

Characterising Drought in East Africa

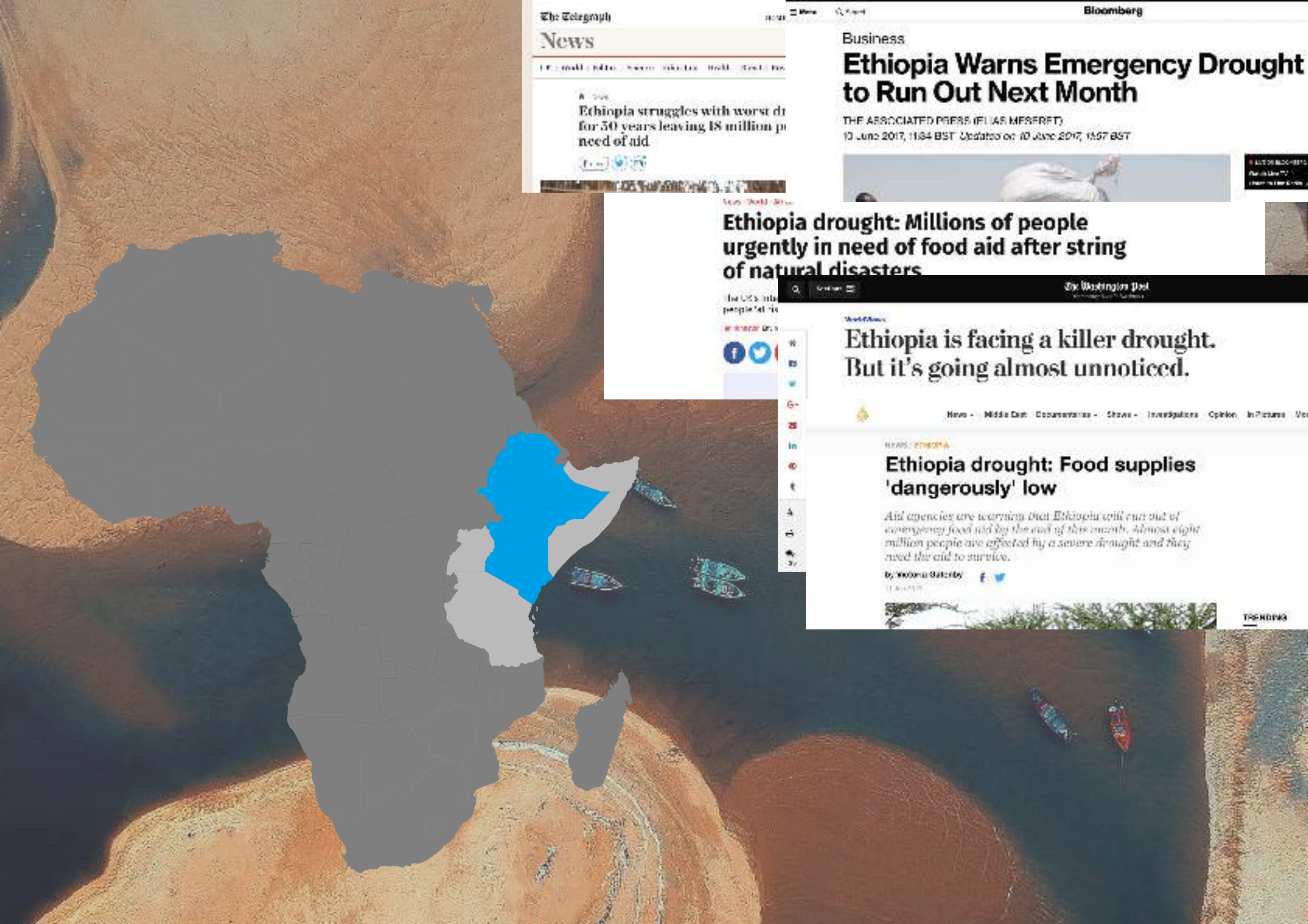
Improving datasets and drought indices using Earth observation data.

