Precipitation Effectiveness and Drought

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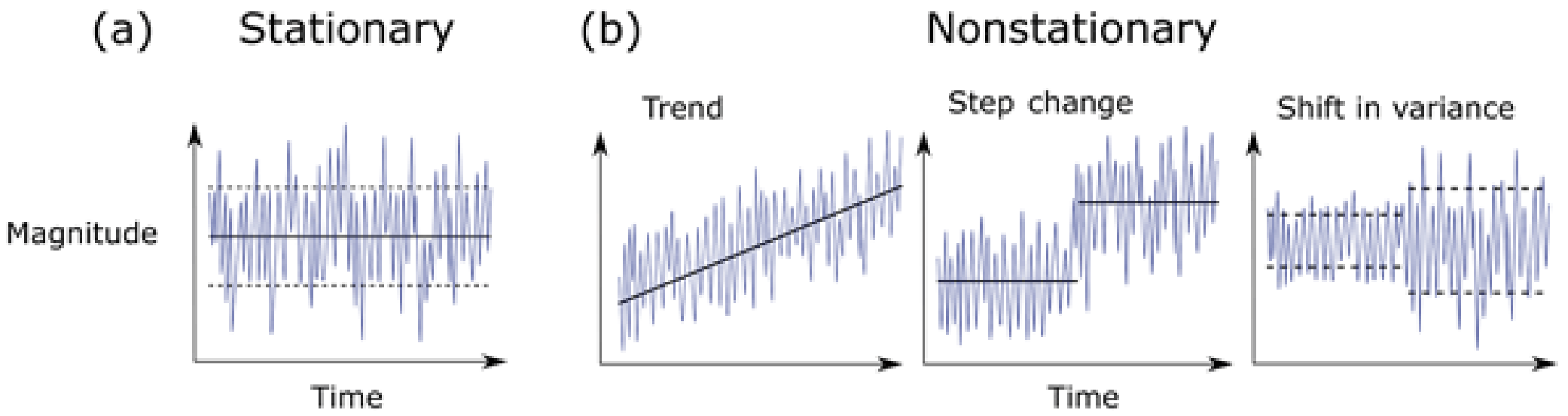
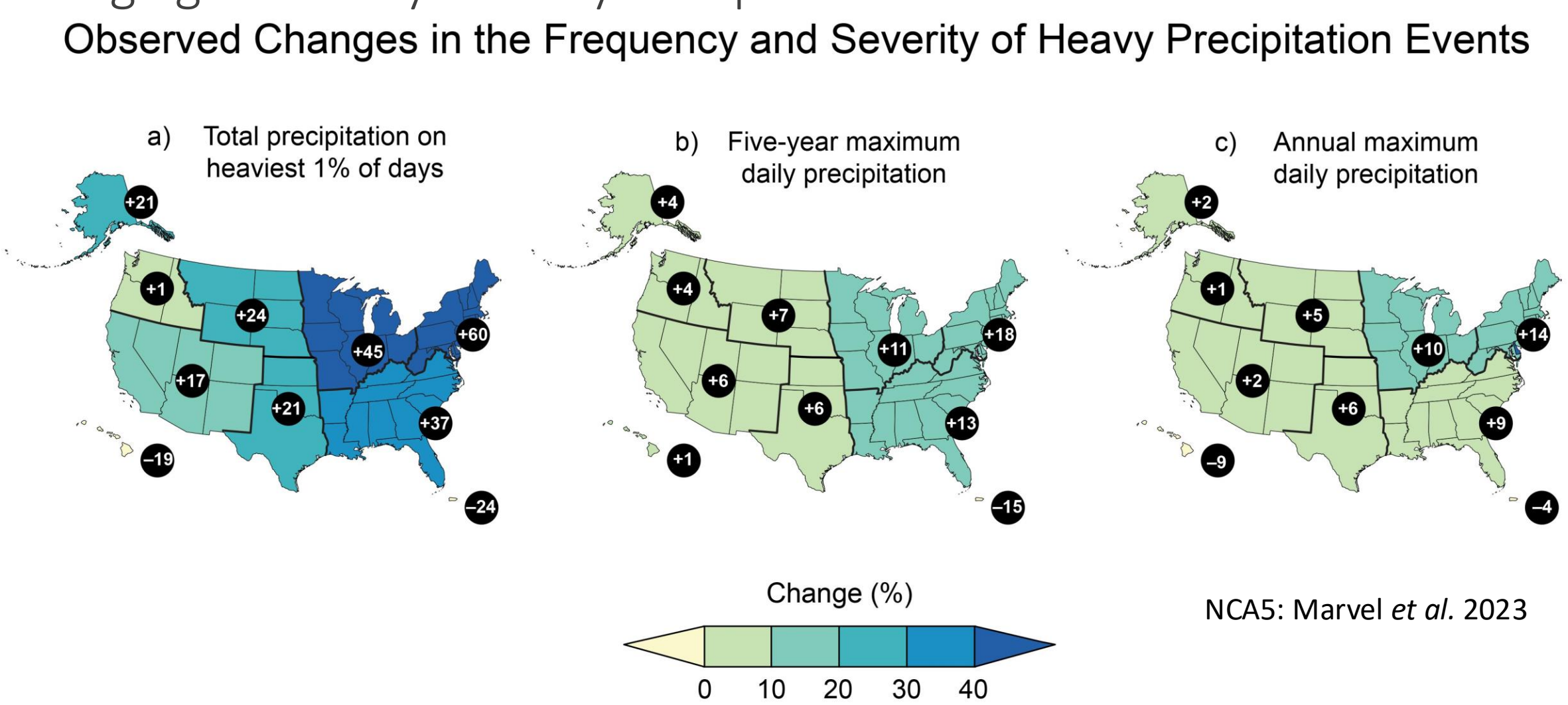
(Non)Stationarity & Variability



