

Trees as sensors of metallic pollution dissemination during past flood events: the case of the Odiel River (southern Iberian Peninsula)

Delapierre A, **Ballesteros-Canovas JA**, Buzzi-Marcos J, Stoffel M, Slaveykova, V

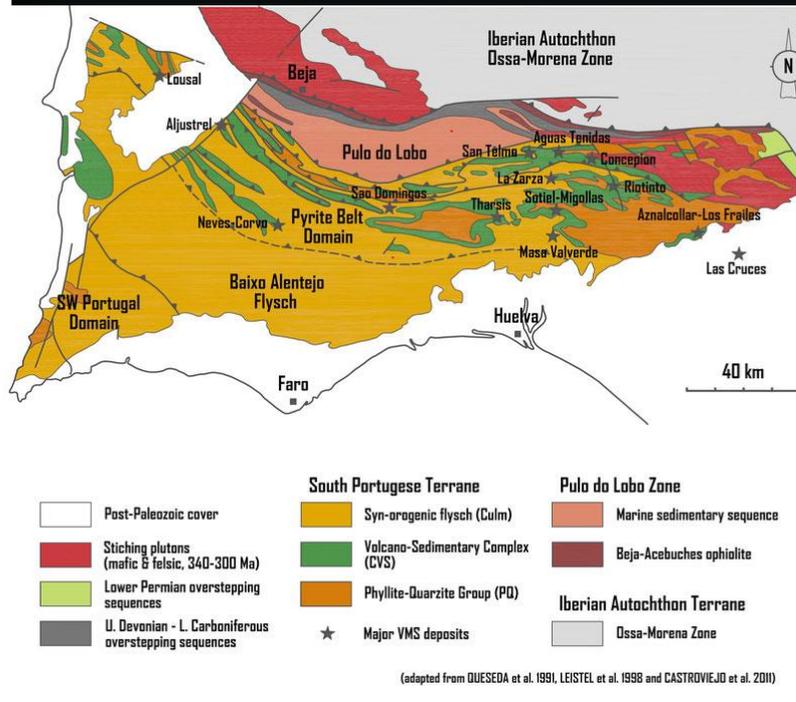
Department of Earth Sciences (DESTE)
University of Geneva
Switzerland



