

SHAPING THE FUTURE OF SCIENCE

AGU FALL
MEETING



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THE HYDROCLIMATE–VEGETATION RELATIONSHIP IN THE SOUTHWESTERN AMAZON DURING THE LAST 20 YEARS

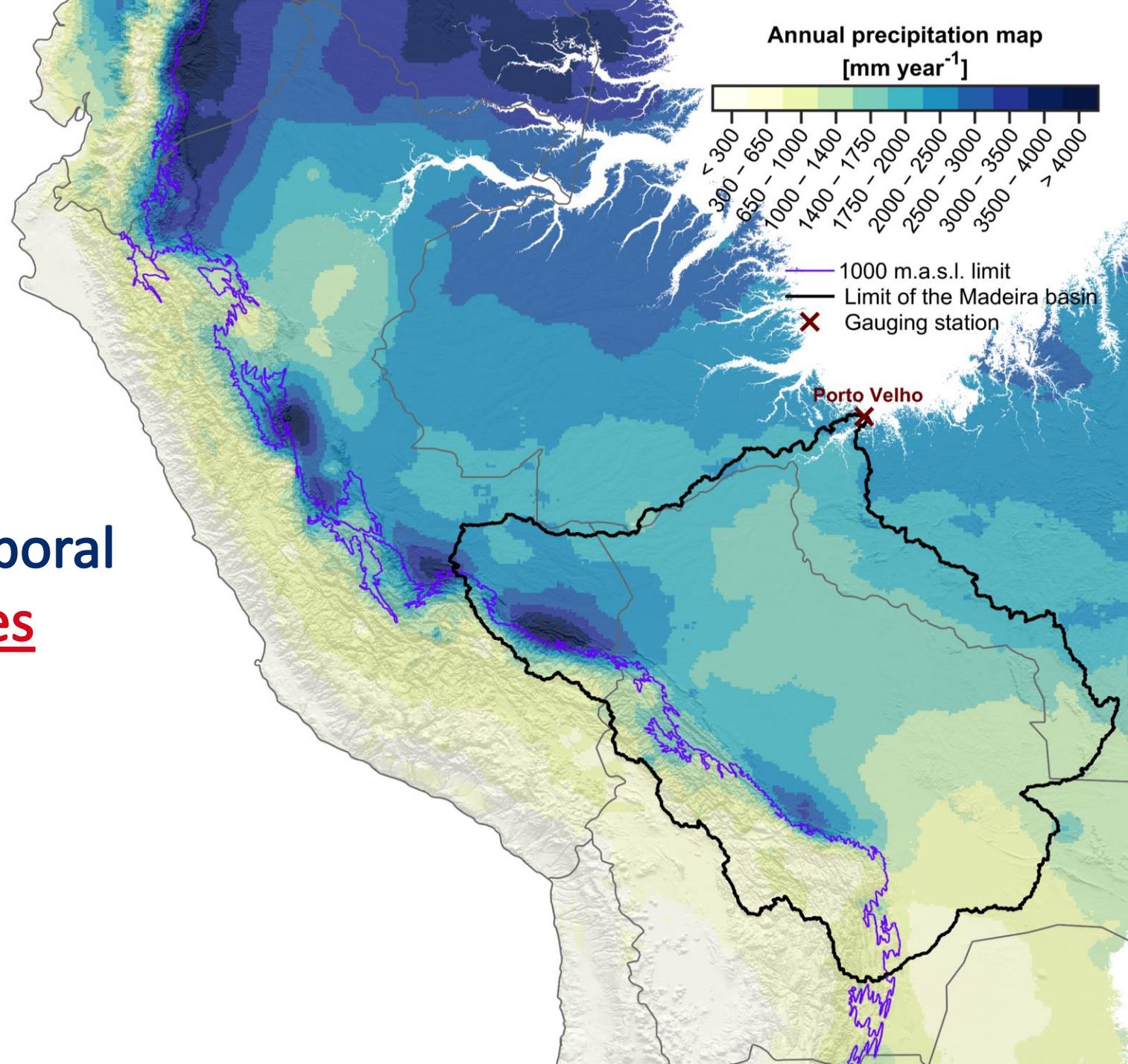
Omar Gutierrez-Cori, Jhan Carlo Espinoza, Laurent Z.X. Li, Sly Wongchuig-Correa,
Paola A. Arias, Josyane Ronchail, Hans Segura