Need to consider nonstationarity in the forms of a trend (wetting/drying) and variability

Drought dynamics respond to all forms of non-stationarity, not just the trend

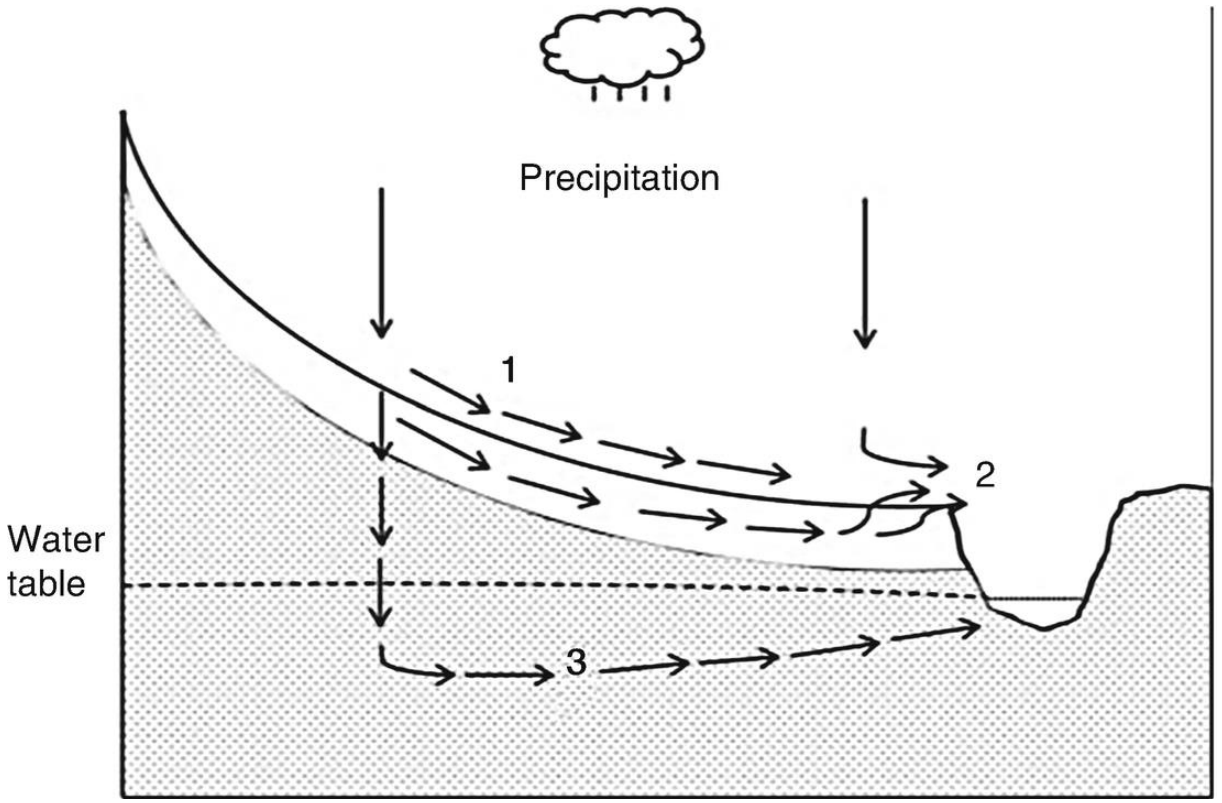
Changing Variability – Heavy Precipitation

