

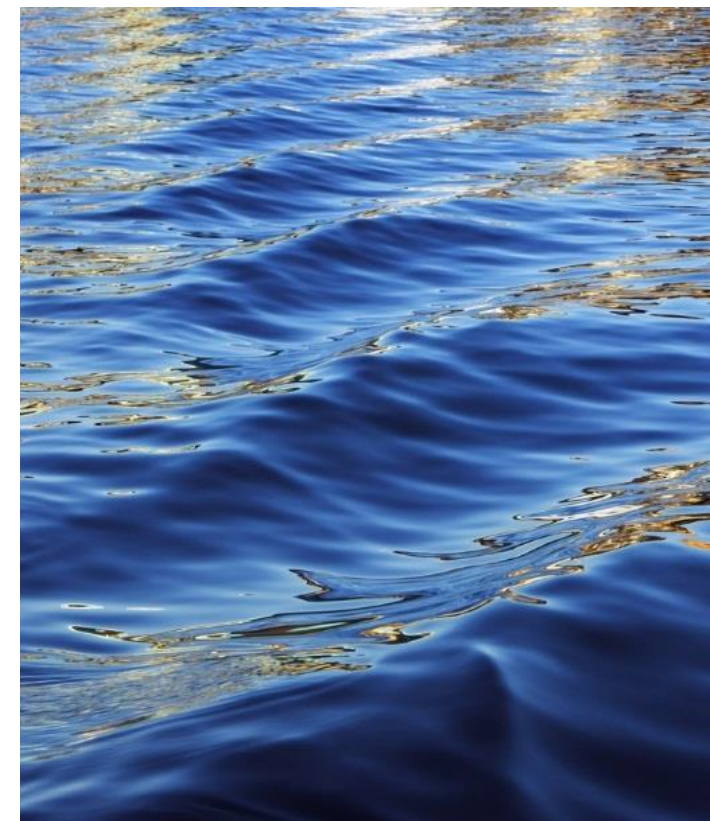
LAMMOC

Laboratório de Monitoramento e
Modelagem de Sistemas Climáticos

Prof. Marcio Cataldi

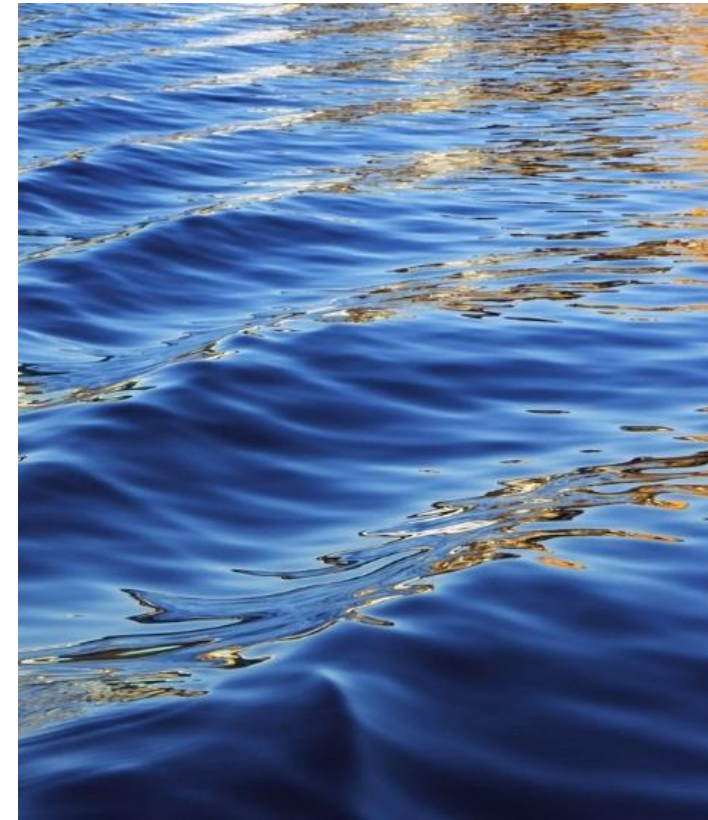
PREVISÃO DO TEMPO E CLIMA

14/11/2017



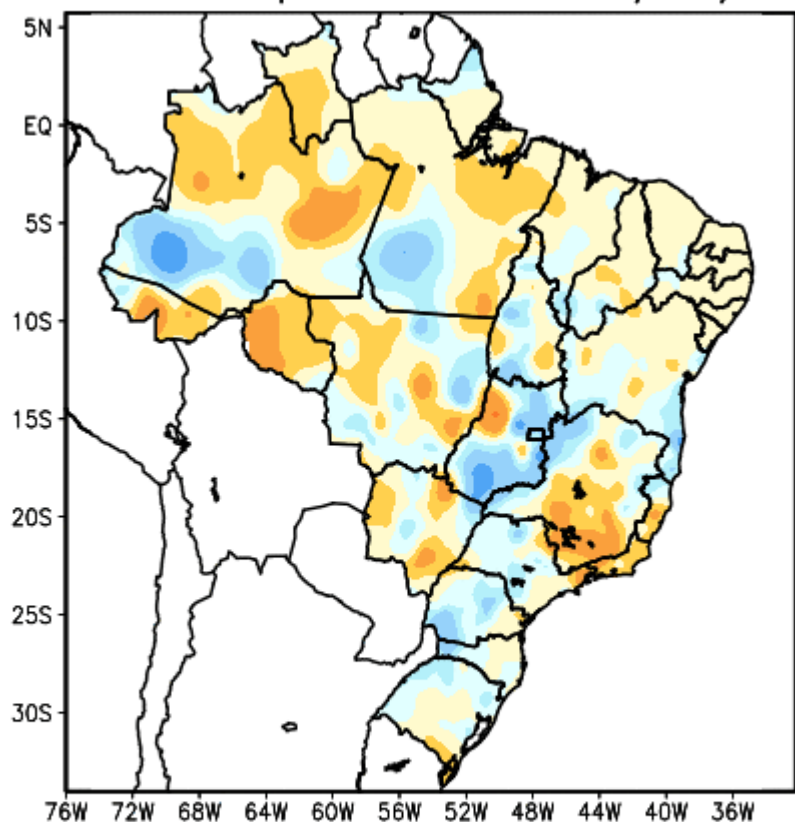


Anomalias climáticas observadas



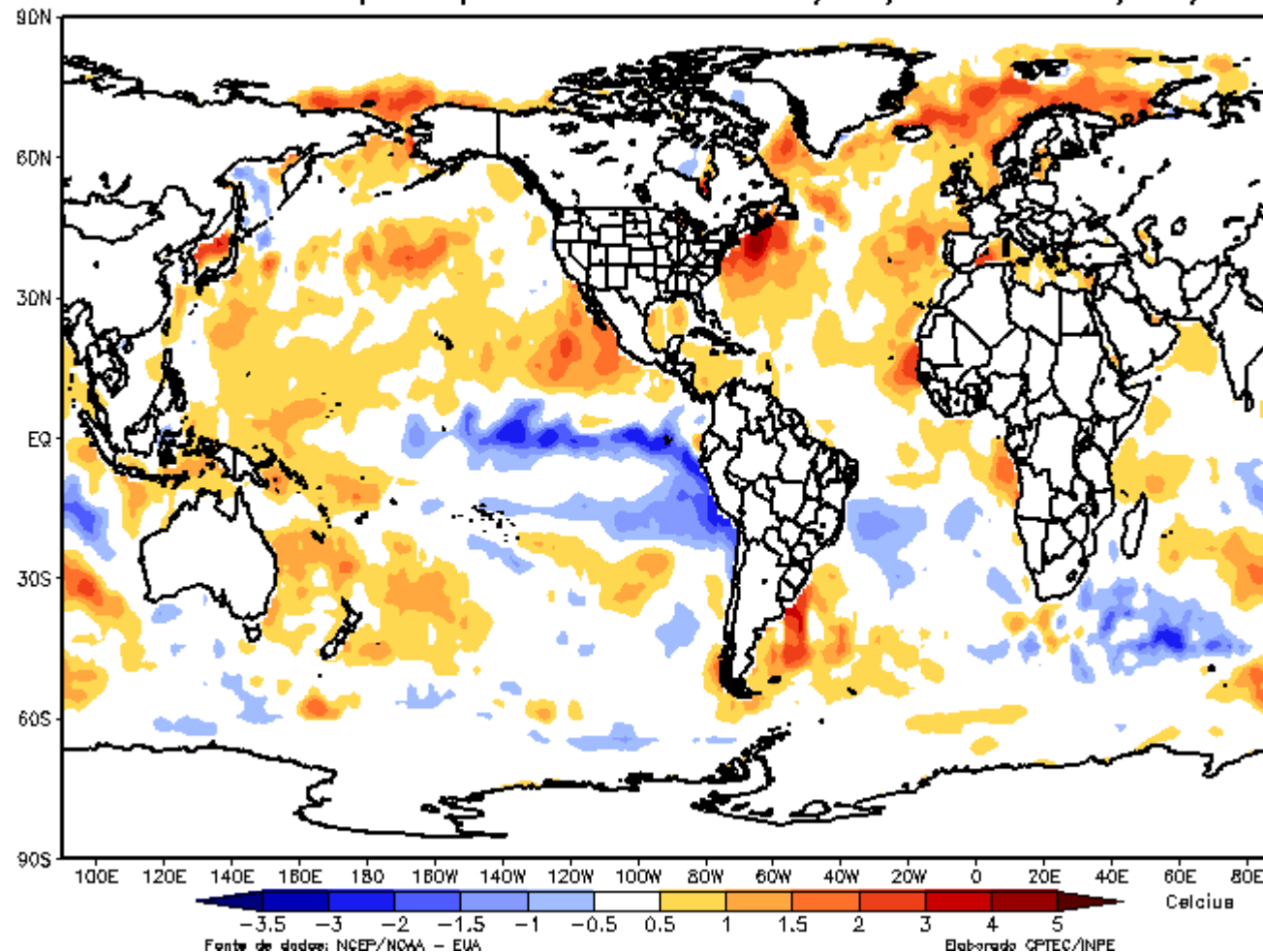
Anomalias de precipitação e TSM

Anomalia Precipitacao Acum. ate 13/NOV/2017



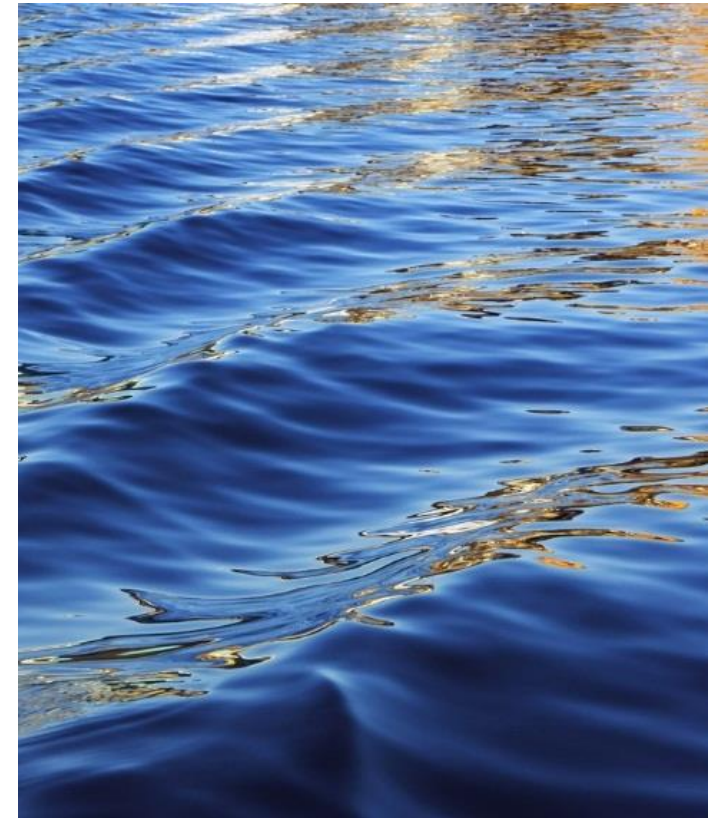
Fontes de dados: CPTEC/INPE-INMET-FUNCME/CE-AESA/PB-EMPARN/RN
ITEP/LAMEPE/PE-FEPAGRO/RS-CHESF-COMET/RJ-DHME/PI-CMRH/SE-SEMARH/A
SEMARH/BA-CEMIG/SIMGE/MG-SEAG/ES-SIMEPAR/PR-CLIMERH/SC-IAC/SP

Anomalia de Temp. Superfície do Mar 05/11/2017 a 11/11/2017

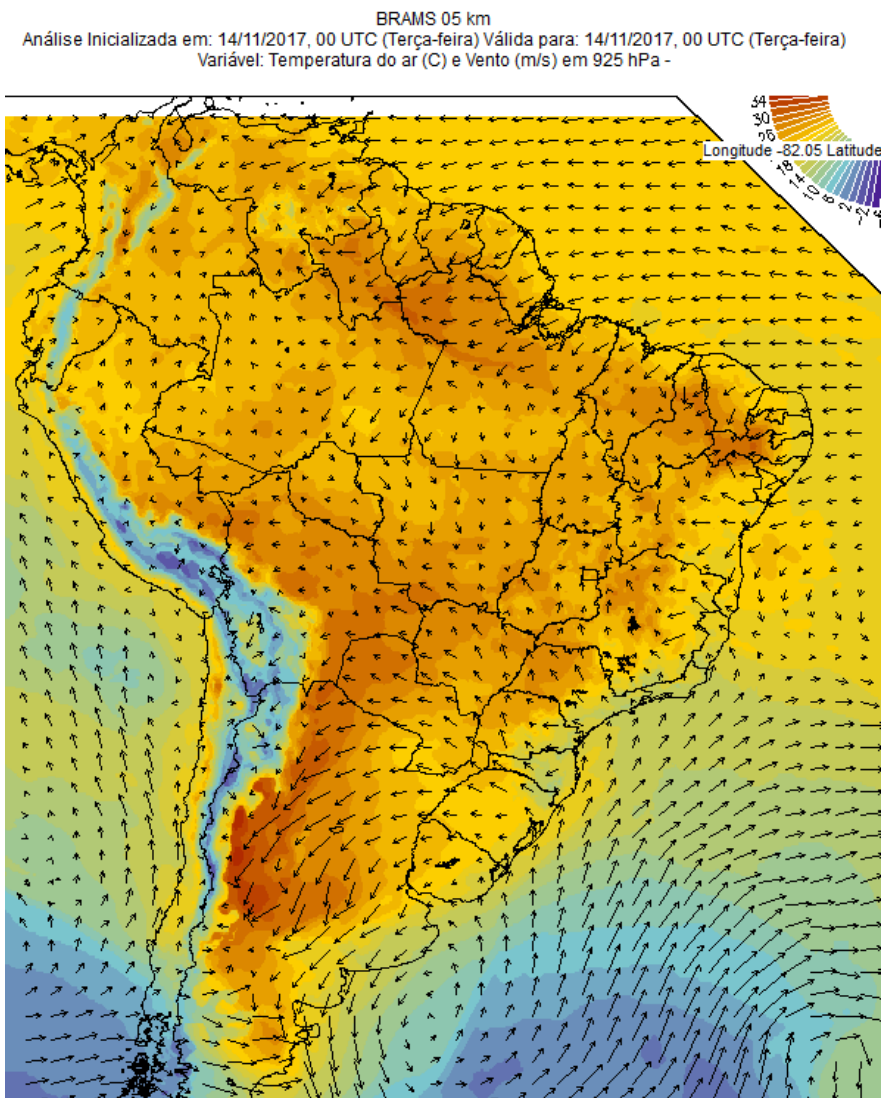
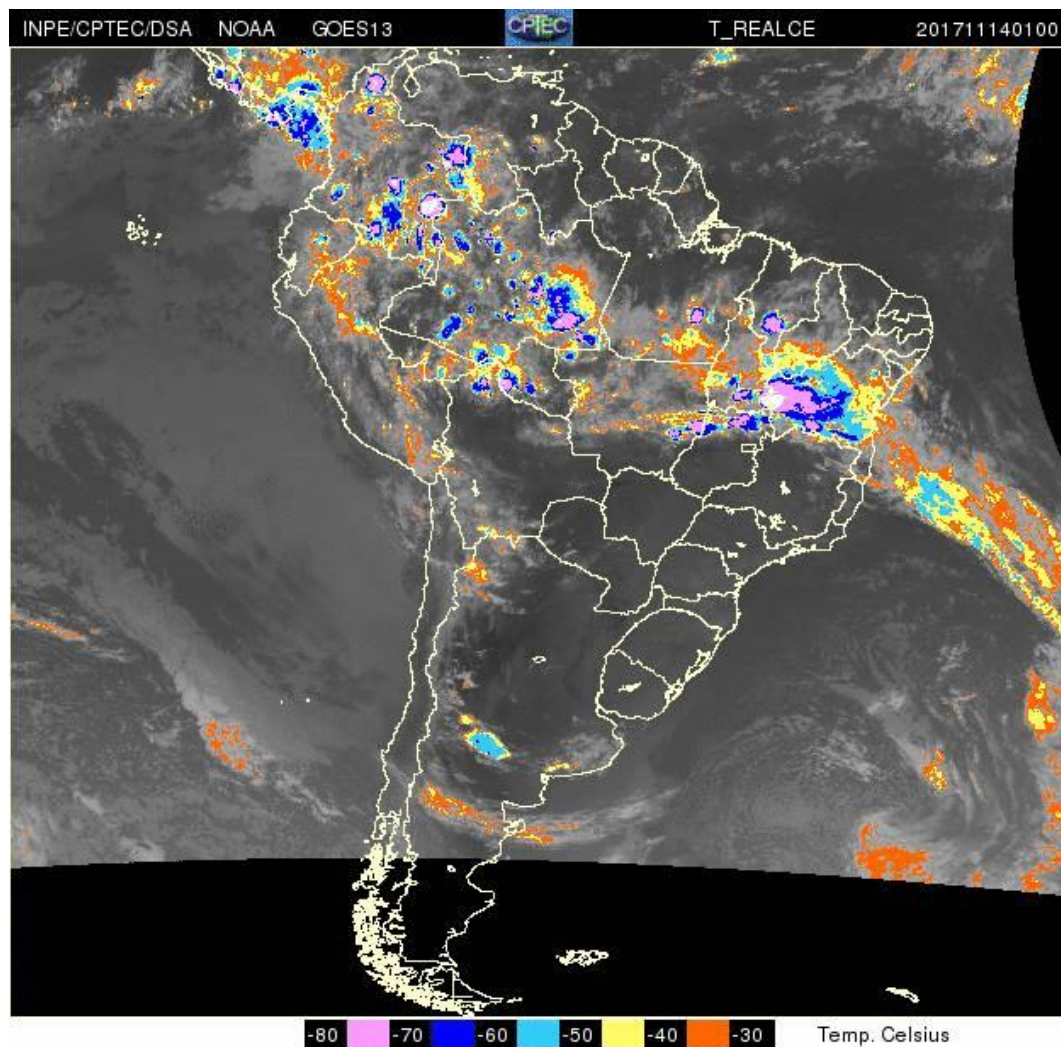




PREVISÃO CURTO PRAZO GFS

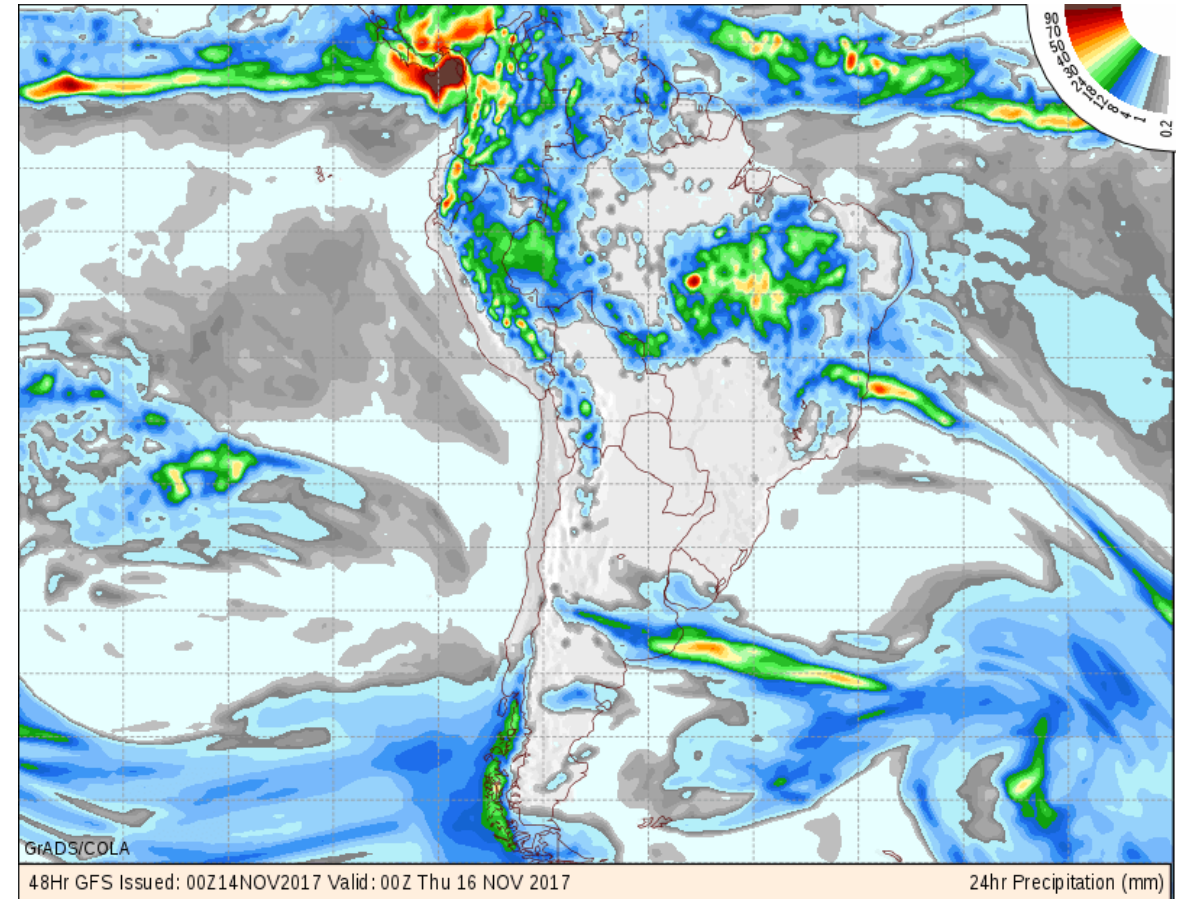
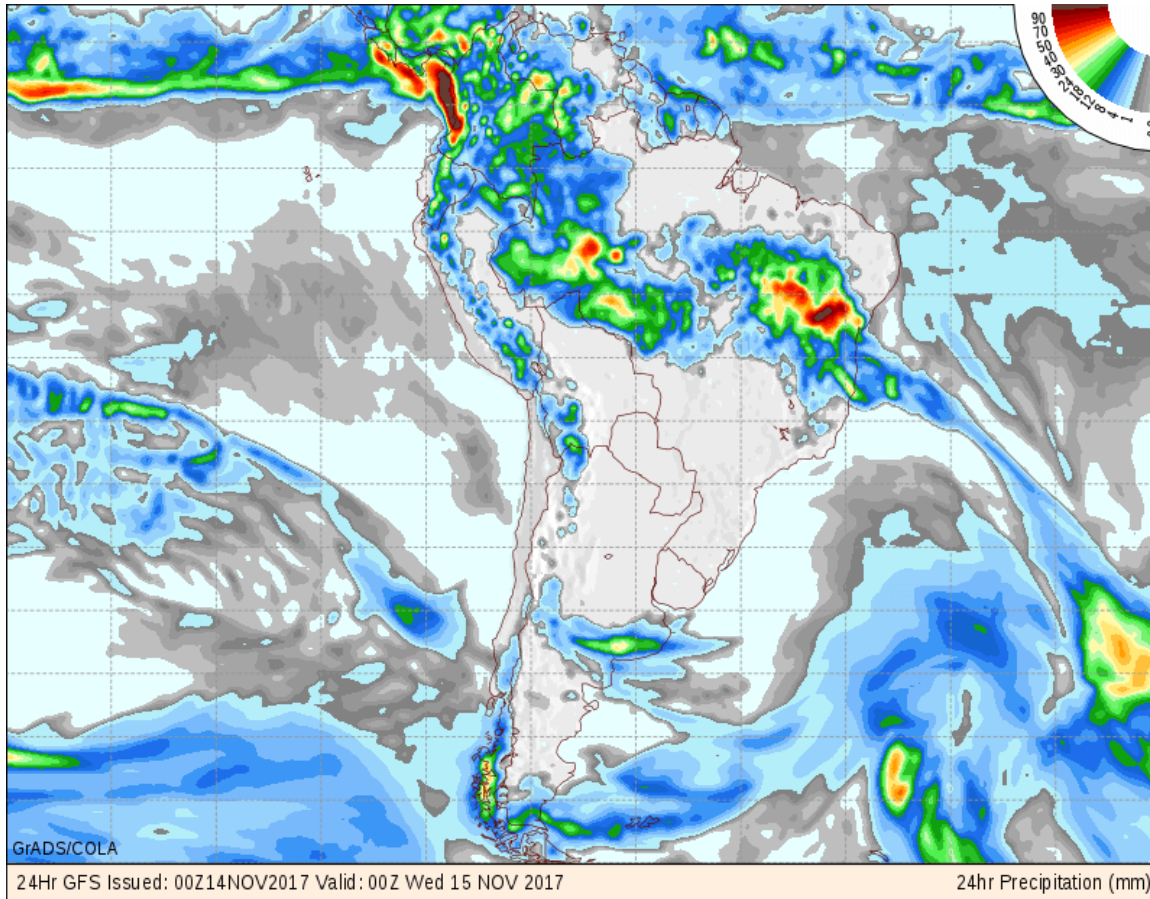


Imagens de Satélite e vento em superfície



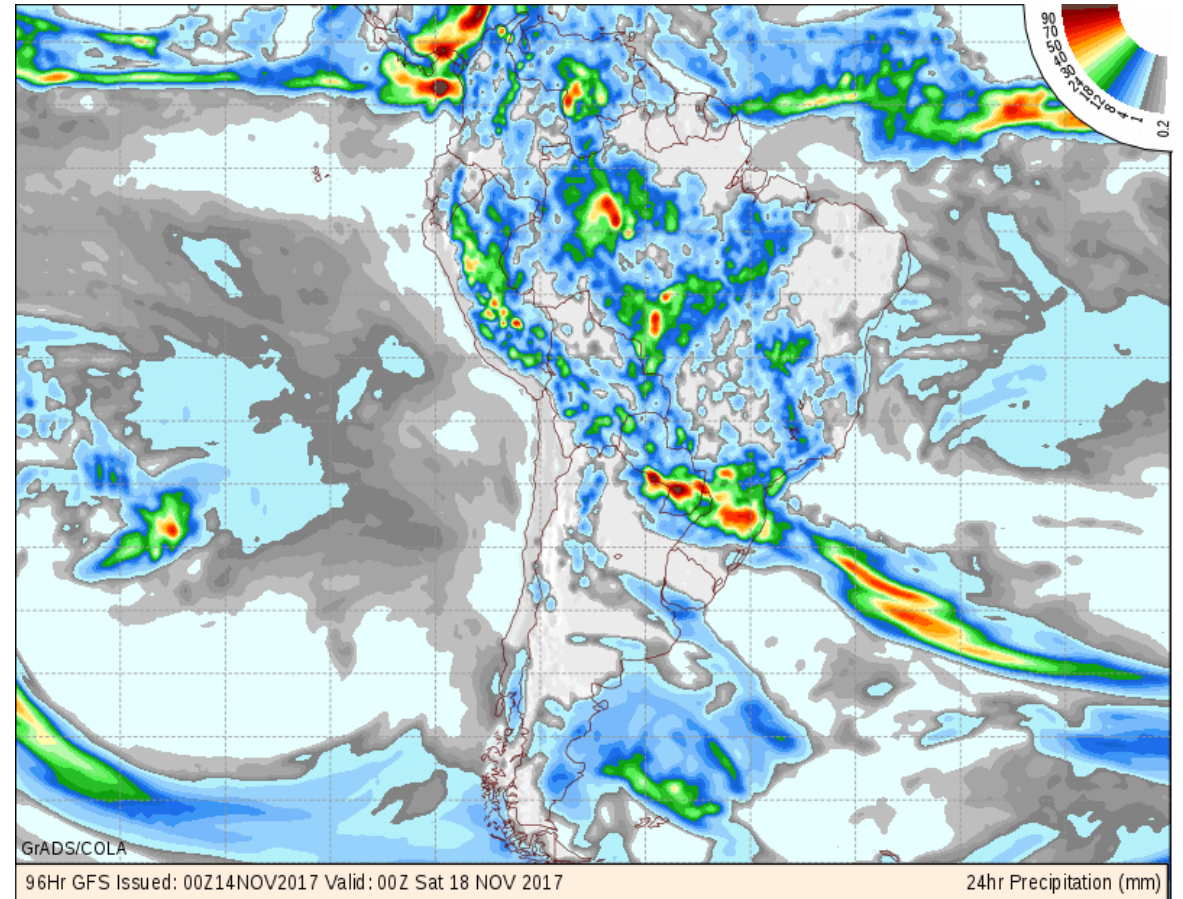
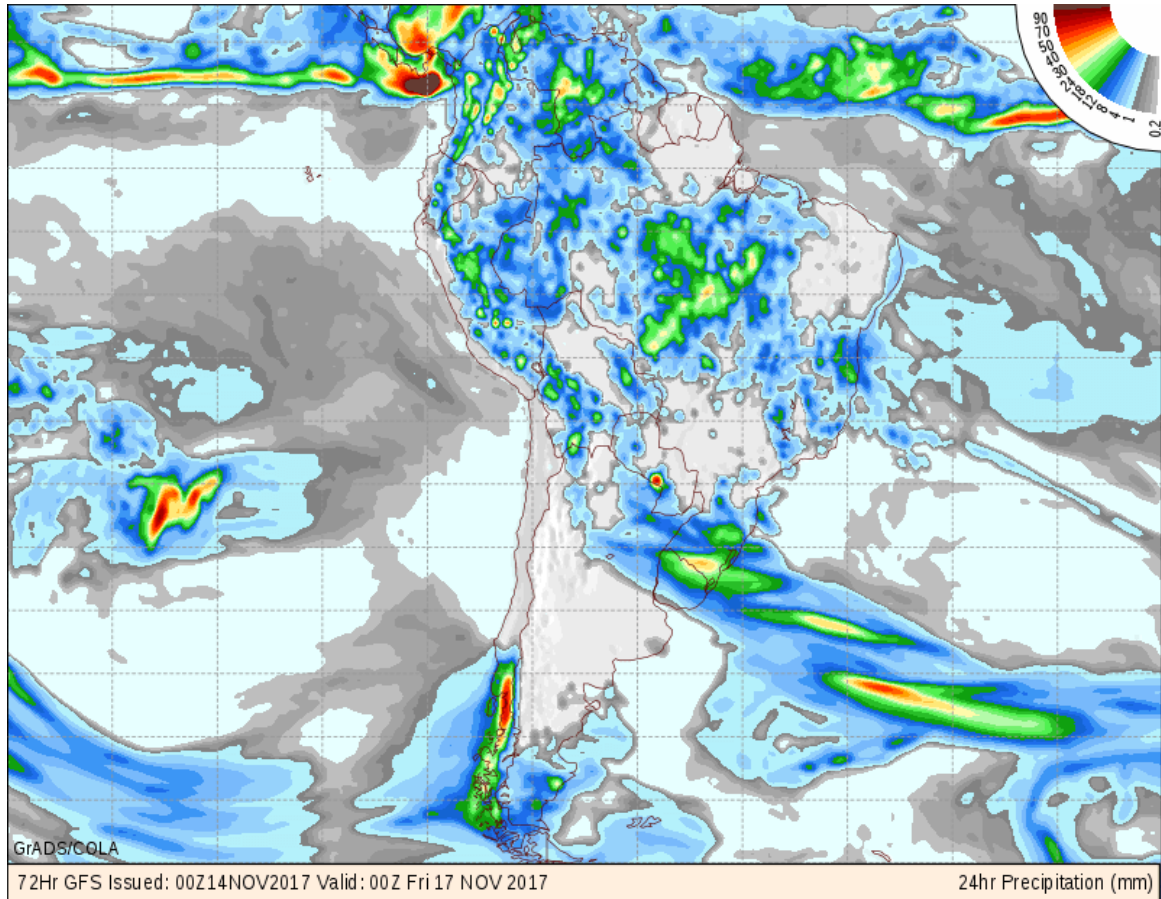
PREVISÃO CURTO-PRAZO

