Validation of Different NARCCAP-RCMs in the Southern Part of the Domain



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April 8th, 2011

NARCCAP 3<sup>rd</sup> Users 'Meeting Boulder, Colorado



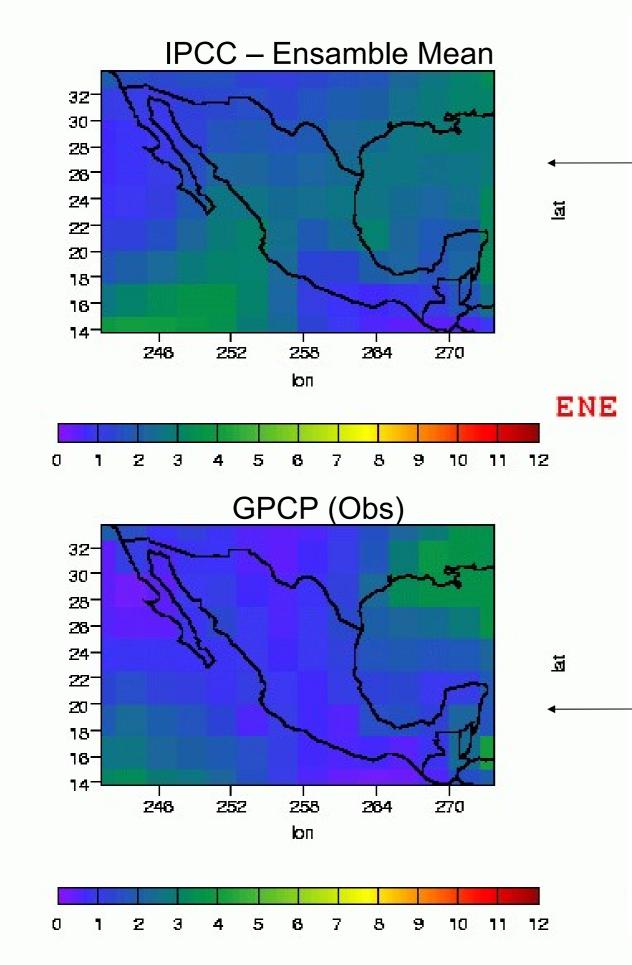




#### • Datasets

NARCCAP (phase I) and CRU (obs)

- Results: Srf Temp & Precip (DJF & JAS)
  - Bias (%)
  - Climatology Correlation
  - Temporal Correlation (Yr to Yr)
  - RCMs Trends
  - Bias Trend
- Final Comments



Models 16 IPCC Model Avg

#### CLIMATOLOGY

1980-1989

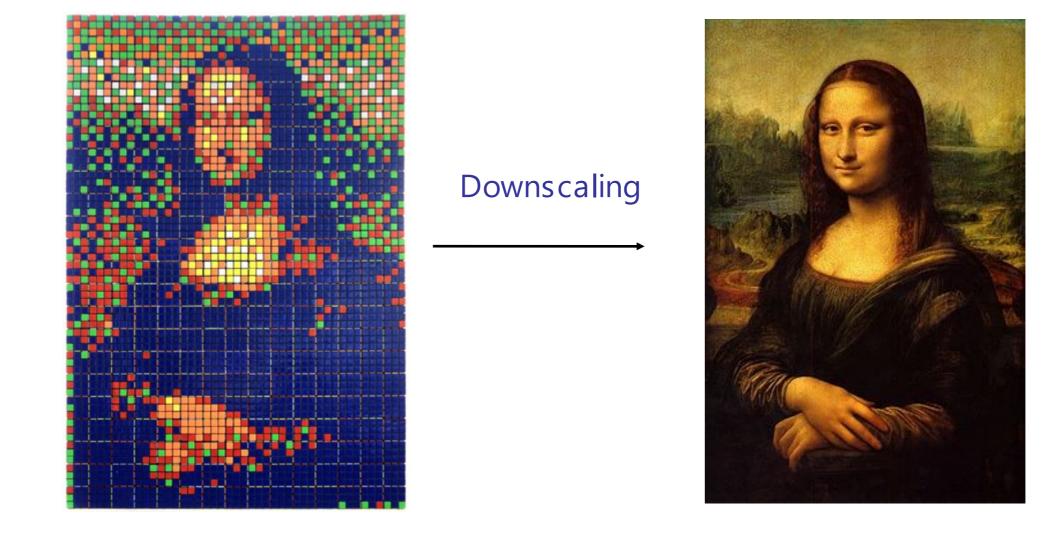
Precipitation (mm/d)

Observations
GPCP, Global Precipitation
Climate Project



#### What downscaling should do?





Not exactly right any more ...