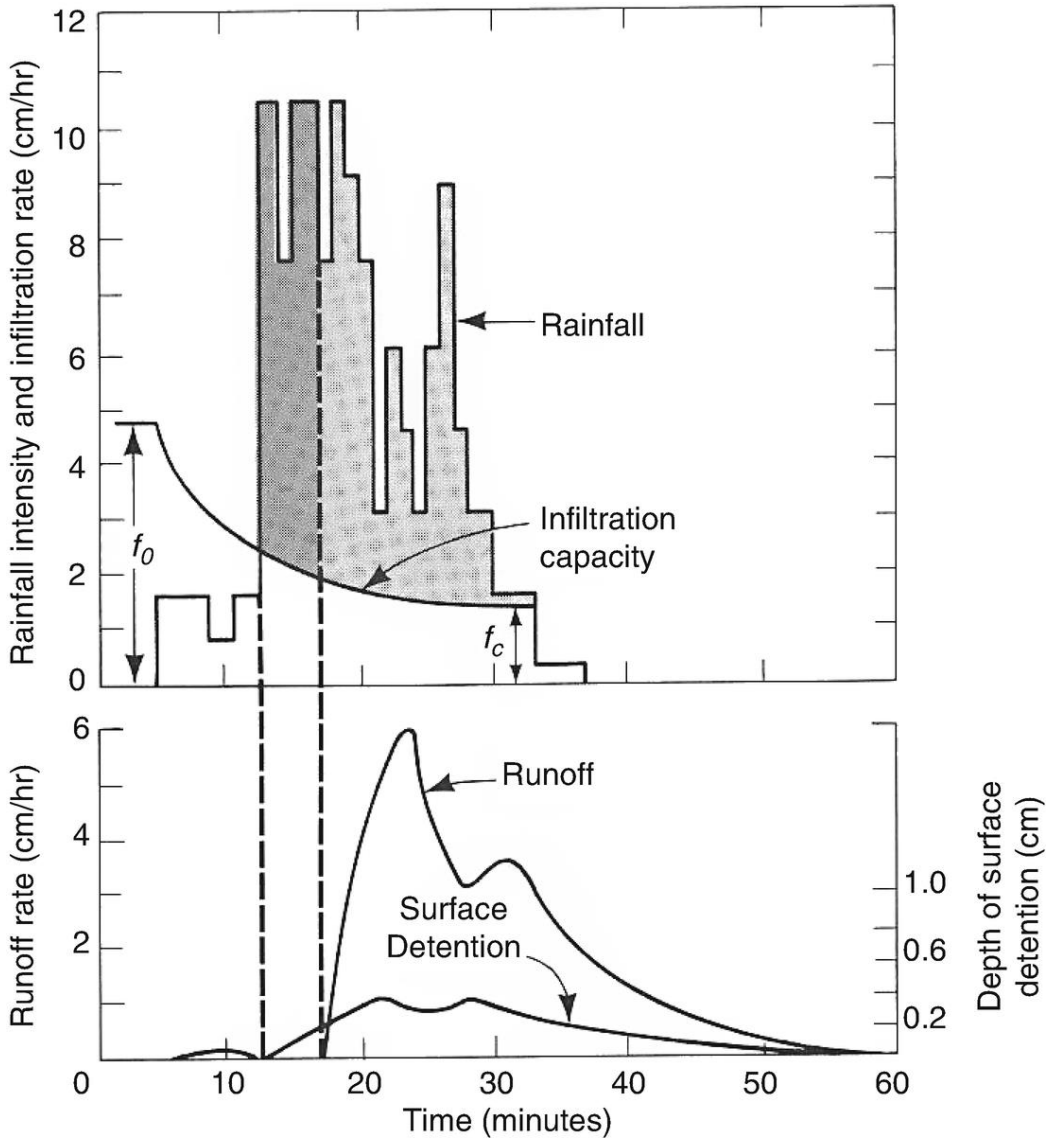


NCA5: Marvel *et al.* 2023

Observed increase in heavy precipitation frequency in most US regions

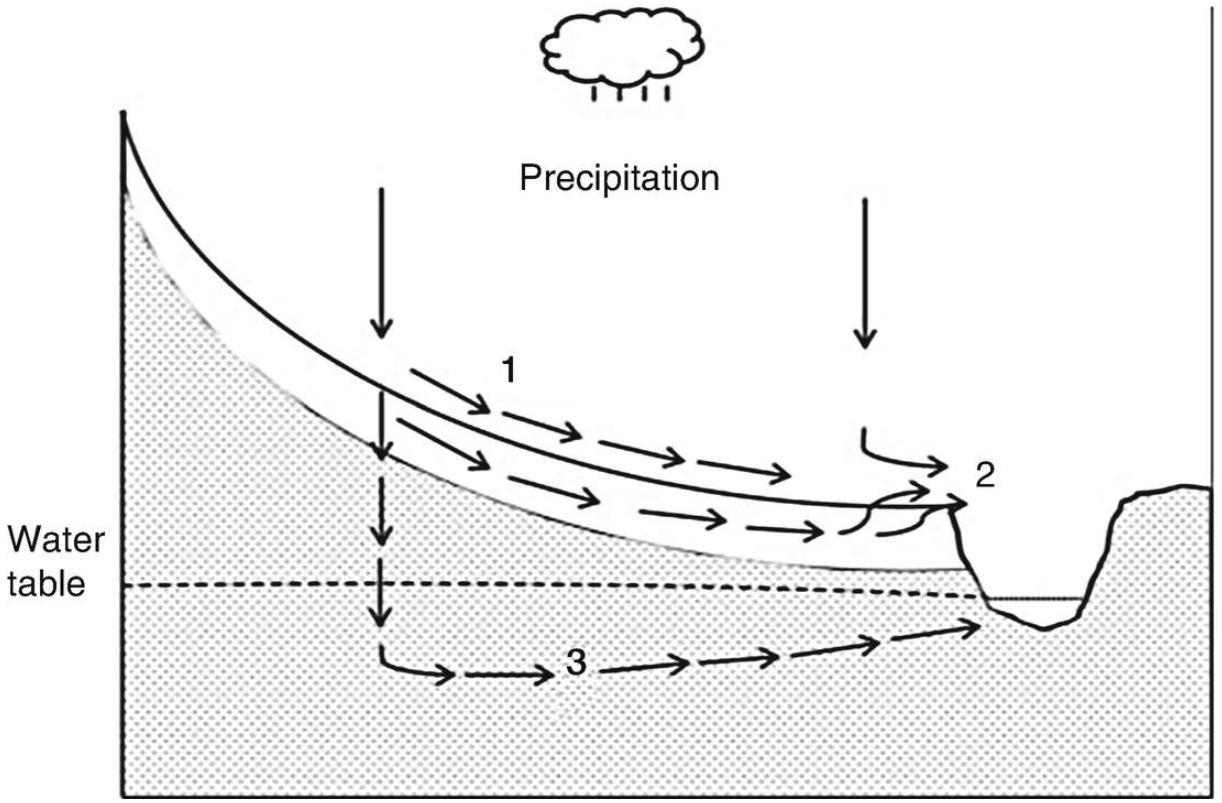
Surface & Subsurface Response to More Intense Rainfall

