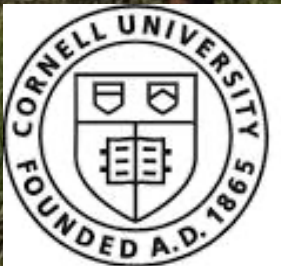


The impact of agricultural sulfur use on mercury methylation in vineyards



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Acknowledgements

Key collaborators

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Michelle Rothman

CU Boulder

Clifford Adamchak

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Hannah Miller

Laura Rea

Zachary Schwartz

Mia Williams



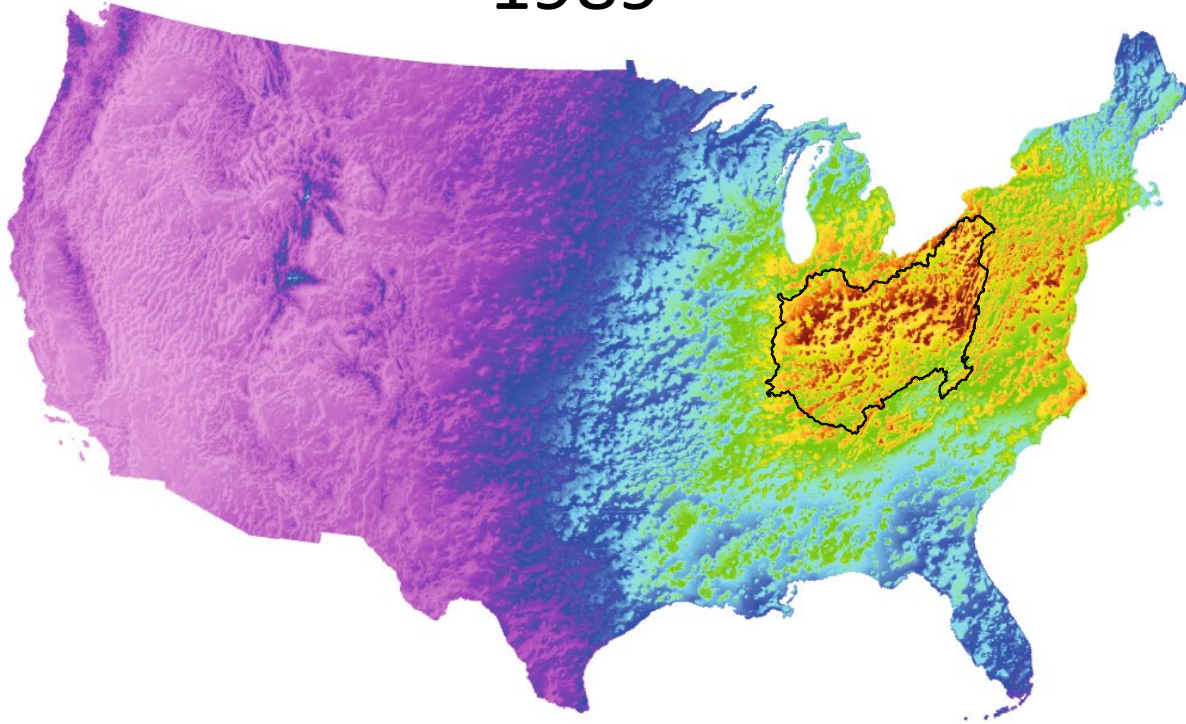
USDA NIFA Award #2022-67019-36103



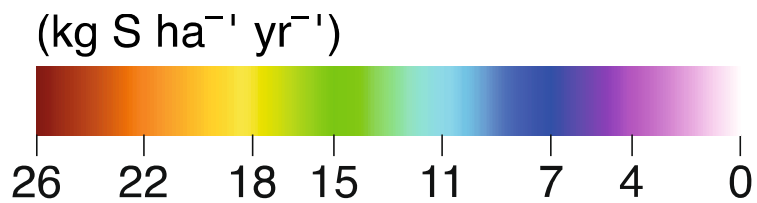
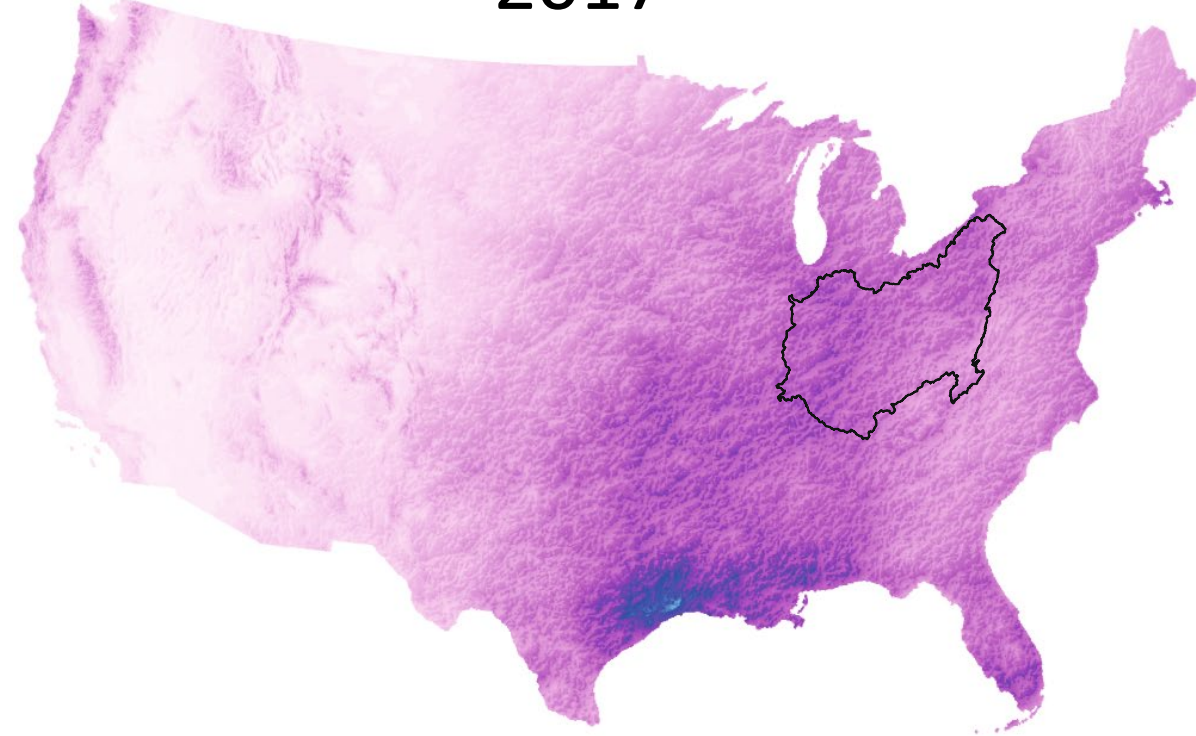
University of Colorado
Boulder

Atmospheric S deposition is decreasing

1989

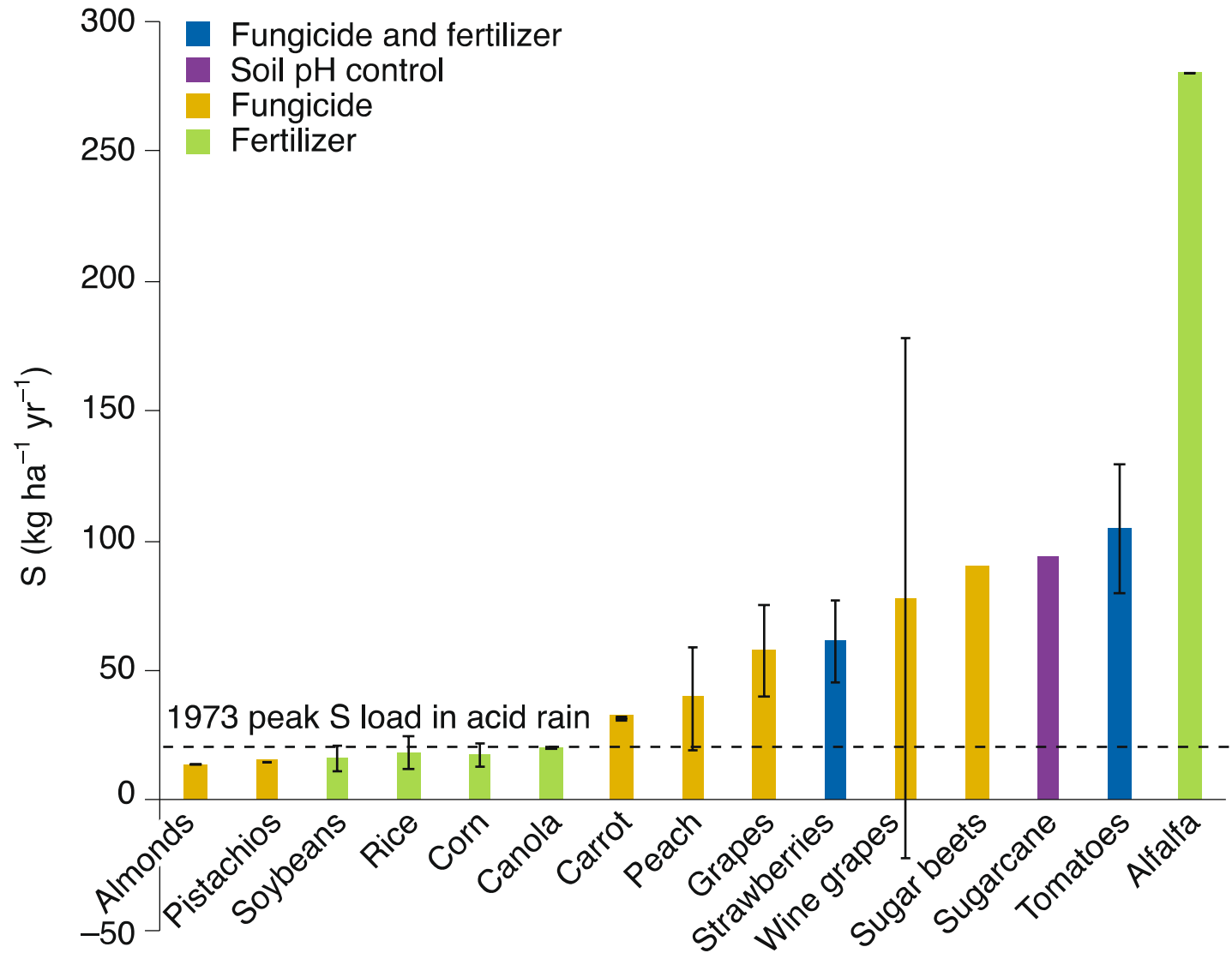


2017



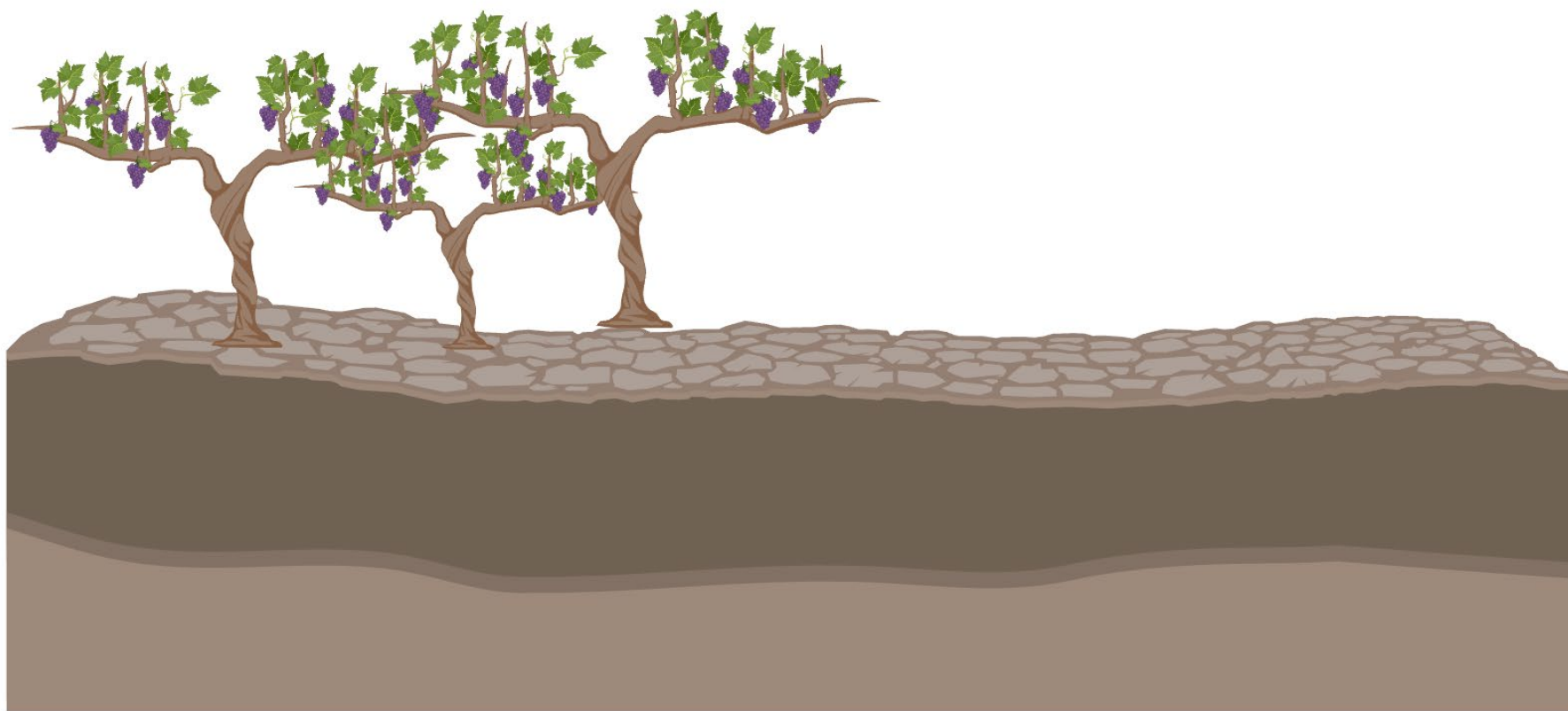
Agricultural S applications are increasing