-7 -6 -5 -4 -3 -2 -10 2 З 5 7 1 4 6

Surface Temperature Bias (%), DJF,

NCEP-RCM vs CRU, 1981-2000

36°N

34°N

32°N

30°N

28°N

26°N

36°N

34°N

32°N

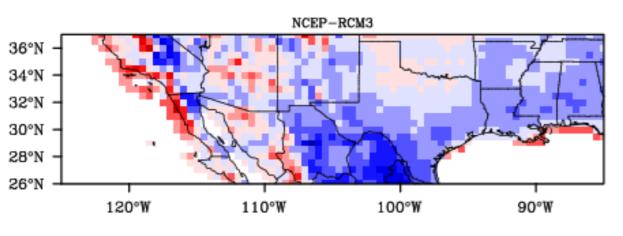
30°N

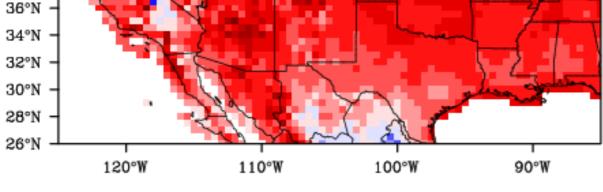
28°N

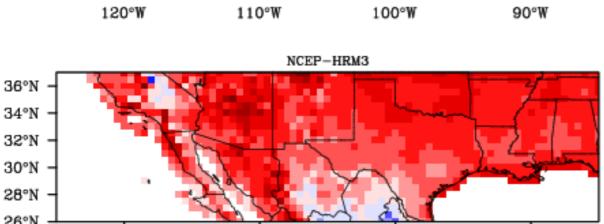
26°N

120°W

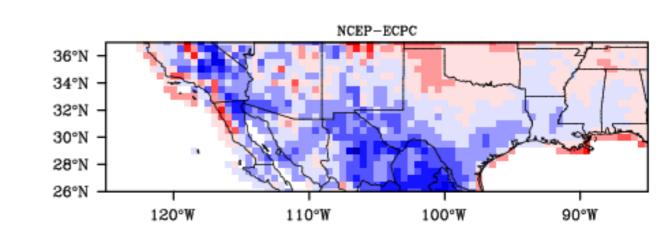
120°W







NCEP-CRCM



110°W

110°W

NCEP-MM5I

NCEP-WRFP

100°W

100°W

#### SEMARNAT

90°W

90°W



36°N

34°N

32°N

30°N

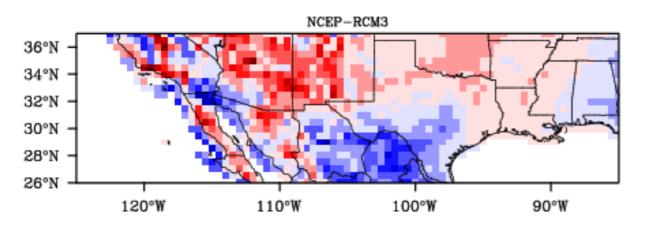
28°N

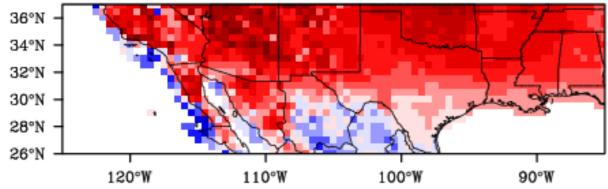
26°N

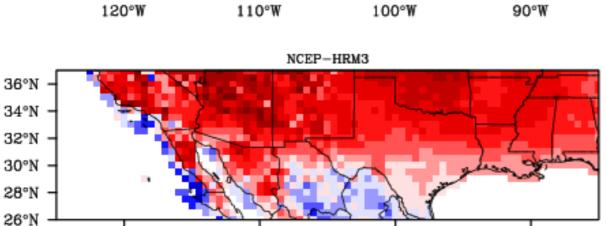
-7 -6 -5 -4 -3 -2 -1З 

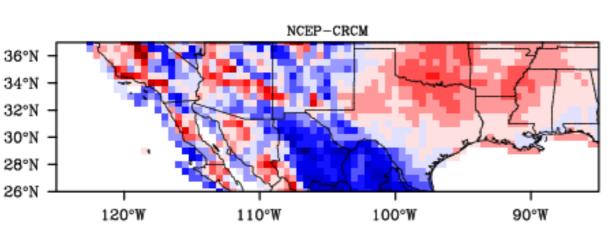
Surface Temperature Bias (%), JAS,

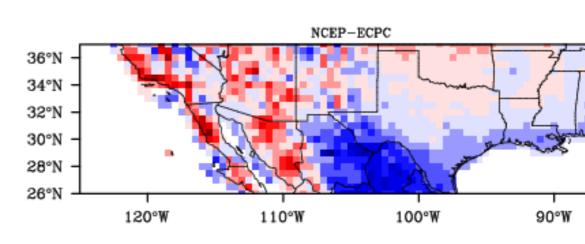
NCEP-RCM vs CRU, 1981-2000

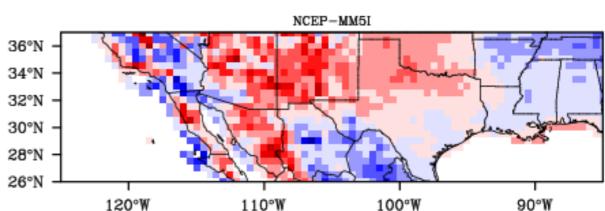


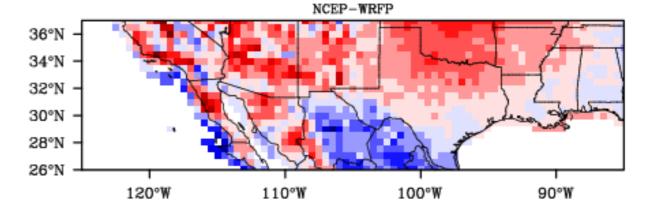


















36°N

