

The footprint of global climate oscillations on temperature across lakes

Daniel Mercado-Bettín, Rafael Marcé

Context

Climate oscillations are expected to influence any ecosystem around the world. But, there is no global evaluation of the relation between these oscillations and water temperature in lakes.

Hence, the annual average of surface and bottom water temperature in 41449 lakes were related to climate oscillation indexes.

Data used

ISIMIP3a GOTM simulations

41449 lakes

ONLY ISIMIP3a data, ensemble mean of the 4 models: GSWP3-W5E5, 20CRv3-W5E5, 20CRv3-ERA5, 20CRv3

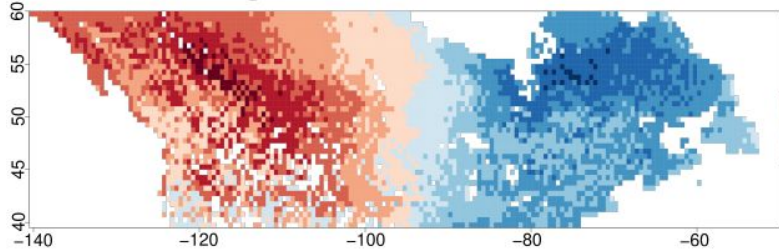
Yealy average, to avoid seasonality patterns

Time series between 1901-2021

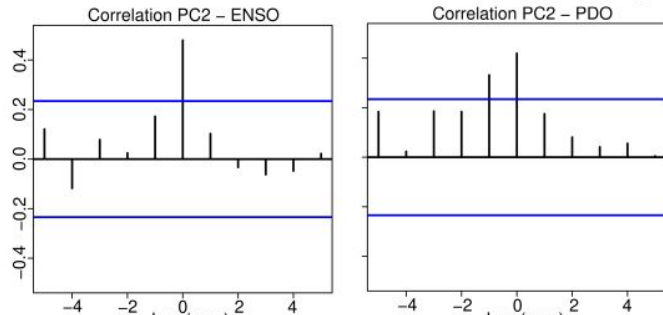
Current How?

1. Hierarchical Clustering was applied to surface water temperature to separate by region
2. Principal component analysis was applied for all the pixels contained in each cluster
3. Cross-correlation between PCs and climate indexes

Loadings of PC in North America



Cross-correlation between PC and ENSO/PD



Significant correlation between PC2 and ENSO/PDO indexes

