

Which water sources do trees on seasonal floodplains in southeastern Brazil use for transpiration?

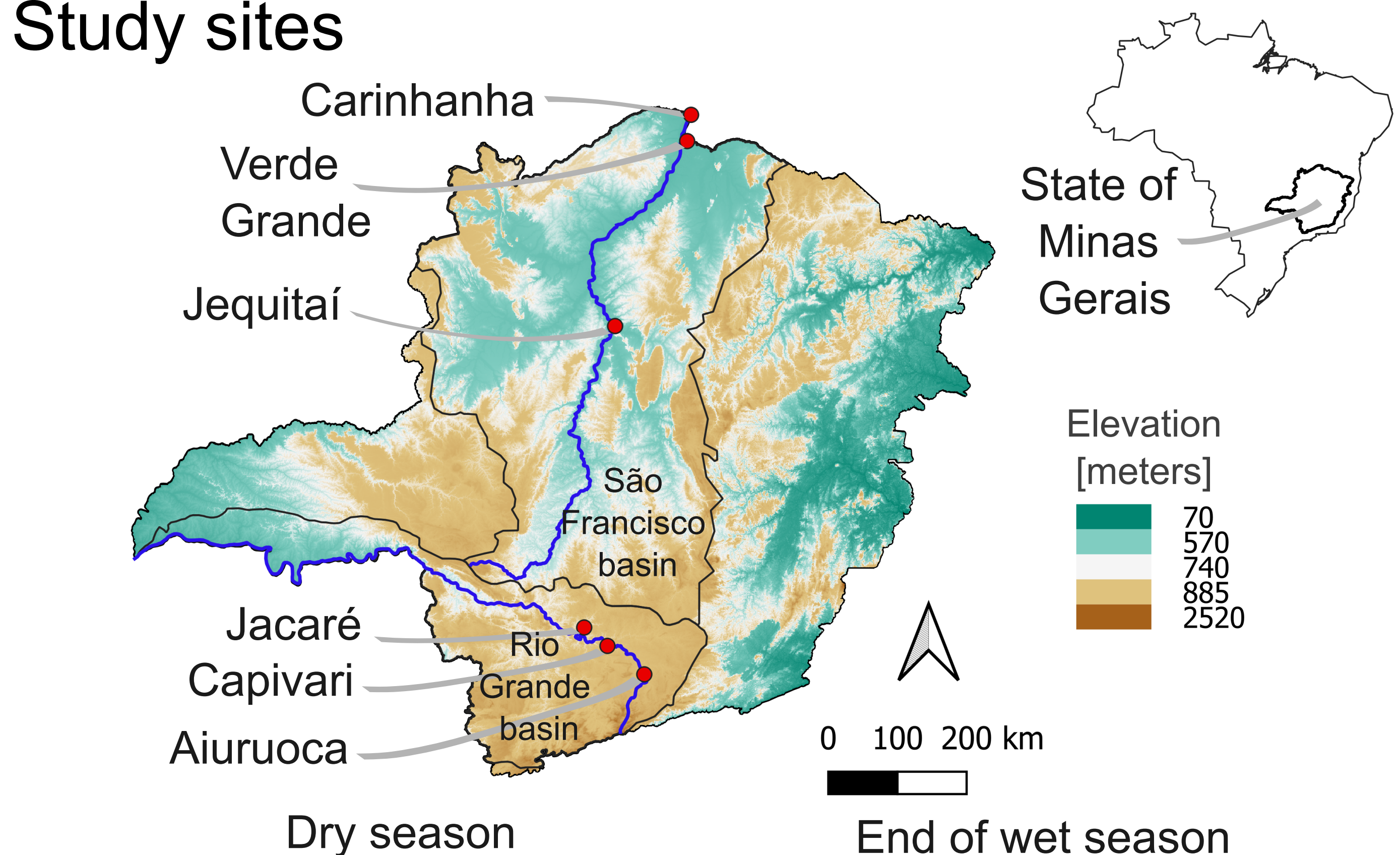
Aline Meyer Oliveira, Marius Floriancic, Fernanda Moreira Gianasi, Barbara Herbstritt, Patricia Vieira Pompeu, Felipe de Carvalho Araújo, André Maciel Silva-Sene, Miguel Gama Reis, Camila Farrapo, Leony Aparecido Silva Ferreira, Rubens Manoel dos Santos, Ilja van Meerveld
aline.meyeroliveira@glasgow.ac.uk

Introduction

Seasonal floodplain forests are unique but threatened ecosystems. Trees in these forests have adapted to extreme conditions of prolonged flooding and droughts. Their vulnerability to changes in the hydrological cycle is poorly understood.