34°N

32°N

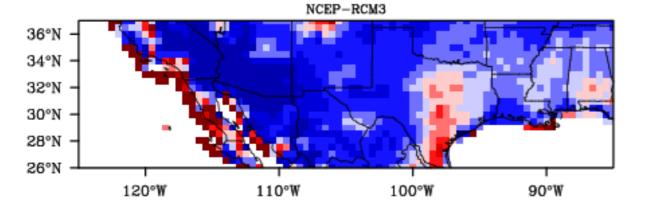
30°N

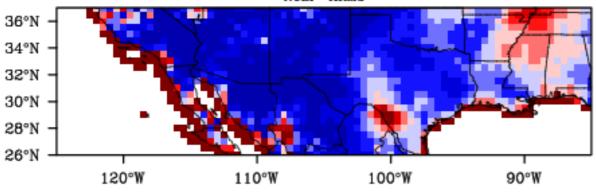
28°N

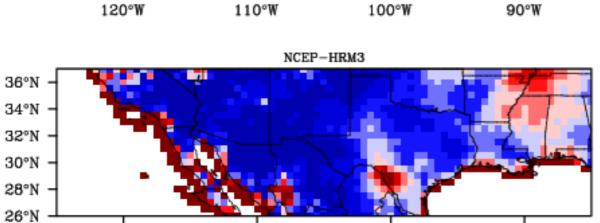
26°N

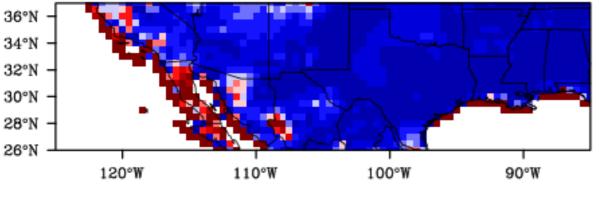
120°W

1981-2000

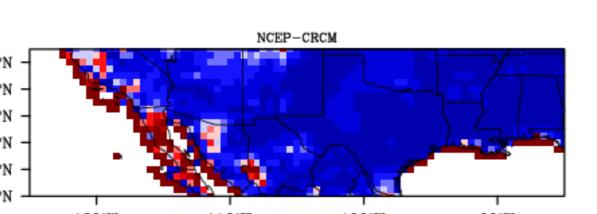


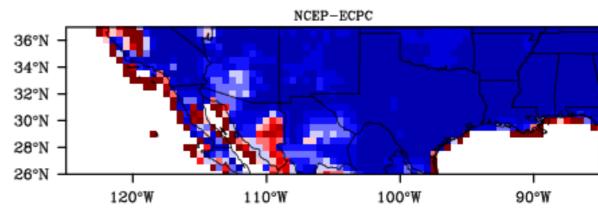


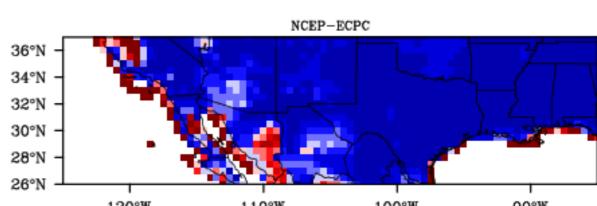


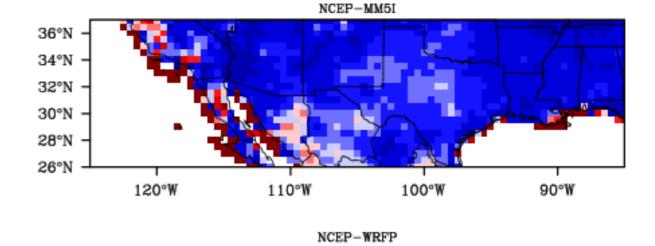


IMTA









110°W

100°W

90°W



36°N

34°N

32°N

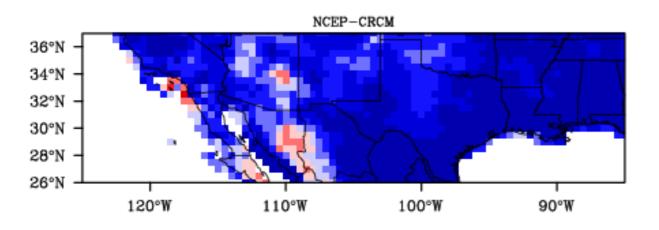
30°N

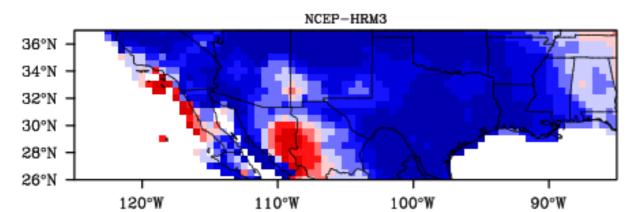
28°N

26°N

120°W

#### TS Temporal Correlation (Yr to Yr) **NCEP-RCM vs CRU**





110°W

NCEP-RCM3

100°W

90°W

0.2

0.4

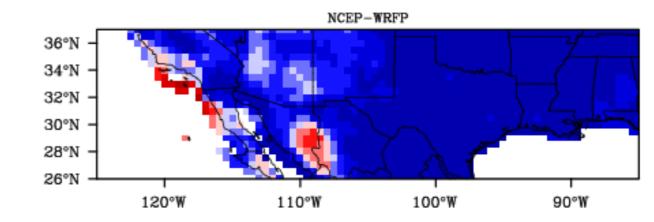
0.6

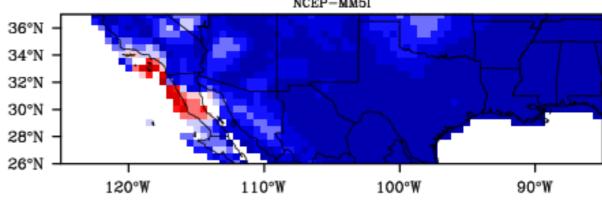
0.8

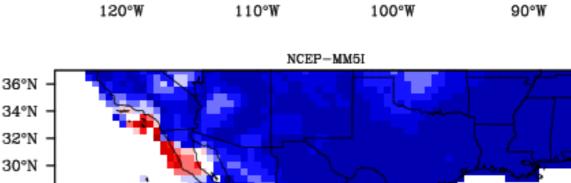
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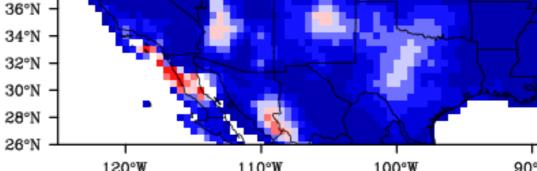
0

