trend

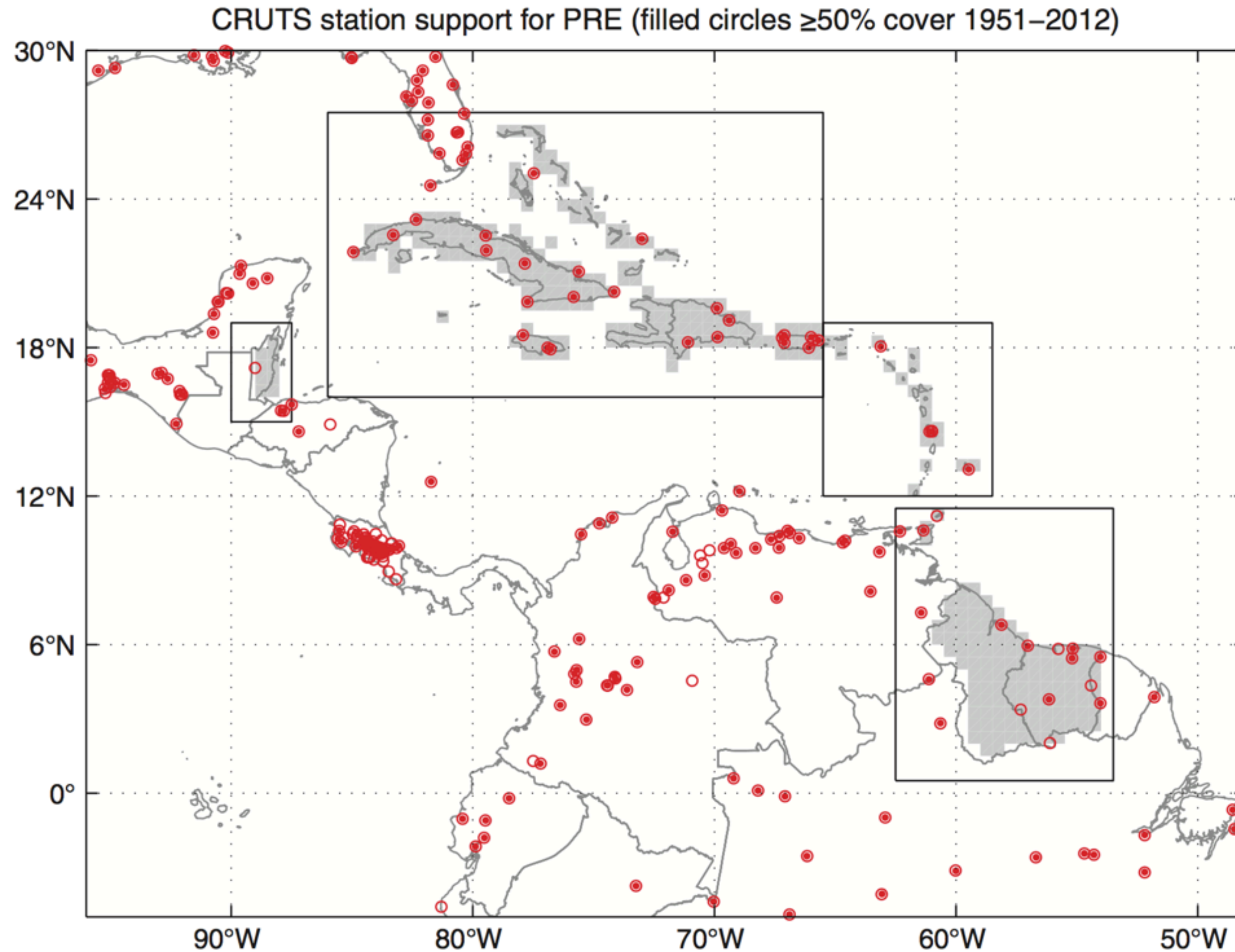


# Current trends in rainfall are uncertain



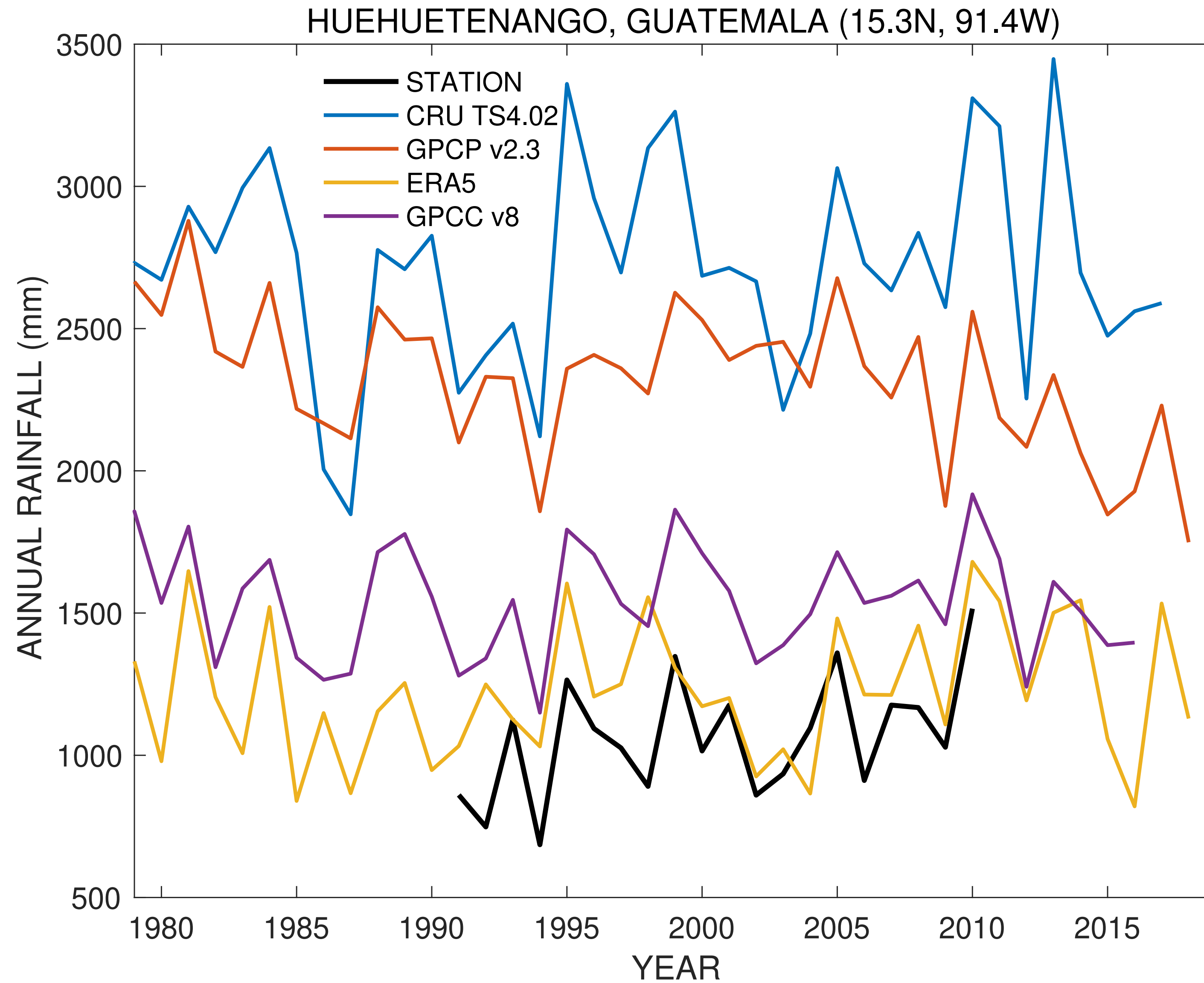


# Short, sparse precipitation data





# 'Observed' in rainfall very uncertain



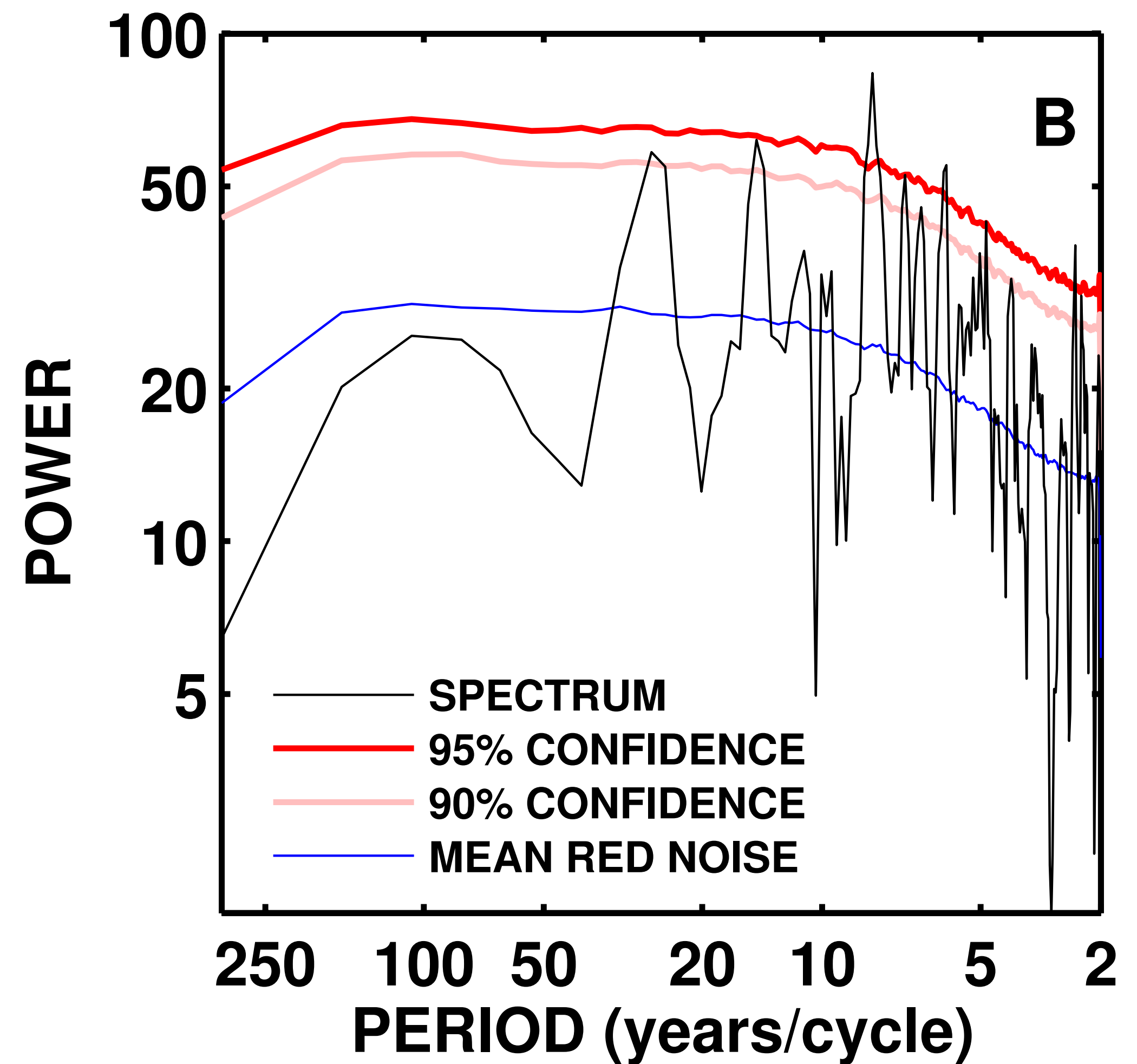