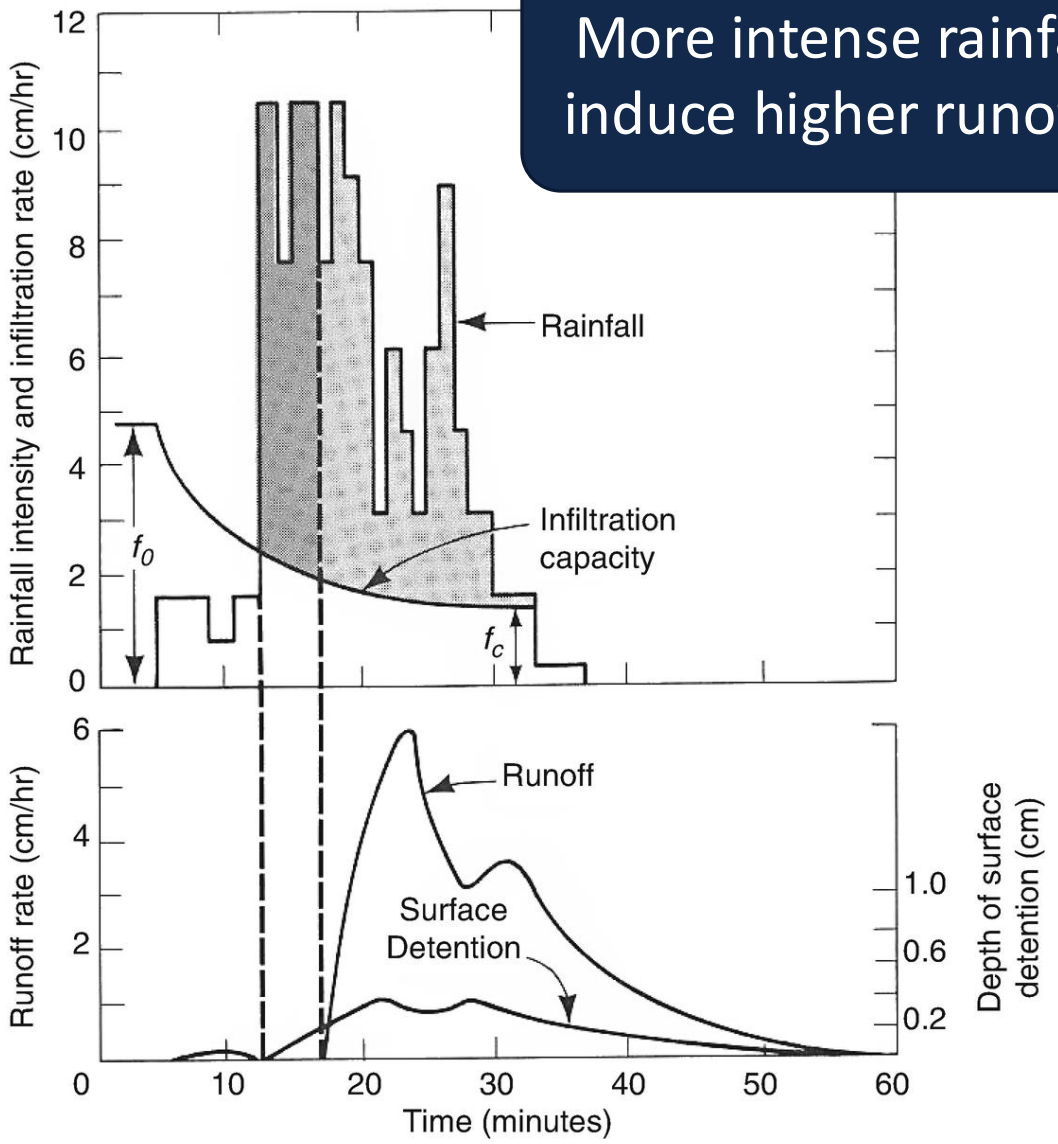




Guo *et al.* 2019

Surface & Subsurface Response to More Intense Rainfall