-1 -0.8 -0.6 -0.4 -0.2









NCEP-ECPC



90°W

# Trends NCEP-RCM DJF, 1981-2000

C/decade

36°N

34°N

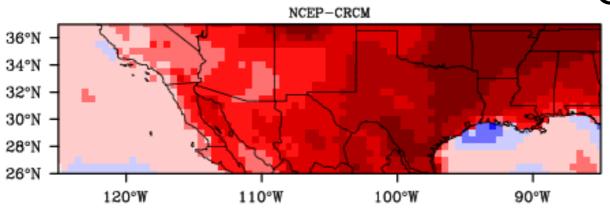
32°N

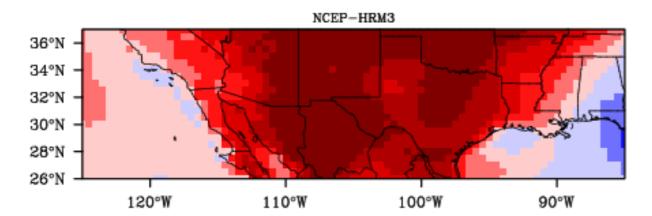
30°N

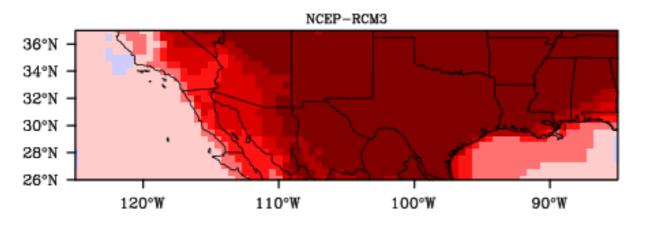
28°N

26°N

120°W







-1 -0.8 -0.6 -0.4 -0.2

0

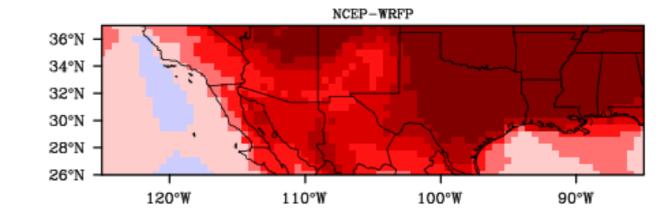
0.2

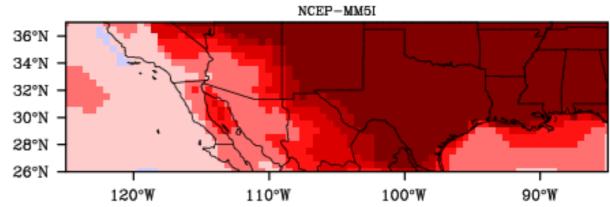
0.4

0.6

0.8

1







100°W

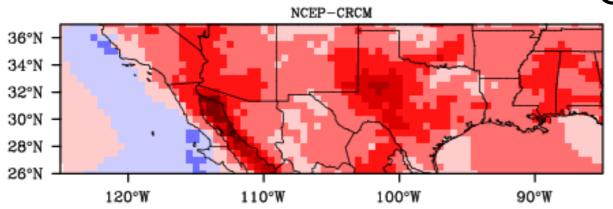
110°W

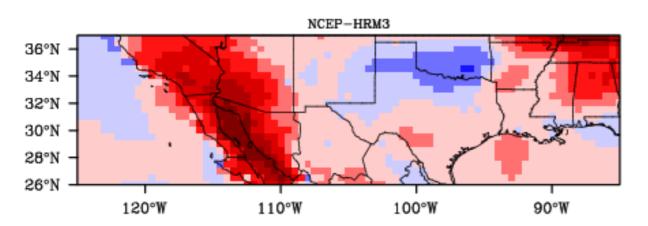
NCEP-ECPC

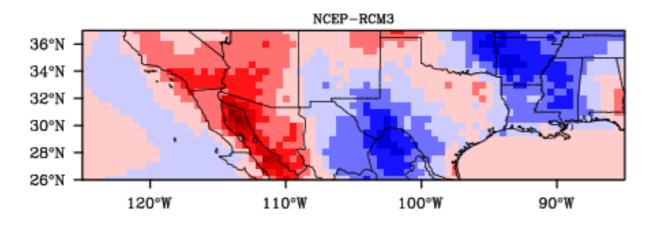


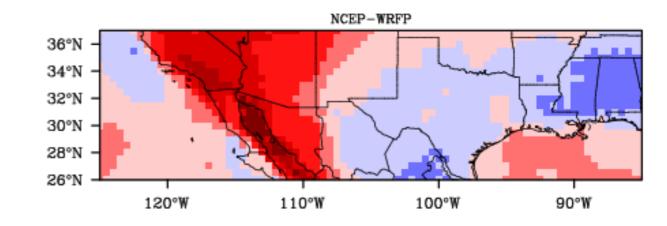
## Trend NCEP-RCM JAS, 1981-2000

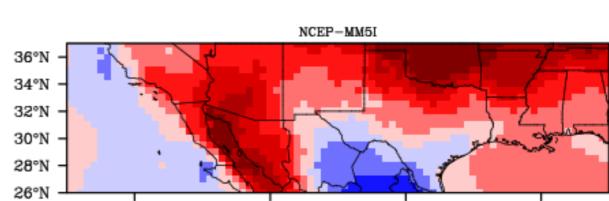
C/decade







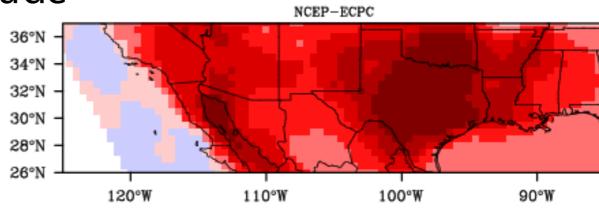




100°W

110°W

120°W



SEMARNAT

90°W

-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1

-1 -0.8 -0.6 -0.4 -0.20 0.2 0.4 0.6 0.8 1

36°N

34°N

32°N

30°N

28°N

26°N

36°N

34°N

32°N

30°N

28°N

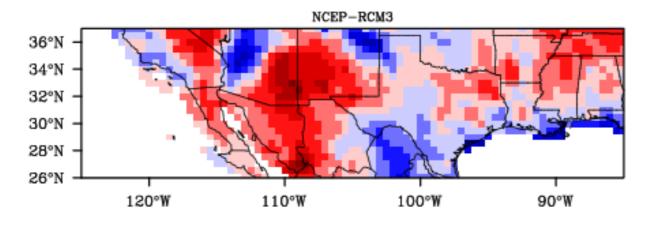
26°N

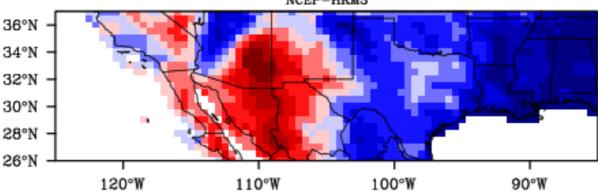
120°W

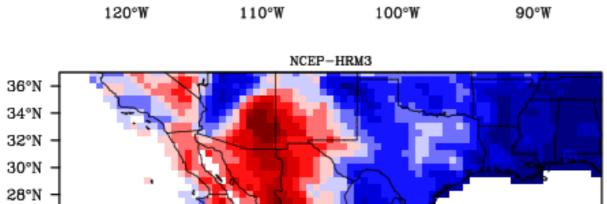
120°W

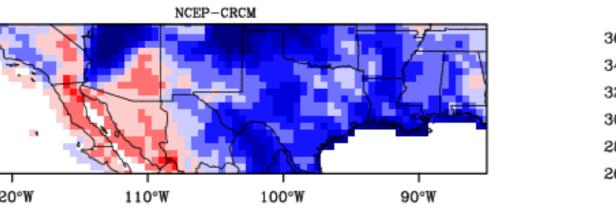
Bias = ((TrendMod - TrendCRU)/TrendCRU)