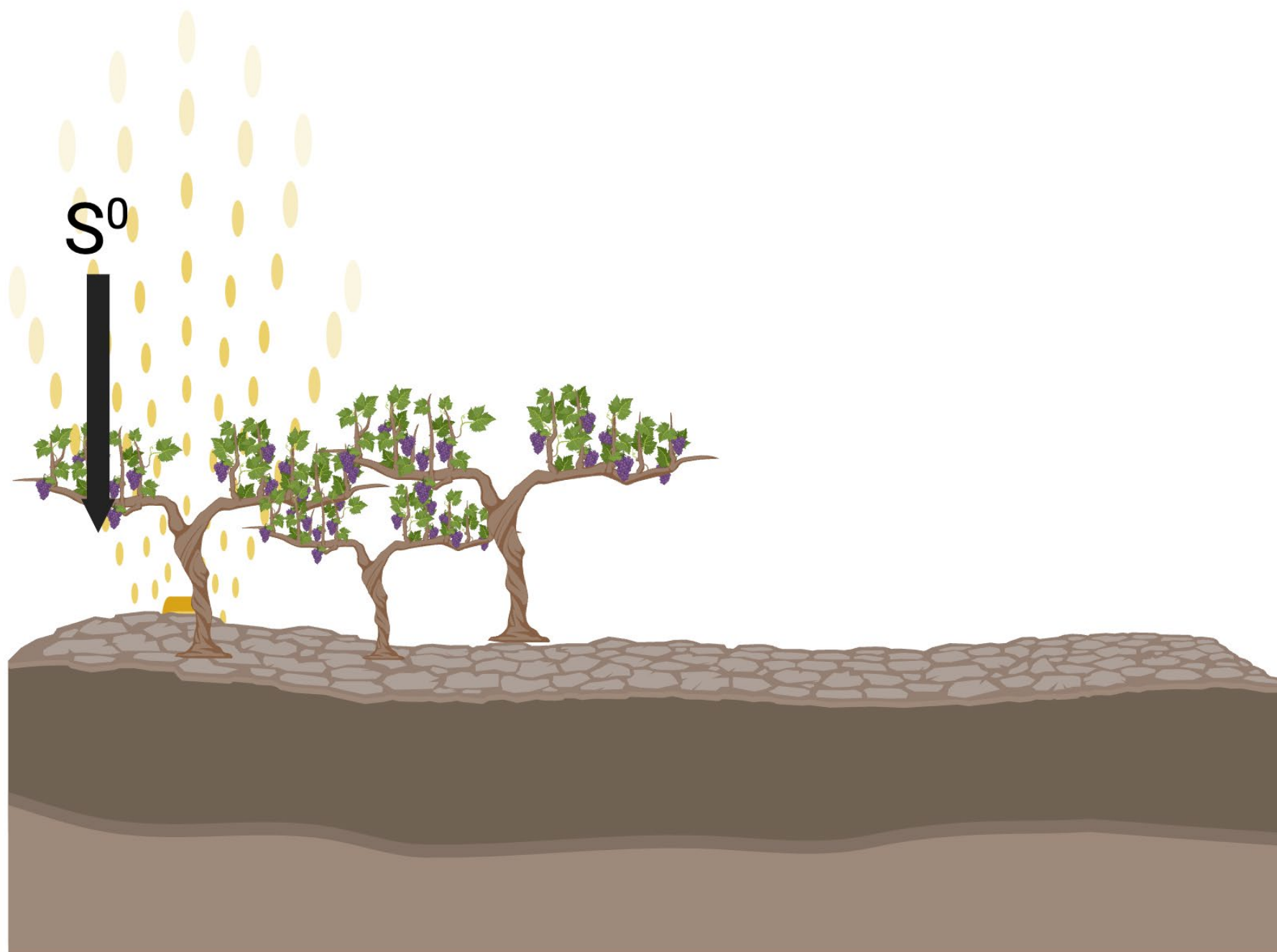
Agricultural S applications are increasing

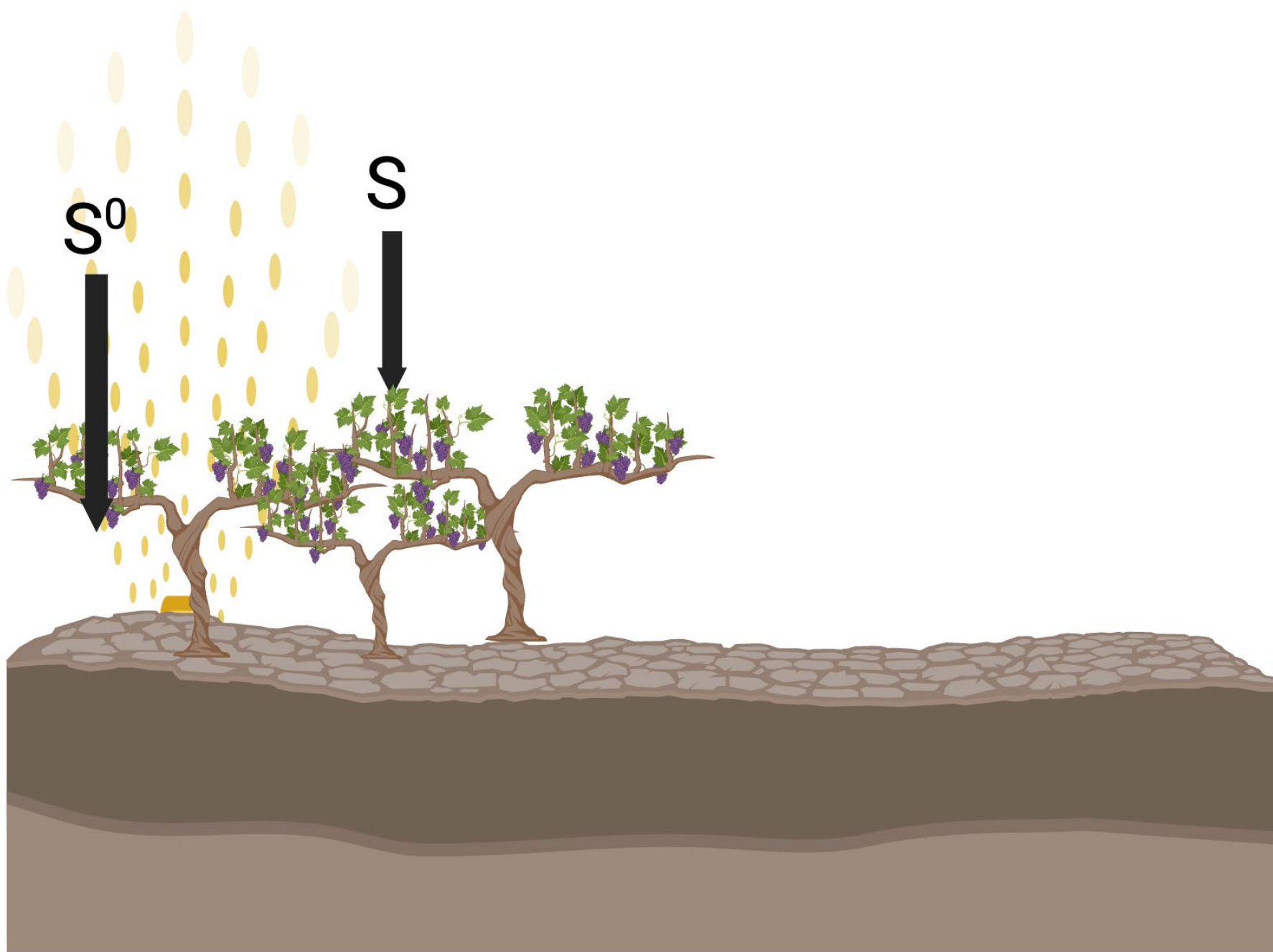


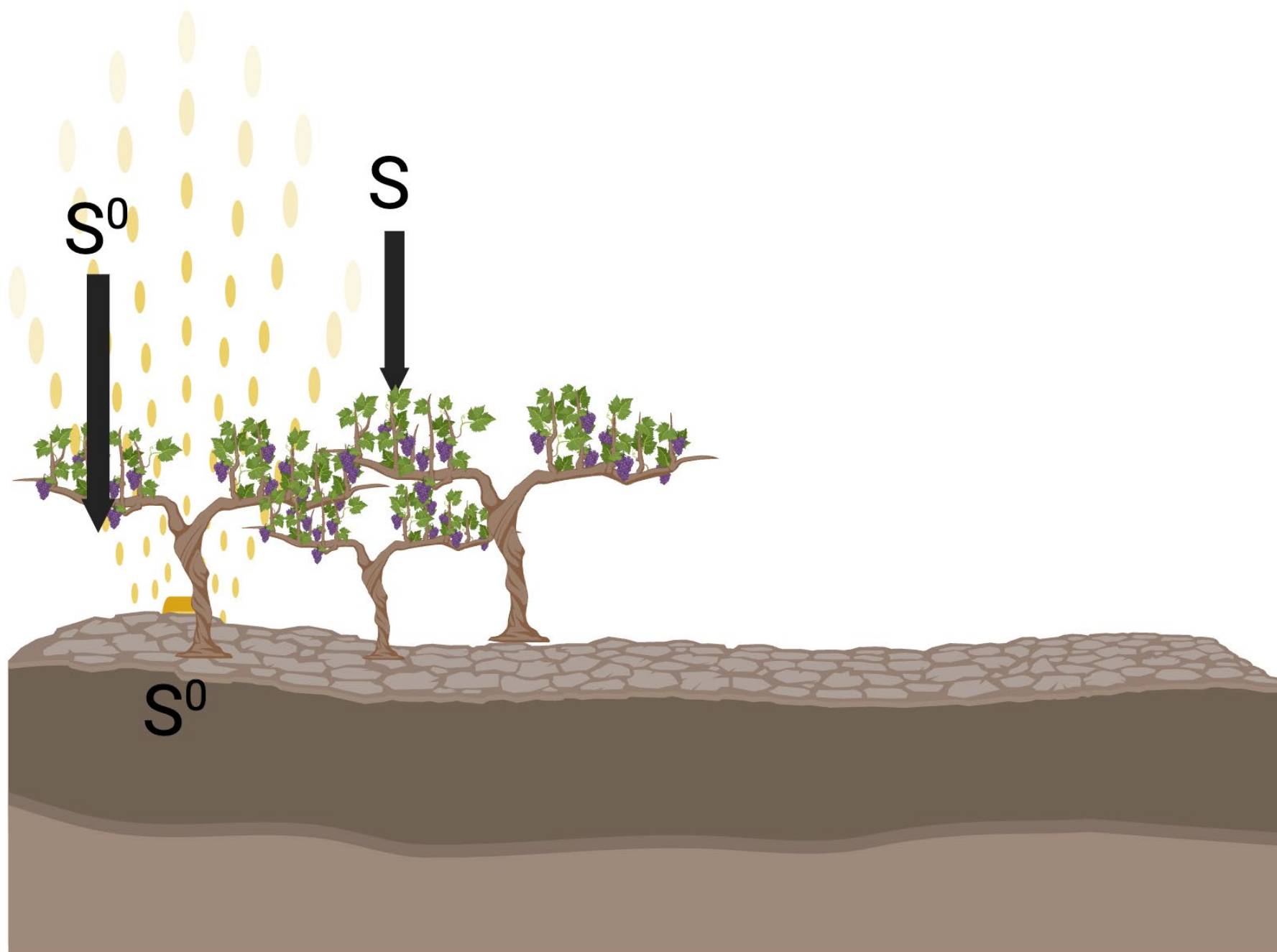
California vineyards (Napa Valley)

