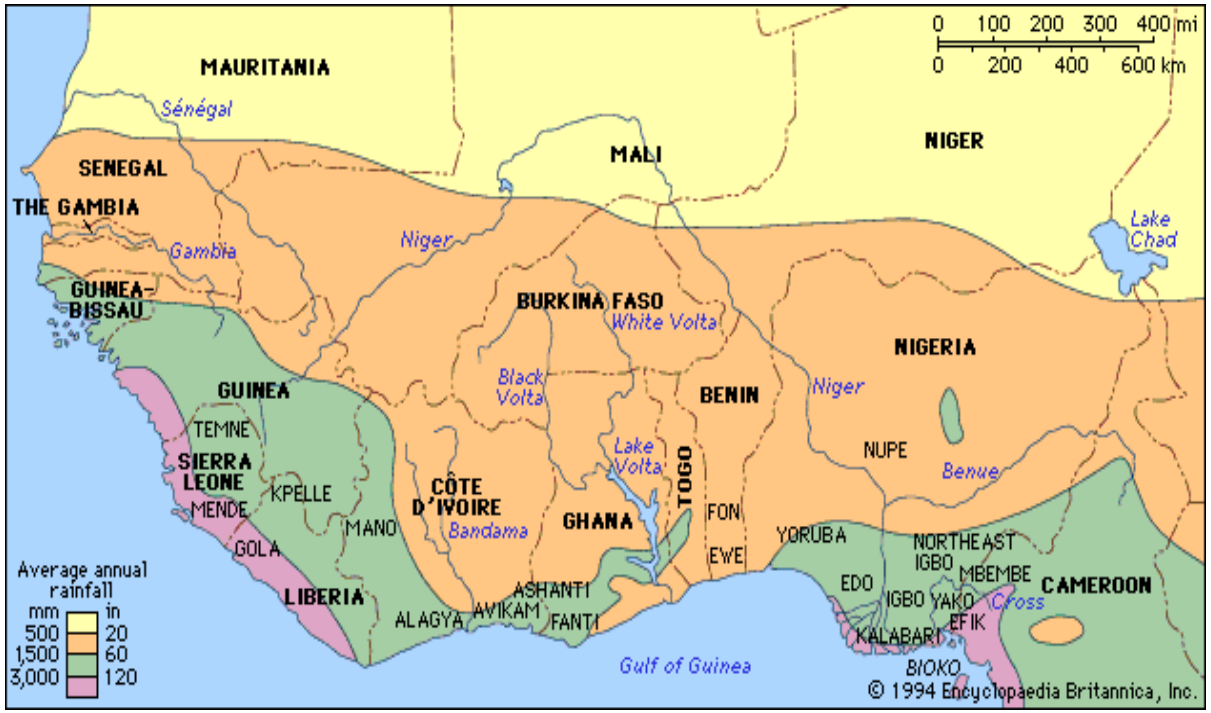
Impact of SST variability on West African Precipitation