Supervisors: Professor Simon Dadson; Dr Steven Reece



ENVIRONMENTAL RESEARCH
DOCTORAL TRAINING PARTNERSHIP





Business

Ethiopia Warns Emergency Drought to Run Out Next Month

THE ASSOCIATED PRESS (ELIAS MESERET)

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Ethiopia drought: Millions of people urgently in need of food aid after string of natural disasters

The UK's info people's risk

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The Washington Post

Washington Post

Ethiopia is facing a killer drought. But it's going almost unnoticed.



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HEADLINE

Ethiopia drought: Food supplies 'dangerously' low

Aid agencies are warning that Ethiopia will run out of emergency food aid by the end of this month. Almost eight million people are affected by a severe drought and they need the aid to survive.

by [Nadine Stansby](#)

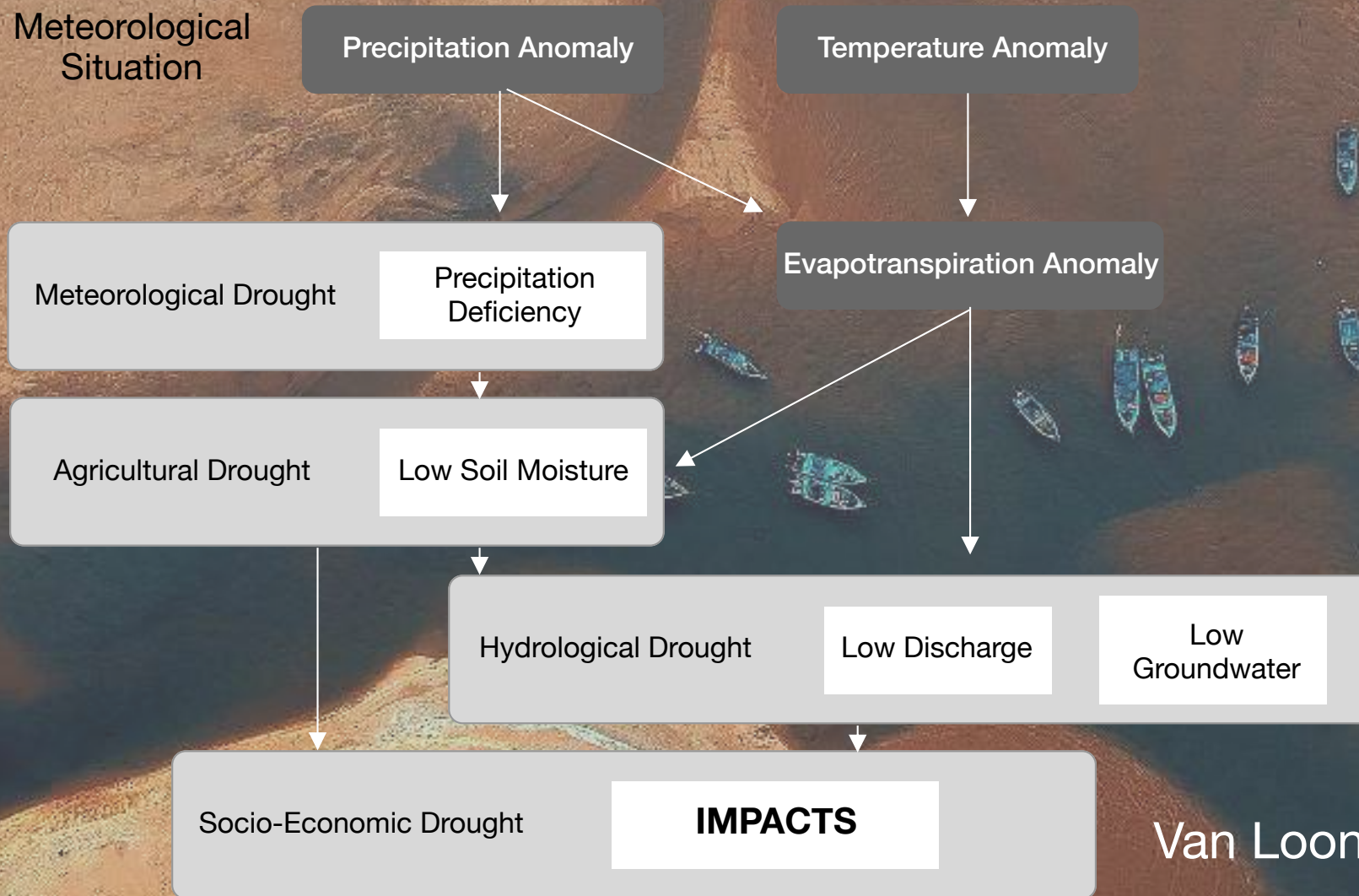
11 June 2017



TRENDING

“the creeping disaster”

Sheffield and Wood (2011)



Van Loon (2015)

An aerial photograph of a dry, cracked riverbed. The cracked earth is a mix of light tan and dark brown. Several small, colorful boats are scattered along the edges of the dry riverbed, some in the remaining pools of water. The scene conveys a sense of drought and scarcity.