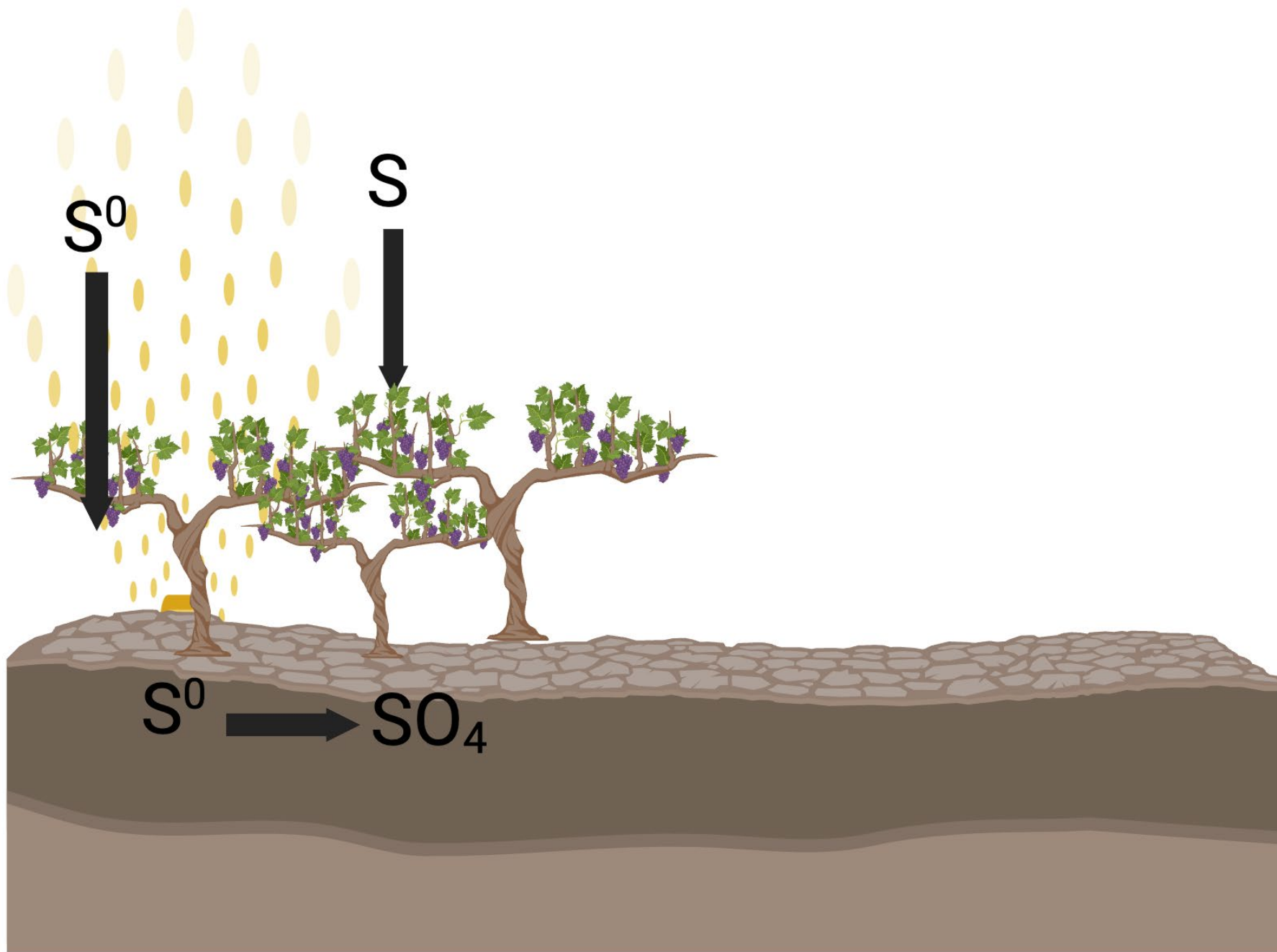


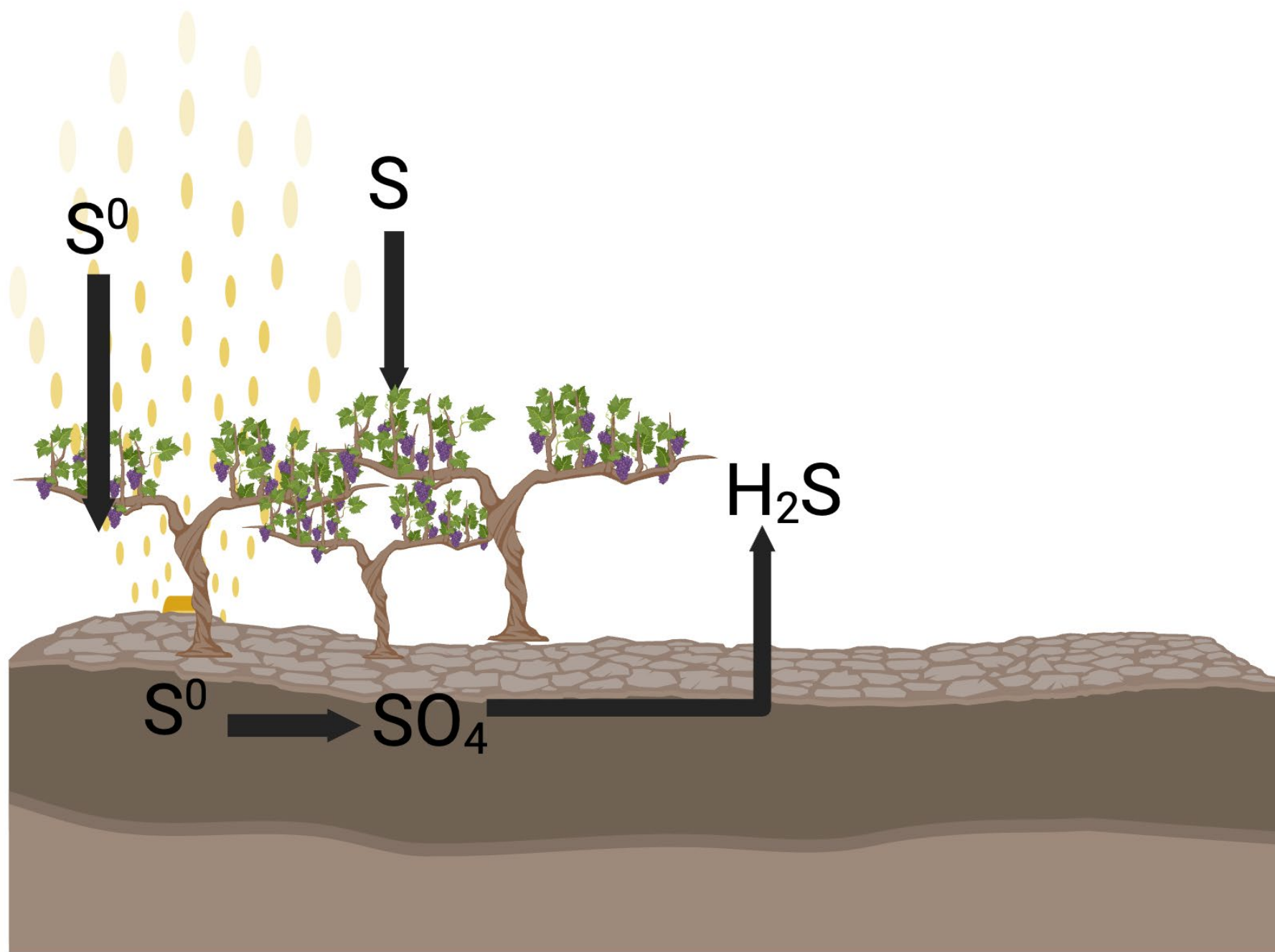


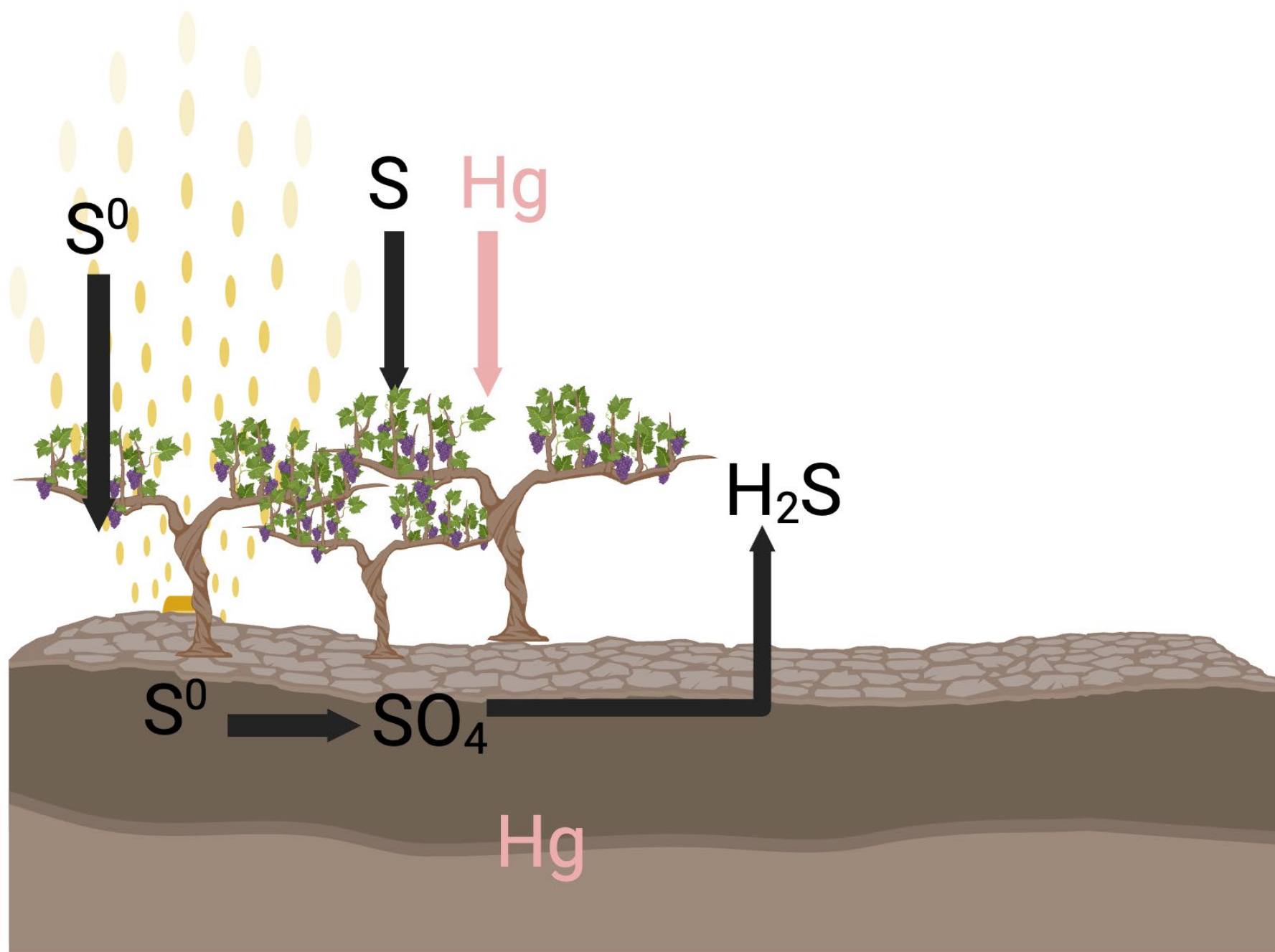






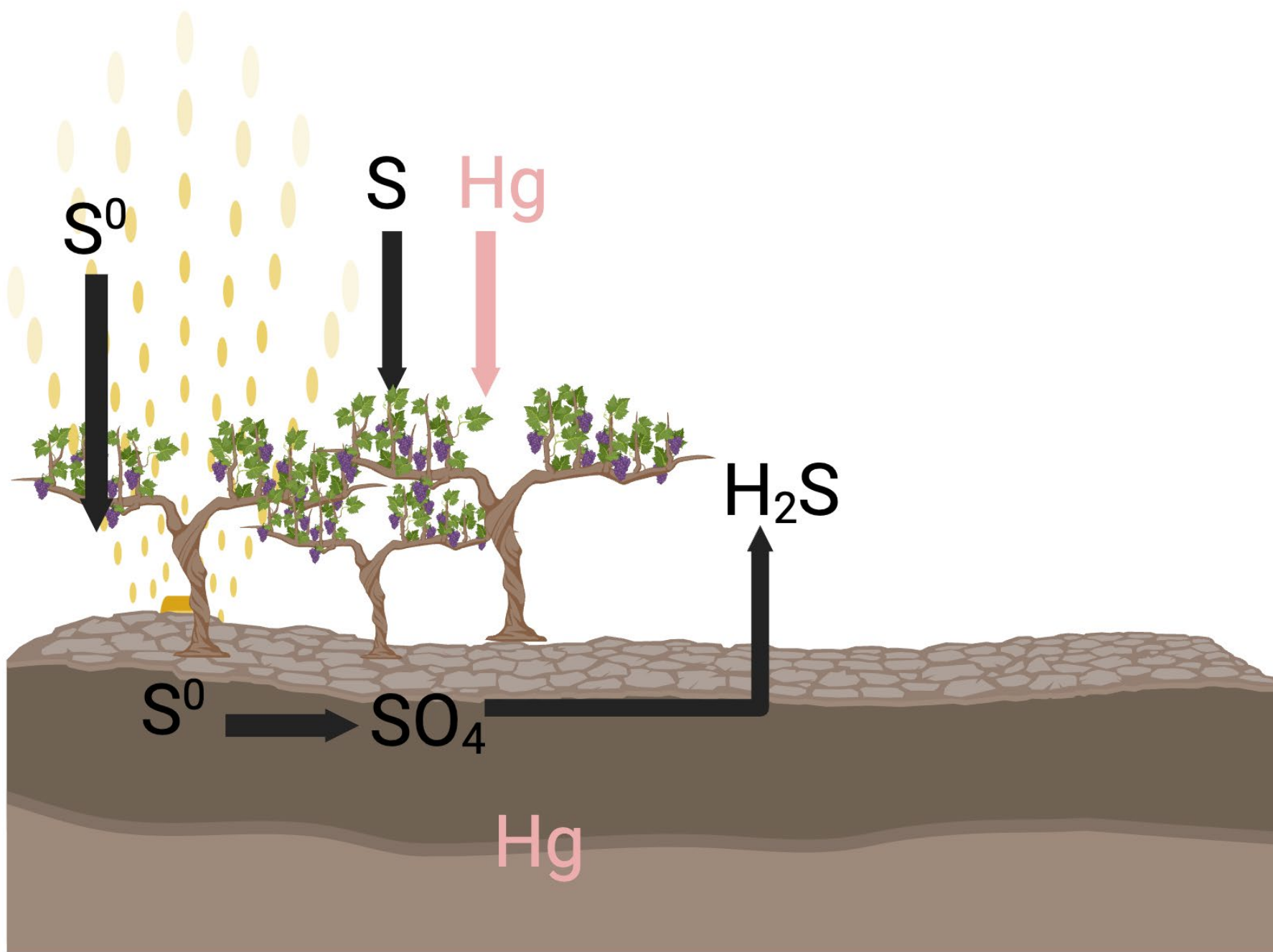


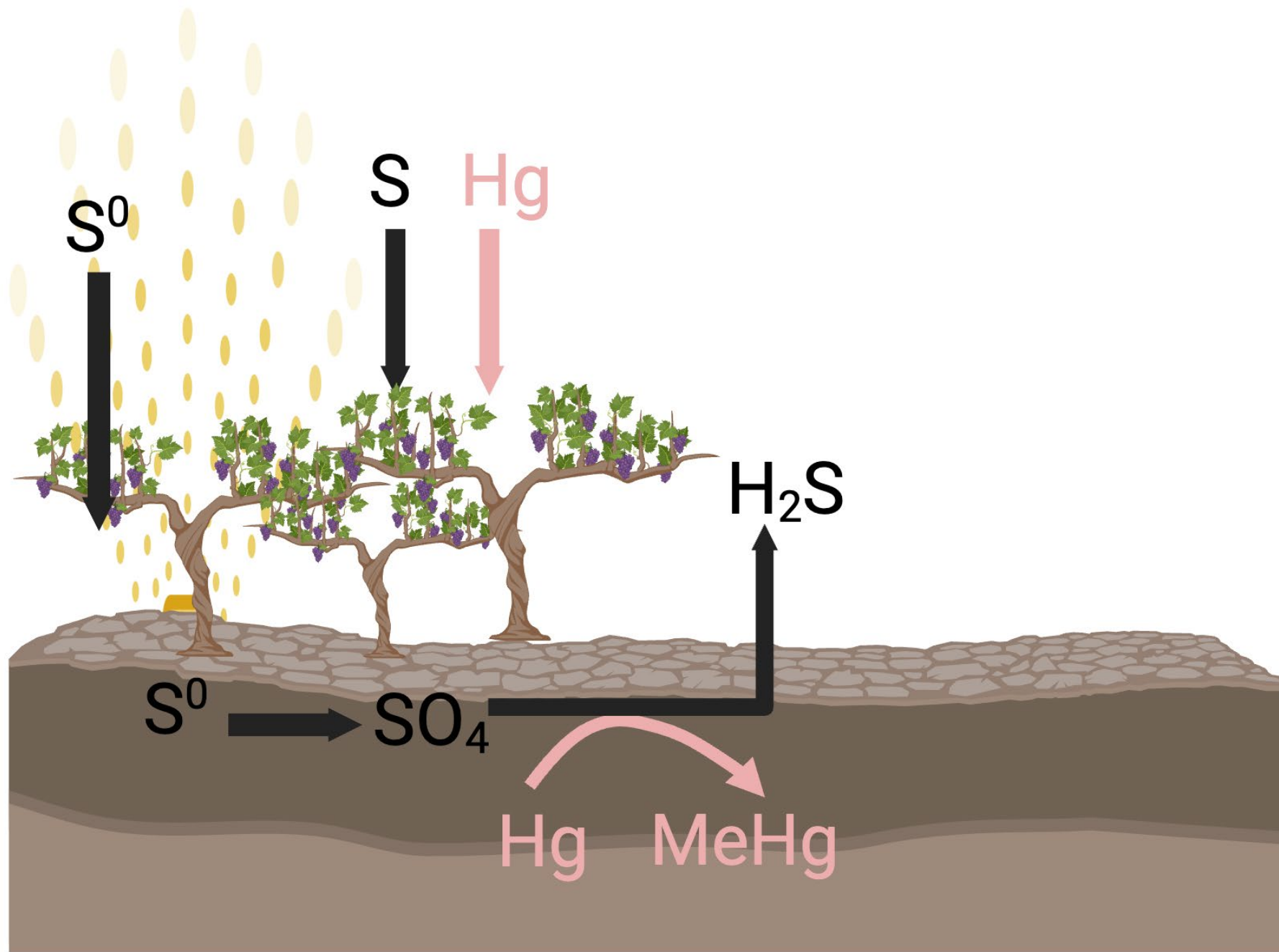




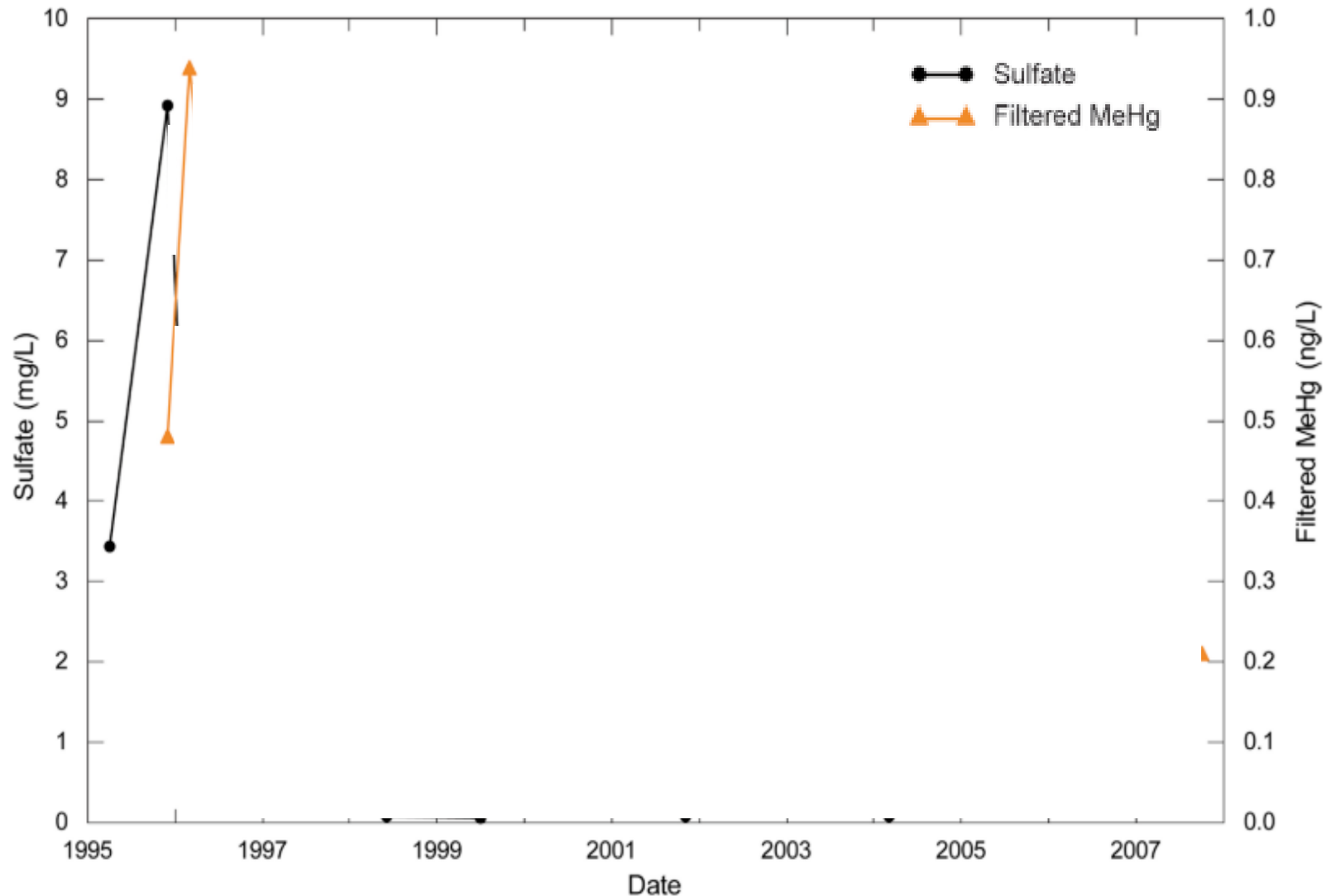




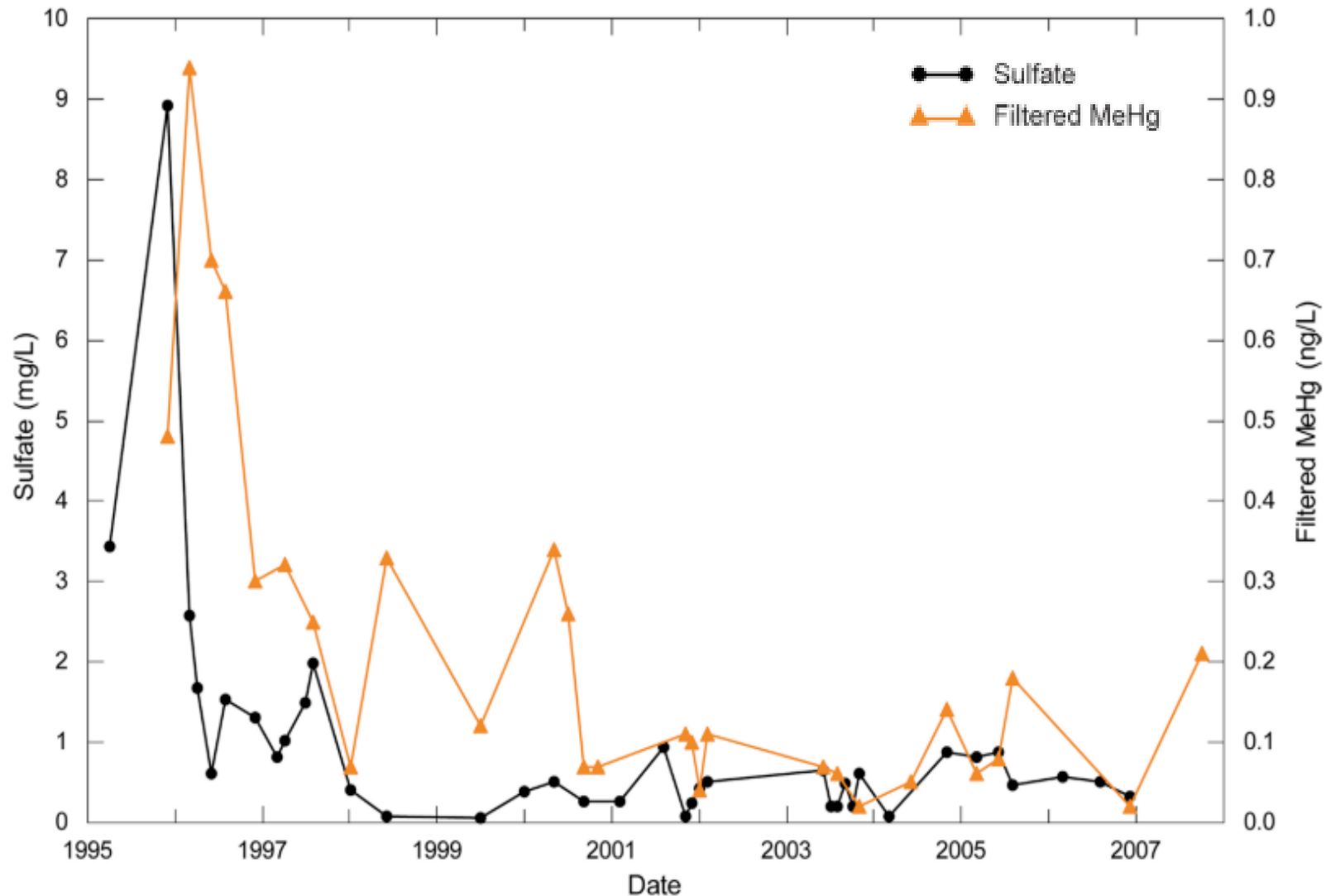




MeHg production linked to sulfate levels in the Everglades