Schematic of average annual rainfall



http://www.britannica.com

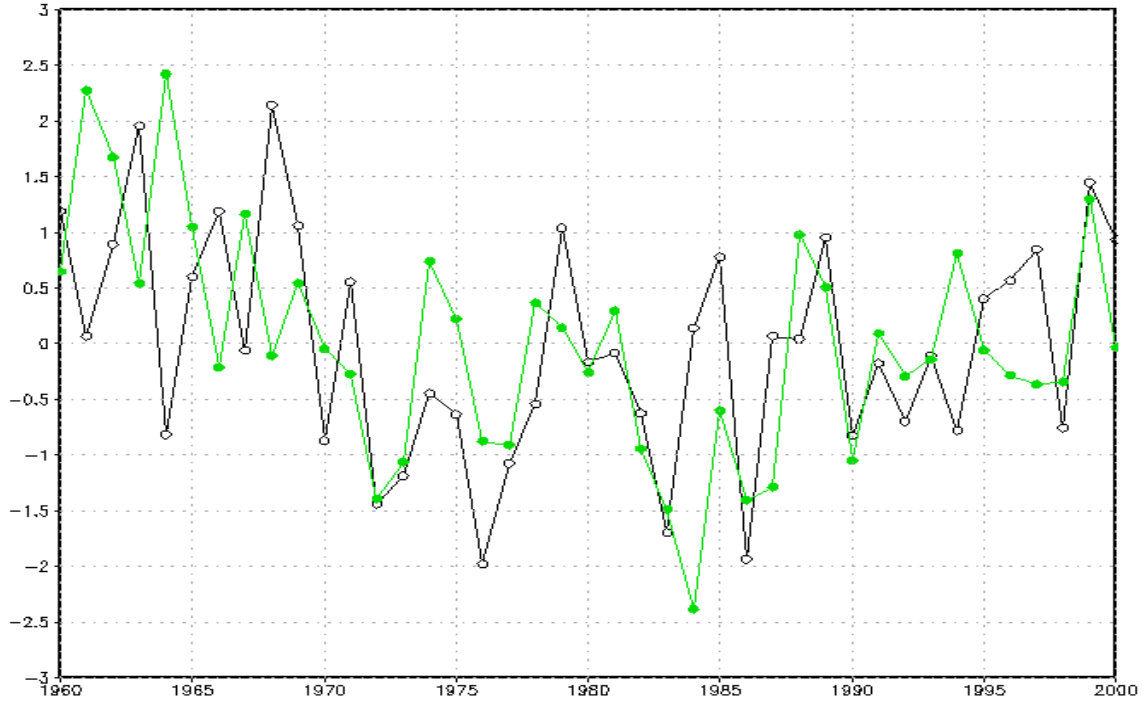
Climate Indices

- Atlantic Meridional Mode
- Atlantic Nino
- Atlantic Tripole SST EOF
- Tropical North Atlantic Index
- Tropical South Atlantic Index