B128 - Tropical Forests Under a Changing Environment II

Thursday, 17 December 2020

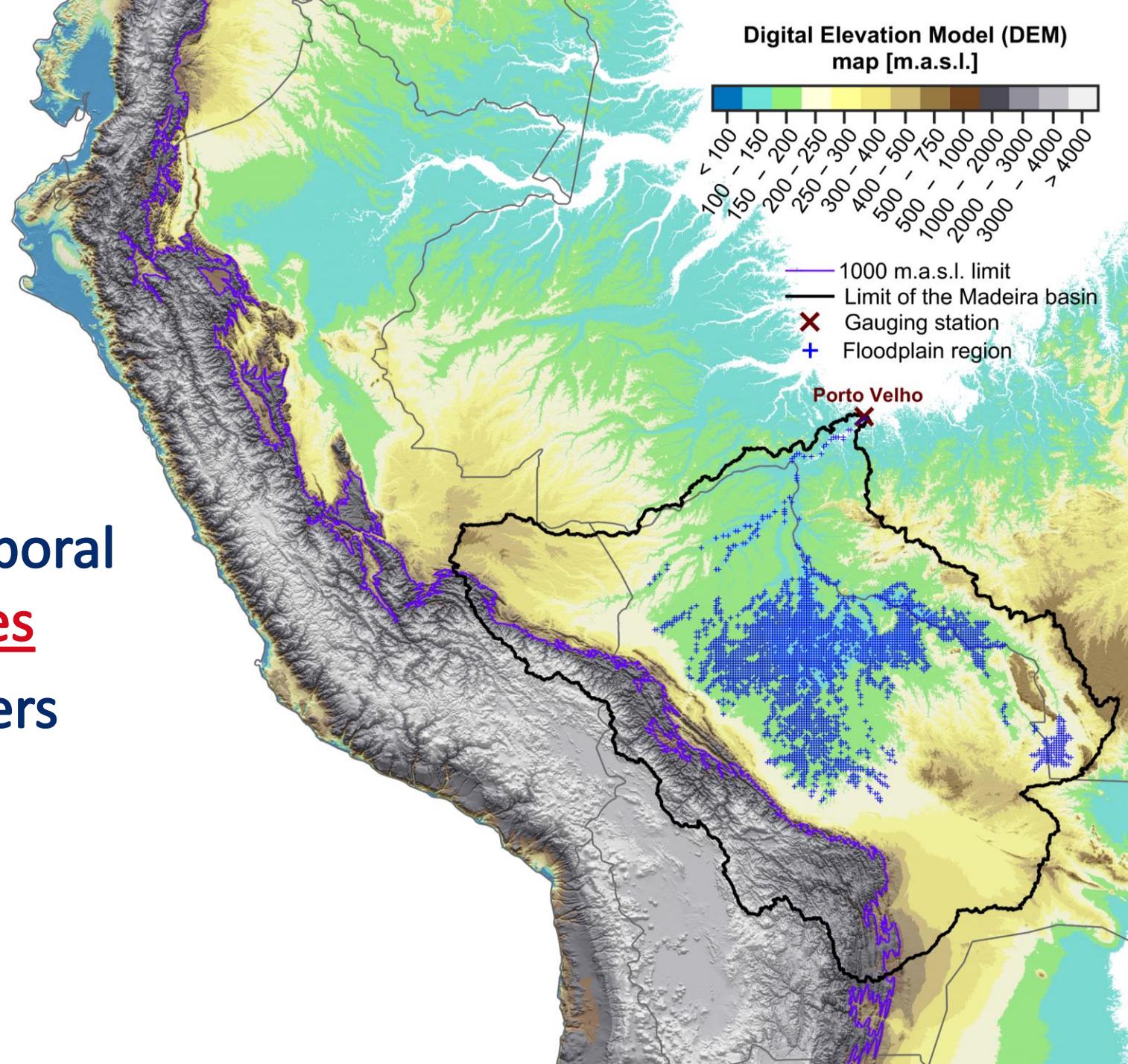
THE SOUTHWESTERN ANDEAN-AMAZON BASIN

□ Region of high spatio-temporal variability in rainfall regimes