MeHg production linked to sulfate levels in the Everglades



How does Hg methylation in vineyards compare to non-agricultural soils?

High S inputs



Vineyard
(n=4)

Low S inputs



Woodland
(n=2)



Grassland
(n=2)

How does Hg methylation in vineyards compare to non-agricultural soils?

End of dry growing season (Oct)



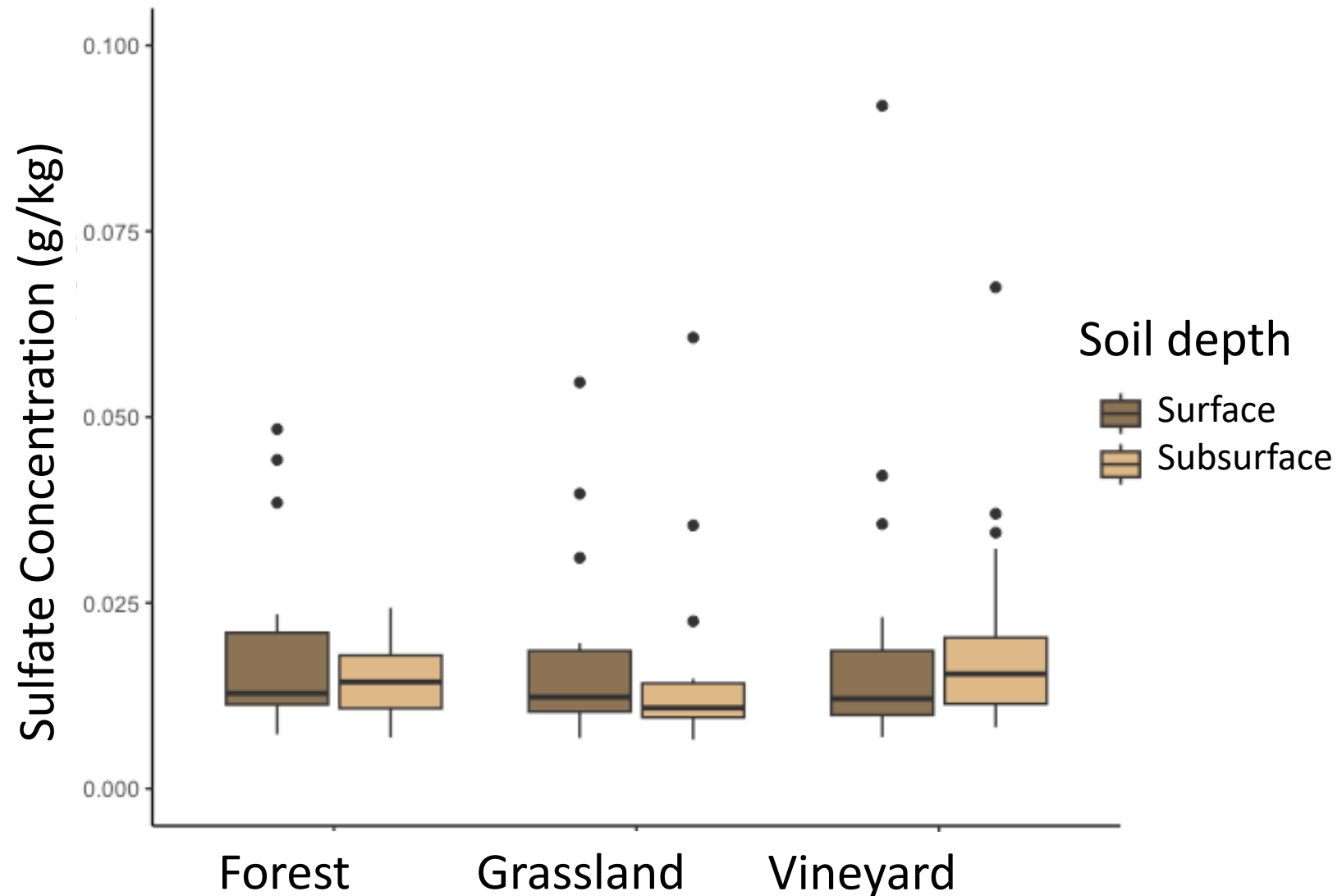
Middle of rainy dormant season (Feb)