UNIVERSITÉ
DE GENÈVE

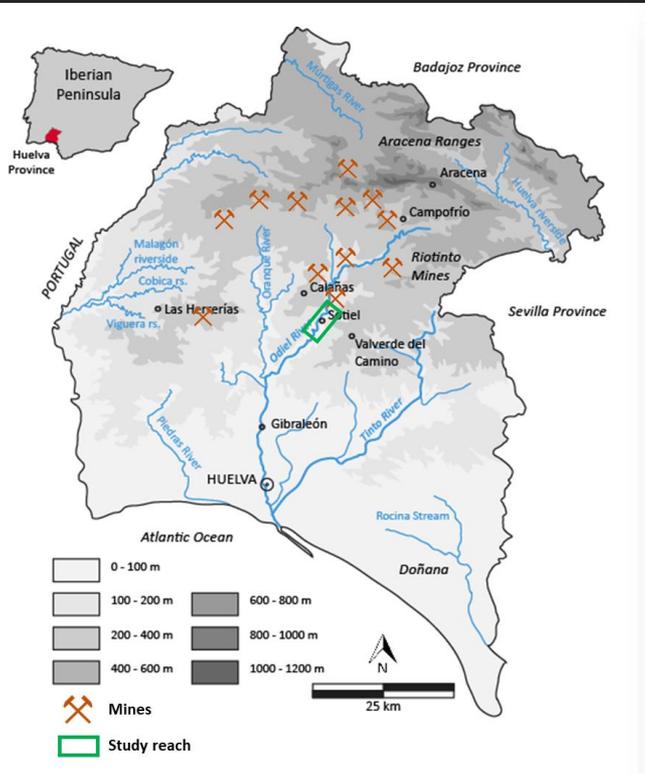


Problematic: the Iberian pyrite belt



Mining activity since Roman period

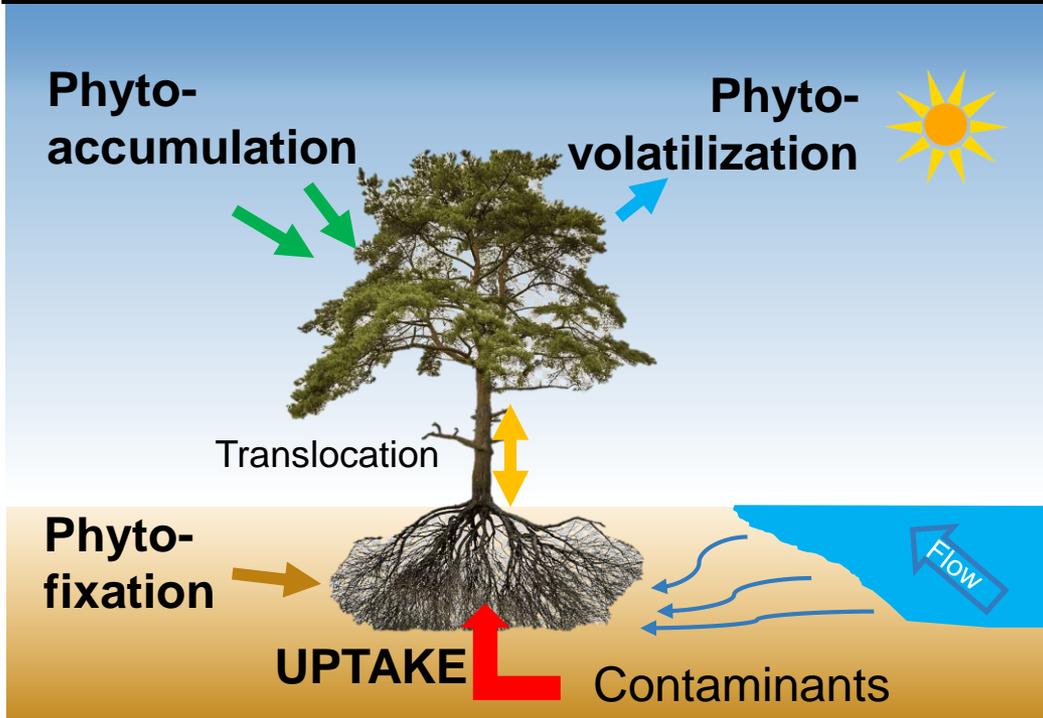
Problematic: acid drainages associate to mining



Huge environmental issues such dam failures: Aznalcóllar, 1998)



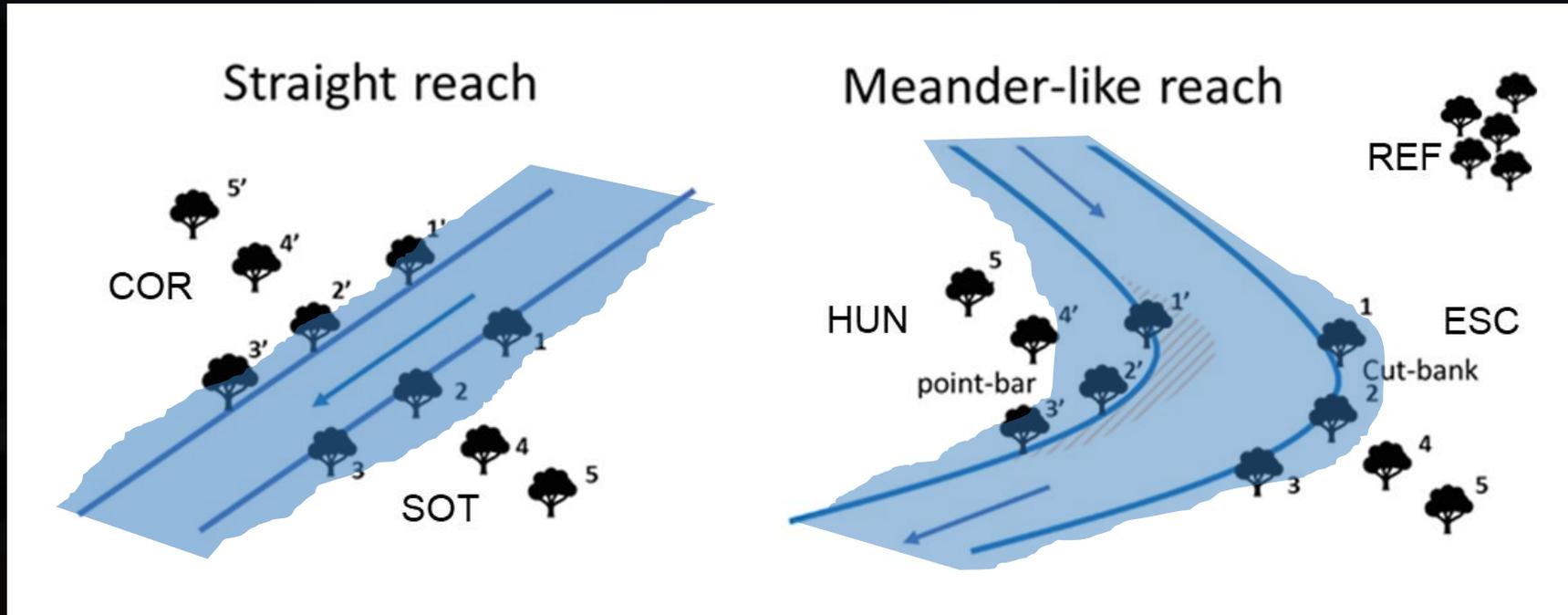
Dendrochemistry Tracing metallic pollution in tree-rings