MODELO GFS



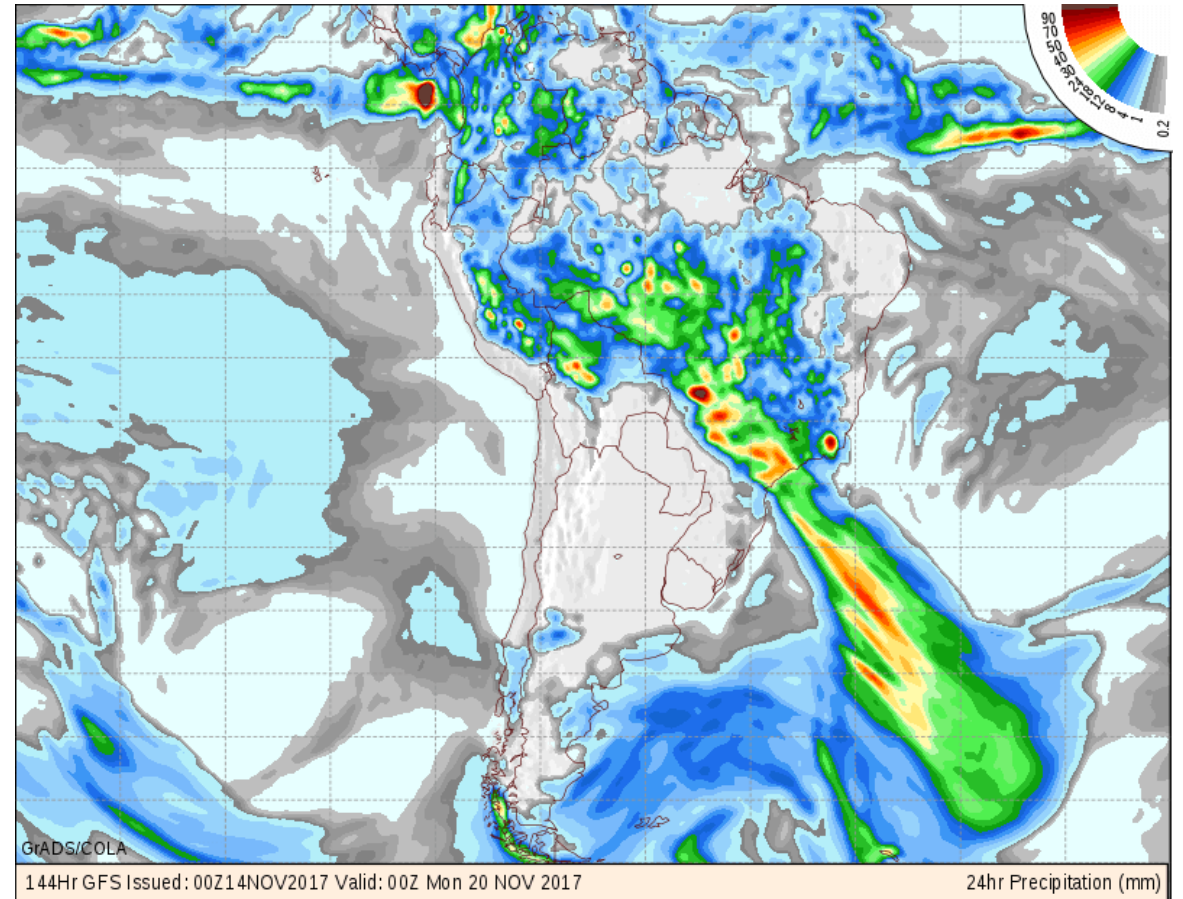
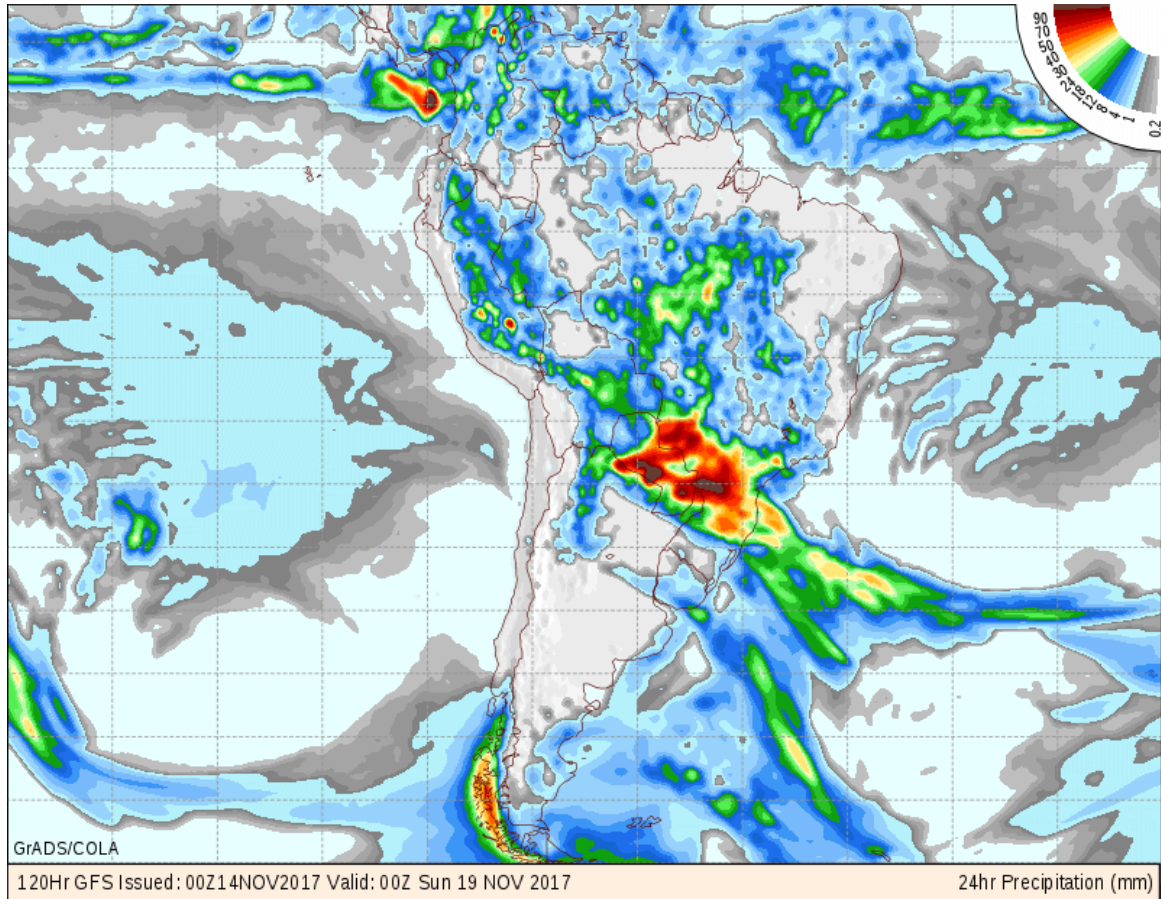
PREVISÃO CURTO-PRAZO

MODELO GFS

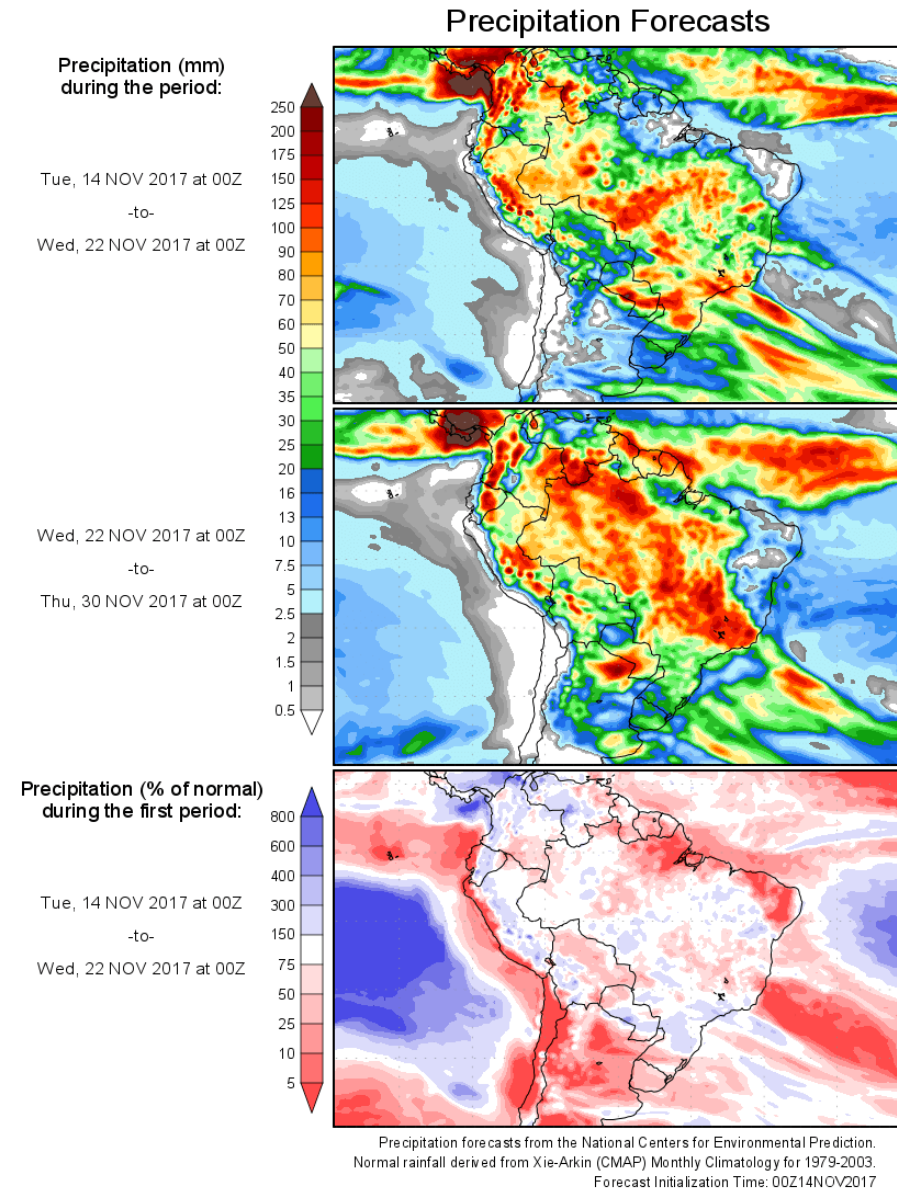


PREVISÃO CURTO-PRAZO

MODELO GFS



PREVISÃO CURTO PRAZO - GFS

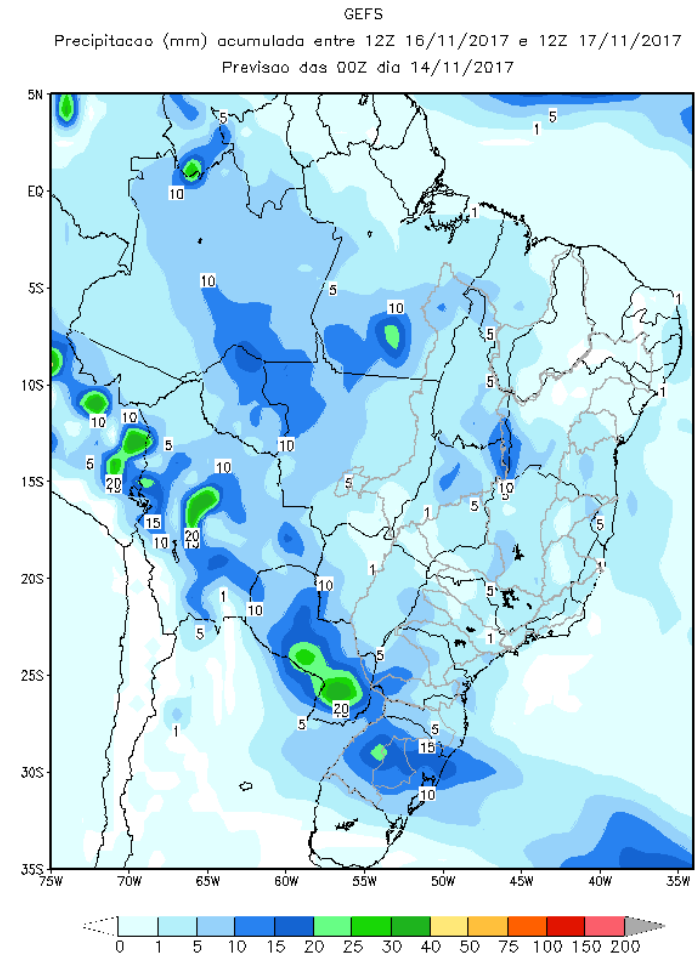
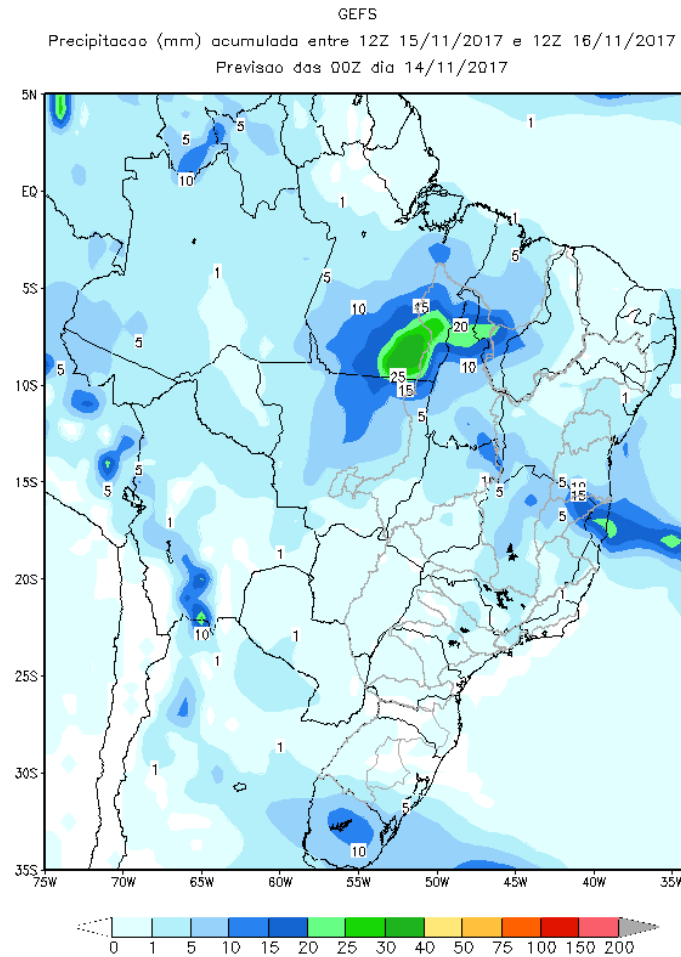
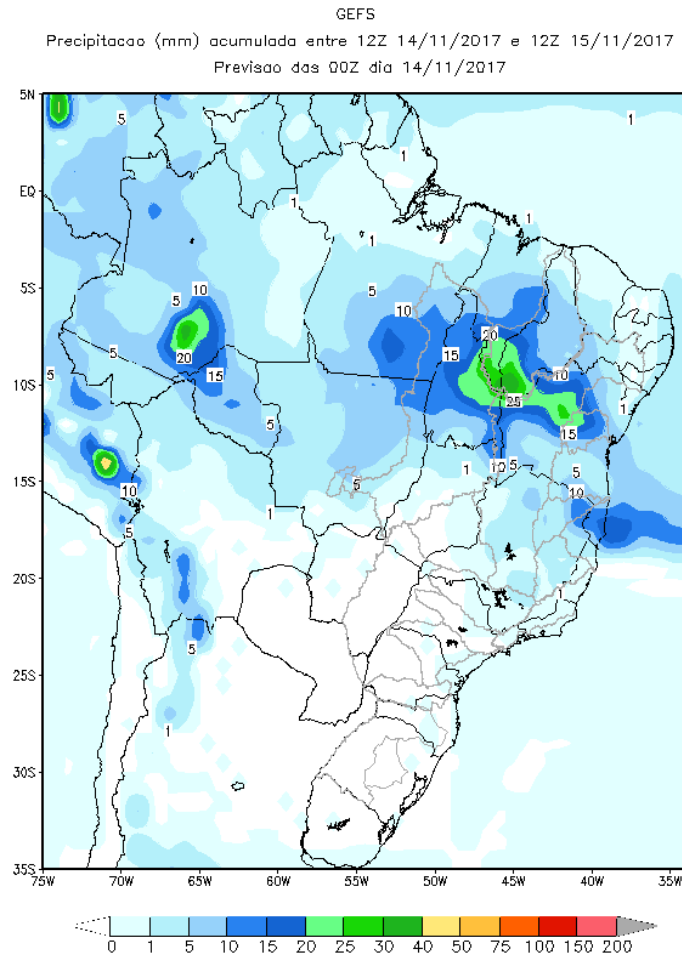




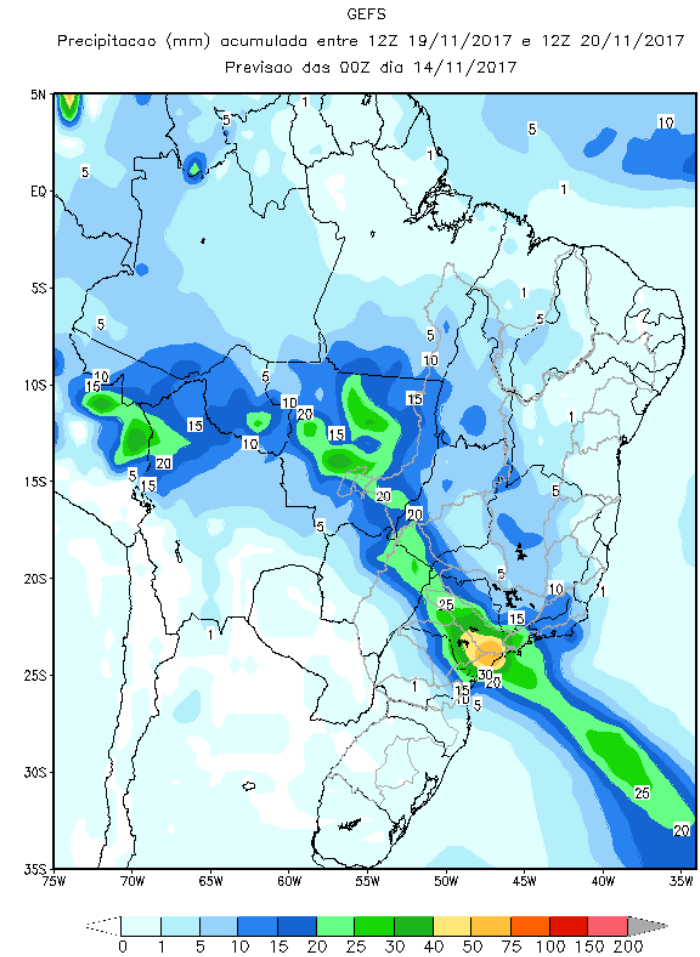
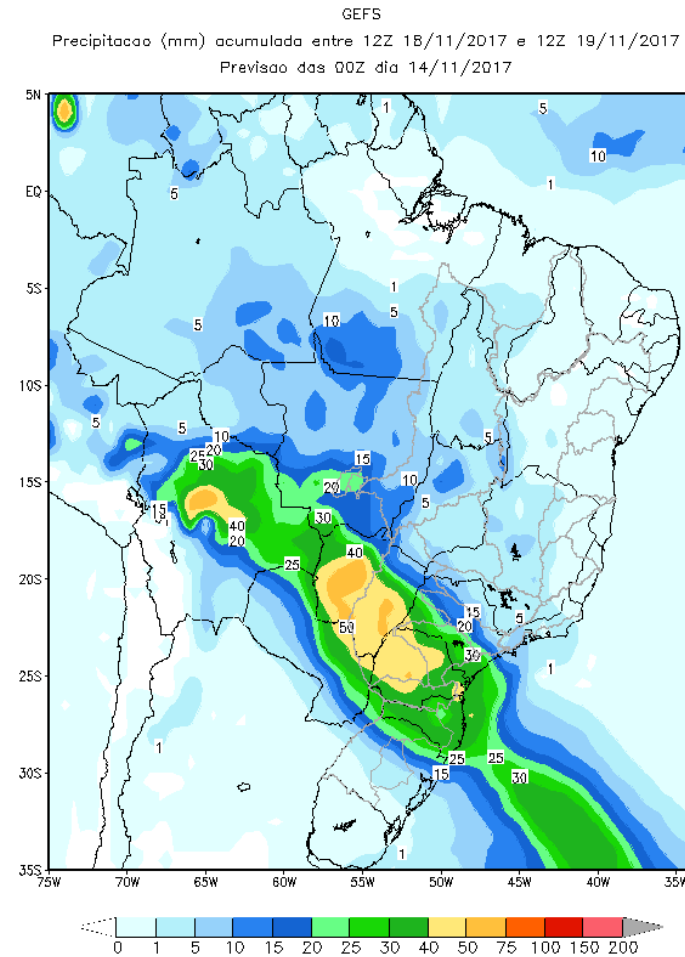
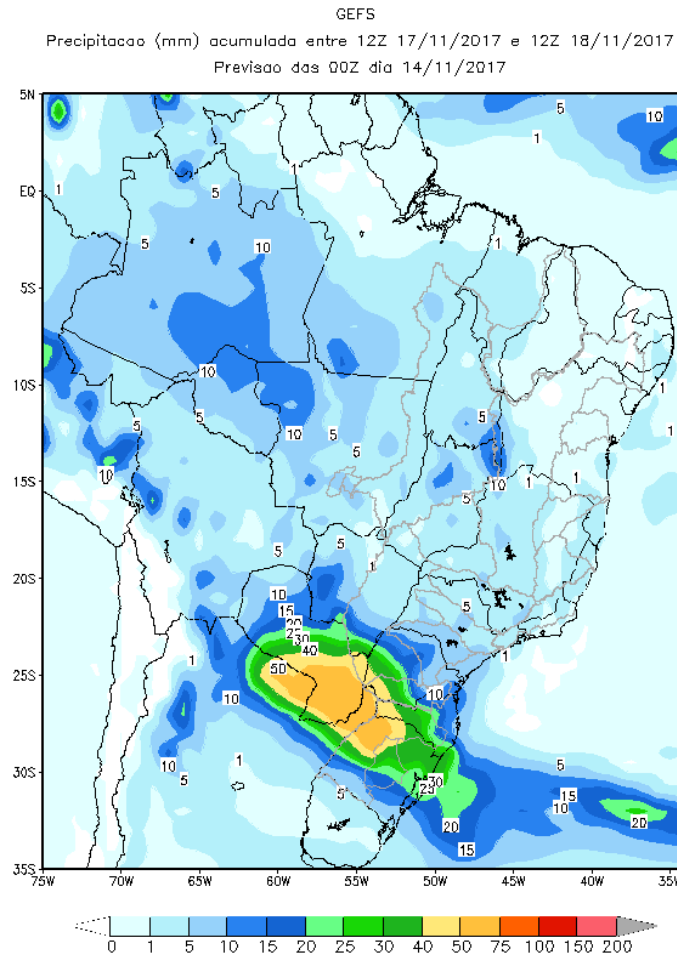
PREVISÃO CURTO PRAZO GEFSONS



PREVISÕES MODELO GEFS ONS



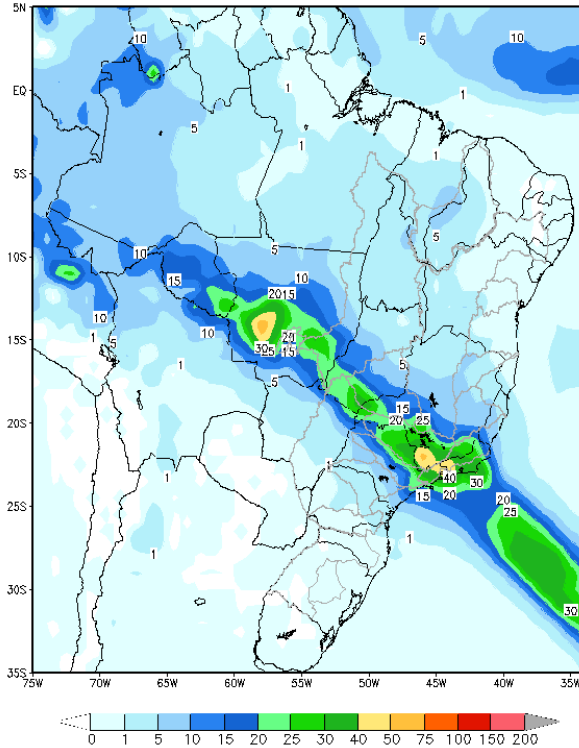
PREVISÕES MODELO GEFS ONS



PREVISÕES MODELO GEFS ONS

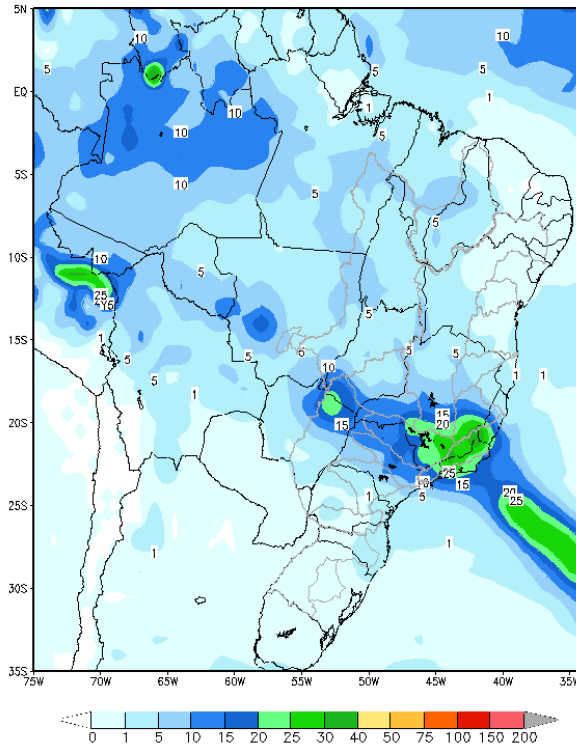
GEFS

Precipitacao (mm) acumulada entre 12Z 20/11/2017 e 12Z 21/11/2017
Previsao das 00Z dia 14/11/2017



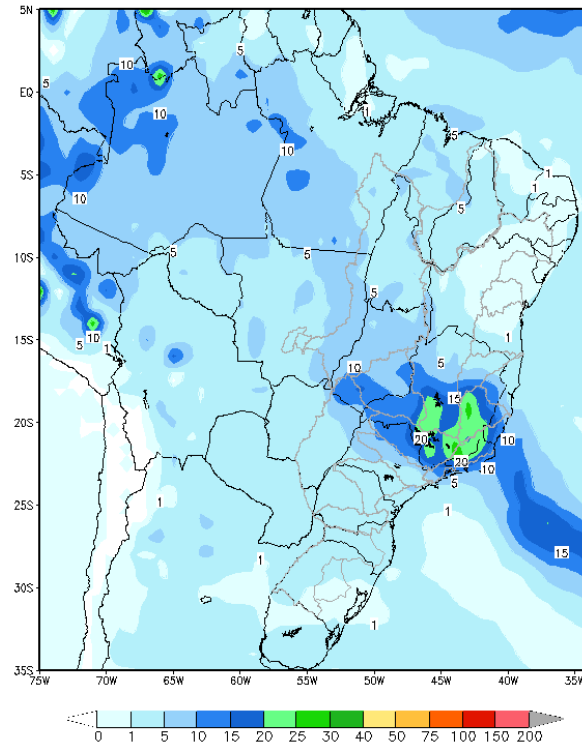
GEFS

Precipitacao (mm) acumulada entre 12Z 21/11/2017 e 12Z 22/11/2017
Previsao das 00Z dia 14/11/2017



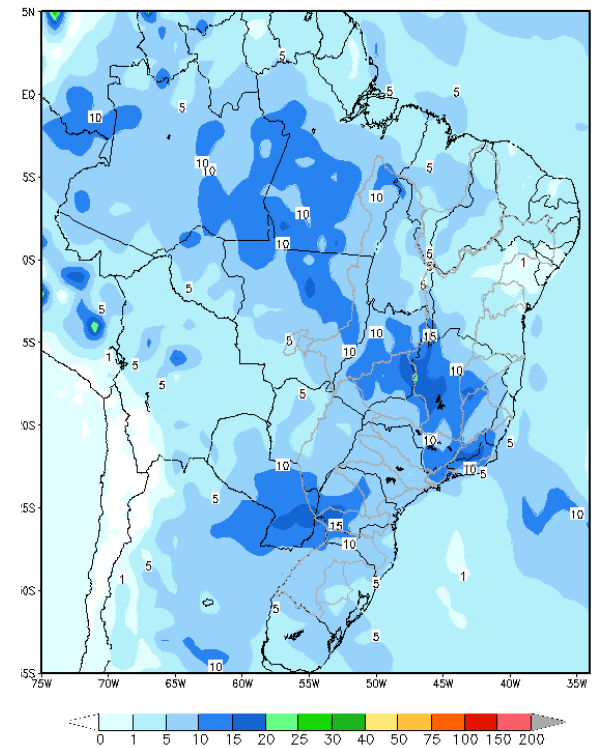
GEFS

Precipitacao (mm) acumulada entre 12Z 22/11/2017 e 12Z 23/11/2017
Previsao das 00Z dia 14/11/2017



GEFS

Precipitacao (mm) acumulada entre 12Z 23/11/2017 e 12Z 24/11/2017
Previsao das 00Z dia 14/11/2017