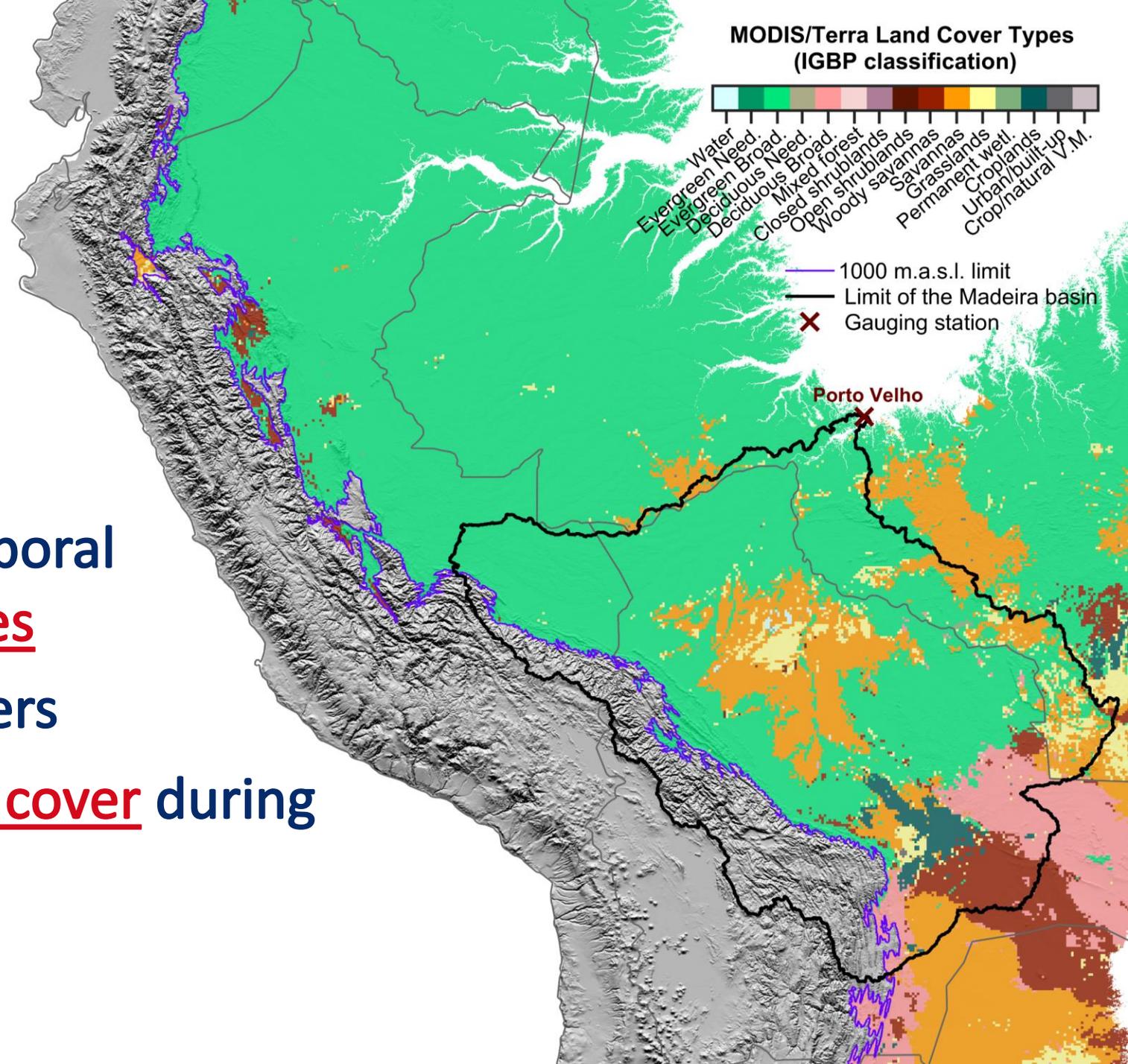
THE SOUTHWESTERN ANDEAN-AMAZON BASIN

- ❑ Region of high spatio-temporal variability in rainfall regimes
- ❑ Elevation: 100 – 4000 meters



