[Speaker Zoom video]

Extraordinary ENSO El Niño (1997-98) on East Africa: applying anomalies and dipole index to precipitation, temperature, NDVI assessment

Saurophaganax_Popping_forte

Climatematch Academy

Introduction

[Speaker Zoom video]

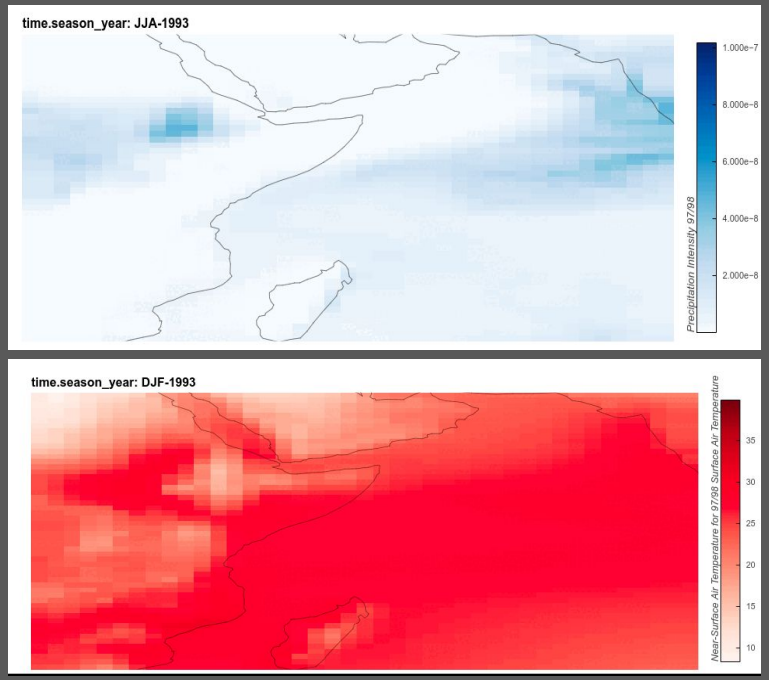
- Question
  - How have extreme El Niño events impacted precipitation and temperatures in East Africa and what is the effect on vegetation in the region?
    - It is expected that during strong episodes of the Niño years, the events will be more harmful and affect the sensibility of the vegetation in the East Africa.
    - Indian Ocean Dipole (IOD) effects on strong episodes of the Niño

Historical changes

Time range for 97/98 El Nino phase

- Pr: median over seasons
- Temp: mean over seasons

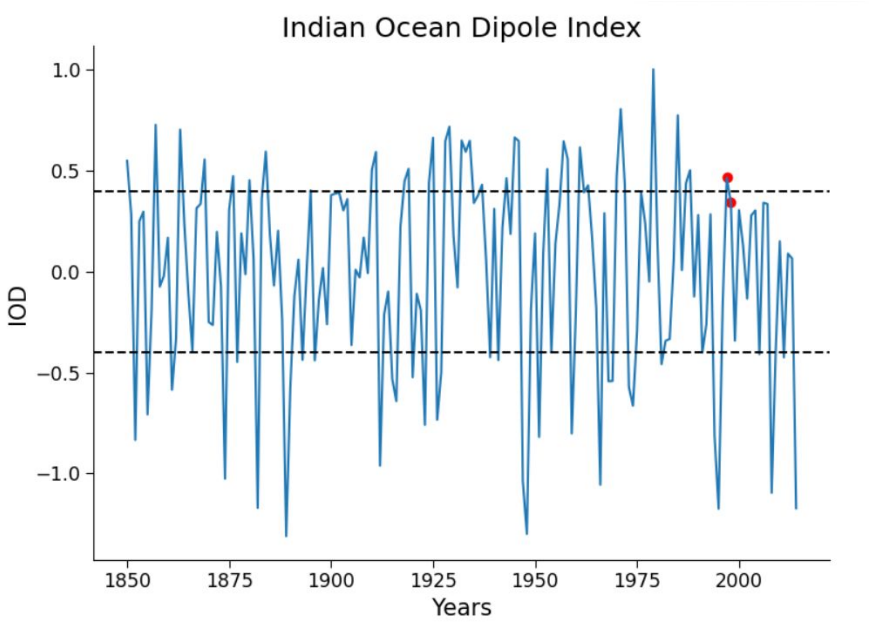
[Speaker Zoom video]

