



Avaliação preliminar do caso de chuvas intensas no RS



Grupo de Avaliação de Modelos da DIMNT

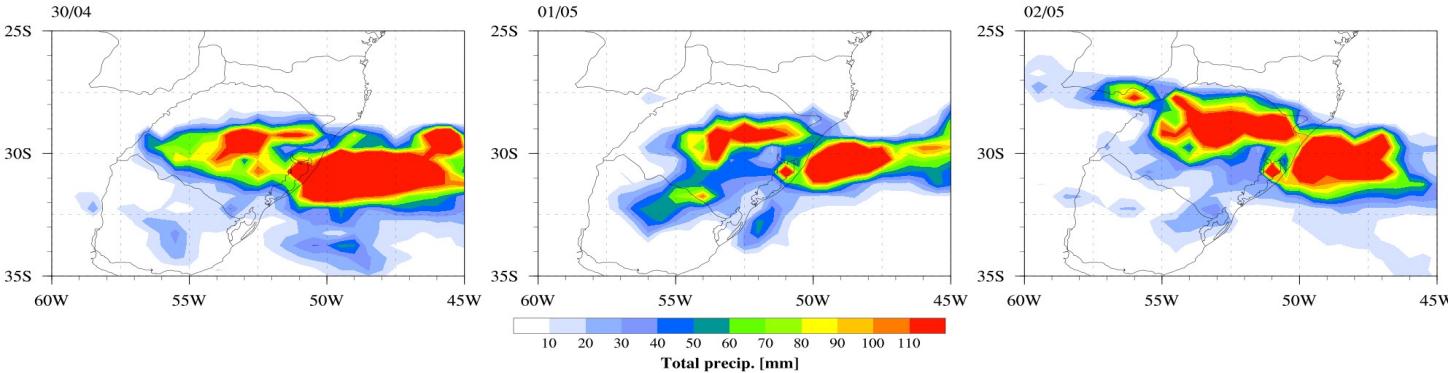
Ariane Frassoni, Julio P. Fernandez, Marcelo Barbio Rosa, Regiane Moura,
D. Arsego, C. Bastarz, J. G. Mattos, J. R. Rozante

22 de outubro de 2024

Total precipitation (24h) – combined satellite precipitation estimates and rain gauges MERGE/CPTEC

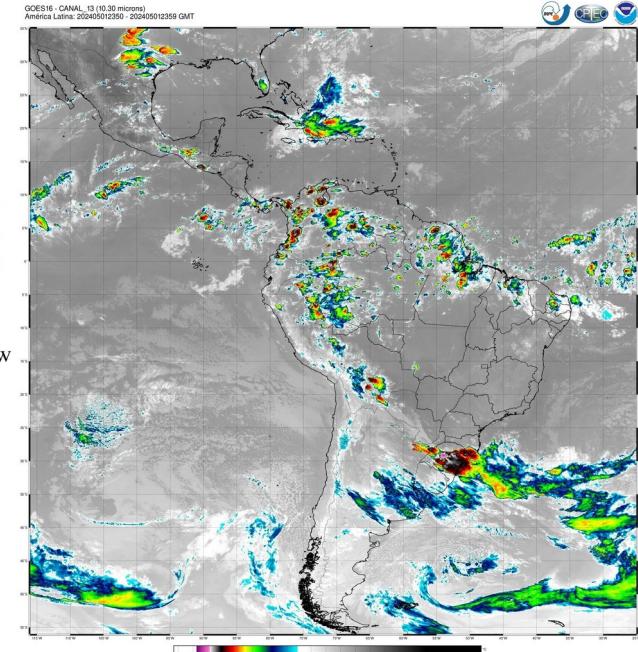
GOES16 Satellite

20240501 23:59



Most critical period of rain in Rio Grande do Sul - April 30 and May 02

Highest accumulations were concentrated in the central-northern and northeastern regions of the state, with values between 240mm and 480mm, according to MERGE datasets – combined weather stations and satellite estimates



Precipitation forecasts – INPE/CPTEC regional models (5km h. resolution)



27/04

28/04

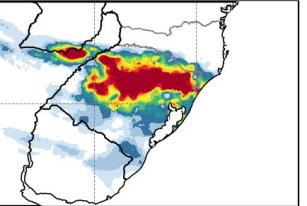
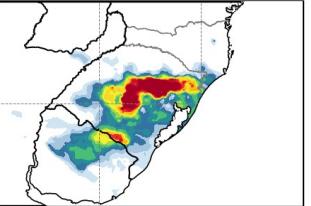
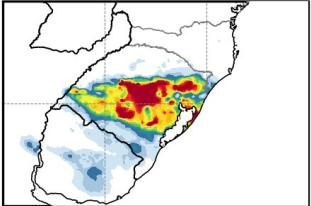
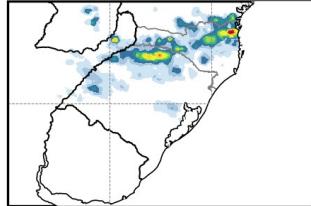
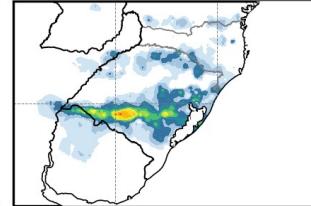
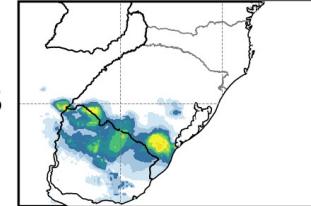
29/04

30/04

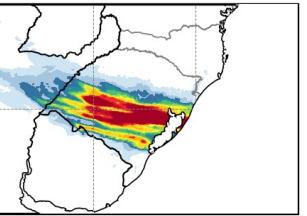
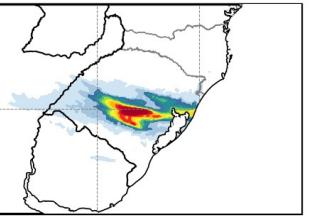
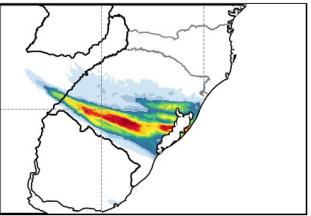
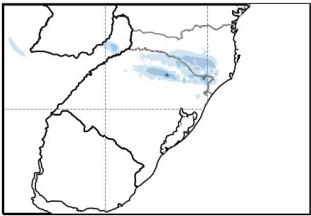
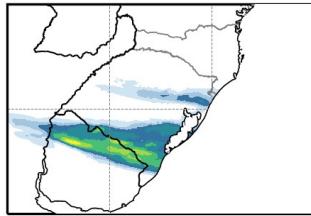
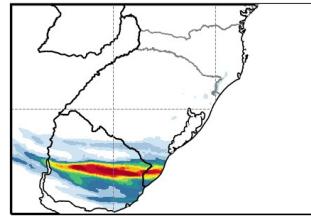
01/05