http://www.esrl.noaa.gov

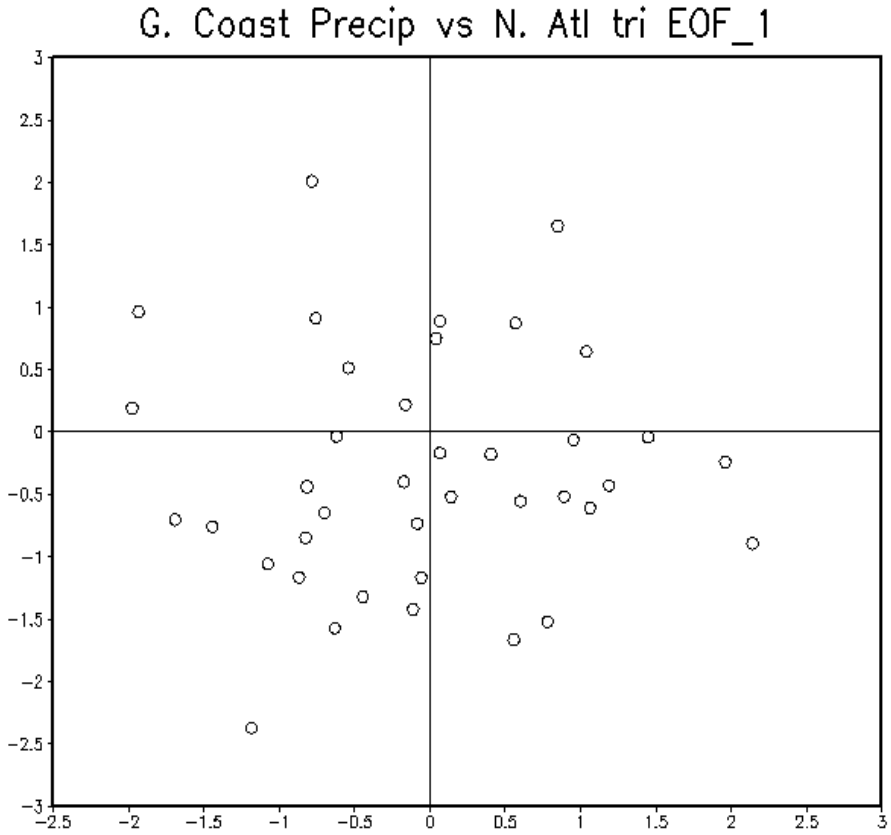
Results

West Africa Rainfall AnomalyTime Series

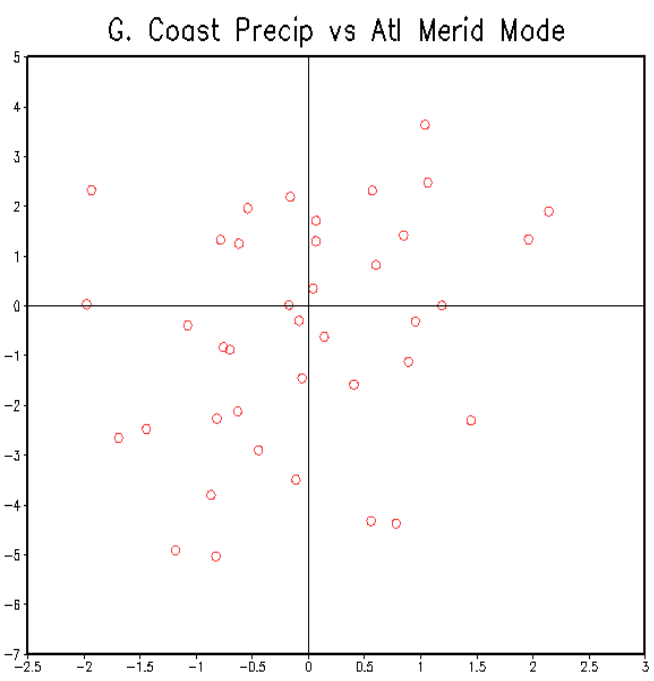


