

Soil salinization: worldwide risks of irreversible soil degradation

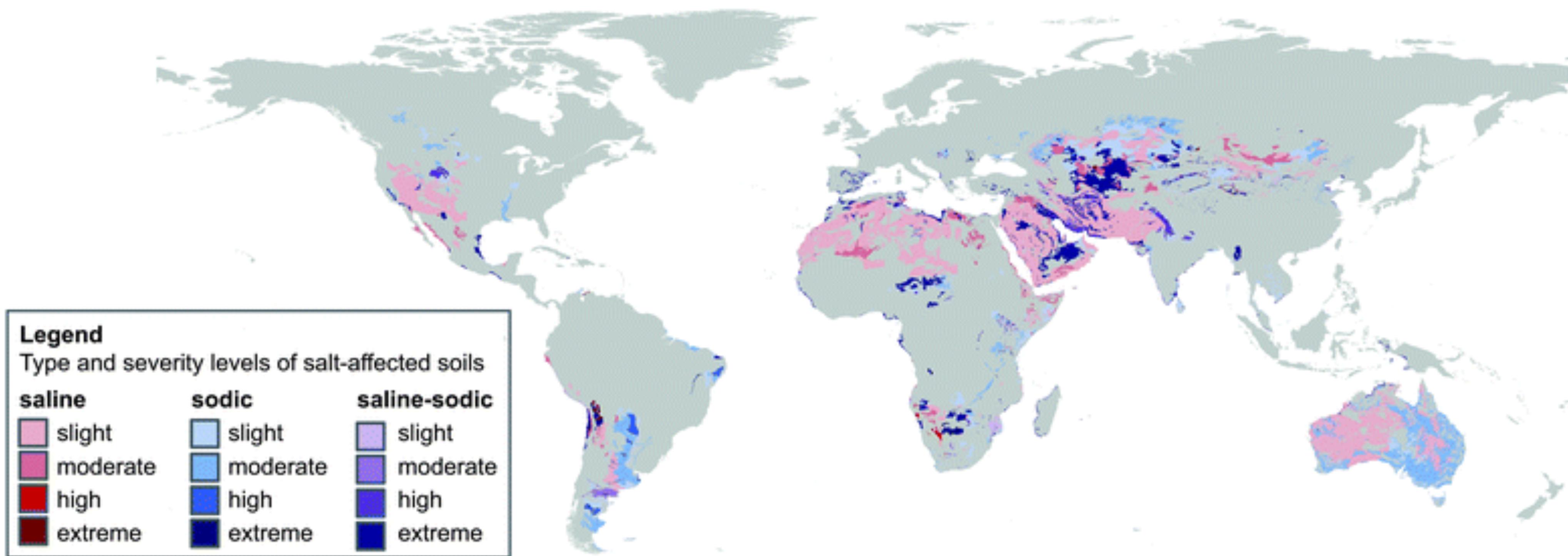
Yair Mau

1.5 billion people, living with soil too salty to be fertile



<https://news.un.org/en/story/2021/10/1103532>

global extent of salinization / sodification



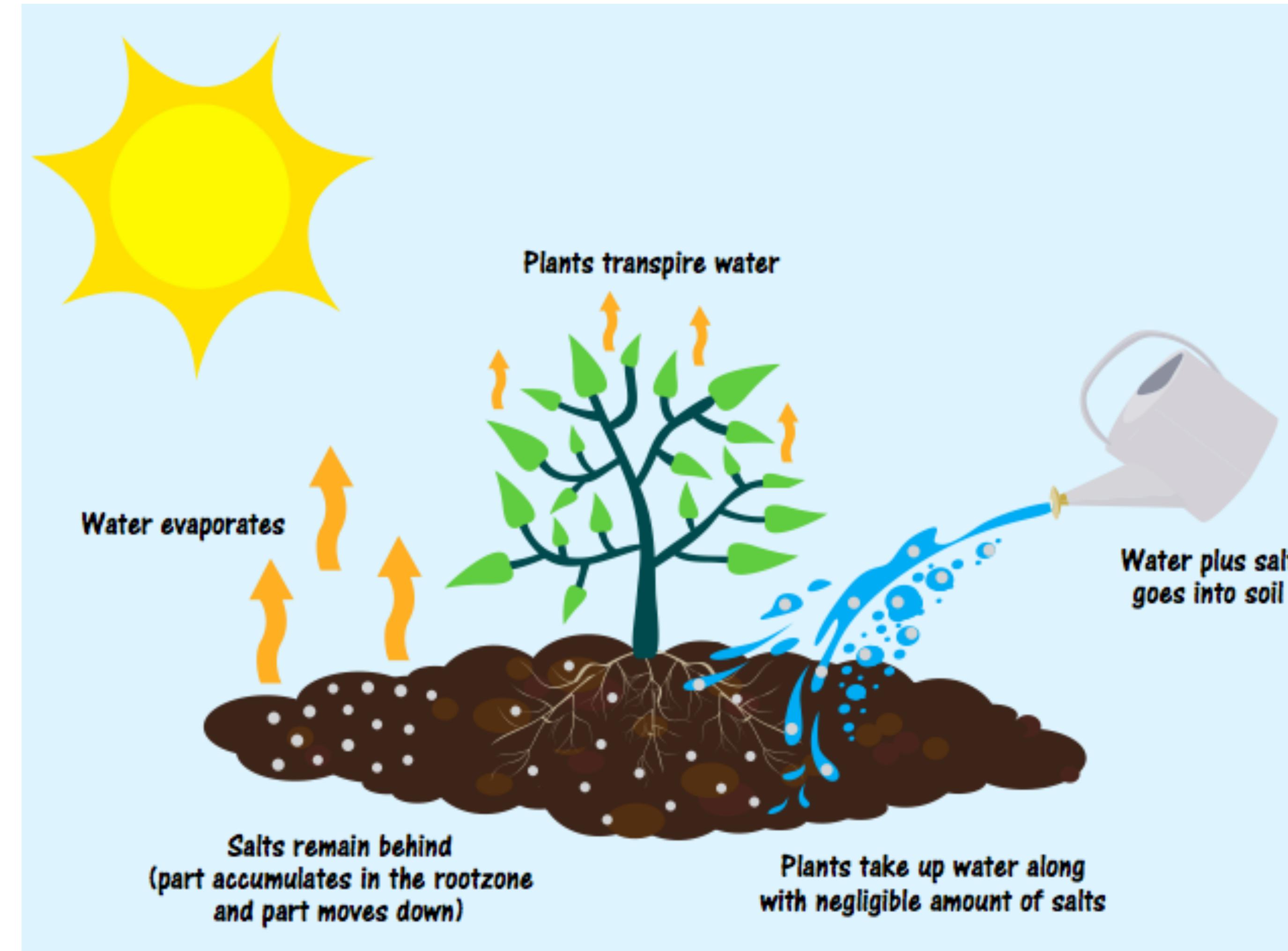
Wicke (2011)

