# Volcanism and ENSO

## A Re-appraisal with Paleoclimate Data Assimilation

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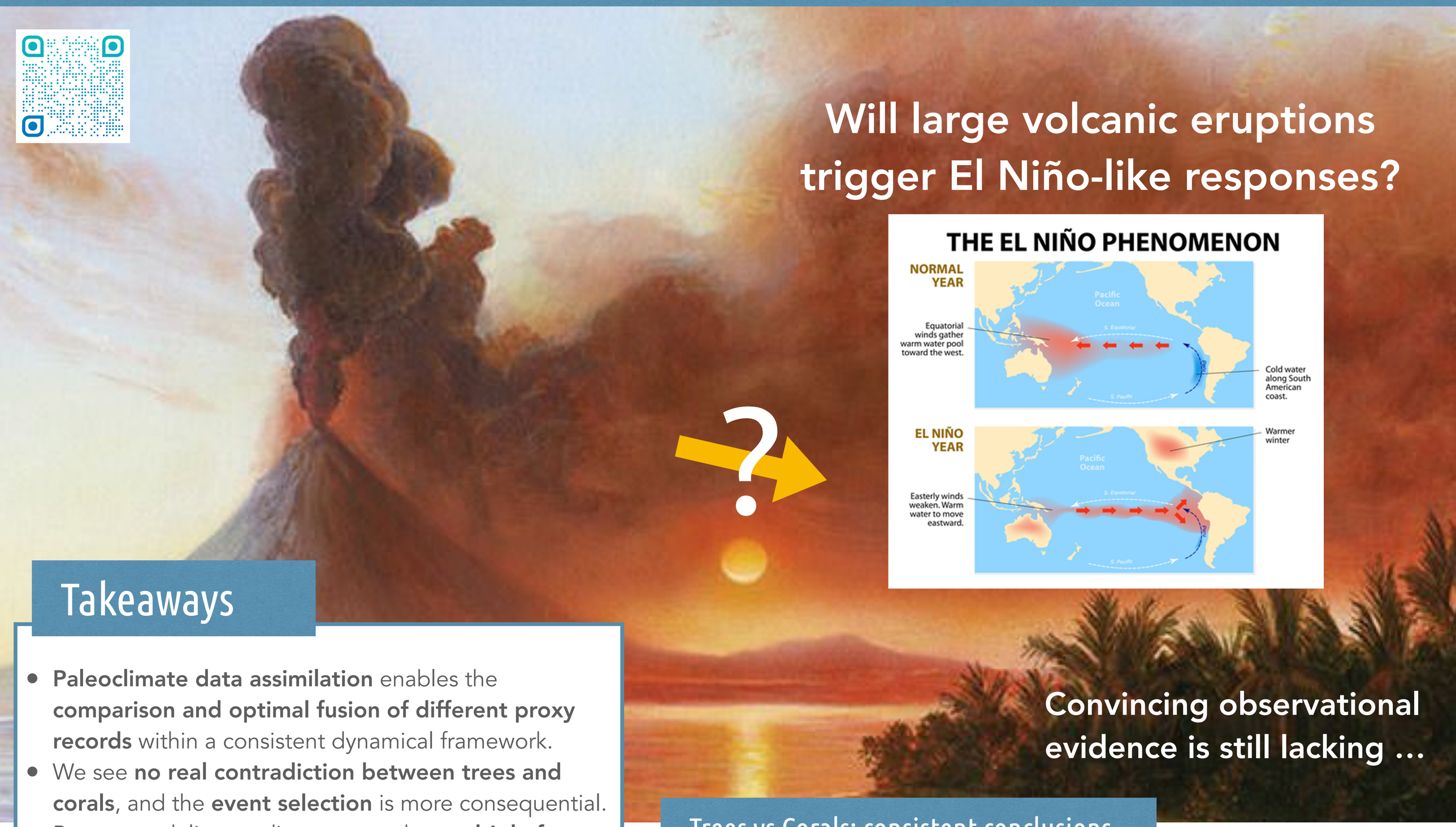