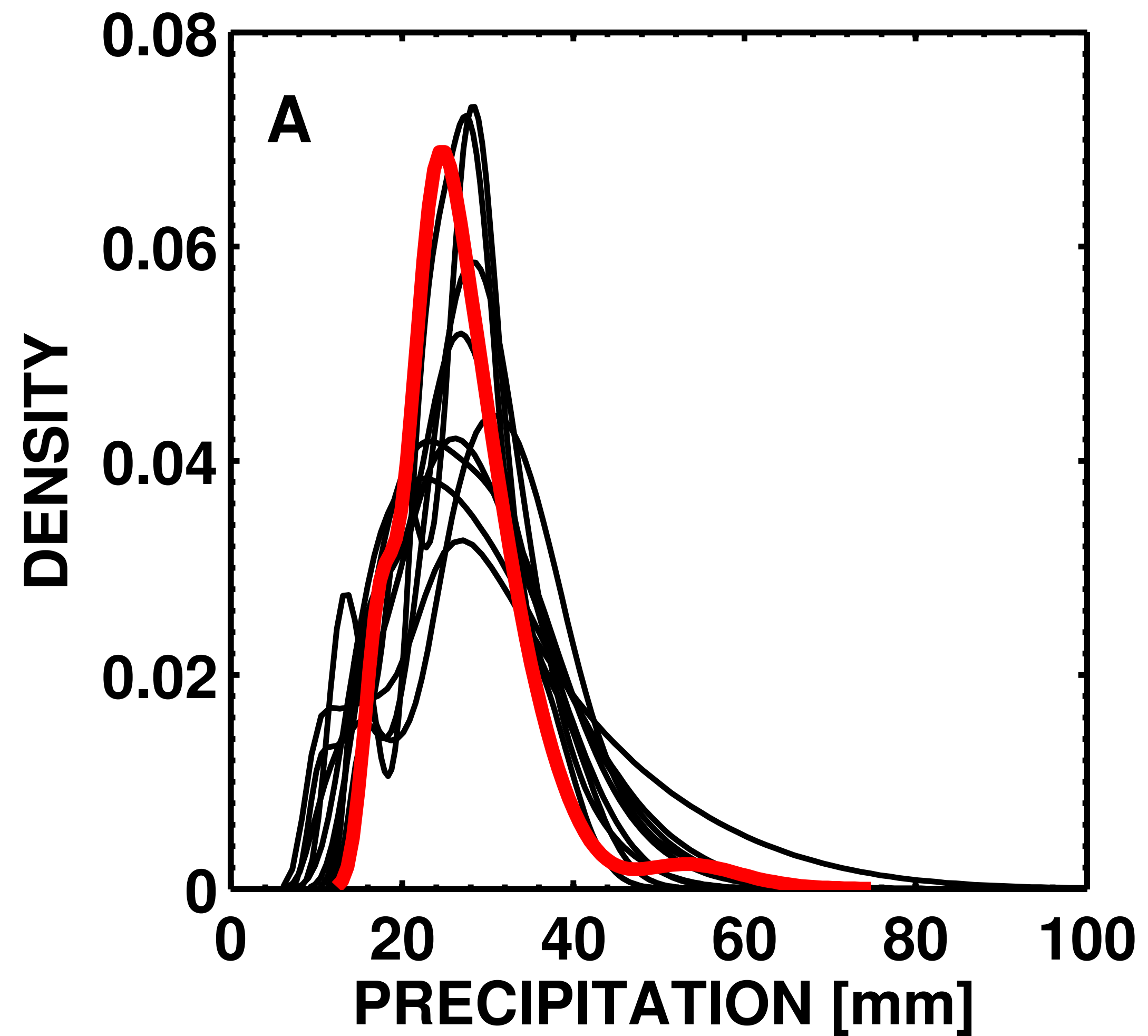


# Natural variability and persistent vulnerability

‘ ‘The drought of 1915-1916 ...  
dried streams and springs, made  
farming impossible, and drove  
many campesinos to eat banana  
roots and seek water, charity, and  
wages throughout the region’ ’

Brent Metz, *Ch'orti'-Maya Survival in Eastern Guatemala: Indigeneity in Transition*,  
University of New Mexico Press, 2006