statistics

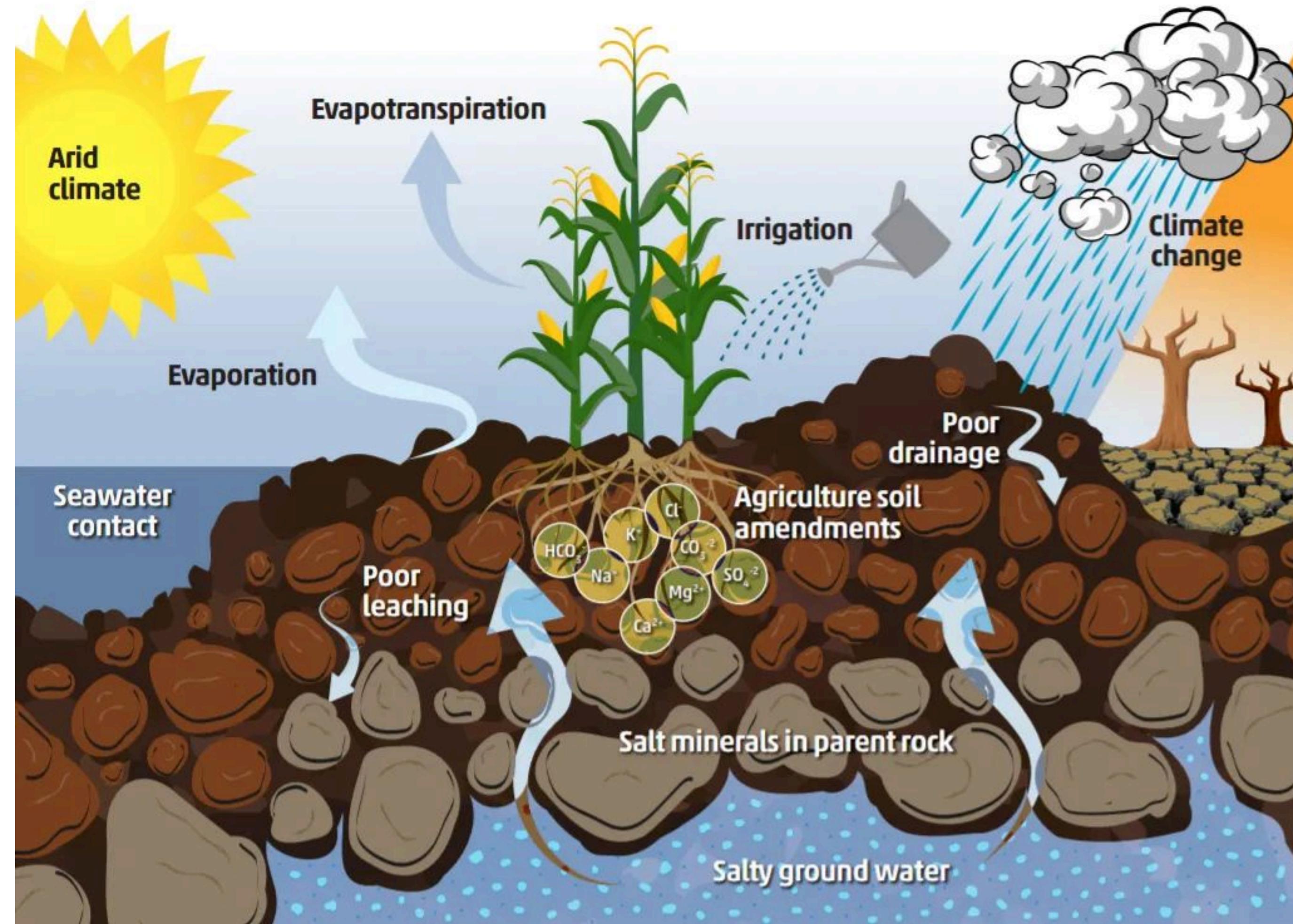
- 10% of all the world's arable land is affected by soil salinity and/or sodality
- 25–30% of all irrigated lands are salt-affected
- more than two thirds of global salt-affected soils are found in arid and semi-arid climatic zones
- great uncertainty regarding data

Shahid (2018)
Ghassemi (1995)
Szabolcs (1989)