What have droughts **been like in the past?**

What might droughts look like in the **future?**

How do we overcome **scarcity of in-situ data?**

How do we deal with **the complexity of drought?**

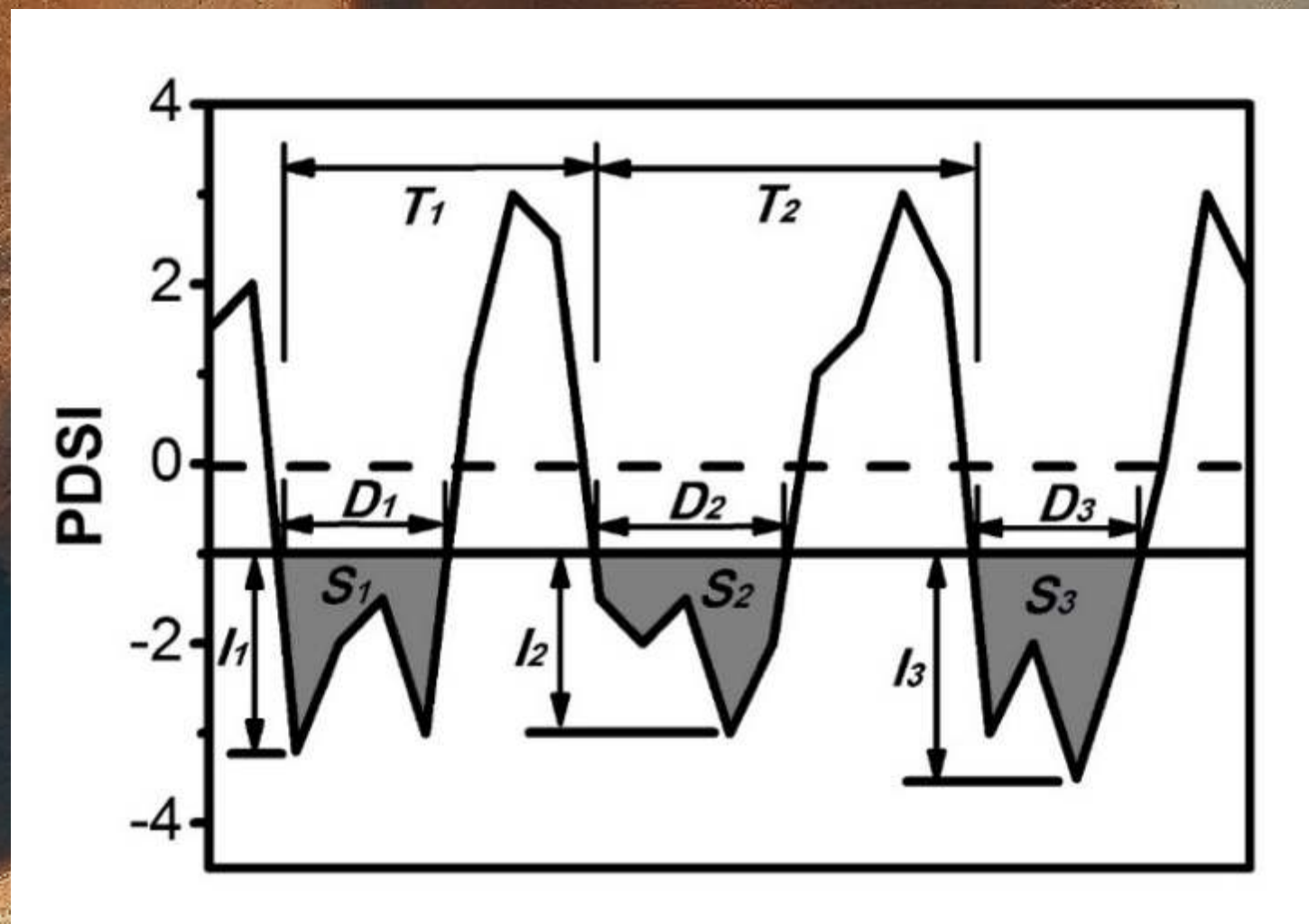
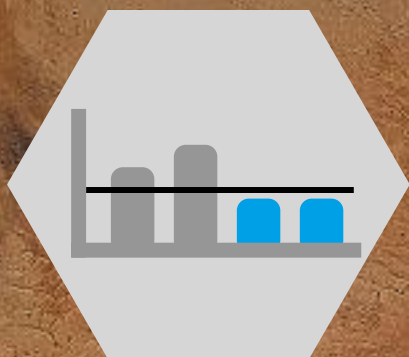
An aerial photograph of a harbor. The water is a deep, dark blue. Several small boats, mostly blue and white, are scattered across the water. The surrounding land is a mix of light brown and tan, with some darker patches. The overall texture is grainy, suggesting a high-resolution satellite or aerial image.