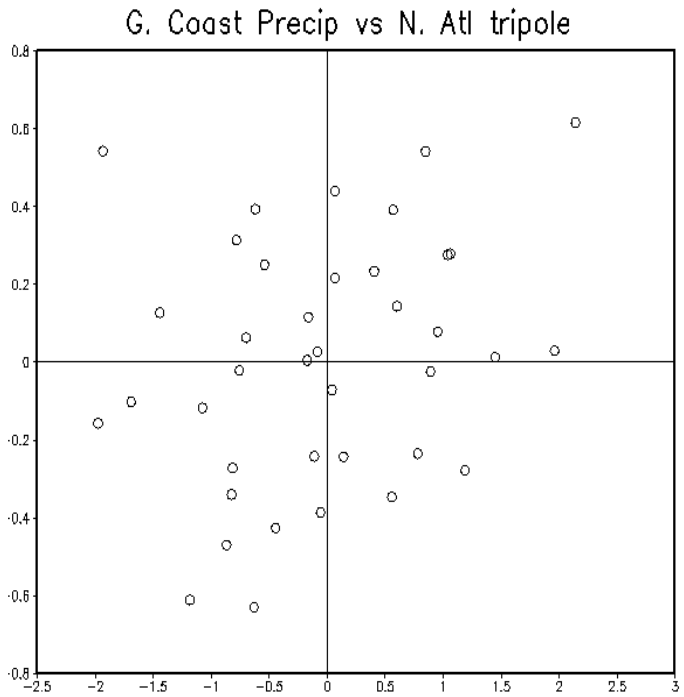
GrADS: COLA/IGES

Results

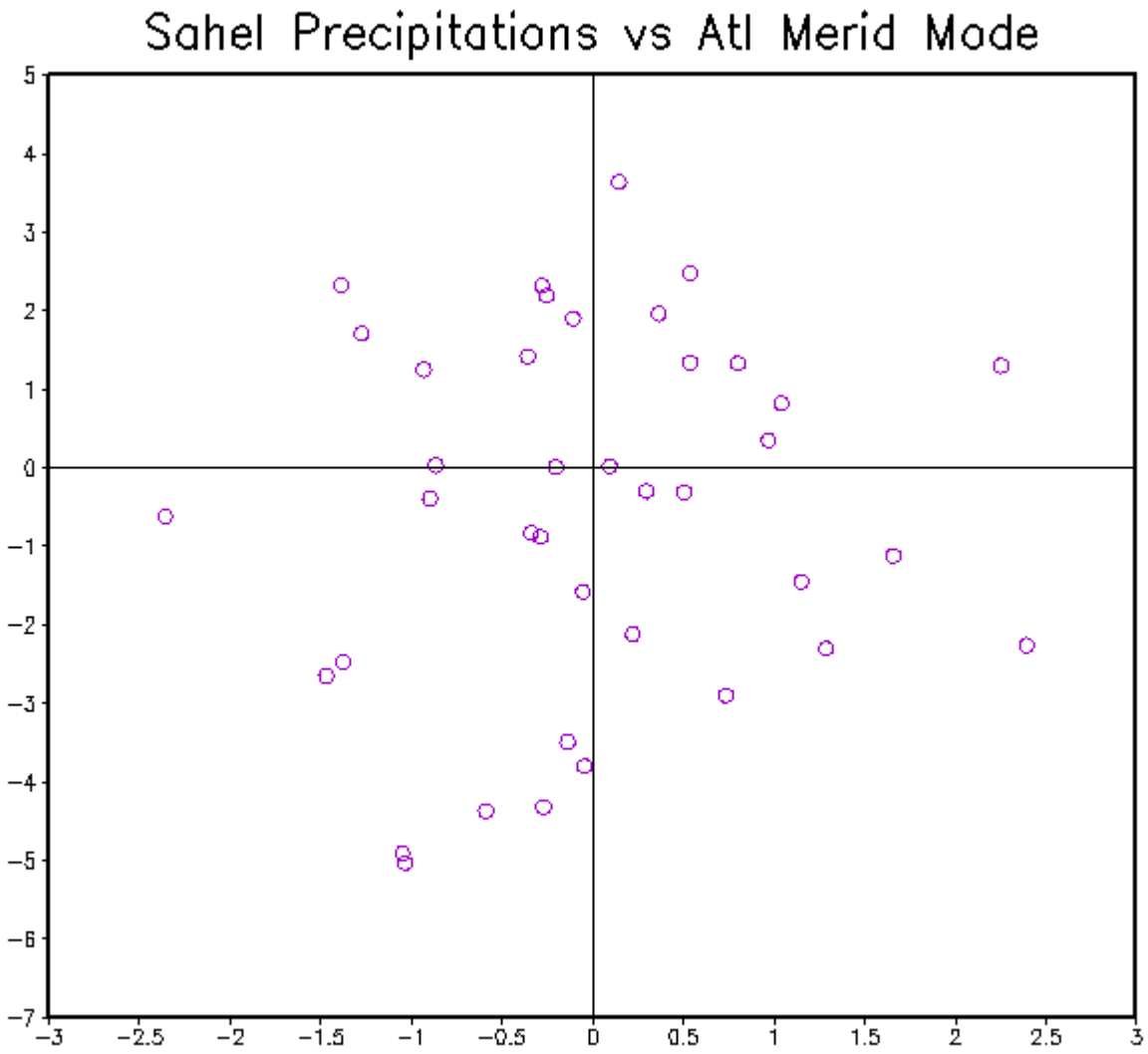

G. Coast Precip vs N. Atl tri EOF_1
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