causes of the problem



causes of the problem



FAO: Global map of salt-affected soils

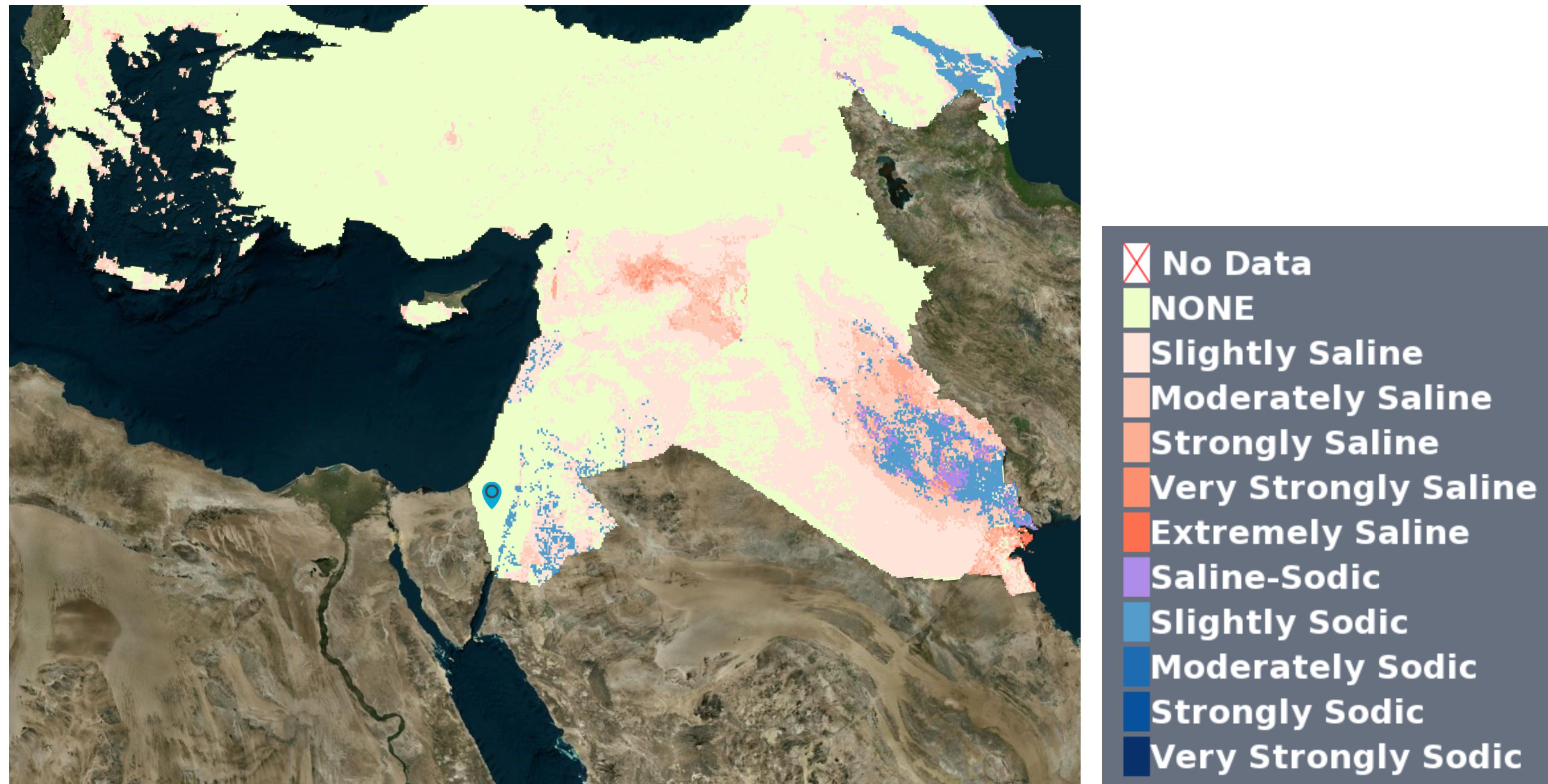
FAO: Global map of salt-affected soils

launched: 10-2021



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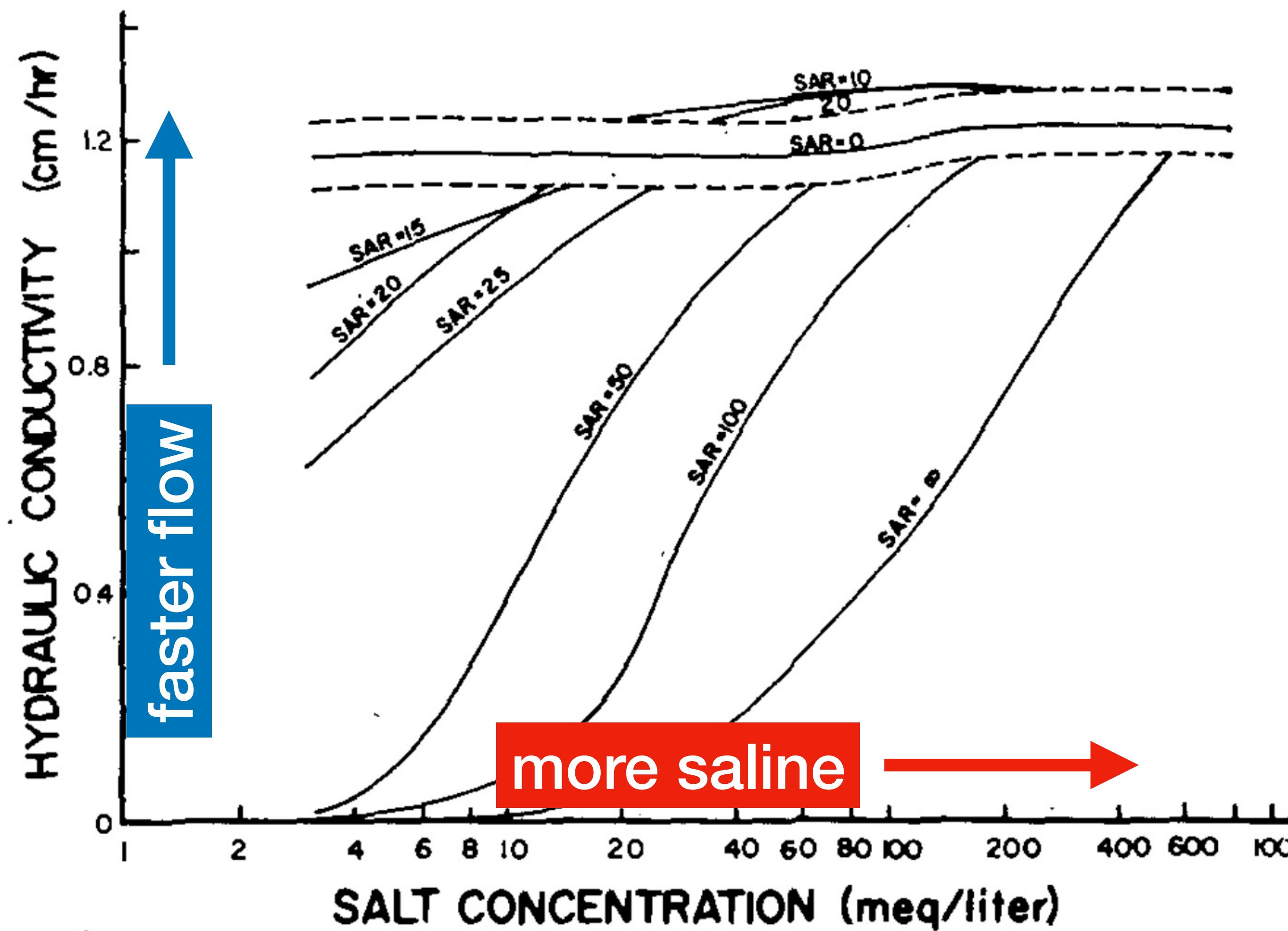


can soil salinity / sodicity be IRREVERSIBLE?