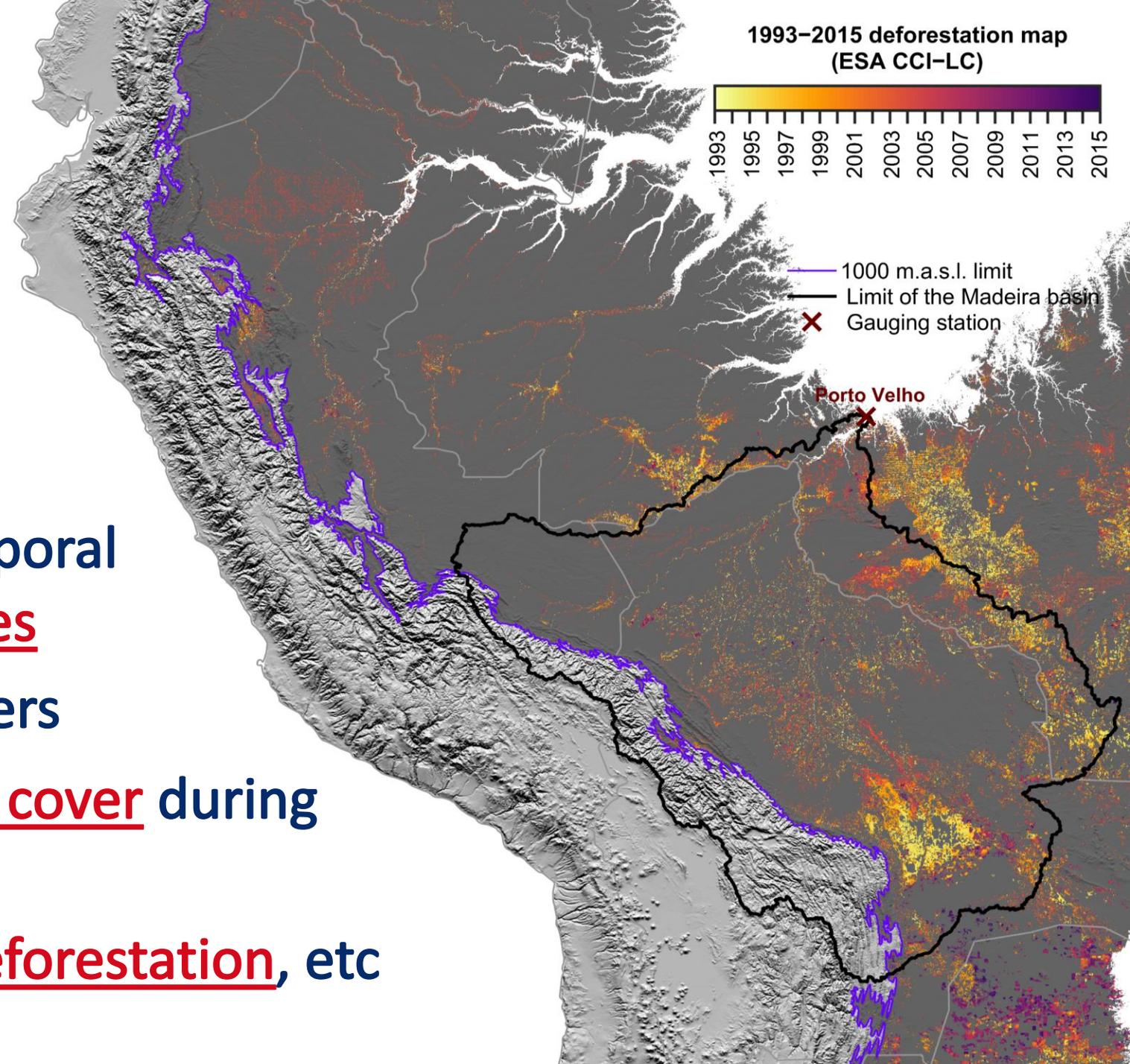
THE SOUTHWESTERN ANDEAN-AMAZON BASIN

- ❑ Region of high spatio-temporal variability in rainfall regimes
- ❑ Elevation: 100 – 4000 meters
- ❑ Significant changes in land cover during the last years

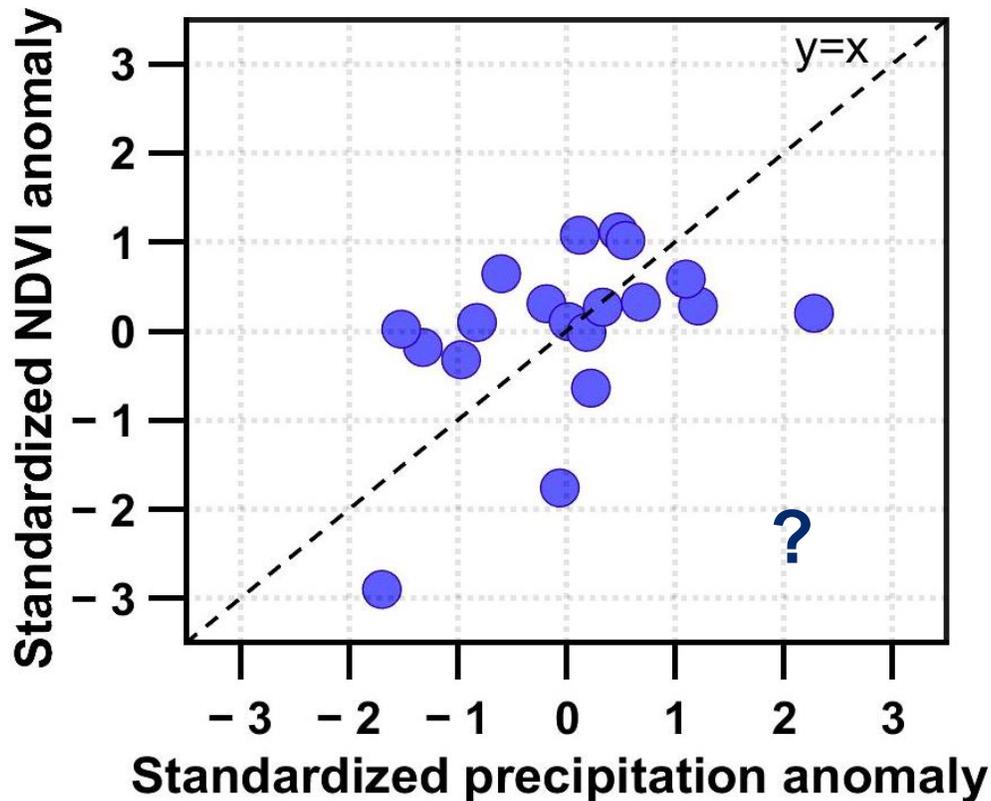


THE SOUTHWESTERN ANDEAN-AMAZON BASIN

- ❑ Region of high spatio-temporal variability in rainfall regimes
- ❑ Elevation: 100 – 4000 meters
- ❑ Significant changes in land cover during the last years
- ❑ Forest fires, agriculture, deforestation, etc