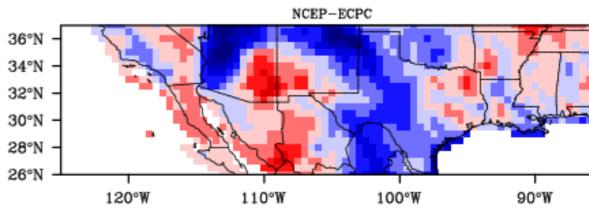
**DJF**, 1981-2000











110°W

110°W

NCEP-MM5I

NCEP-WRFP

100°W

100°W

#### SEMARNAT

90°W

90°W

IMTA

36°N

34°N

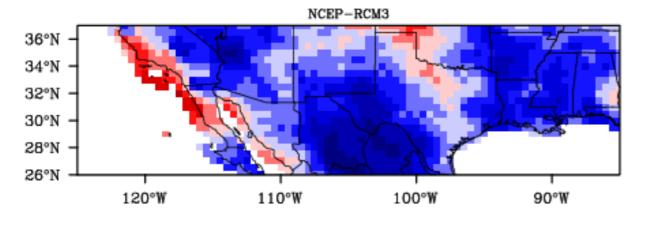
32°N

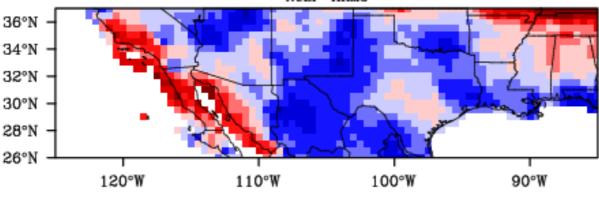
30°N

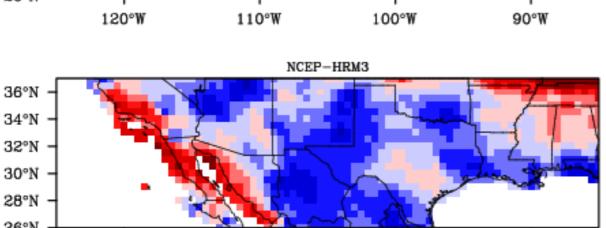
28°N

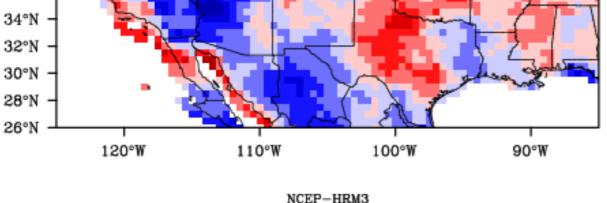
26°N

-1 -0.8 -0.6 -0.4 -0.20 0.2 0.4 0.6 0.8 1



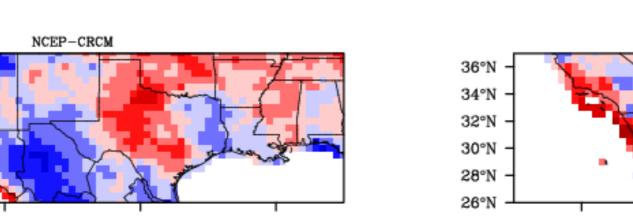






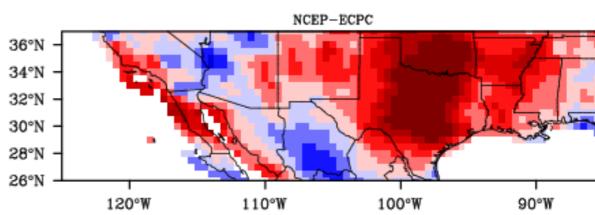
MTA

36°N

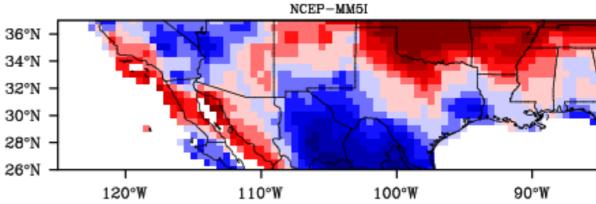


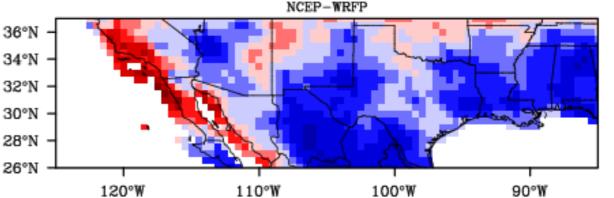
Bias = ((TrendMod - TrendCRU)/TrendCRU)

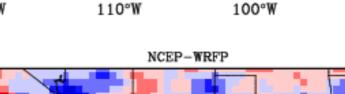
**JAS**, 1981-2000





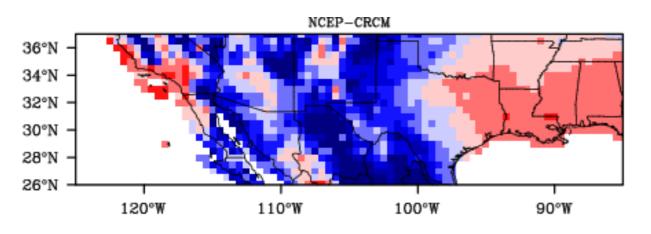


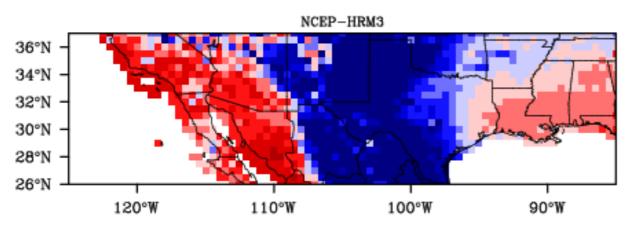


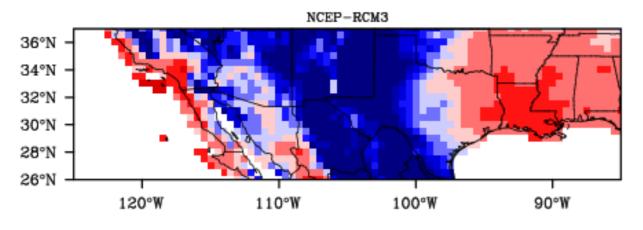


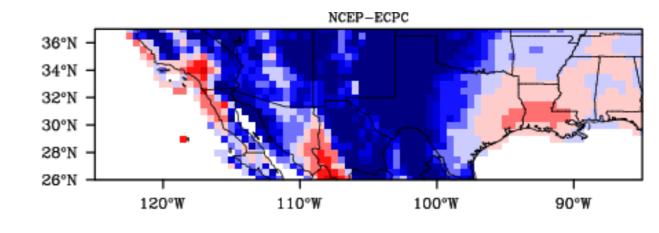


# Precipitation Bias (%), DJF, NCEP-RCM vs CRU, 1981-2000

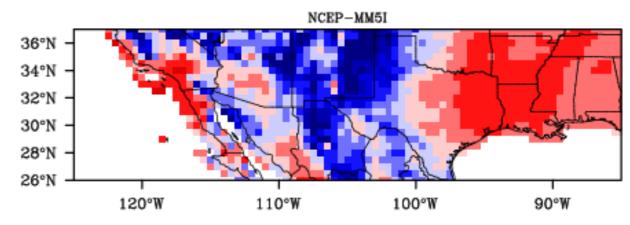


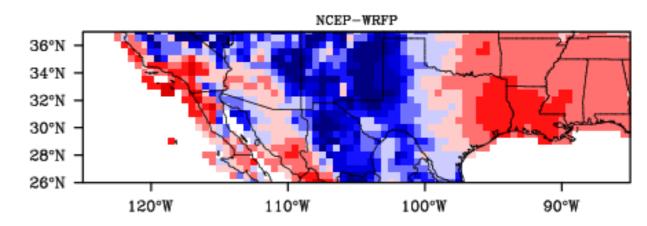






SEMARNAT

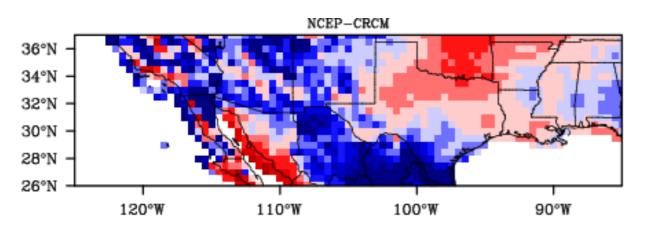


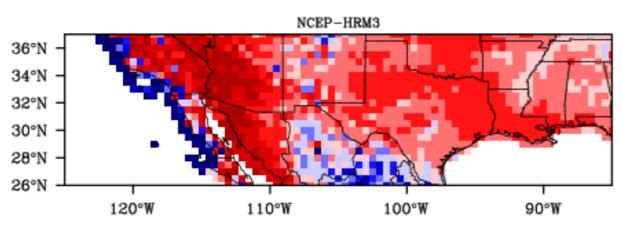


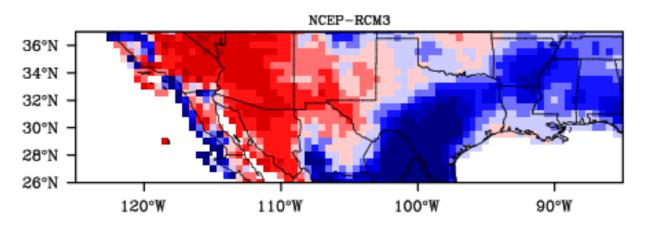
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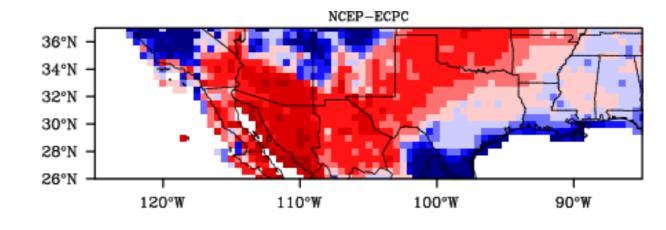