duration

spatial extent

magnitude

frequency





Research Gap

soil moisture key variable for **impact**

Rojas et al (2011)

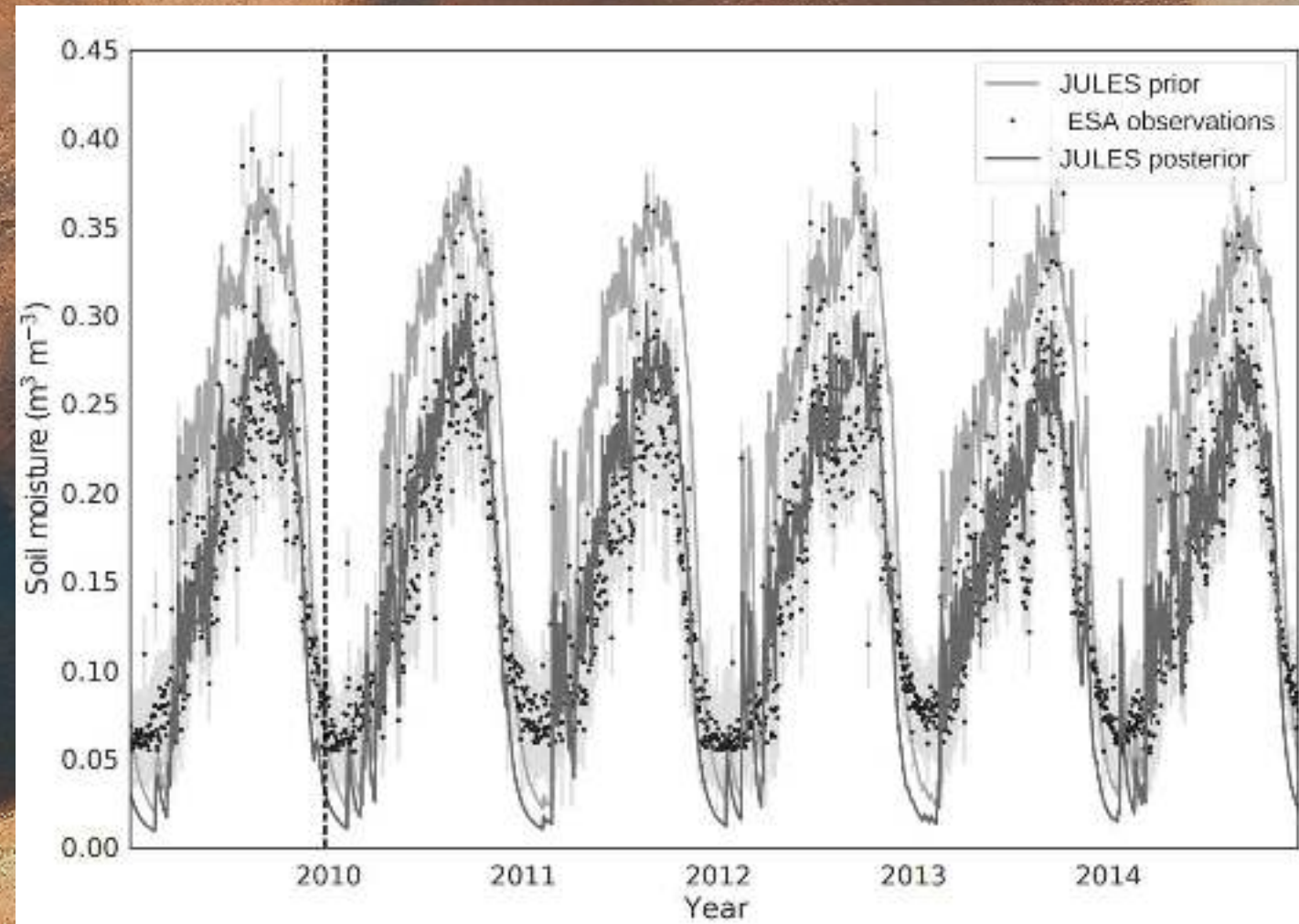
memory of soil moisture = **predictability**

Aghakouchak et al (2016), Aghakouchak et al (2015)

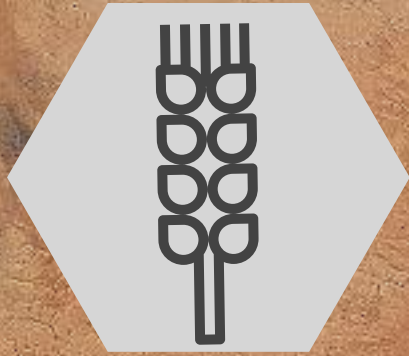
unable to directly observe **root zone**

Dorigo et al (2016), Wagner et al (2012)

Method



Pinnington et al (2018)