02/05

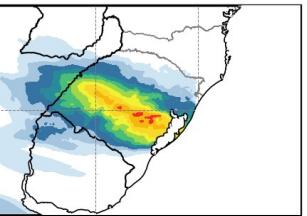
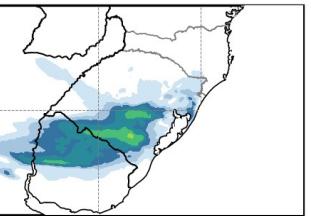
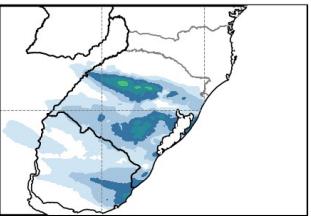
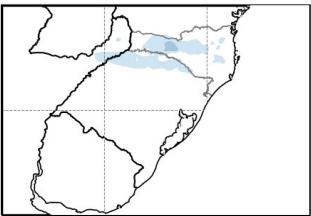
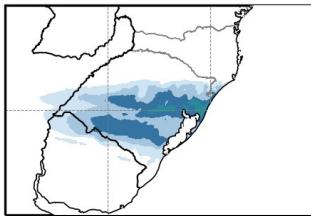
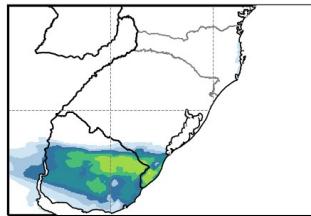
MERGE



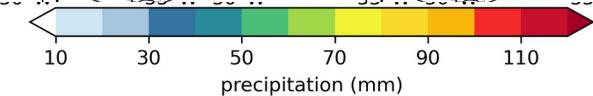
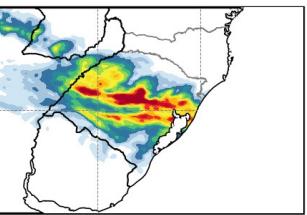
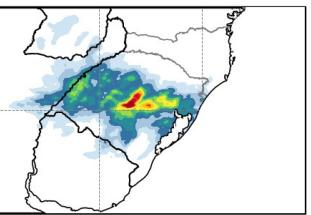
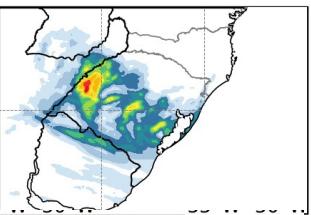
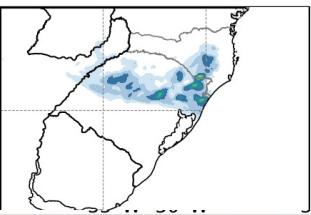
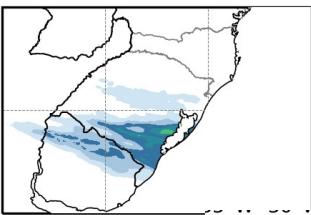
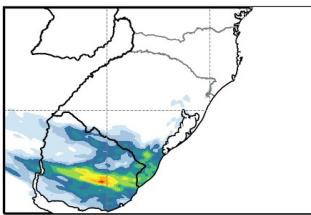
BRAMS 24 hs