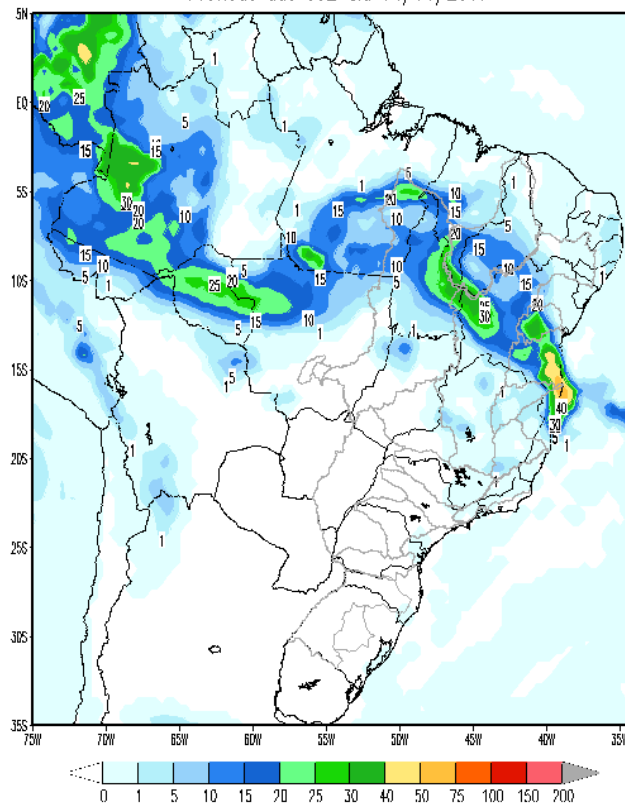


PREVISÃO CURTO PRAZO ETA 40KM

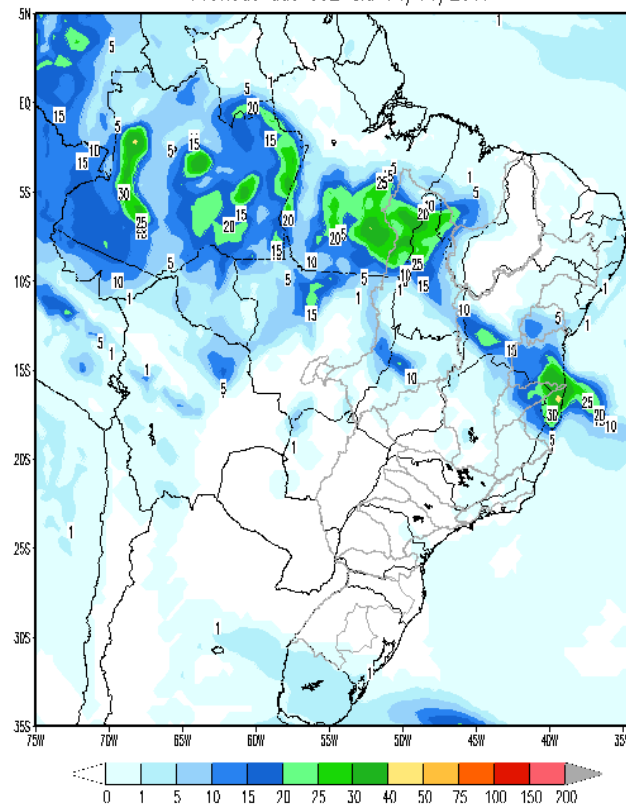


PREVISÕES MODELO ETA 40KM

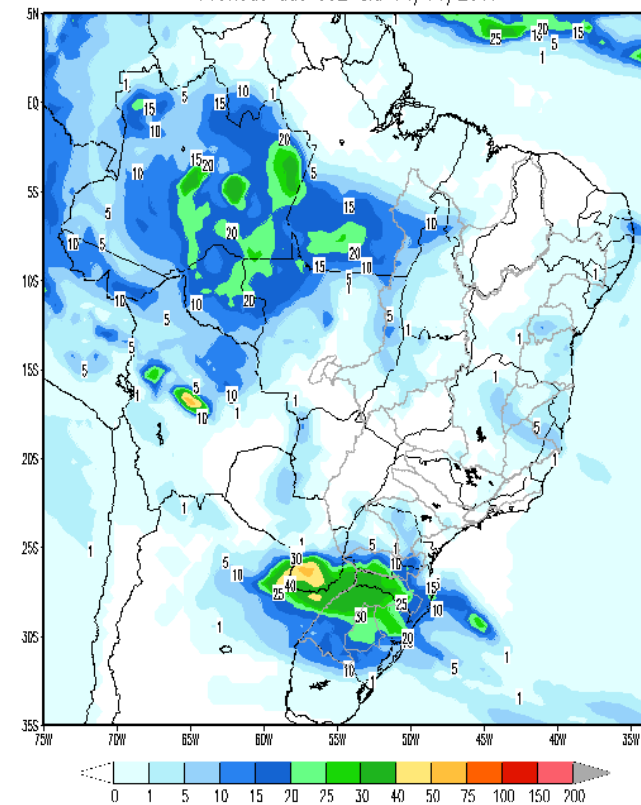
Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 14/11 ate 12Z 15/11
Previsao das 00Z dia 14/11/2017



Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 15/11 ate 12Z 16/11
Previsao das 00Z dia 14/11/2017

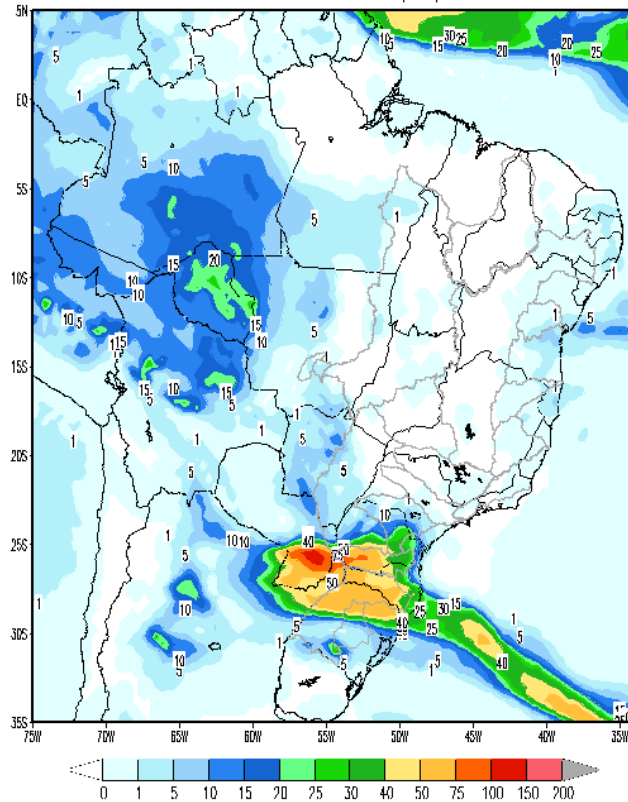


Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 16/11 ate 12Z 17/11
Previsao das 00Z dia 14/11/2017

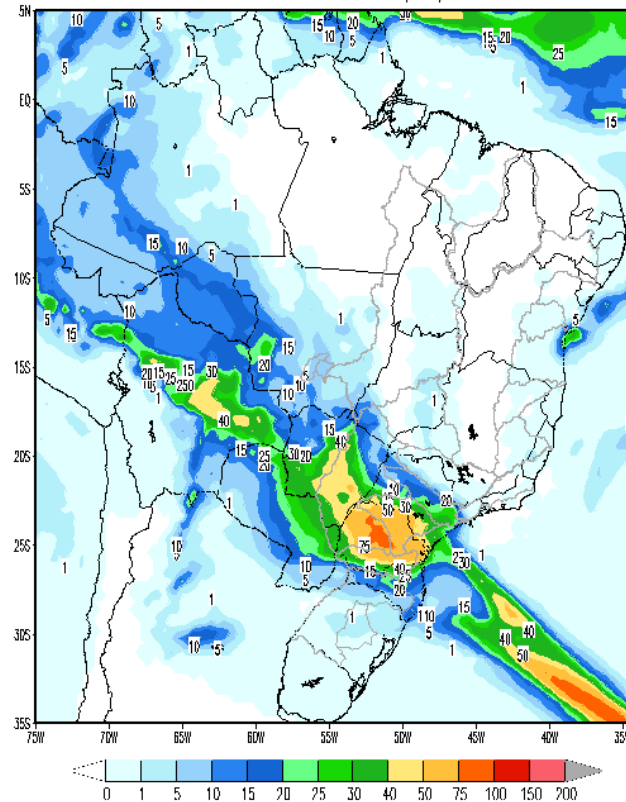


PREVISÕES MODELO GEFS ONS

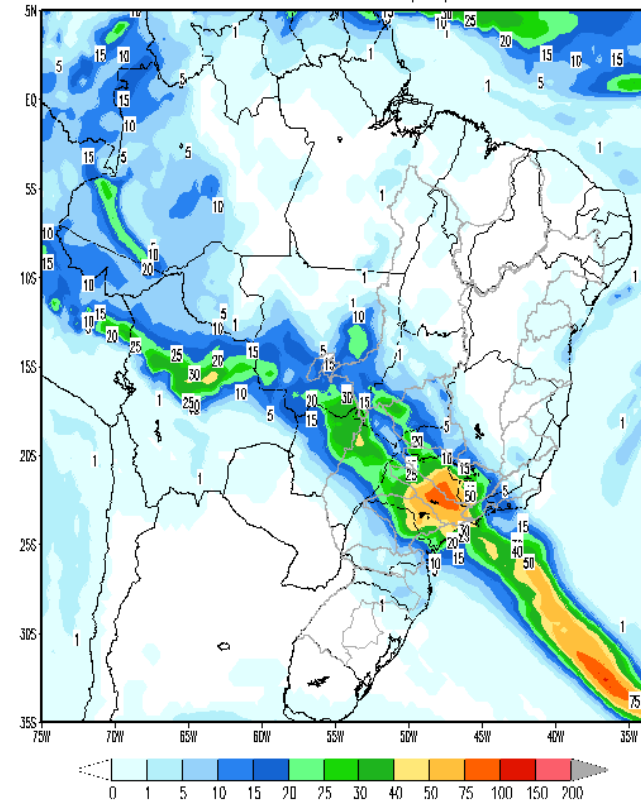
Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 17/11 ate 12Z 18/11
Previsao das 00Z dia 14/11/2017



Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 18/11 ate 12Z 19/11
Previsao das 00Z dia 14/11/2017

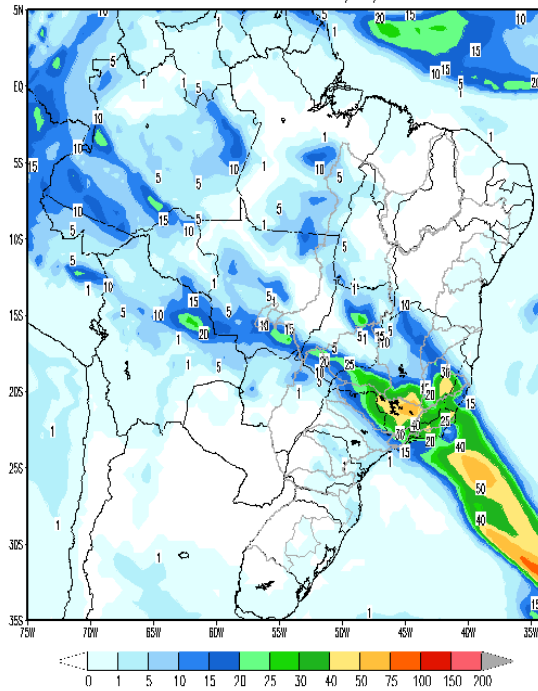


Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 19/11 ate 12Z 20/11
Previsao das 00Z dia 14/11/2017

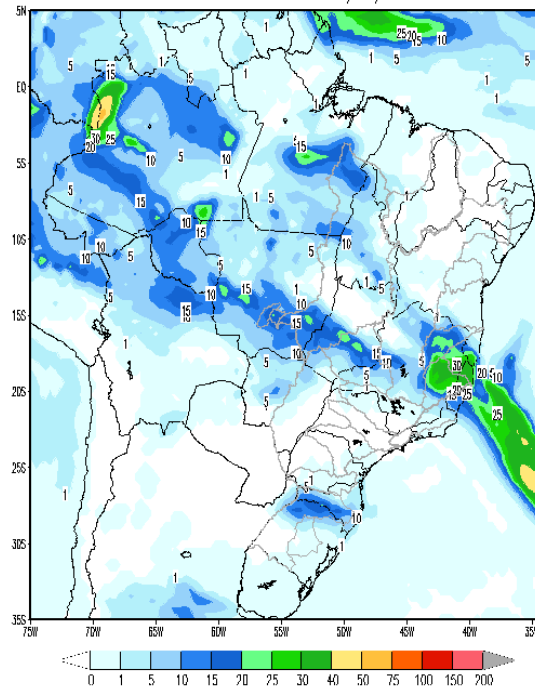


PREVISÕES MODELO GEFS ONS

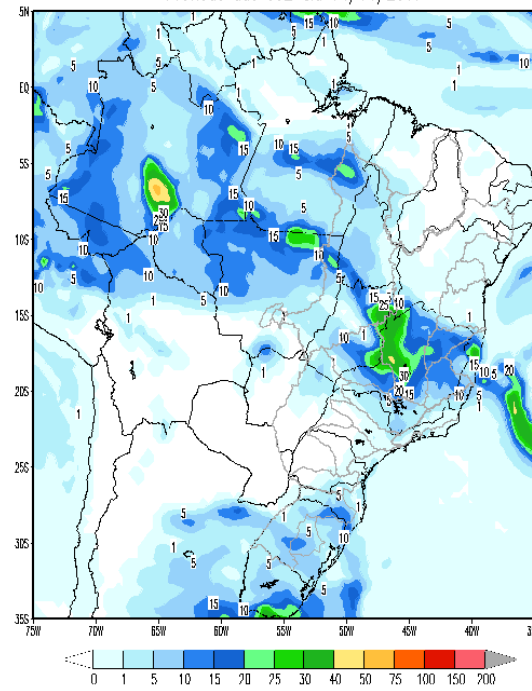
Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 20/11 ate 12Z 21/11
Previsao das 00Z dia 14/11/2017



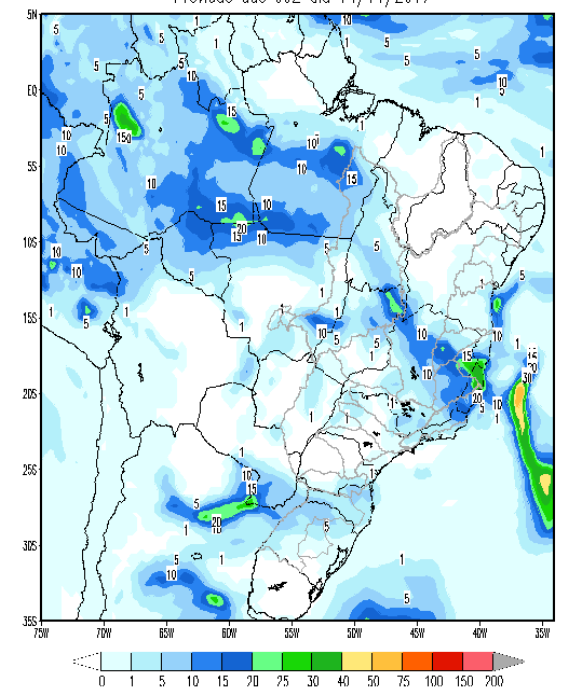
Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 21/11 ate 12Z 22/11
Previsao das 00Z dia 14/11/2017



Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 22/11 ate 12Z 23/11
Previsao das 00Z dia 14/11/2017



Modelo Regional / Brasil
Precipitacao (mm) acumulada entre 12Z 23/11 ate 12Z 24/11
Previsao das 00Z dia 14/11/2017





Previsões Climáticas

Estado atual



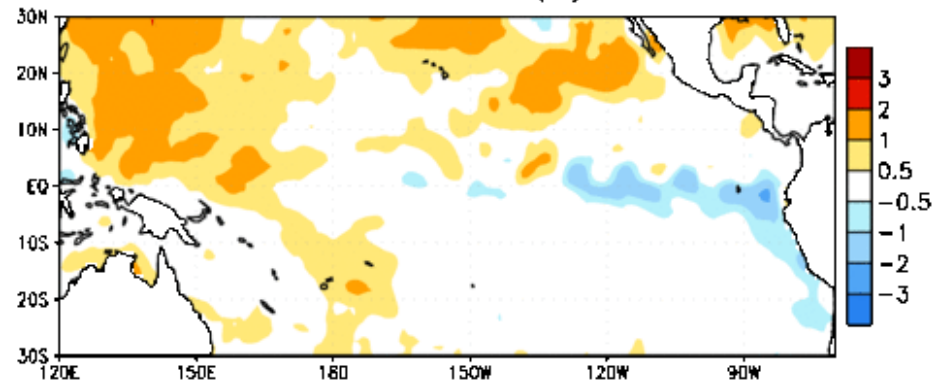


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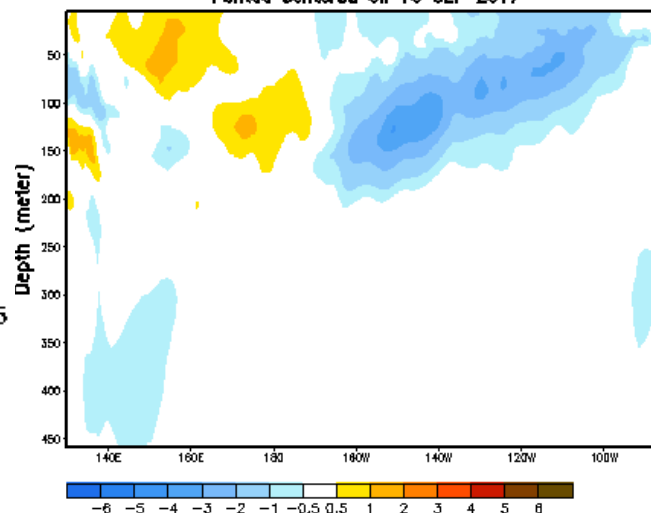
Laboratório de Monitoramento e Modelagem de Sistemas Climáticos - LAMMOC



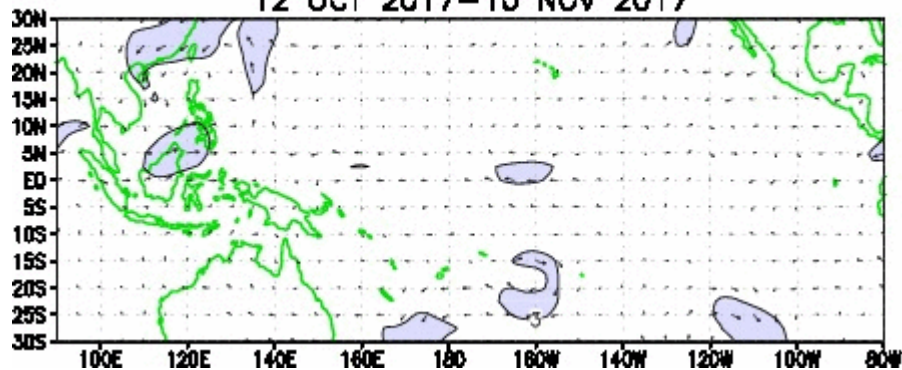
Week centered on 23 AUG 2017
SST Anomalies (°C)



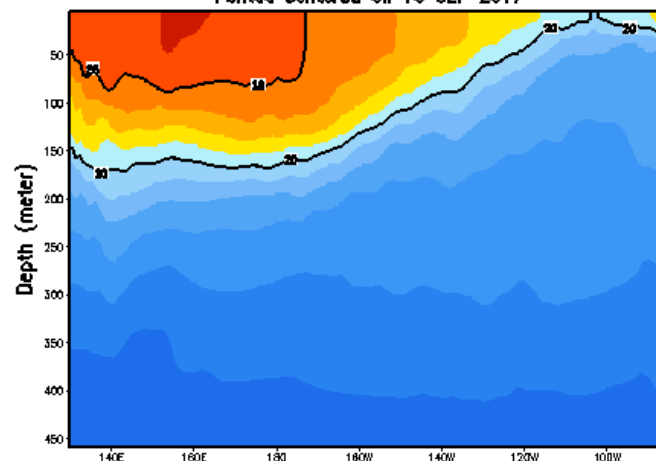
Equatorial Temperature Anomaly (°C)
Pentad centered on 10 SEP 2017



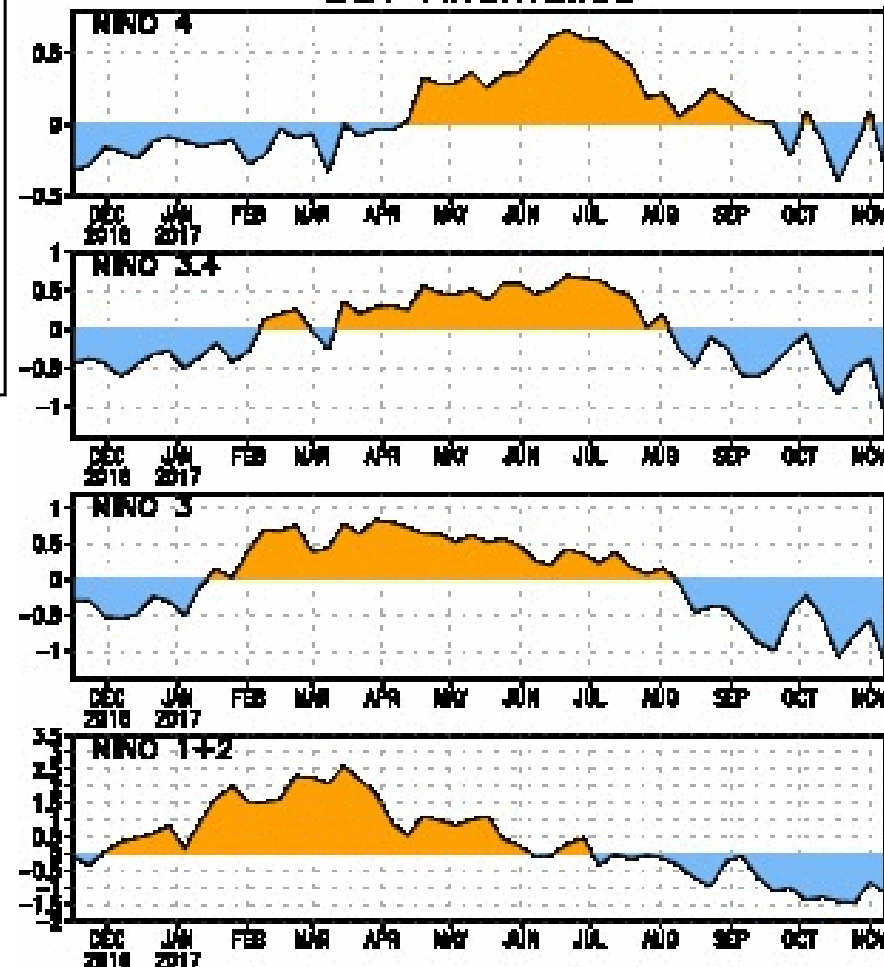
CDAS B50-hPa Wind Anoms
12 OCT 2017-10 NOV 2017



Equatorial Temperature (°C)
Pentad centered on 10 SEP 2017



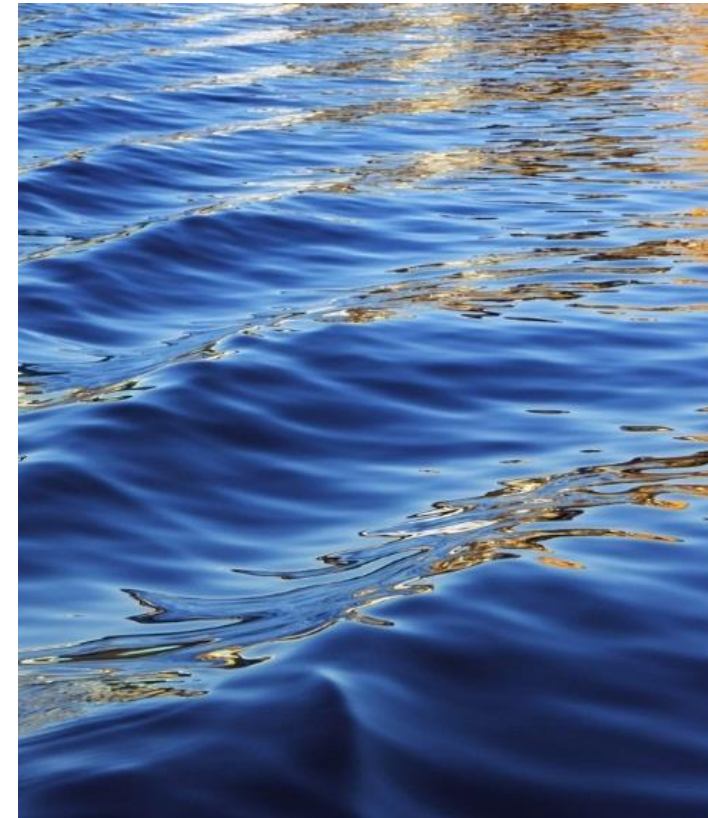
SST Anomalies





AVALIAÇÃO COMPARATIVA DAS
PREVISÕES PARA O QUADRIMESTRE
Julho/Agosto/Setembro/Outubro

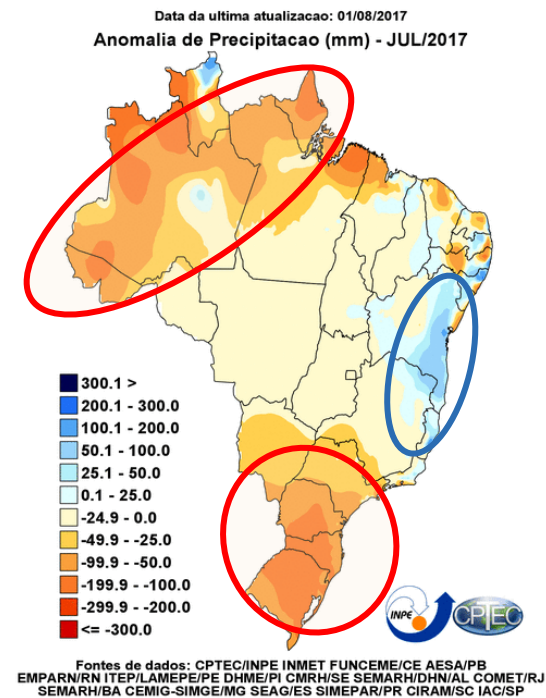
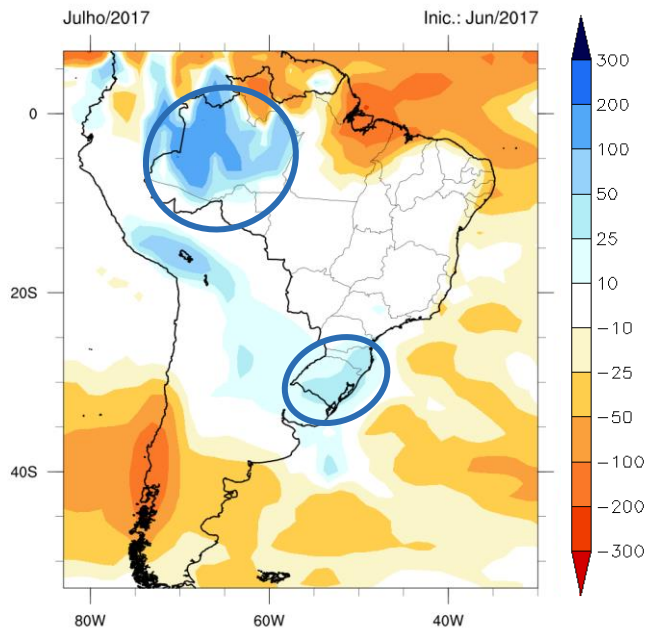
CAM 3.1 e Ensembles da NOAA



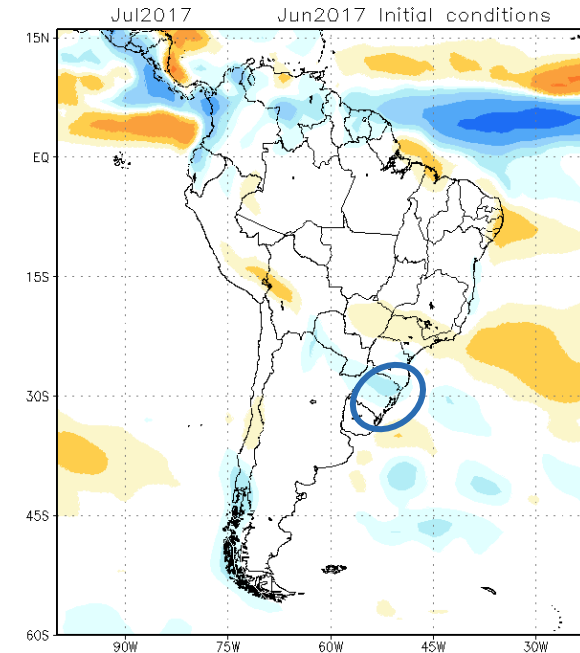
Julho 2017

Comparação das Previsões CAM 3.1, NASA e CFSv2 com o Observado

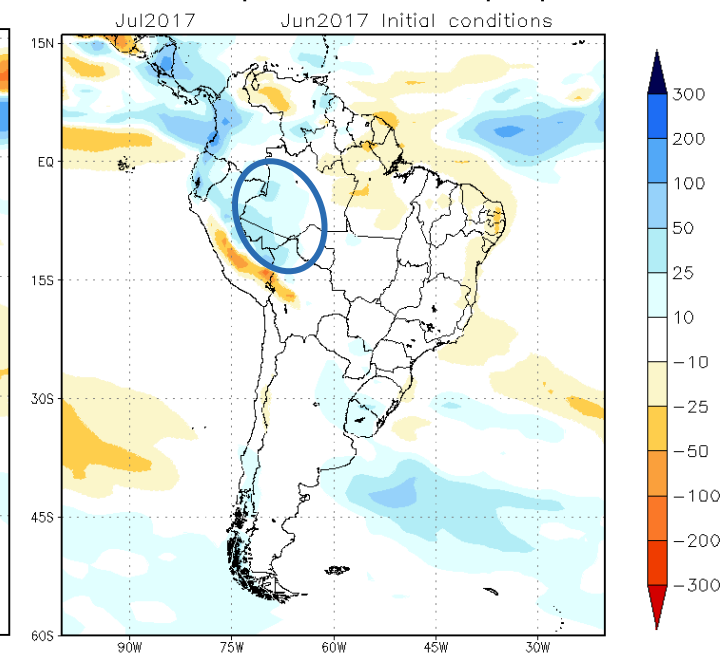
LAMMOC - Anomalia de Precipitação (mm)



CFSv2 Precipitation Anomalies (mm)



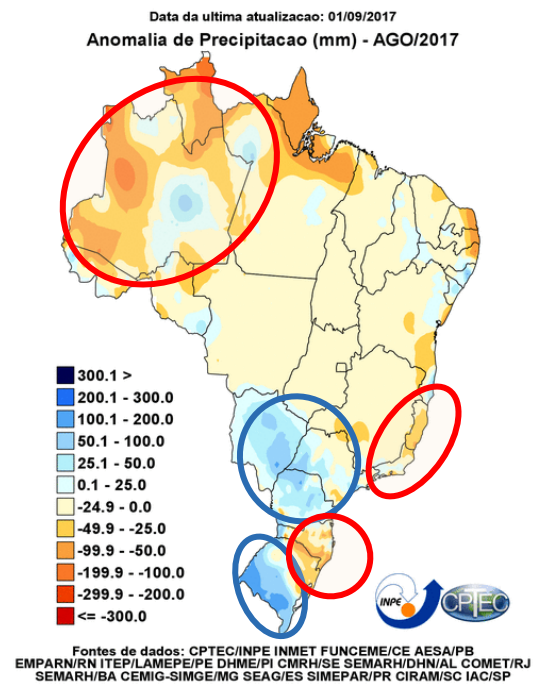
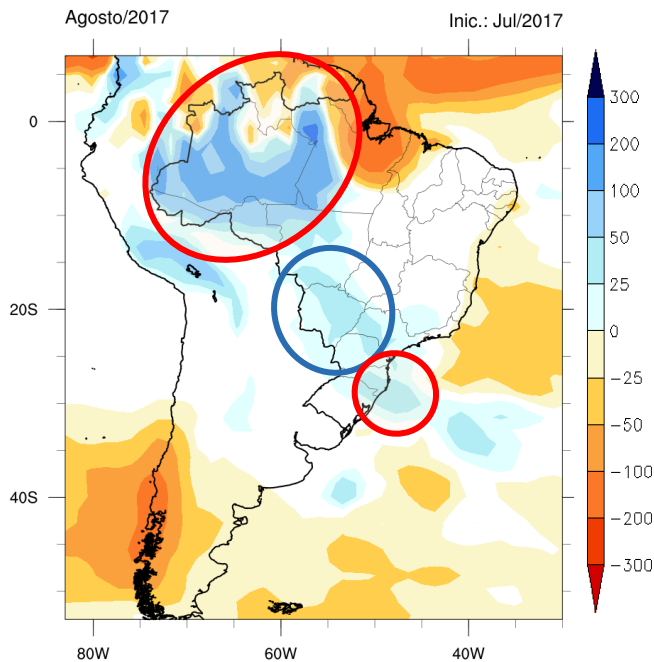
NASA Precipitation Anomalies (mm)