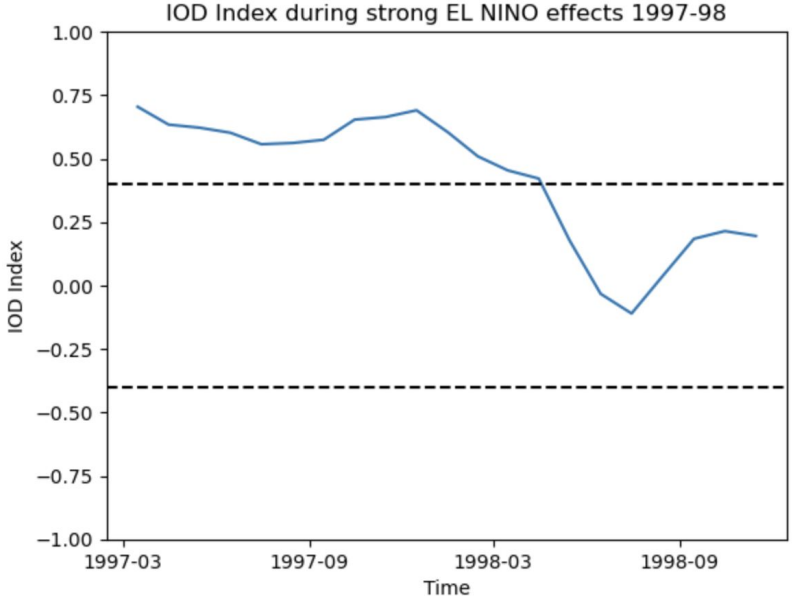


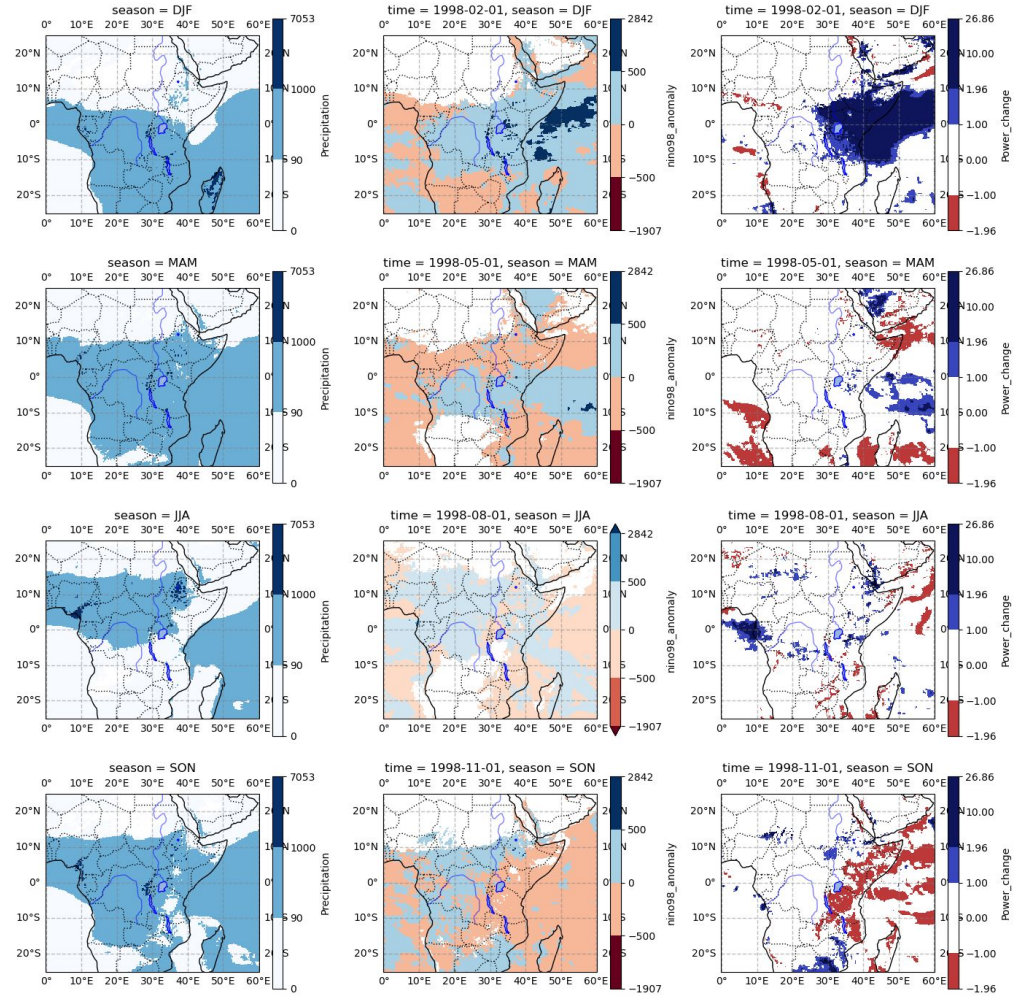
Indian Ocean Dipole

[Speaker Zoom video]