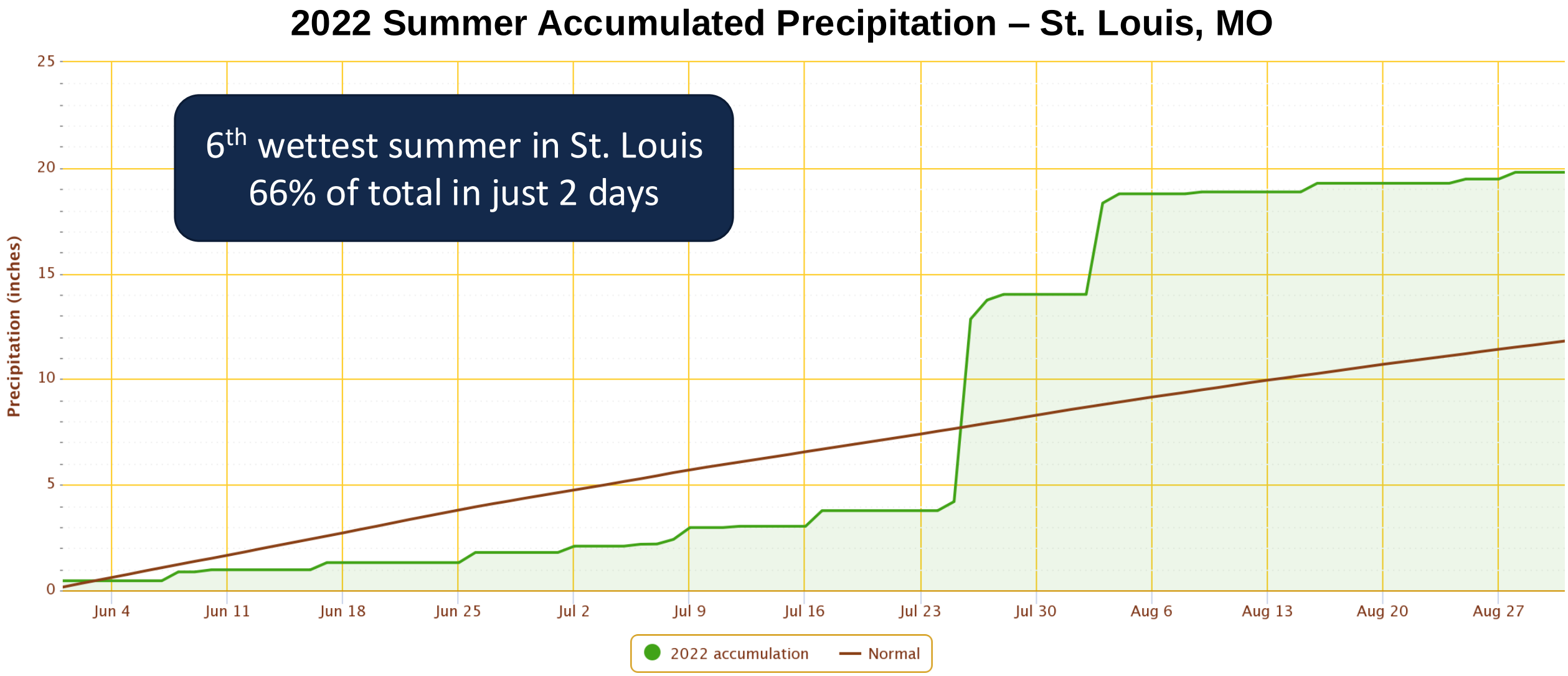




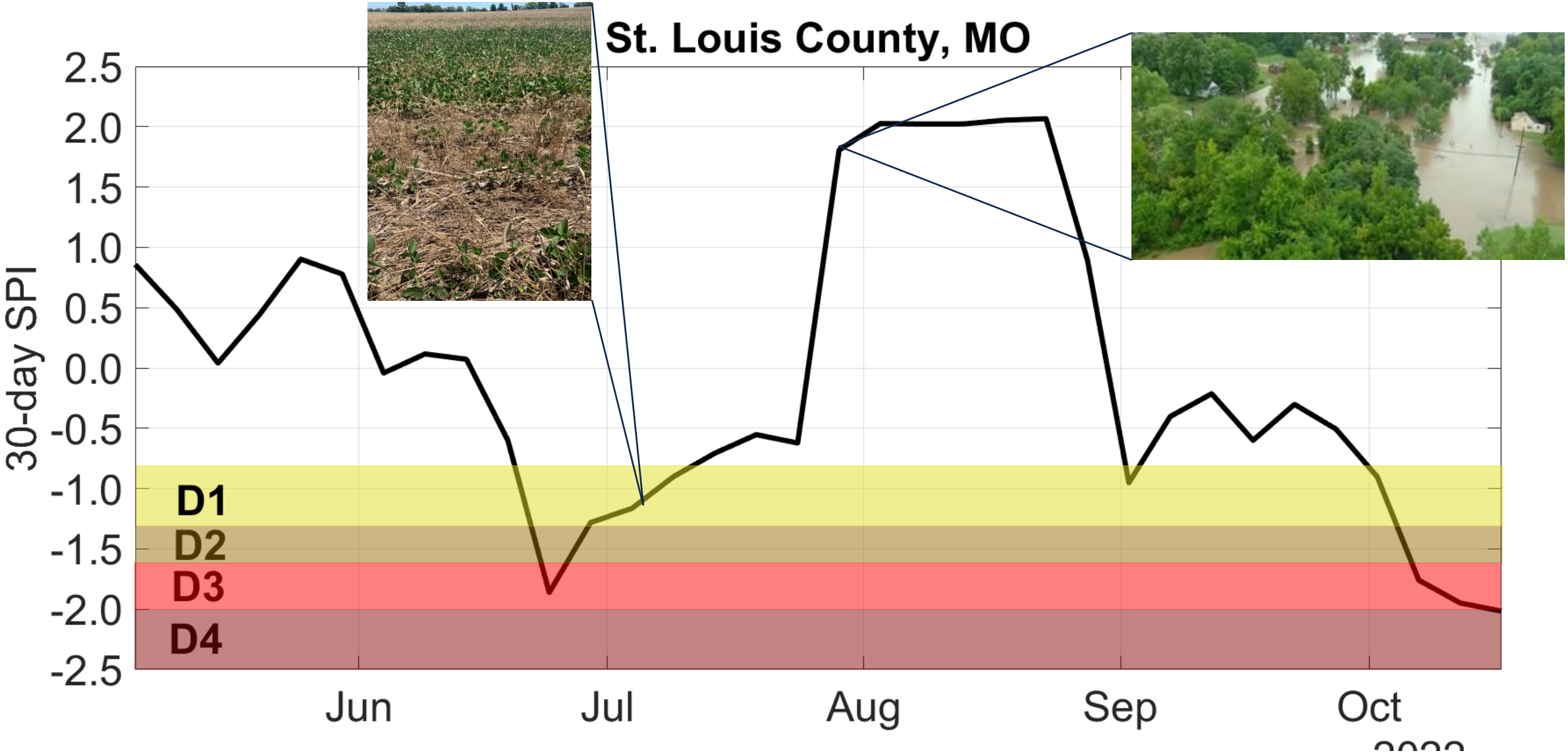
More intense rainfall can induce higher runoff ratio