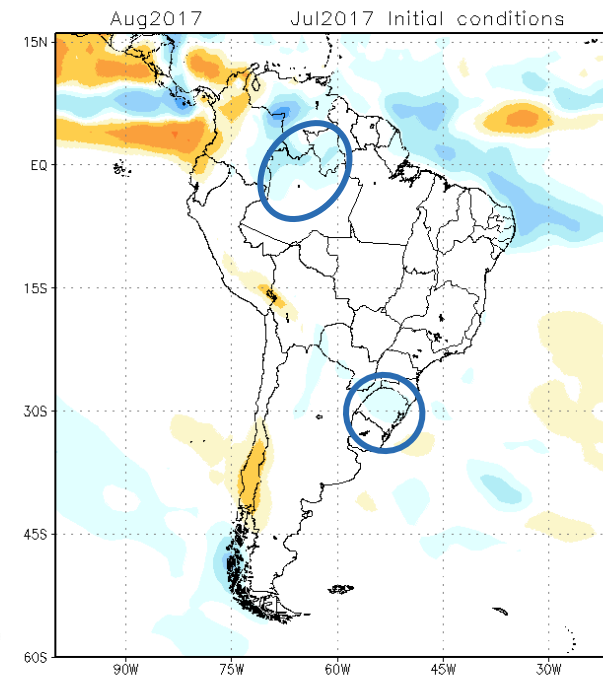
Agosto 2017

Comparação das Previsões CAM 3.1, NASA e CFSv2 com o Observado

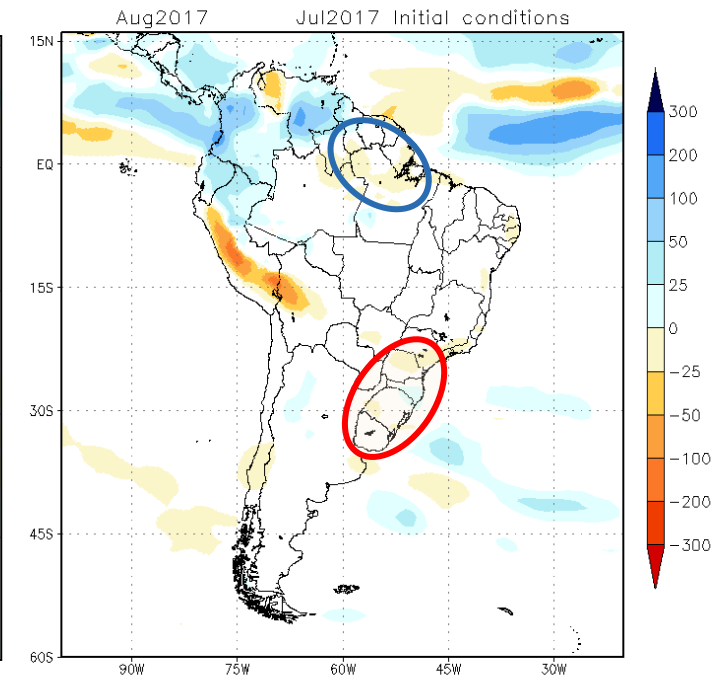
LAMMOC - Anomalia de Precipitação (mm)



CFSv2 Precipitation Anomalies (mm)



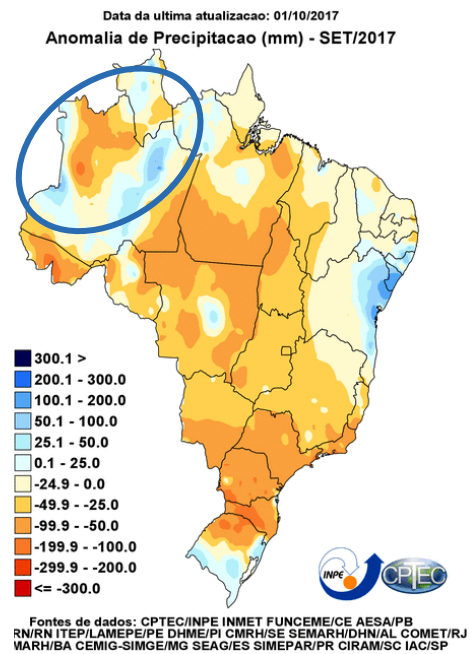
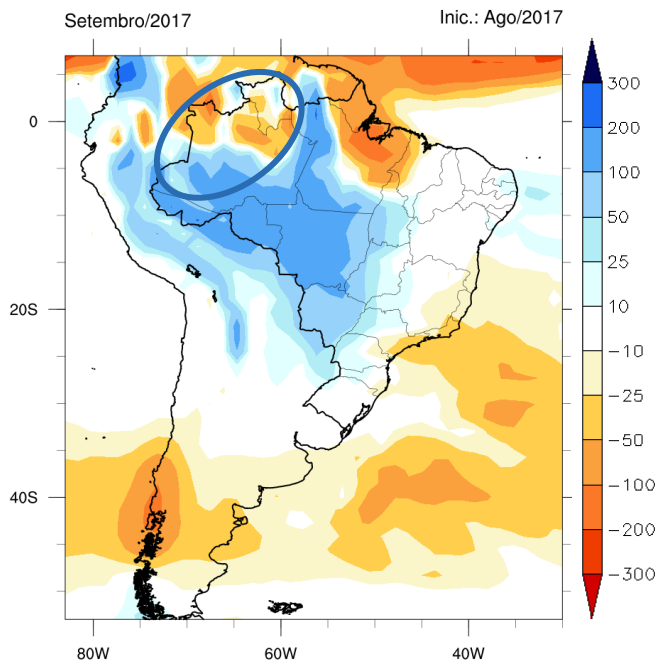
NASA Precipitation Anomalies (mm)



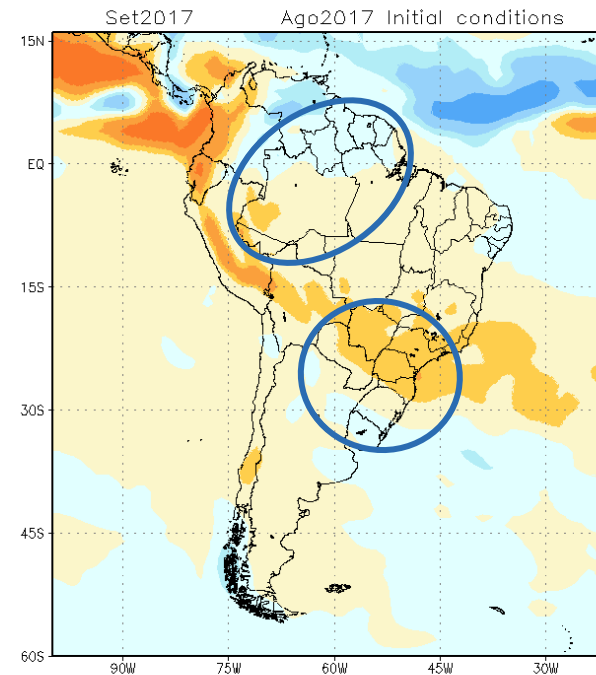
Setembro 2017

Comparação das Previsões CAM 3.1, NASA e CFSv2 com o Observado

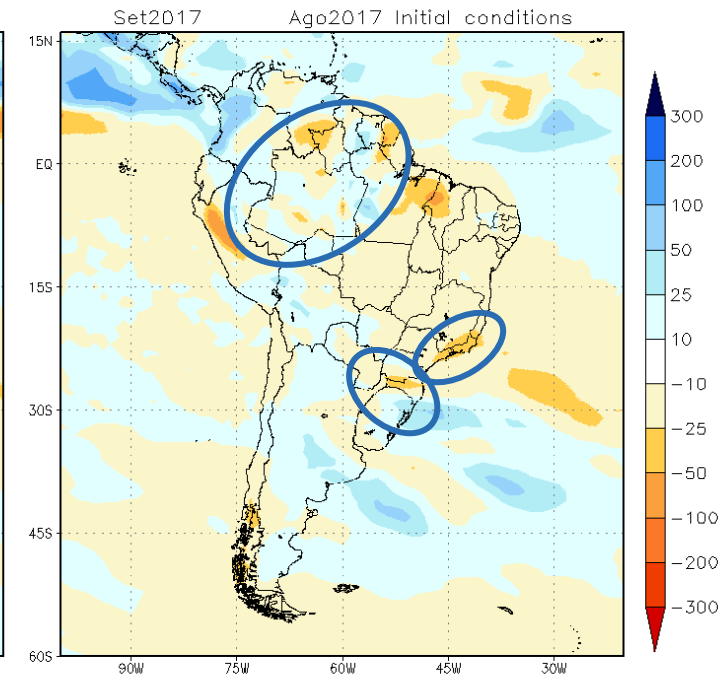
LAMMOC - Anomalia de Precipitação (mm)



CFSv2 Precipitation Anomalies (mm)



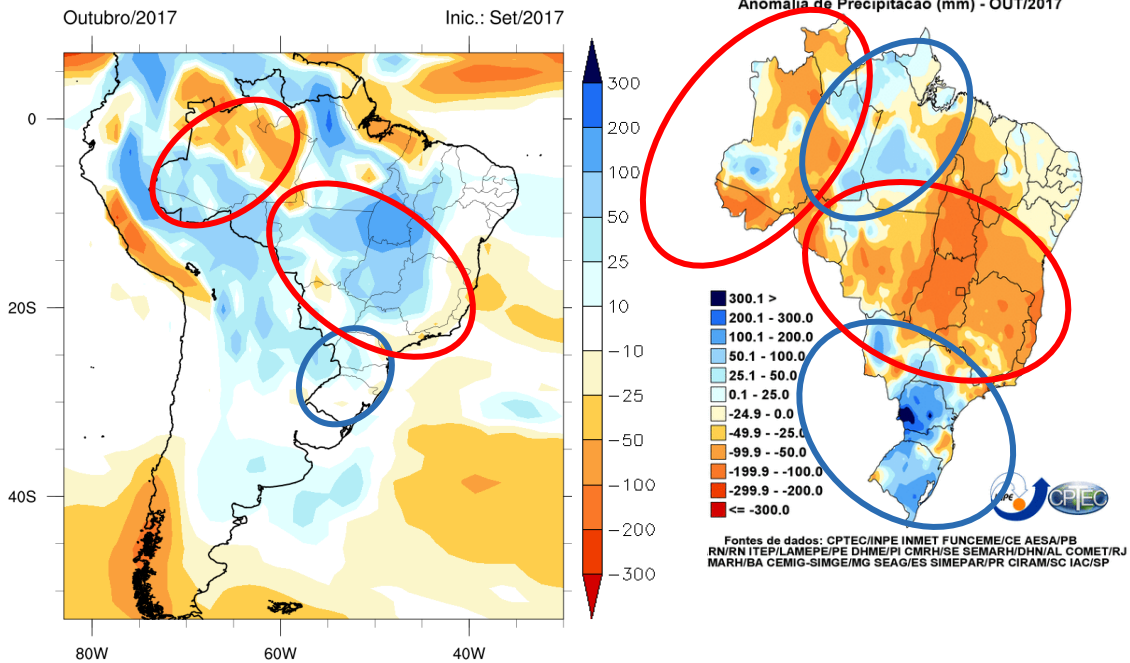
NASA Precipitation Anomalies (mm)



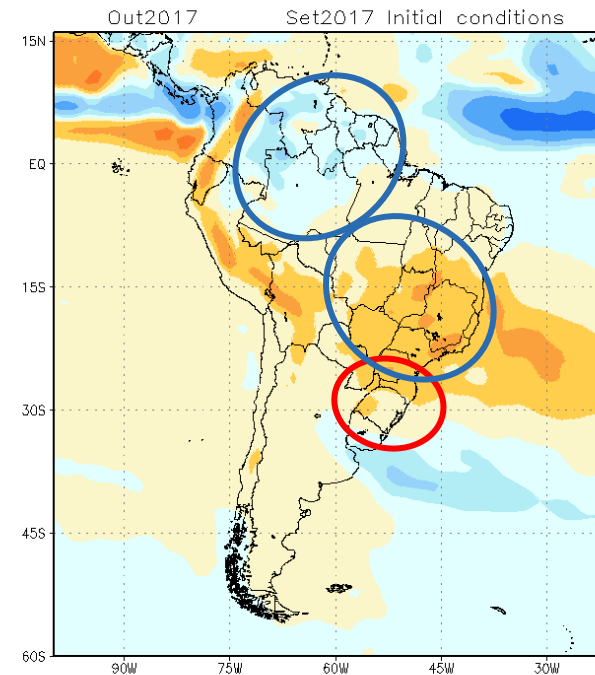
Outubro 2017

Comparação das Previsões CAM 3.1, NASA e CFSv2 com o Observado

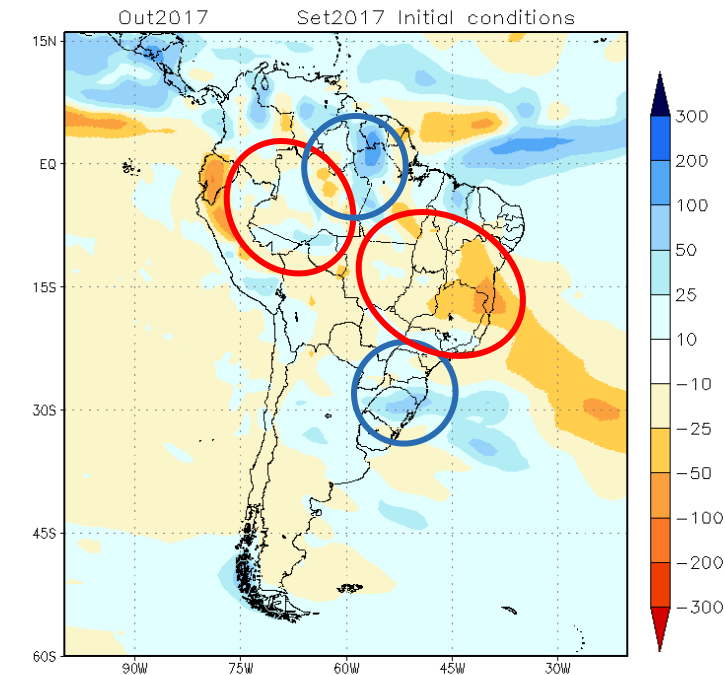
LAMMOC - Anomalia de Precipitação (mm)



CFSv2 Precipitation Anomalies (mm)



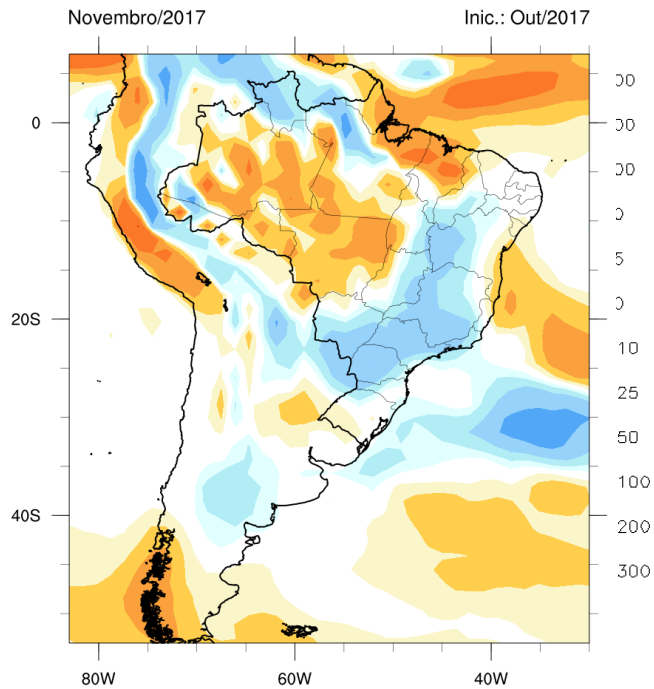
NASA Precipitation Anomalies (mm)



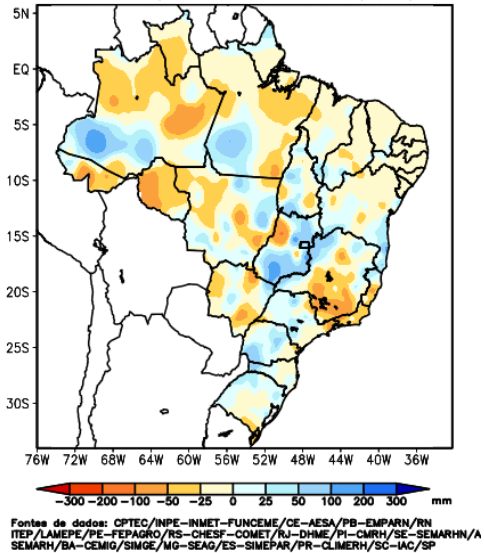
Novembro 2017

Comparação das Previsões CAM 3.1, NASA e CFSv2 com o Observado

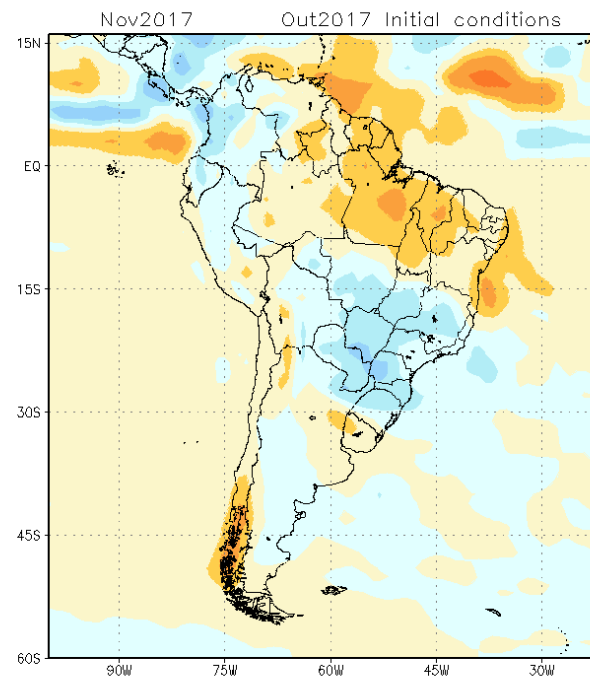
LAMMOC - Anomalia de Precipitação (mm)



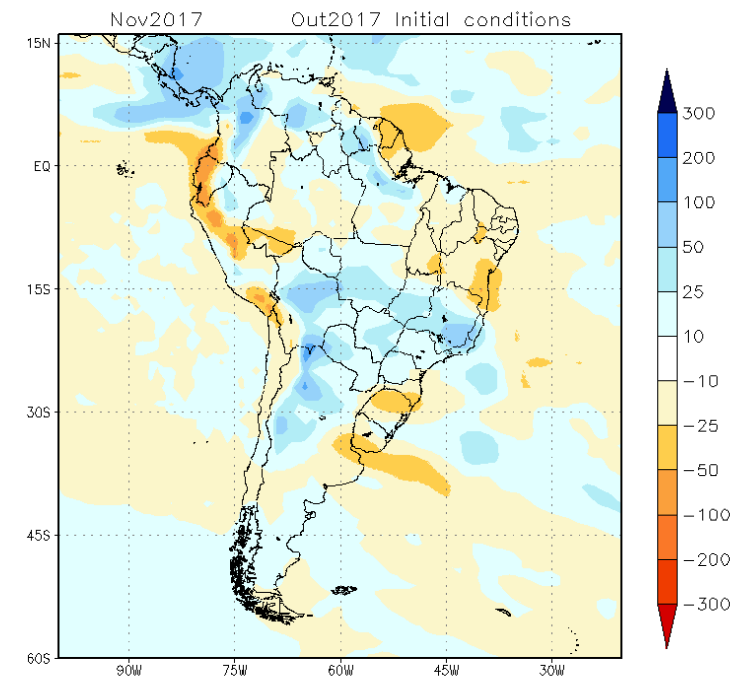
Anomalia Precipitacao Acum. ate 13/NOV/2017



CFSv2 Precipitation Anomalies (mm)



NASA Precipitation Anomalies (mm)





Previsões para os trimestres
Novembro/Dezembro/Janeiro - CAM 3.1 e
Ensembles da NOAA





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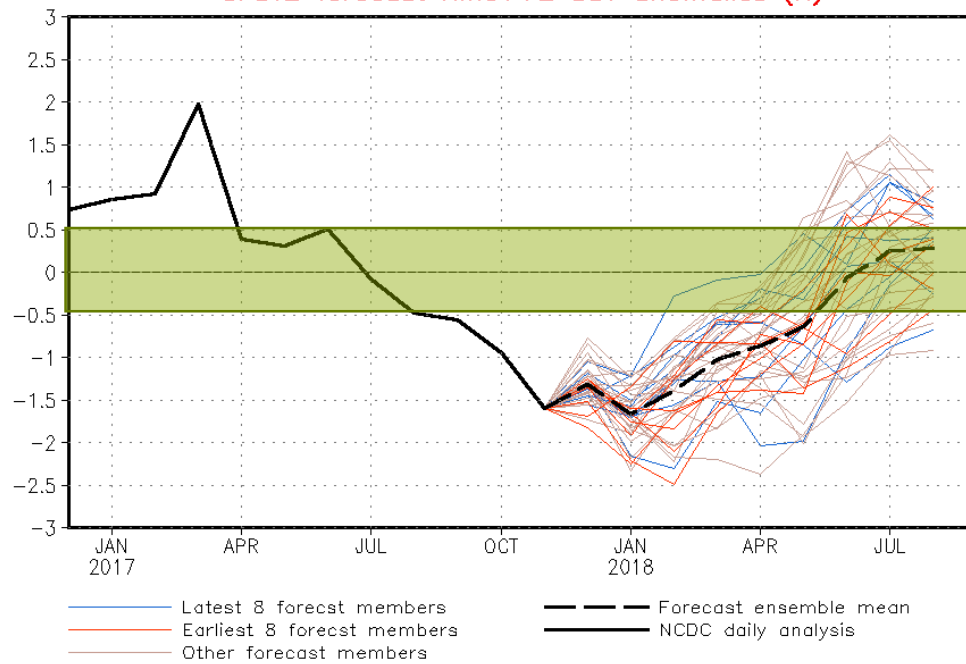
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NWS/NCEP/CPC

Last update: Mon Nov 13 2017
Initial conditions: 3Nov2017-12Nov2017

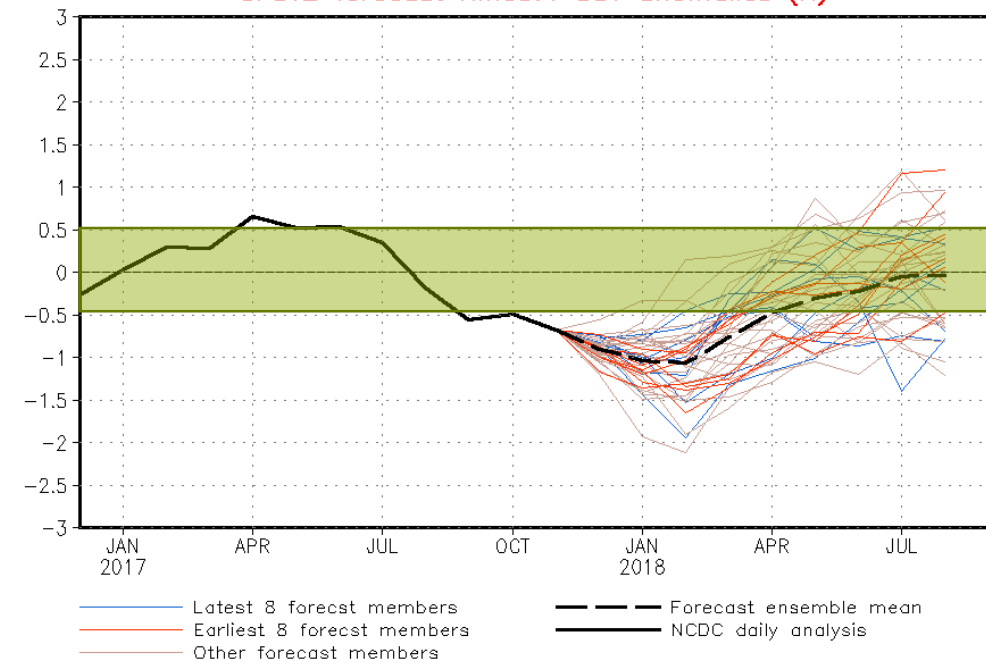
CFSv2 forecast Nino1+2 SST anomalies (K)



NWS/NCEP/CPC

Last update: Mon Nov 13 2017
Initial conditions: 3Nov2017-12Nov2017

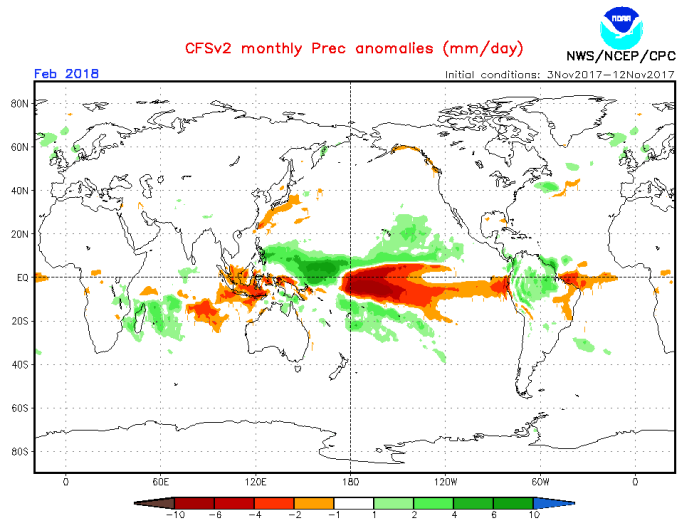
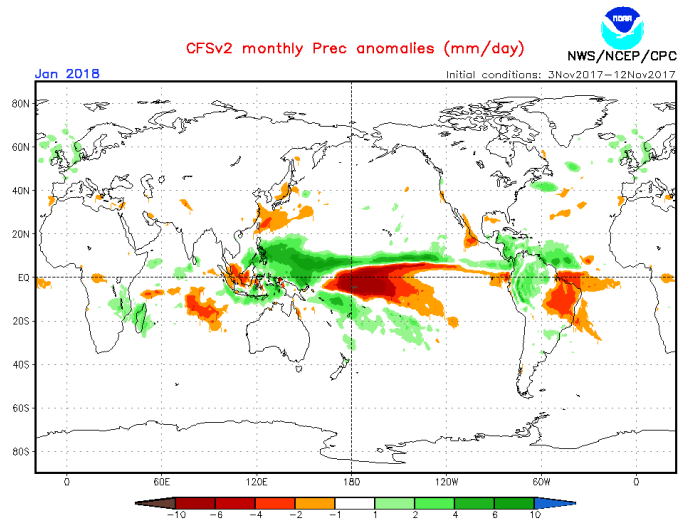
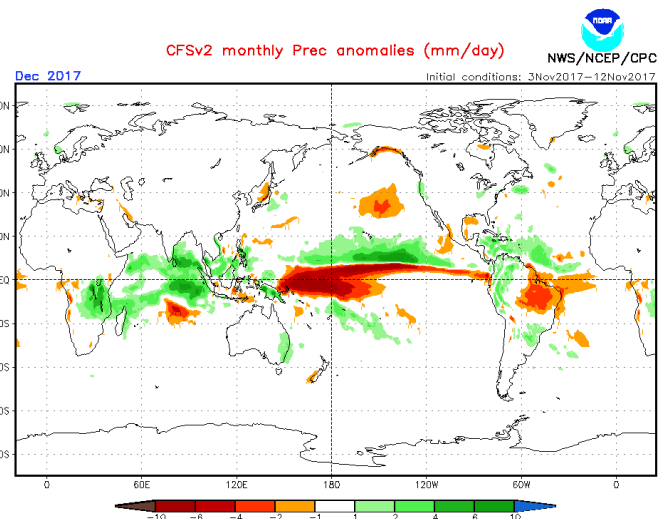
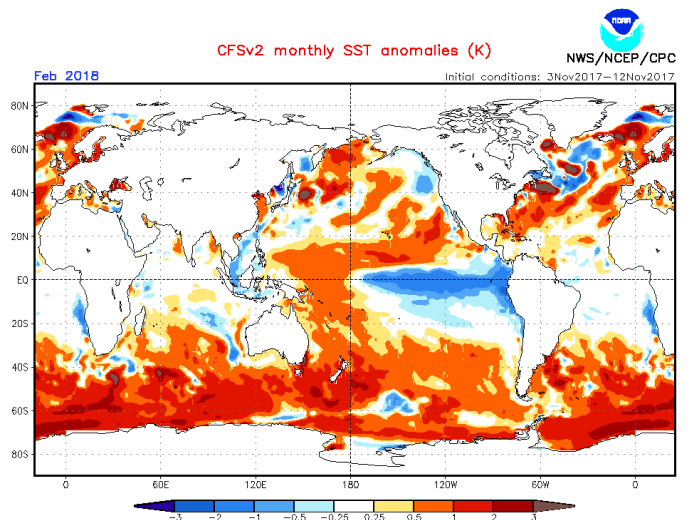
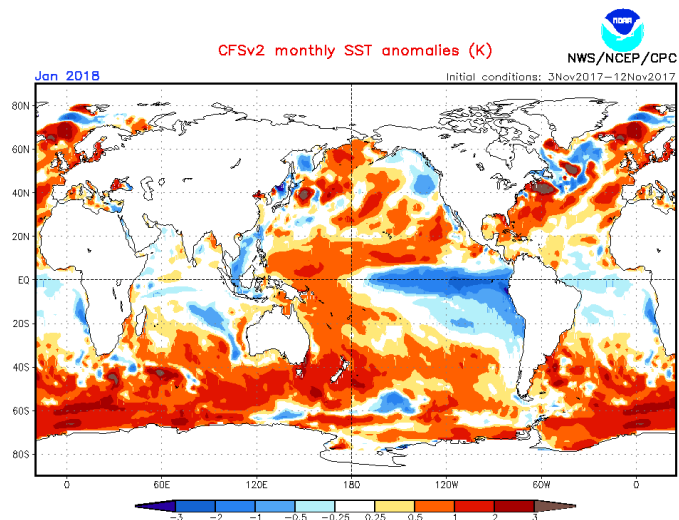
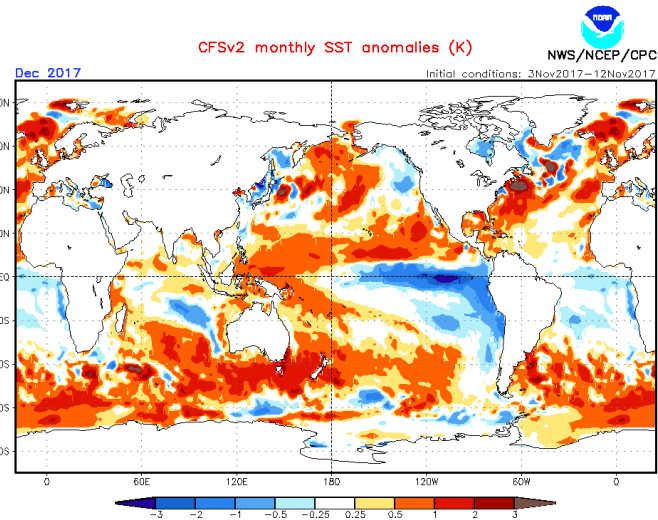
CFSv2 forecast Nino3.4 SST anomalies (K)





