Preliminary results of speleothem U-Th dating and paleoclimate reconstruction from Garganta del Dino Cave (Ecuador)

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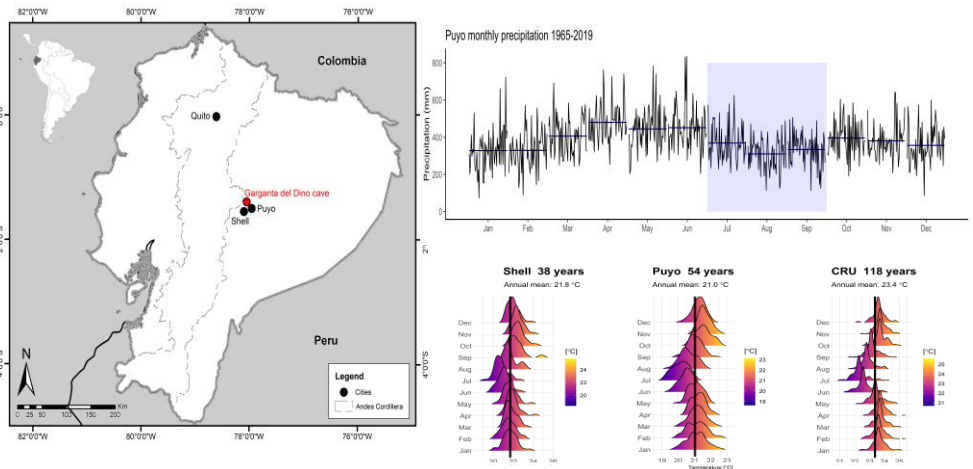
Introduction

Most of the paleoclimate records in South America have focused in the central and southern parts of the continent. Here, the sites receive 70-80% of the annual precipitation during the mature stage of the South American Monsoon System (SAMS) in austral summer (DJF) (Vuille et al. 2005). Therefore, we aim to:

-Bridge the gap of paleoclimate records in northern South America, particularly western Amazon.
-Improve our understanding of ITCZ migrations at millenial scale.

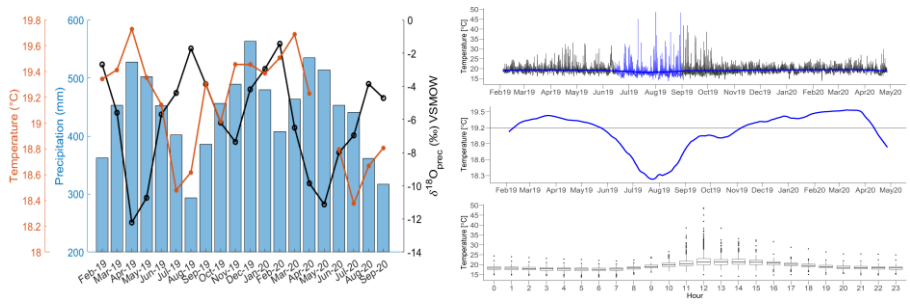
Study site

Garganta del Dino cave is located in the Ecuadorian western Amazon (1°25' S, 78°2’ W). Precipitation shows a bimodal pattern modulated by the Intertropical Convergence Zone (ITCZ) from April to June and October to December.



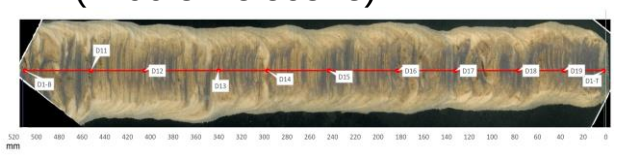
Monitoring

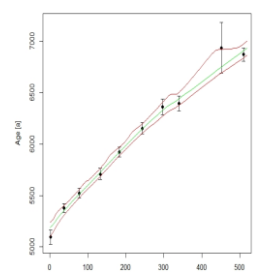
Stable isotopes in precipitation show an amount effect in the lowland Amazon, whereas altitude effect is more pronounced towards the Andes. Temperature does not play a significant role and follows the normal march of insolation with a minimum decrease during June solstice.