3

Results

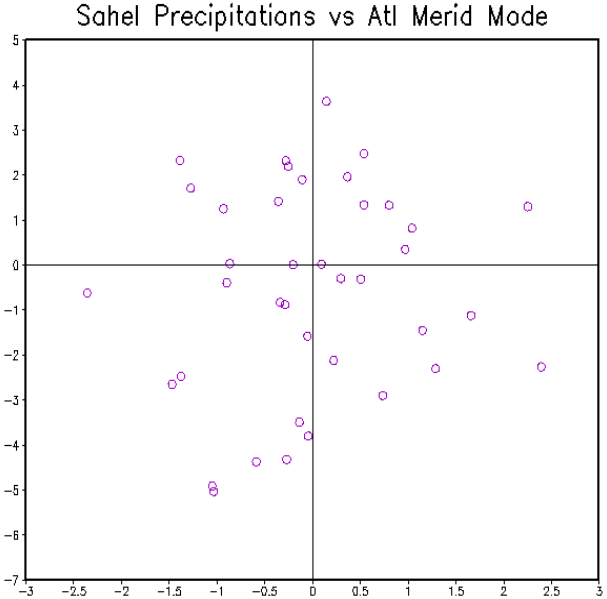

G. Coast Precip vs Atl Merid Mode

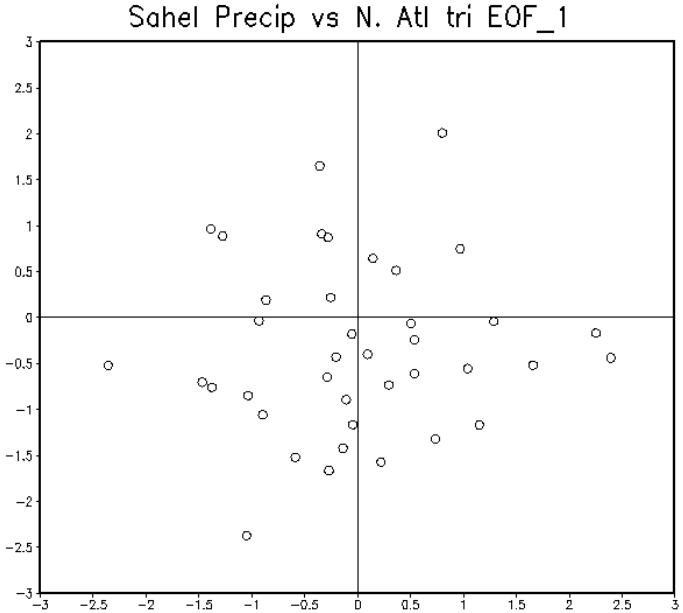

G. Coast Precip vs N. Atl tripole

Results

