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**Extratropical atmospheric variability and precipitation over South America in a  
multidecadal timescale**

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# **Extratropical atmospheric variability and precipitation over South America in a multidecadal timescale**

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**Brazil**

# OBJECTIVE

- Analysis of extratropical influences on precipitation over South America in observations and model simulations
- Interannual variability: ENSO, NAO, AAO, PSA
- Multidecadal: PDO, NAO, AAO

# Data and method

- Precipitation station data (1956-2001)
- Precipitation GPCP (1979-2001)
- NCEP/NCAR reanalysis (1951-2001)
  
- CPTEC/COLA AGCM (1951-2001)
- HAD CM3 CGCM (1949 to 1999)
- 51 years

# Background South America

- Different precipitation regimes in South America (tropical to extratropical)
- DJF rainy season Central and SE Brazil
- MAM rainy season NE Brazil (ITCZ)
- SON onset monsoon system
- JJA eastern NE
- Southern Brazil: uniform precipitation

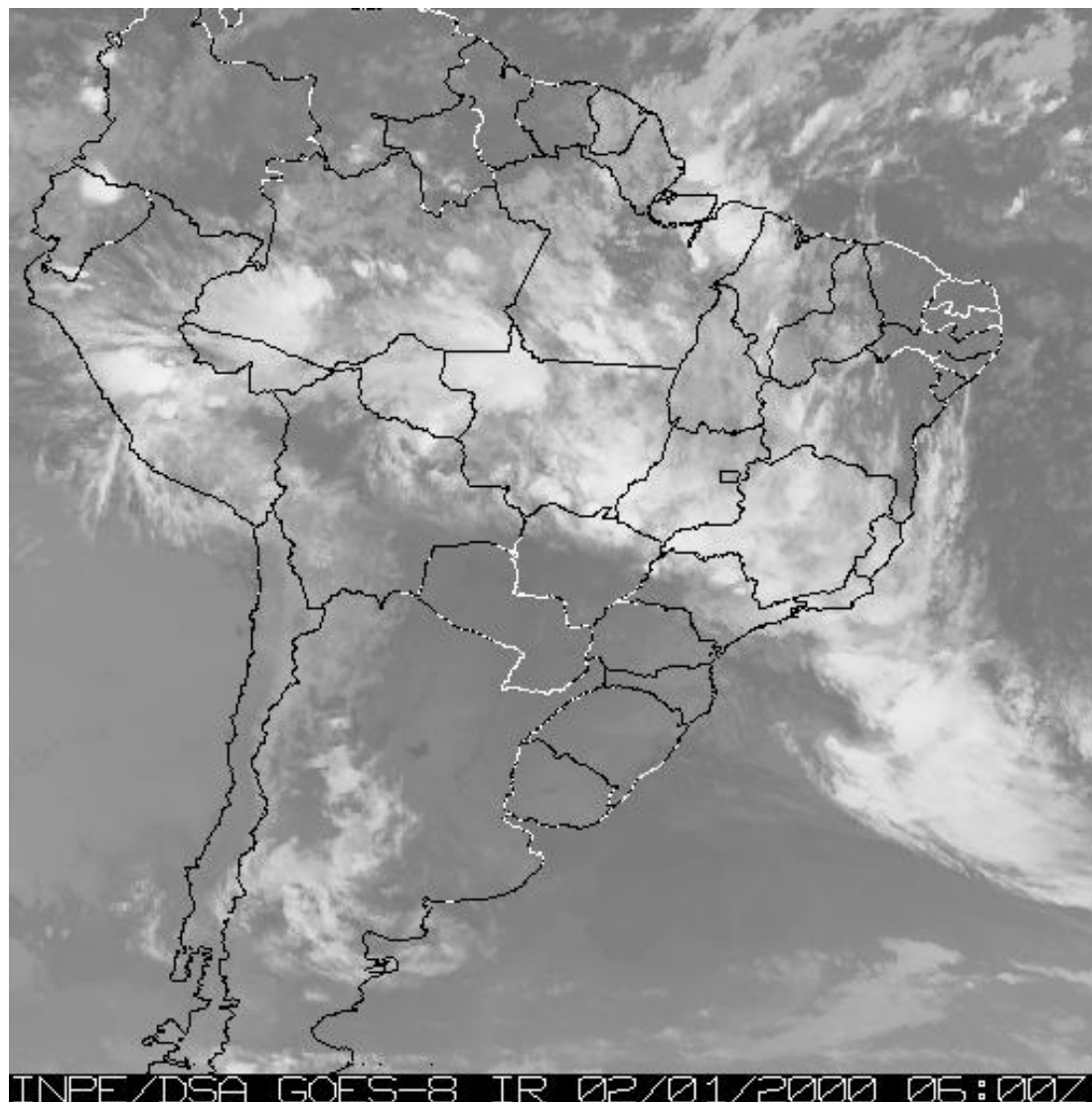
## Teleconnection influences in several regions