## Will large volcanic eruptions trigger El Niño-like responses?

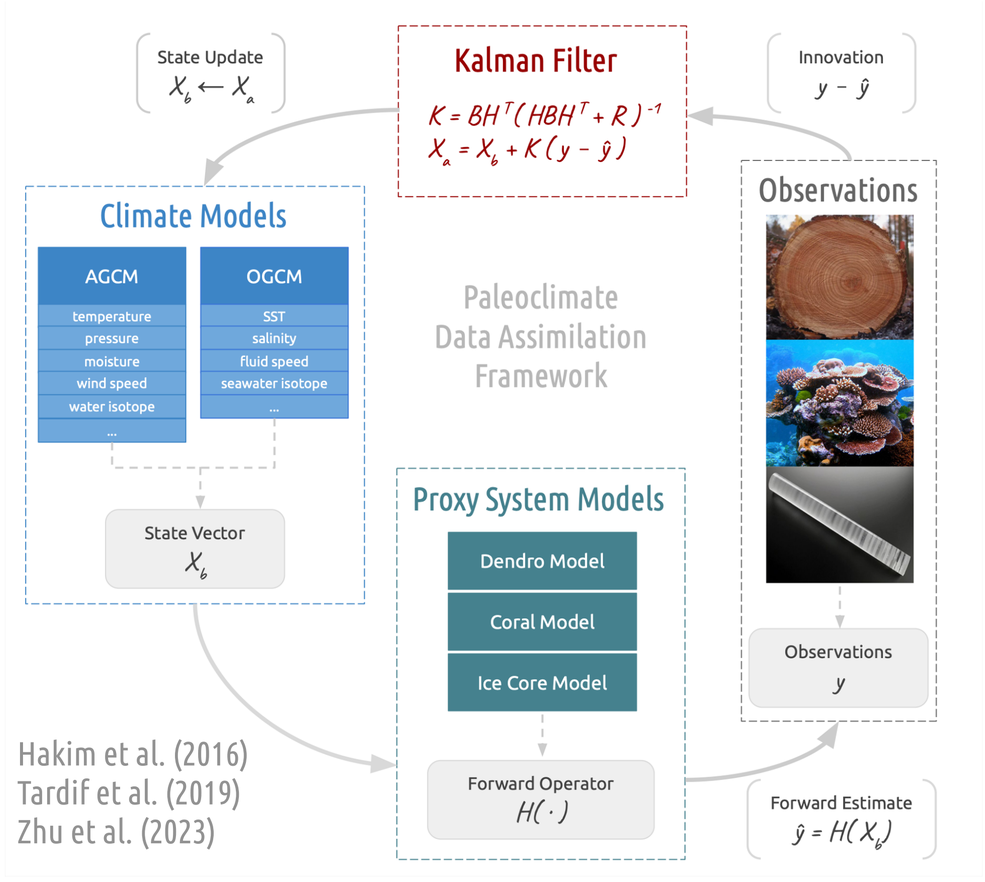


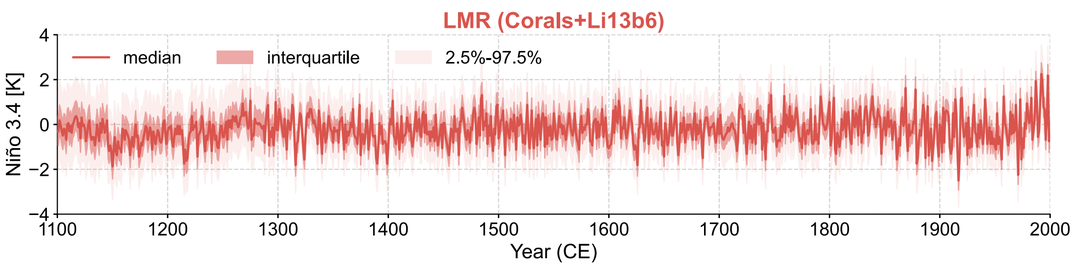

**Convincing observational evidence is still lacking …**

## Takeaways

- **Paleoclimate data assimilation** enables the **comparison and optimal fusion of different proxy records** within a consistent dynamical framework.
- We see **no real contradiction between trees and corals**, and the **event selection** is more consequential.
- Recent modeling studies suggest that **multiple factors can affect the response**: location, intensity, season, preconditioning of the ENSO state…
- Last millennium is not enough. **More and longer proxy records are needed.**