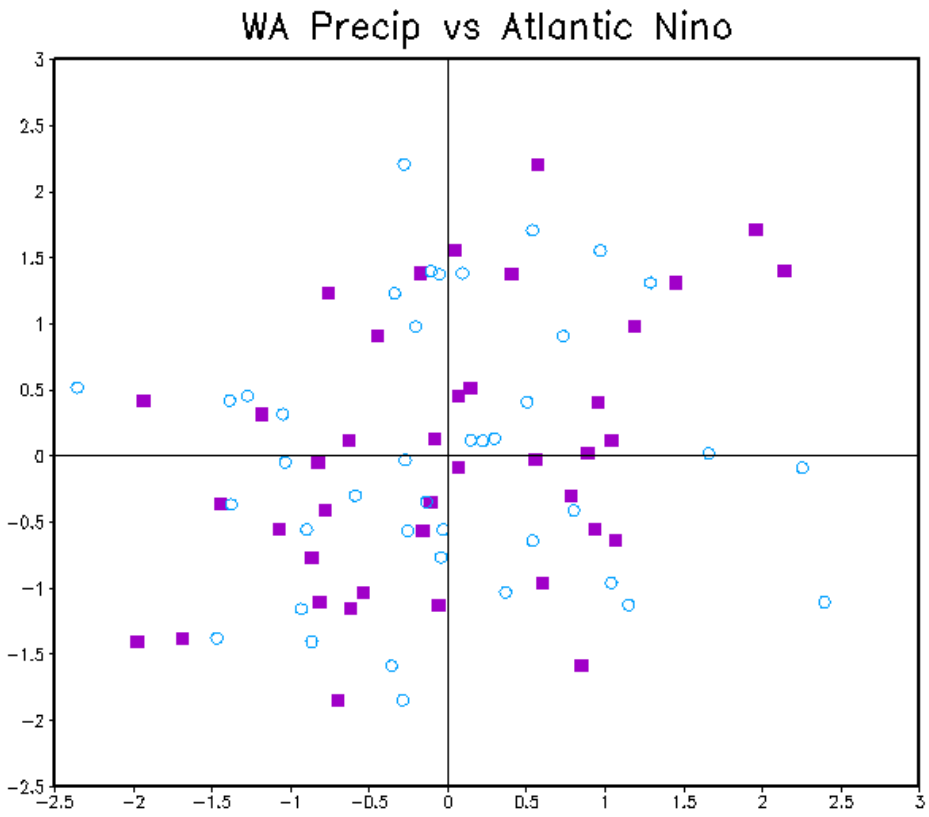

Sahel Precipitations vs Atl Merid Mode
5
4
3
2
1
0
−1
−2
−3
−4
−5
−6
−7
−3
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
3