- **North/Northeastern S.A: ENSO, MJO, C.A.NAO**
- **SE and South : ENSO, PSA, AAO, blocking**

**Southeastern Brazil AAO**

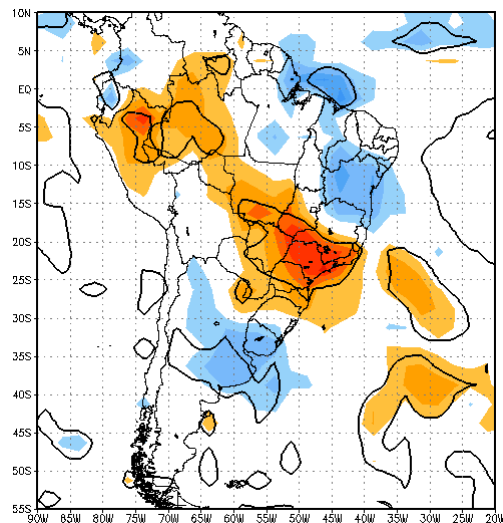
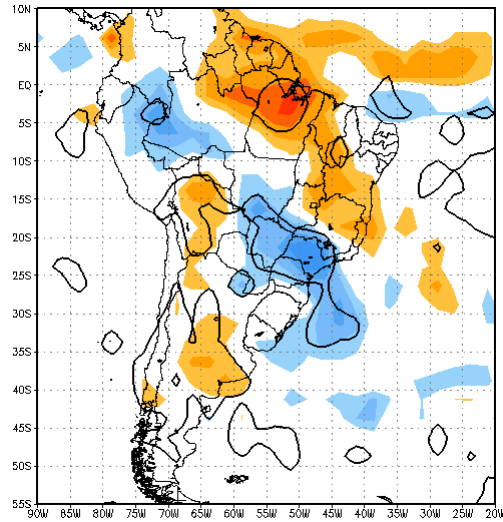
**Northeastern Brazil C.A. NAO**

# SACZ



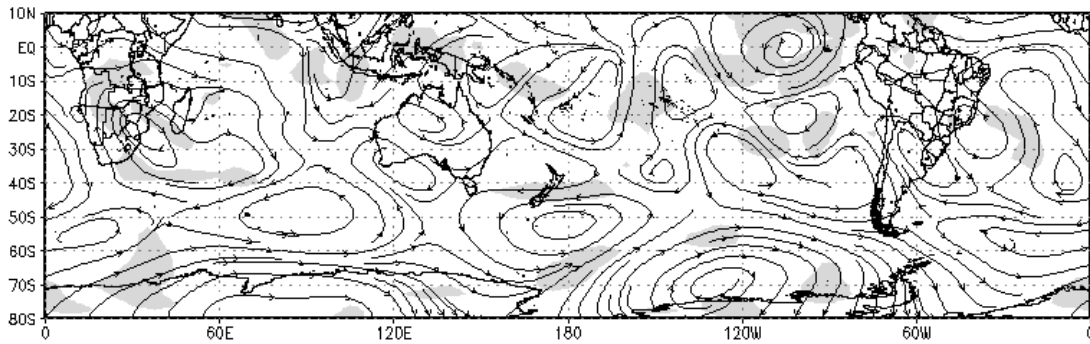
# Precipitation anomalies of the 5 wettest and 5 driest DJF over SE Brazil