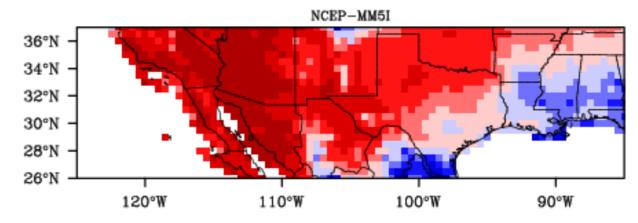
# Precipitation Bias (%), JAS, NCEP-RCM vs CRU, 1981-2000

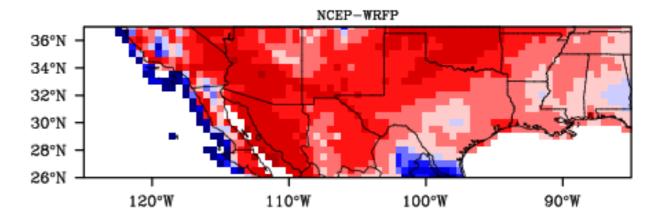










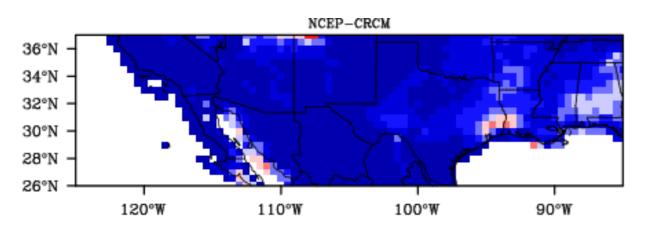


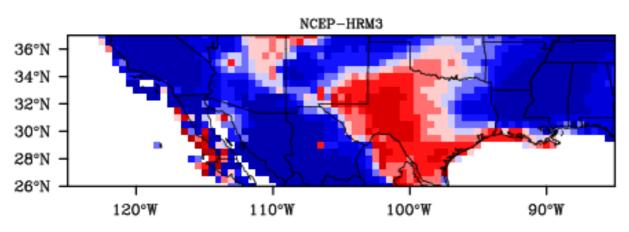
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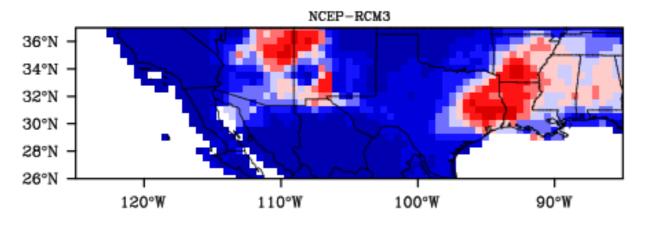
SEMARNAT

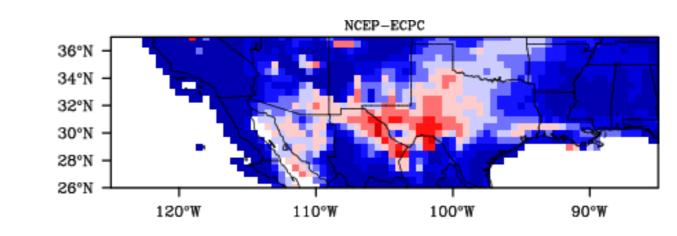


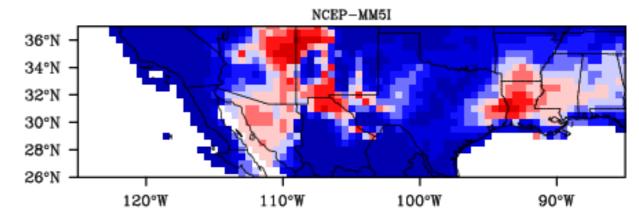
# Climatology correlation vs CRU 1981-2000

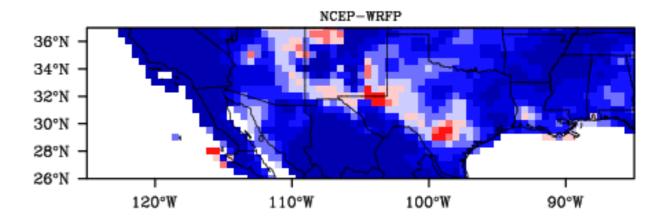










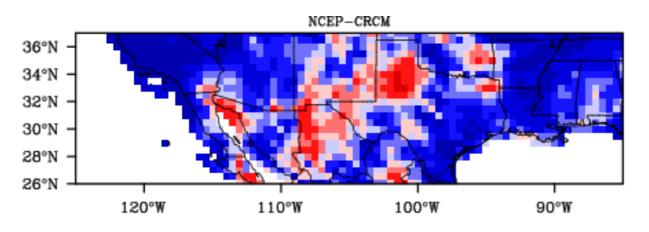


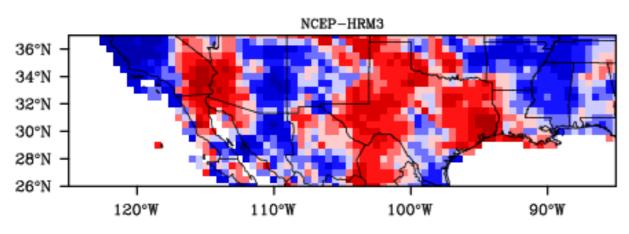
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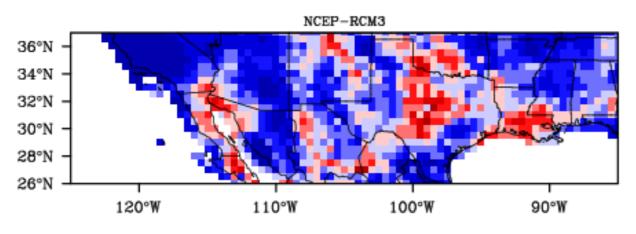
SEMARNAT

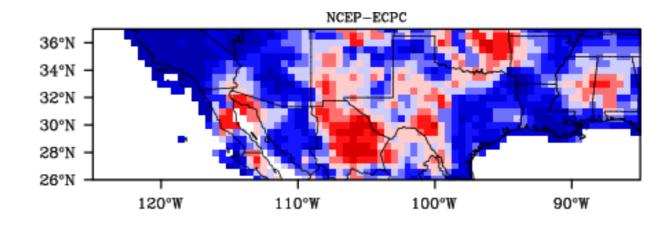


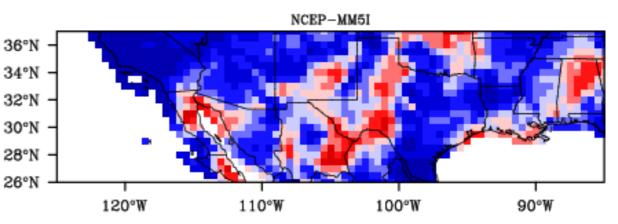
#### Precip Temporal Correlation (Yr to Yr) NCEP-RCM vs CRU