Substantial natural variability in rainfall across and  
range of time scales



# Fifth Straight Year of Central American Drought Helping Drive Migration

By Jeff Masters on December 23, 2019

## Climate change is the overlooked driver of Central American migration

Living on Earth

February 06, 2019 · 12:45 PM EST

Writer **Adam Wernick**



## HOW CLIMATE CHANGE IS FUELLING THE U.S. BORDER CRISIS

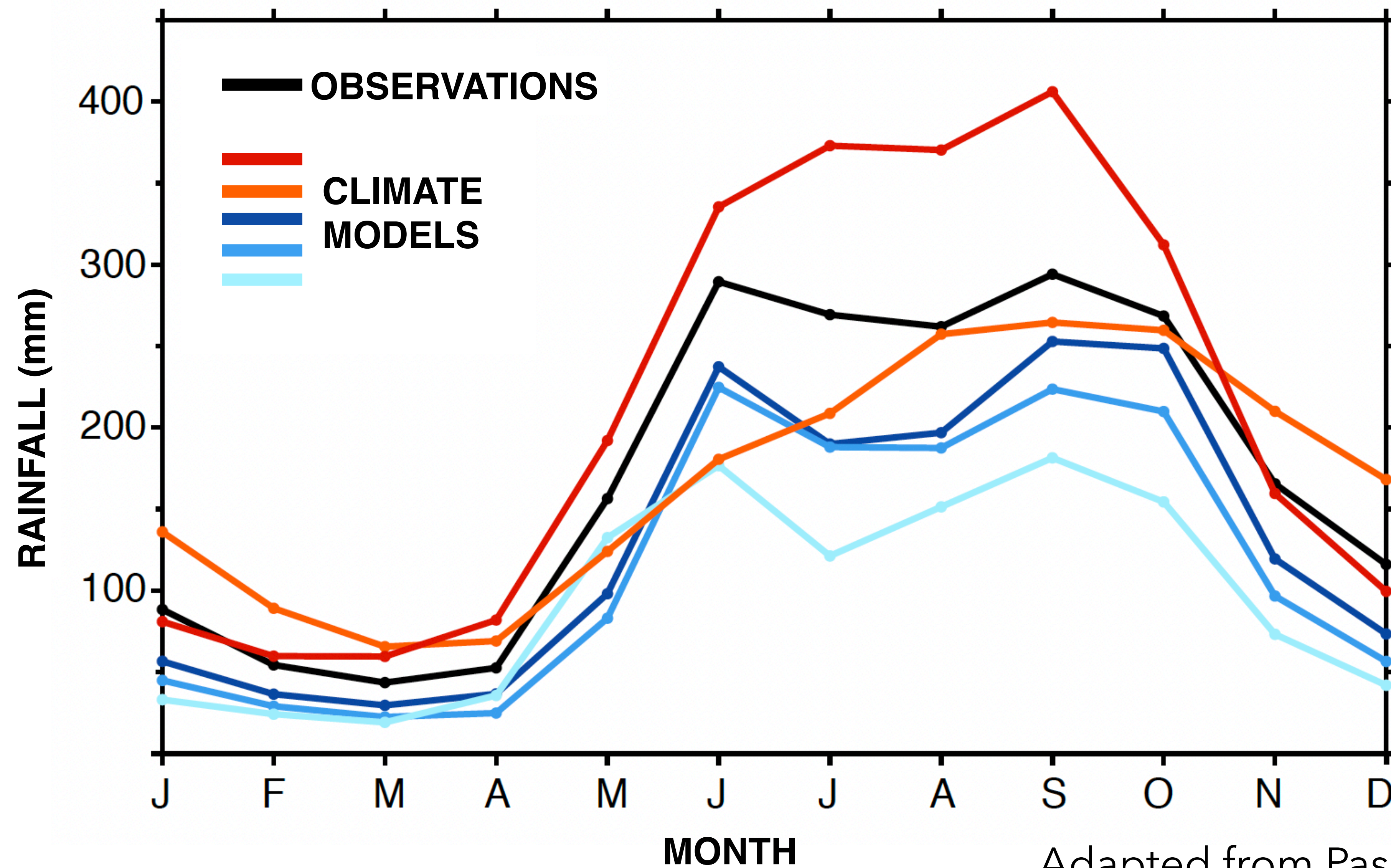
*In the western highlands of Guatemala, the question is no longer whether someone will leave but when.*

By Jonathan Blitzer  
Photography by Mauricio Lima

April 3, 2019



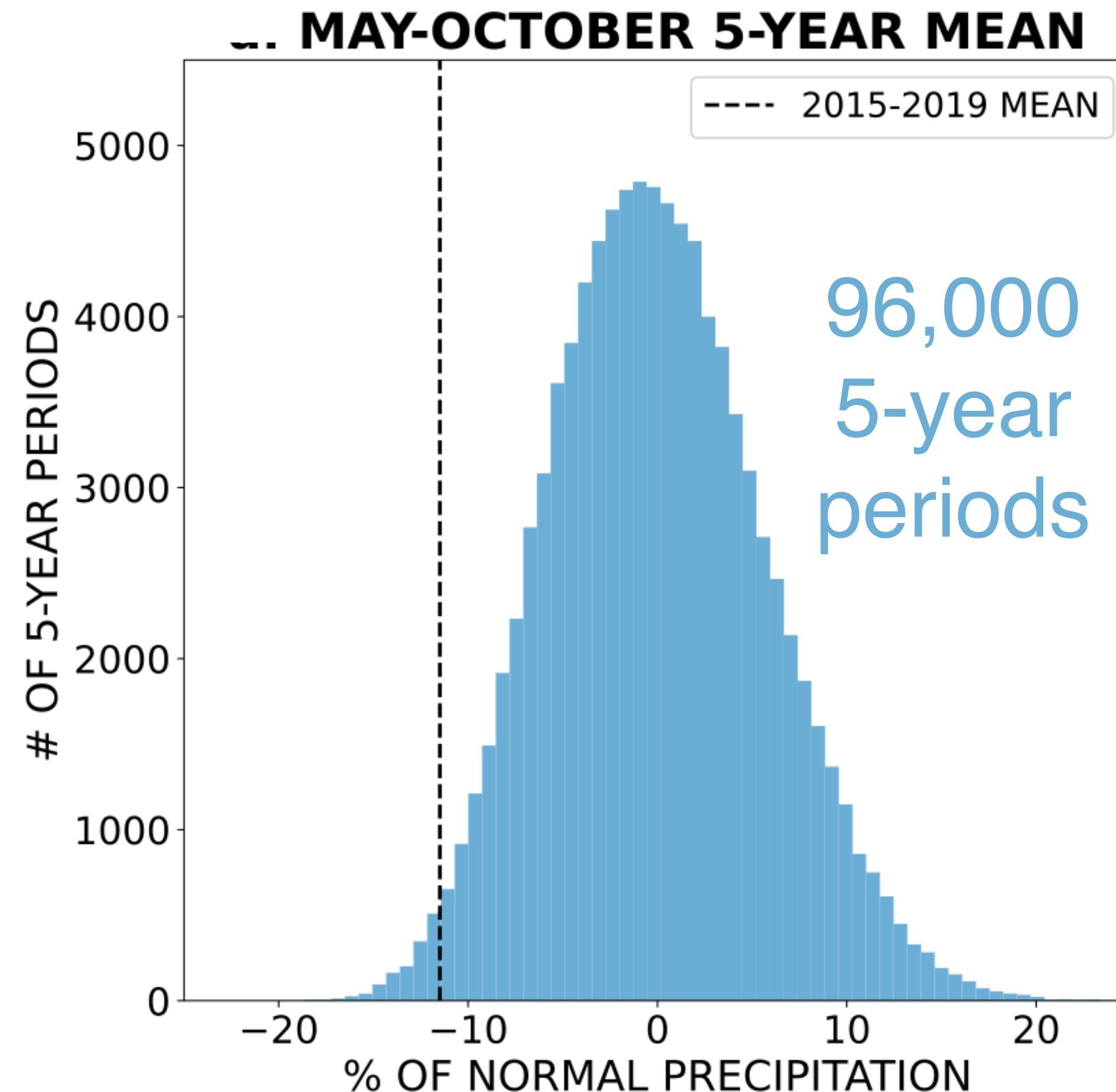
# Climate models struggle to represent Central American precipitation