## PDA: comparison and optimal fusion

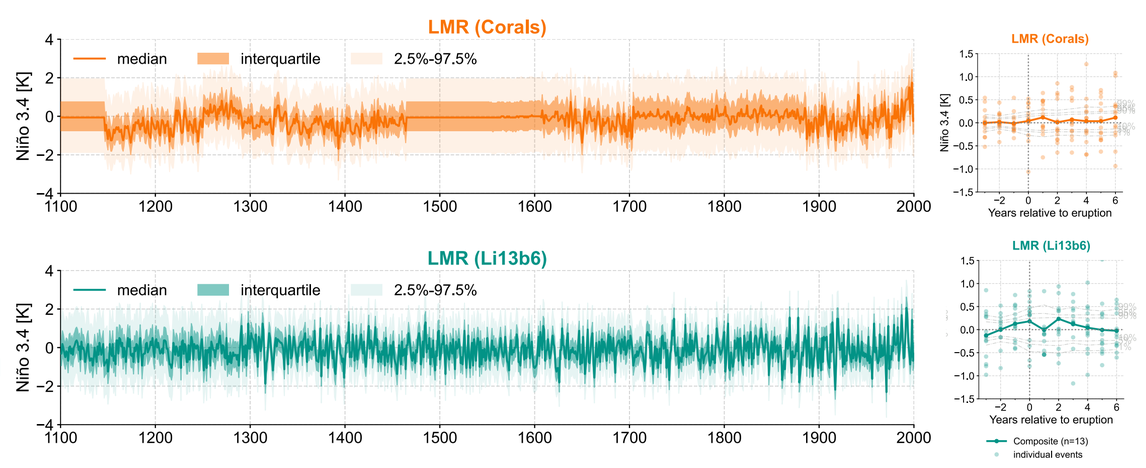


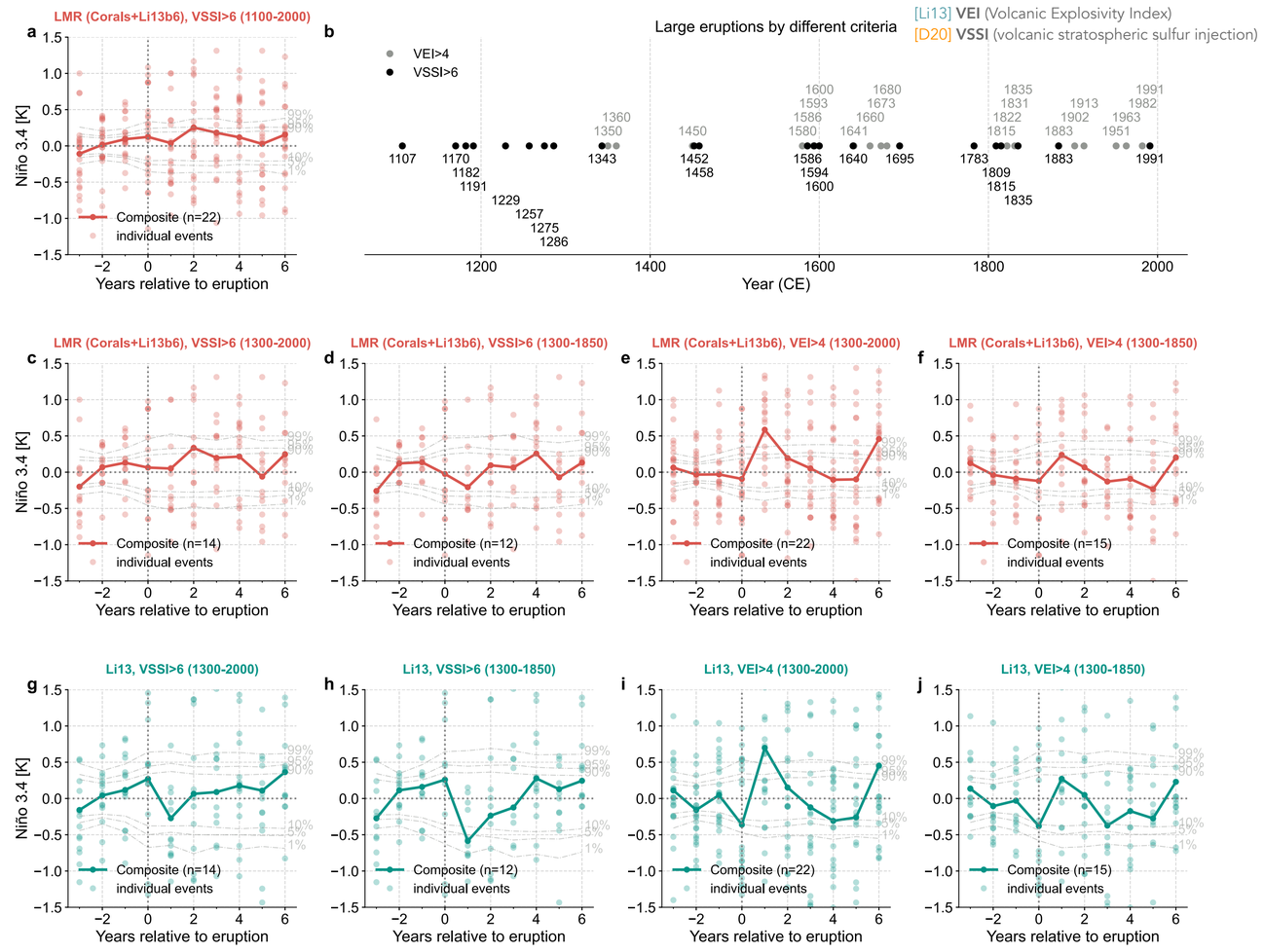

## Trees vs Corals: consistent conclusions

**Corals only**
- PAGES2k v2
- Latest Palmyra [D20]

**Trees only**
- 6 best predictors [Li13]




## Trees ⊕ Corals: event selection is consequential




## Key Refs

Tree ring-based Study [Li13] — Li et al. (2013)
Coral-based Study [D20] — Dee et al. (2020)
PAGES2k v2 Database — PAGES2k Consortium (2017)
Last Millennium Reanalysis PDA framework — Hakim et al. (2016), Tardif et al. (2019), Zhu et al. (2023)