Samples collected at 2 depths: 0-10 cm, 10-20 cm

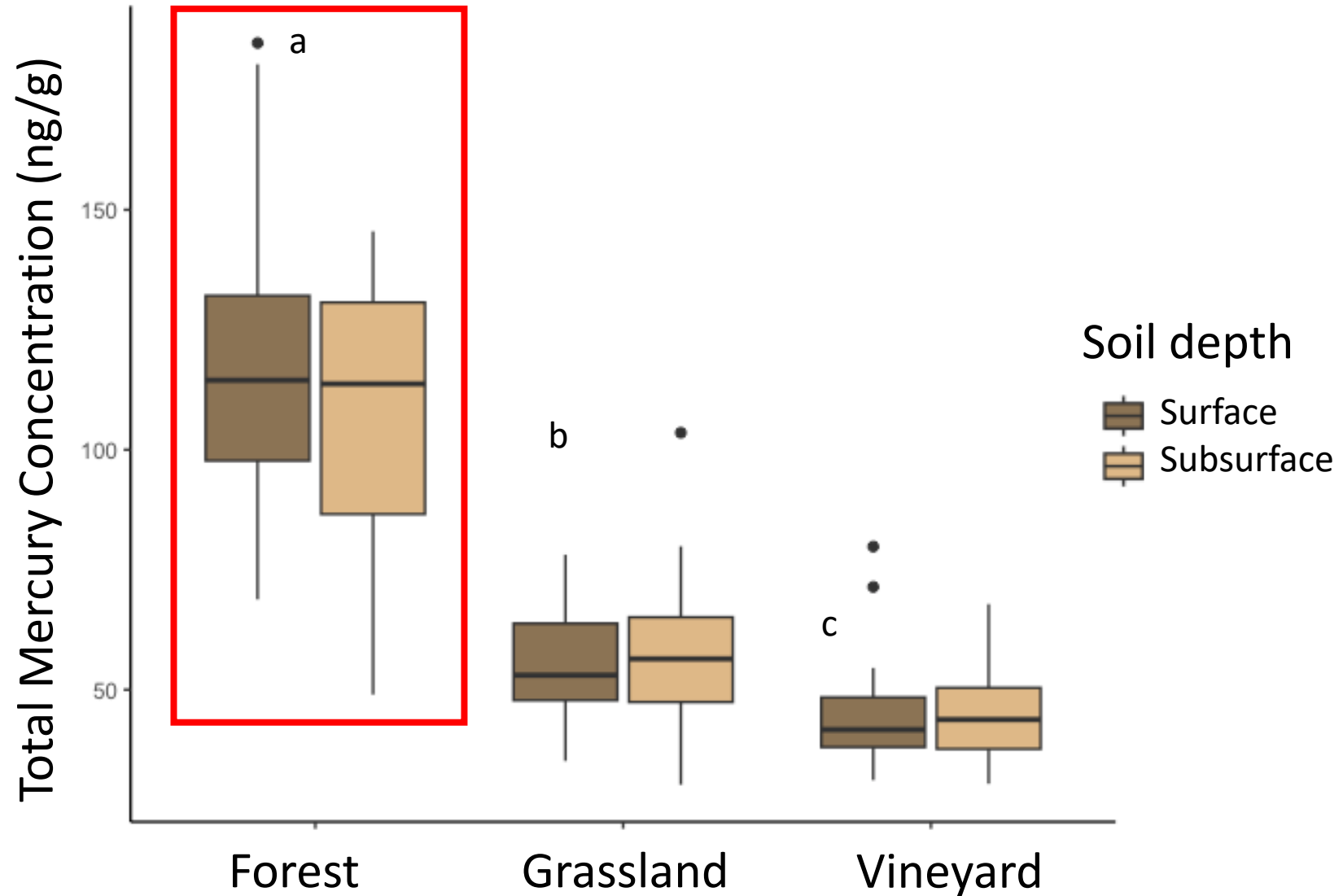


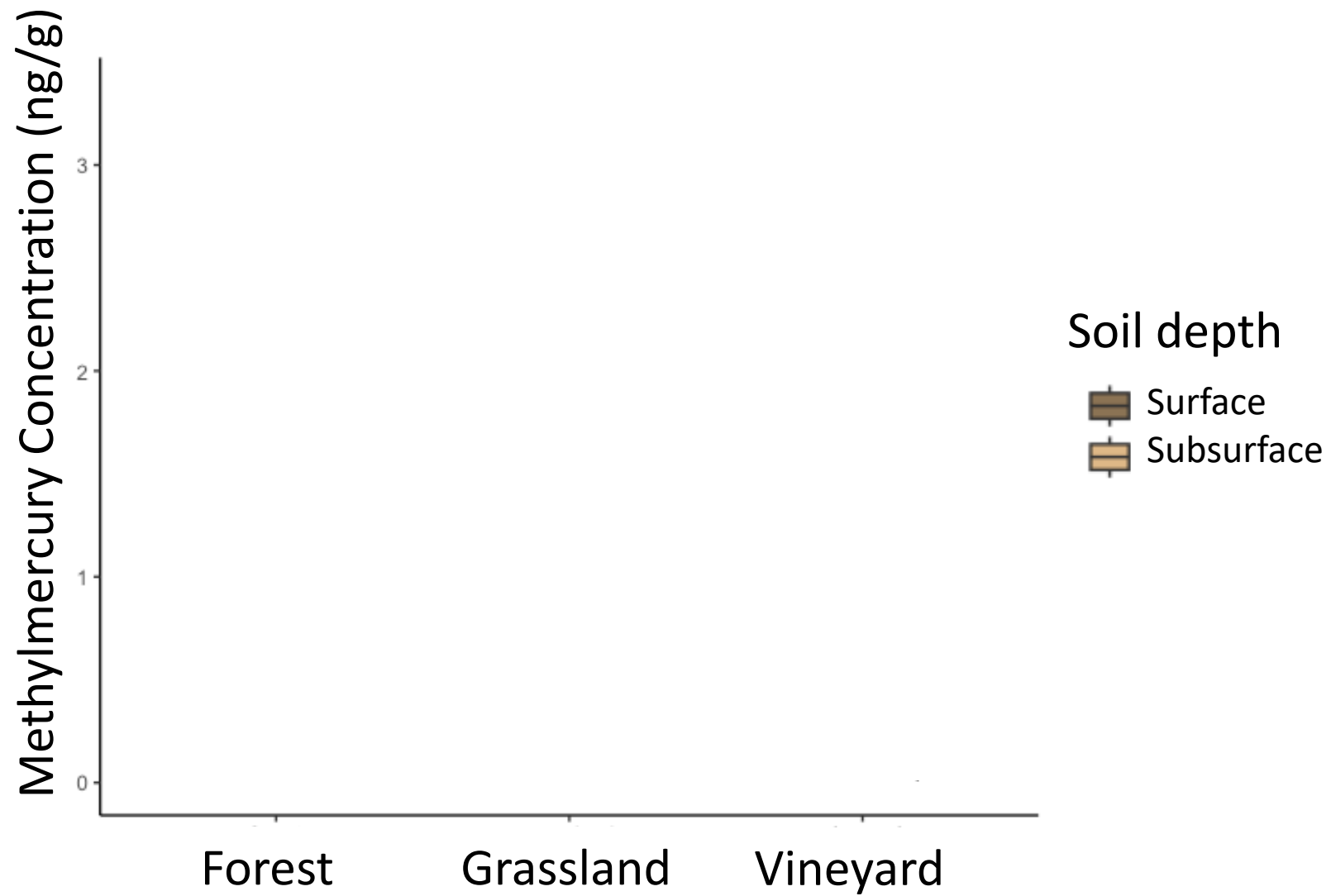
Soil sulfate does not differ between sites