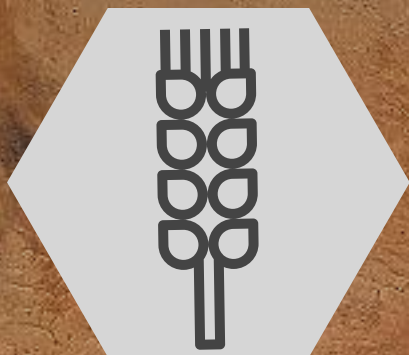
Research Gap

impact often considered at **national scale**

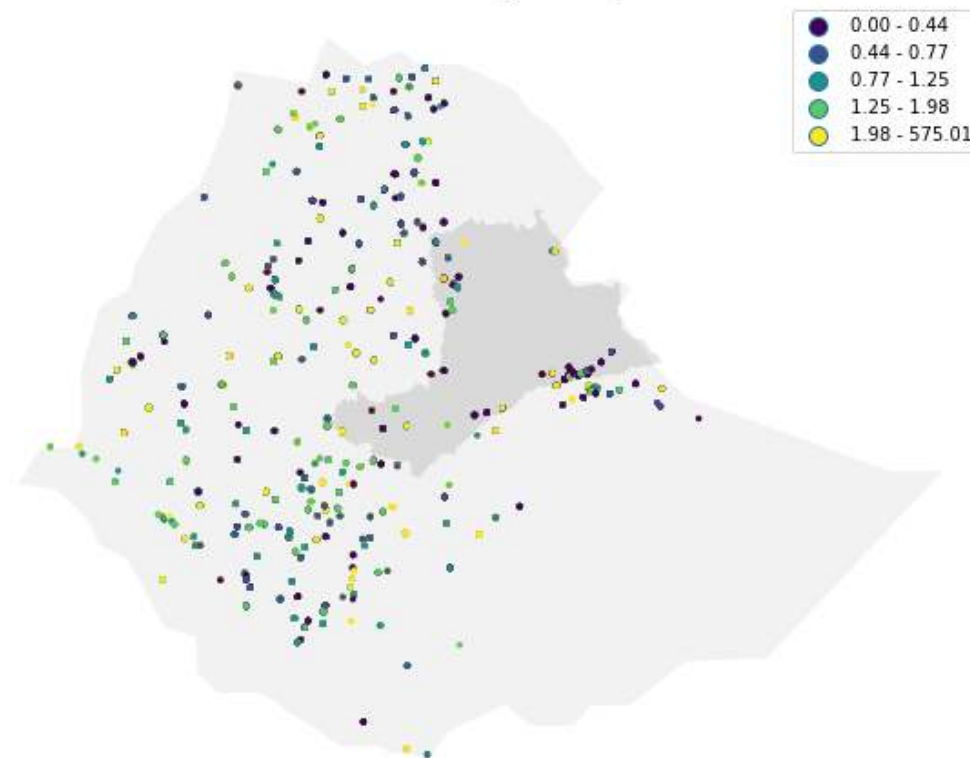
Enenkel et al (2011)

Increased predictive **accuracy using GPs**

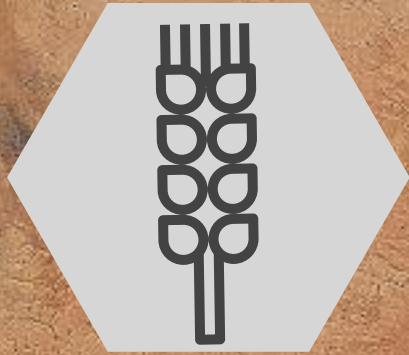
J, You et al (2017)