Adapted from Pascale et al., 2021



5-year deficit was **very severe, but not impossible**  
for natural climate variability alone



Anderson et al., 2023





Why do we care  
about perceptions?





# Why do we care about perceptions?

Inaccurate perceptions can lead to maladaptive choices (*Rao et al., 2011; Niles & Mueller, 2016; Waldman et al., 2019*)





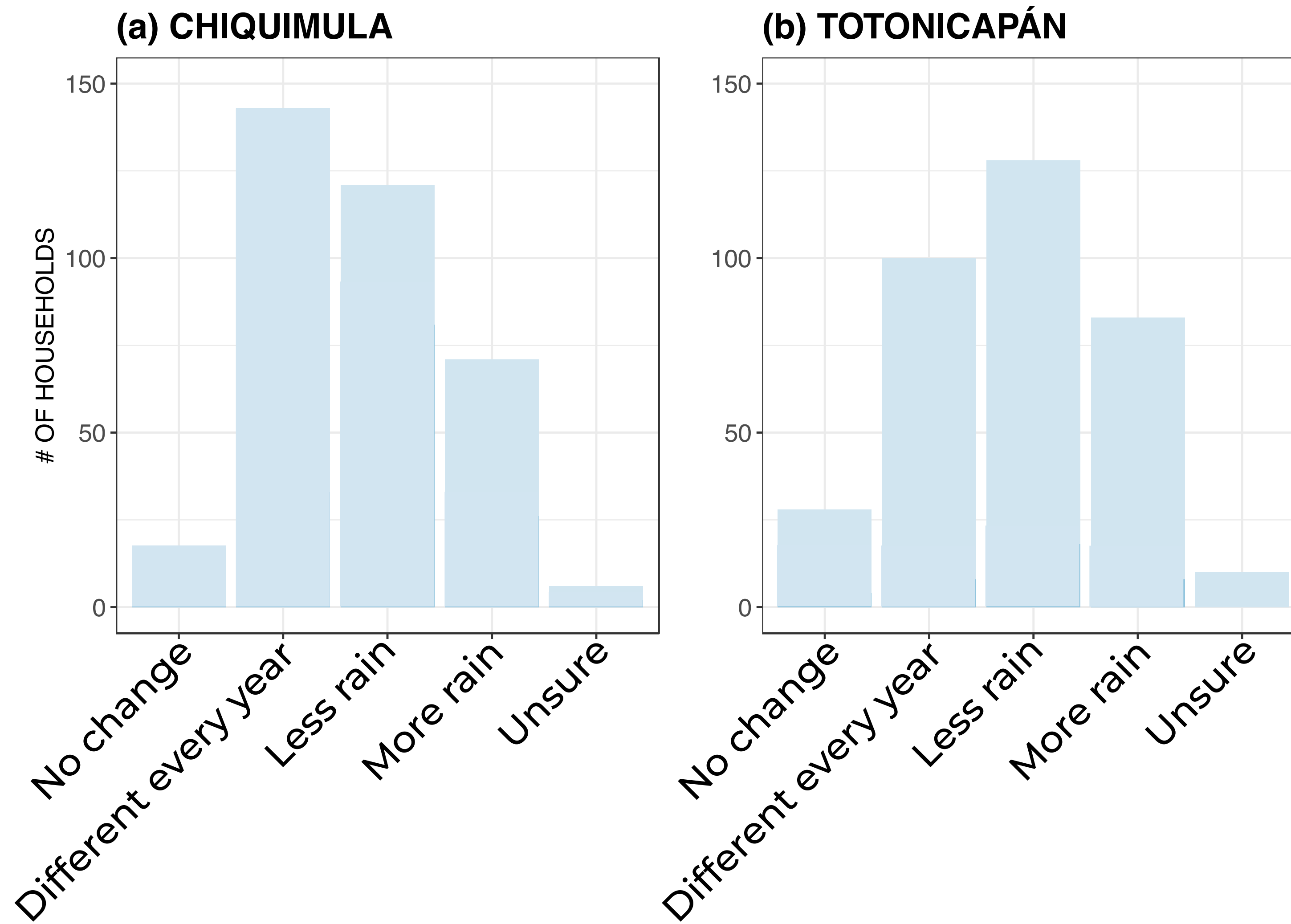
# Why do we care about perceptions?