Here we described the variability in the isotopic composition of different water pools across seasonal floodplain forests in southeastern Brazil, and estimated the contribution of soil water to tree water uptake for trees growing on different locations on the floodplains.

Study sites

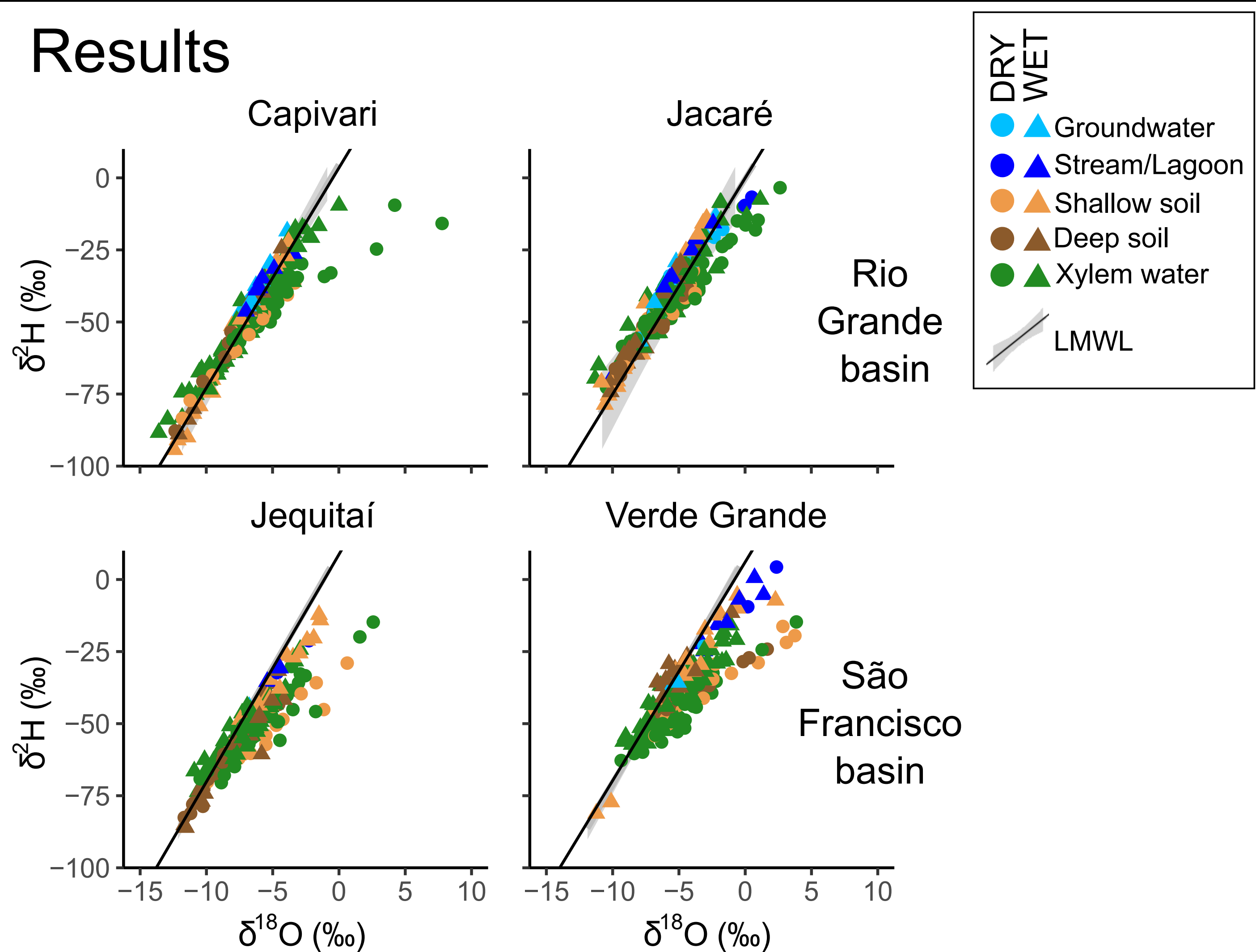


	Rio Grande	São Francisco
Annual precipitation [mm]	1450	906
Annual PET [mm]	907	1070
Area [km ²]	143,000	641,000