Location of Surveys in Ethiopia



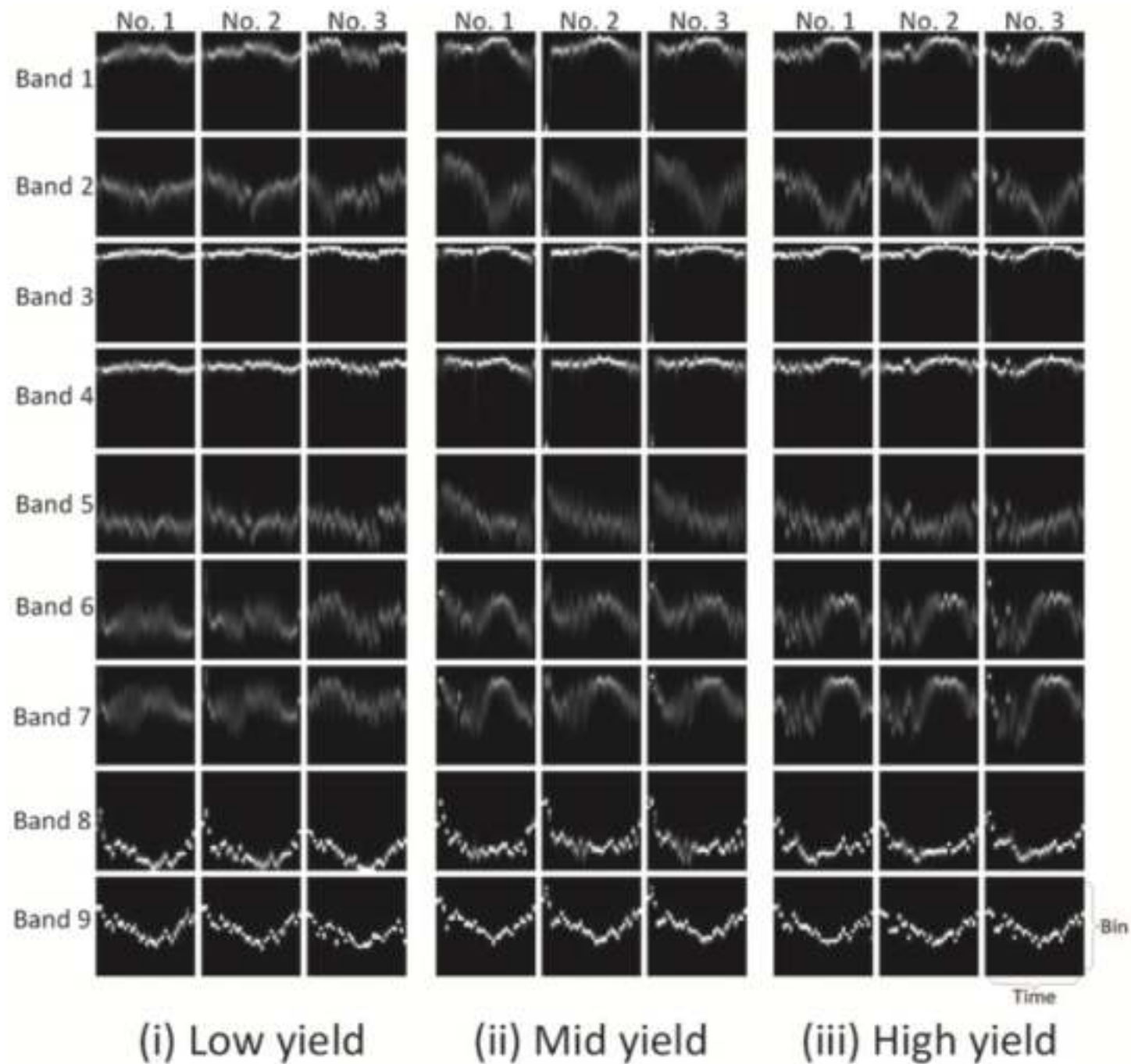
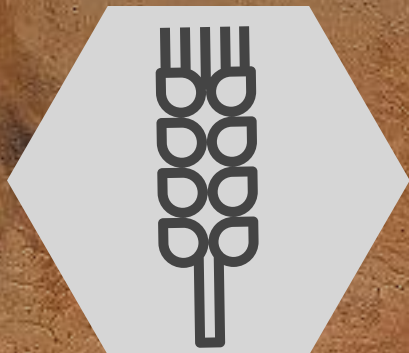
Method