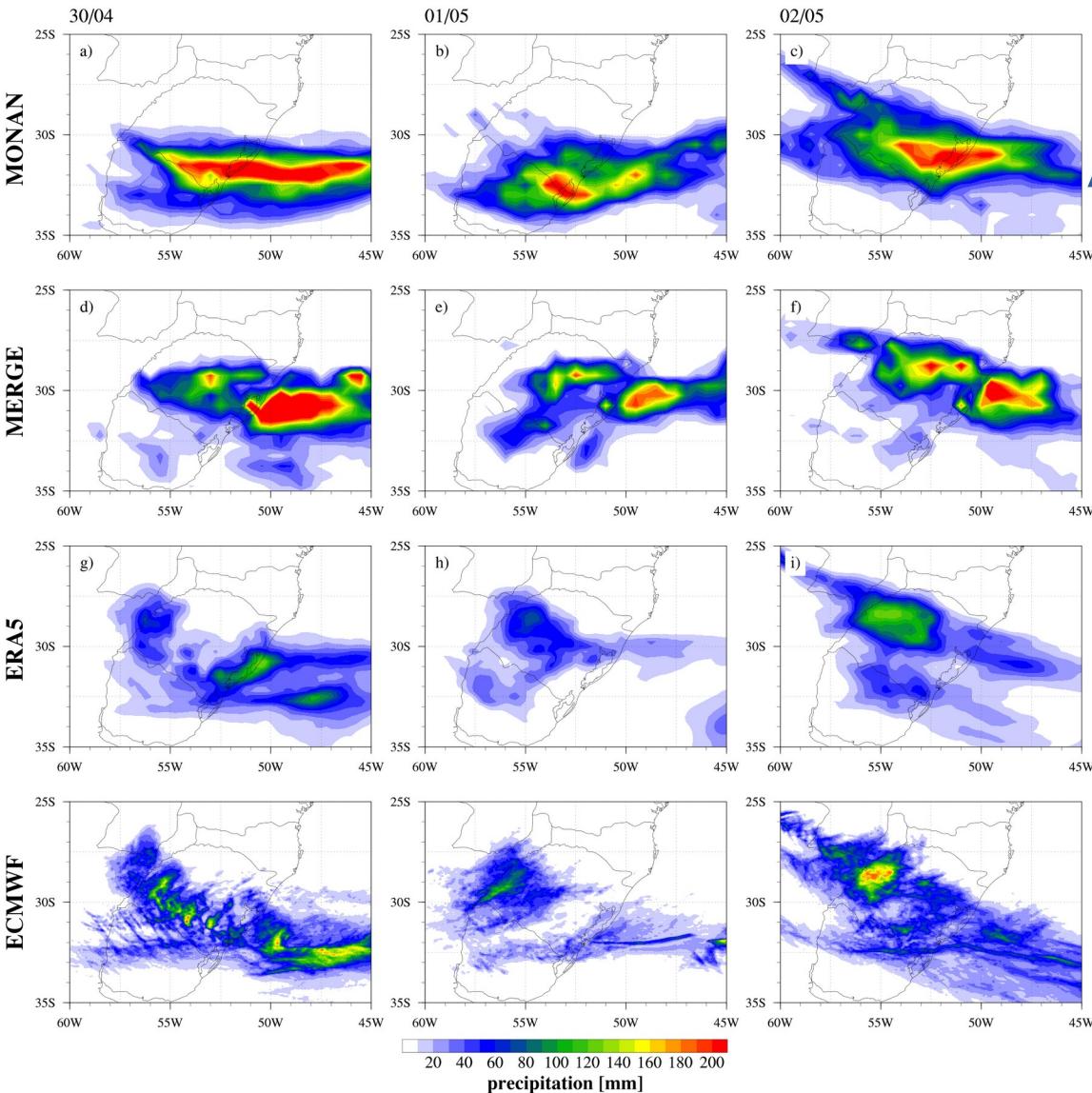
ETA 24 hs



WRF 24 hs

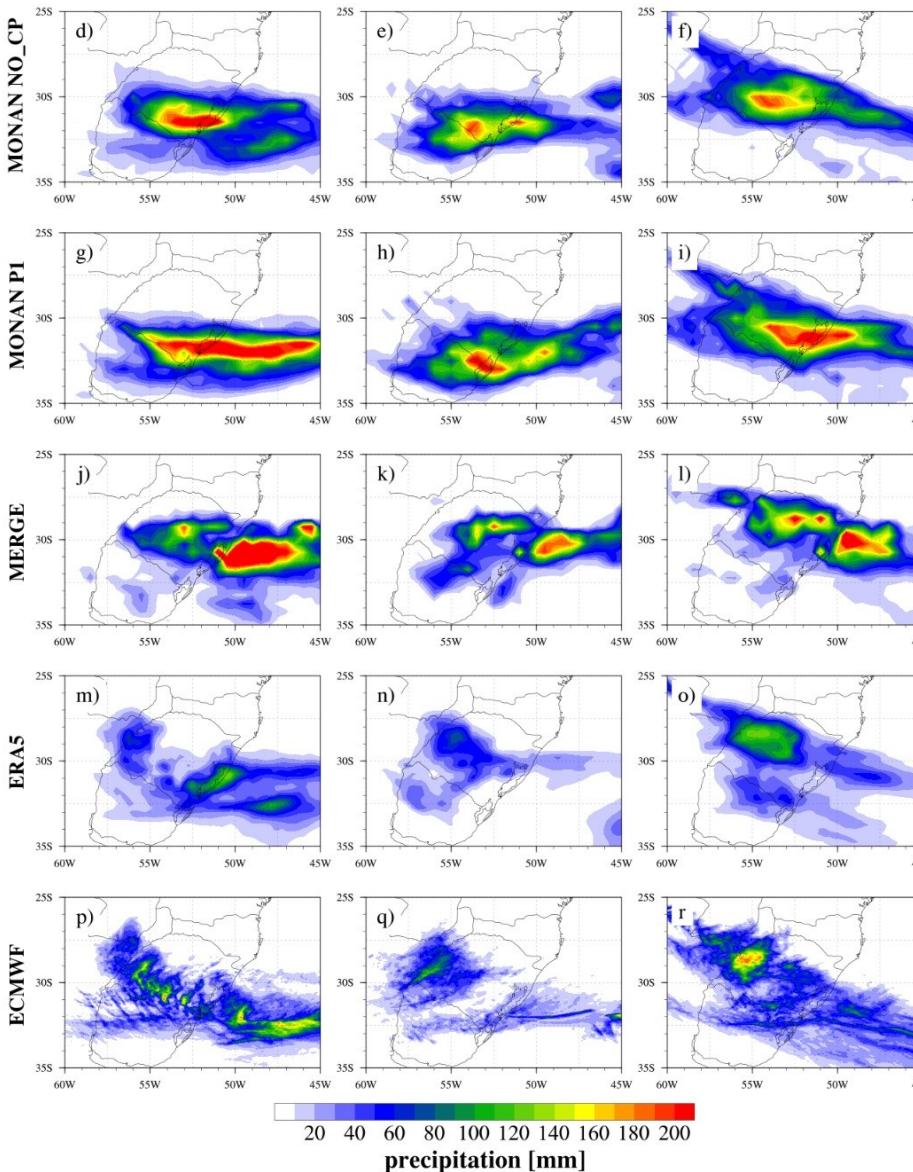


24h Precipitation forecasts for total precipitation



Acumulados de chuva em 24h para os dias 30/04 a 02/05/2024

- A precipitação esteve mais concentrada nas regiões centrais do RS em especial na bacia do Guaíba
- O ERA5 mostrou que a chuva esteve mais concentrada no centro-sul do Estado, com maiores acumulados sobre a Lagoa dos Patos e no extremo oeste do RS
- O MONAN concentrou as chuvas mais no sul do RS, porém mostrando acumulados compatíveis ao observado (> 200 mm), bastante superior ao modelo do ECMWF, igualmente inicializado pelo ERA5



