

Causal maps versus correlation maps: visual analysis of tropical-extratropical atmospheric teleconnections using causal discovery

Giorgia Di Capua and Reik V. Donner

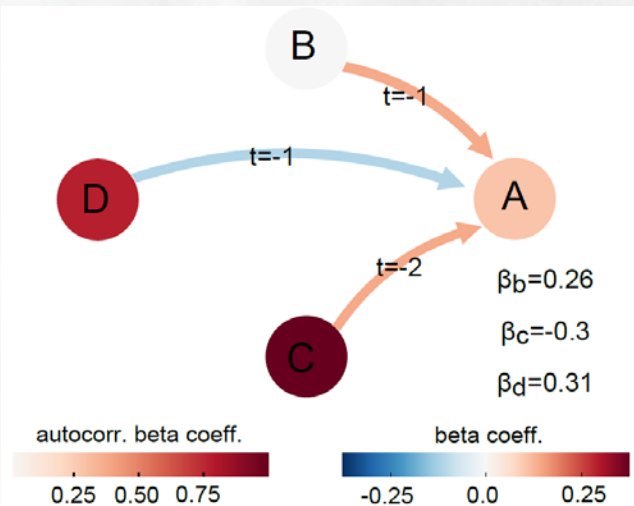
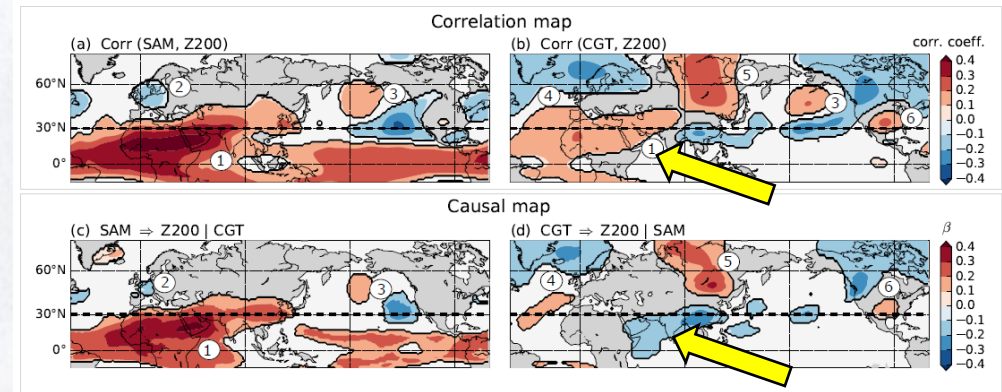
Causal maps

- Alternative to corr. maps based on a causal discovery algorithm
- help remove spurious links, find causal links

Main mode of covariability between tropical convection and mid-latitude circulation in boreal summer

- the South Asia monsoon (SAM) paired with the circumglobal teleconnection pattern (CGT)

- Corr. maps very similar
- Causal maps disentangle spurious links
- two-way causal link between SAM and CGT



Di Capua et al. WCD 2020 <https://wcd.copernicus.org/articles/1/519/2020/>

Causal maps

- Based on causal effect networks (CEN)
- PCMCI: based on partial correlation
- Remove spurious links from correlation maps

Is it possible to improve seasonal forecasts with causal maps?

- SEAS5 causal maps agree qualitatively
- Weaker magnitude