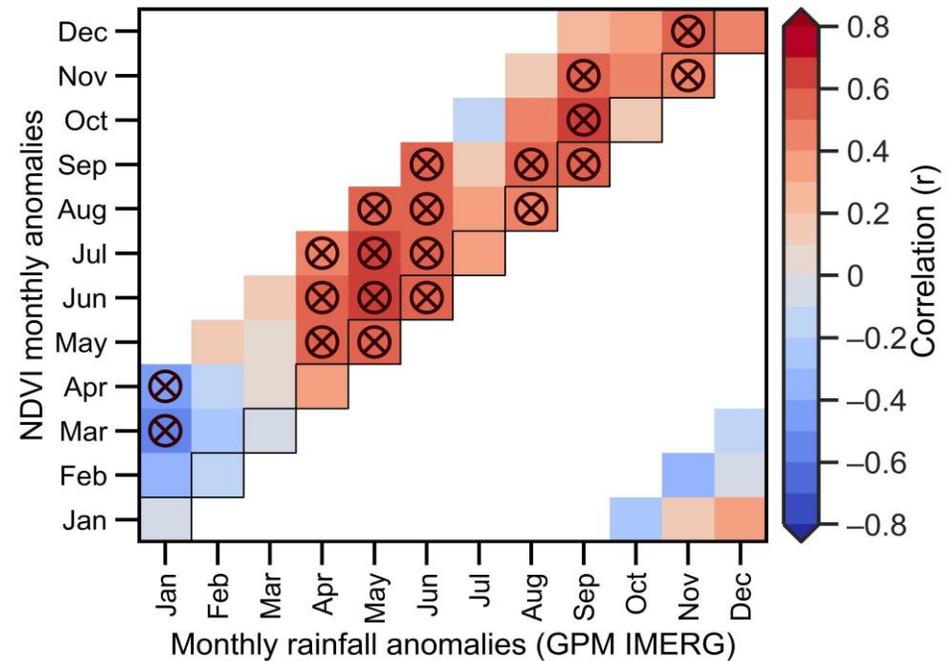
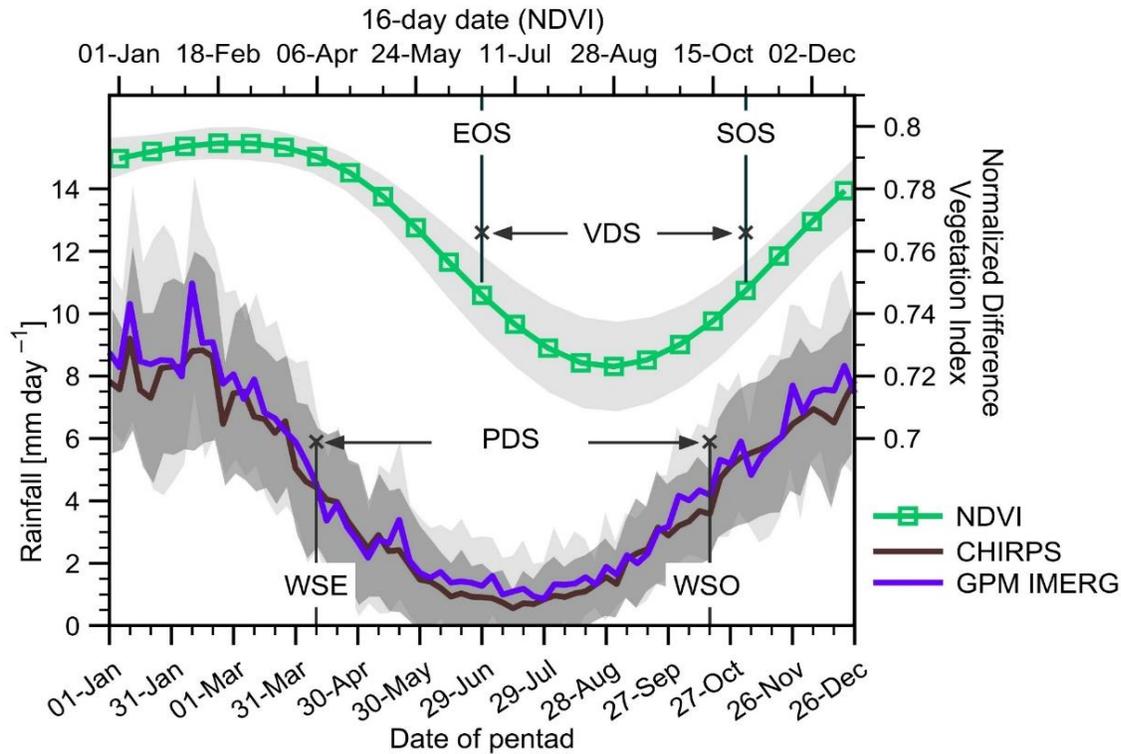


MOTIVATION



- The hydroclimate-vegetation relationship is not clear
- Amazon forests are energy-limited or water-limited?
- What happens during years of extreme droughts?