Rodadas
contínuas

Experimento
P1

MERGE

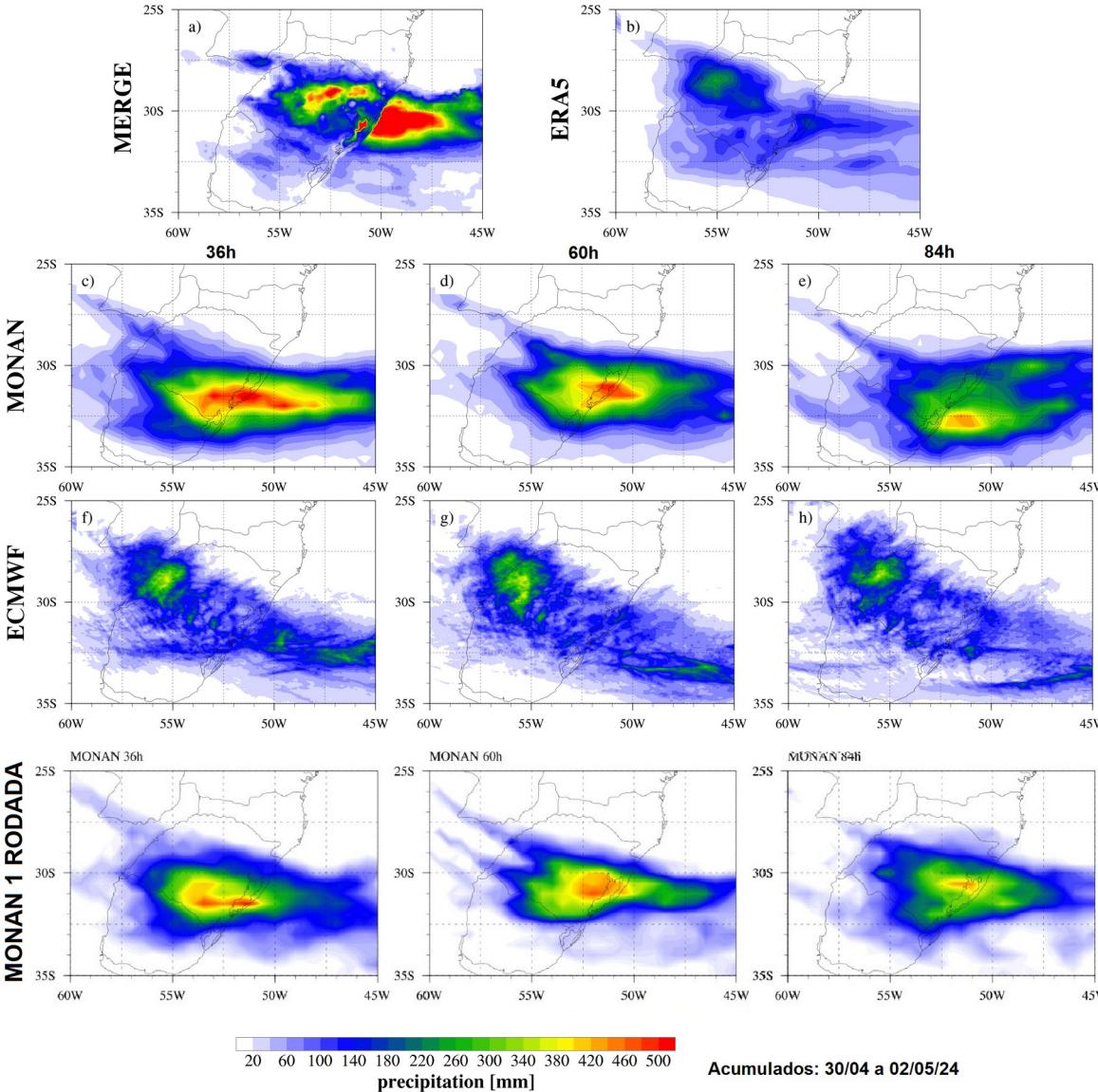
ERA5

IFS/DE

24h Precipitation forecasts for
total precipitation

Precipitação da nova
rodada passou a ser
superestimada no
continente

Melhora importante sobre
o oceano

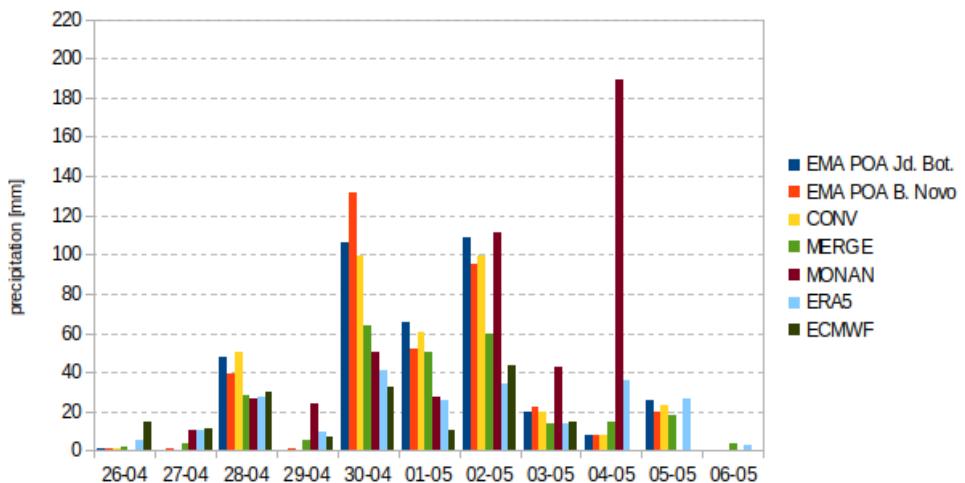


Acumulados em 3 dias para 36h, 60h e 84h

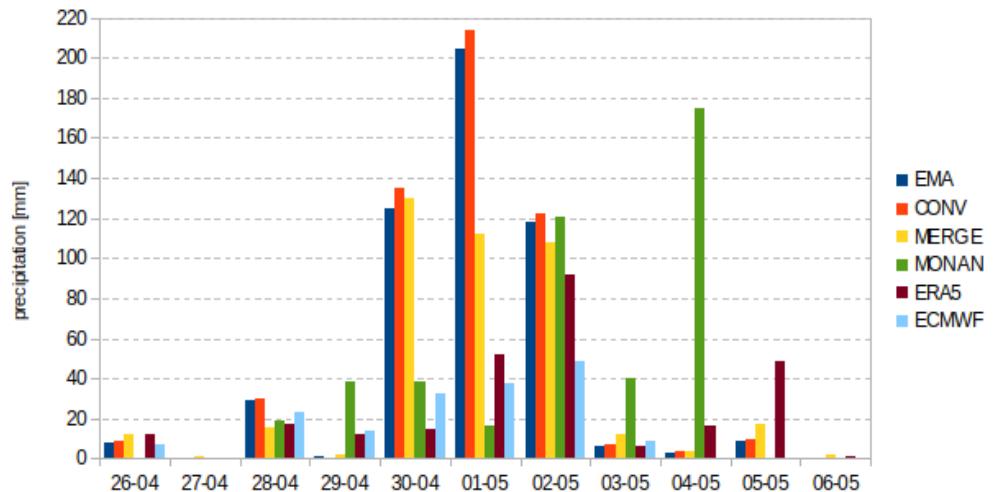
- MONAN apresentou um excelente desempenho quando à magnitude do evento, apesar de não ter acertado a localização
- Mostrou uma tendência a reduzir o volume e a área precipitada ao longo da integração, e ainda concentrando-a no litoral do RS e Lagoa dos Patos
- A reanálise do ERA5 e a previsão do ECMWF tiveram comportamento similar e bem aquém do volume observado
- A atual rodada do MONAN também aumentou o volume de chuva sobre as regiões atingidas, apesar de ter mantido o posicionamento ao sul do observado

24h Precipitation forecasts for total precipitation

Porto Alegre rain stations



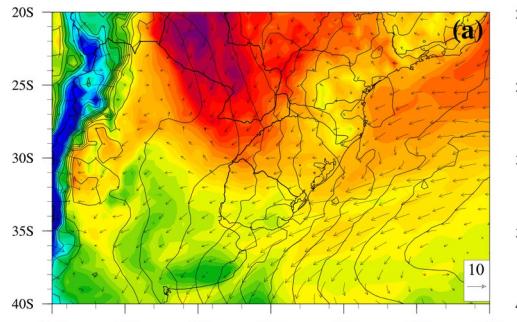
Santa Maria rain stations



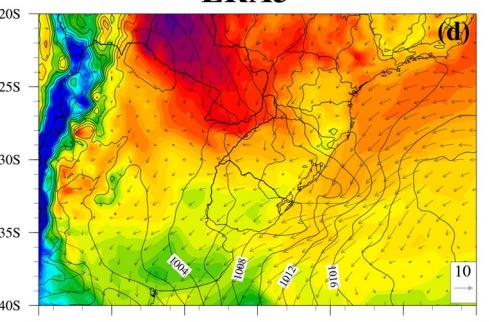
*Necessário complementar com nova rodada

30-04

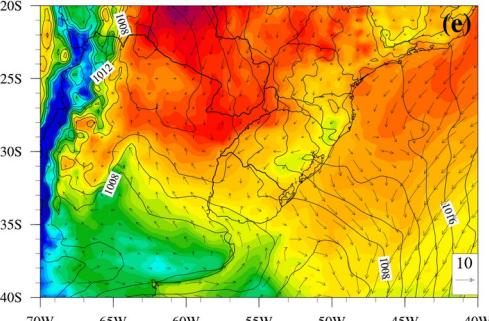
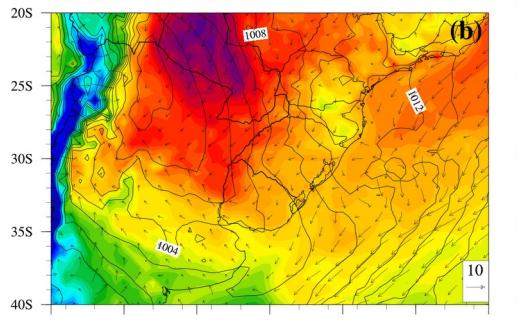
MONAN