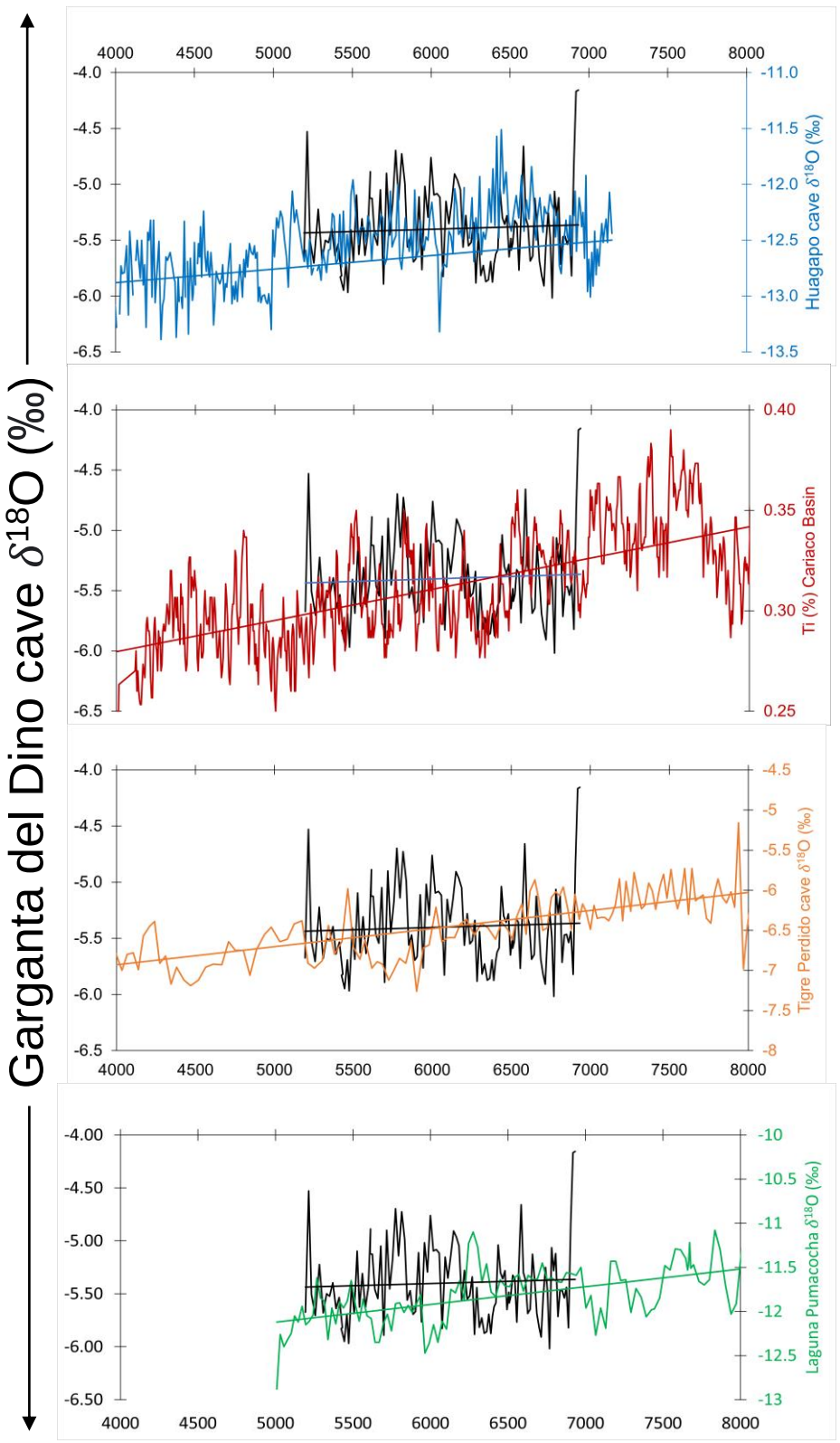


Preliminary results Dino-1

- 11 U-Th ages (1 age reversed at bottom)
-110 samples stable isotope composition ($\delta^{18}O$, $\delta^{13}C$)
- Fast growth rate (0.2–0.5 mm/yr)
- Dated to 6.87 to 5.10 ka BP (Middle Holocene)







Observations

1. Dino-1 stalagmite time-series loosely follow the general trend of decrease in $\delta^{18}O$ values from Early to Middle-Holocene. Previous studies have hypothesize a southward shift of the ITCZ mean position during the Holocene (Haug et al.2001), and our record seems to confirm that observation
2. Similar $\delta^{18}O$ trends despite altitude of the records supports the interpretation of constant lapse-rate during the Holocene (Kanner et al.2013).
3. $\delta^{18}O$ integrates both circulation and precipitation variability from Amazon to the Andes.

References

-Haug et al., 2001. *Science Reports.* Vol. 293
-Kanner et al., 2013. Quater. Science Reviews. 75
-Vuille et al., 2005. *Clim. Dynam.* 25:401-413

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