Guo *et al.* 2019

Precipitation Variability in Practice

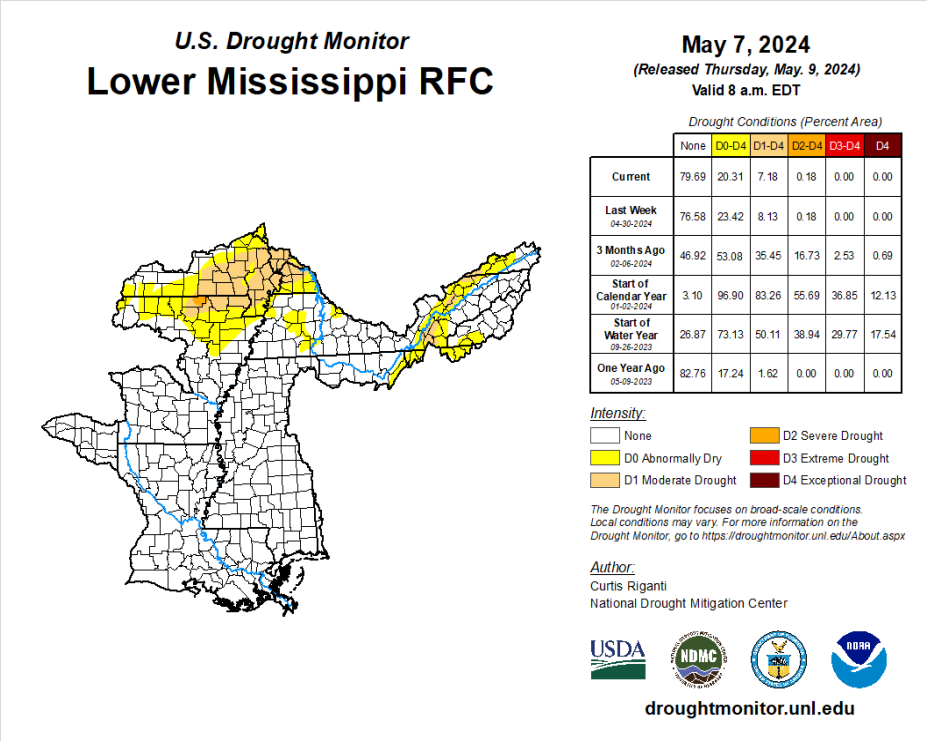


Changing Variability – Heavy Precipitation



Present & Future Challenges

OPERATIONAL MONITORING AND ASSESSMENT



U.S. Drought Monitor

Lower Mississippi RFC

May 7, 2024

(Released Thursday, May. 9, 2024)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	79.69	20.31	7.18	0.18	0.00	0.00
Last Week 04-30-2024	76.58	23.42	8.13	0.18	0.00	0.00
3 Months Ago 02-06-2024	46.92	53.08	35.45	16.73	2.53	0.69
Start of Calendar Year 01-02-2024	3.10	96.90	83.26	55.69	36.85	12.13
Start of Water Year 09-26-2023	26.87	73.13	50.11	38.94	29.77	17.54
One Year Ago 05-09-2023	82.76	17.24	1.62	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

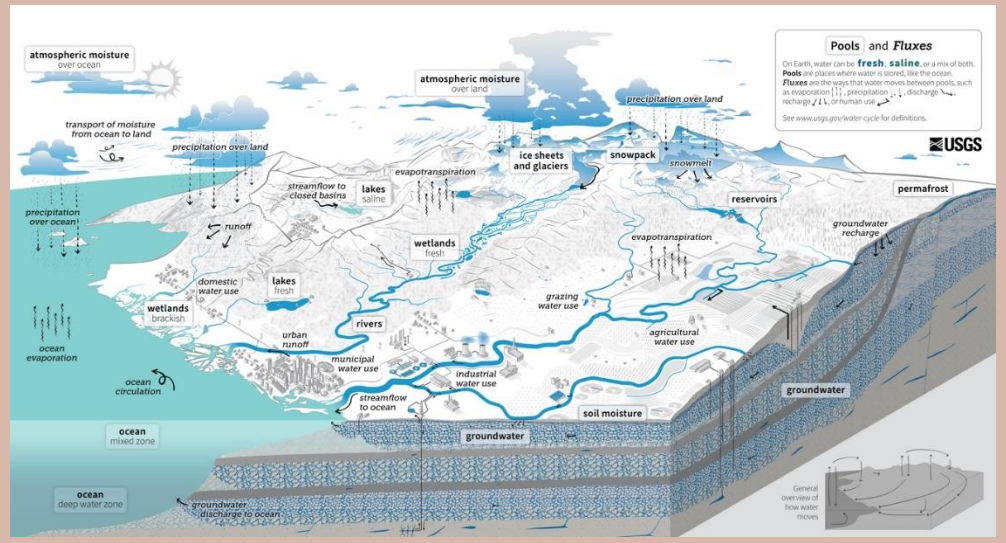
Curtis Riganti

National Drought Mitigation Center

droughtmonitor.unl.edu

How do we consider precipitation in drought monitoring and assessment?