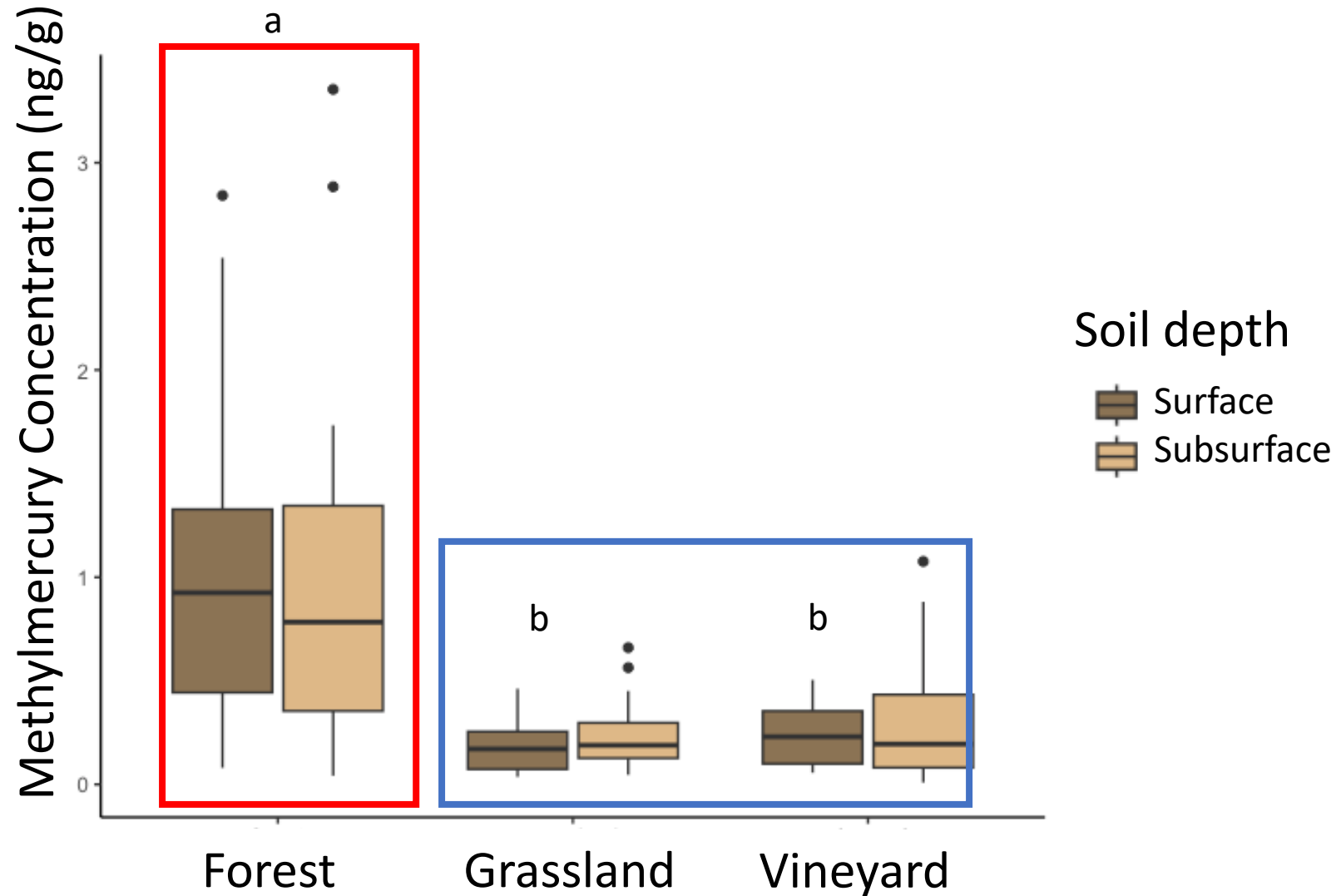


Soil total Hg is greatest in forests



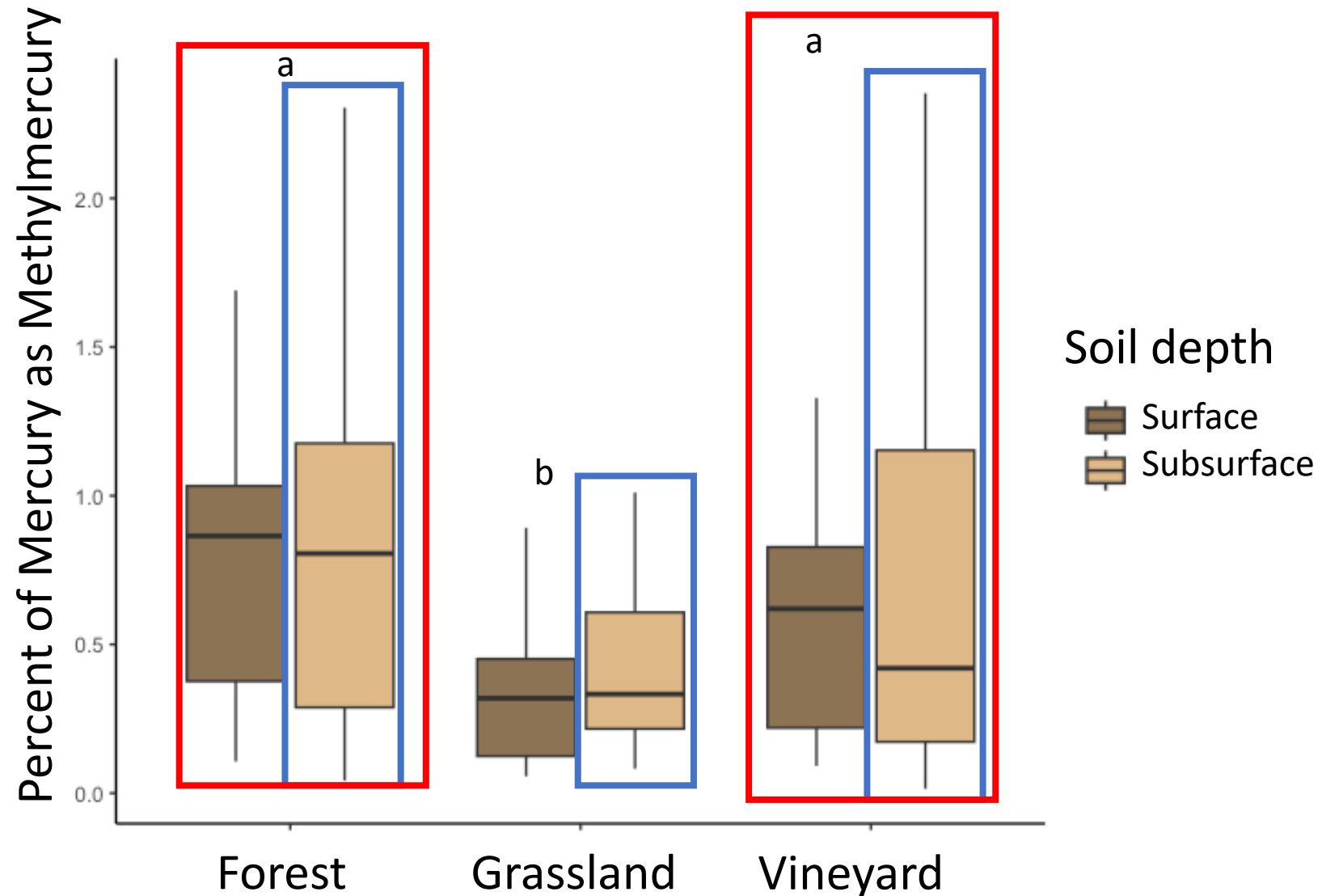


Soil MeHg is greatest in forests

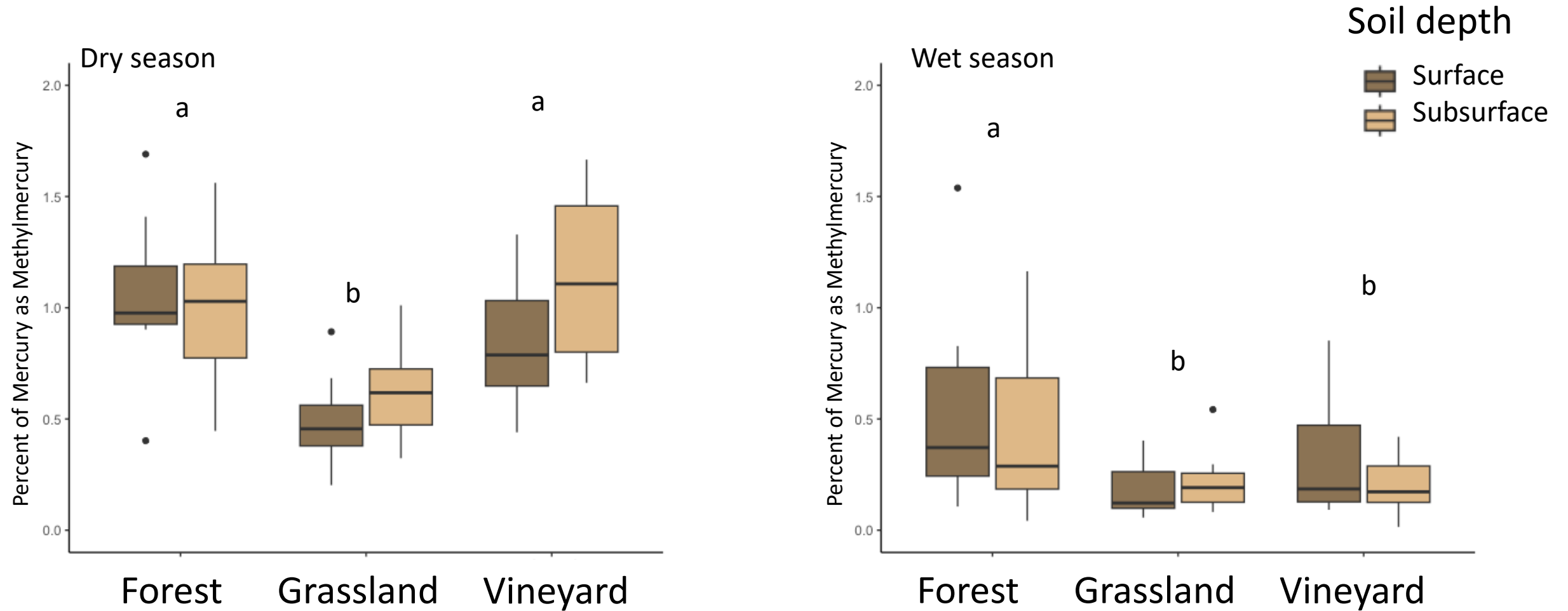




Soil %MeHg is the same in forests and vineyards

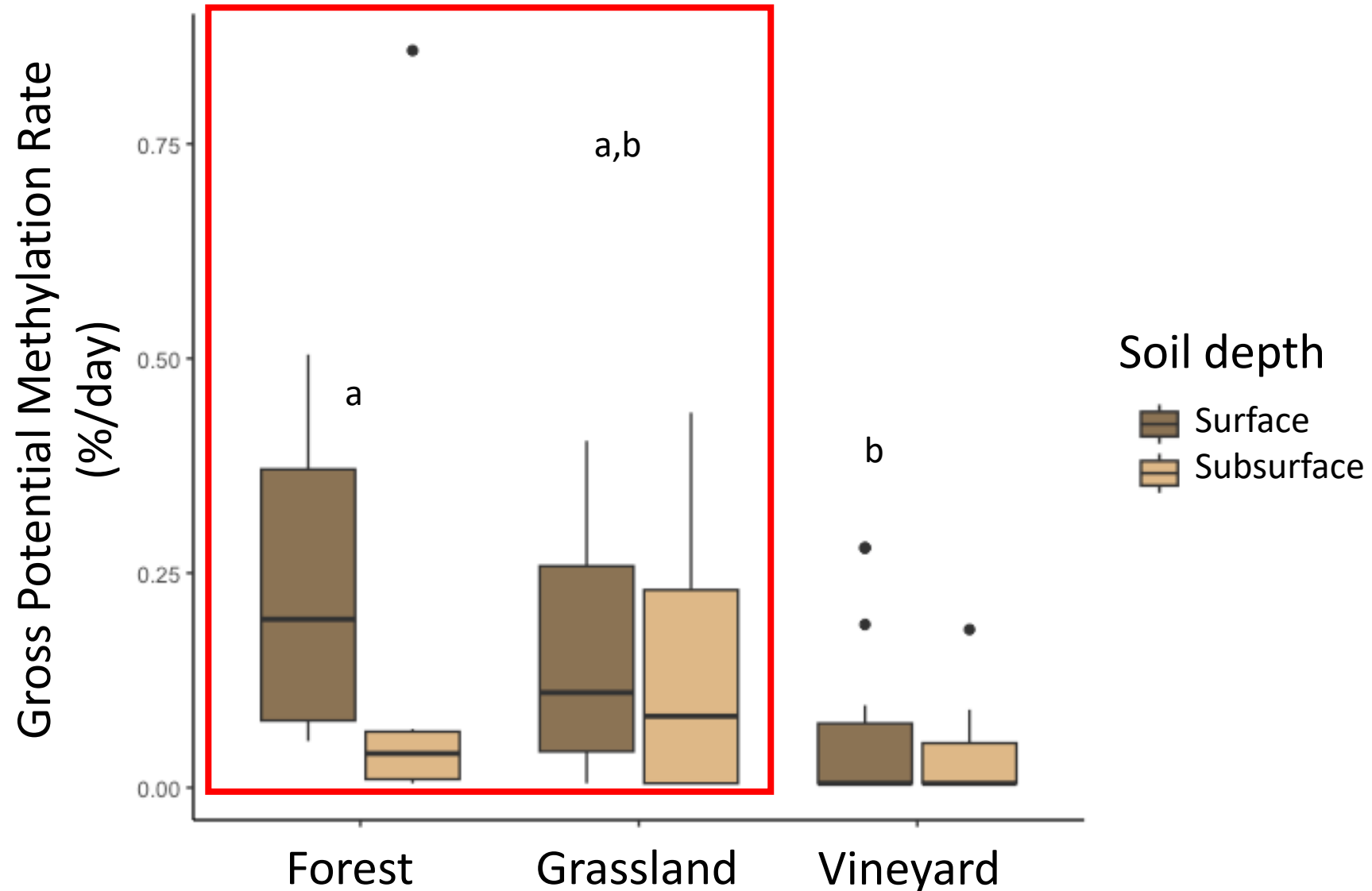


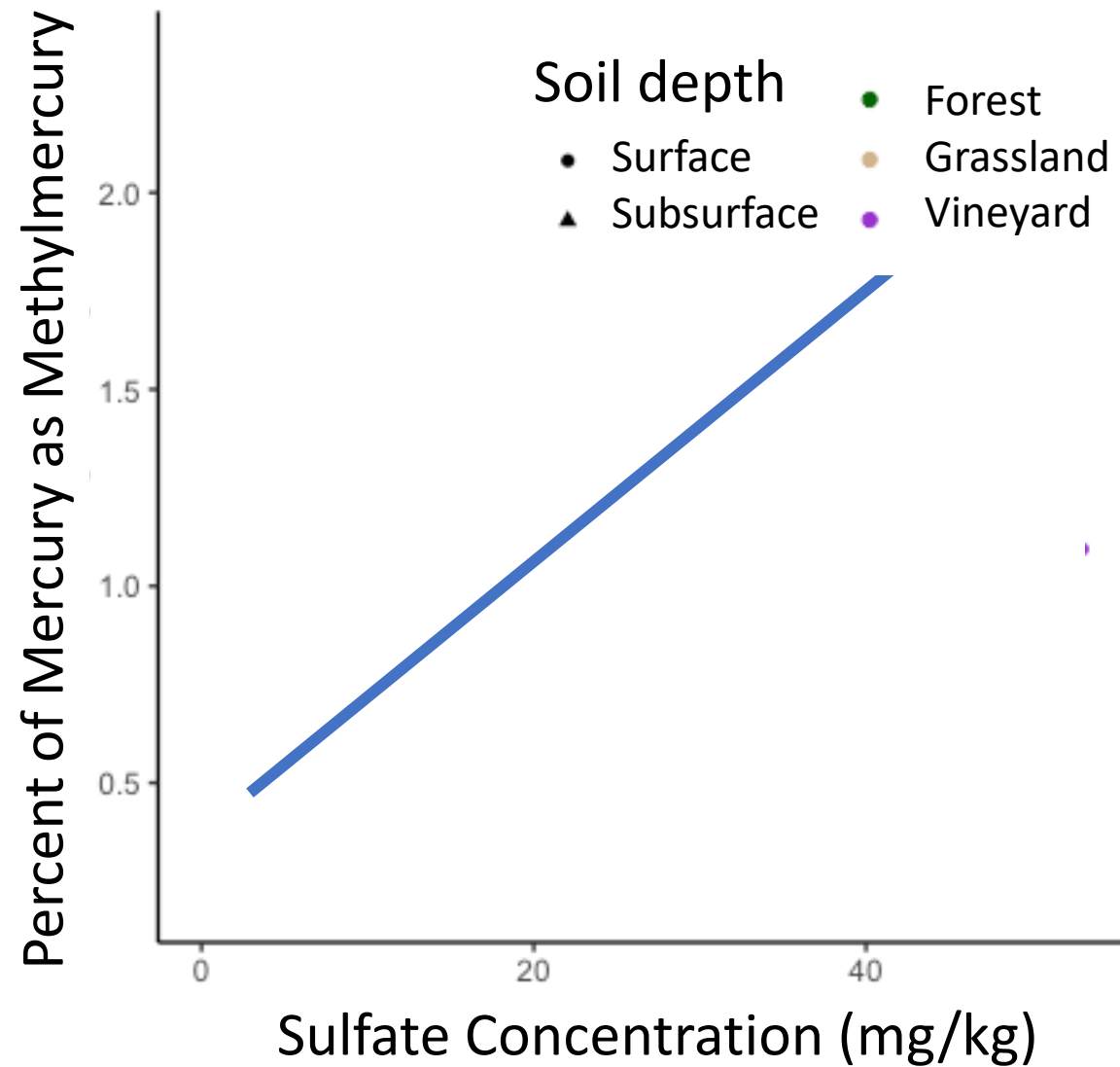
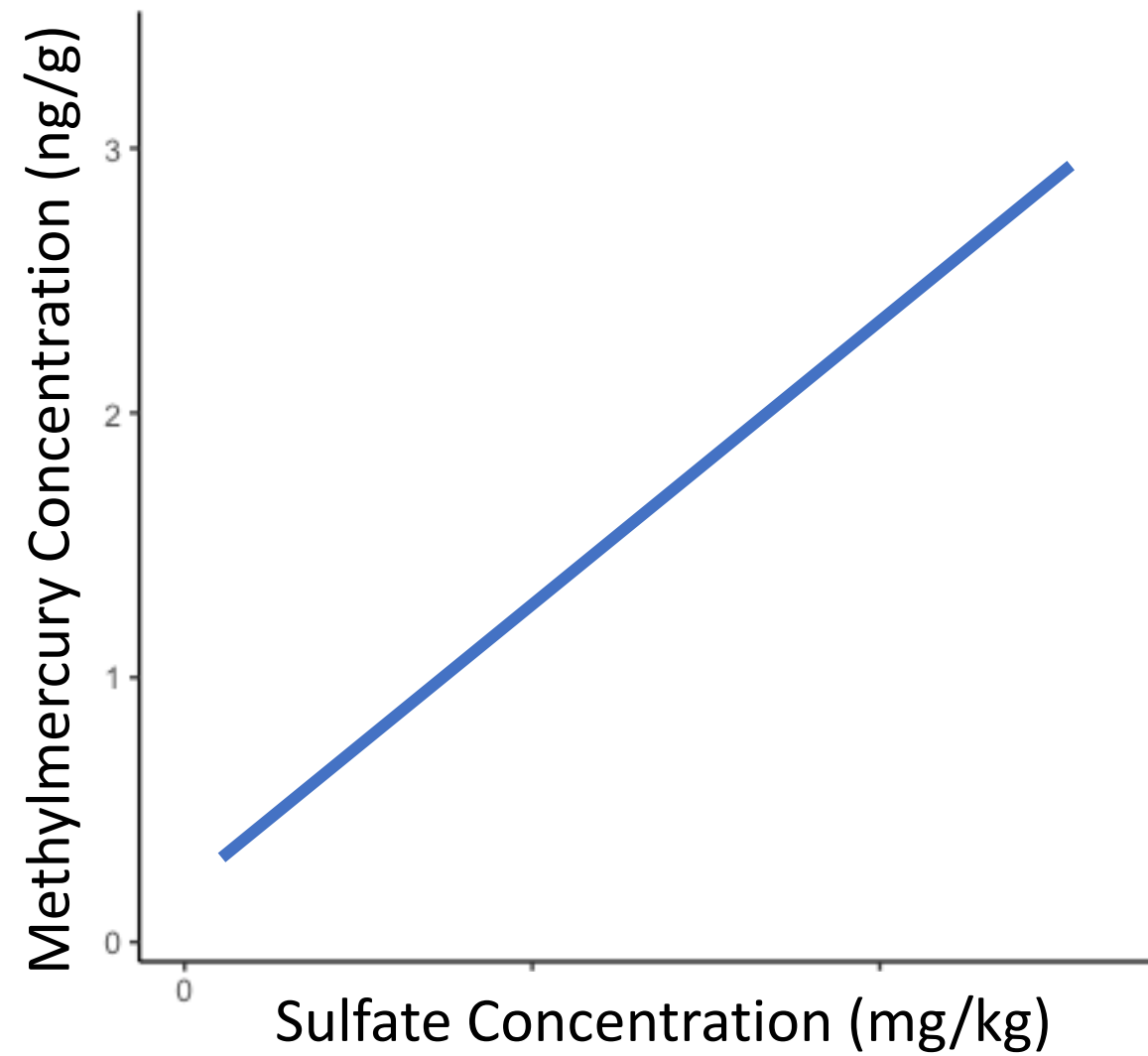
Soil %MeHg patterns differ by season