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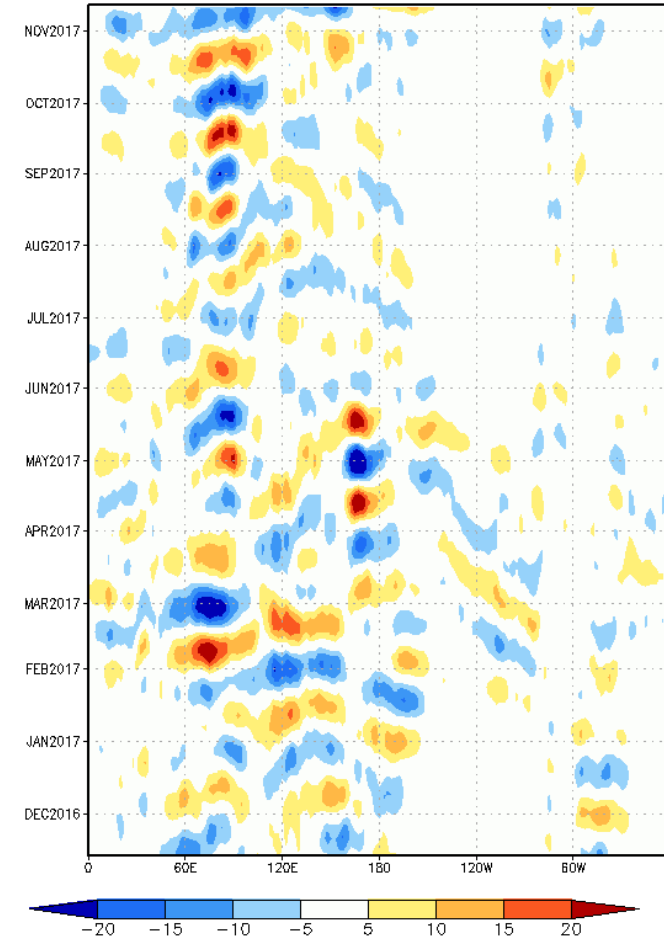
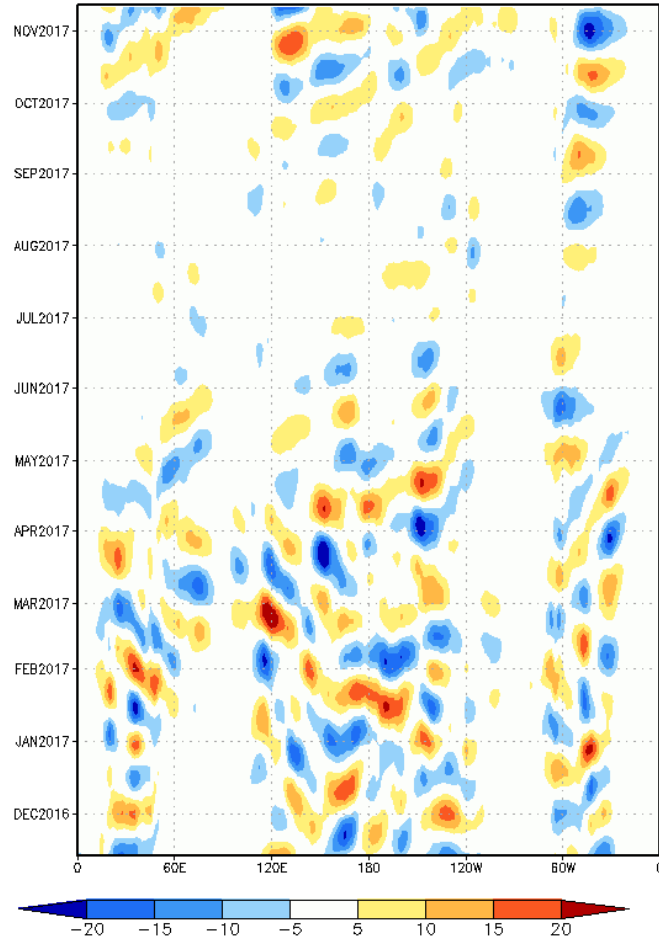


SE

NE

13NOV2016 12NOV2017

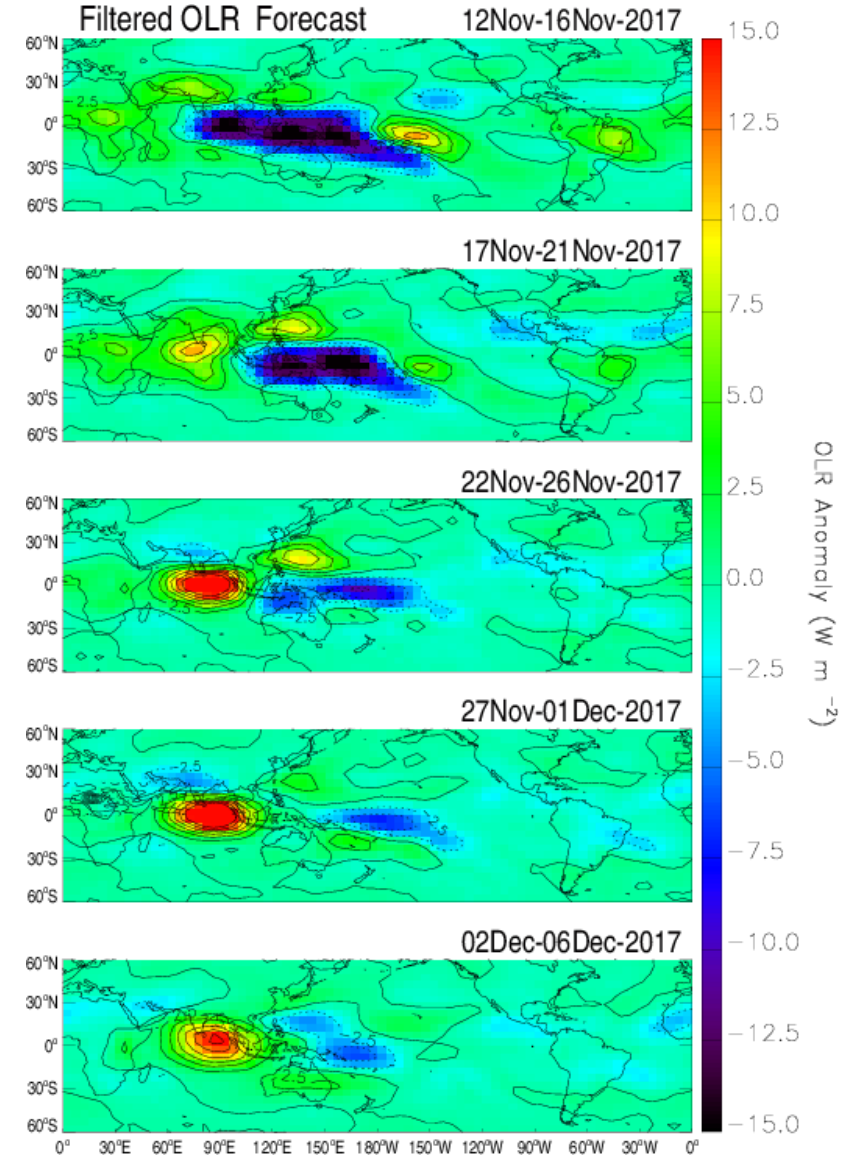
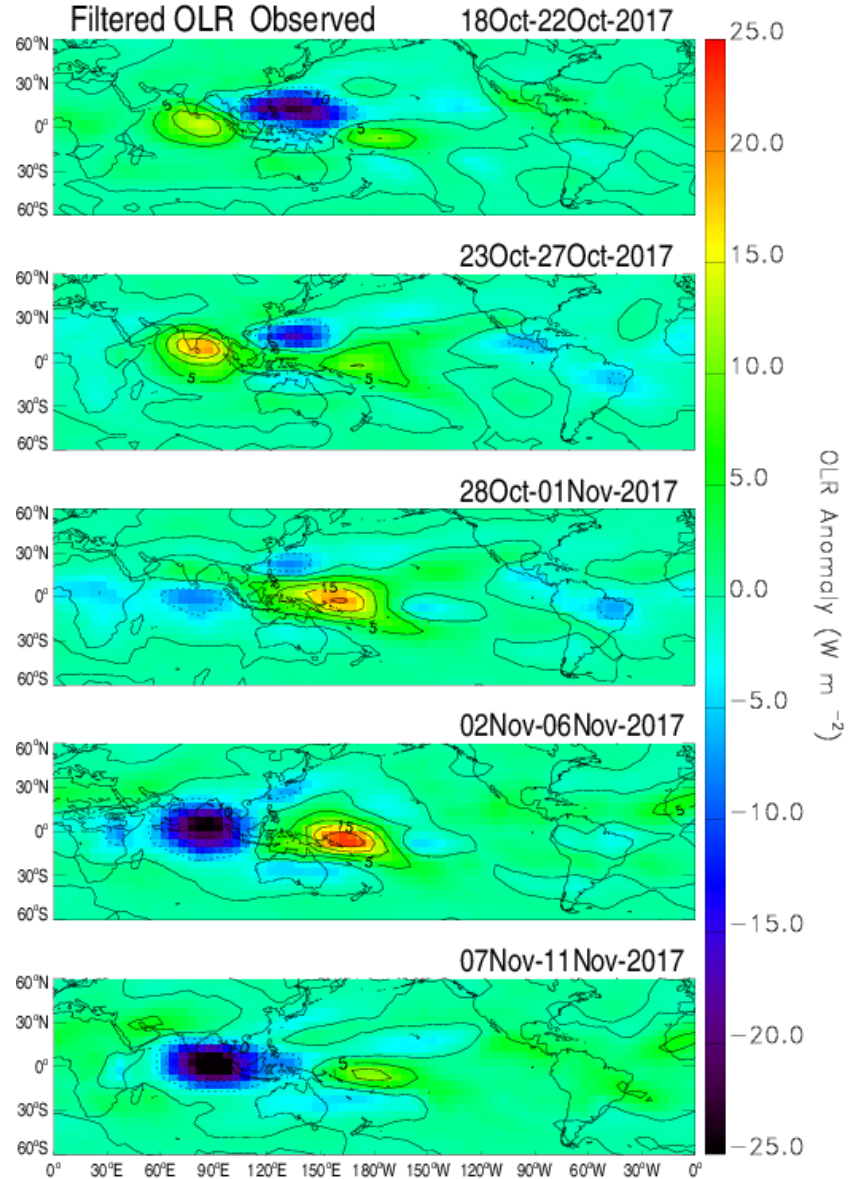
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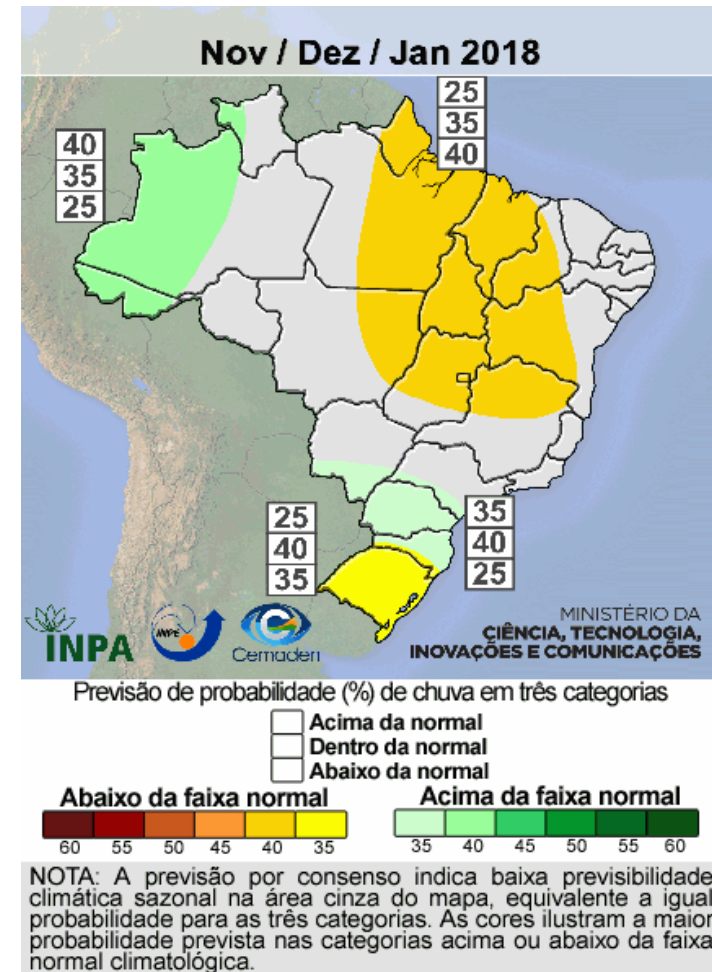
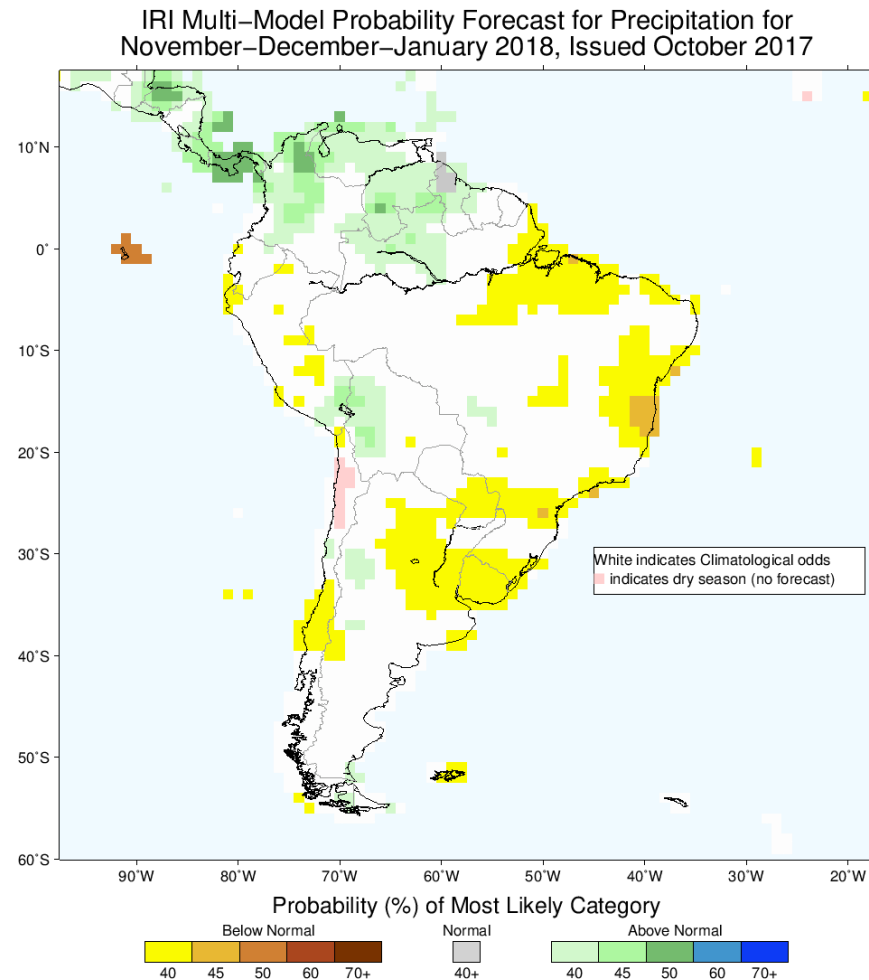




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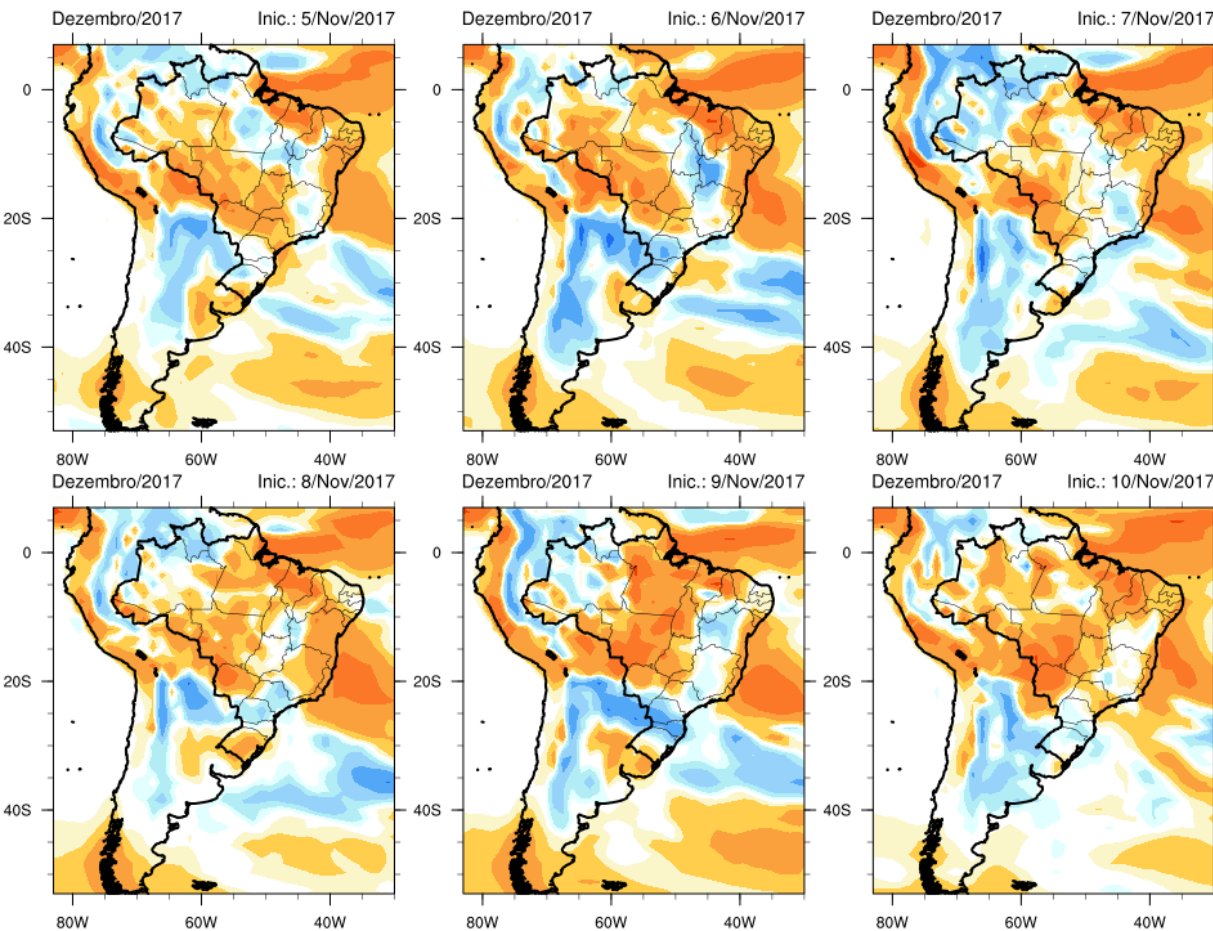




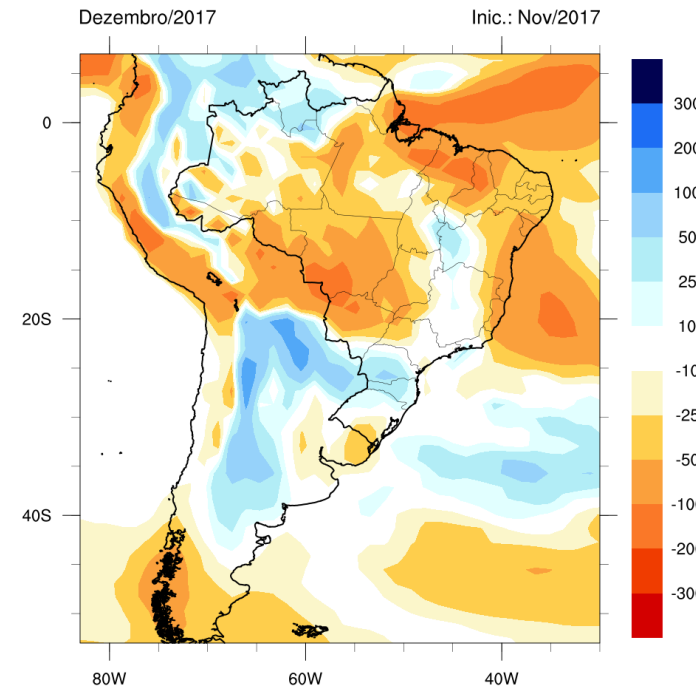
Previsões para Dezembro

Previsão de Precipitação (Anomalias) – Dezembro/2017

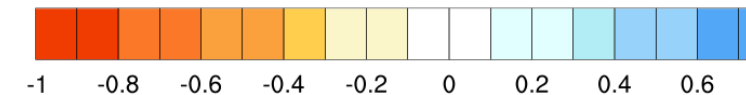
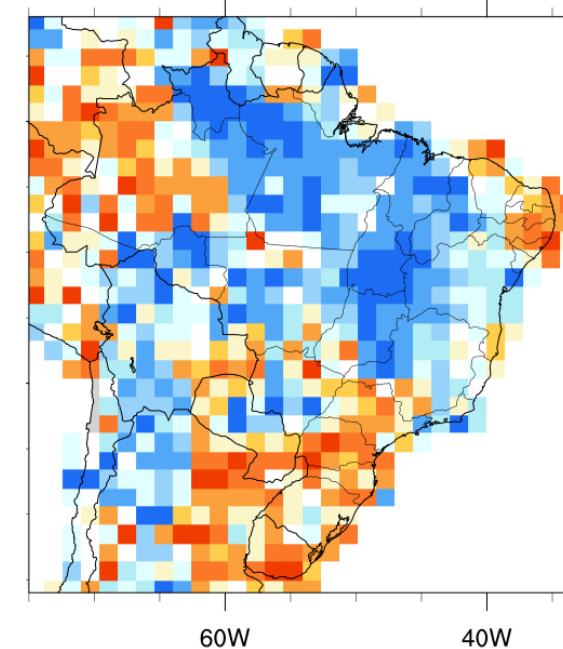
LAMMOC - Anomalia de Precipitação (mm)



LAMMOC - Anomalia de Precipitação (mm)



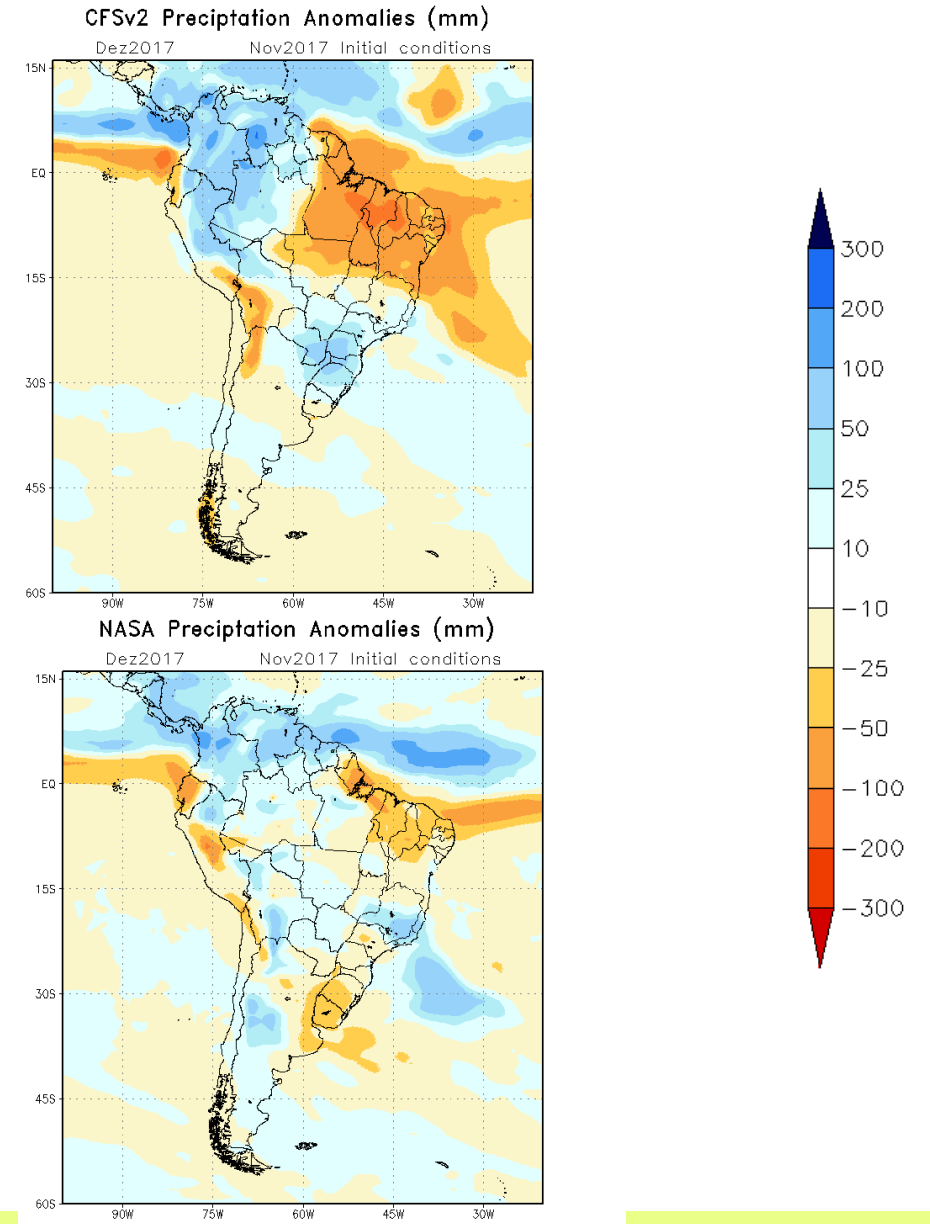
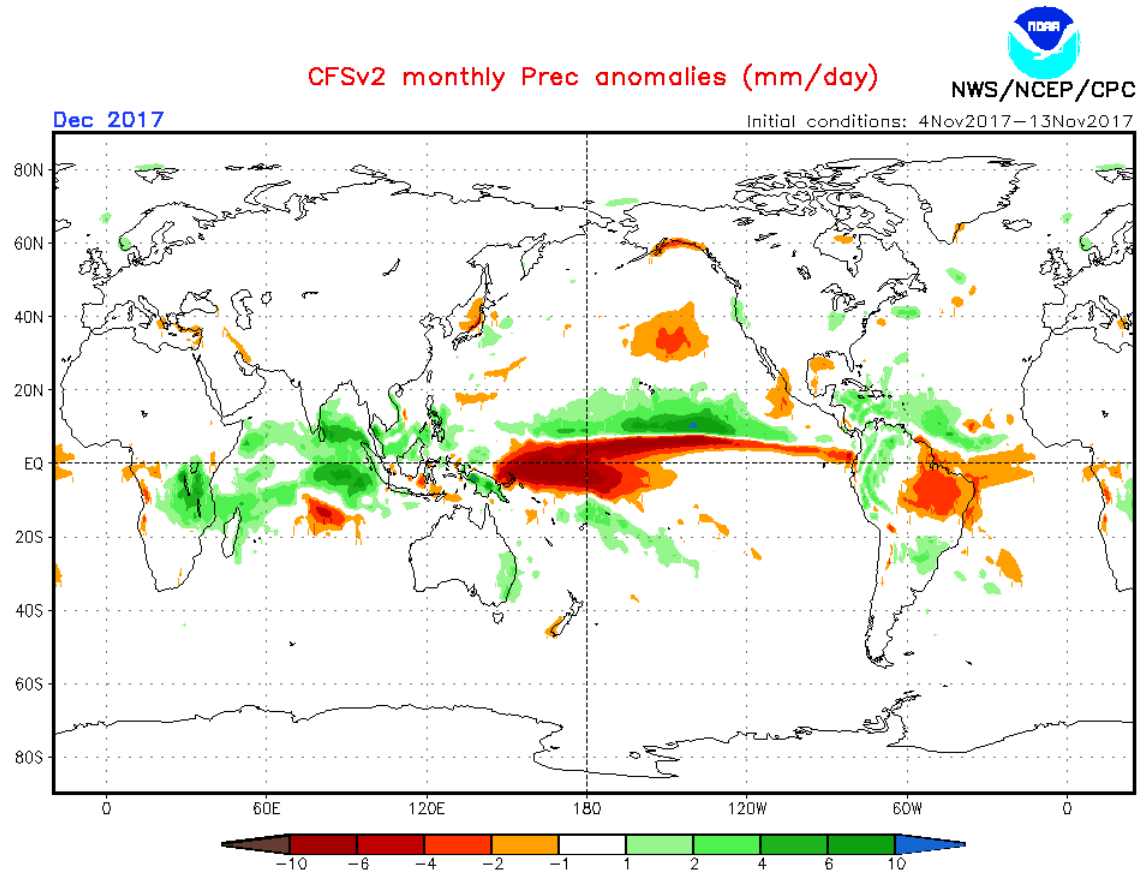
SKILL para dezembro L1