GPCP

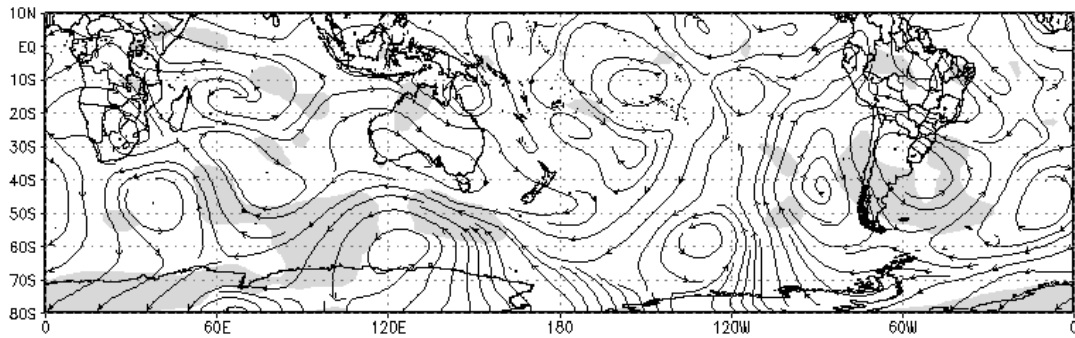


DJF seasonal

200 hPa wet



200 hPa dry



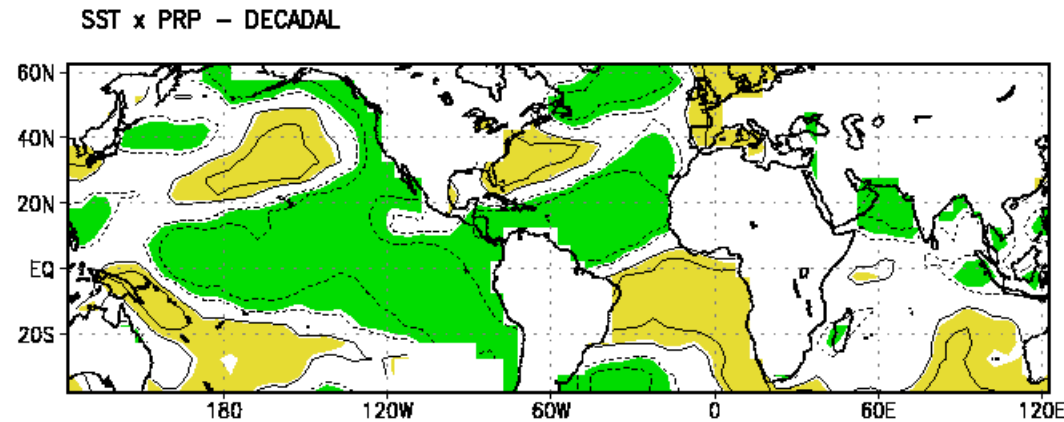
Vasconcellos and Cavalcanti (2009)

PSA type pattern



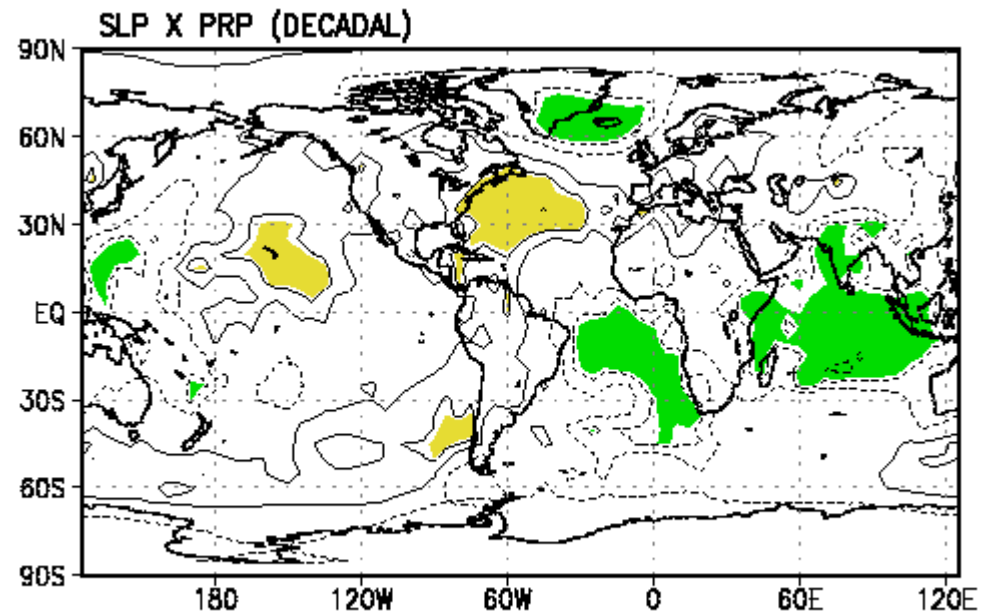
# **Extratropical influences on NE Brazil**