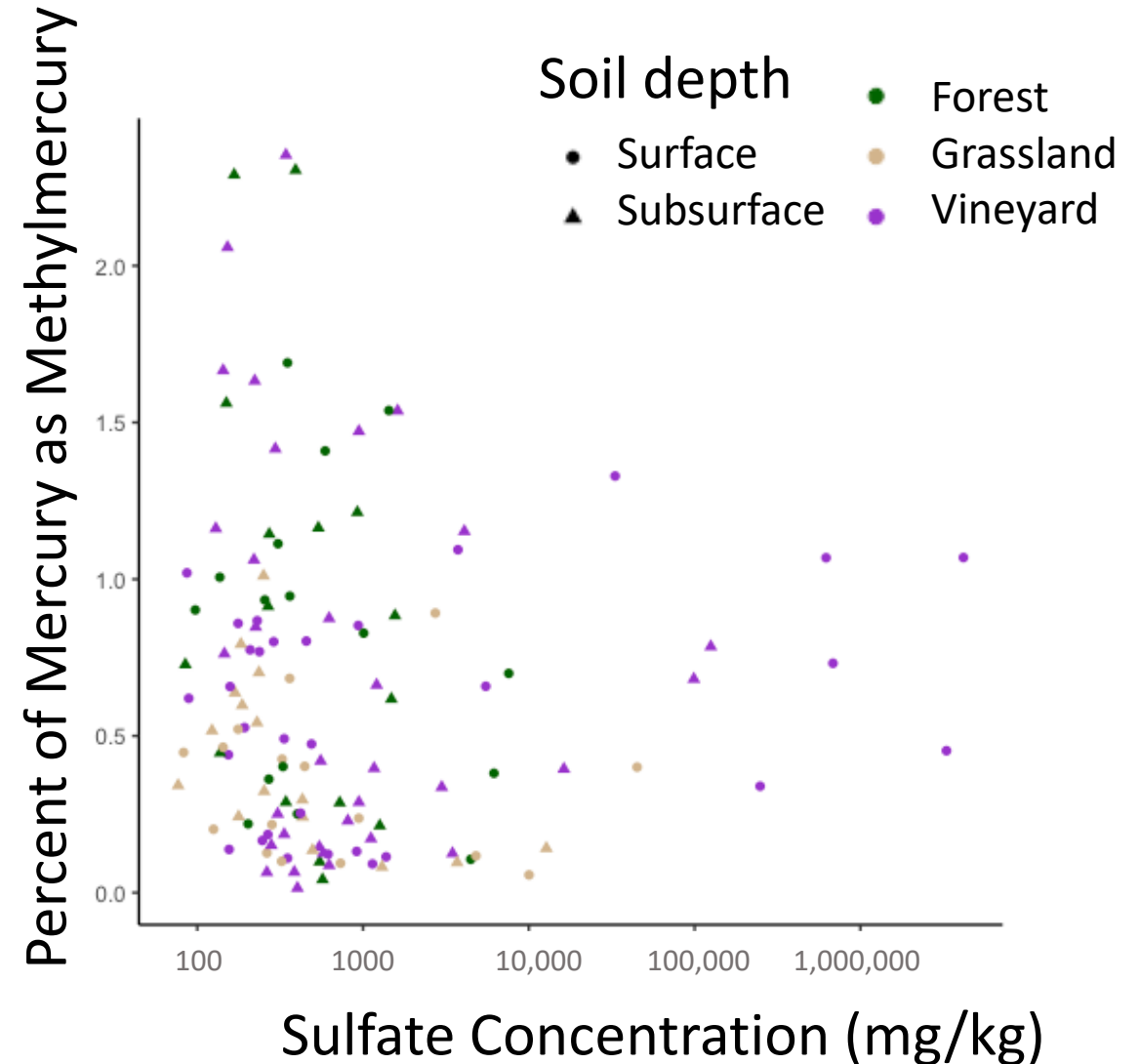
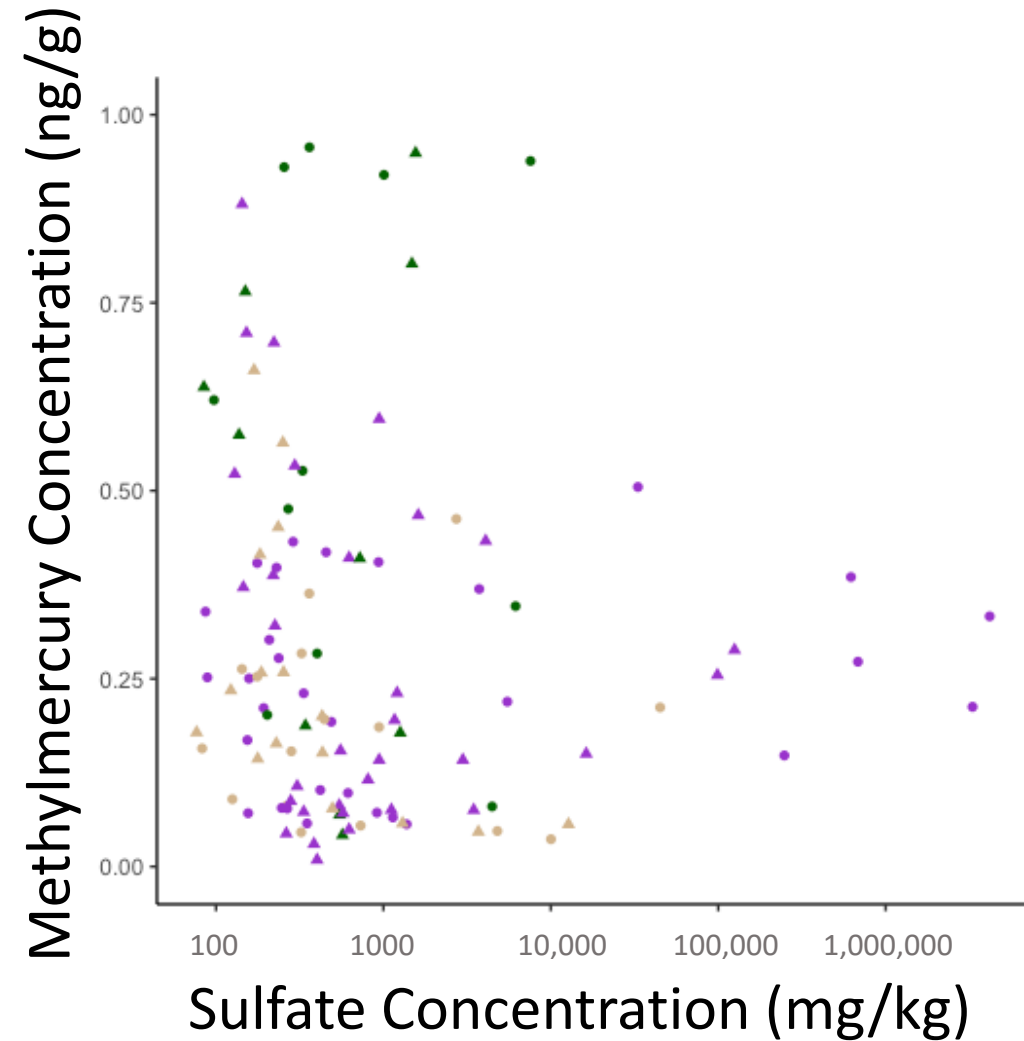