Inaccurate perceptions can lead to maladaptive choices (*Rao et al., 2011; Niles & Mueller, 2016; Waldman et al., 2019*)

Disregarding perceptions and local knowledge might lead to rejection of potentially usable climate information (*Lemos & Dilling, 2007; Tucker et al., 2010; Eakin et al., 2014*)

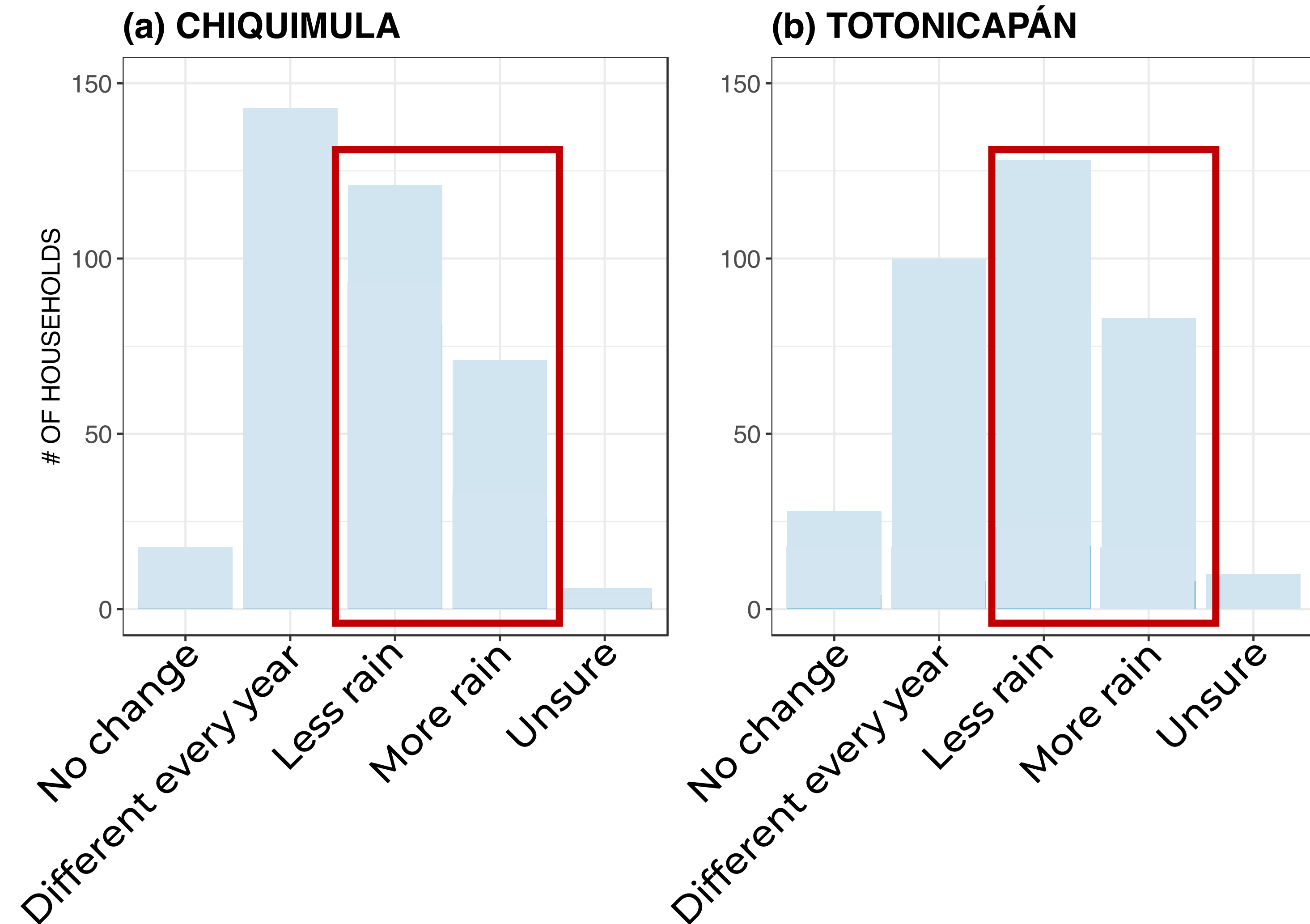