(yes, it can)

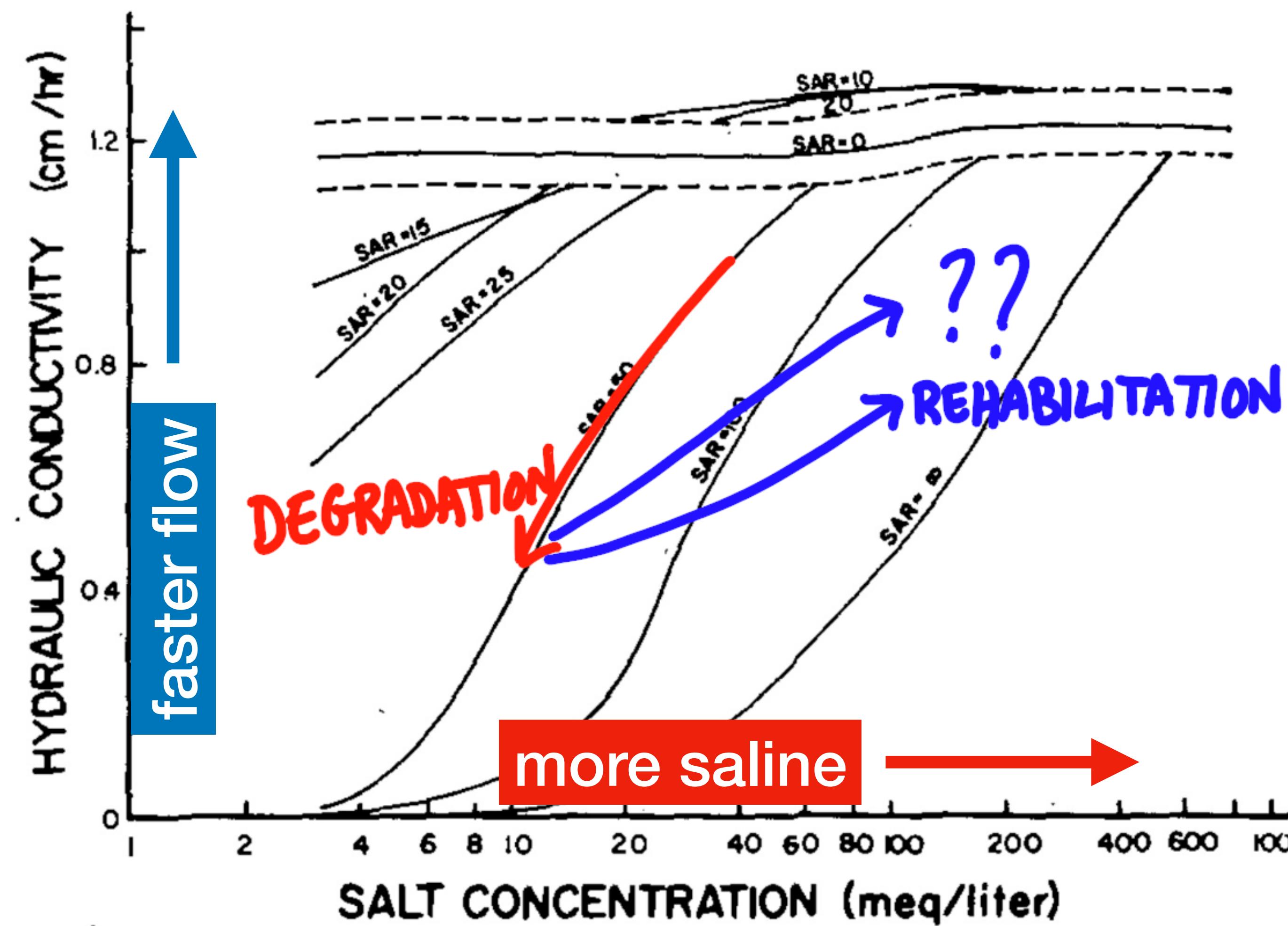


soil degradation cause by salinization/sodification



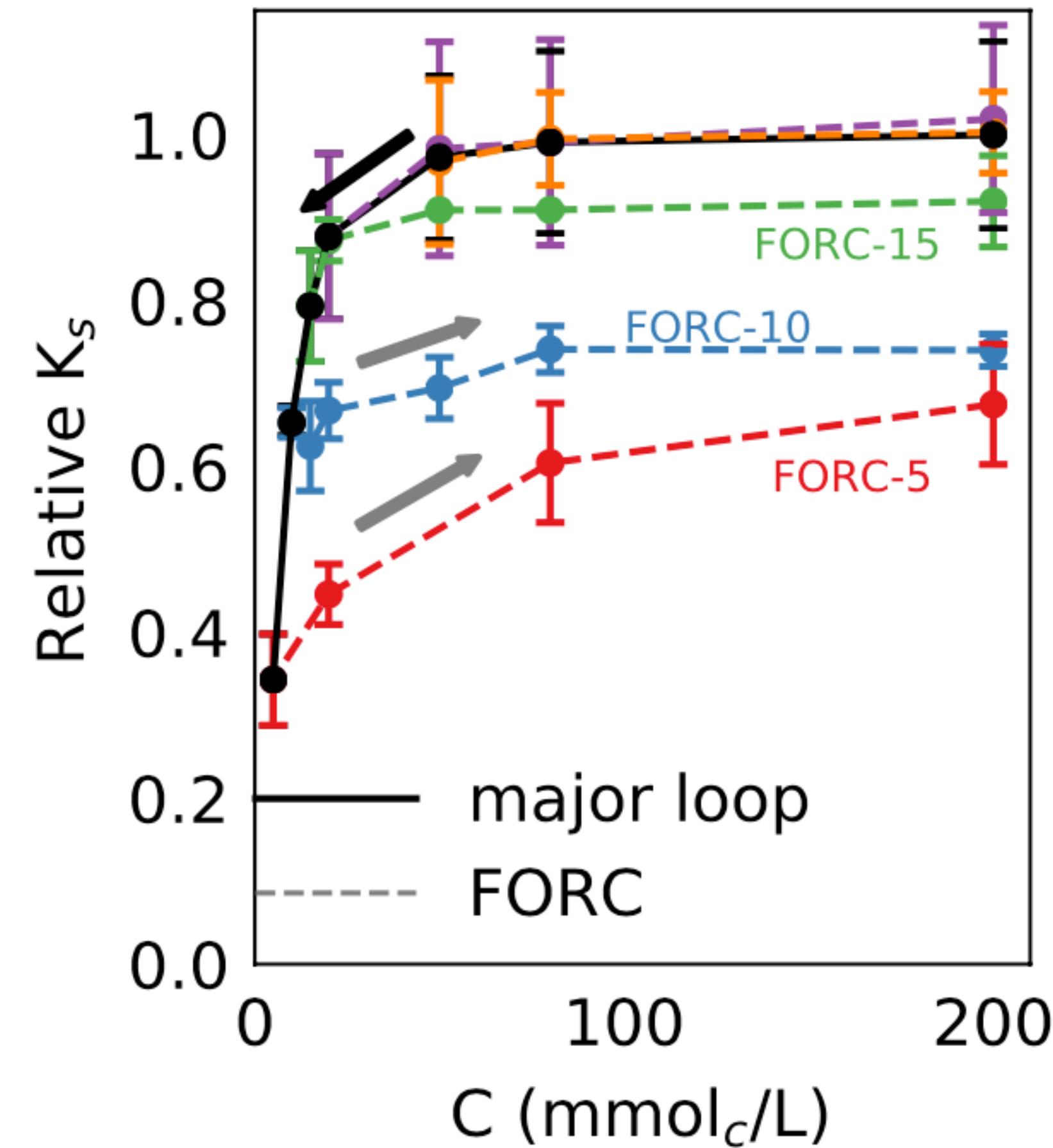
McNeal & Coleman, 1966

soil degradation cause by salinization/sodification



McNeal & Coleman, 1966

soil column experiments



Kramer, I., Bayer, Y., Adeyemo, T., & Mau, Y., "Hysteresis in soil hydraulic conductivity as driven by salinity and sodicity—a modeling framework." HESS, 2021

take-home message

- soil is a non-renewable resource, our lives depend on it
- because of salinization, we might be irreversibly degrading soils 😔

we can do better! 🚀

we need:

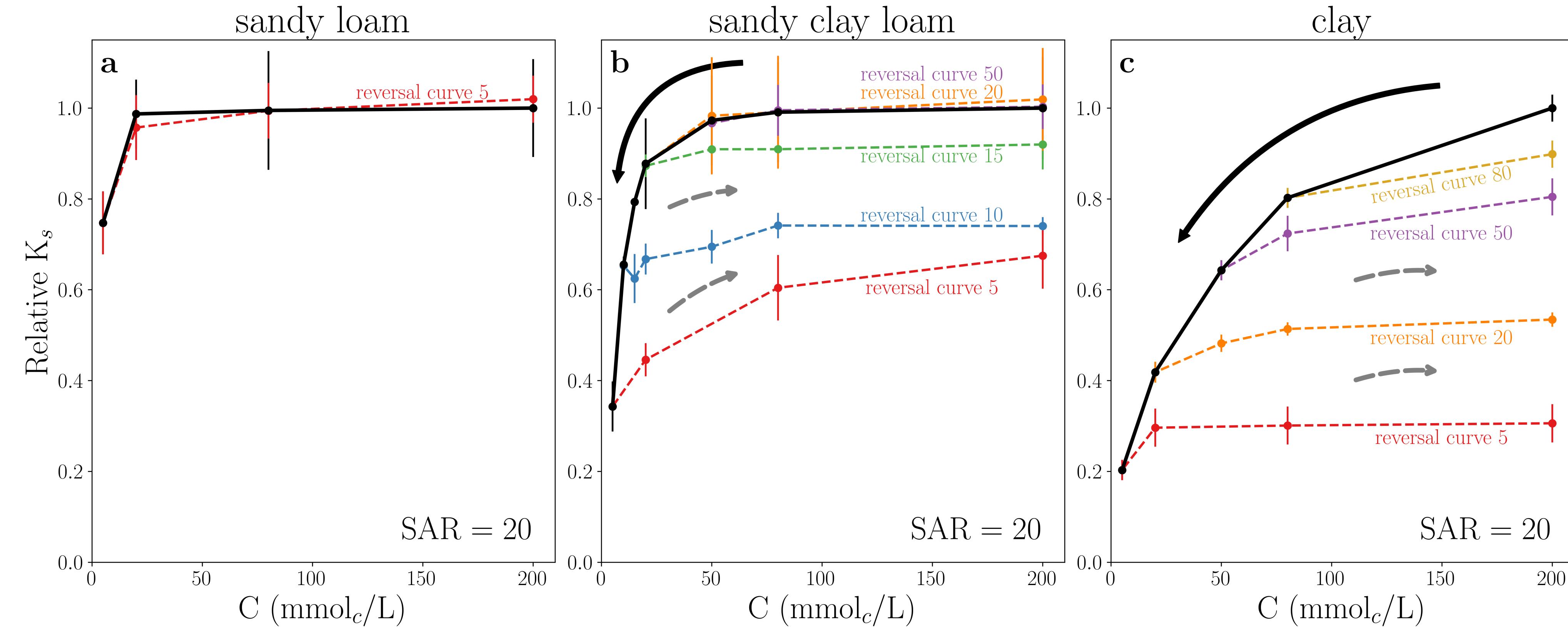
- knowledge
- political will



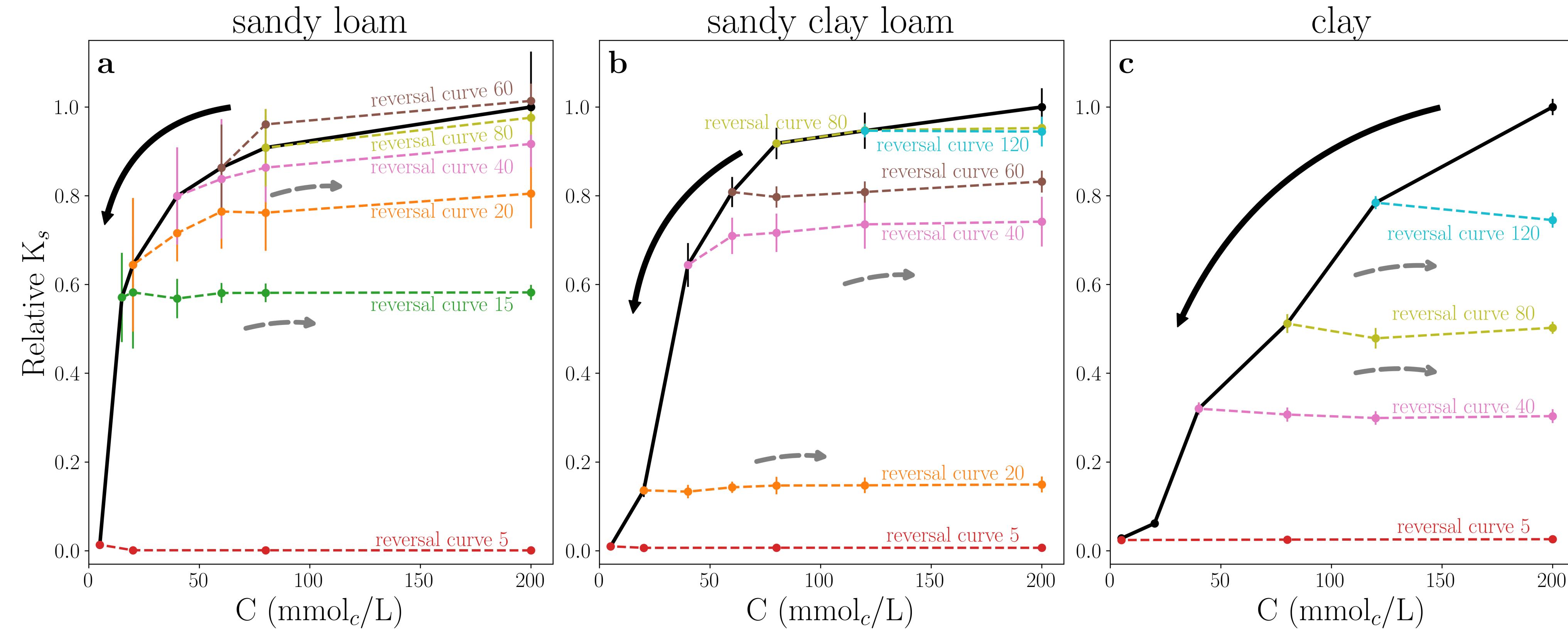
Thanks!