Results

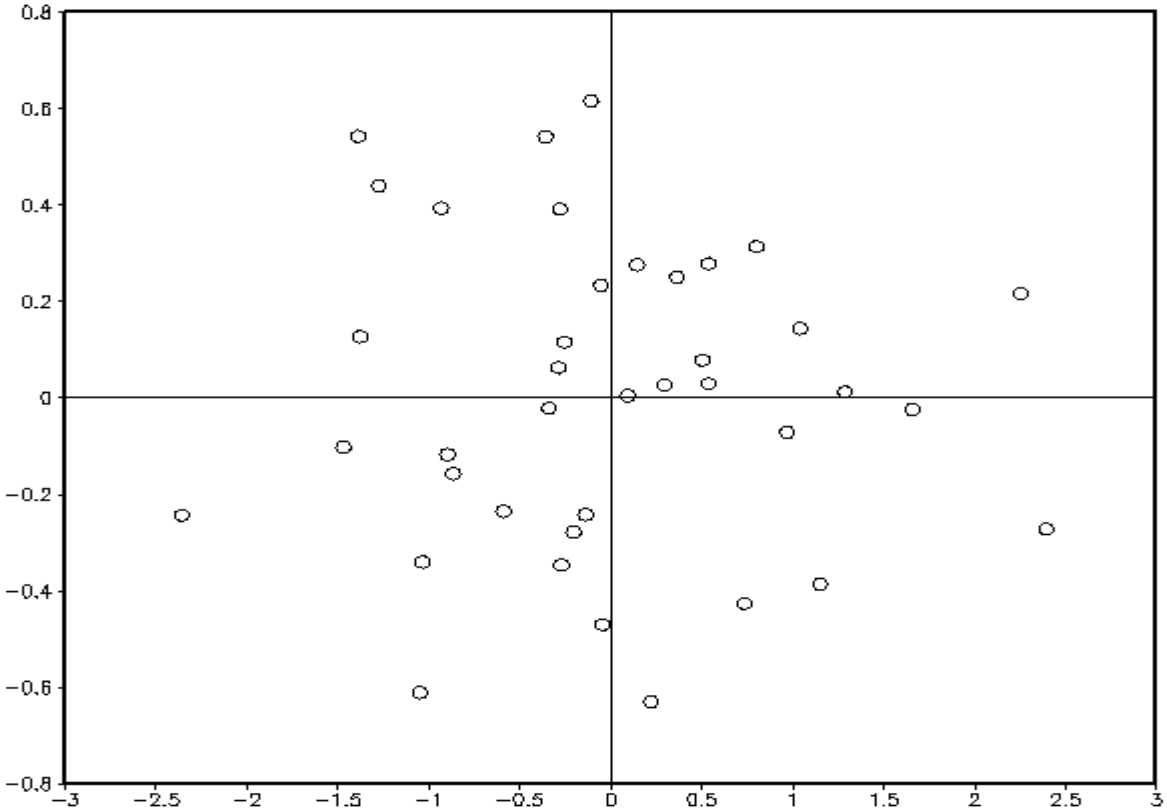

Sahel Precipitations vs Atl Merid Mode


Sahel Precip vs N. Atl tri EOF_1

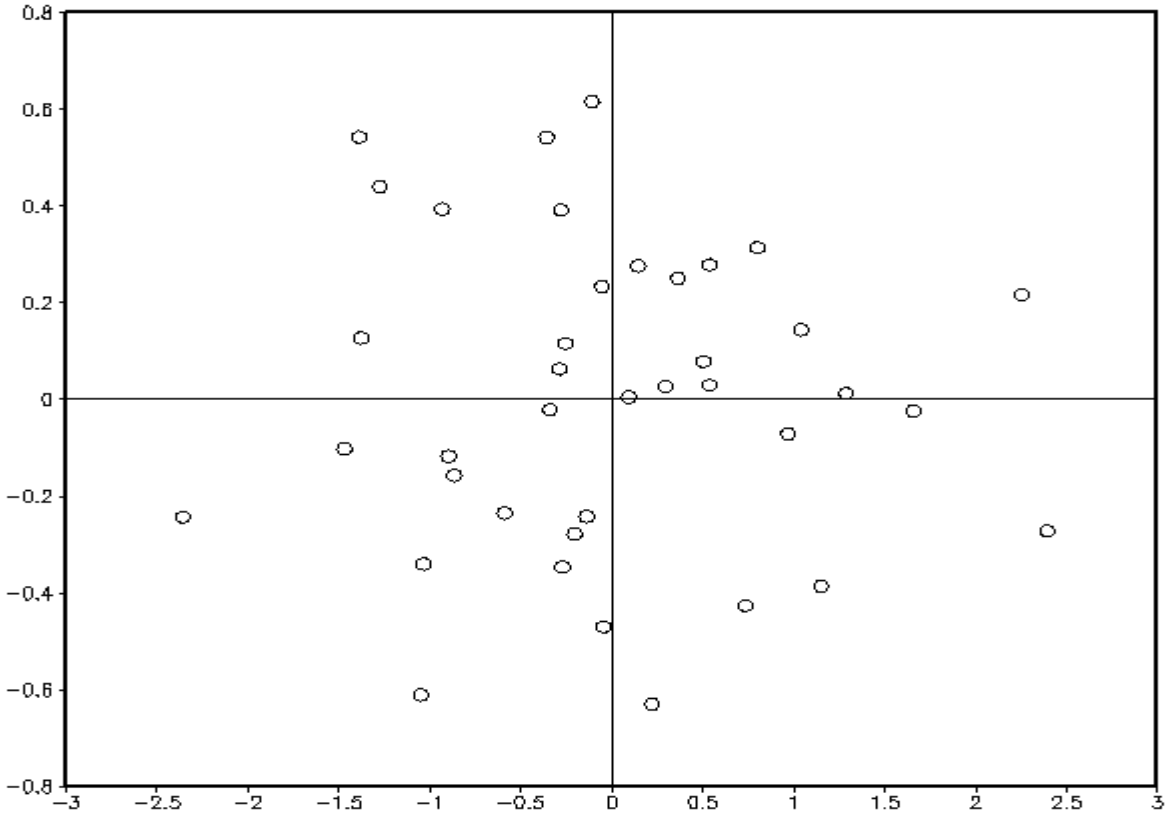
Results


WA Precip vs Atlantic Nino
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
3