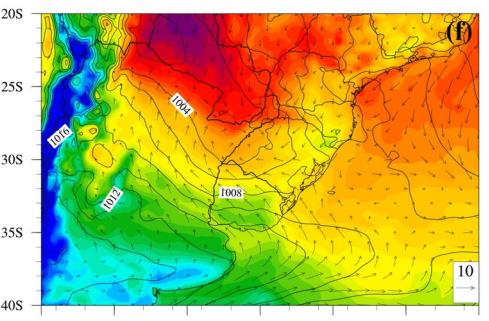
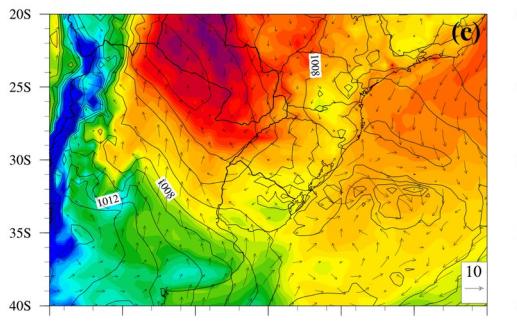
ERA5



01-05



02-05



Temperatura, PNMM e Vento (24h prev)

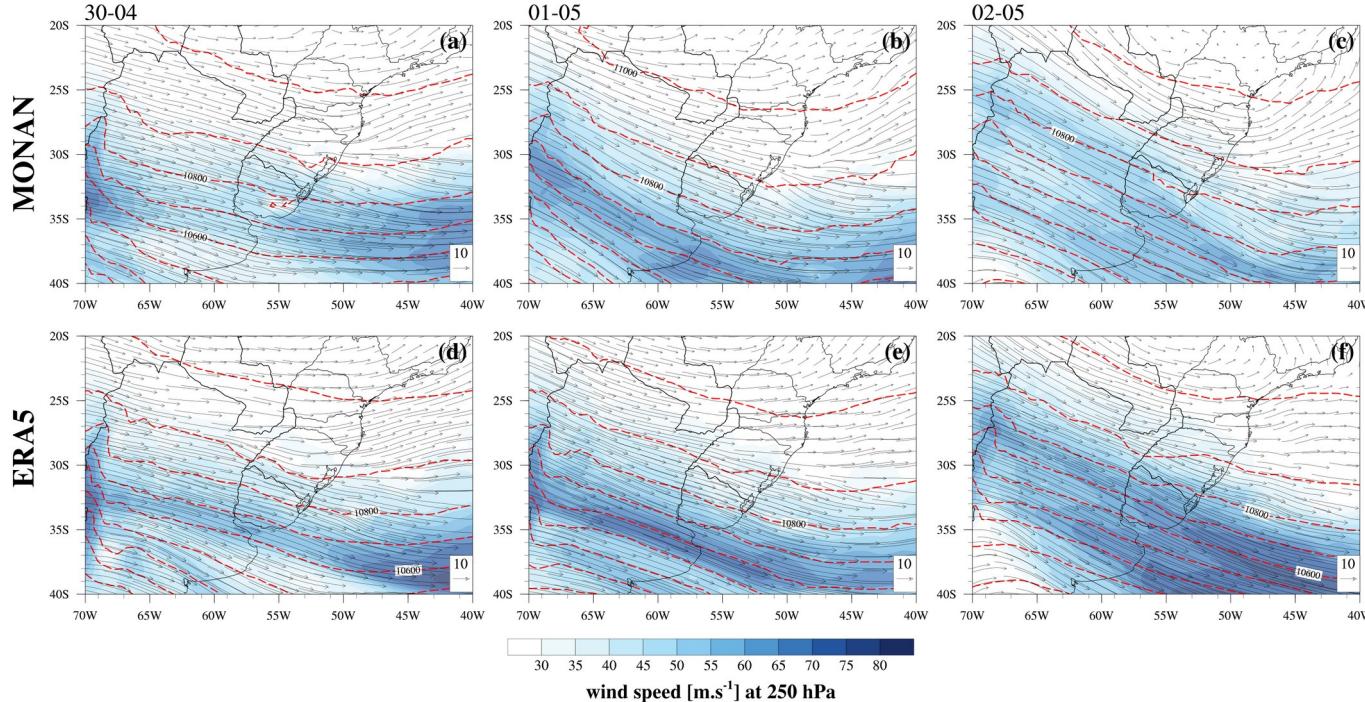
O campo é dominado pela **advecção quente** oriunda do Paraguai e por outra área com forte advecção sobre o oceano na costa sul do Brasil.

No dia 30/04, o modelo mostrava alguma discrepância com relação ao ERA5 que já mostrava um padrão ciclônico sobre o centro-sul do RS