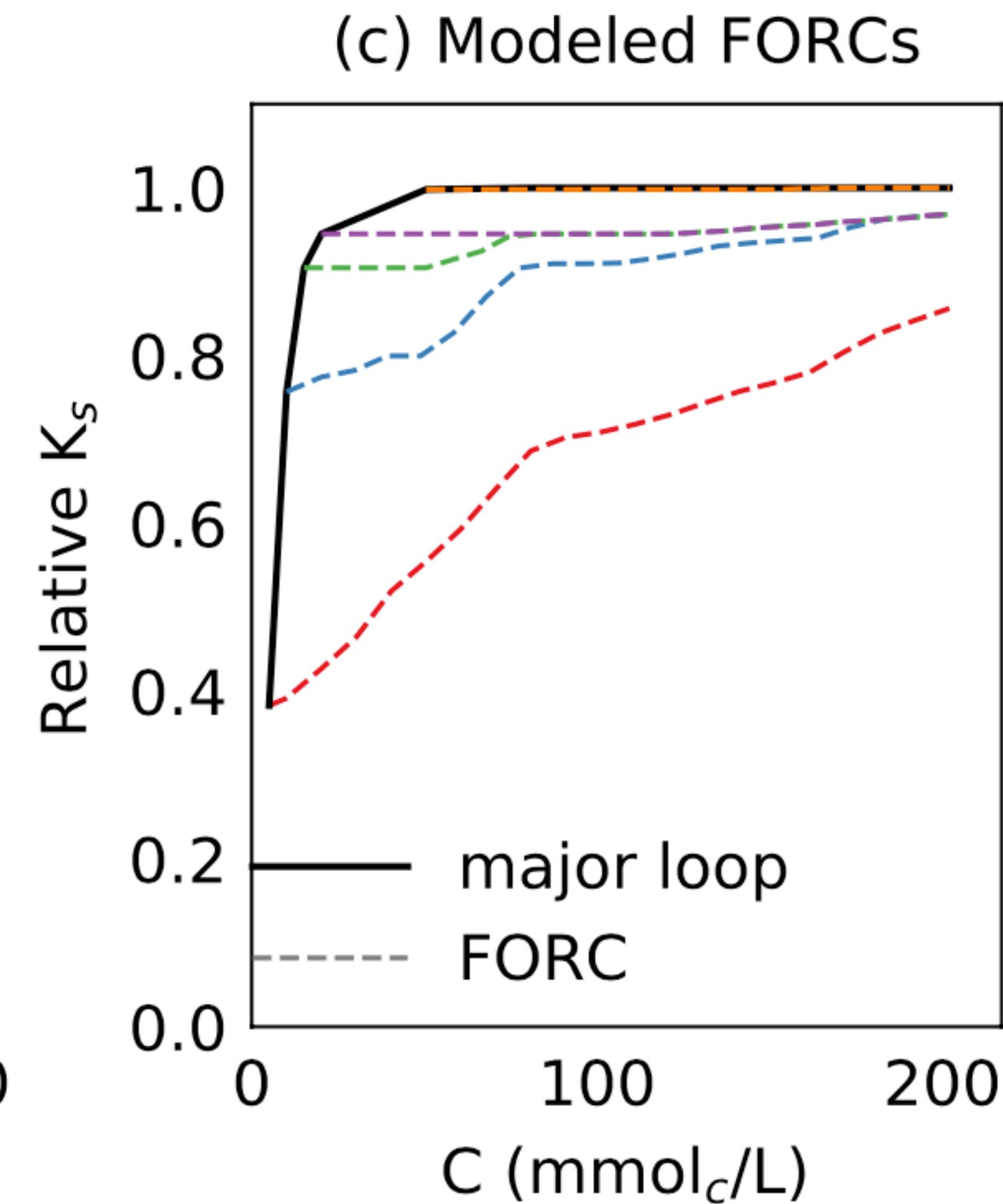
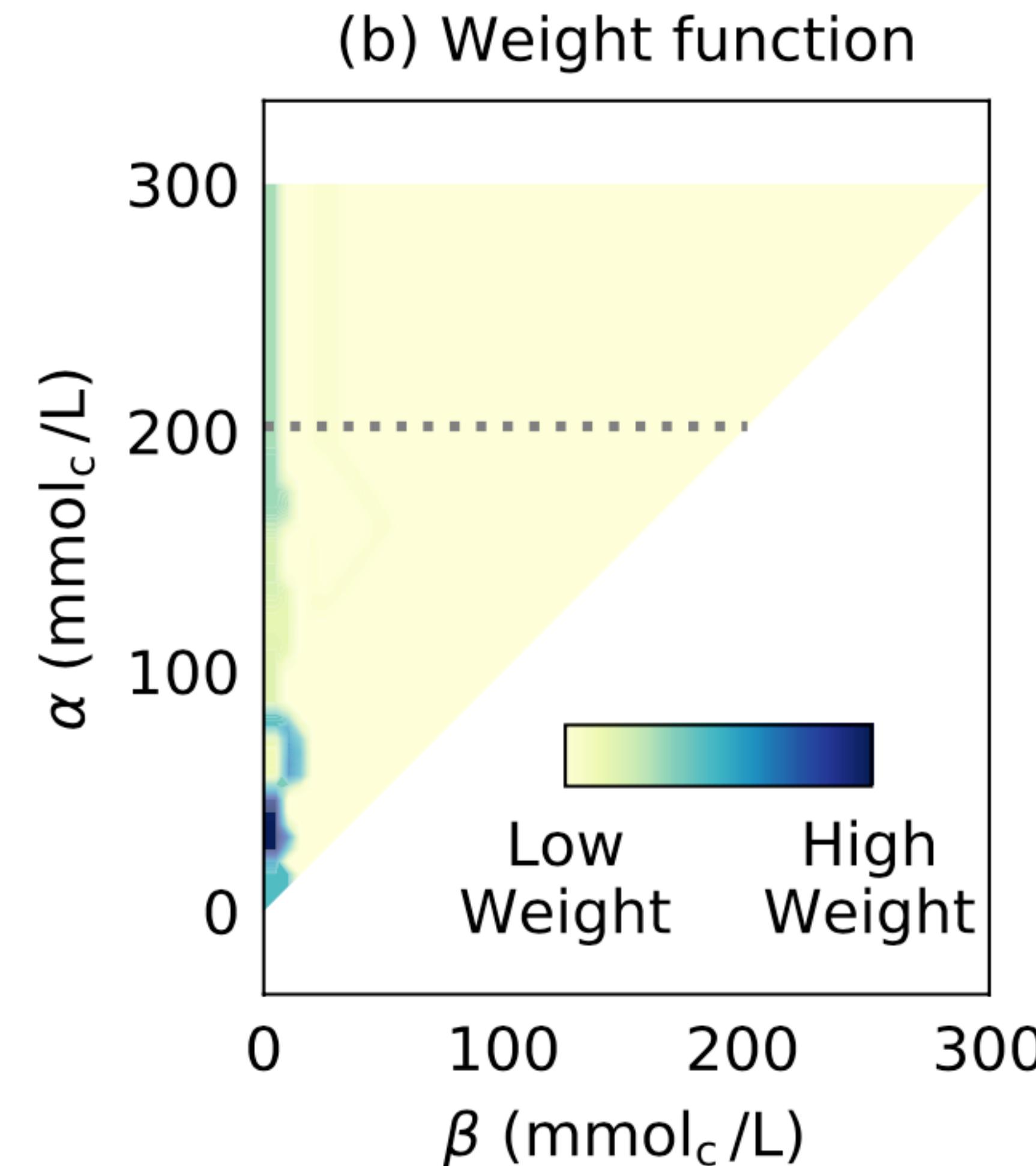