IOD Index = Western Indian Ocean SST Anomaly - Eastern Indian Ocean SST Anomaly







East Africa seasonal accumulated total precipitation (1991-2020)

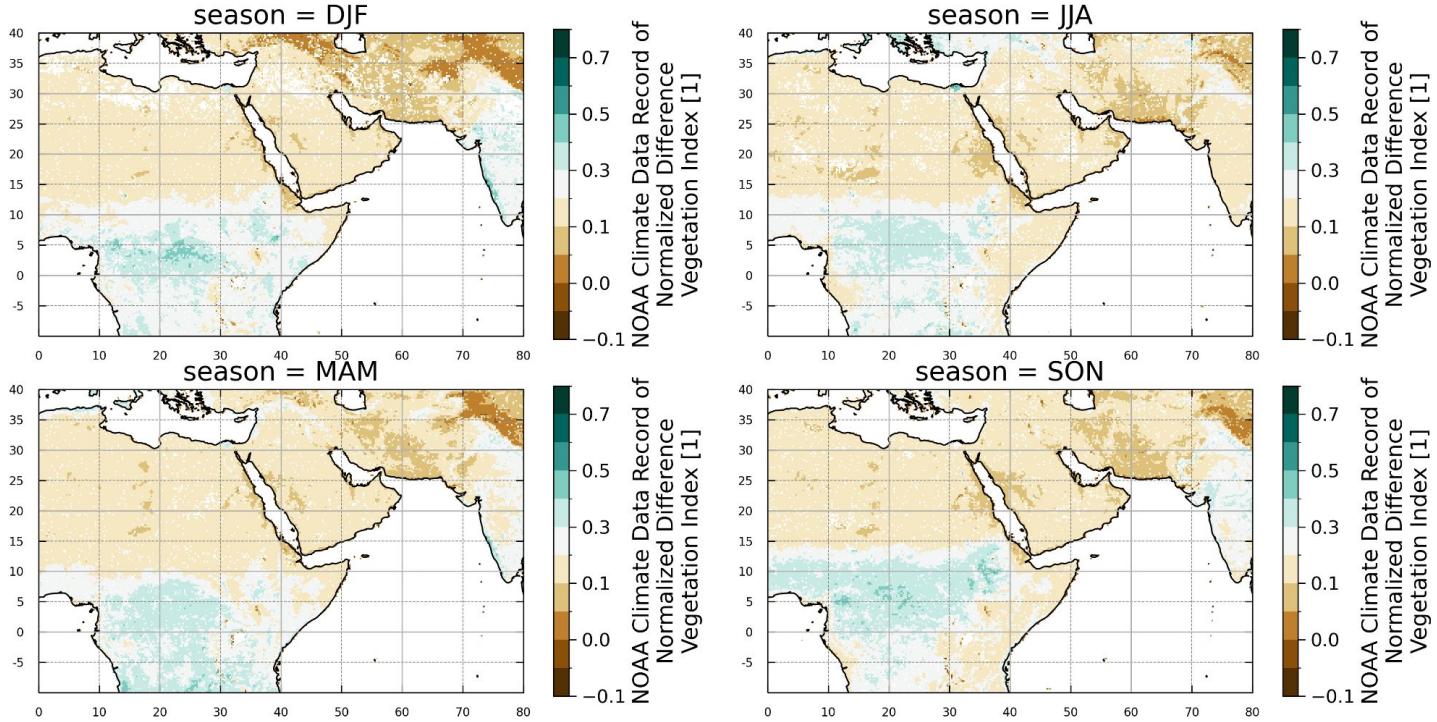
[Speaker Zoom video]

Data: ERA 5, 0.25°, monthly averaged data

- East Africa, particularly the Ethiopian Highlands and Madagascar island, can receive more than 1000 mm of rainfall during their respective summer season.
- The 97-98 extraordinary Niño significantly impacted the eastern region of Africa, specifically the Somalia region, resulting in increased rainfall during the DJF season and causing a lack of rainfall in the southern part of the continent.
- This extraordinary ENSO event led to up to 26 times the normal accumulated precipitation in certain regions.

Normalized Difference Vegetation Index

[Speaker Zoom video]



NDVI index mean in time range 97/98 for seasons

Conclusion

[Speaker Zoom video]

- Key Takeaways
  - Strong El Niño events associated with excessive rainfall in portions of Eastern Africa
  - Following an event of excessive rainfall, there is a delay in increase in vegetation
  - The NDVI index mainly depends on the change of climatic factors (precipitation and temperature)
- Future Work
  - Expand our research to additional case studies
- Broader Impacts
  - Provide early warning of extreme events
  - Densely populated
  - Industries such as agriculture
  - Food security