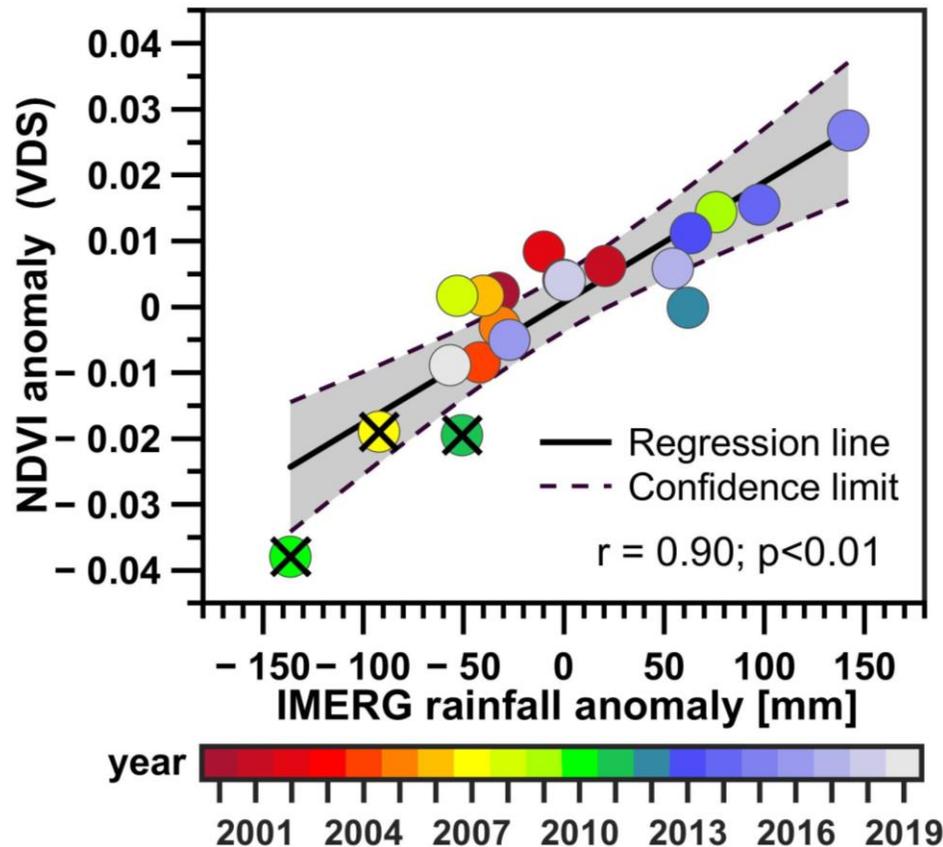
SEASONALITY IN RAINFALL AND VEGETATION



- WSE: wet season end
- WSO: wet season onset
- PDS: precipitation dry season
- EOS: end of growing season
- SOS: start of growing season
- VDS: vegetation dry season

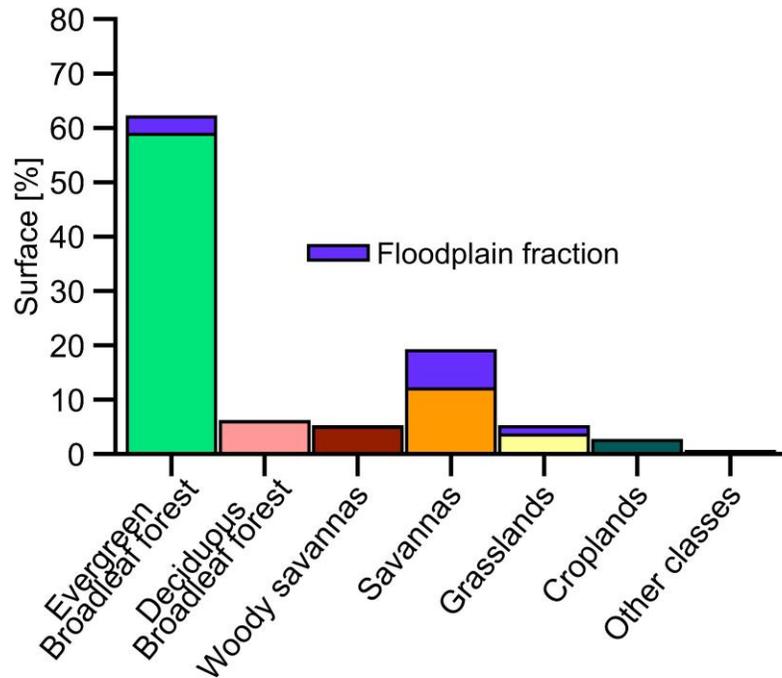
* significant correlation

THE RAINFALL AND VEGETATION DURING THE DRY SEASON

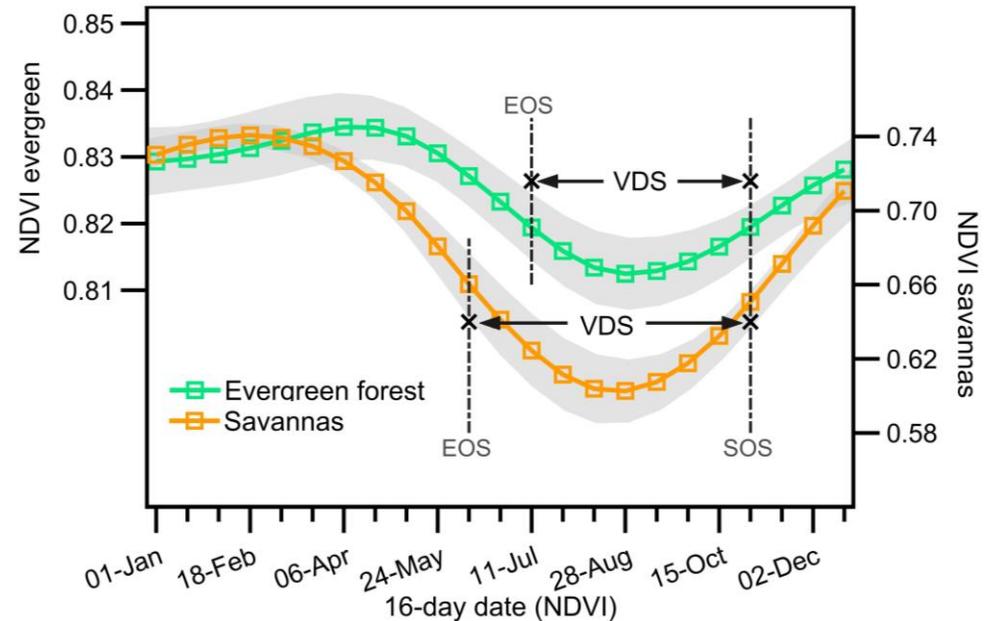


- 2007, 2010 and 2011: years of extreme drought
- Vegetation depends mainly on water availability, particularly during the vegetation dry season (VDS)