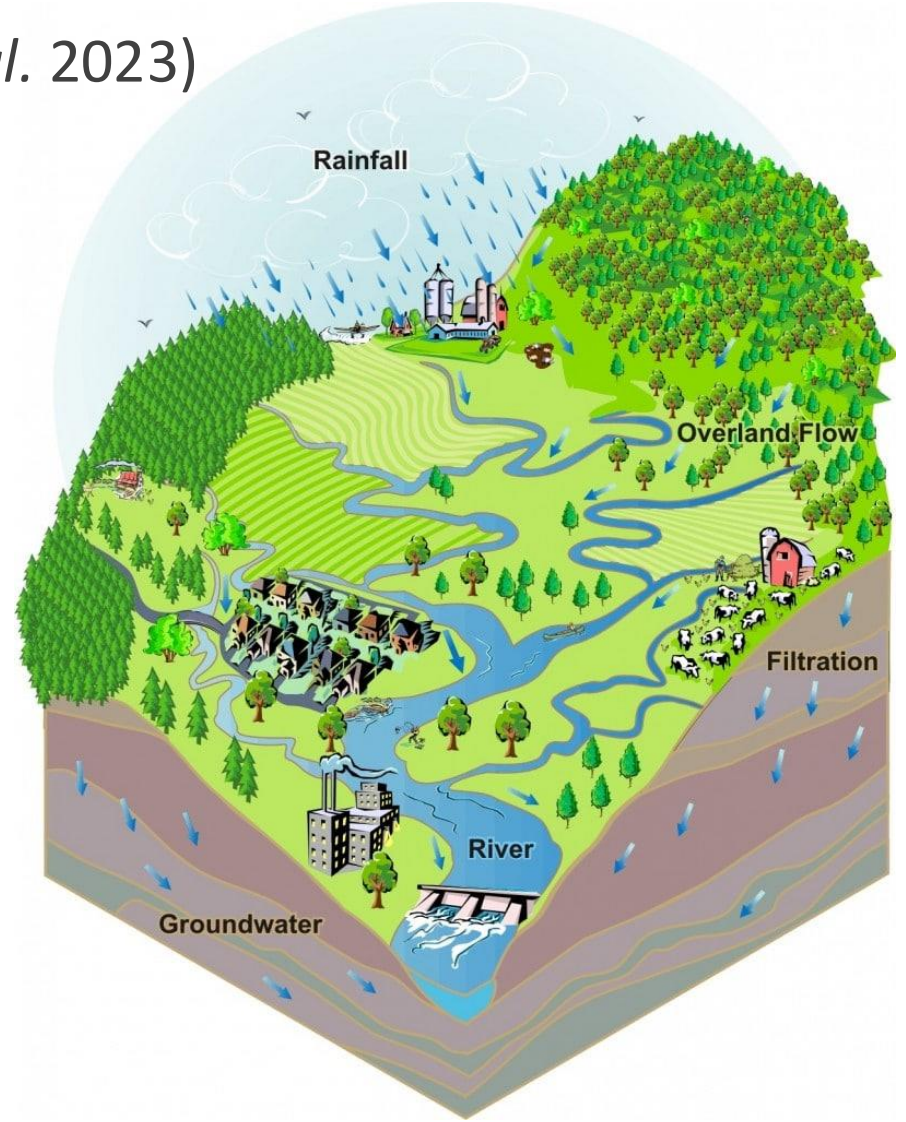
DROUGHT SCIENCE



How do we understand and predict drought dynamics with increasingly intense precipitation?

Considering Precipitation Effectiveness

The usefulness of precipitation within a system (Parker *et al.* 2023)