Trees growing close to the water course



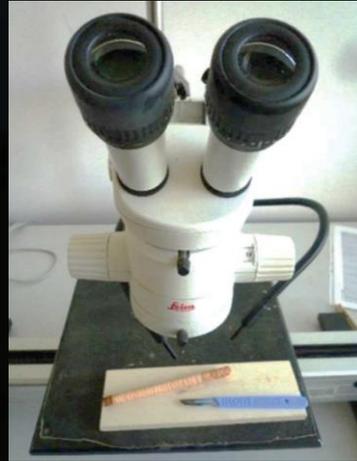
Research questions Tree ring, floods & metallic pollution



1. Do trees along Odriel River record metallic pollution?
2. Does tree (fluvial) positions matters?
3. Is there a chemical signature related to flood in tree-rings?

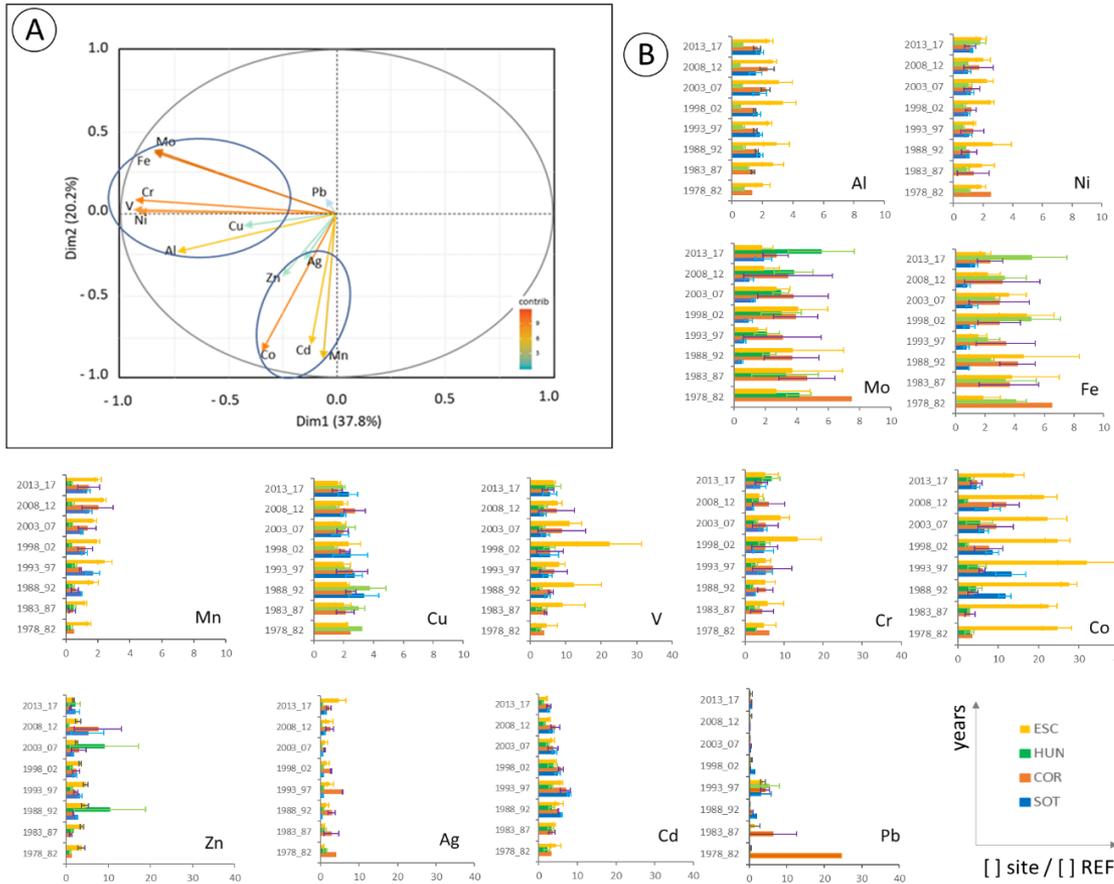


Methods: dendrochemical analysis



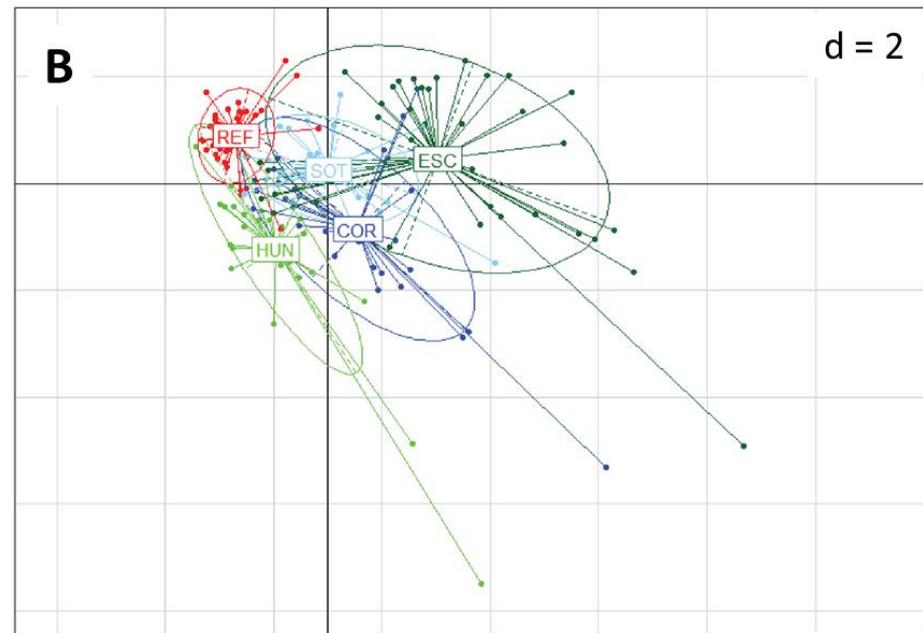
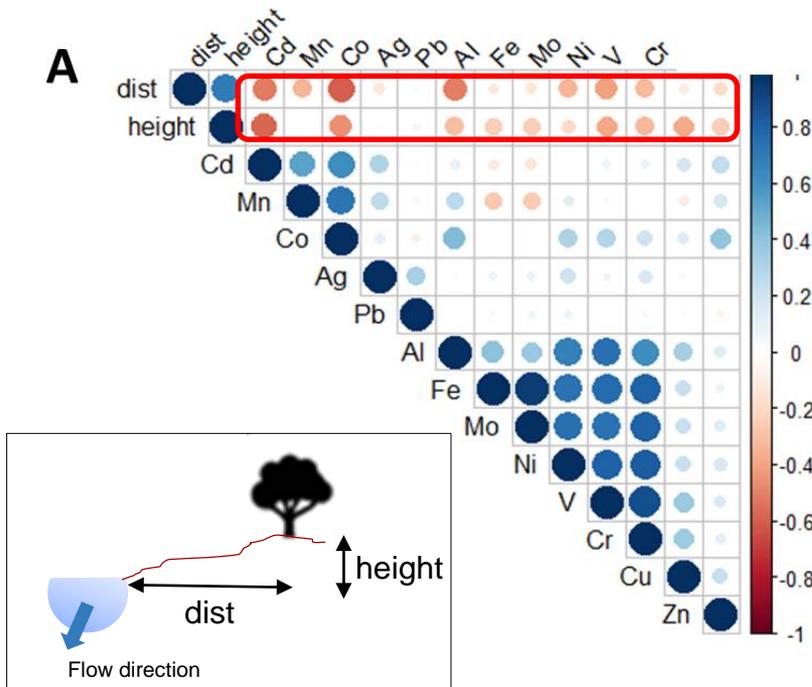
1. Tree sampling
2. Tree-ring dating
3. Preparation of samples
4. ICPM (Inductively Coupled Plasma Mass Spectrometry)

Q1. Do trees along Odief River record metallic pollution?