# Decadal timescale



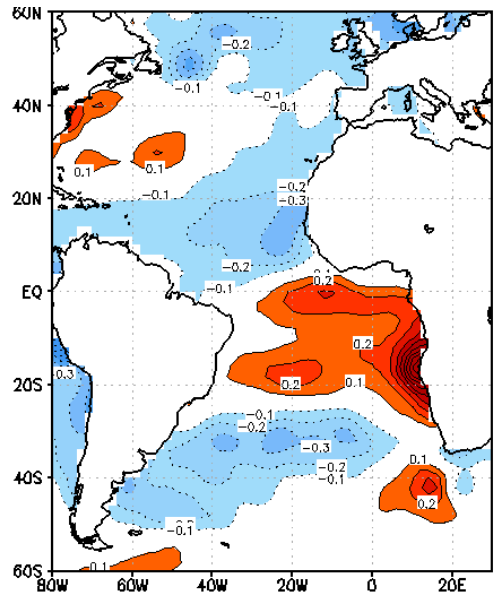
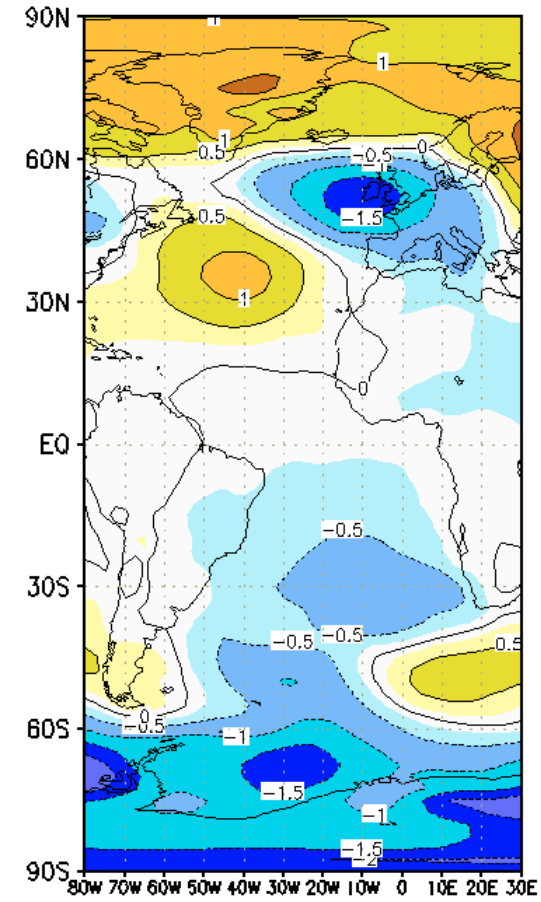
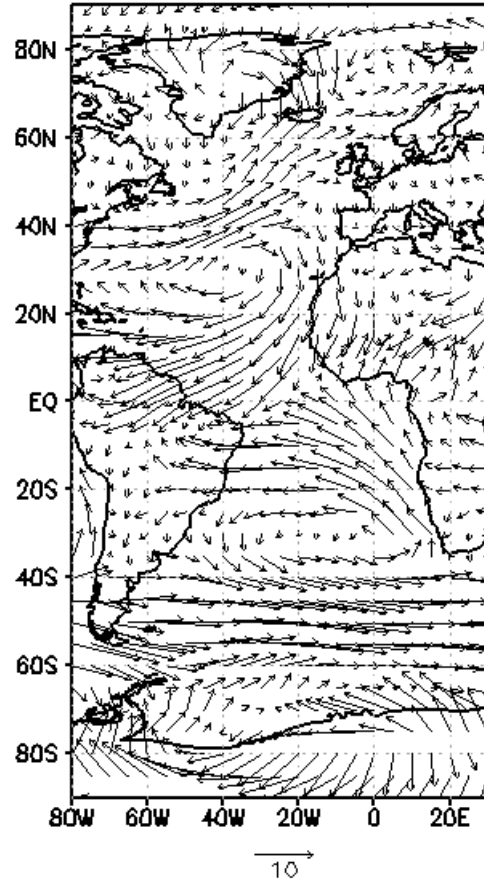
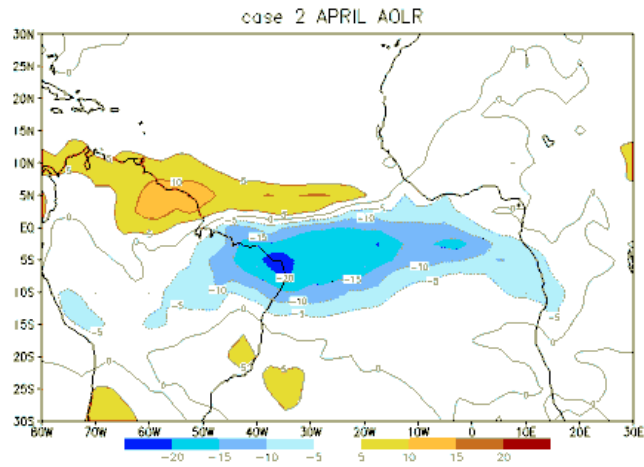
**Correlation NE Brazil  
Precipitation X SST**

**Correlation NE Brazil  
Precipitation X SLP**



Kayano and Andreoli, 2006

# ITCZ position and extratropical influences



(Souza and Cavalcanti, 2009)

# CONCLUSION

- **Precipitation over South America is affected by teleconnection patterns of extratropical regions: AAO, C.A of NAO, PDO, which present variability in several timescales.**
- **These teleconnections have decadal to multidecadal variability. Therefore we can expect the influence over SA in this timescale.**
- **Next: filtering of variables in decadal timescale, running mean and other methods to identify the decadal variability and relations with precipitation over other regions in SA.**
- **Analysis of next generation of IPCC models.**