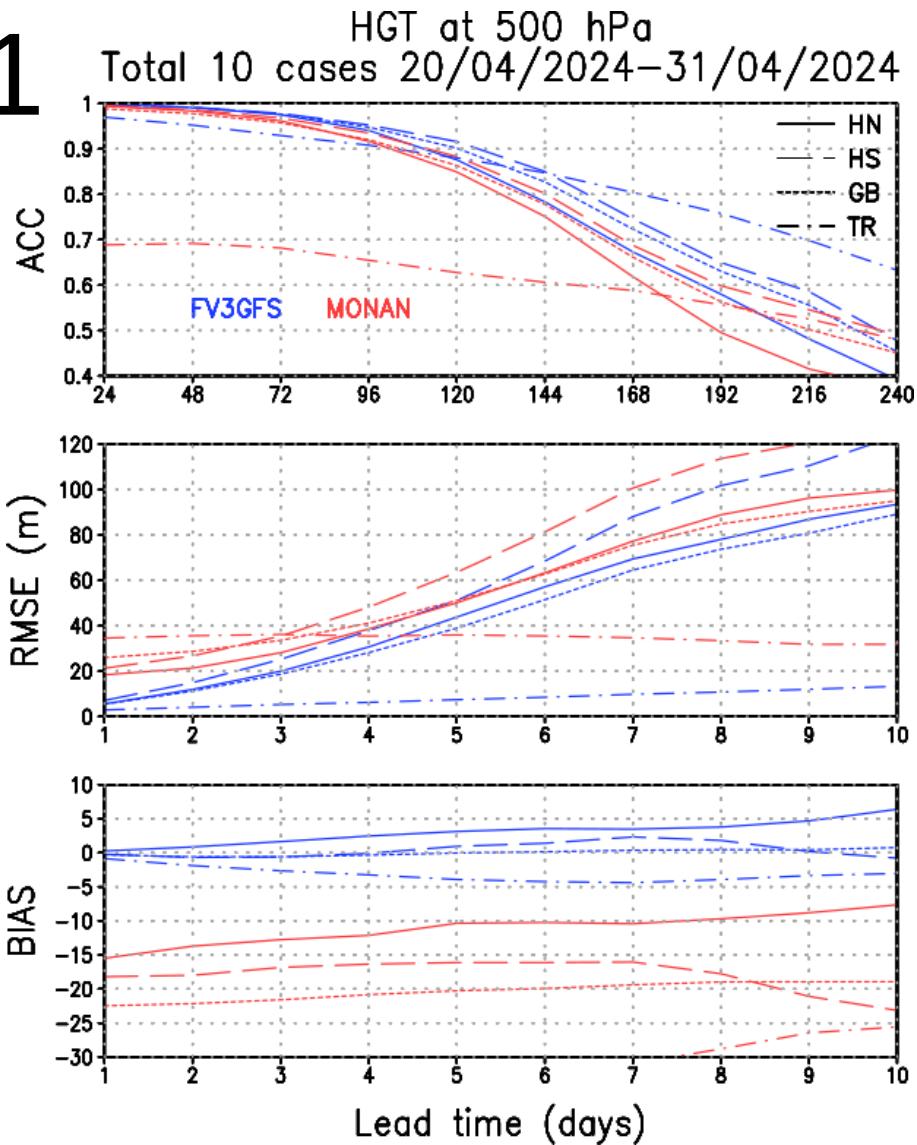
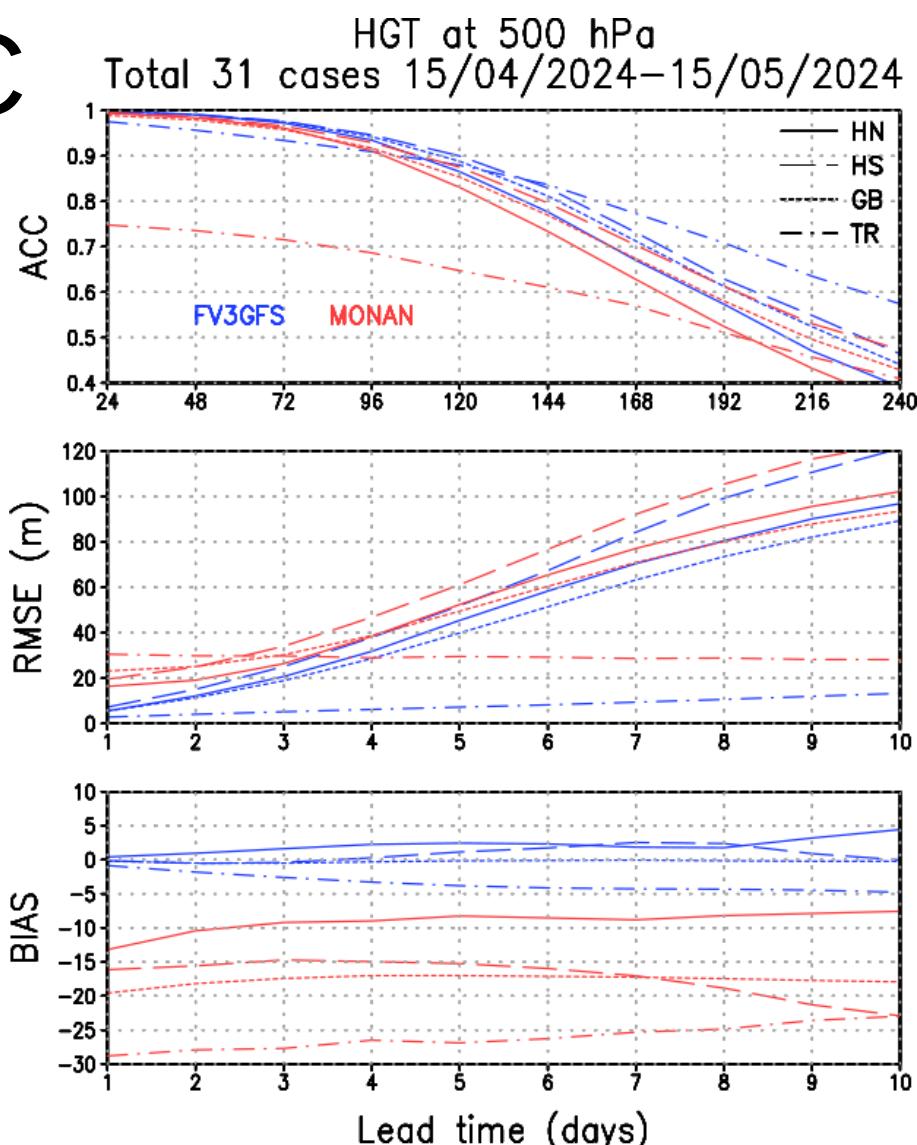
No dia 01/05, o ERA5 mostrava a presença de um sistema de baixa pressão em torno de 40S e 50W, algo não mostrado pelo MONAN.

No dia 02, o ERA5 mostrava a presença de uma **crista fria** avançando longitudinalmente ao sul do RS, com ventos de SE. Já a previsão do MONAN tinha uma forte componente sul do vento sobre a Argentina e a crista menos caracterizada.

Campo de Circulação em 250 hPa

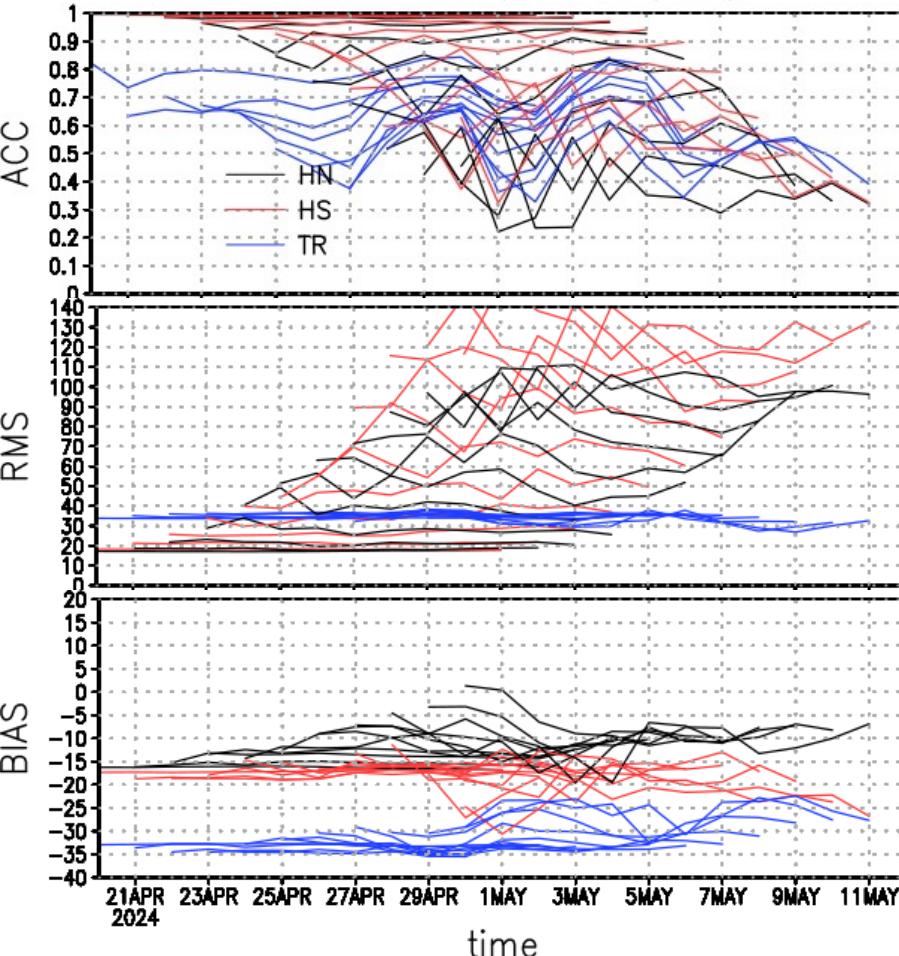


- A reanálise do ERA5 (d-f) indica o posicionamento da Corrente de Jato sobre a Argentina e com um direcionamento de NW-SE
- Na previsão de 24h feita pelo MONAN (a-c), o Jato também foi previsto na mesma direção dado pelo ERA5, porém com ligeiras discrepâncias, em especial na intensidade no dia 02/05