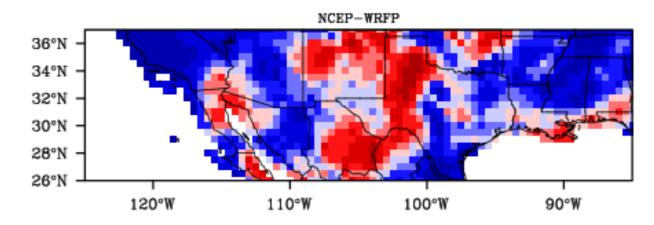










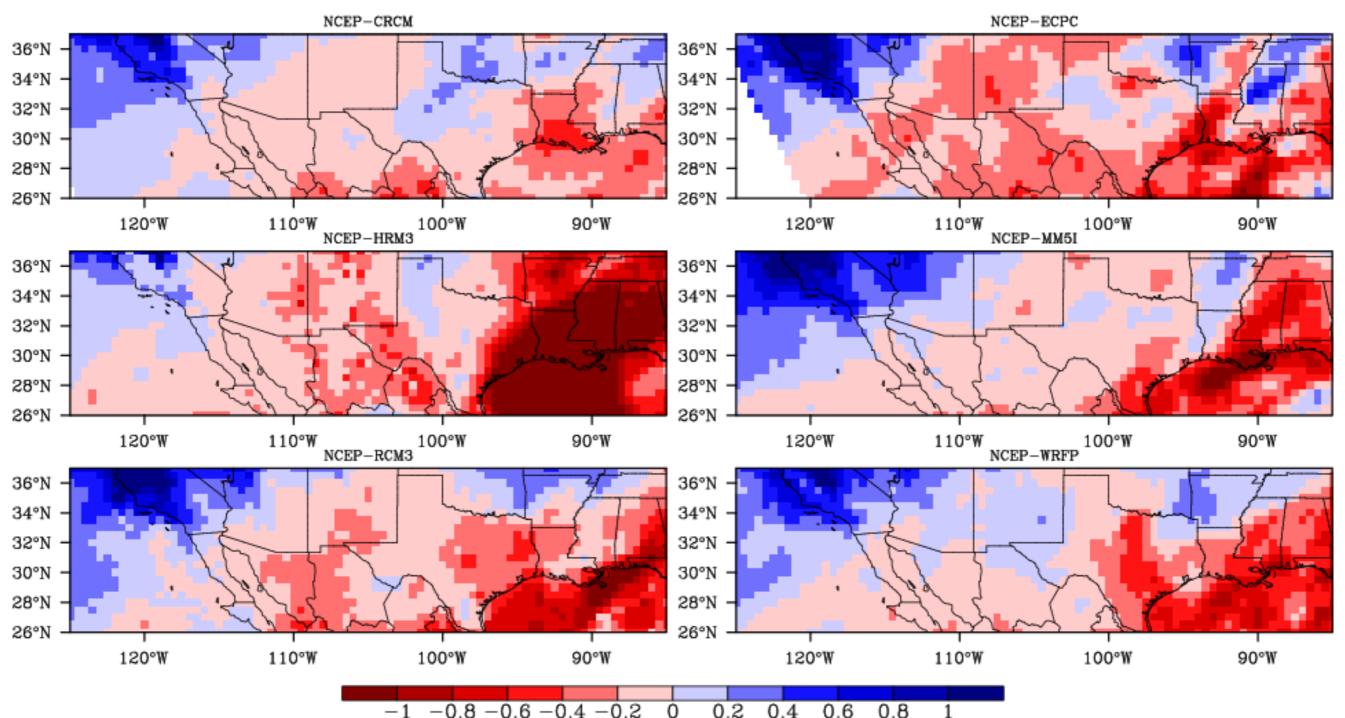


-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1



## Trends NCEP-RCM DJF, 1981-2000

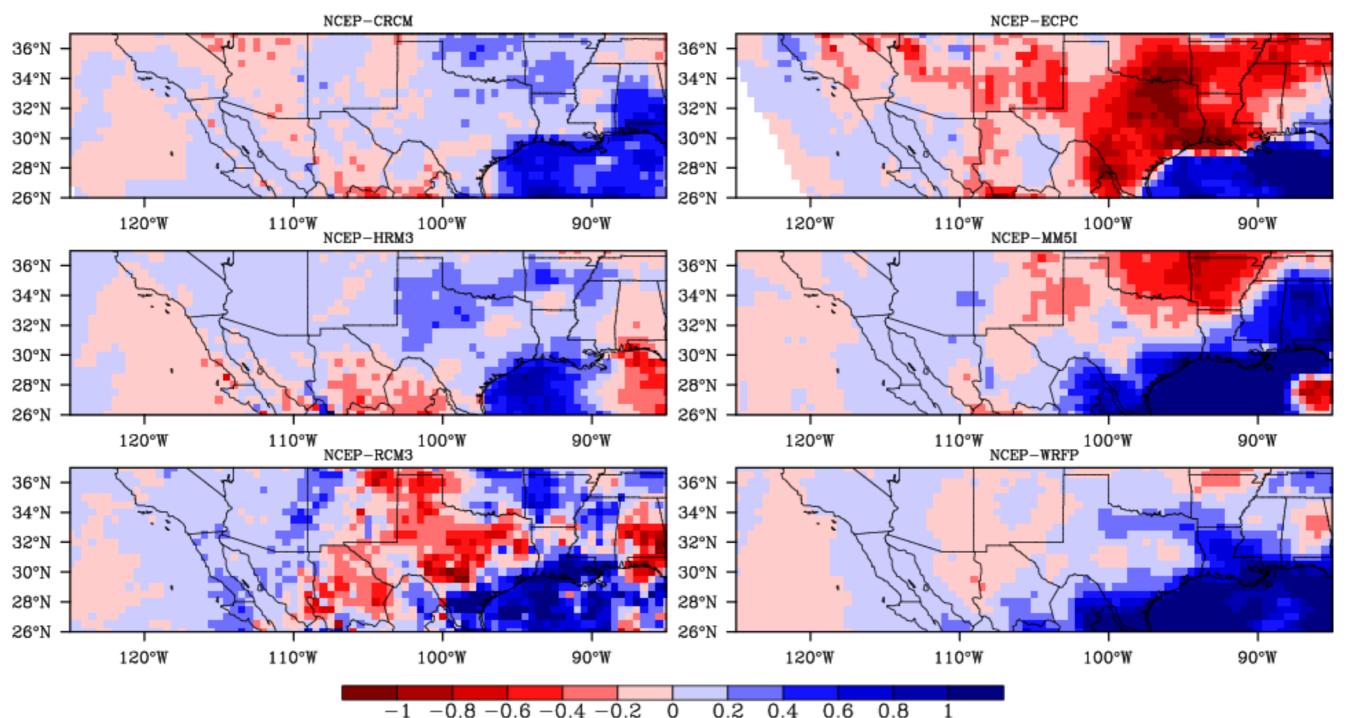
Tendencia de Precipitacion (mm/dia/decada)