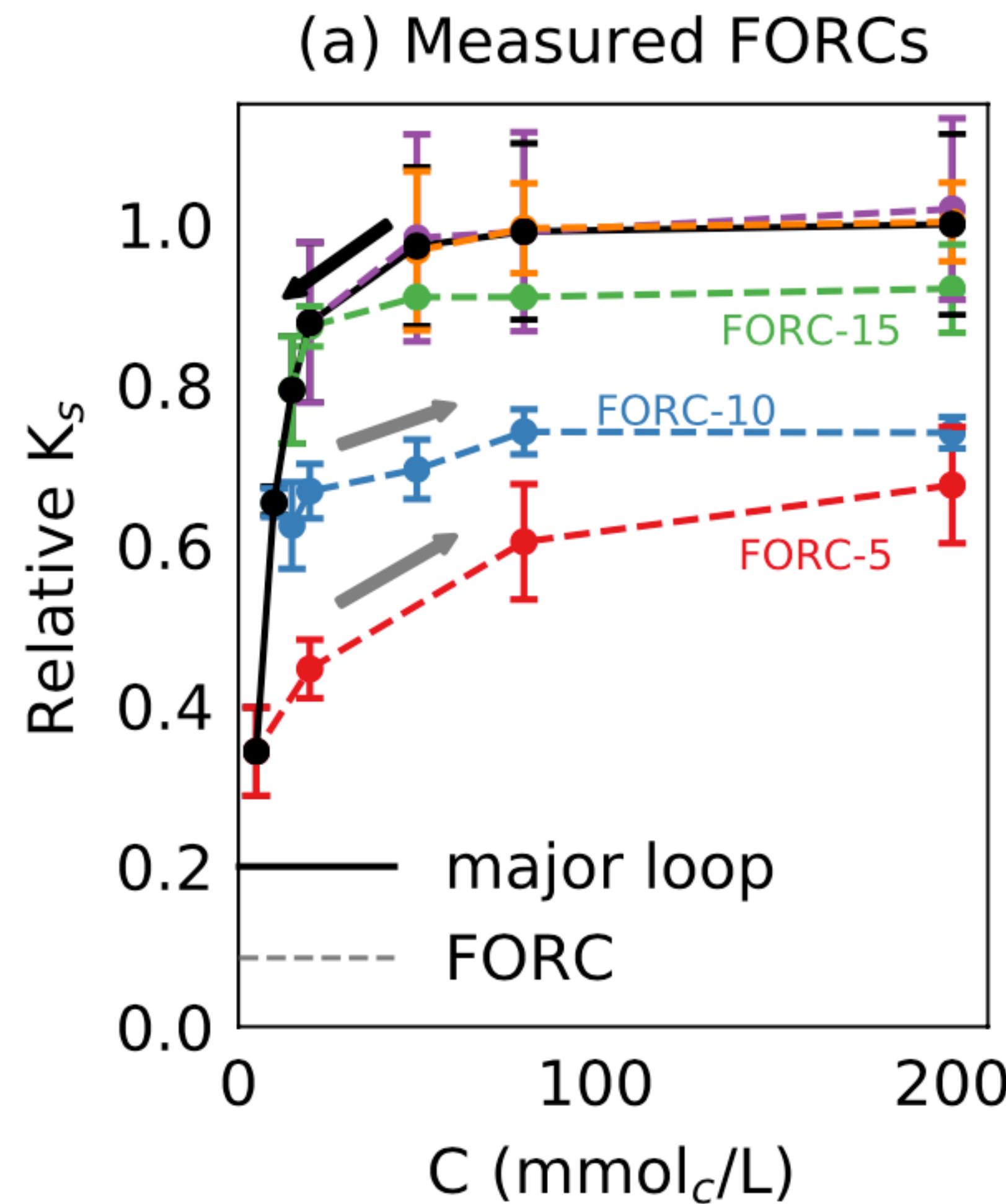
soil column experiments; SAR=20