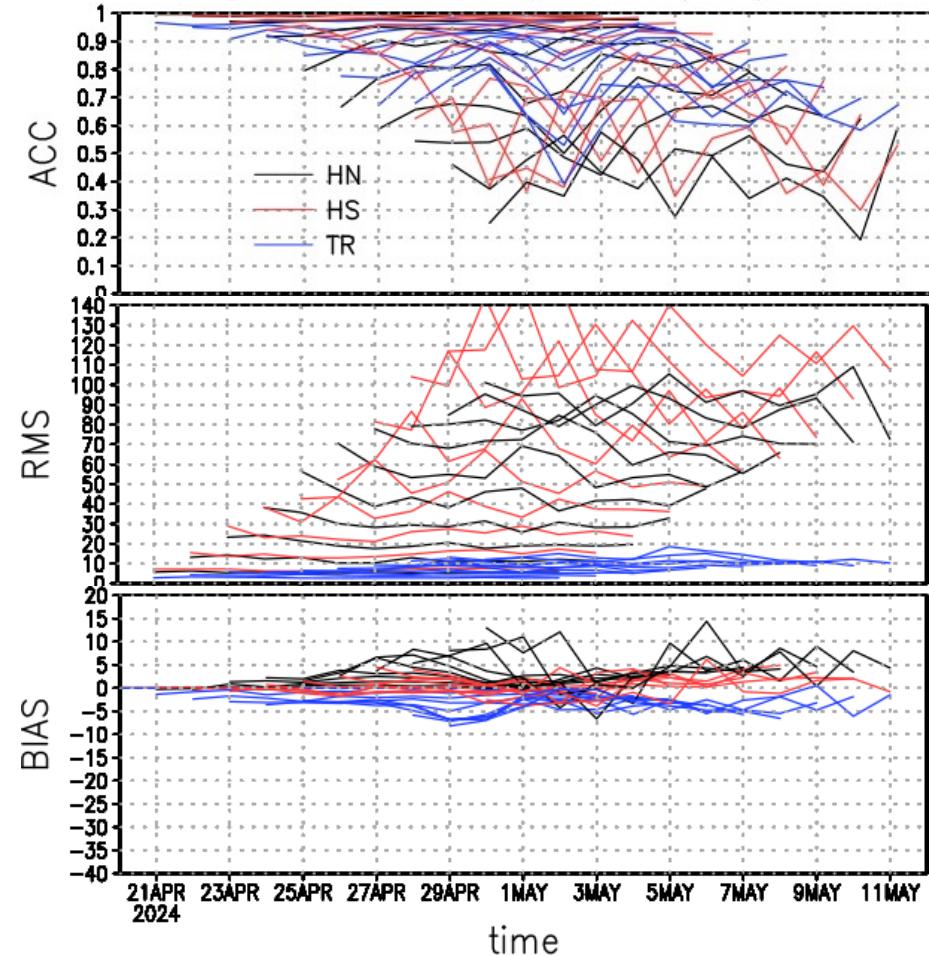
P1**TC**

P1(RS case)

MONAN HGT at 500 hPa
Total 10 cases 20/04–01/05/2024



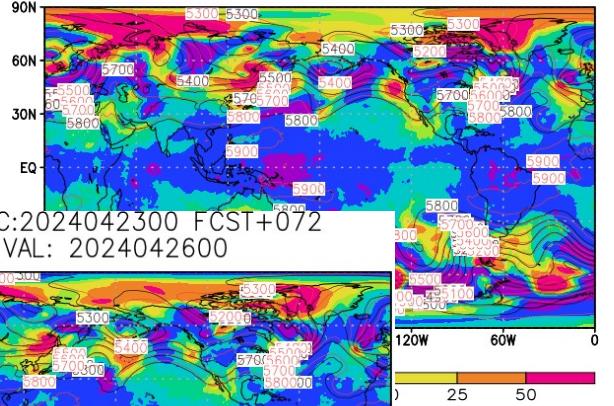
FV3GFS HGT at 500 hPa
Total 10 cases 20/04–01/05/2024



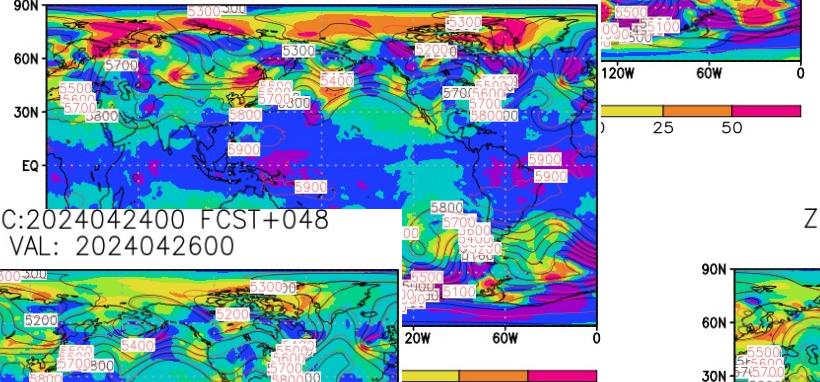
MONAN

Var: zgeo

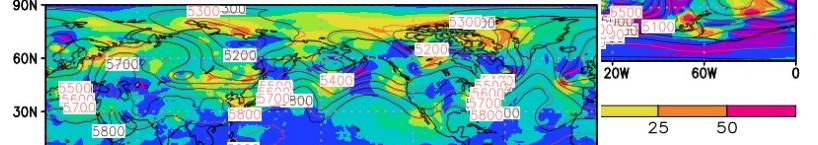
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VAL: 2024042600



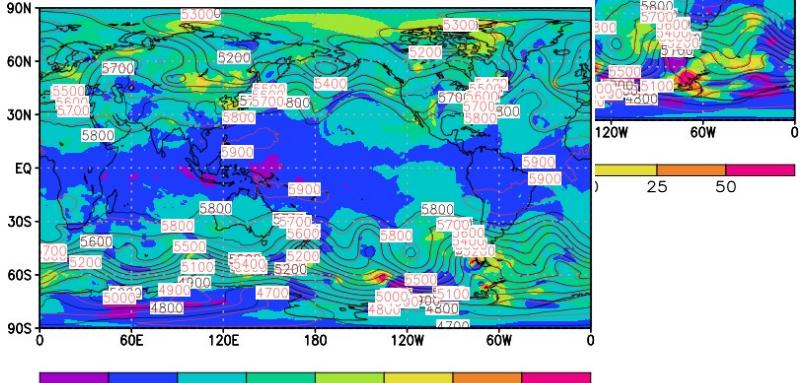
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VAL: 2024042600