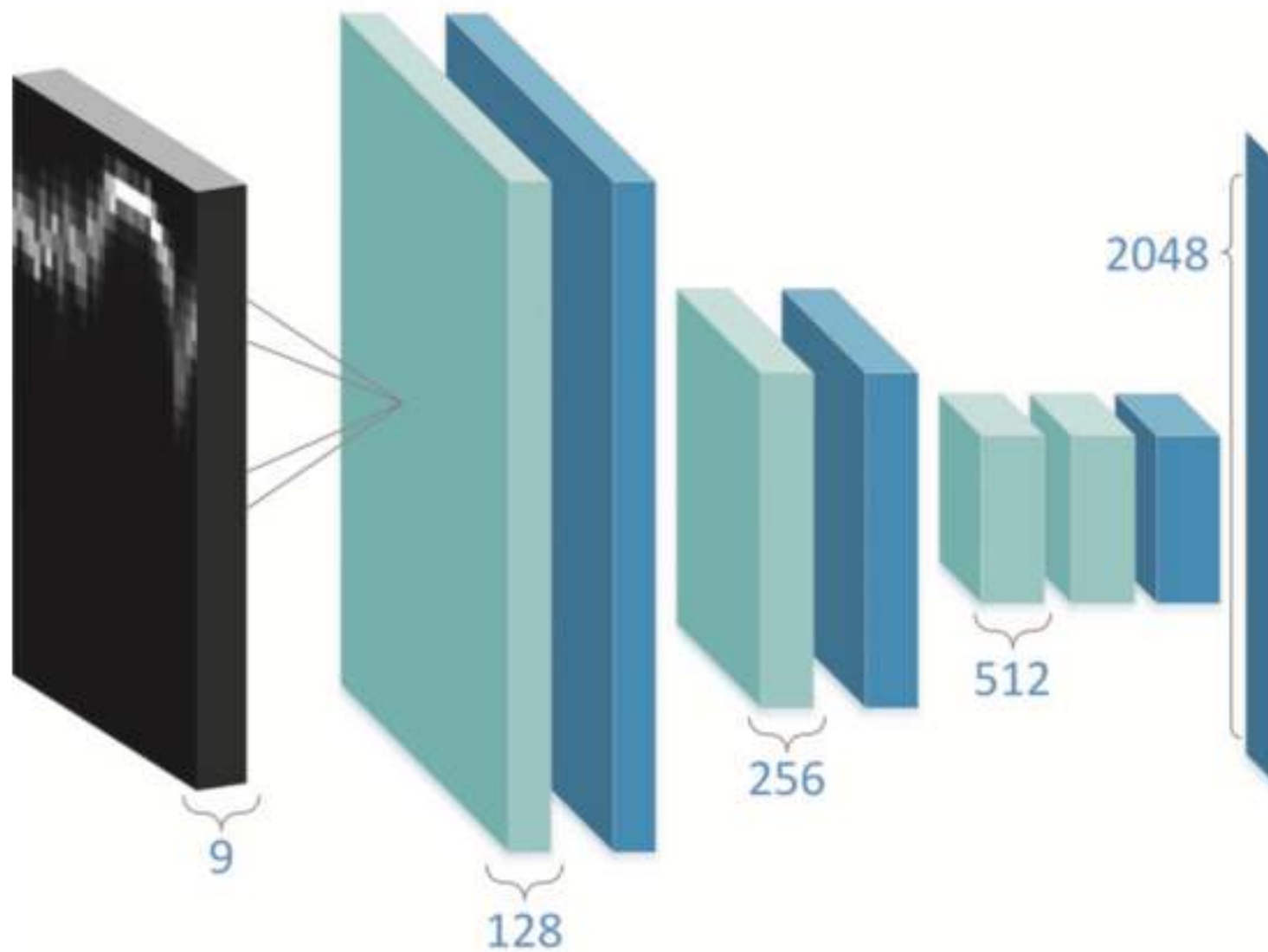
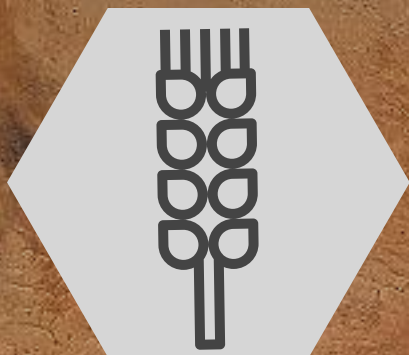


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THIS IS YOUR MACHINE LEARNING SYSTEM?

YUP! YOU POUR THE DATA INTO THIS BIG
PILE OF LINEAR ALGEBRA, THEN COLLECT
THE ANSWERS ON THE OTHER SIDE.

WHAT IF THE ANSWERS ARE WRONG?

JUST STIR THE PILE UNTIL
THEY START LOOKING RIGHT.