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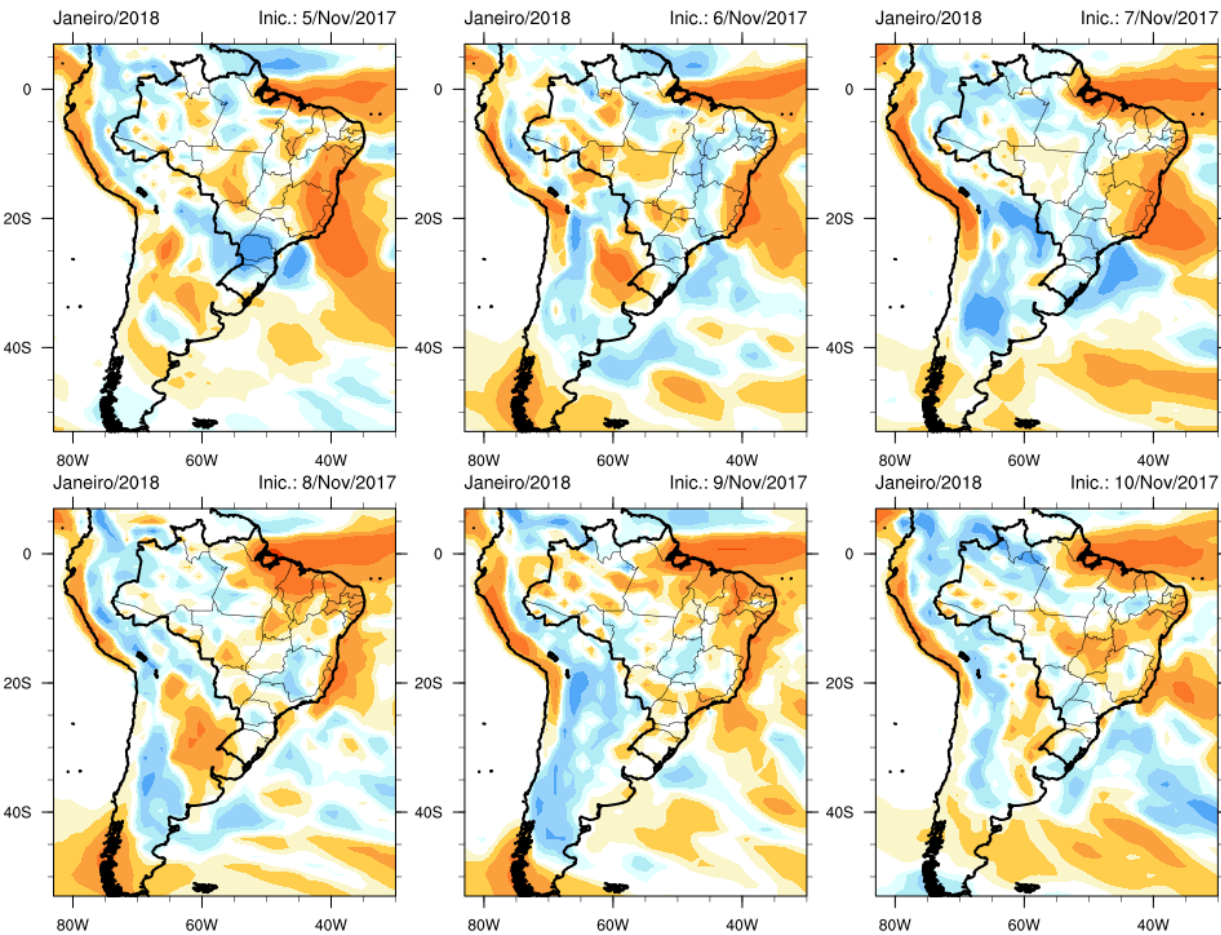




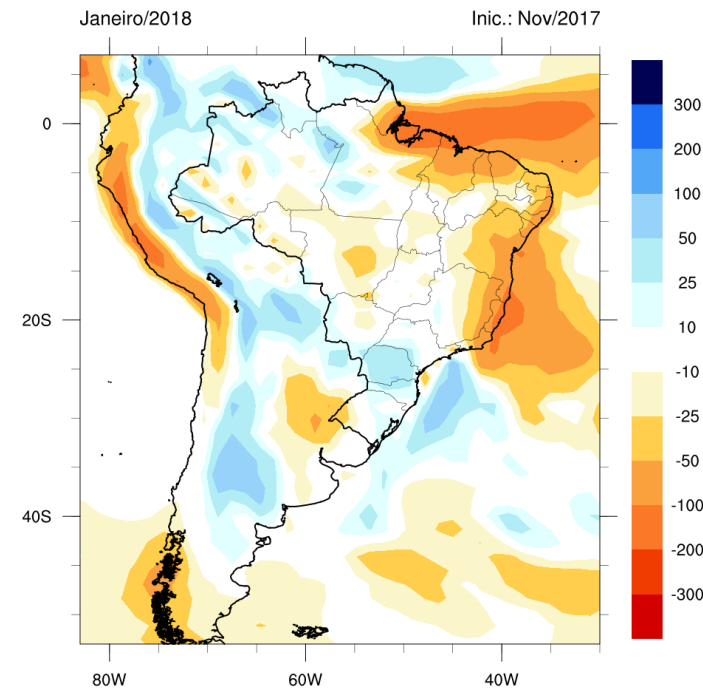
Previsões para Janeiro

Previsão de Precipitação (Anomalias) – Janeiro/2018

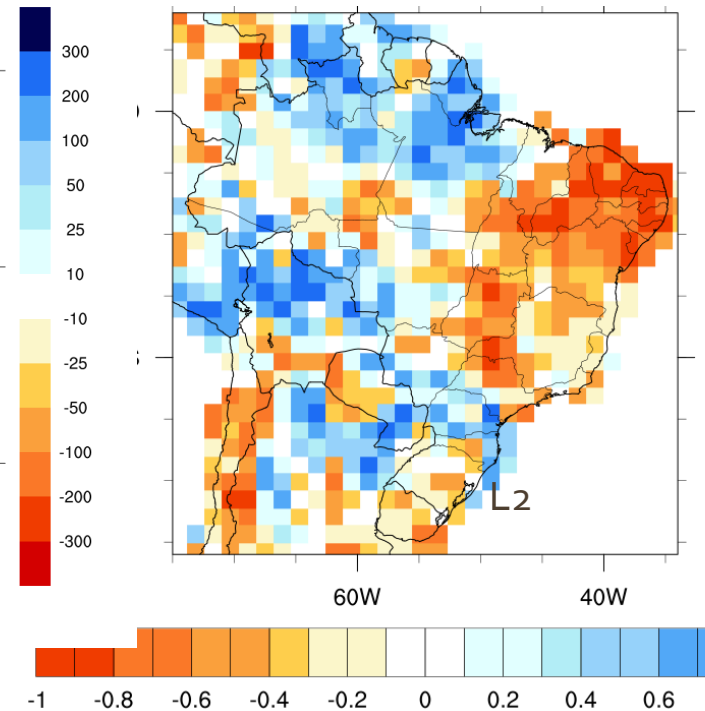
LAMMOC - Anomalia de Precipitação (mm)



LAMMOC - Anomalia de Precipitação (mm)



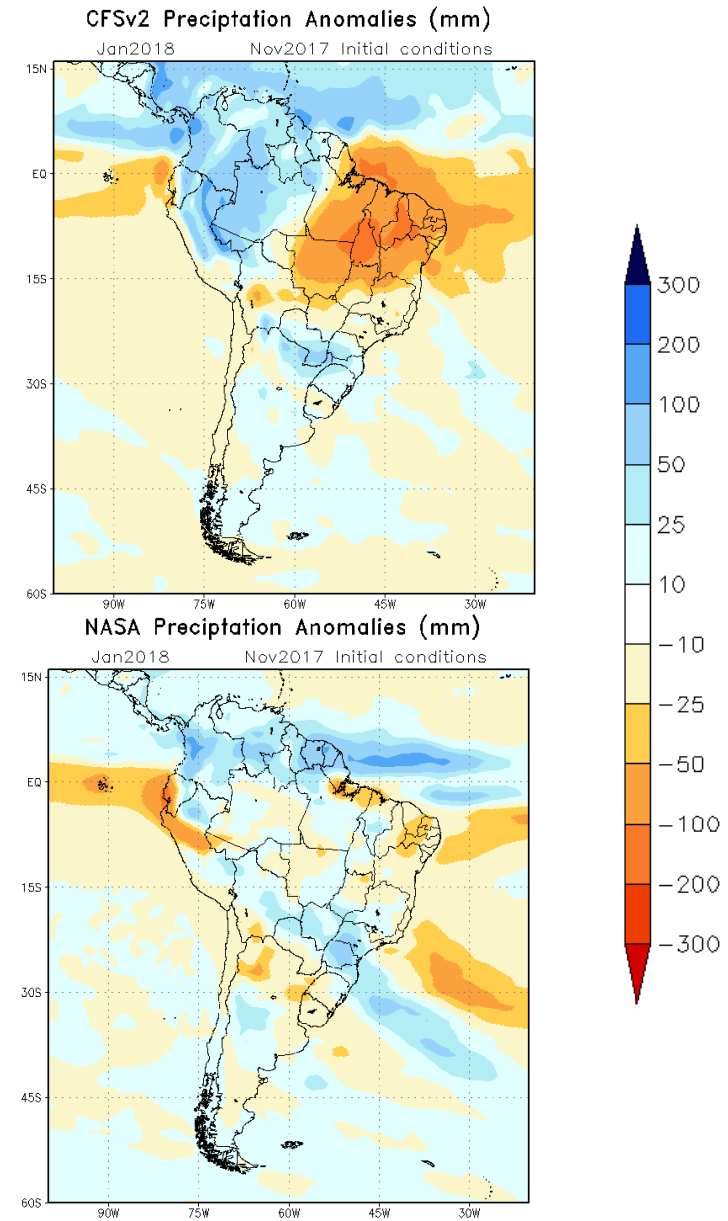
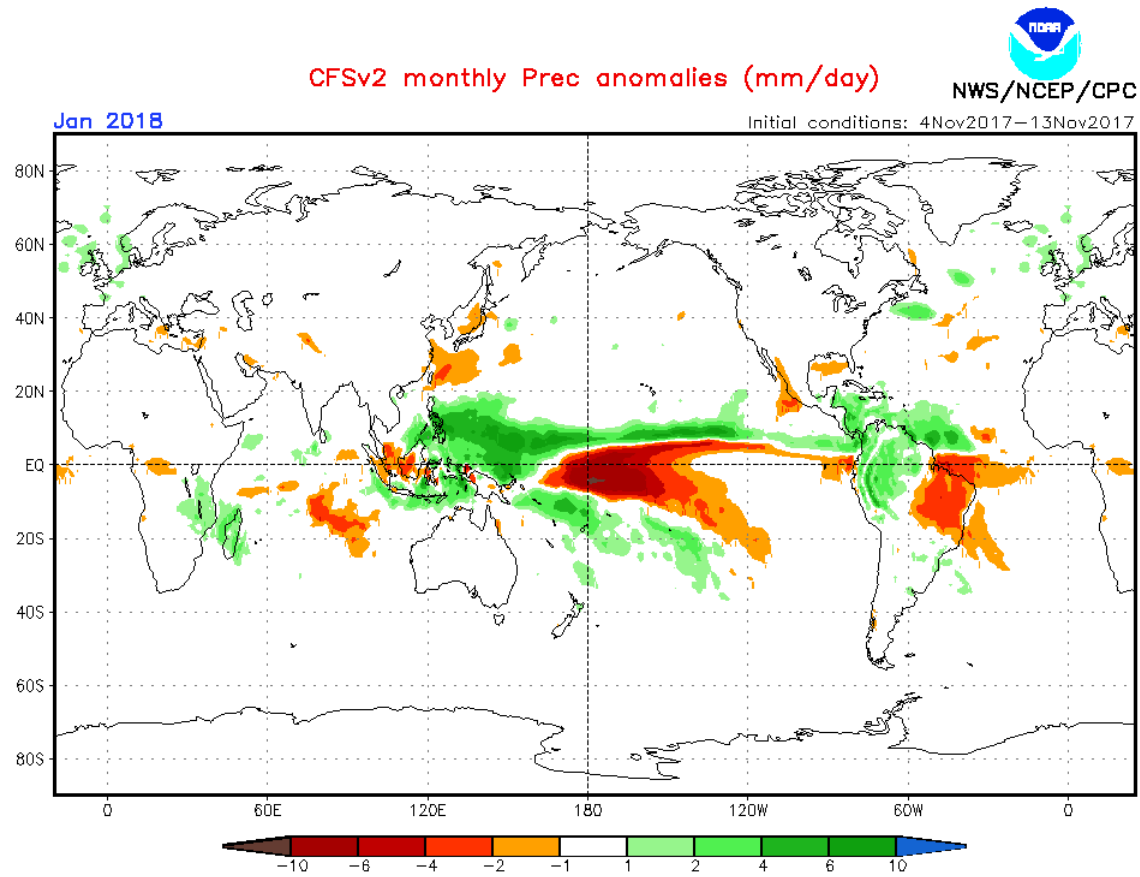
SKILL para janeiro L2





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Laboratório de Monitoramento e Modelagem de Sistemas Climáticos - LAMMOC

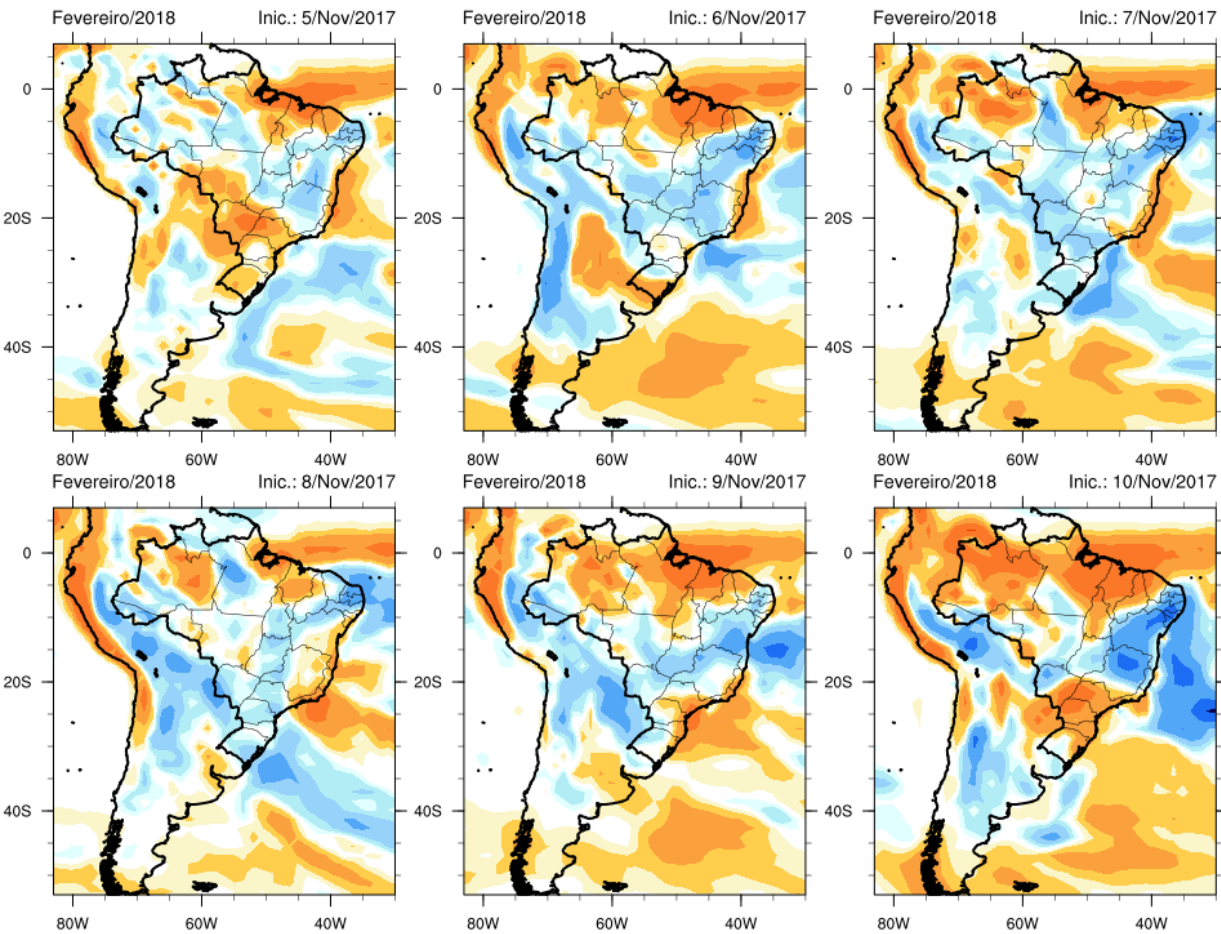




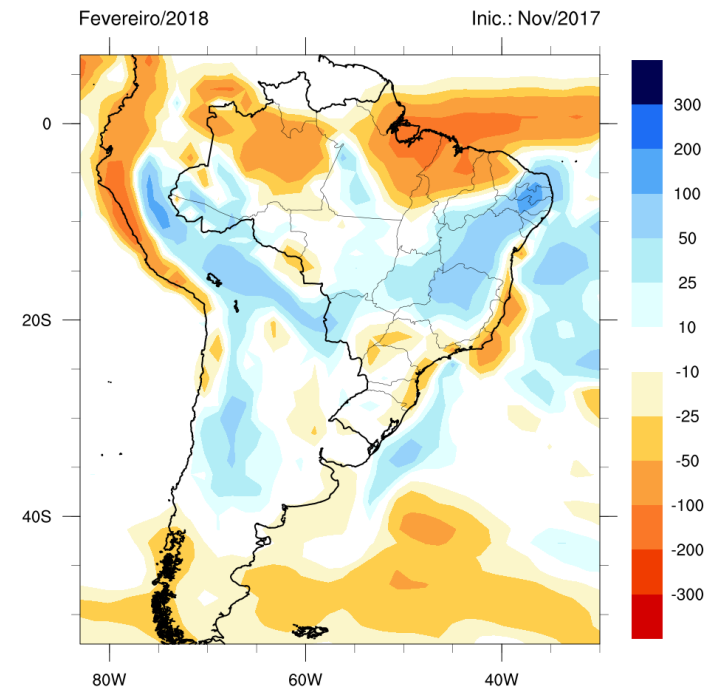
Previsões para Fevereiro

Previsão de Precipitação (Anomalias) – Fevereiro/2018

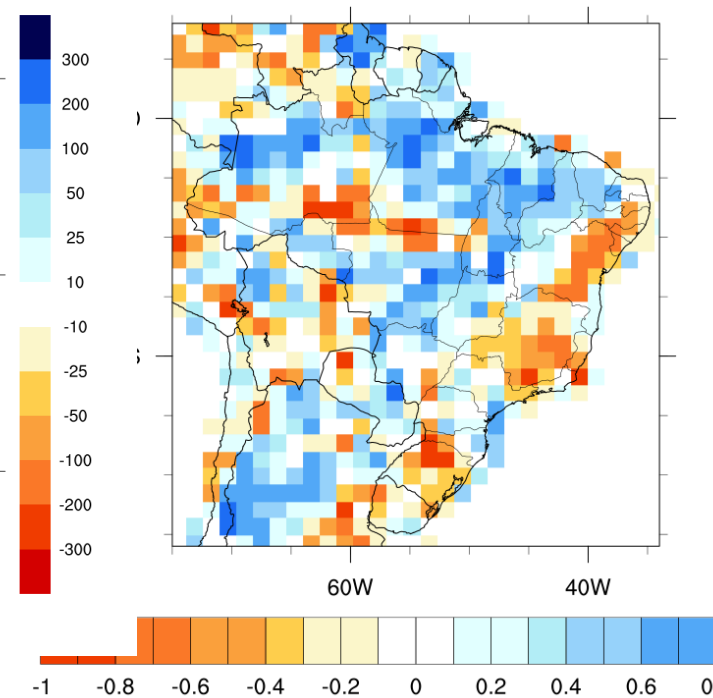
LAMMOC - Anomalia de Precipitação (mm)



LAMMOC - Anomalia de Precipitação (mm)



SKILL para fevereiro L3





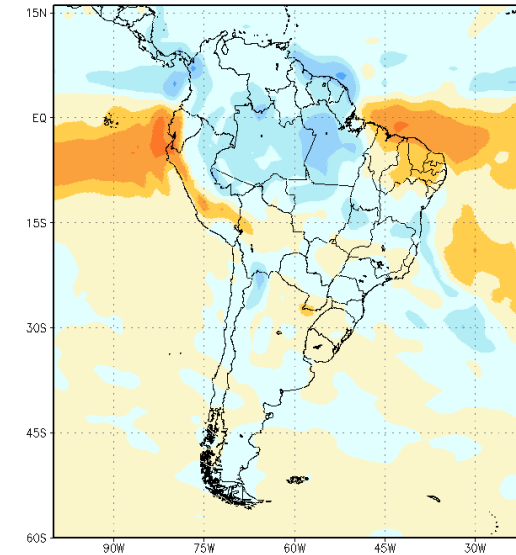
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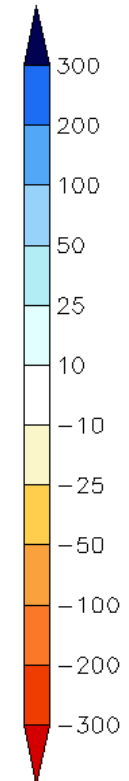
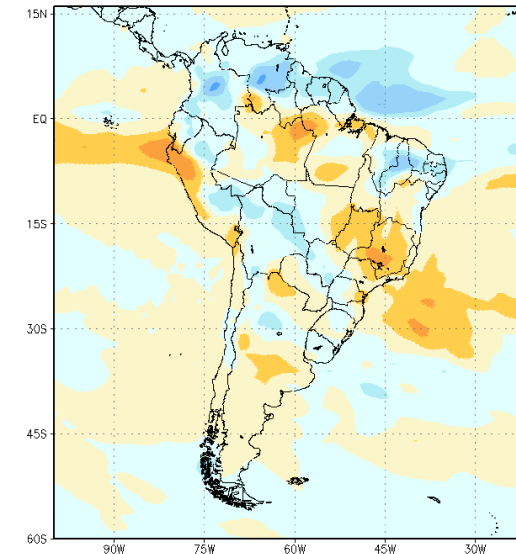
CFSv2 Precipitation Anomalies (mm)

Fev2018 Nov2017 Initial conditions



NASA Precipitation Anomalies (mm)

Fev2018 Nov2017 Initial conditions

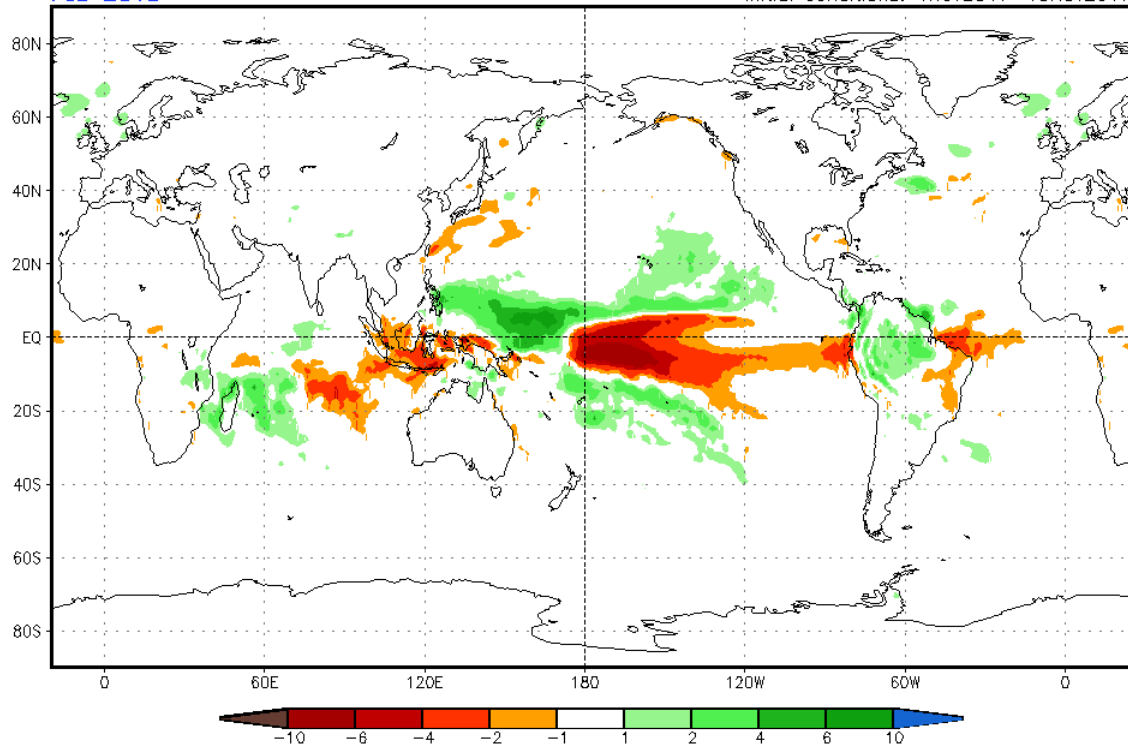


CFSv2 monthly Prec anomalies (mm/day)

NWS/NCEP/CPC

Initial conditions: 4Nov2017-13Nov2017

Feb 2018

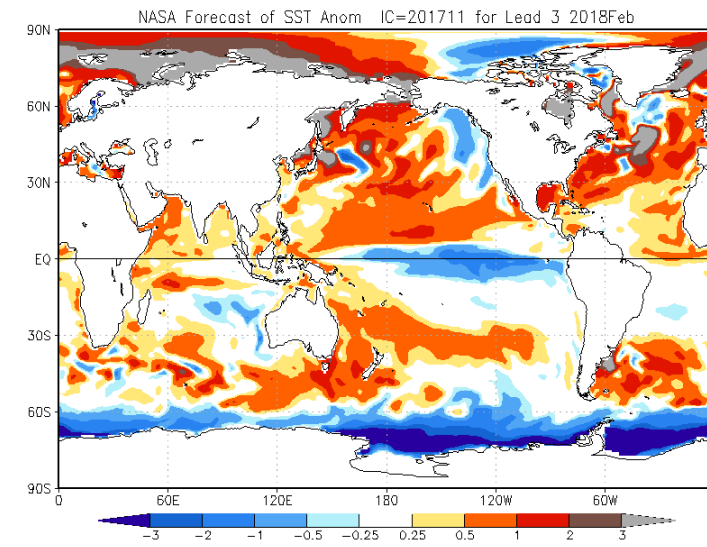
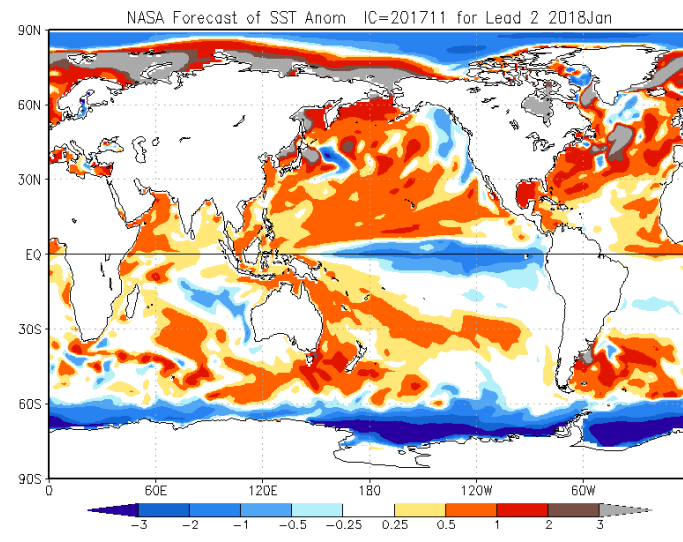
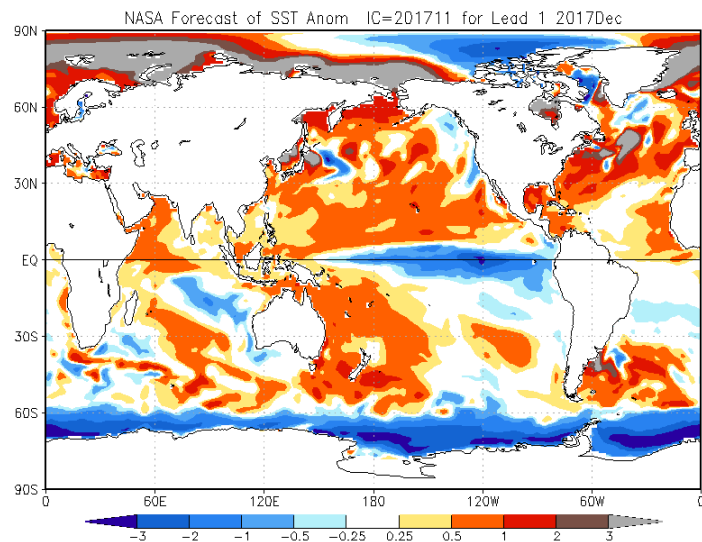
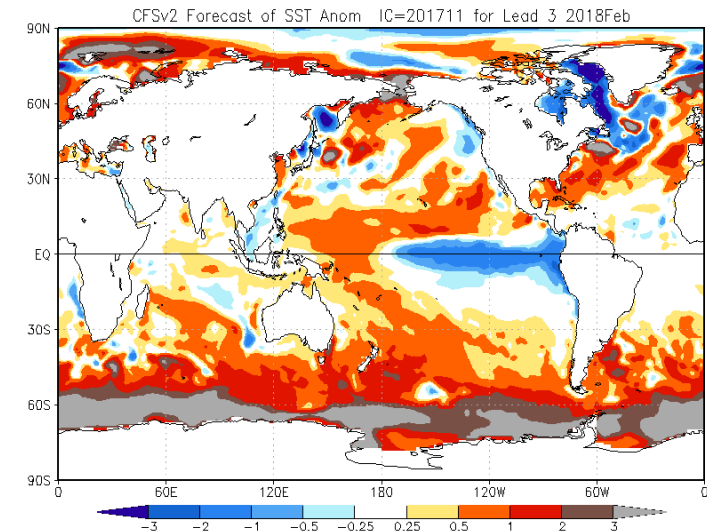
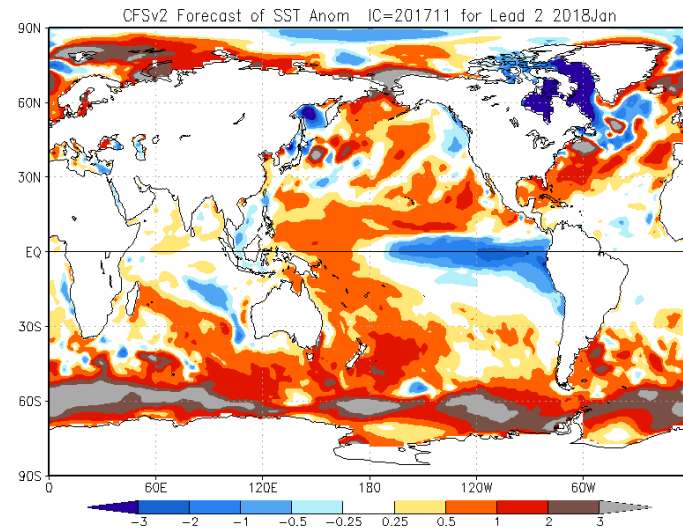
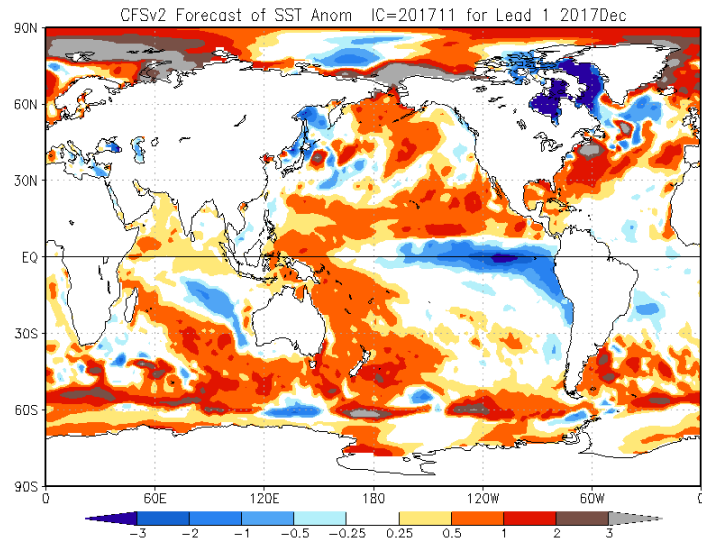