VARIABILITY AND SEASONALITY BY LAND COVER TYPES

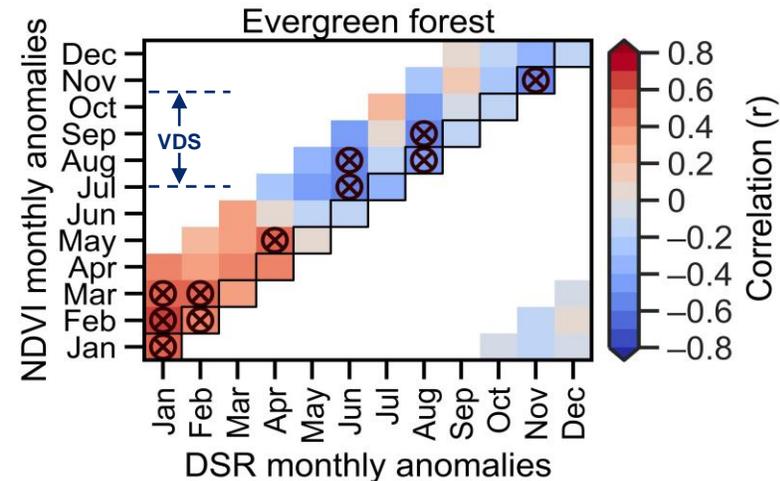
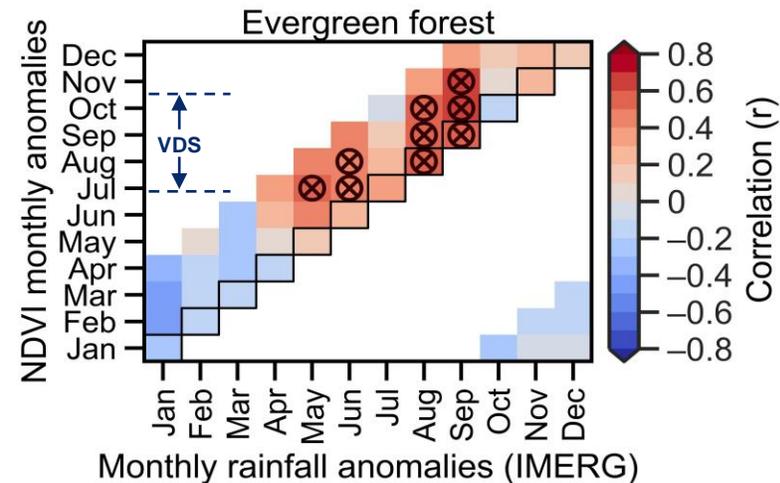
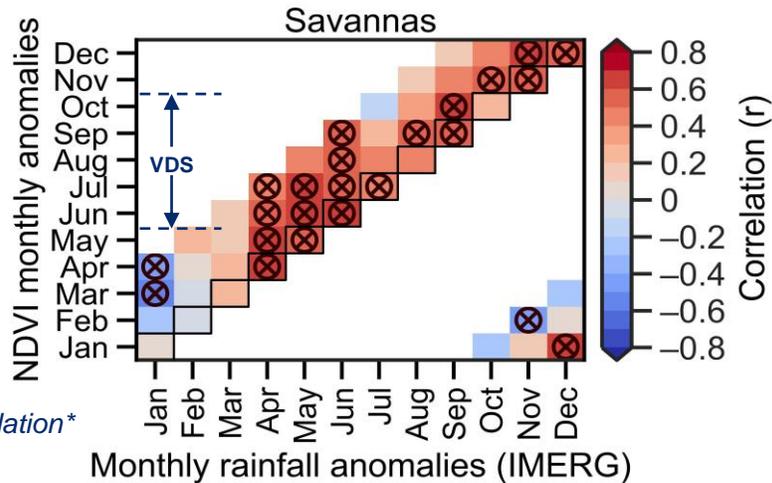