Methods

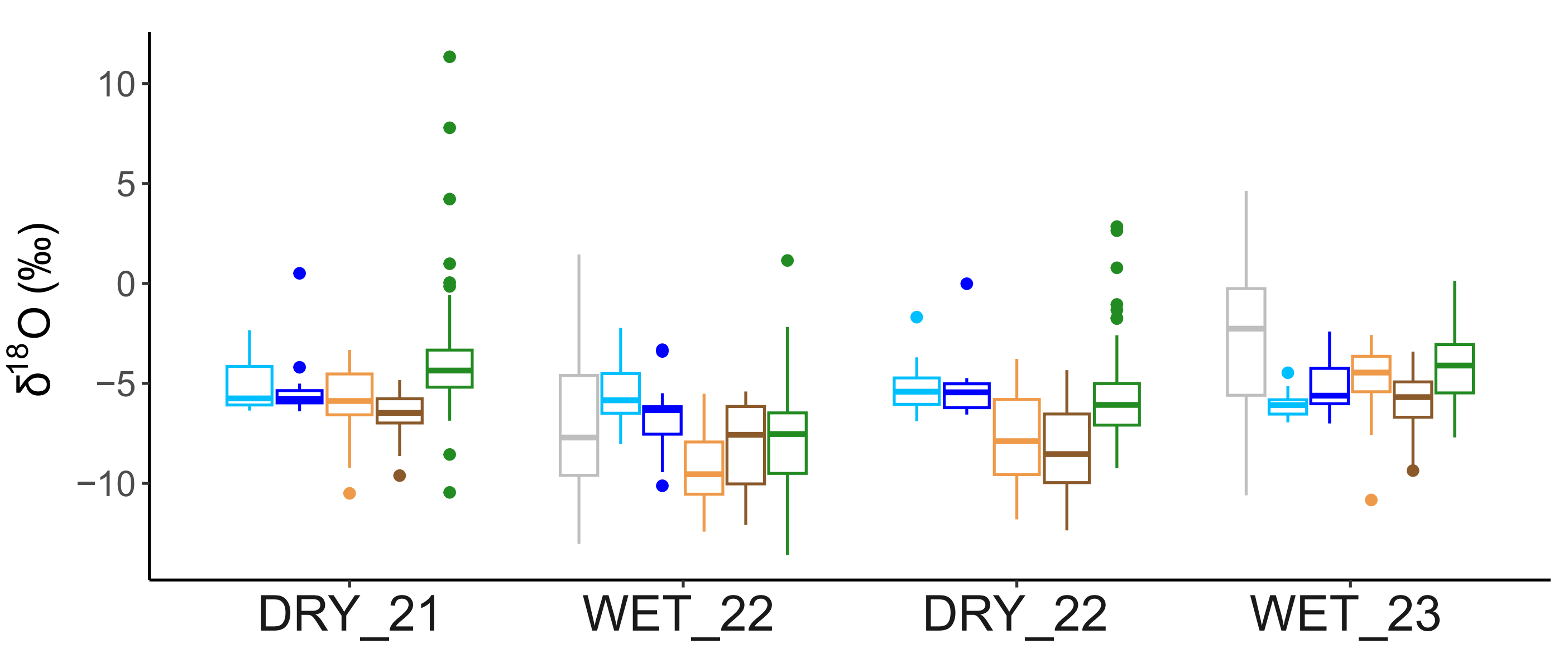
- Sampling of precipitation, streamflow, groundwater, soil water at different depths and vegetation (twigs)
- Three "eco-units" per floodplain: levees, terraces, plains
- Four campaigns (dry seasons in 2021 and 2022 and wet seasons in 2022 and 2023)
- MixSIAR model to estimate the contributions of soil water (up to 1 m) and stream/groundwater to xylem water