- 1st group (37.8%): Co, Cd, Mn, Zn and Ag (centripetal pattern)
- 2nd group (20.2%): Mo, Fe, Cr, V, Ni, Al and Cu (centrifugal pattern)
- Lower variations (<25%): Al, Ni, and Cu
- Higher variations (> 45%): Zn, Ag, Cd

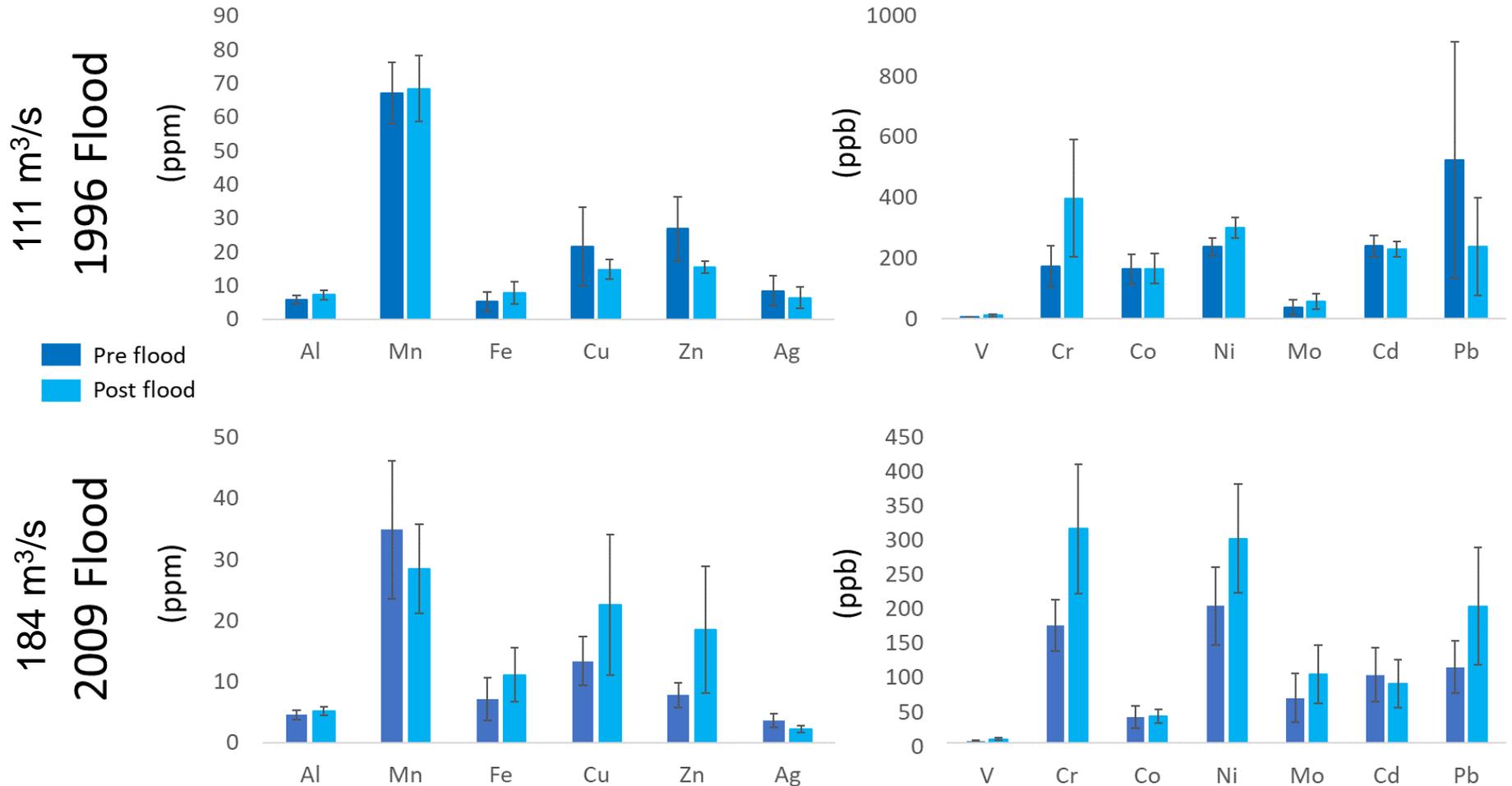
Q2. Does tree (fluvial) positions matters?



1. The fluvial connectivity control the conc. of metallic elements
2. The fluvial geomorphic position control as well.

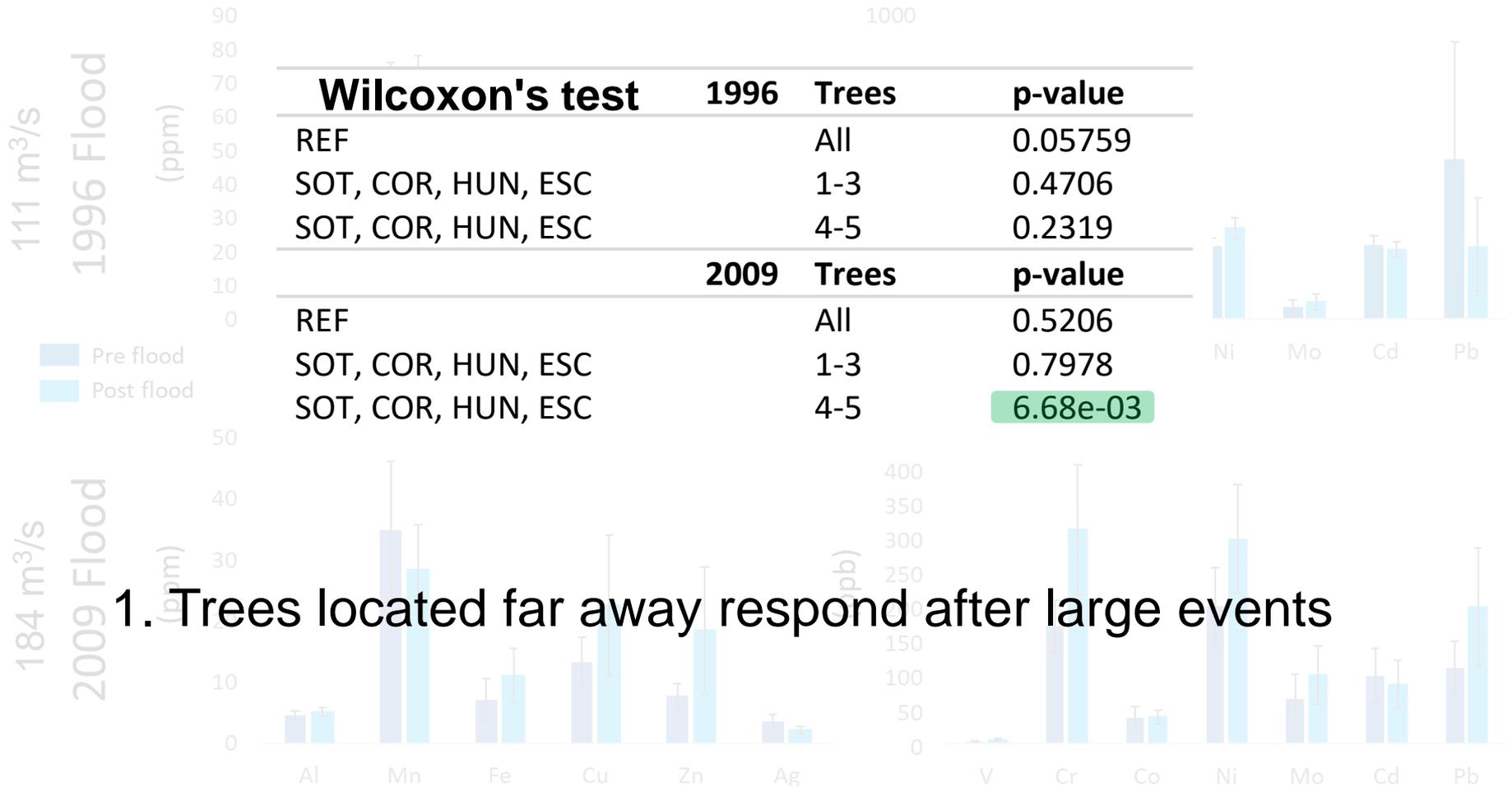


Q3. Is there a chemical signature related to flood in tree-rings?





Q3. Is there a chemical signature related to flood in tree-rings?



1. Trees located far away respond after large events



Conclusions

1. Trees act as sentinels of metallic pollution on floodplains affected by mining,
2. Metallic elements on trees show tendencies related to translocation processes,
3. The fluvial connectivity control the concentration of metallic elements,
4. The fluvial geomorphic position control the concentration of metallic elements,
5. Trees located far away respond after large events.



UNIVERSITÉ
DE GENÈVE



Thank you

Contact: juan.Ballesteros@unige.ch