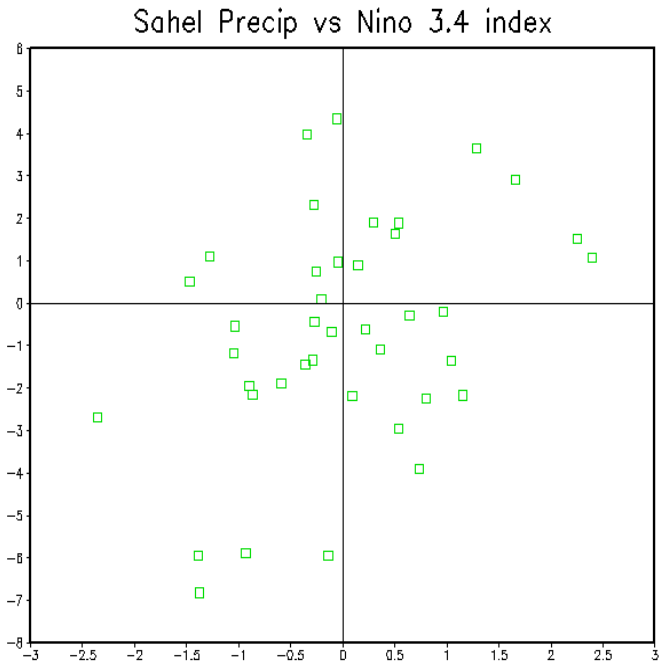
Sahel vs Atl SST tripole EOF

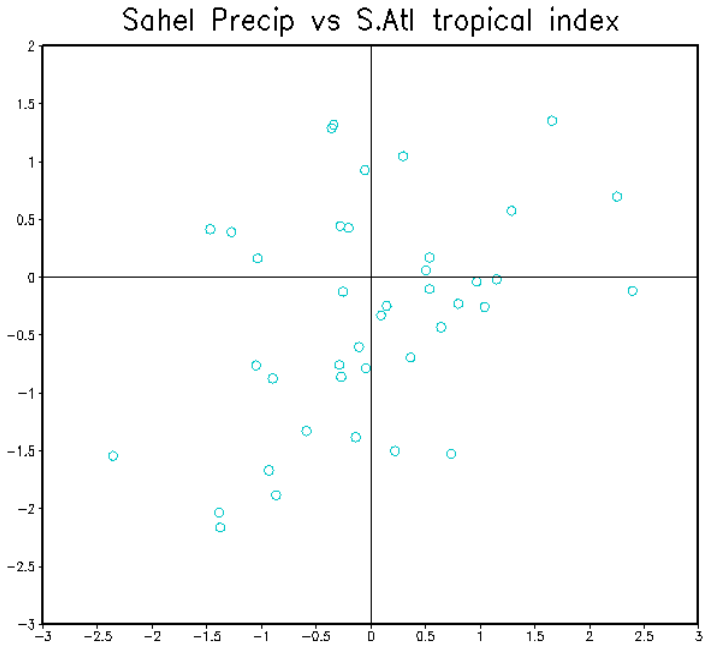


Sahel vs N. Atl tropical osc.



Results





GrADS: COLA/IGES

Guinea Coast Correlation

Index	DJF	MAM	JJA	SON
Atlantic meridional mode	0.353	0.4	0.274	0.222
Atlantic SST tripole EOF	0.427	0.351	0.031	0.123
Atlantic NINO	-0.047	0.102	0.418	0.294
North Atlantic Tropical oscillation	0.013	0.002	0.005	-0.027
South Atlantic Tropical oscillation	0.194	0.032	-0.133	-0.283

Sahel Correlation

Index	DJF	MAM	JJA	SON
Atlantic meridional mode	0.377	0.275	0.105	0.119
Atlantic SST Tripole EOF	0.416	0.271	0.052	0.088
Atlantic NINO	0.274	0.065	0.044	-0.366
North Atlantic Tropical oscillation	-0.220	-0.165	-0.055	-0.101
South Atlantic Tropical oscillation	-0.334	-0.173	-0.098	-0.250

Discussion

- The Atlantic meridional mode and North Atlantic oscillation and the Atlantic NINO has high correlation with west African precipitation anomalies
- The correlation is higher in the Guinea coast than in the sahel
- DJF and MAM anomalies of the Atlantic meridional mode and North Atlantic oscillation affect west african precipitation, while Atlantic nino affects during the JJA season