- 62% Evergreen forest
- 20% Savannas



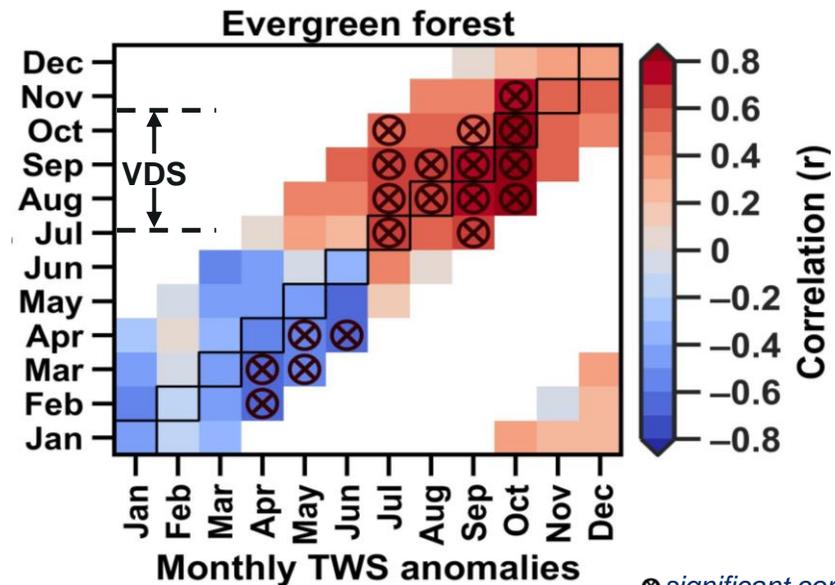
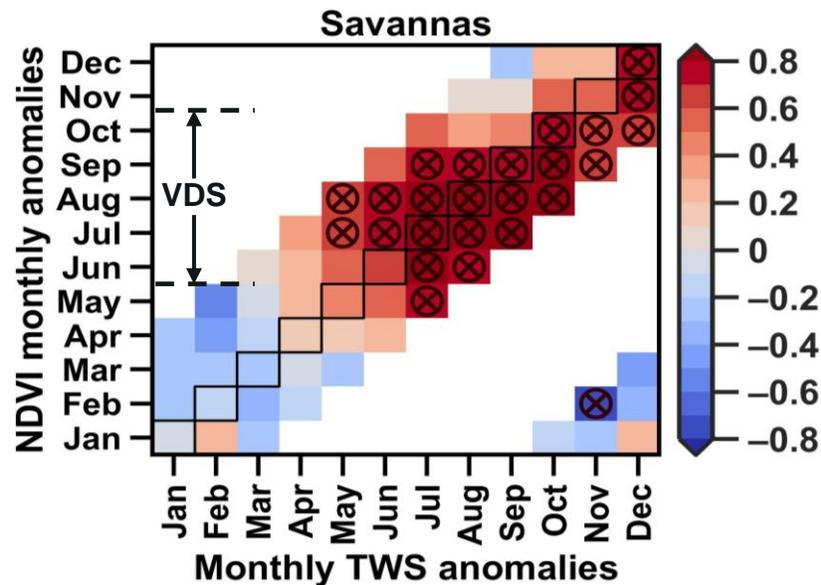
- Differences in the Vegetation Dry Season (VDS)

THE RELATIONSHIP BY LAND COVER TYPES



- Water-limited** during dry season (VDS)
- Energy-limited** during wet season
- The vegetation varies from energy- to water-limited throughout the year

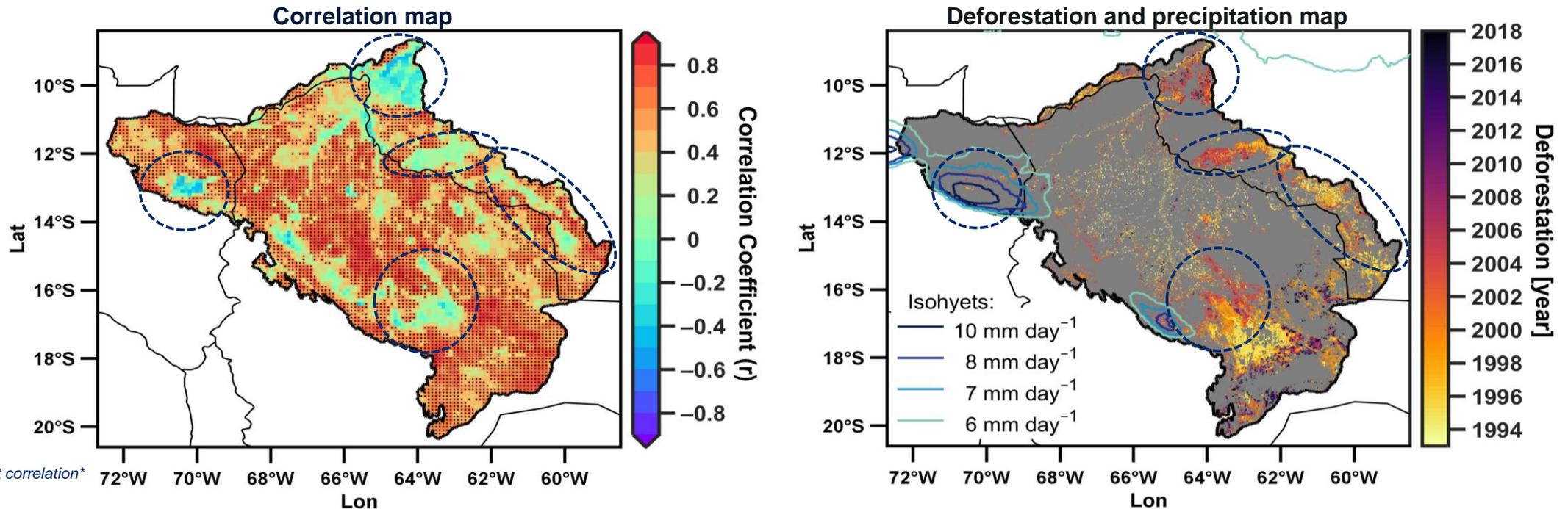
THE VEGETATION AND TERRESTRIAL WATER STORAGE (TWS)



⊗ significant correlation*

- ❑ Vegetation is more dependent on the availability of water in the soil during the Vegetation Dry Season (Water-limited)
- ❑ TWS is a better indicator of NDVI variability in evergreen forests

ROLE OF LAND-COVER CHANGE IN THE RAINFALL-NDVI RELATIONSHIPS



◦ significant correlation*

Specific areas do not show significant hydroclimatic-NDVI correlations during the dry season:

- Very **wet conditions** during most of the year
- Recent **deforested areas**: break the natural response the hydroclimate-vegetation system

Gutierrez-Cori et al., submitted

THANK YOU

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