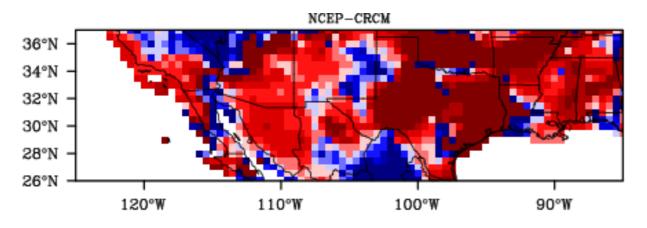
## Trend NCEP-RCM JAS, 1981-2000

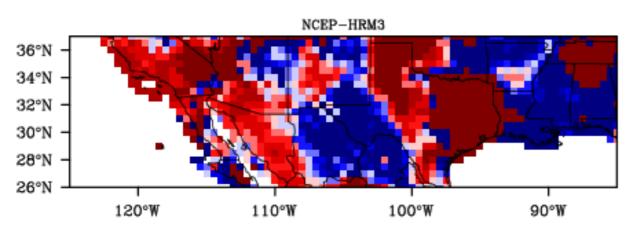
Tendencia de Precipitacion (mm/dia/decada)

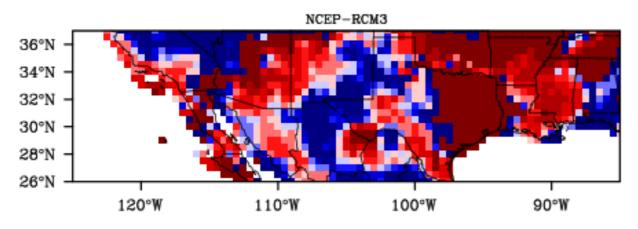


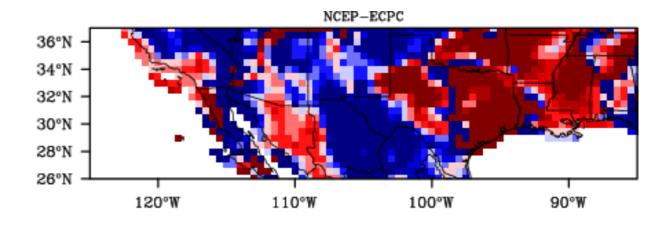
#### SEMARNAT

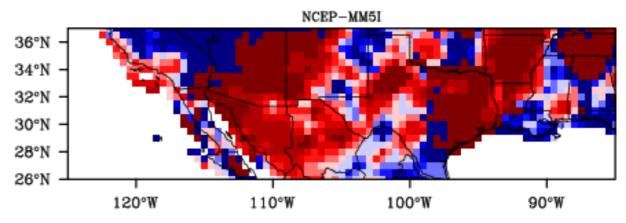
### Bias = ((TrendMod - TrendCRU)/TrendCRU)\*100 DJF, 1981-2000

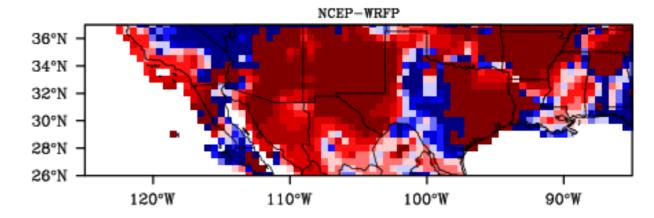








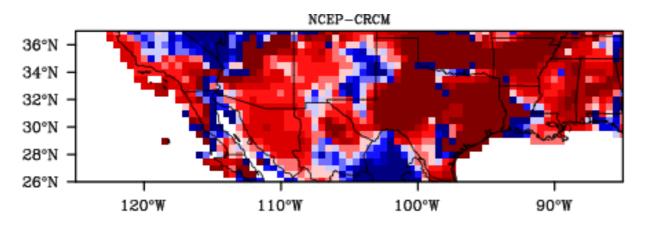


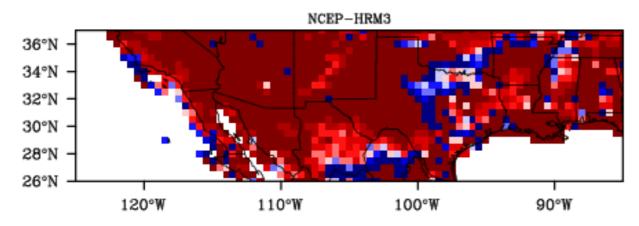


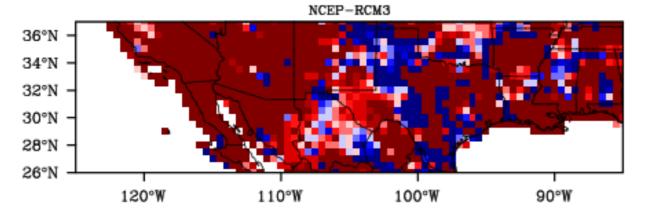
-100 -80 -60 -40 -20 0 20 40 60 80 100

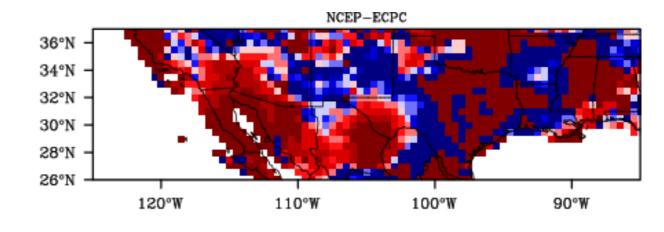
#### SEMARNAT

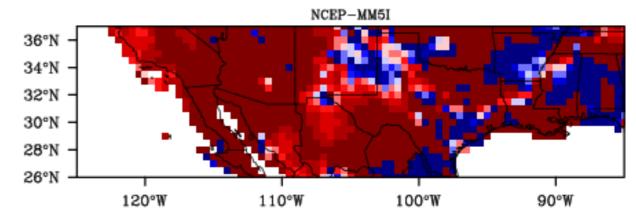
### Bias = ((TrendMod - TrendCRU)/TrendCRU)\*100 JAS, 1981-2000



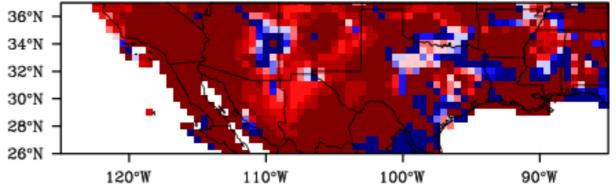












-100 -80 -60 -40 -20 0 20 40 60 80 100



- As expected, similarities among surface temperature are larger than those for precipitation.
- In the whole run, similarities overpass discrepancies among the different RCMs.
- However, in some cases there are clearly important differences among RCMs that need to be taken into account in some way...
- Particularly, I am more on to looking for a weighted ensemble average when you try to get a final number (with uncertainty included of course) to be given to the end user.