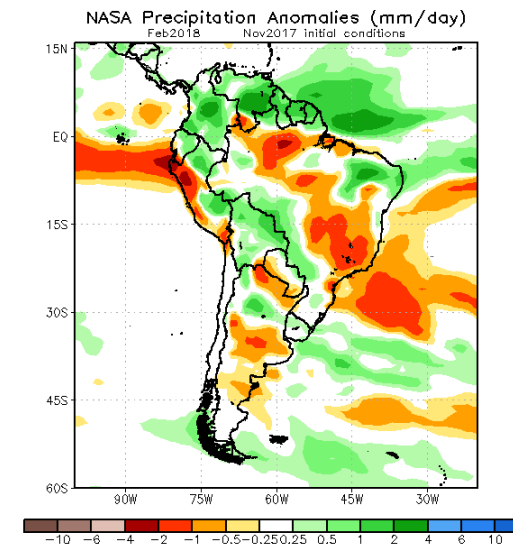
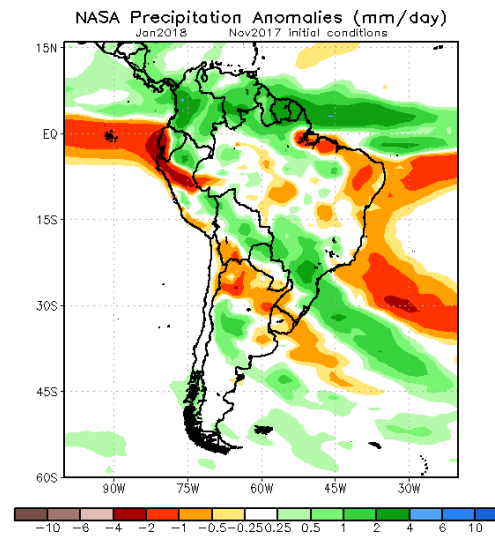
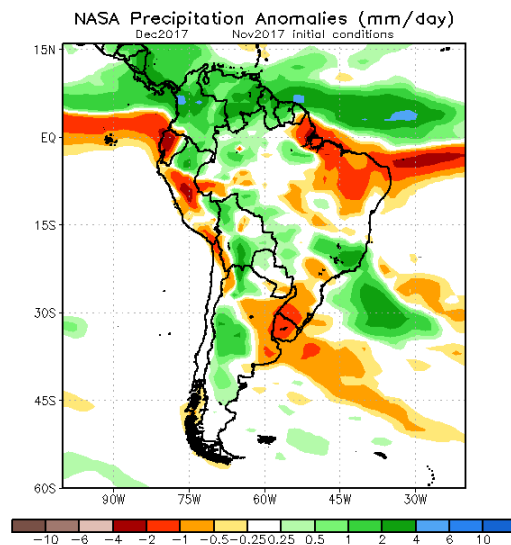
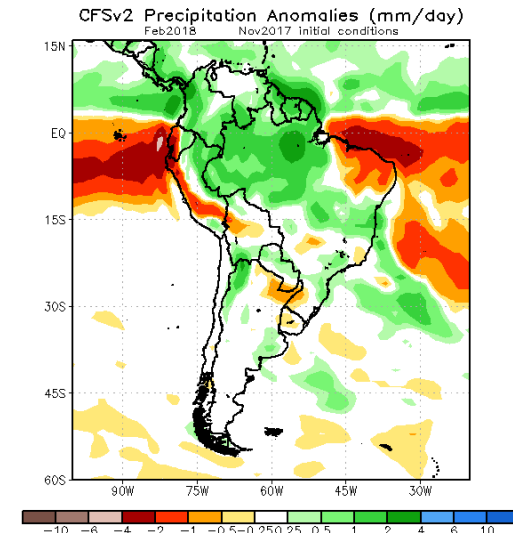
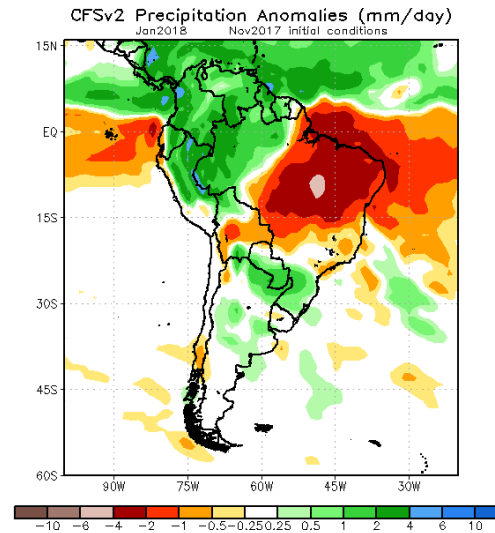
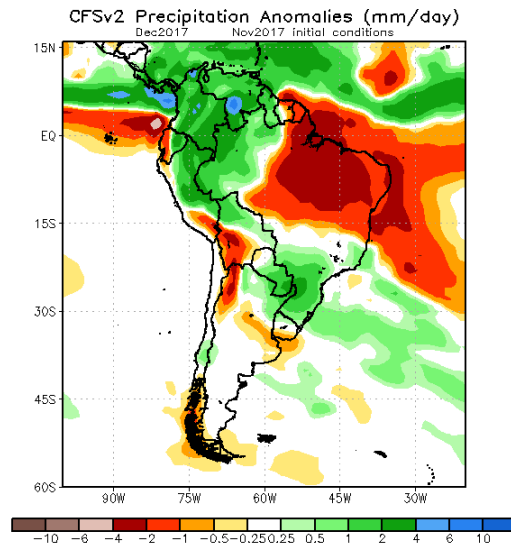
Ensembles



Previsões de Anomalia de TSM do CFSv2 e NASA - GLOBAL



Previsões de Anomalia de TSM do CFSv2 e NASA – América do Sul



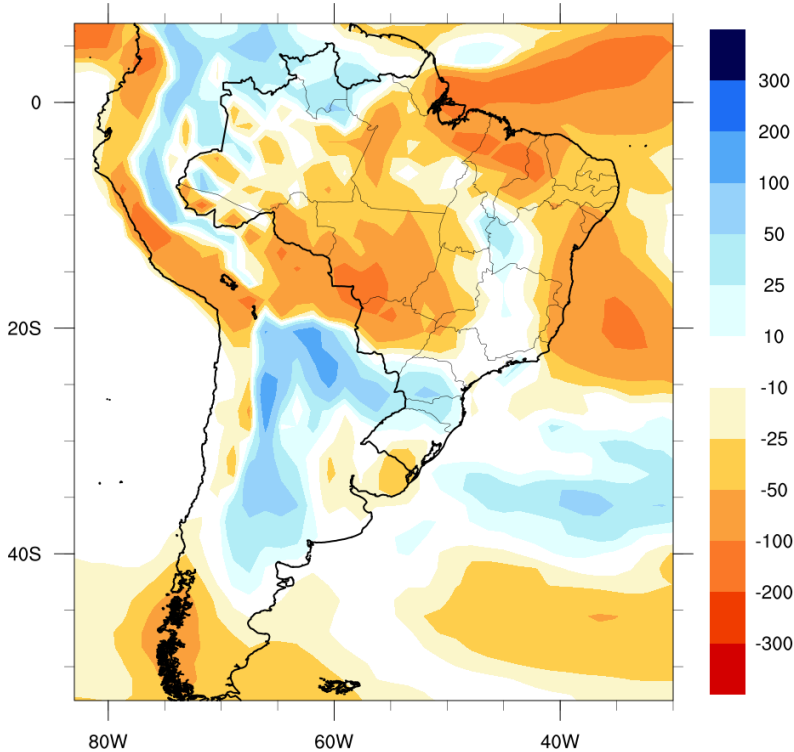
Ensembles

Anomalias de Precipitação

LAMMOC - Anomalia de Precipitação (mm)

Dezembro/2017

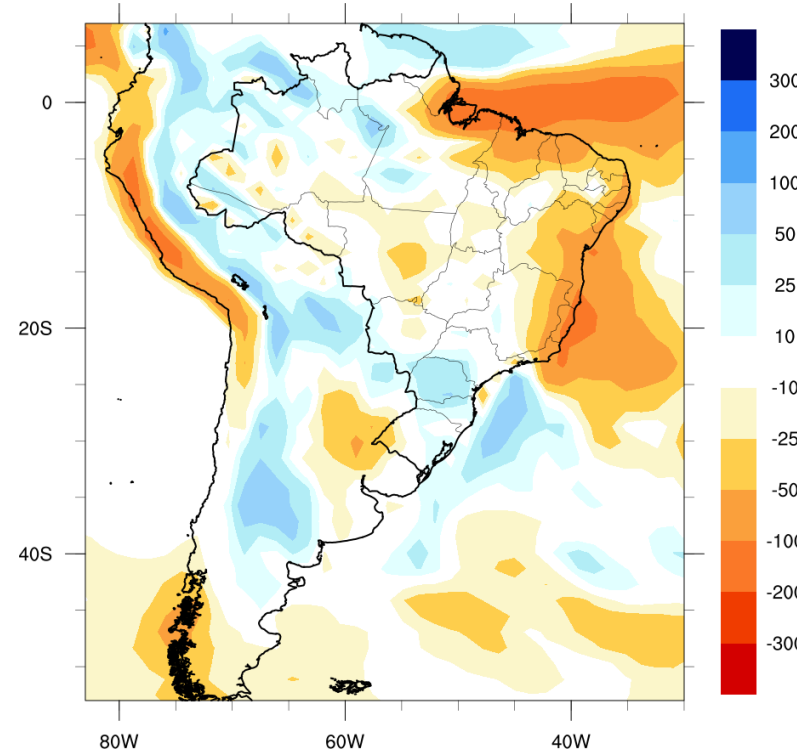
Inic.: Nov/2017



LAMMOC - Anomalia de Precipitação (mm)

Janeiro/2018

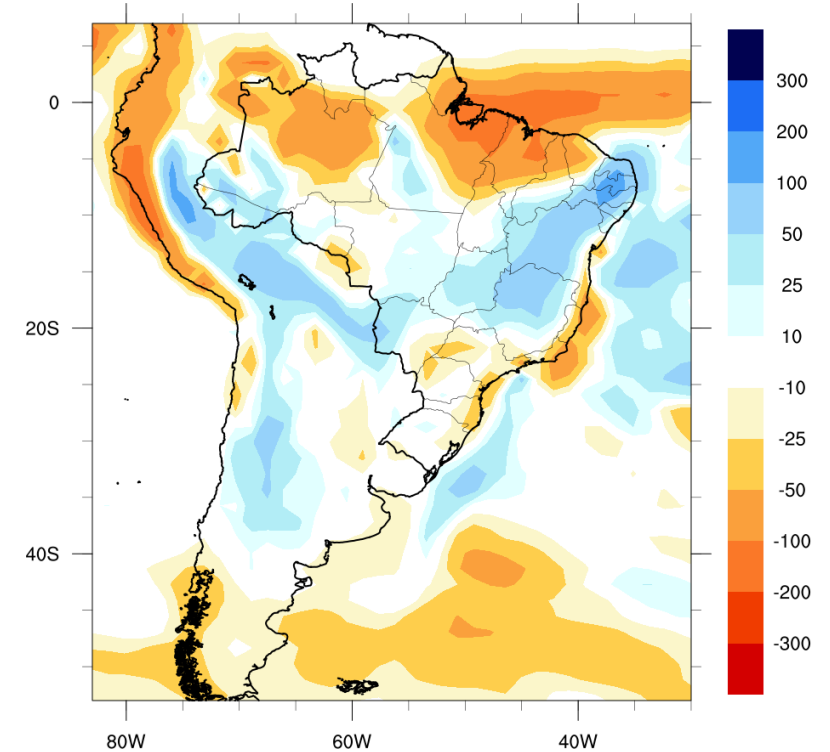
Inic.: Nov/2017



LAMMOC - Anomalia de Precipitação (mm)

Fevereiro/2018

Inic.: Nov/2017

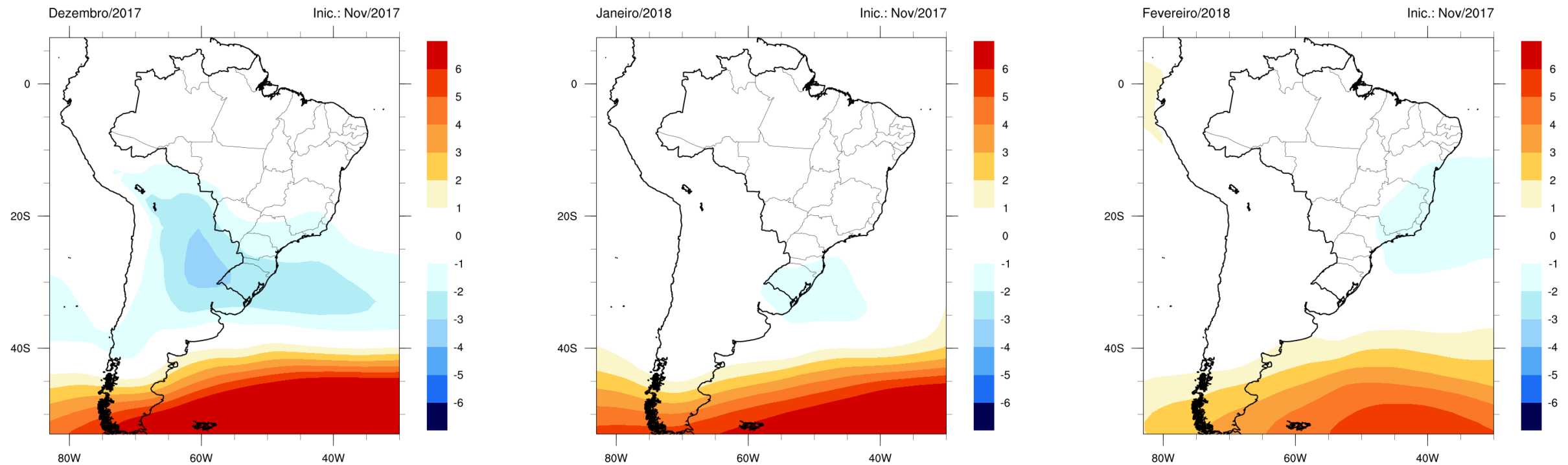




Ensembles

Anomalias de Pressão

LAMMOC- Anomalia de Pressão ao Nível do Mar (hPa) LAMMOC- Anomalia de Pressão ao Nível do Mar (hPa) LAMMOC- Anomalia de Pressão ao Nível do Mar (hPa)

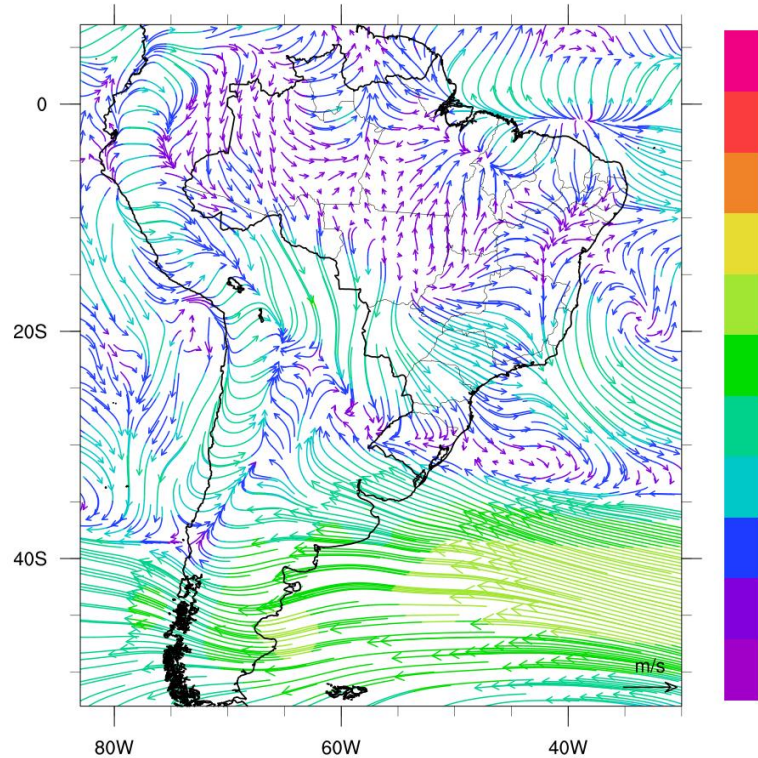


Ensembles

Anomalias de Vento em 1000 hPa

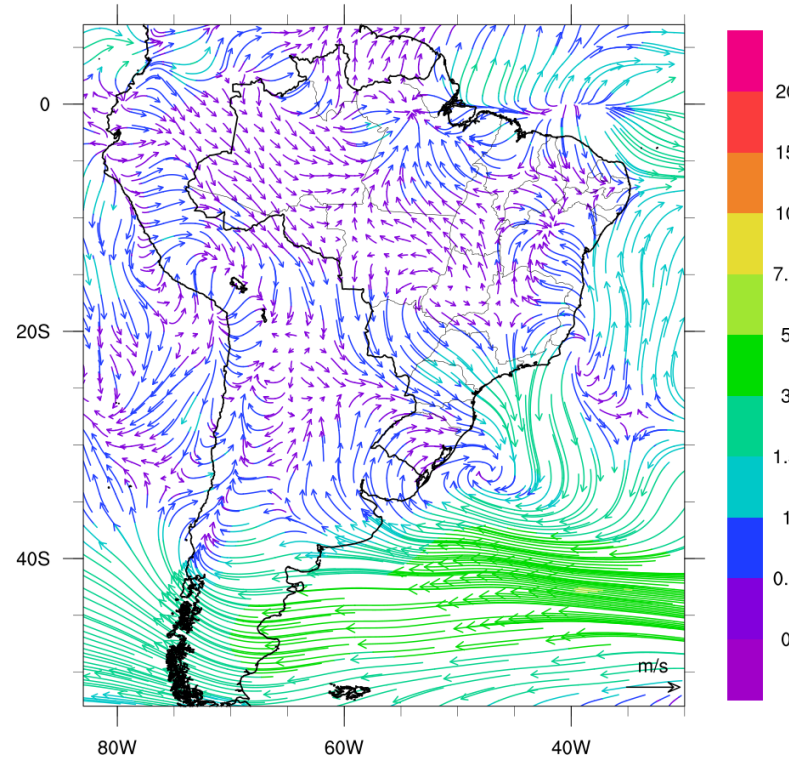
LAMMOC - Anomalia de Vento em 1000 hPa

Dezembro/2017 Inic.: Nov/2017



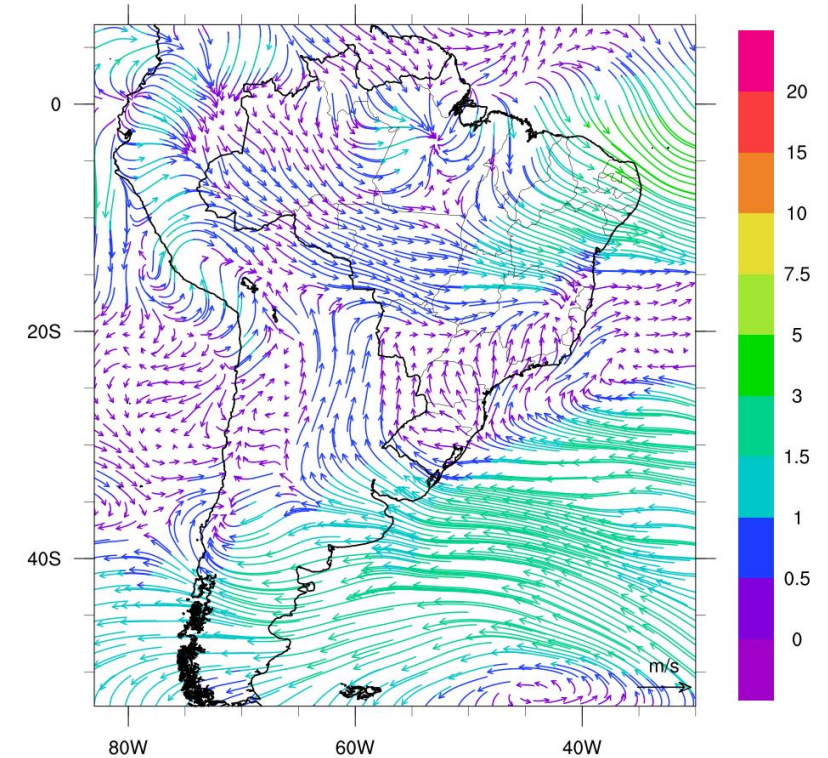
LAMMOC - Anomalia de Vento em 1000 hPa

Janeiro/2018 Inic.: Nov/2017



LAMMOC - Anomalia de Vento em 1000 hPa

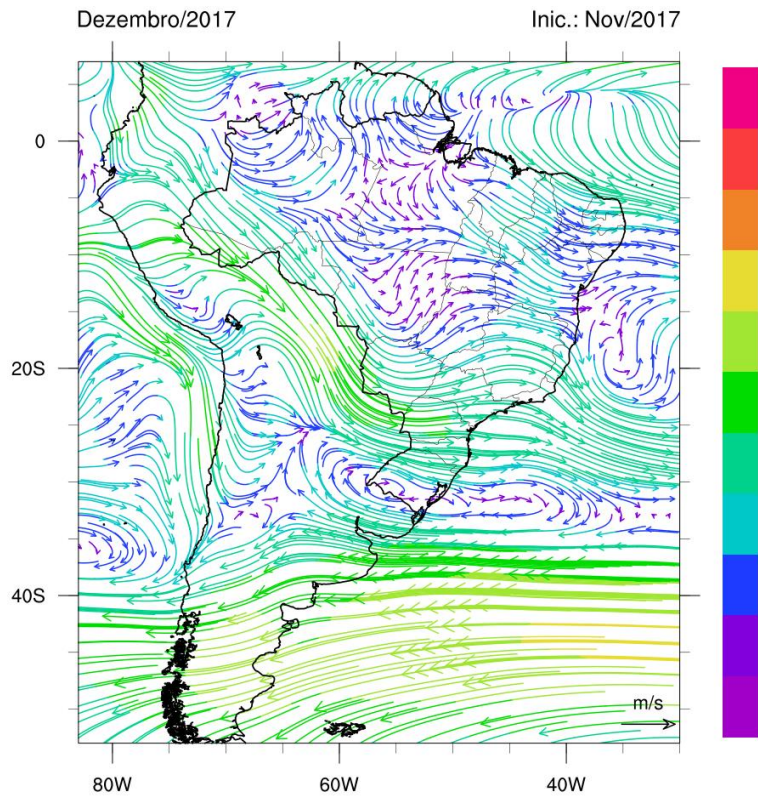
Fevereiro/2018 Inic.: Nov/2017



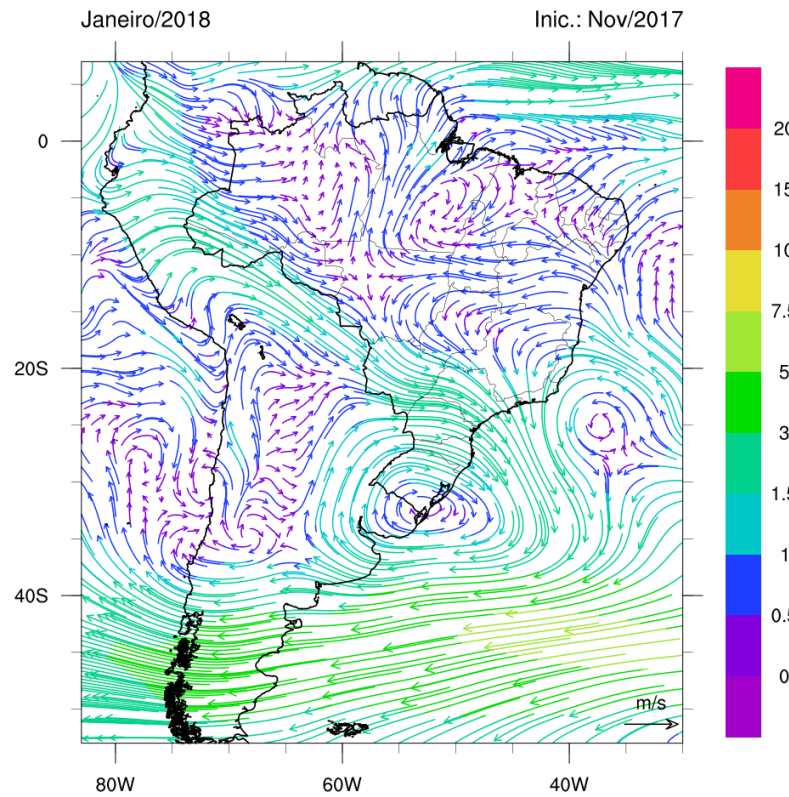
Ensembles

Anomalias de Vento em 850 hPa

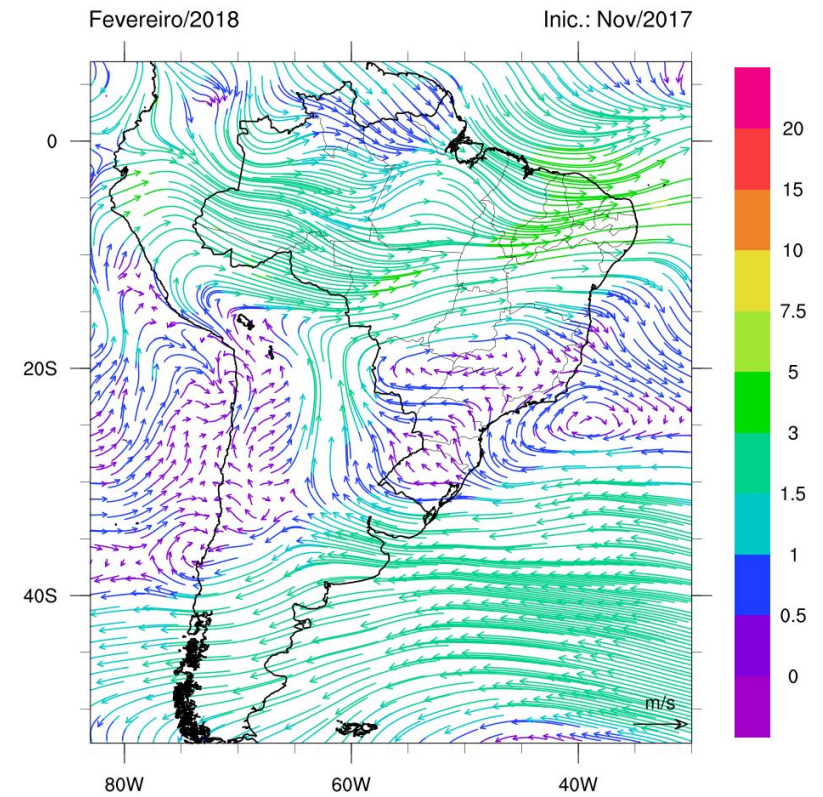
LAMMOC - Anomalia de Vento em 850 hPa



LAMMOC - Anomalia de Vento em 850 hPa



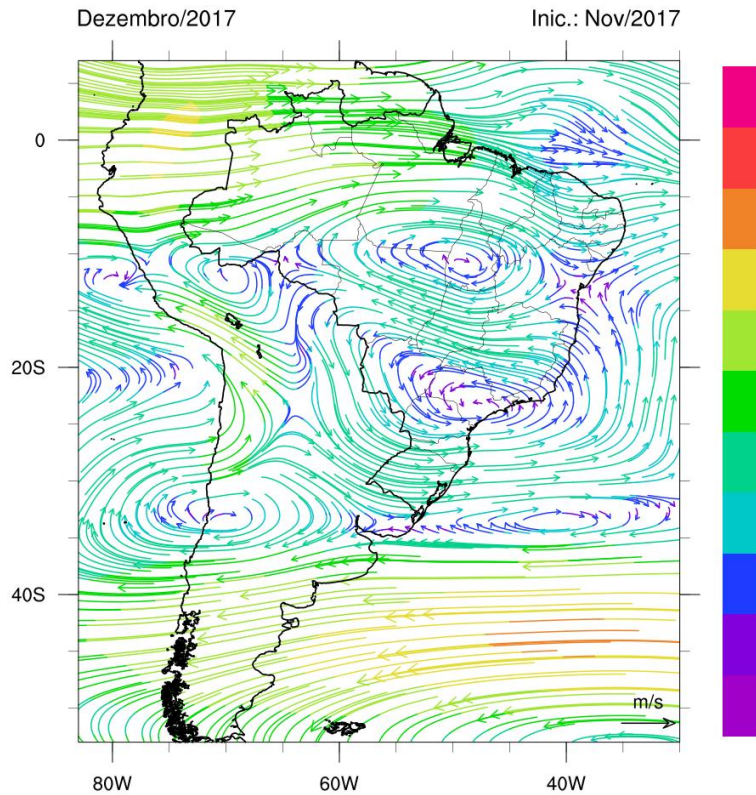
LAMMOC - Anomalia de Vento em 850 hPa



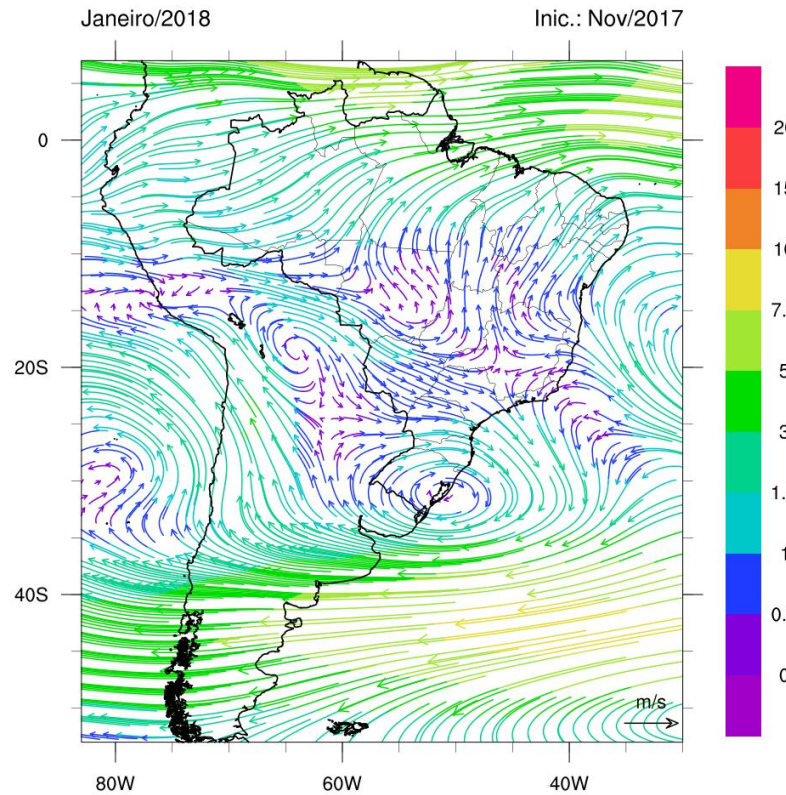
Ensembles

Anomalias de Vento em 500 hPa

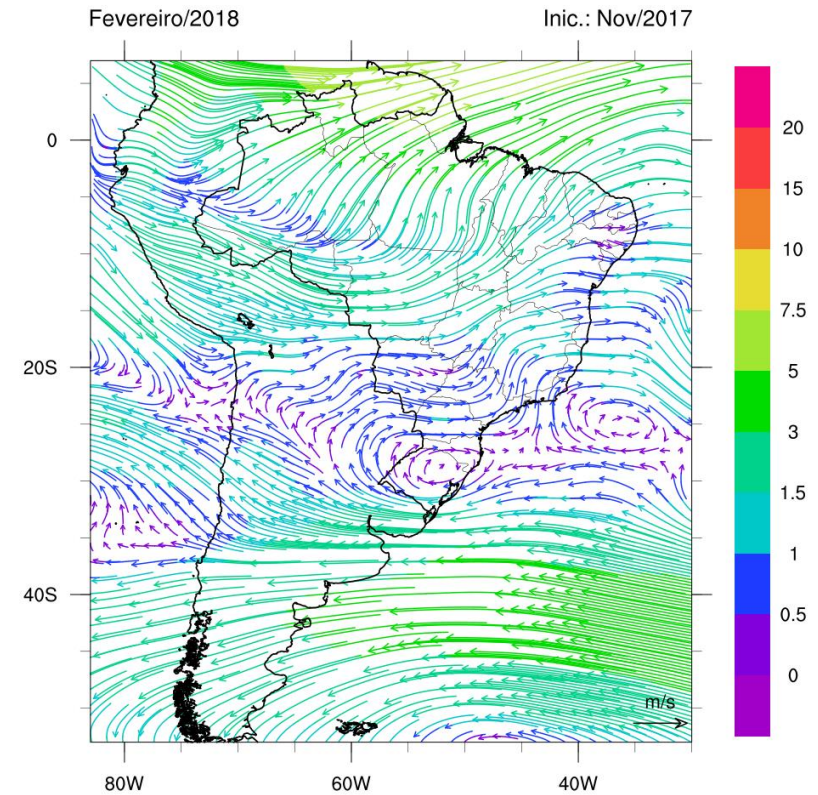
LAMMOC - Anomalia de Vento em 500 hPa



LAMMOC - Anomalia de Vento em 500 hPa



LAMMOC - Anomalia de Vento em 500 hPa





Metodologia de previsão para a configuração de ZCAS (índice ZCAS)