Z500 IC:2024042400 FCST+048
VAL: 2024042600



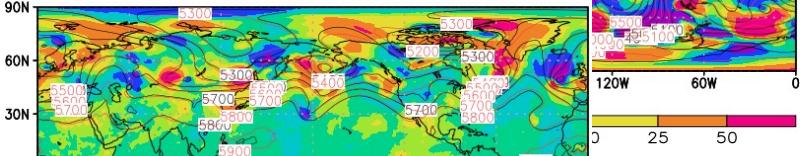
Z500 IC:2024042500 FCST+024
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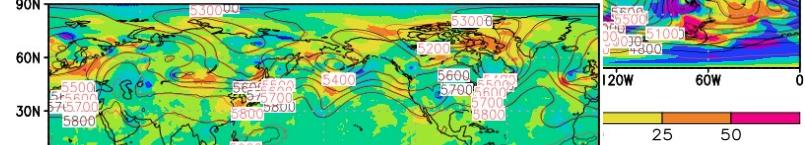
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GFS

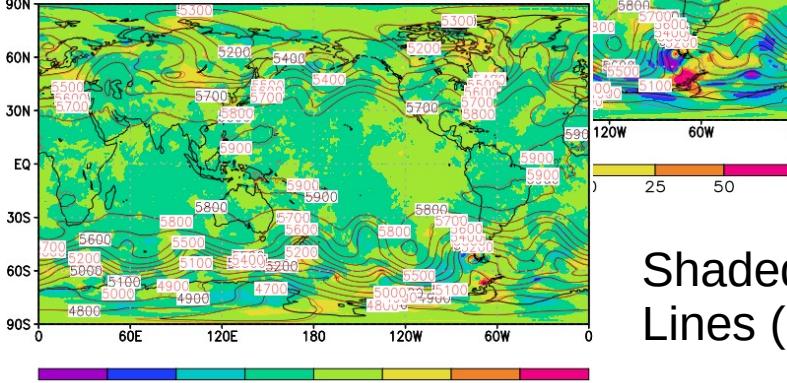
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Z500 IC:2024042400 FCST+048
VAL: 2024042600



Z500 IC:2024042500 FCST+024
VAL: 2024042600

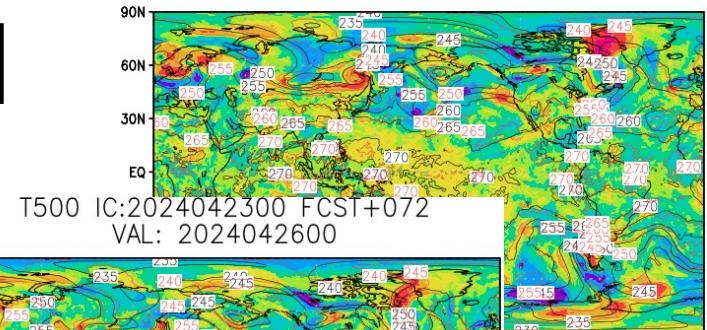


Shaded (FCST-ANL)
Lines (FCST, ANL)

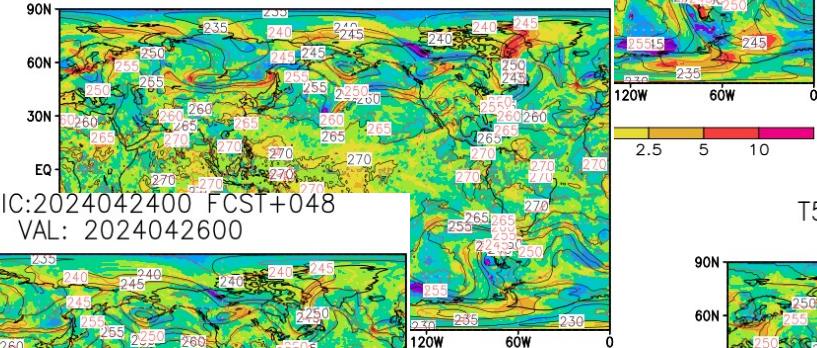
MONAN

Var: TMP

T500 IC:2024042200 FCST+096
VAL: 2024042600



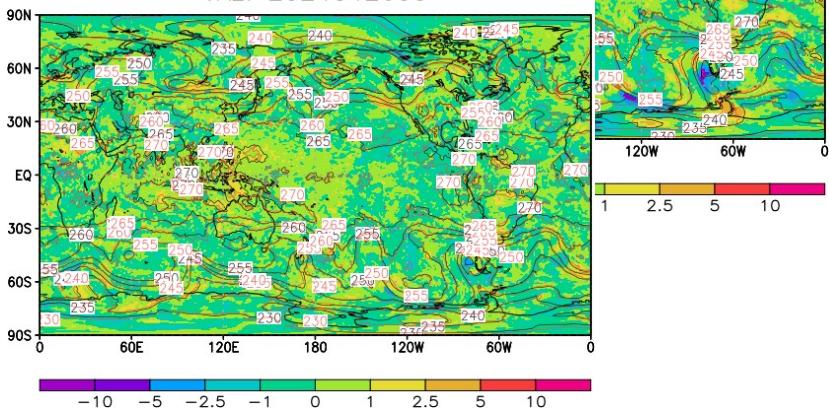
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VAL: 2024042600



T500 IC:2024042400 FCST+048
VAL: 2024042600



T500 IC:2024042500 FCST+024
VAL: 2024042600



T500 IC:2024042200 FCST+096
VAL: 2024042600

GFS

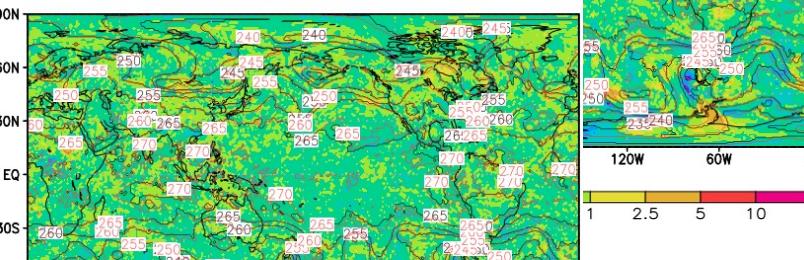
T500 IC:2024042300 FCST+072
VAL: 2024042600



T500 IC:2024042400 FCST+048
VAL: 2024042600



T500 IC:2024042500 FCST+024
VAL: 2024042600



Shaded (FCST-ANL)
Lines (FCST, ANL)

- Recomendações
 - Avaliação de temperaturas e vento em 850 hPa
 - Avaliar componentes da precipitação total
 - Confirmar com o Saulo sobre alterações na versão do MONAN que foi usada para gerar P1 (GCC)