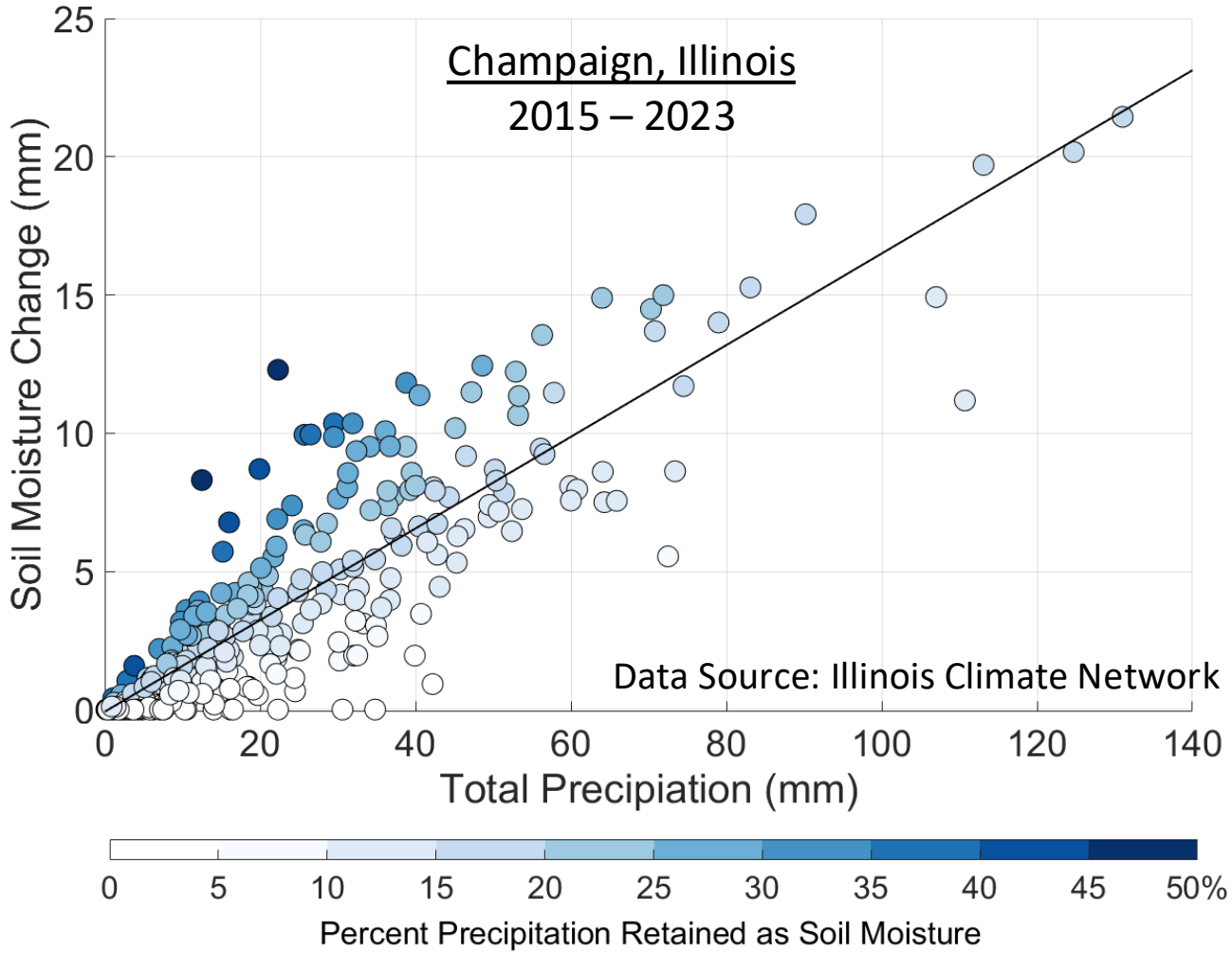


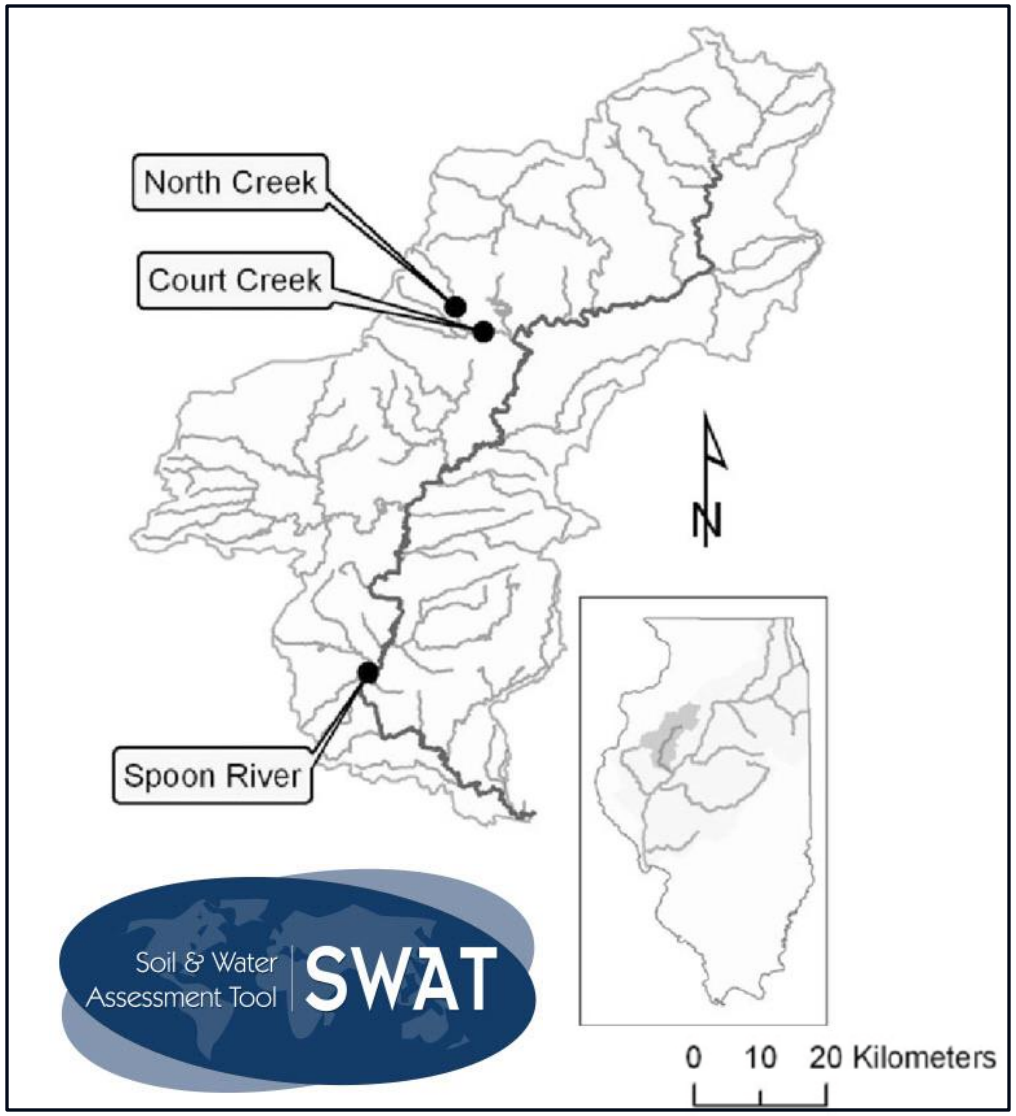
Considering Precipitation Effectiveness

Prairie Research Institute
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

NIDIS

Assessing precipitation effectiveness and agricultural drought in the Midwest





Thank You!

"Any advances toward a deeper understanding and quantification of precipitation effectiveness will lead to a robust drought monitoring paradigm that could more effectively anticipate and assess conditions, and ultimately help build a more drought-resilient future for communities all across the nation."

Brandenburg Farms - Cerro Gordo, IL

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