soil column experiments; SAR=50

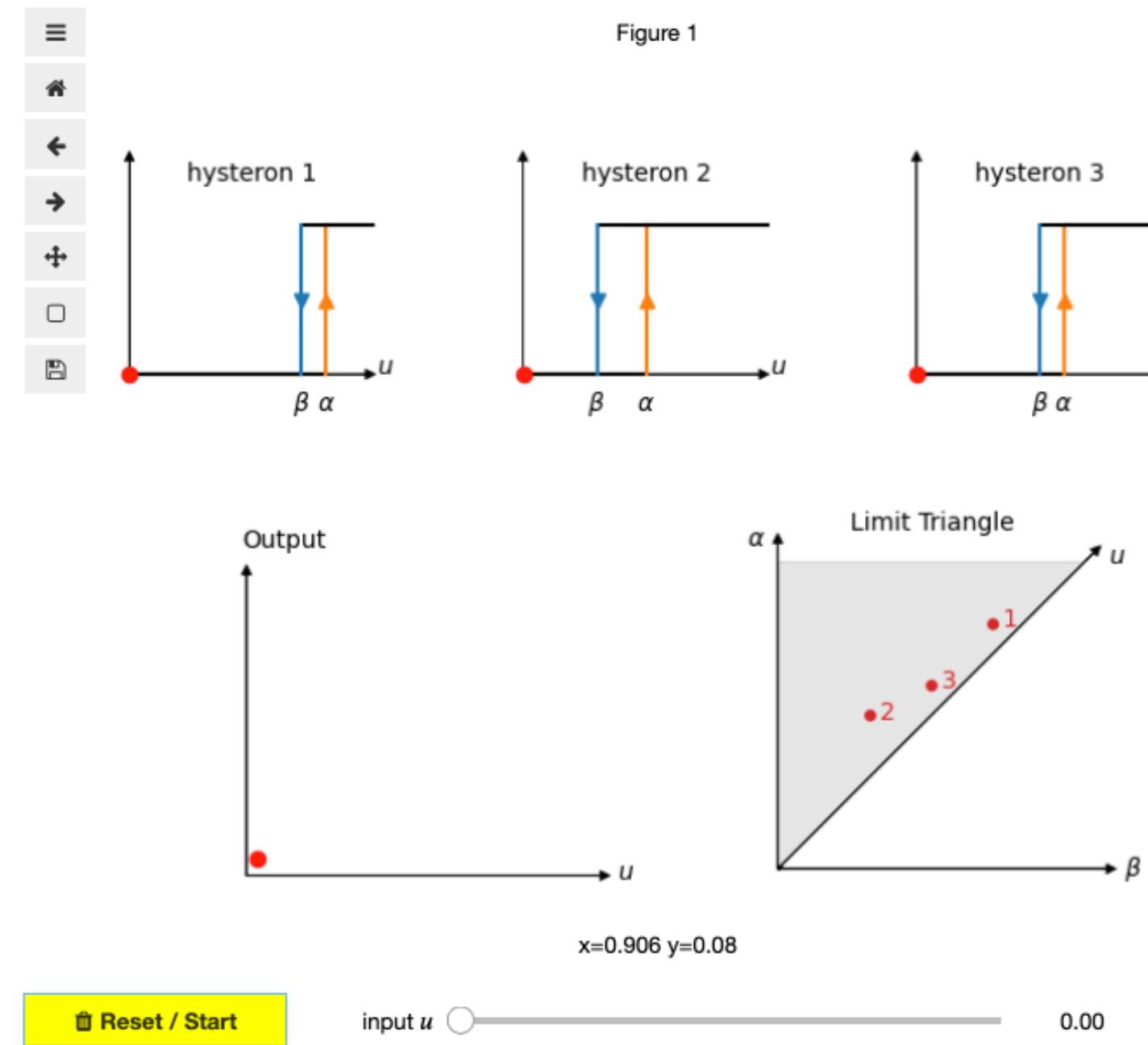


weight functions

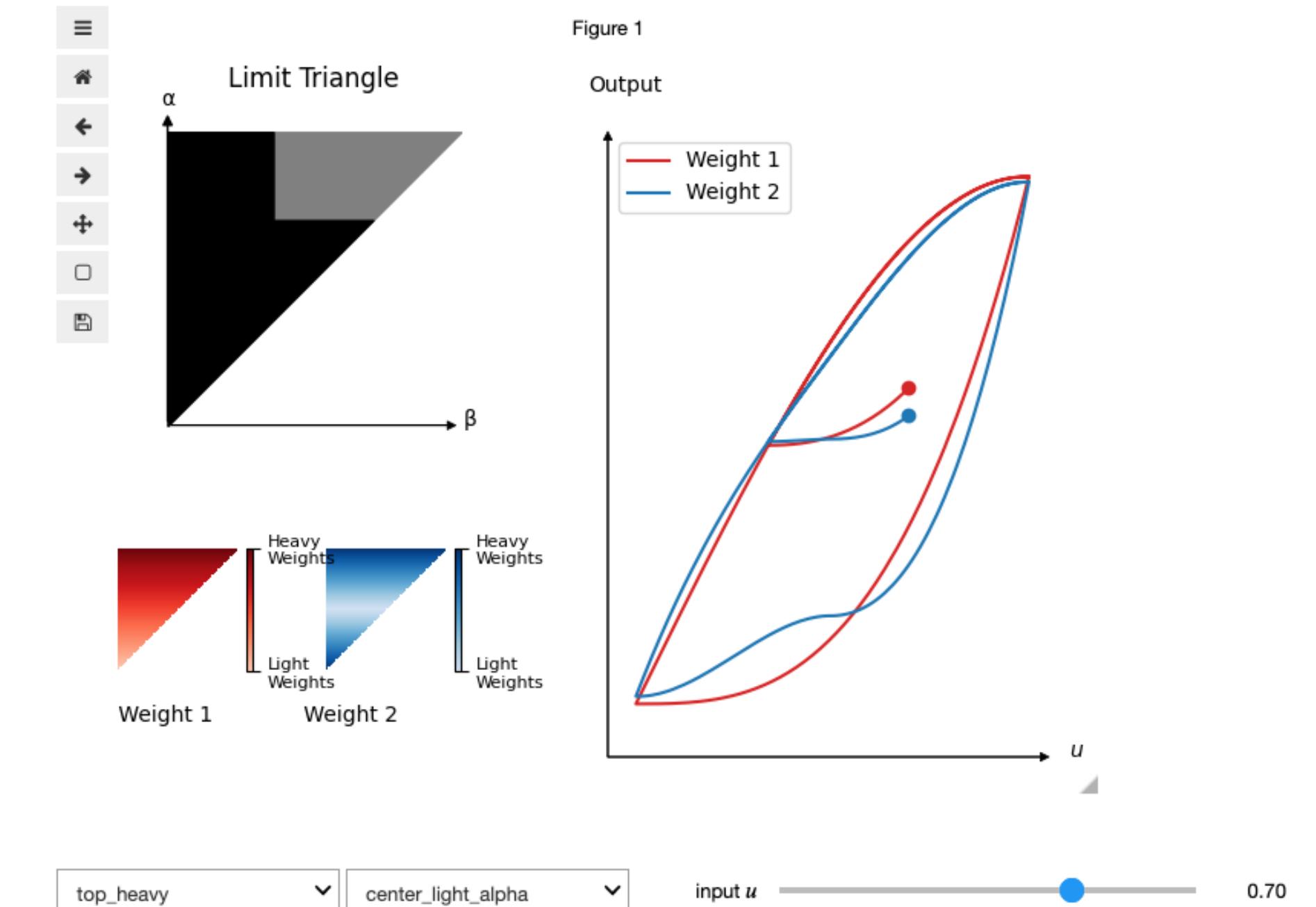


weight functions

- hysterons widget



- weight function widget



Kramer, I., Bayer, Y., Adeyemo, T., & Mau, Y., "Hysteresis in soil hydraulic conductivity as driven by salinity and sodicity—a modeling framework." HESS, 2021