Soil Hg methylation rate is highest in forests

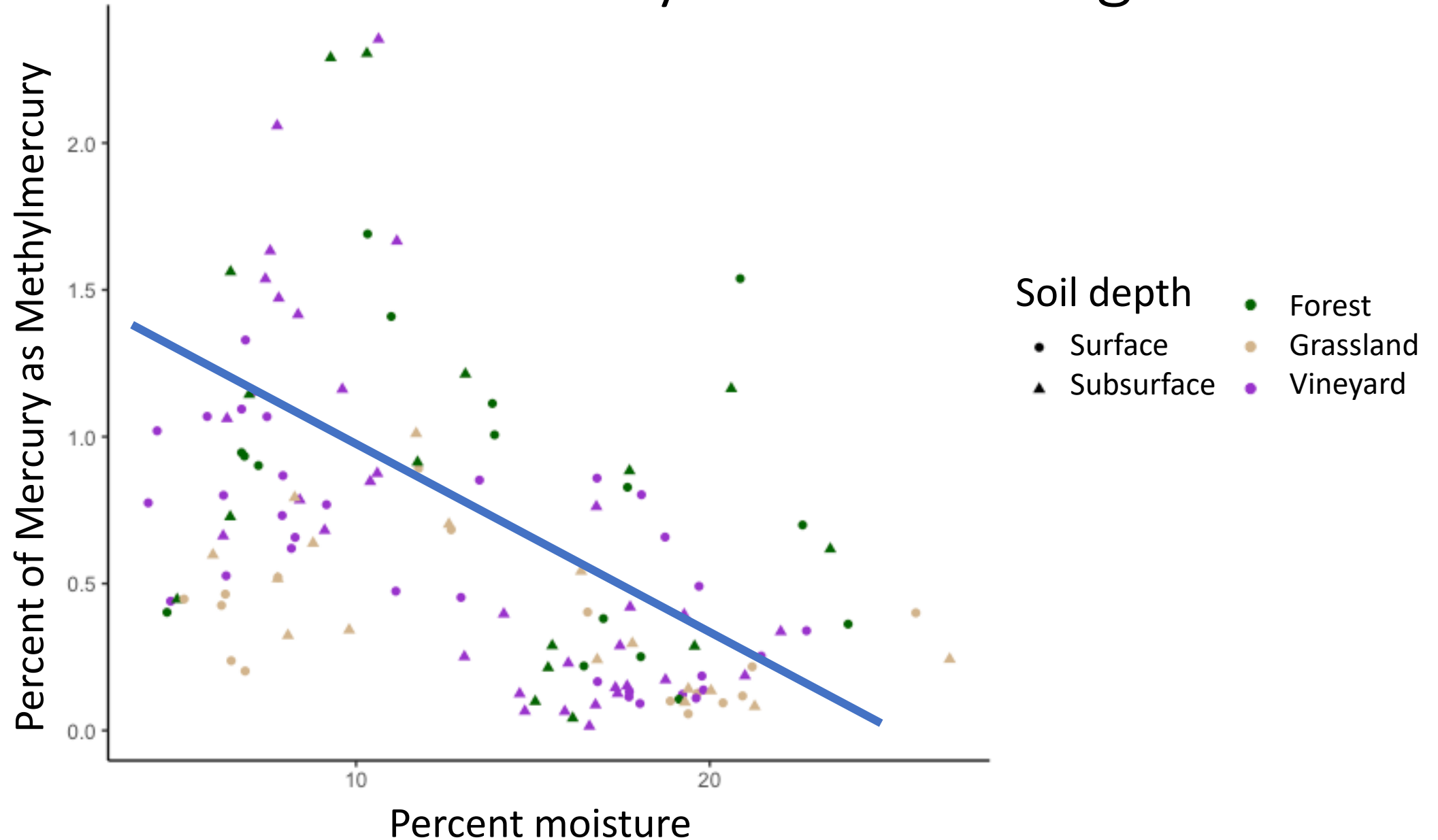




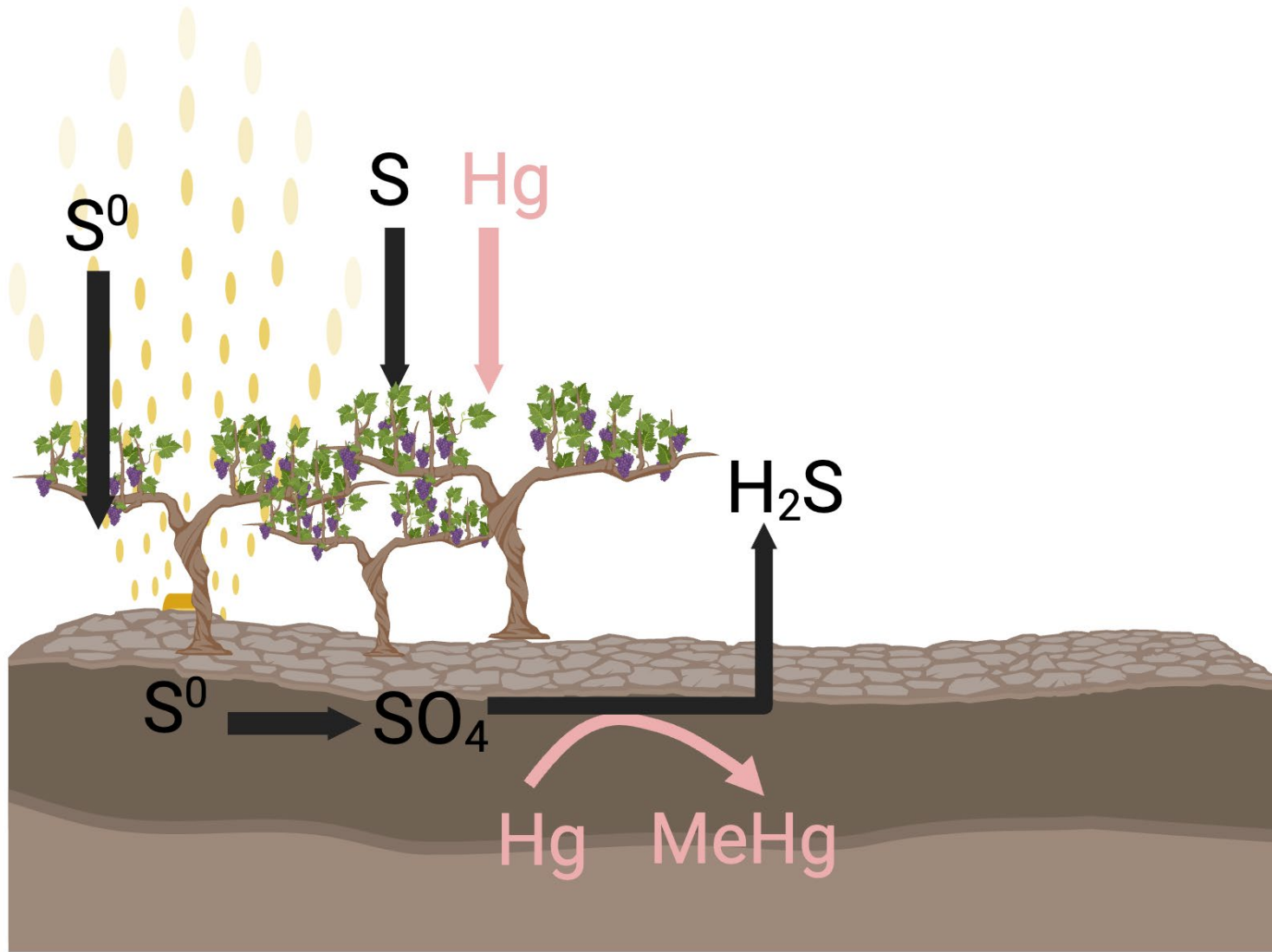
No relationship between MeHg and Sulfate



Moisture may drive %MeHg



Conclusions



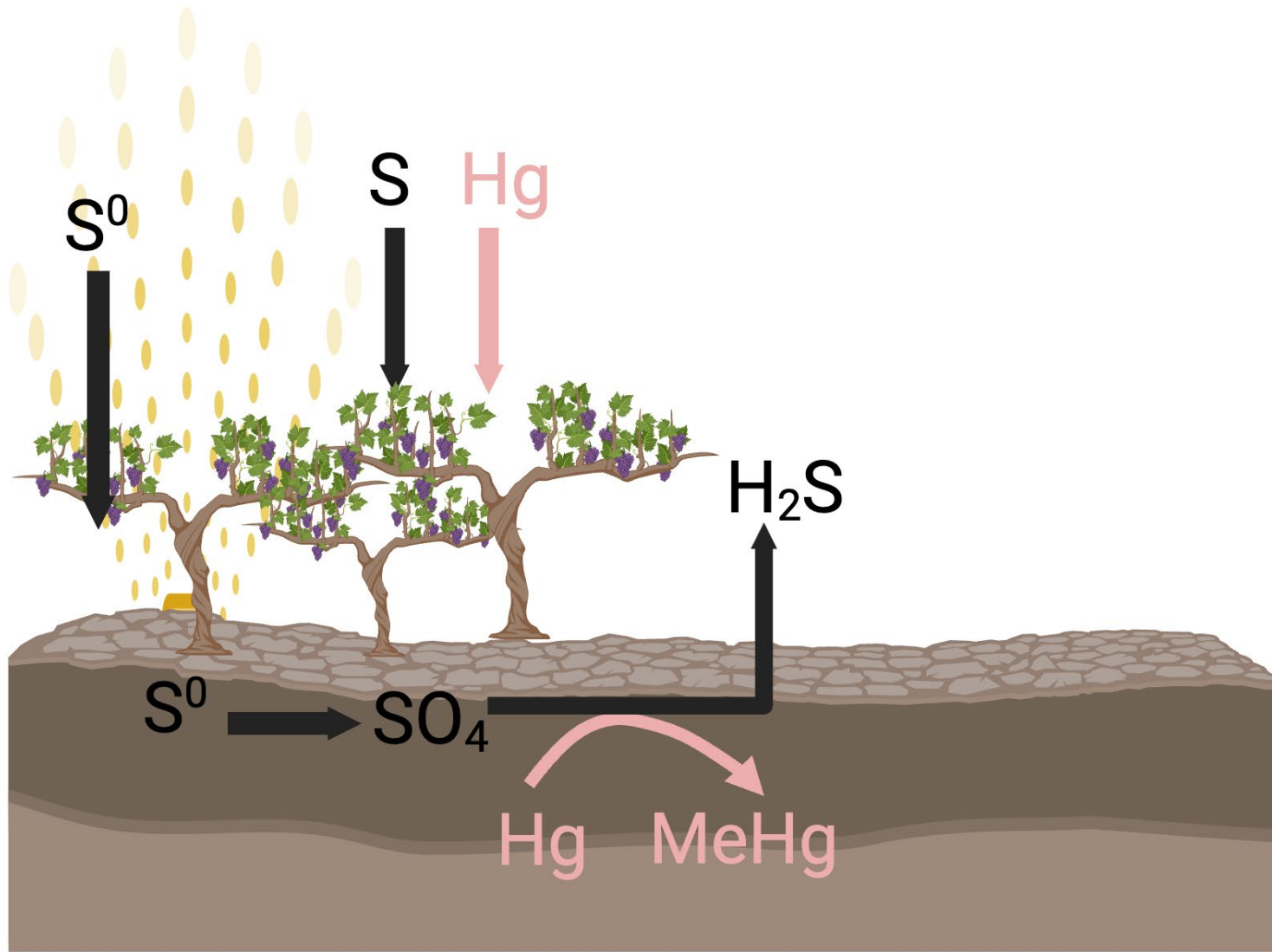
- Highest [sulfate]: none
- Highest [total Hg]: forests
- Highest [MeHg]: forests
- Highest %MeHg: forests, vineyards
- Highest methylation rate: forests, grasslands
- Sulfate reduction and likely MeHg production occurs in microsites
- Next step – examining the terminus of the watershed

I am recruiting grad students and postdocs at
Cornell University!



<http://gersonlab.weebly.com>

Conclusions



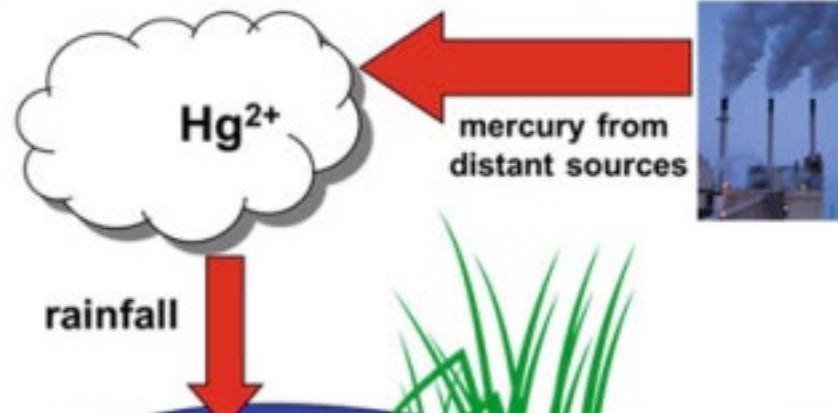
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Extra slides

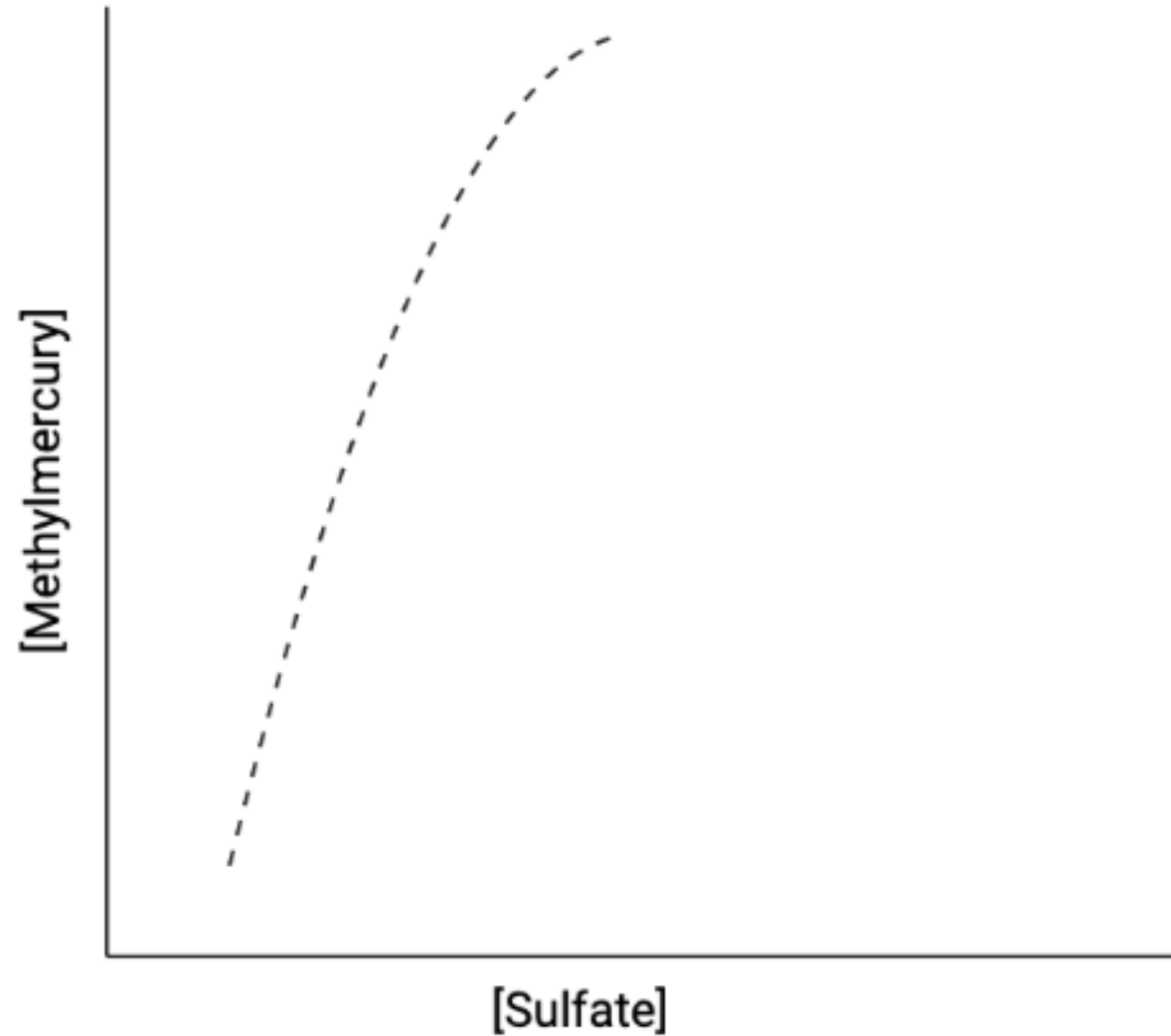
MeHg production in the Everglades



Linking Sulfate and Methylmercury in the Florida Everglades

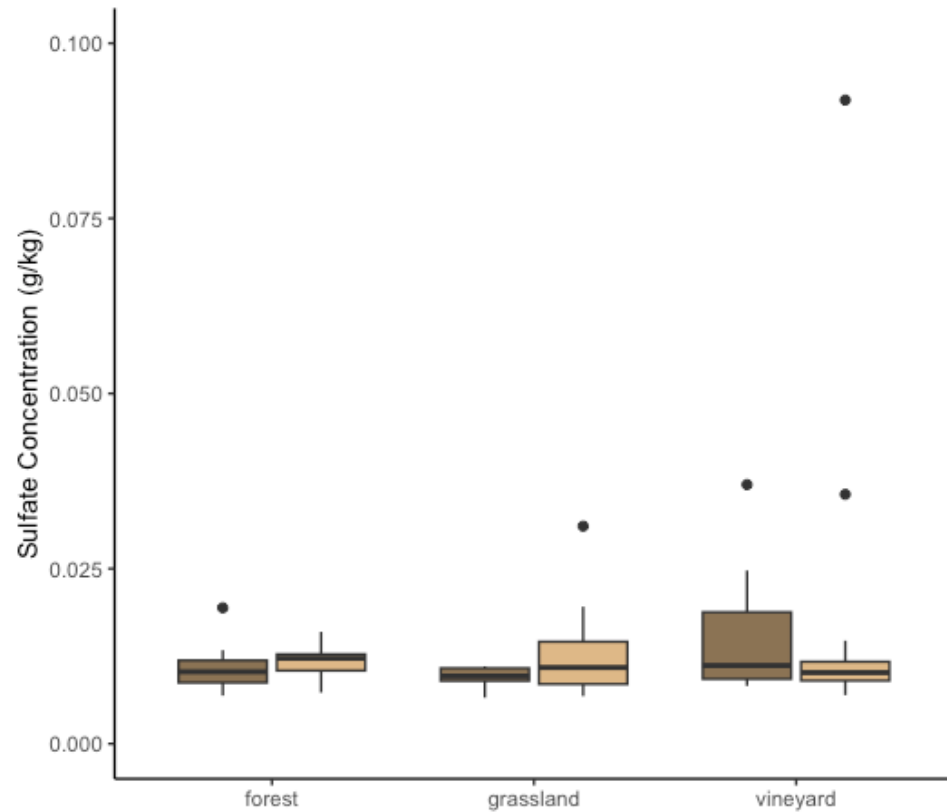


Sulfate-MeHg Goldilocks curve



Soil sulfate does not differ between sites

Dry season



Wet season