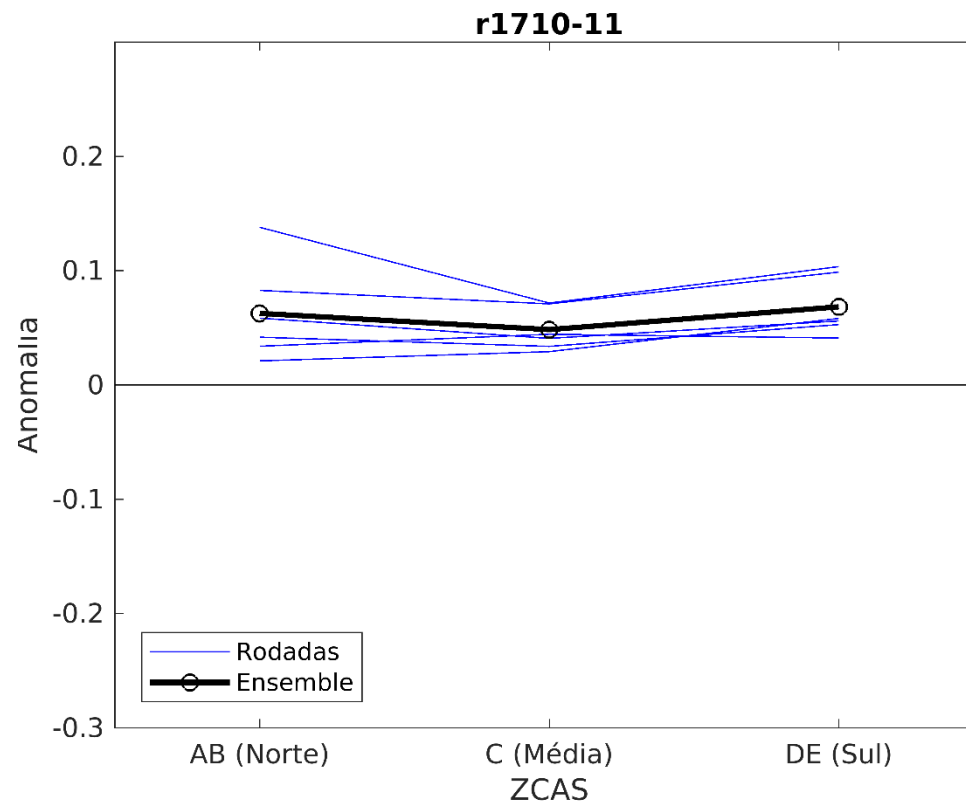
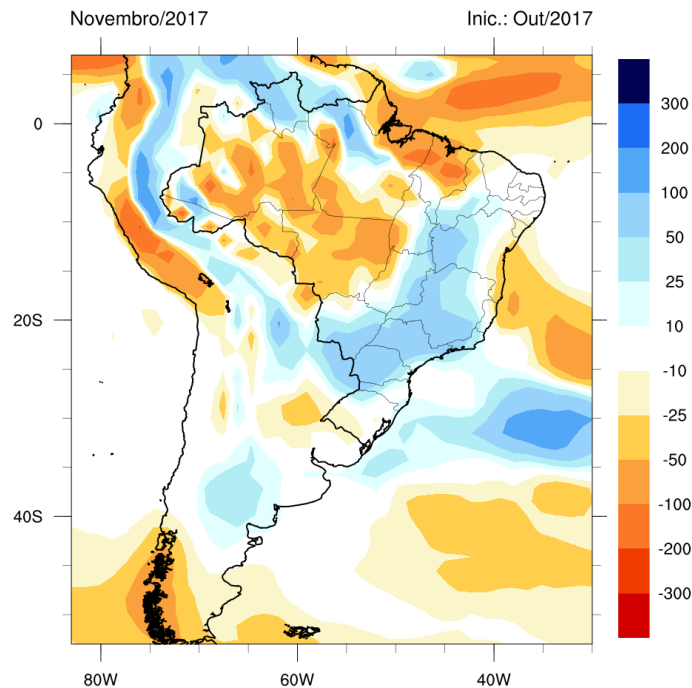


Previsão Sazonal do Índice ZCAS (Anomalias) CAM 3.1

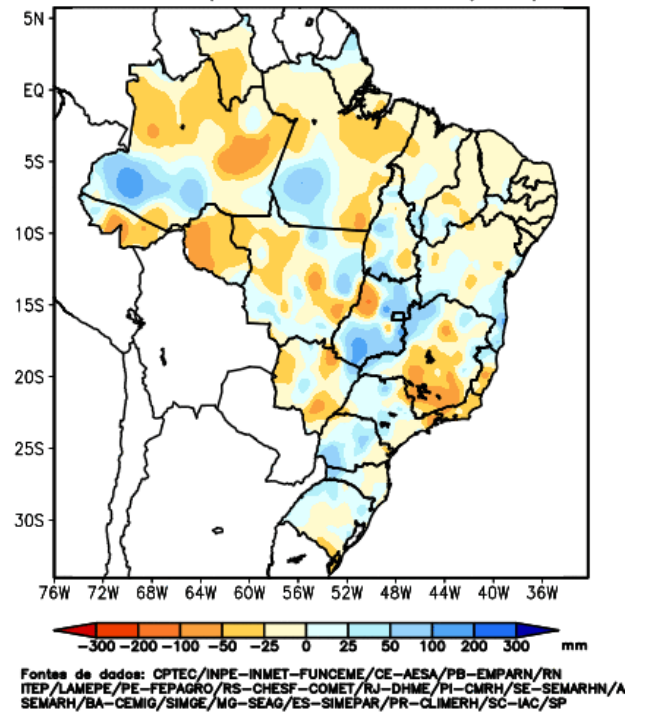
Previsões para Novembro 2017 Lead 1 (Chuva e ZCAS)

Anomalias Observadas (até 13/11)

LAMMOC - Anomalia de Precipitação (mm)



Anomalia Precipitacao Acum. ate 13/NOV/2017

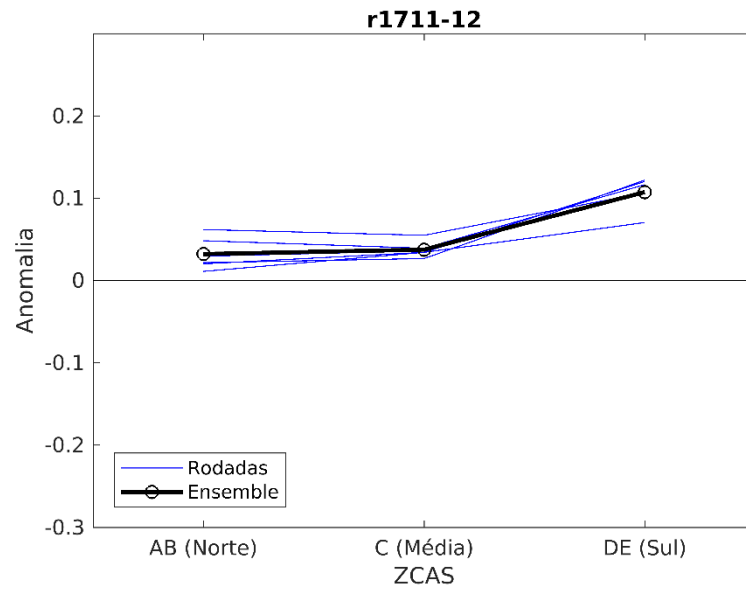




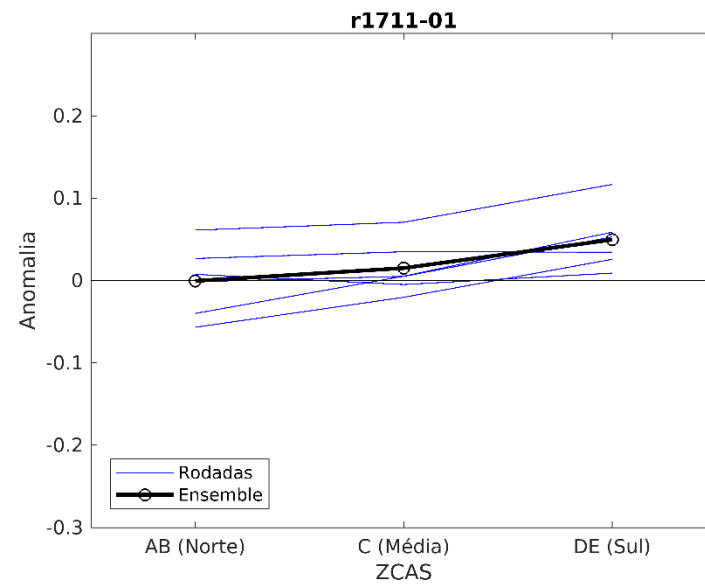
Previsão Sazonal do Índice ZCAS (Anomalias) CAM 3.1



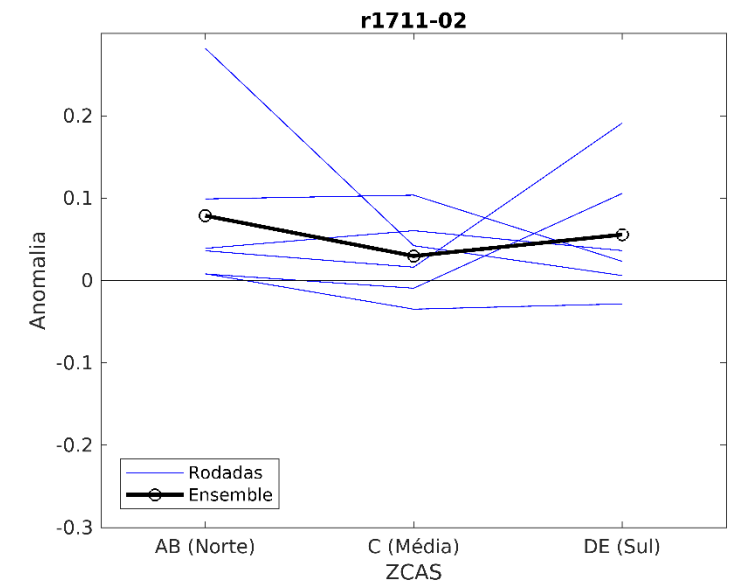
Dezembro 2017



Janeiro 2017



Fevereiro 2018





Modelagem do Sistema Terrestre, MPAS e avanços do LAMMOC para o próximo ano

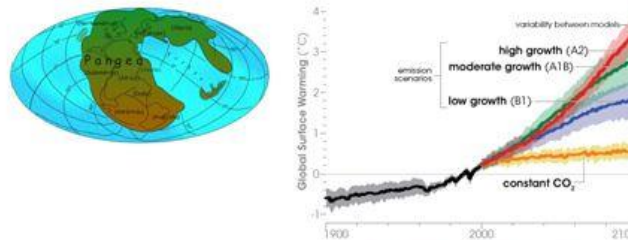


Modelos Implementados na UFF:

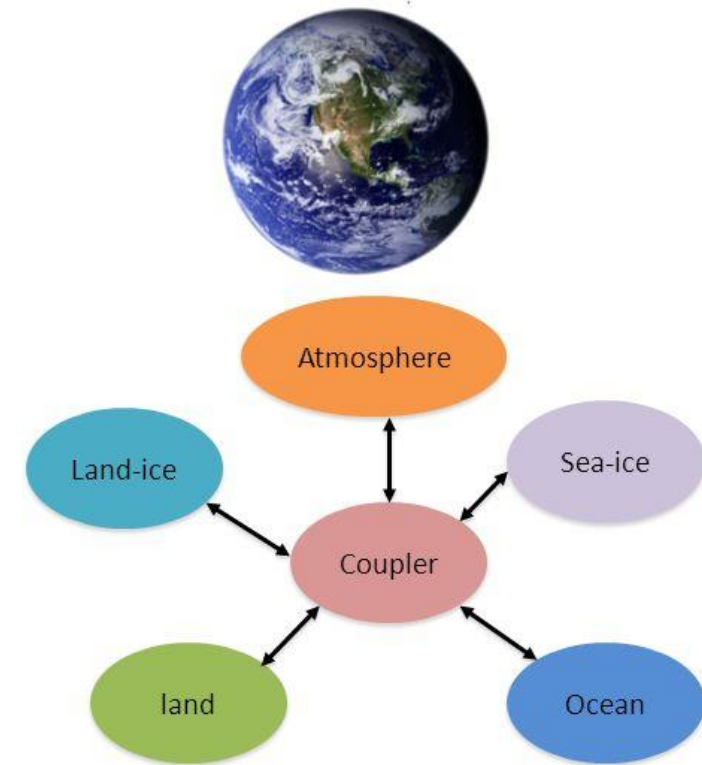
- Community Atmosphere Model (CAM) 3.1
- Weather Research & Forecast Model (WRF)
- Modular Model
- CESM – Modelo de Simulação do Sistema Terrestre (CAM 5.2)

Community Earth System Model (CESM)

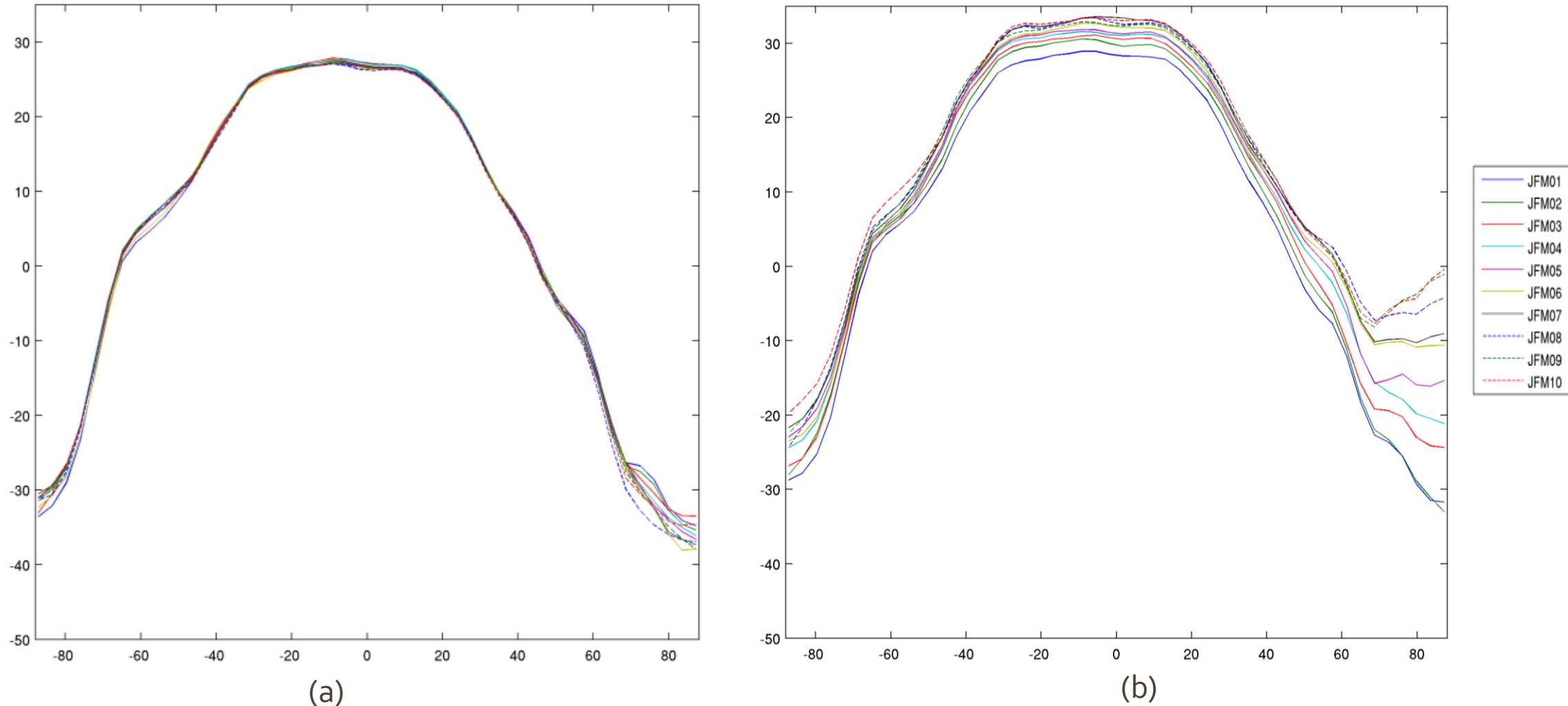
- CESM is a coupled climate model for simulating **Earth's climate system**.
- Composed of **5 separate models** plus one **central coupler**
- Allows research into the Earth's **past, present, and future** climate.



Community Earth System Model Tutorial

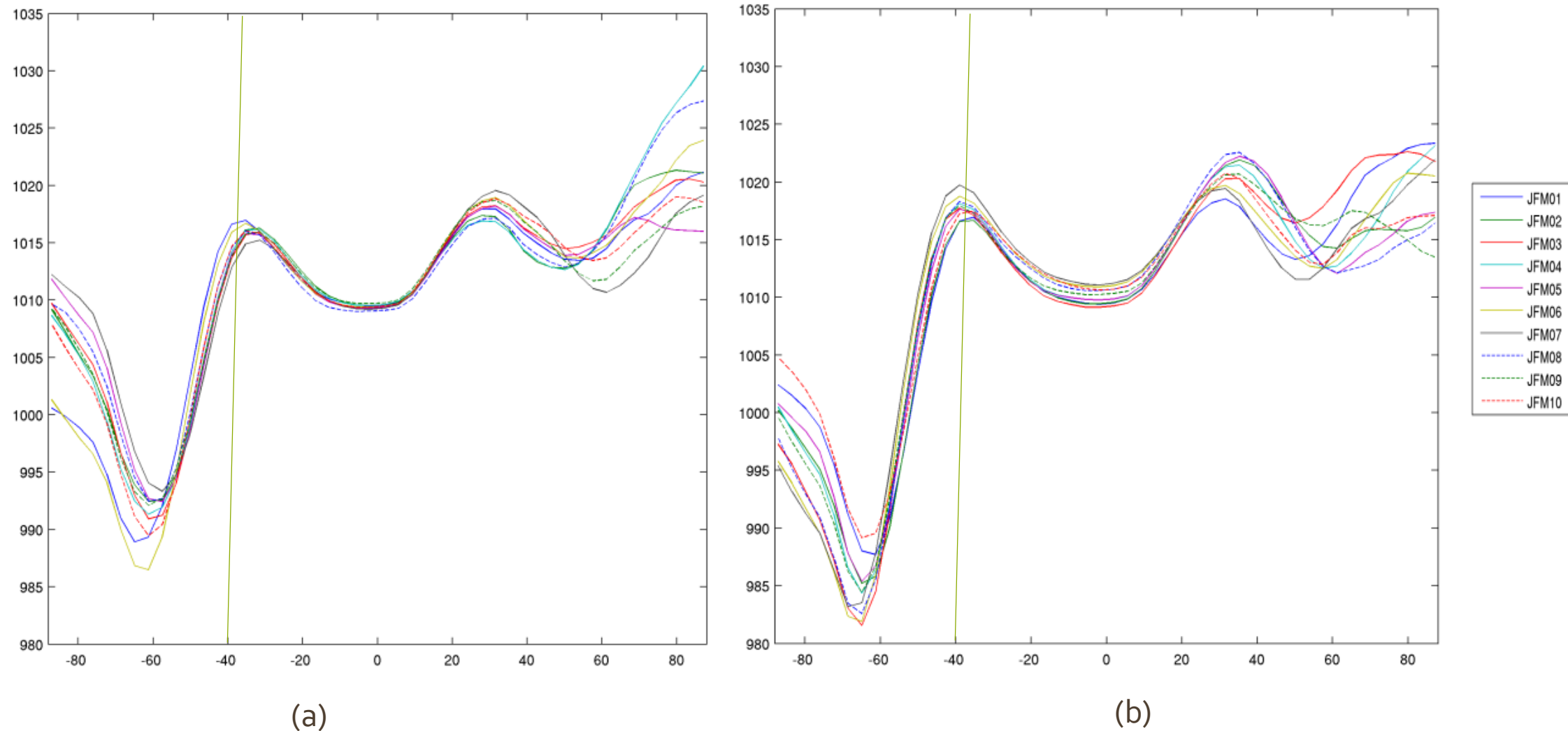


Resultados do CESM 1.2



Distribuição zonal média da temperatura do ar na superfície, em $^{\circ}\text{C}$, para os meses de JFM para os 10 anos de simulação com o CESM padrão (CSP) em (a) e com a constante solar alterada (CS10) em (b).

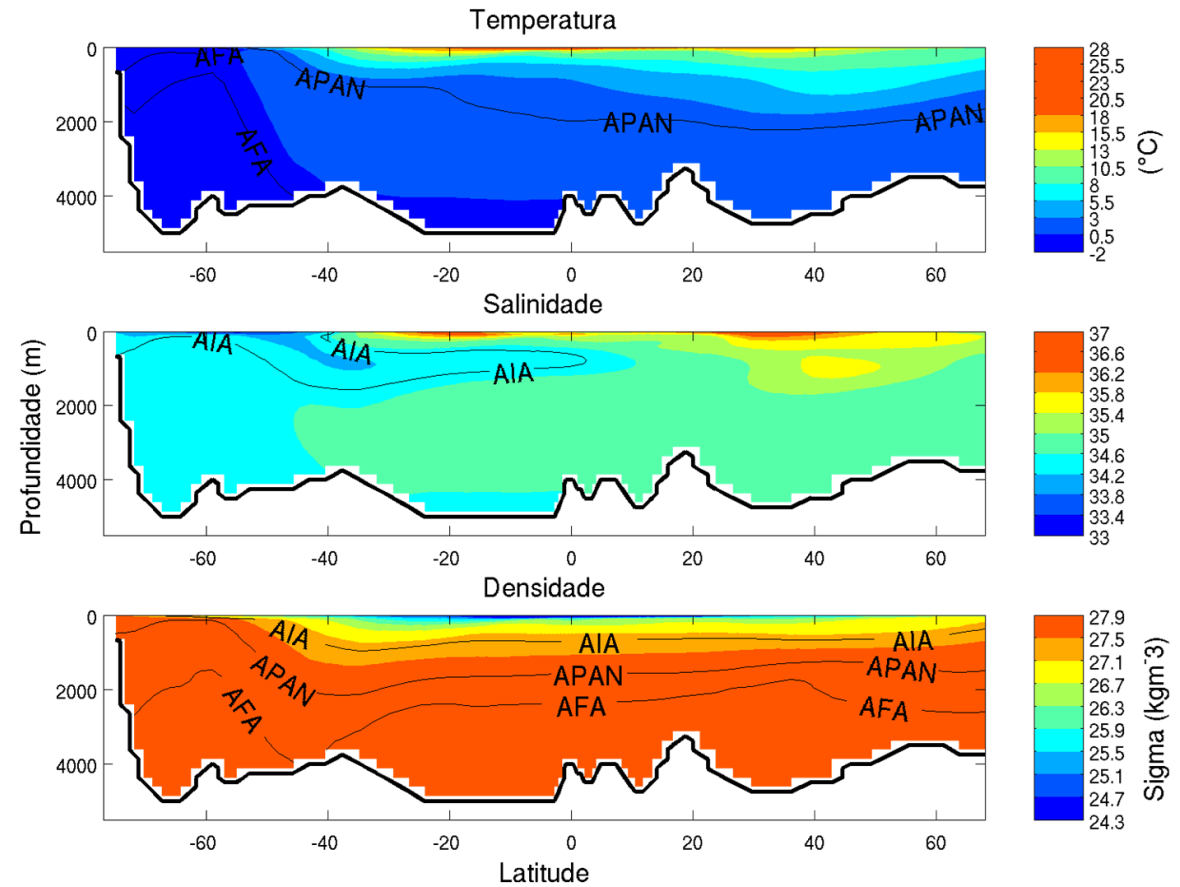
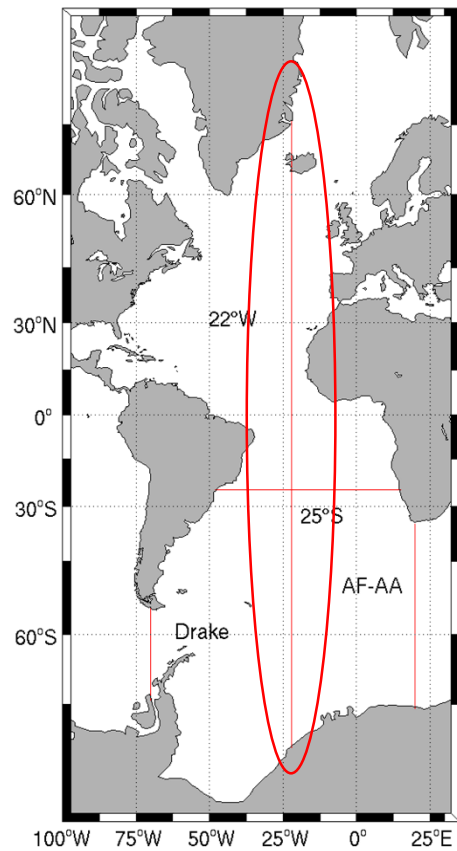
Resultados do CESM 1,2



Distribuição zonal média da pressão atmosférica reduzida ao nível do mar, em hPa, para os meses de JFM para os 10 anos de simulação com o CESM padrão (CSP) em (a) e com a constante solar alterada (CS10) em (b).

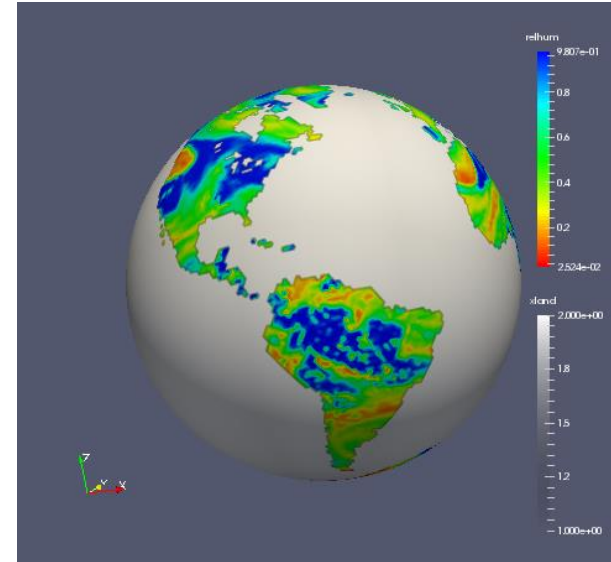
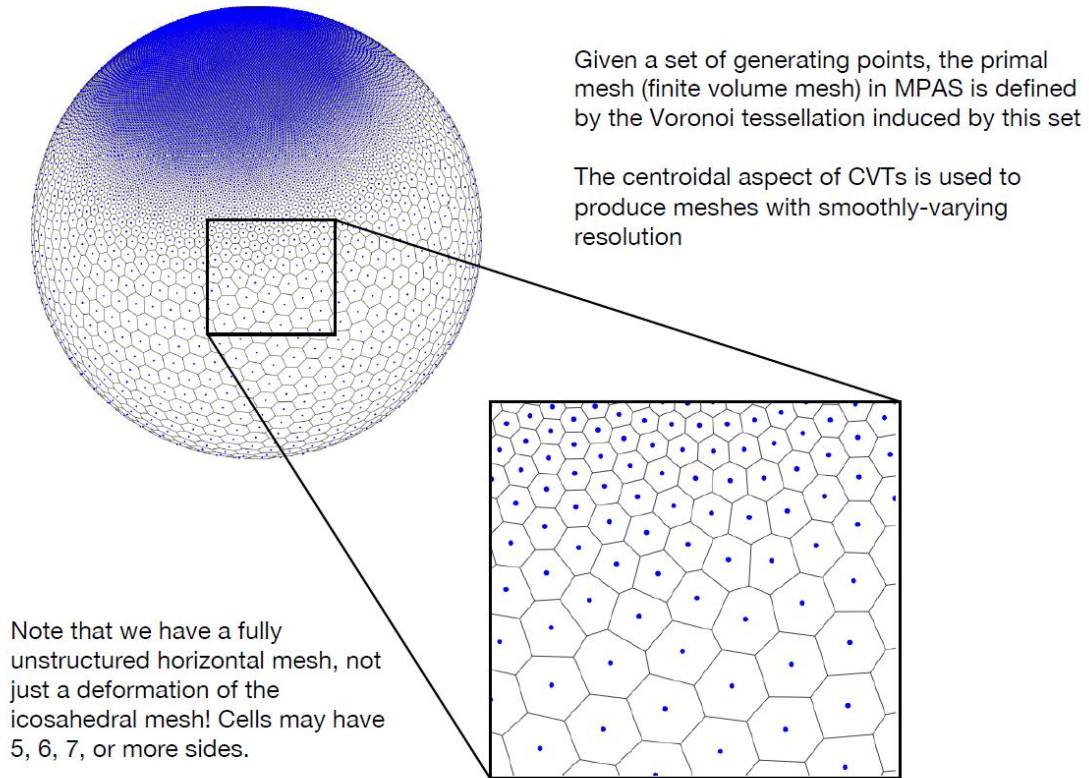
Resultados do CESM 1,2

Localização das Seções Avaliadas

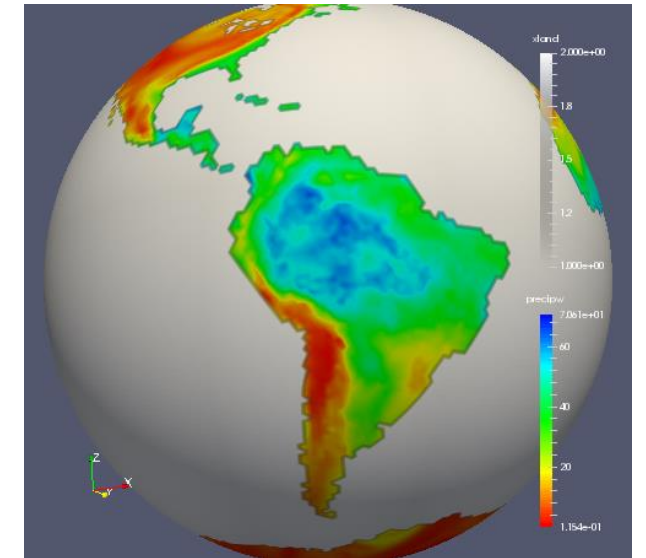


Clima Oceânico do CESM (resultados do POP)

Resultados do NCAR/MPAS



(a)



(b)

Simulação teste MPAS: (a) umidade relativa em 1000 hPa e (b) Água Precipitável



Obrigado

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mcataldi@id.uff.br