# Farmers' observations of rainfall change over the last decade are widely variable



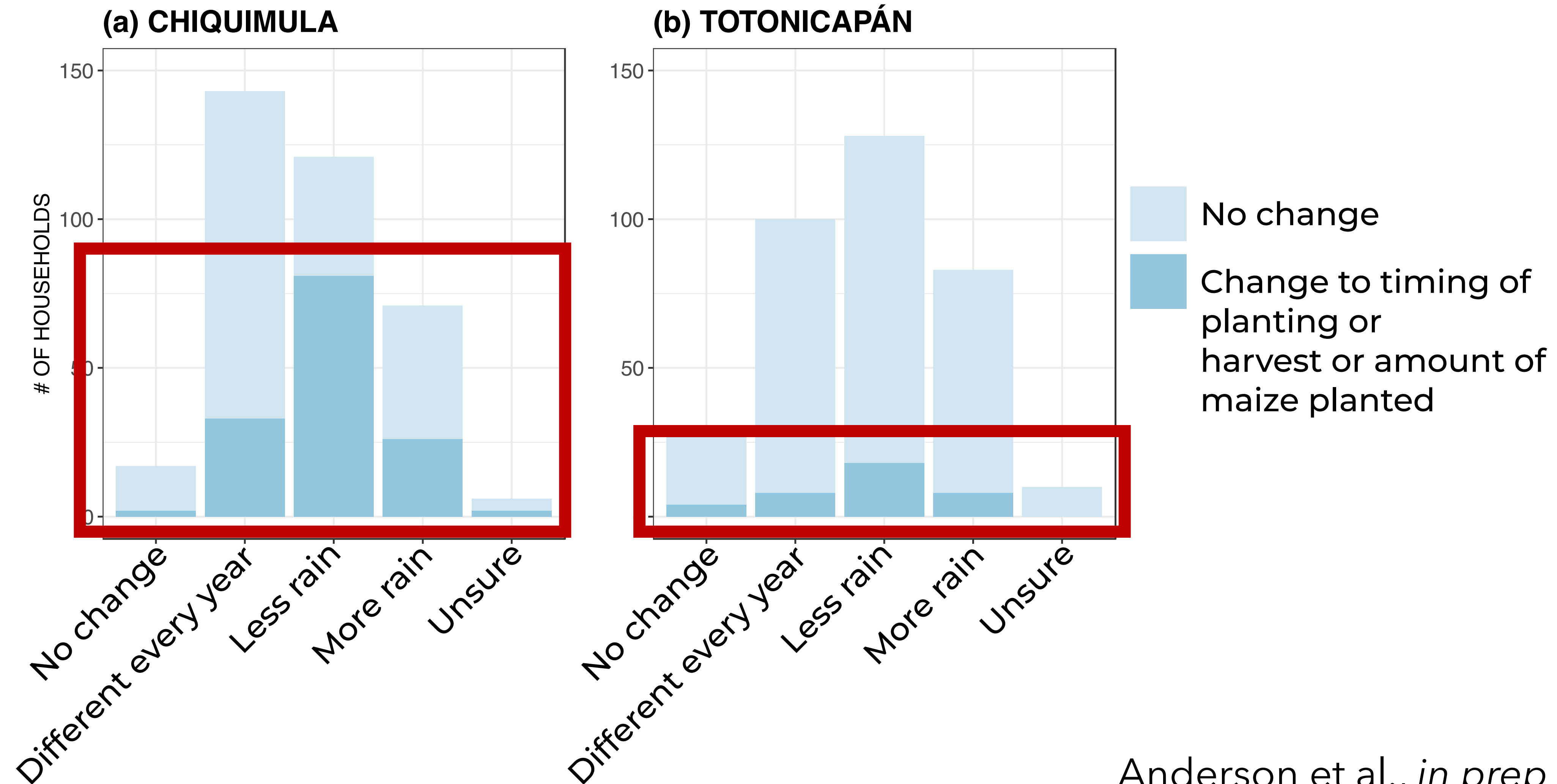


# Farmers' reported observations of rainfall change over the last decade are widely variable

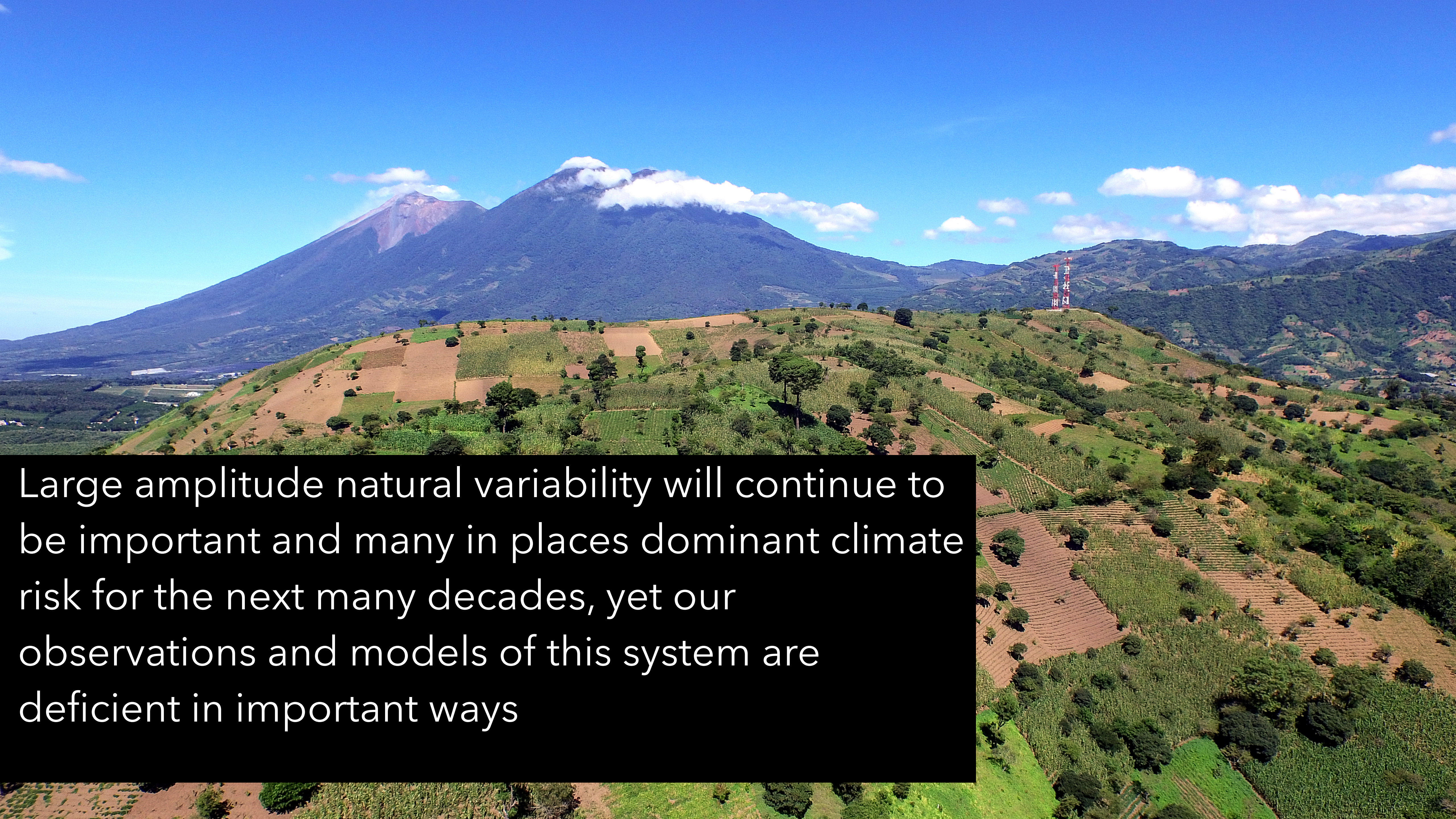




# Adaptation response to perceived changes in rainfall over the last 10 years are vary between communities, linked to non-farm income

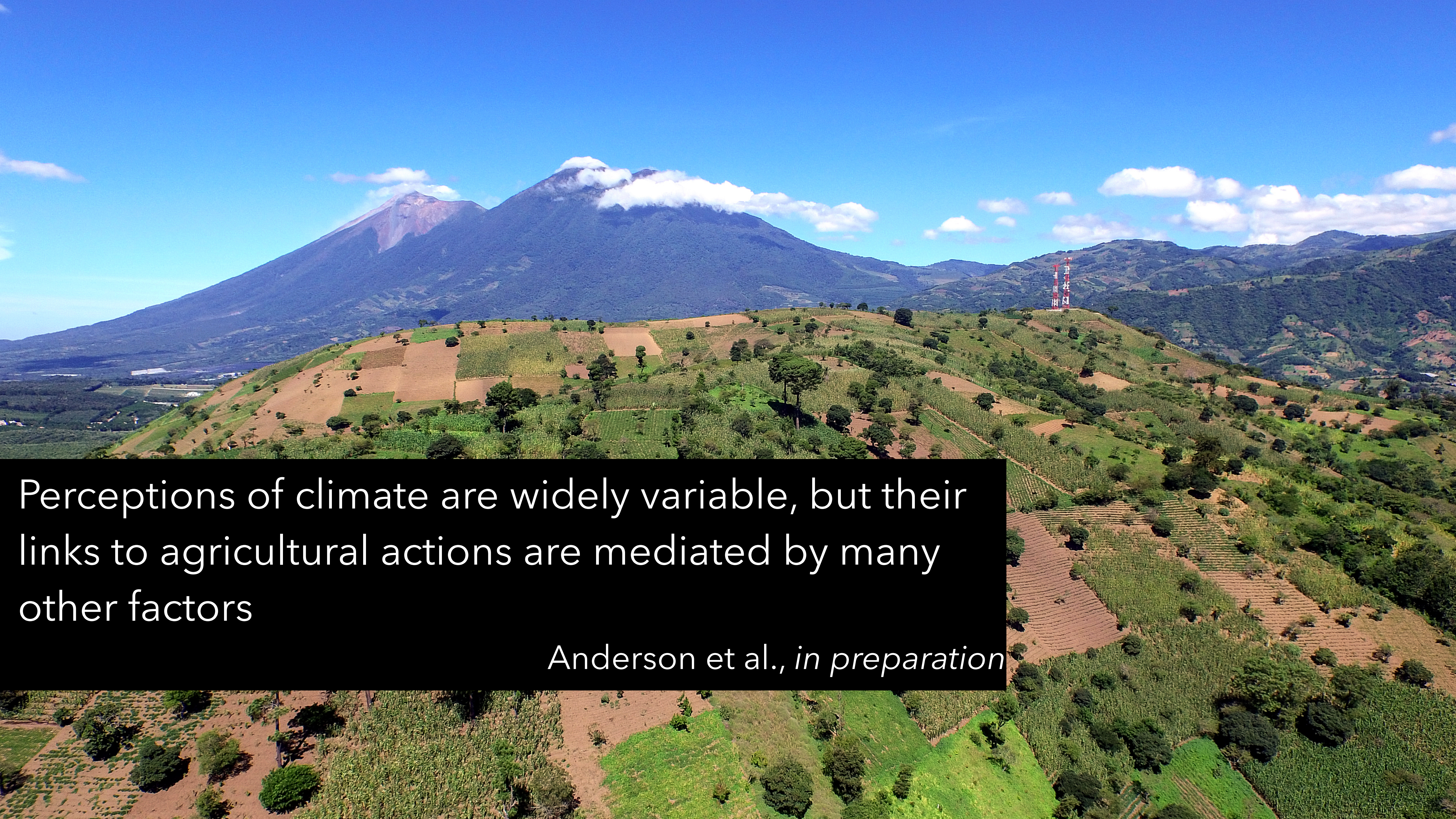






Large amplitude natural variability will continue to be important and many in places dominant climate risk for the next many decades, yet our observations and models of this system are deficient in important ways





Perceptions of climate are widely variable, but their links to agricultural actions are mediated by many other factors

Anderson et al., *in preparation*