Results

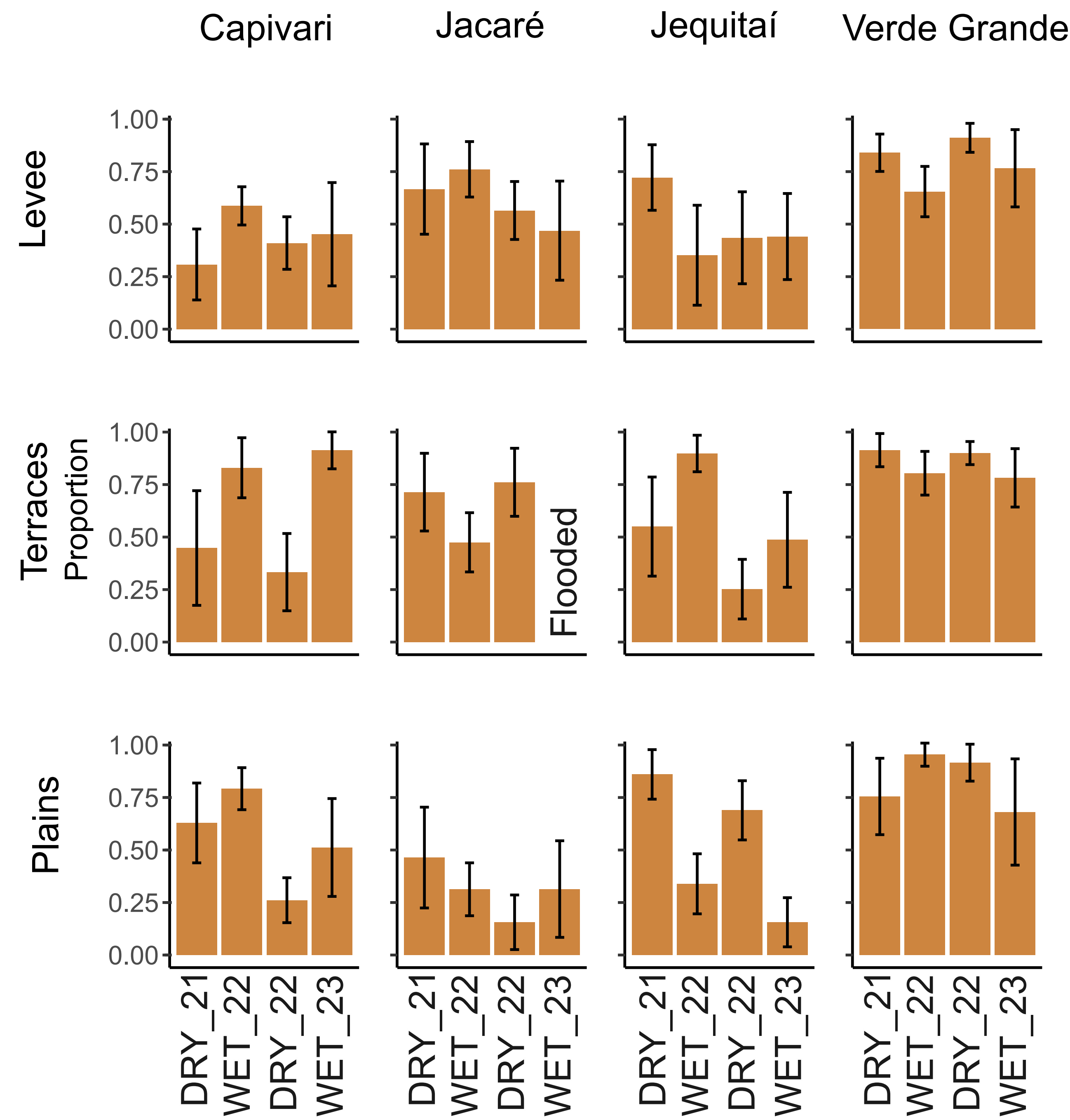


- Very large variability
- Overlap between most sources and xylem water
- Evaporative fractionation for drier sites

Seasonal variation - Rio Grande basin



Soil water contribution to xylem water



Average soil water contribution

	Rio Grande	São Francisco
Wet seasons	64% ± 17	60% ± 17
Dry seasons	43% ± 17	72% ± 15

Conclusions

- Soil water is the main source for tree water uptake
- Large uncertainties due to the similar isotopic composition of the different sources and high variability in xylem water
- Inter-annual variation in xylem water (and soil water) was larger than seasonal variation
- More than 60 trees sampled. Dataset available for future studies!

A publication on this study is in review in the journal *Ecohydrology*: "Isotopic composition of soil and xylem water across six seasonal floodplain forests in southeastern Brazil"

Dataset:



Abstract:

