The Nineth Session of the East Asia winter Climate Outlook Forum

Seasonal Outlook for winter 2021/2022 over Mongolia

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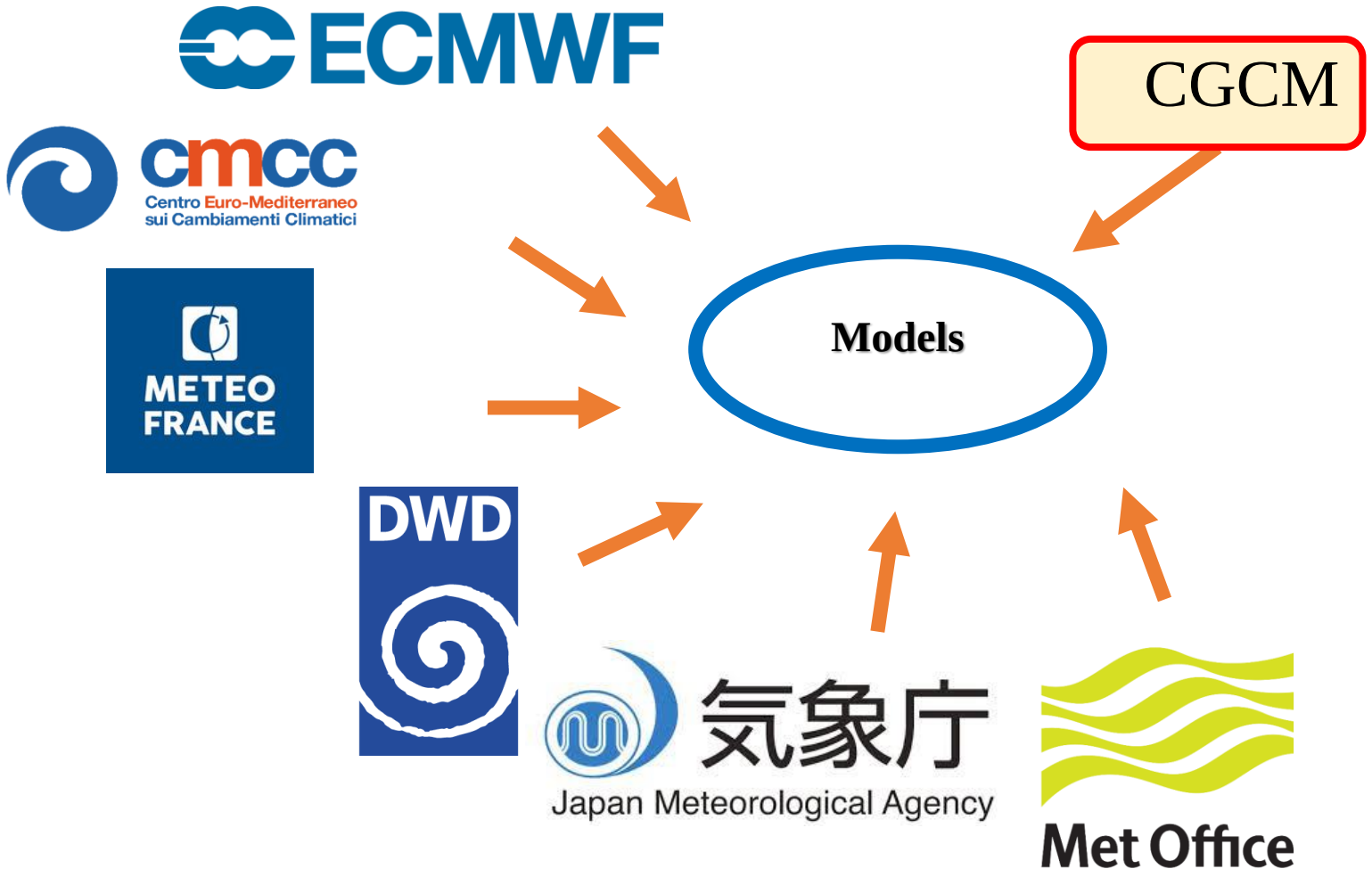
OUTLINE

- Used models
- Multi-models ensemble system (MME)
- Outputs of dynamical models
- Prediction of large scale index
- Observation and prediction for winter (2020/21)
- Outlook for 2021/22 winter

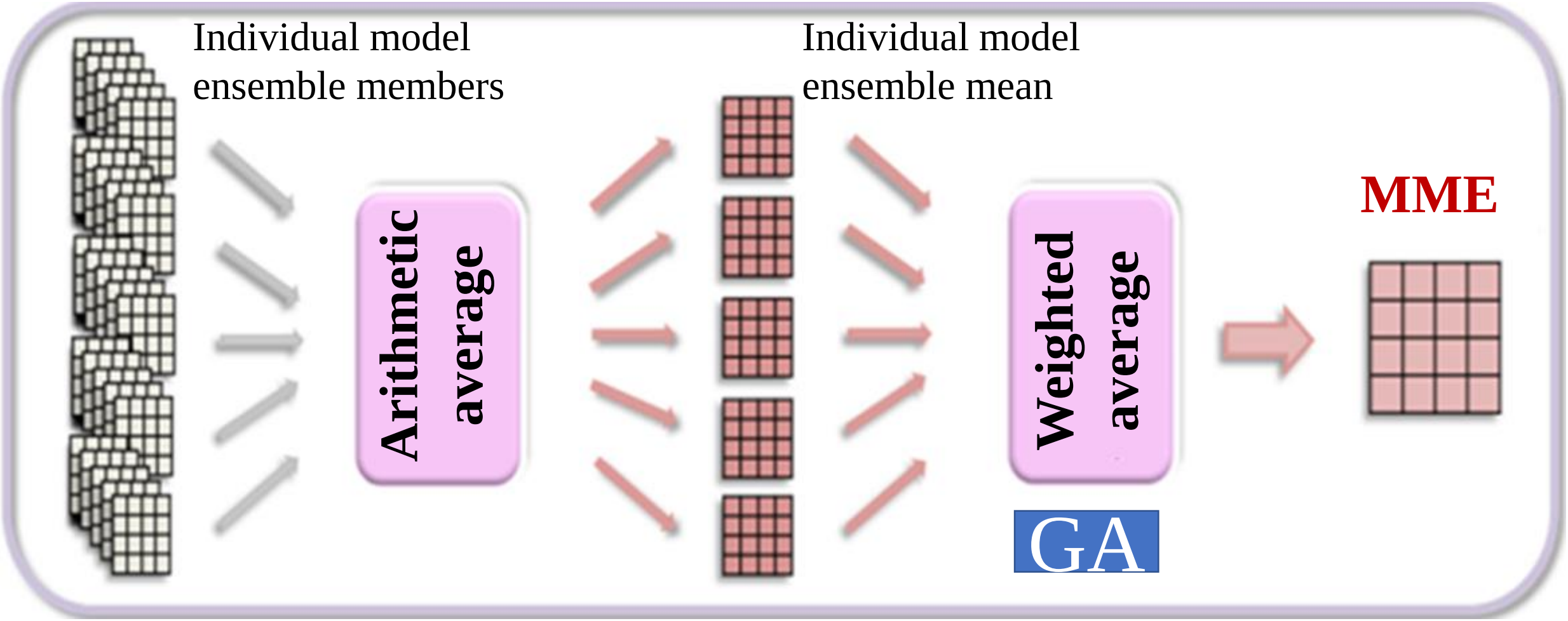
Used models



Models	Ensemble members	Initial condition
CGCM	10 members	SEP 2021
TCC	51 members	18 OCT 2021
ECMWF	51 members	OCT 2021
CMCC	50 members	OCT 2021
METEO	51 members	OCT 2021
DWD	50 members	OCT 2021
UKMO	2 per day	OCT 2021

Data source: https://cds.climate.copernicus.eu/cdsapp#!/dataset/seasonal-postprocessed-pressure-levels?tab=form
https://ds.data.jma.go.jp/tcc/tcc/

Multi-models ensemble system (MME)

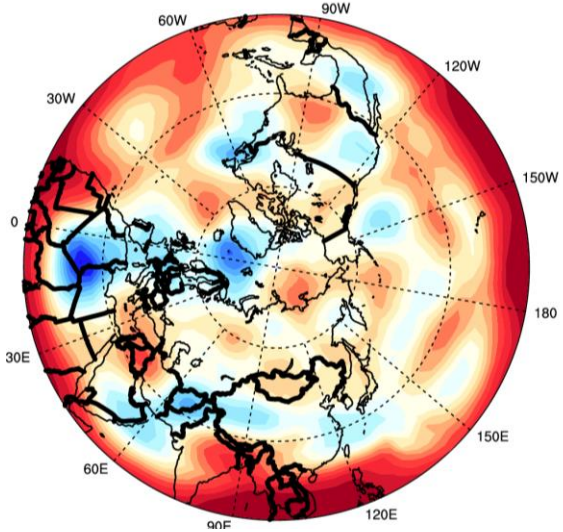


Ahn, J.-B., and J. Lee (2016), A new multimodel ensemble method using nonlinear genetic algorithm: An application to boreal winter surface air temperature and precipitation prediction, J. Geophys. Res. Atmos., 121, doi:10.1002/2016JD025151.

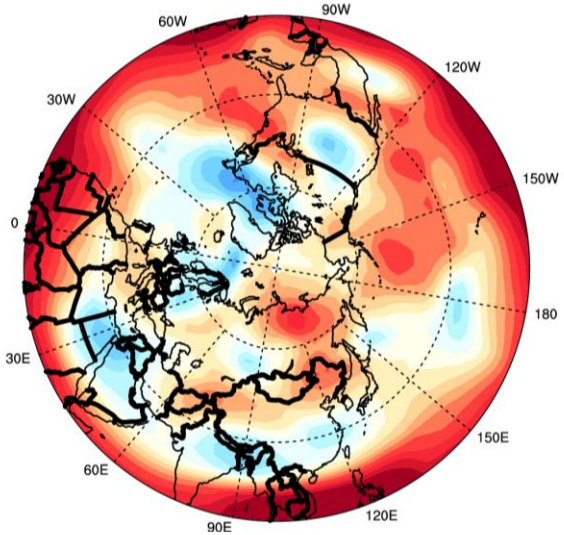
Verification on results of MME (Z500)

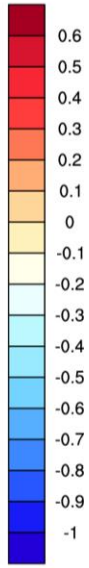
MSSS

EA: -0.02 Lead 1 **NH**: -0.04

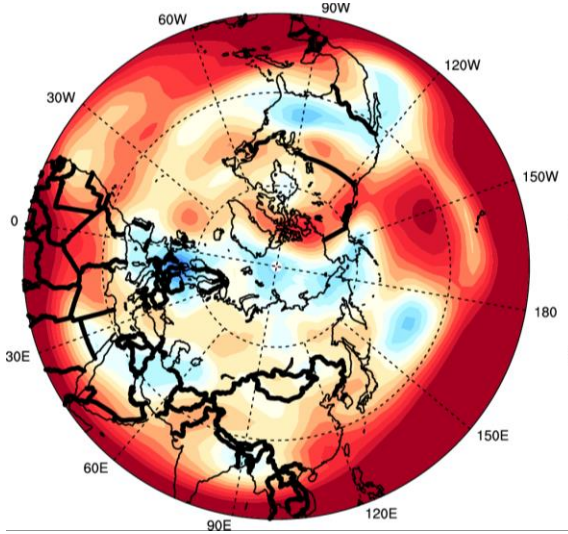


EA: -0.02 Lead 2 **NH**: -0.01

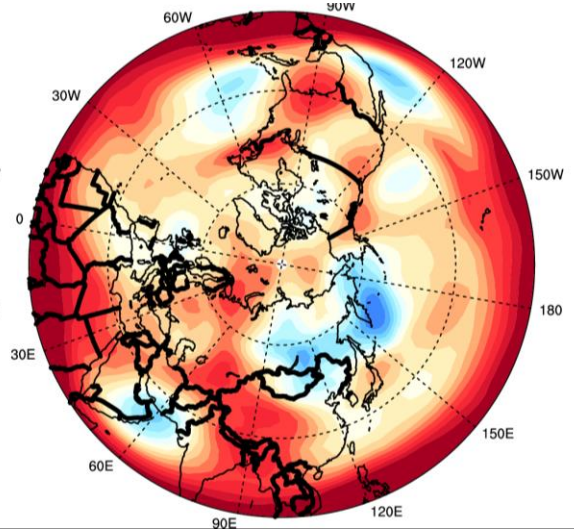




EA: 0.11 Lead 3 **NH**: 0.09

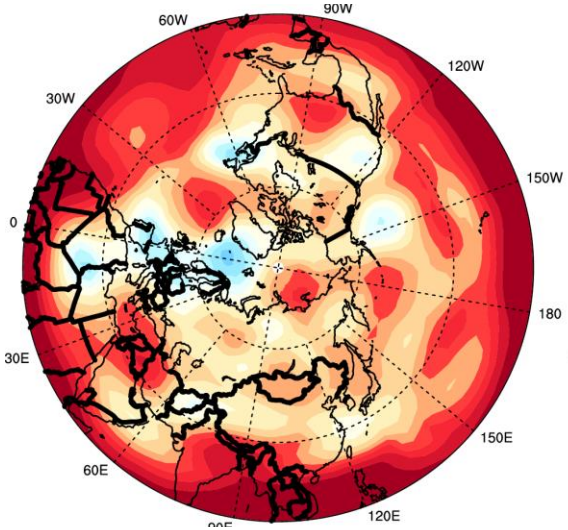


EA: 0.10 Lead 4 **NH**: 0.08

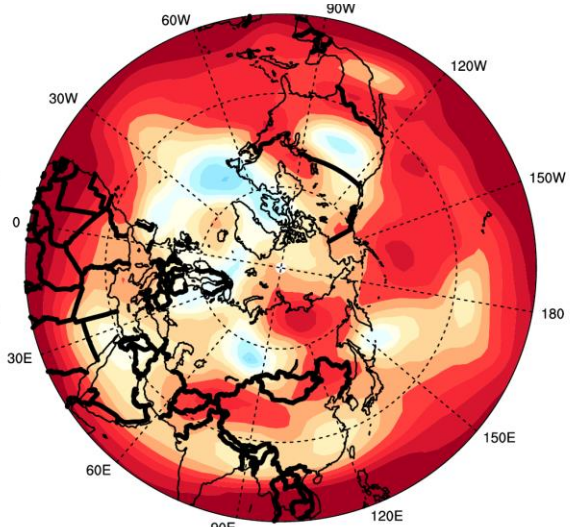


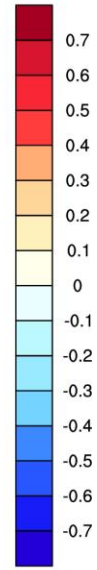
CC

EA: 0.36 Lead 1 **NH**: 0.41

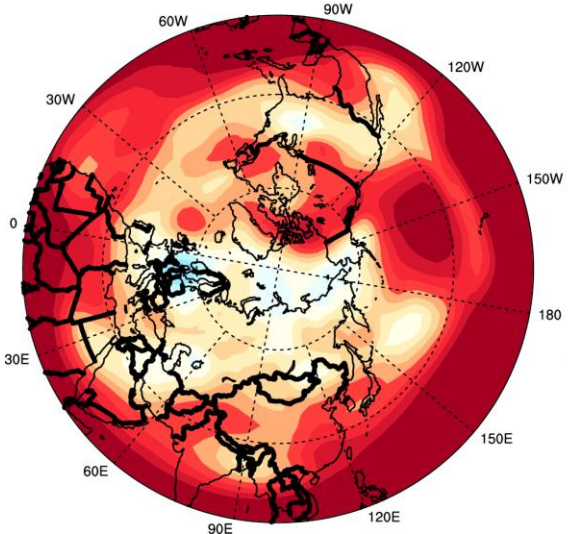


EA: 0.35 Lead 2 **NH**: 0.45

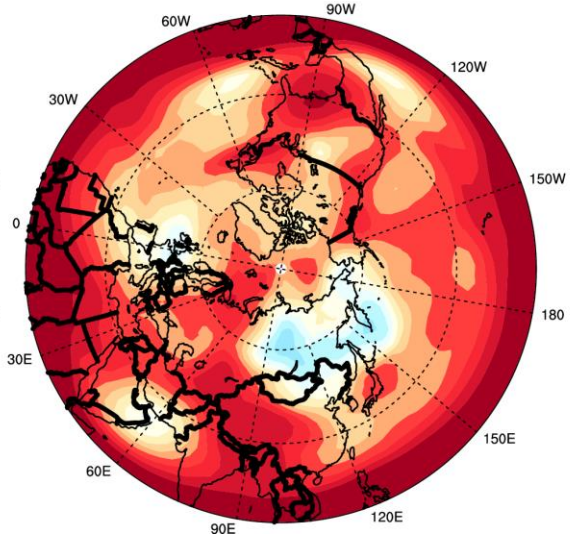




EA: 0.41 Lead 3 **NH**: 0.50



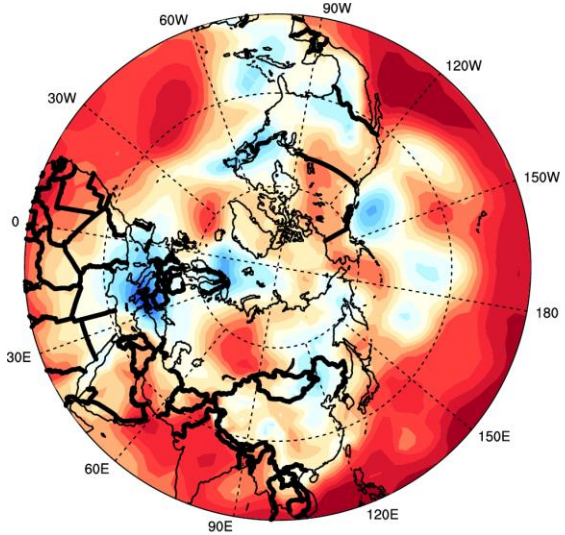
EA: 0.42 Lead 4 **NH**: 0.50



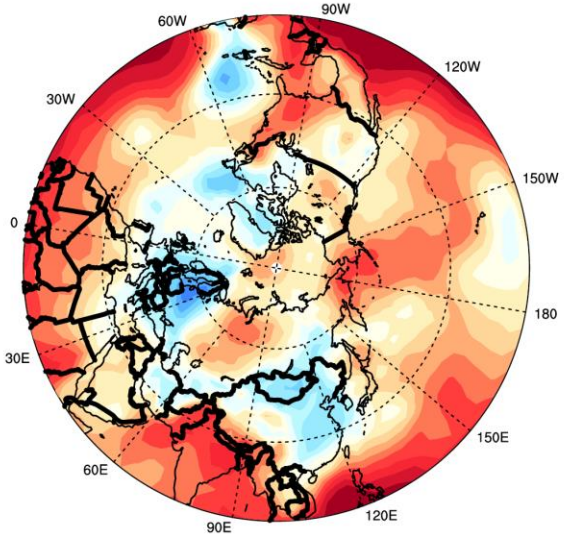
Verification on results of MME (SLP)

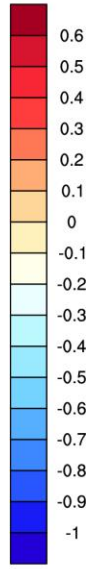
MSSS

EA: 0.11 Lead 1 **NH**: 0.05

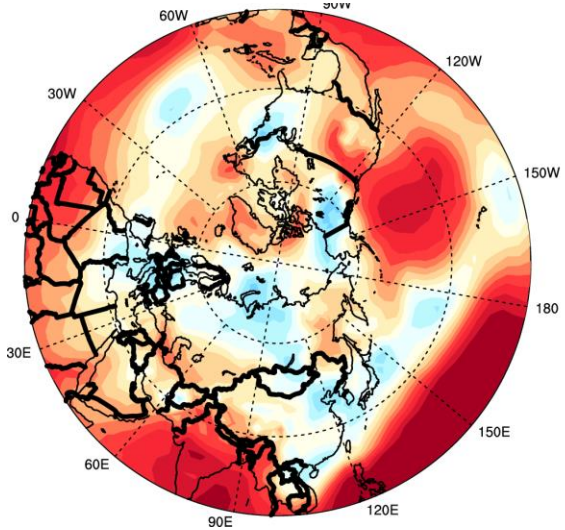


EA: -0.02 Lead 2 **NH**: 0.00

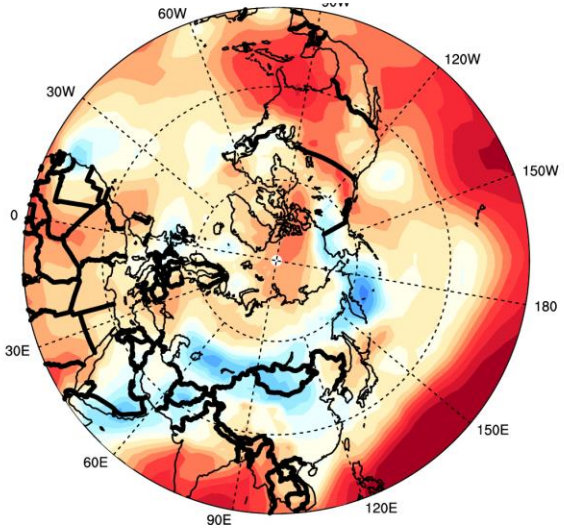




EA: 0.06 Lead 3 **NH**: 0.04

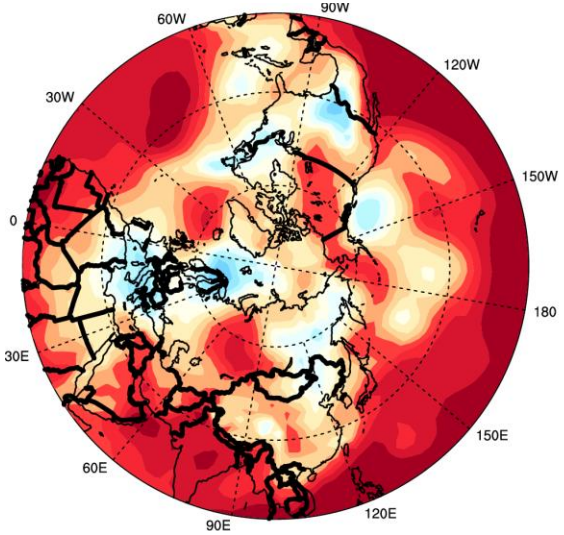


EA: -0.08 Lead 4 **NH**: 0.01

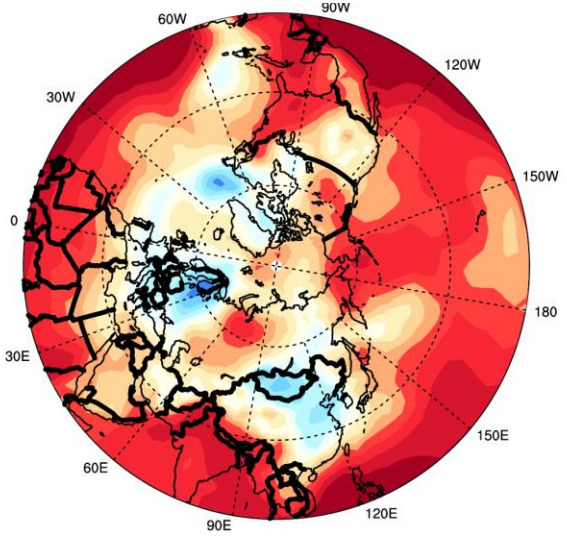


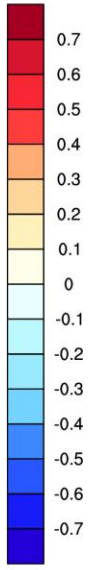
CC

EA: 0.41 Lead 1 **NH**: 0.40

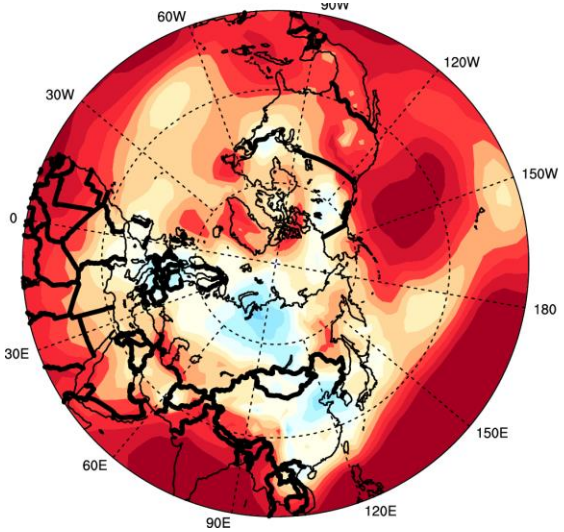


EA: 0.27 Lead 2 **NH**: 0.38

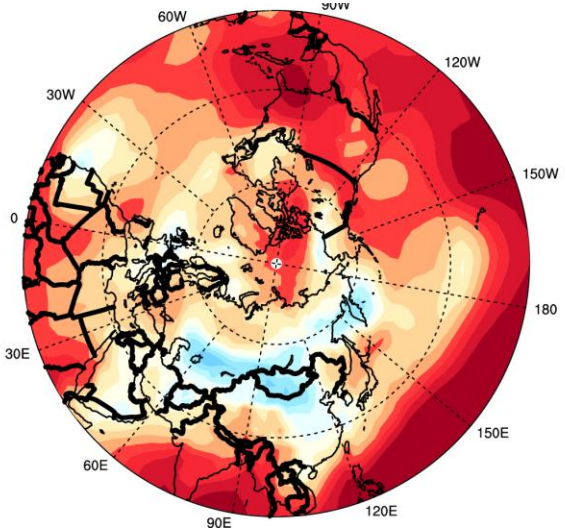




EA: 0.32 Lead 3 **NH**: 0.41

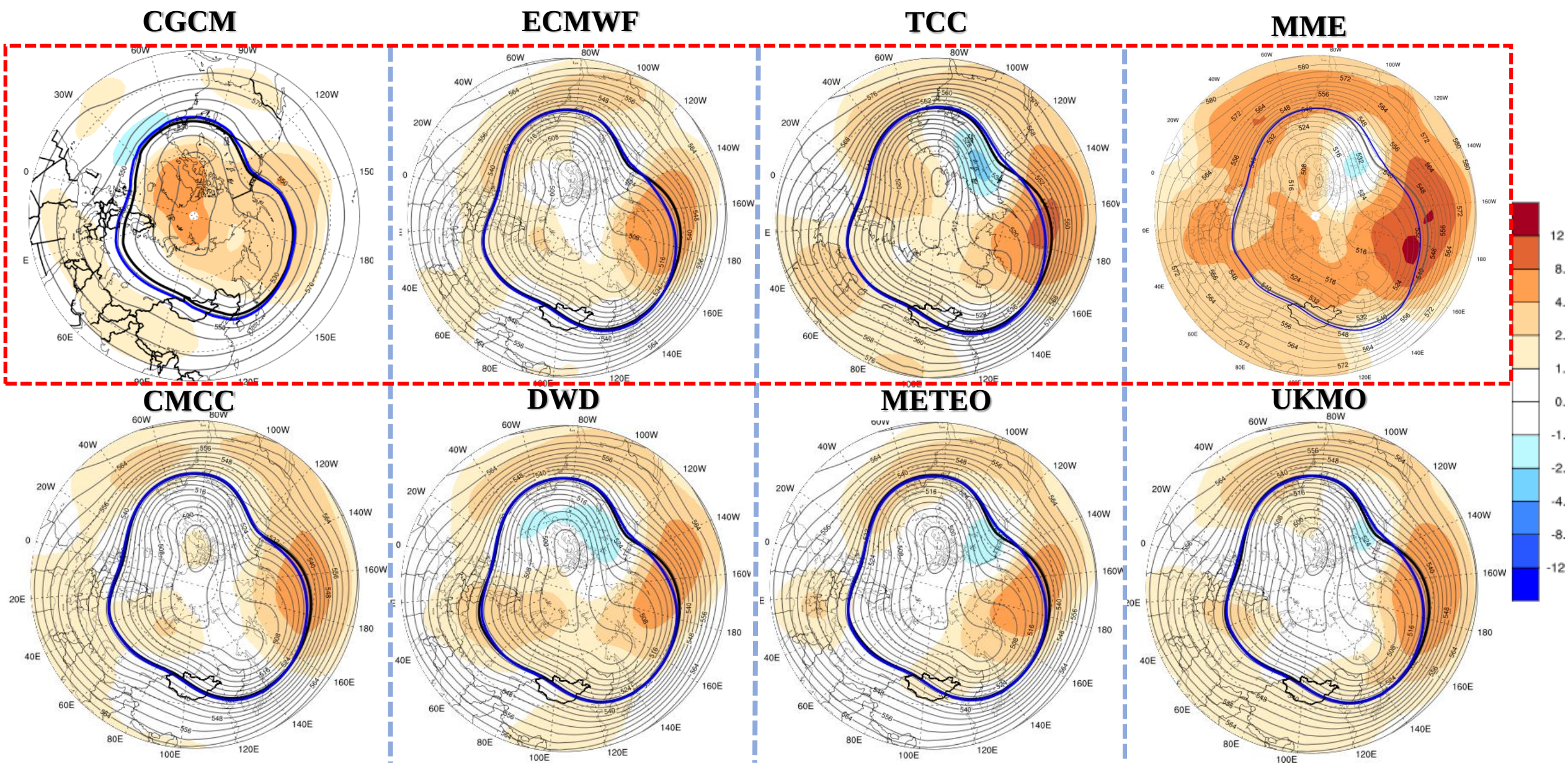


EA: 0.21 Lead 4 **NH**: 0.38

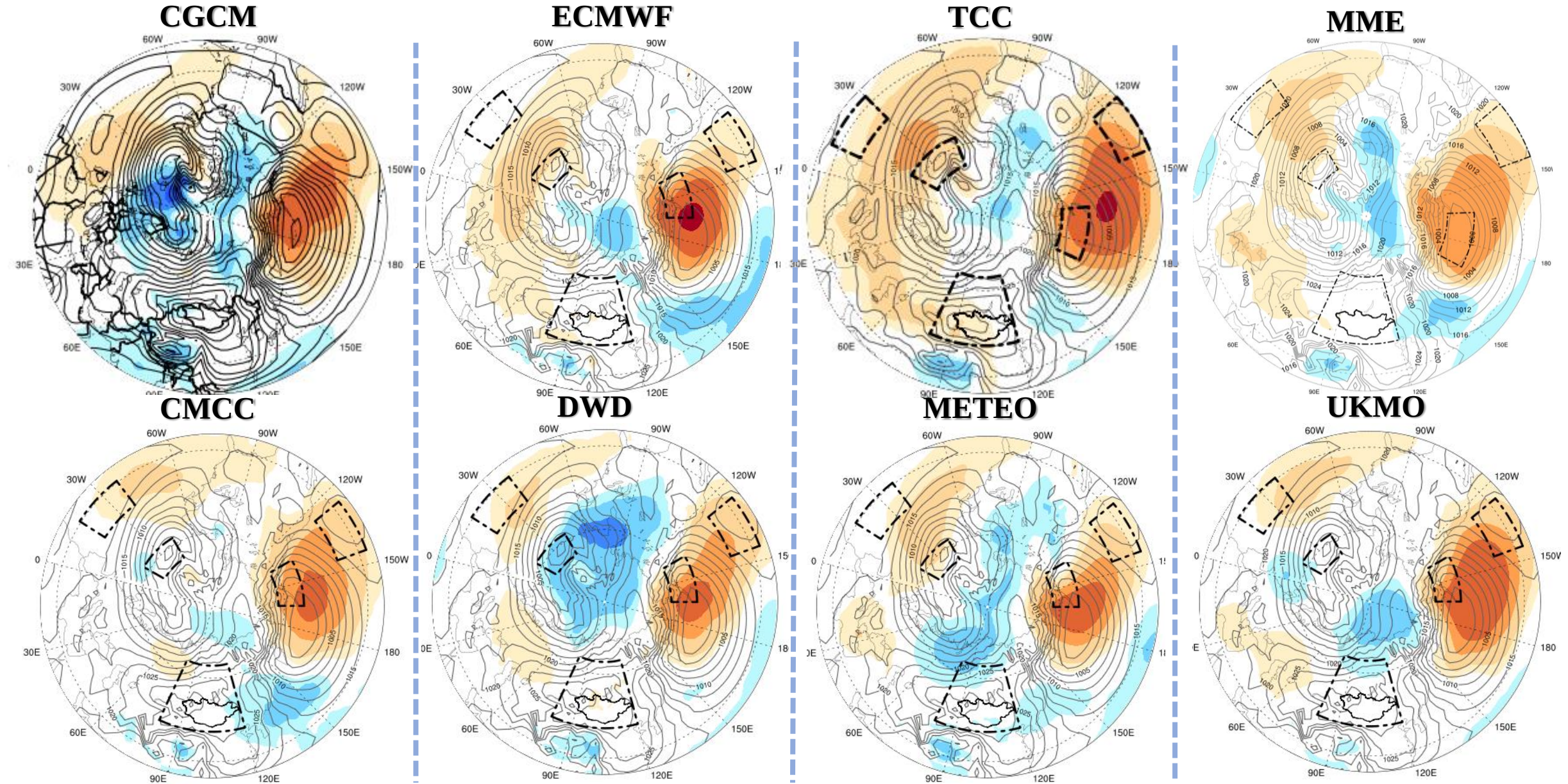


Outputs of dynamical models

Geopotential height at 500 hPa for DJF, 2021/22

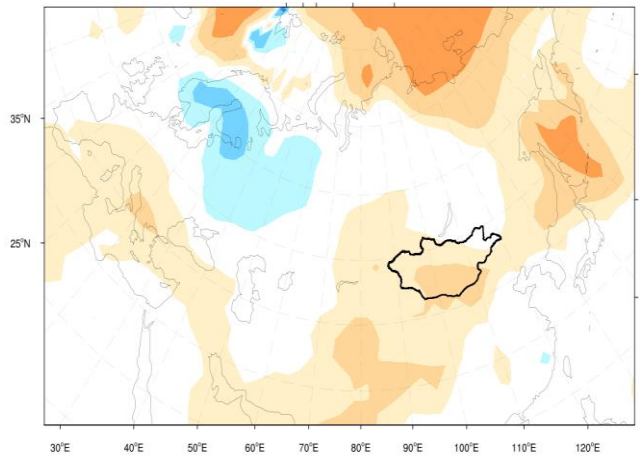


Sea level pressure for DJF, 2021/22

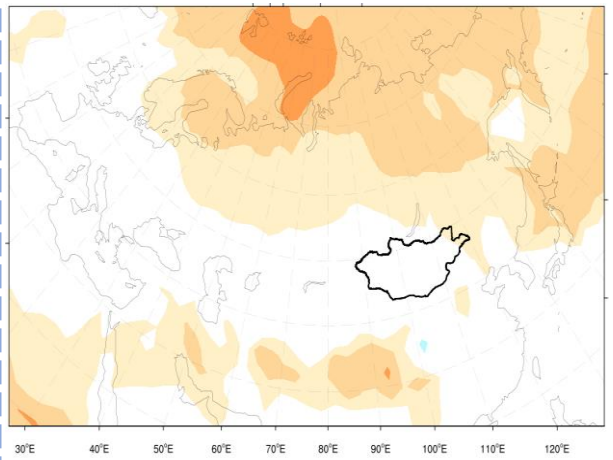


T2m for DJF, 2021/22

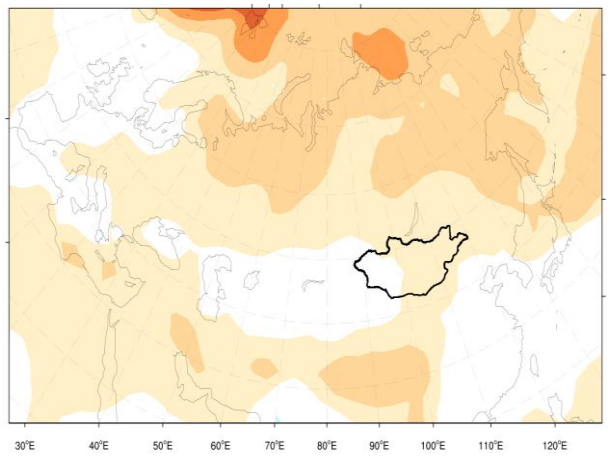
CGCM



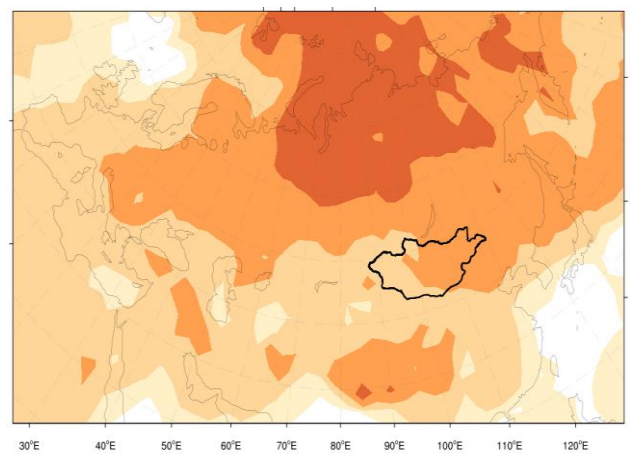
ECMWF



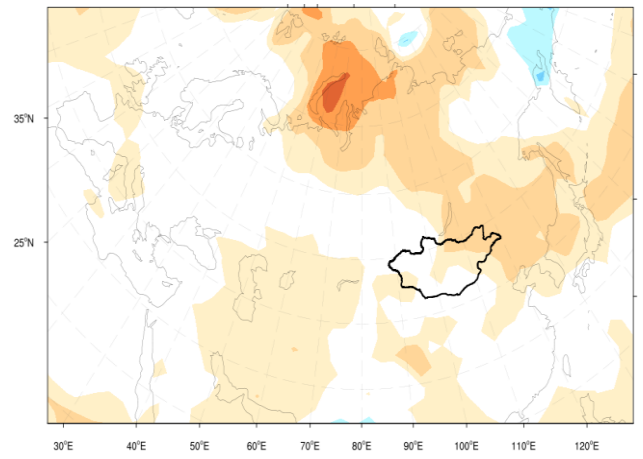
TCC



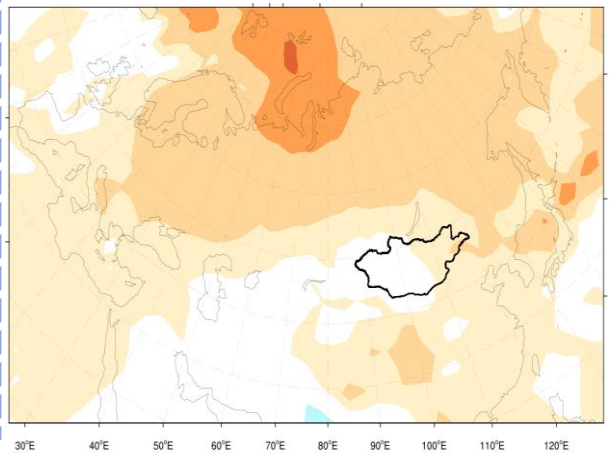
MME



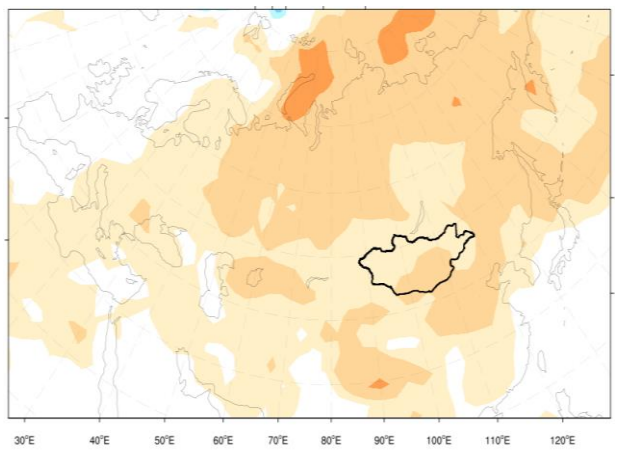
CMCC



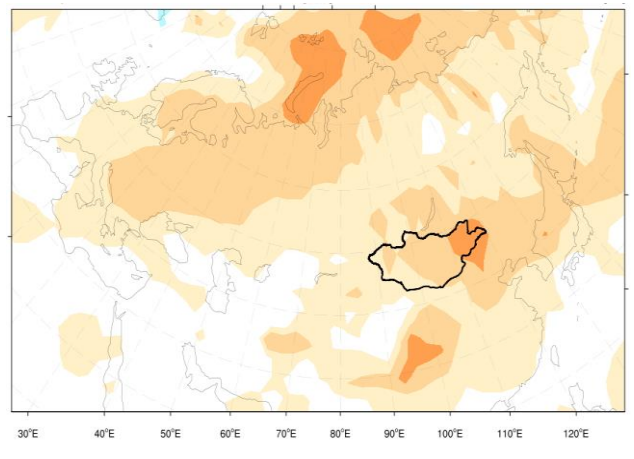
DWD



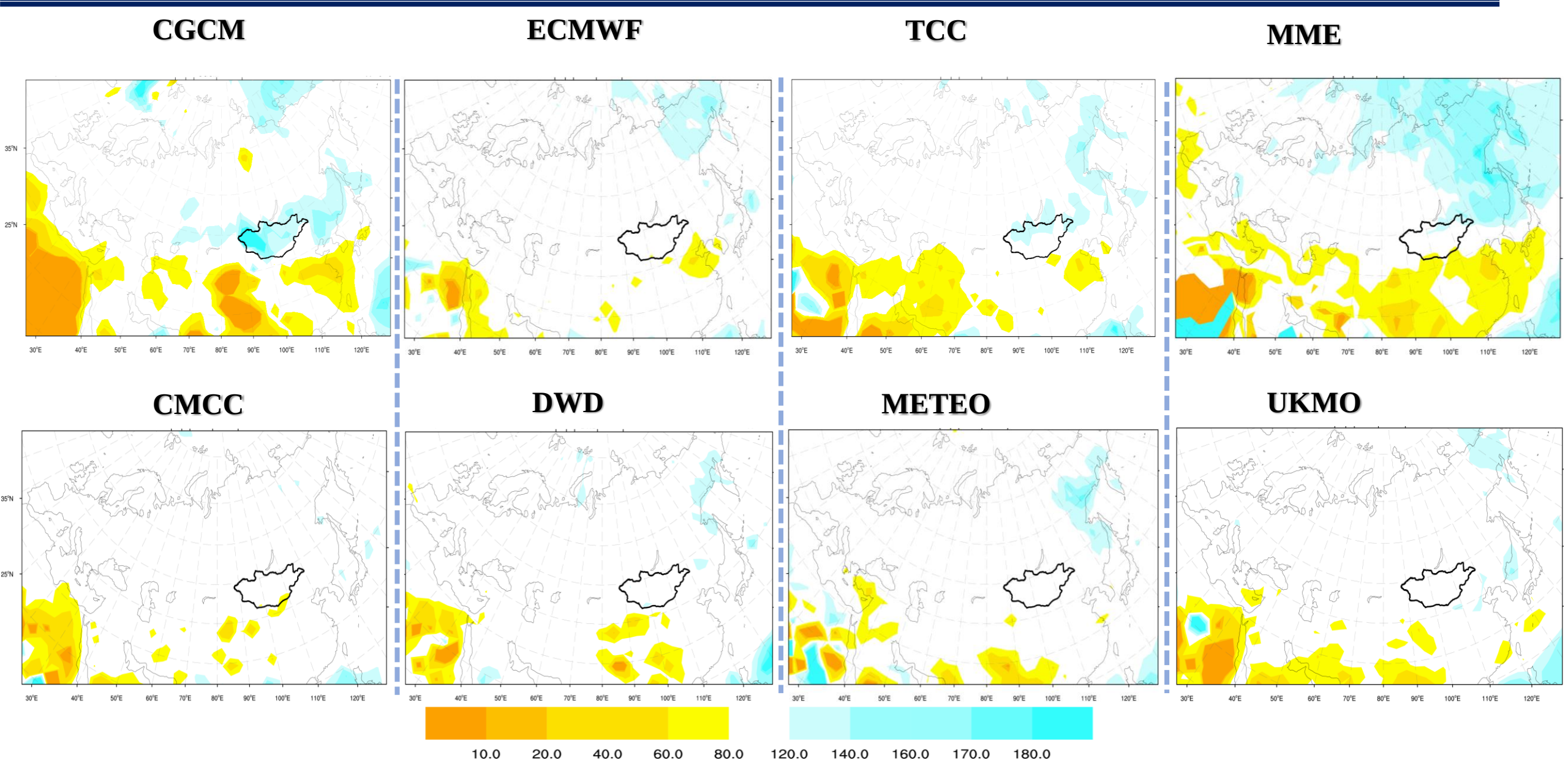
METEO



UKMO

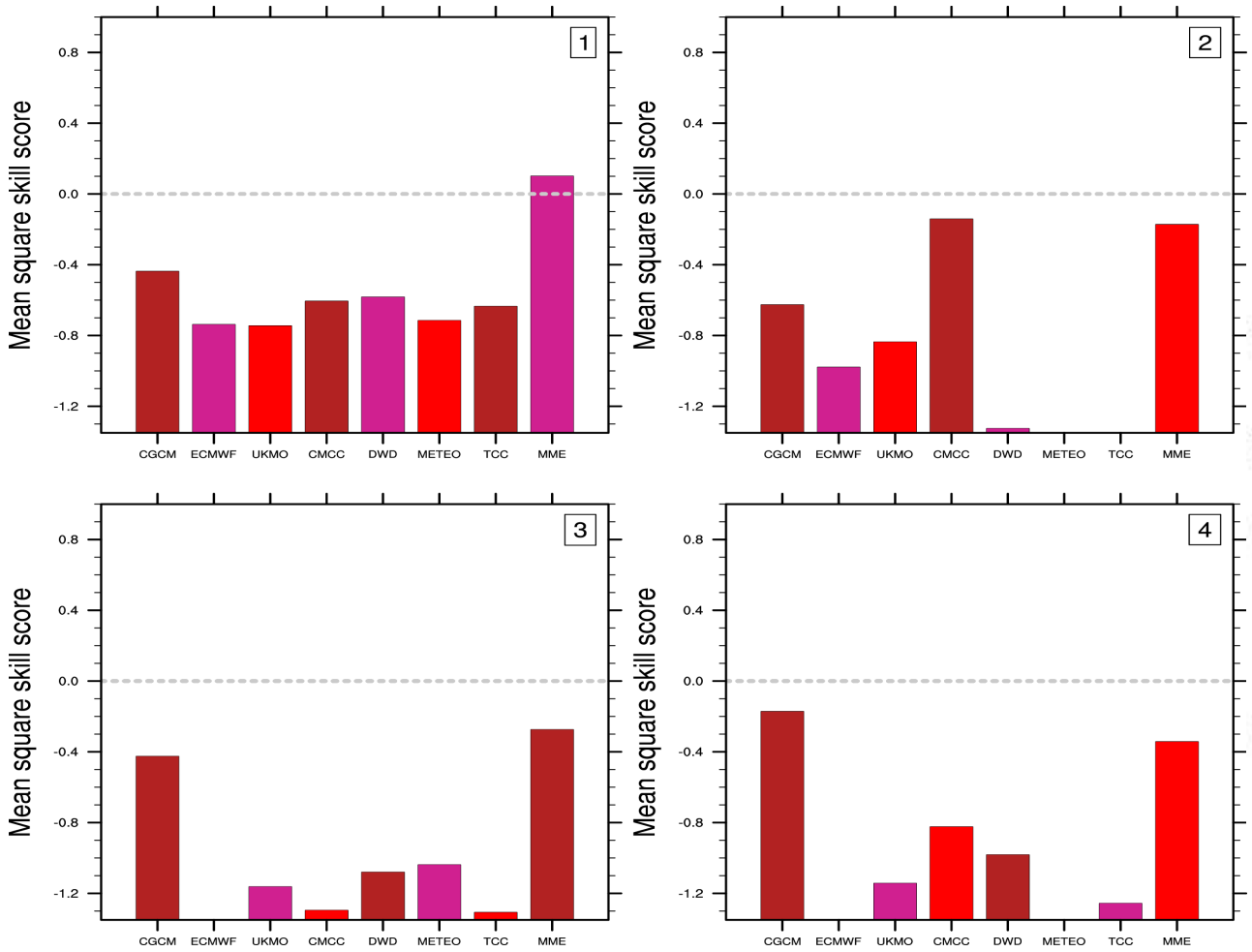


Precipitation for DJF, 2021/22

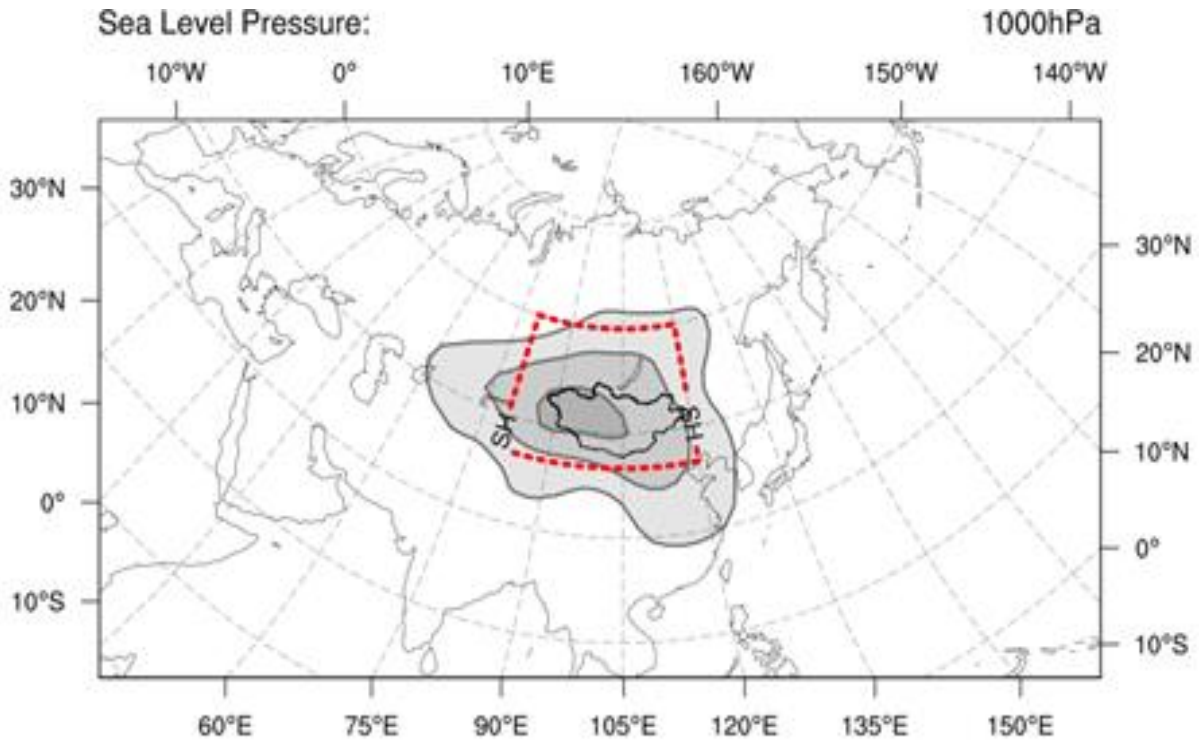


Prediction of large scale index

Prediction for SHI

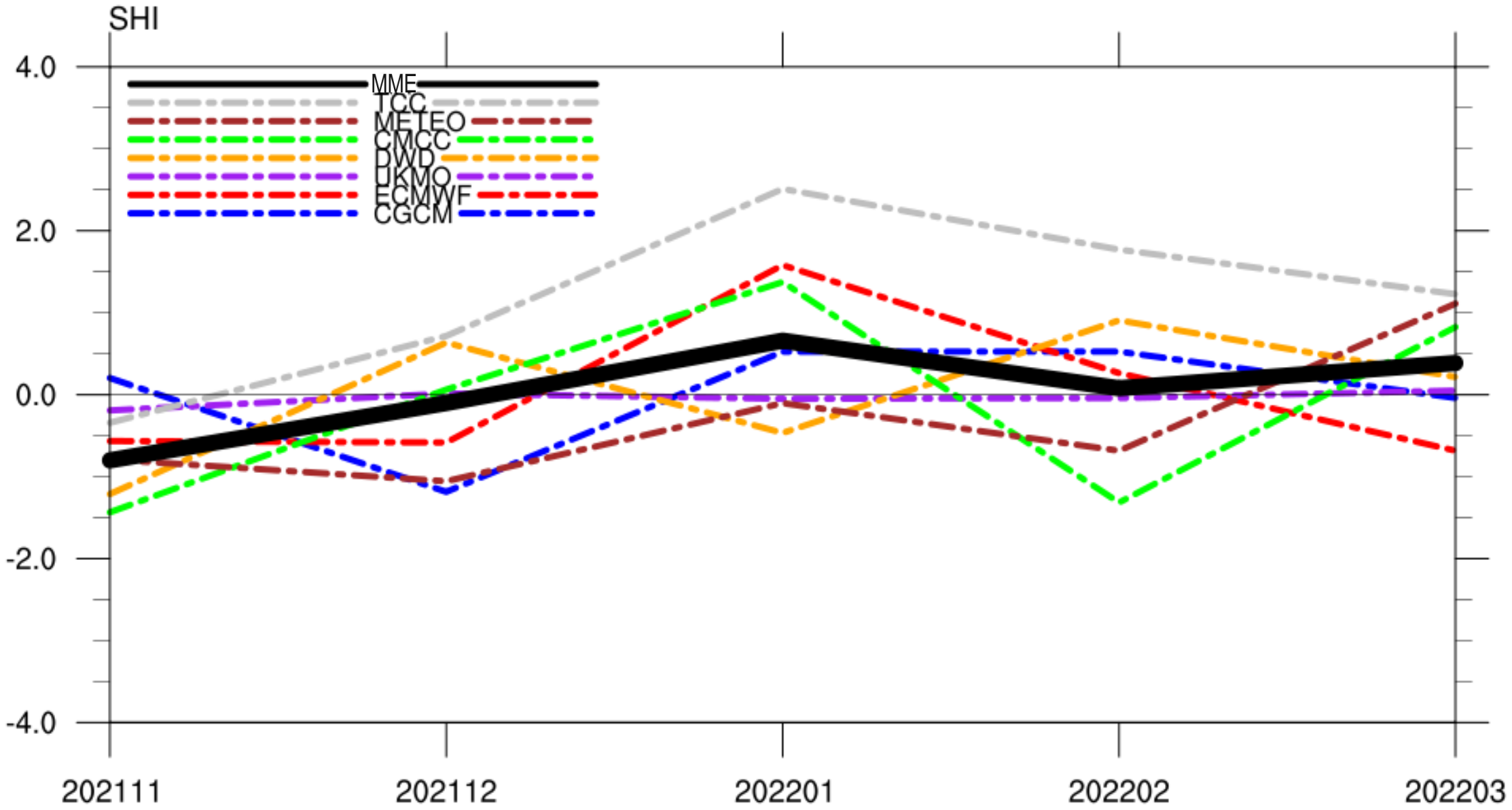


$$SH = Area\_ave\left(slp_{Lat=40\circ N-65\circ N}^{Lon=80\circ E-120\circ E}\right)$$



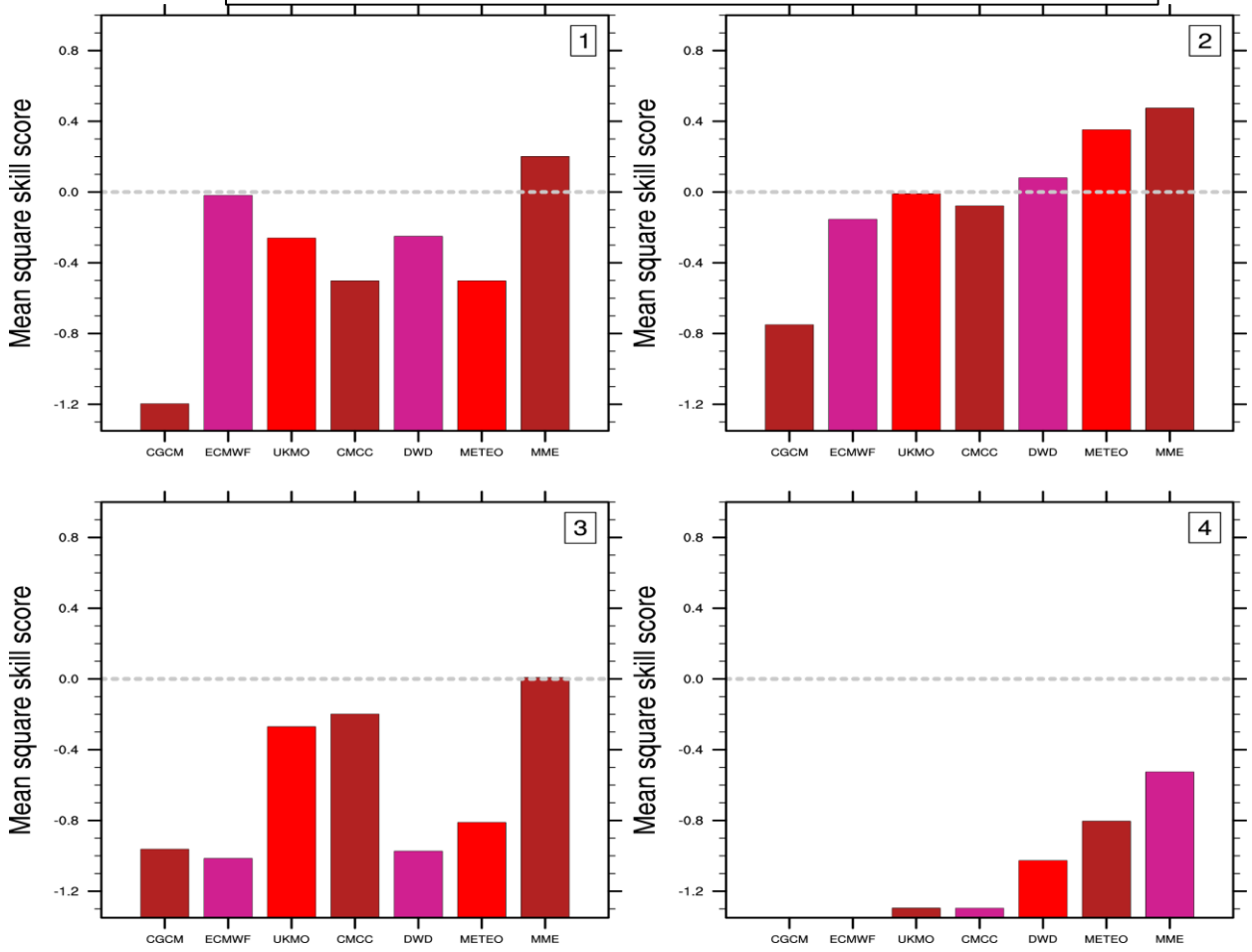
Y. Gong and H.Ho (2002)

Prediction for SHI

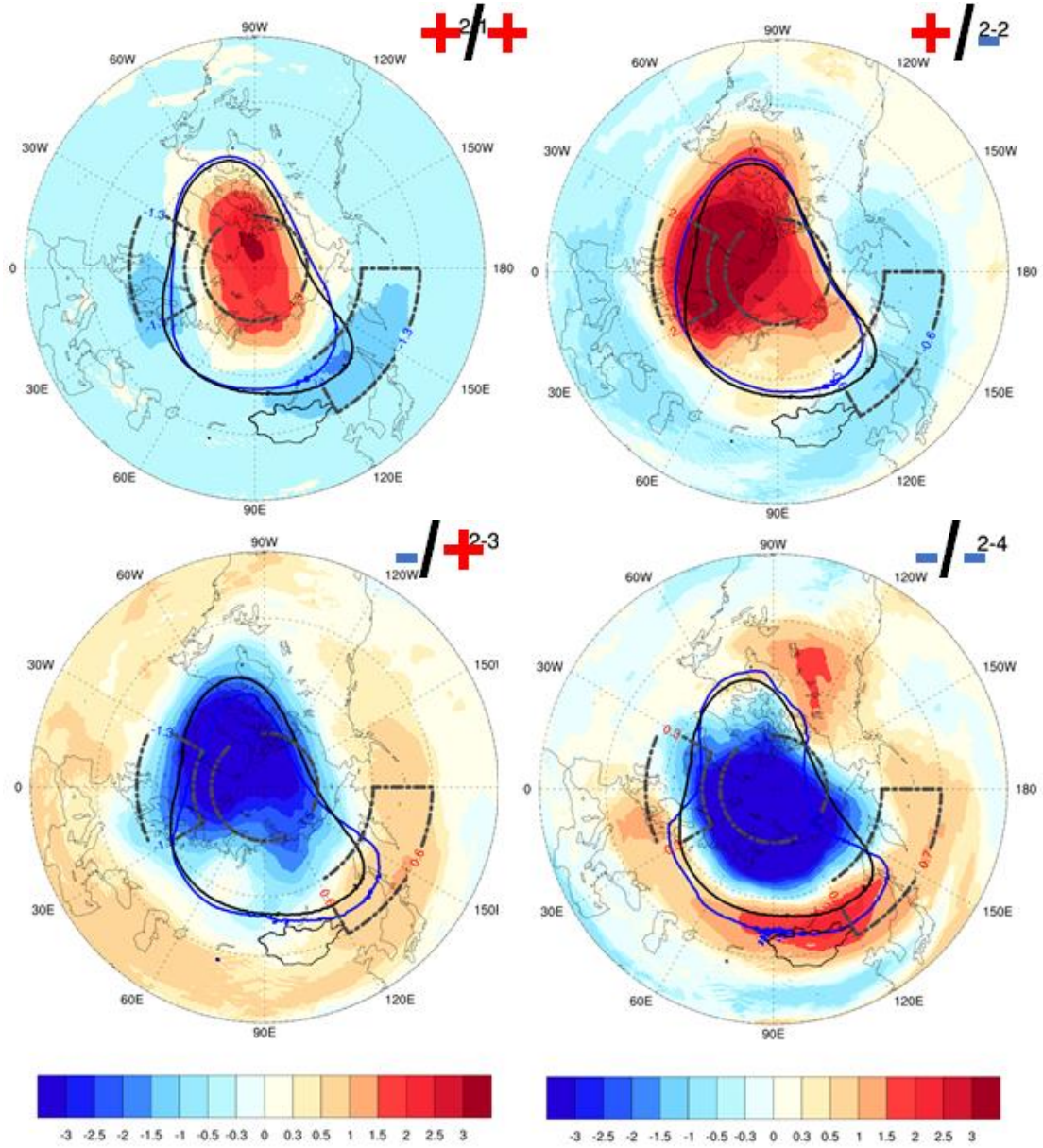


Prediction for PVI

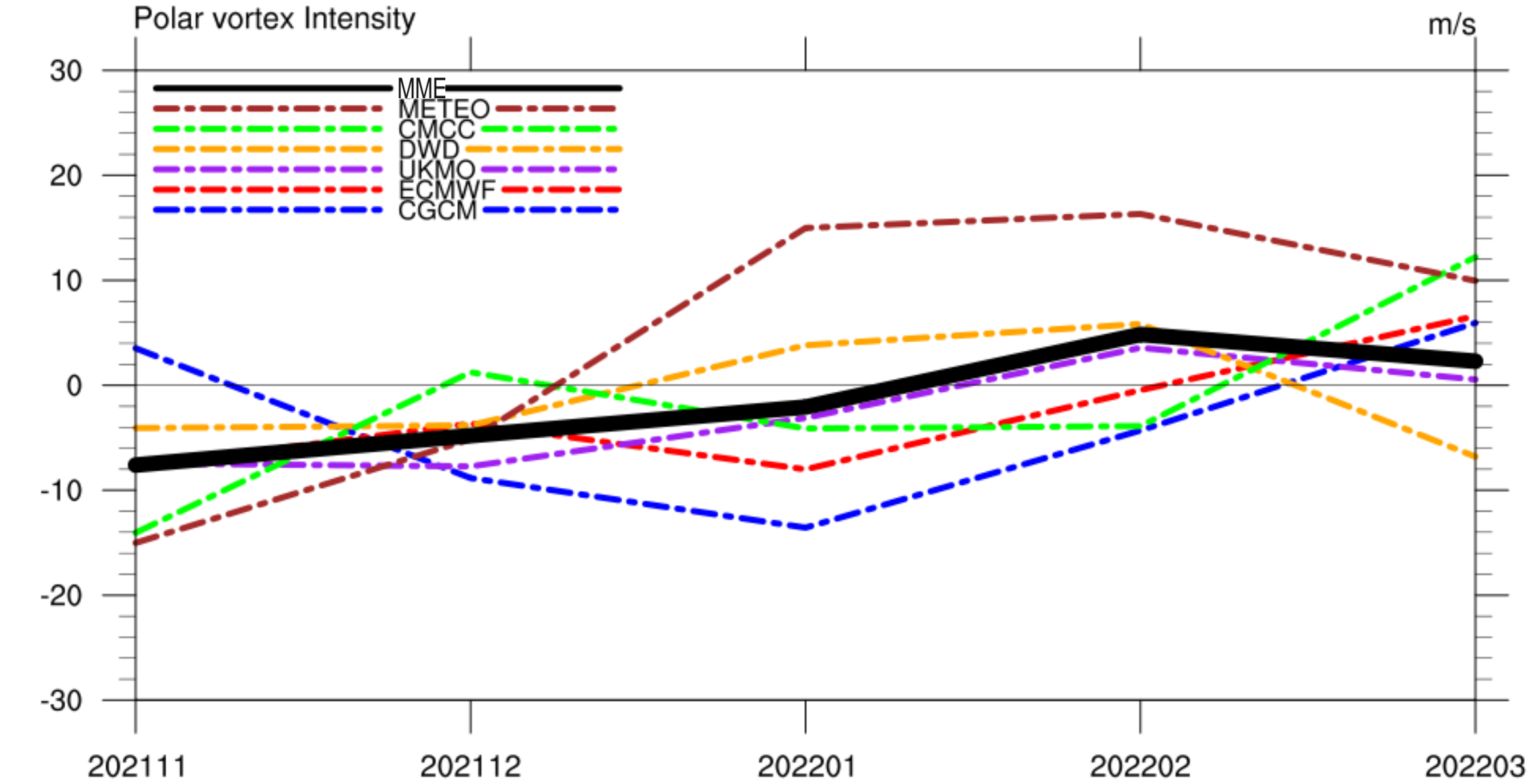
$$PVI = \frac{1}{\lambda_1 - \lambda_2} \int_{\lambda_1=55}^{\lambda_2=65} ZonalAve\left(u_{10}\right) d_\lambda$$



Darryn.W ., *et al* (2017)

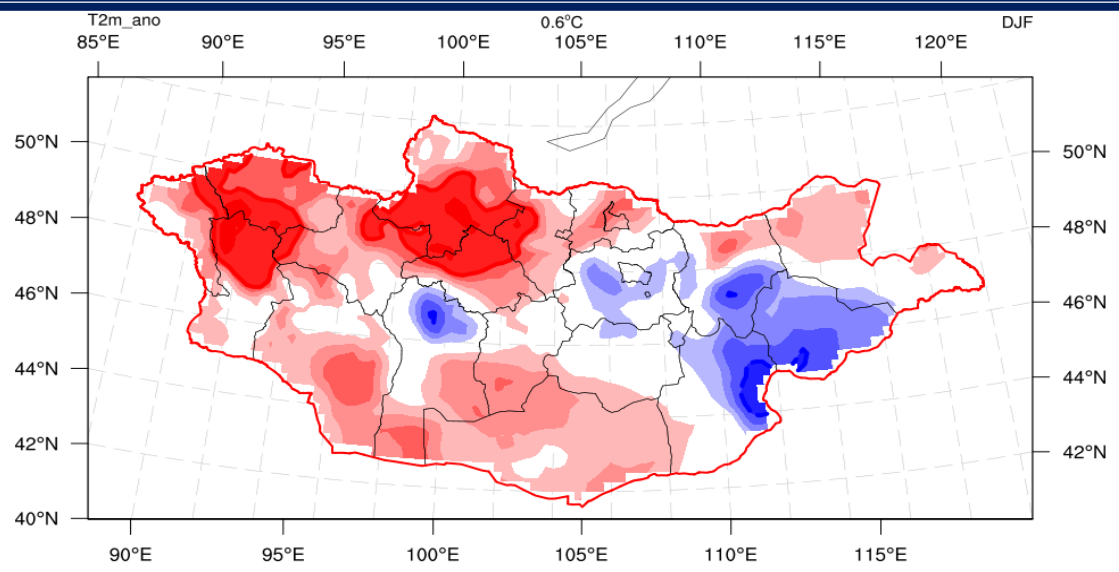


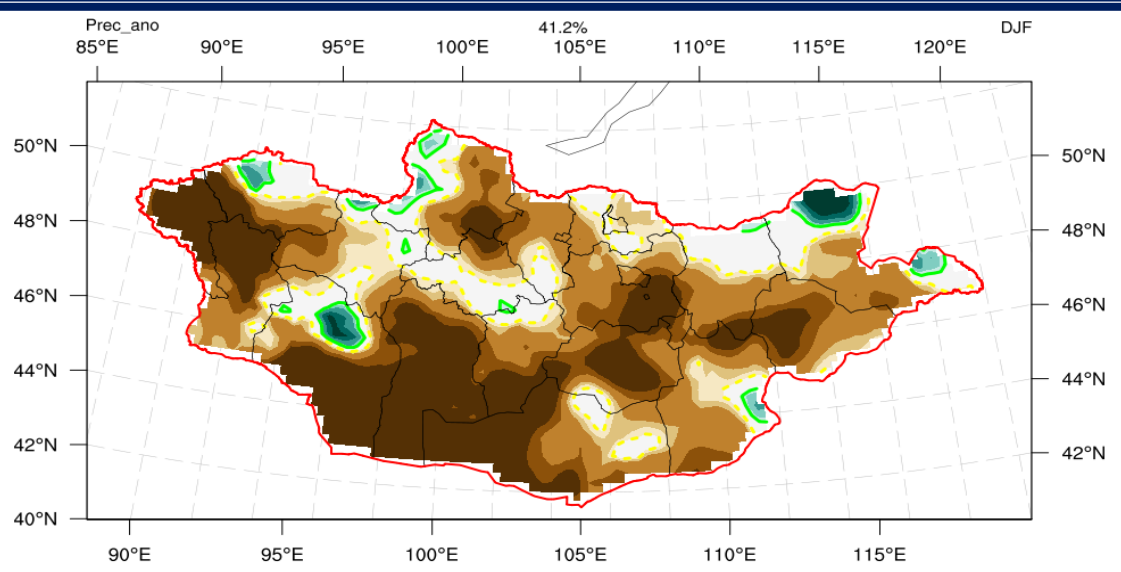
Prediction for PVI



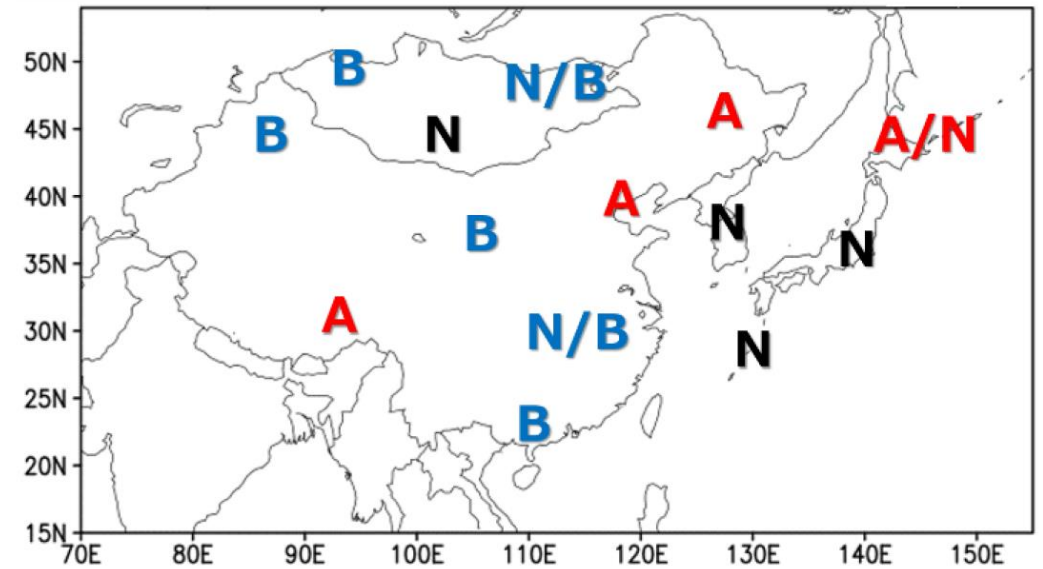
Observation and prediction for winter (2020/21)

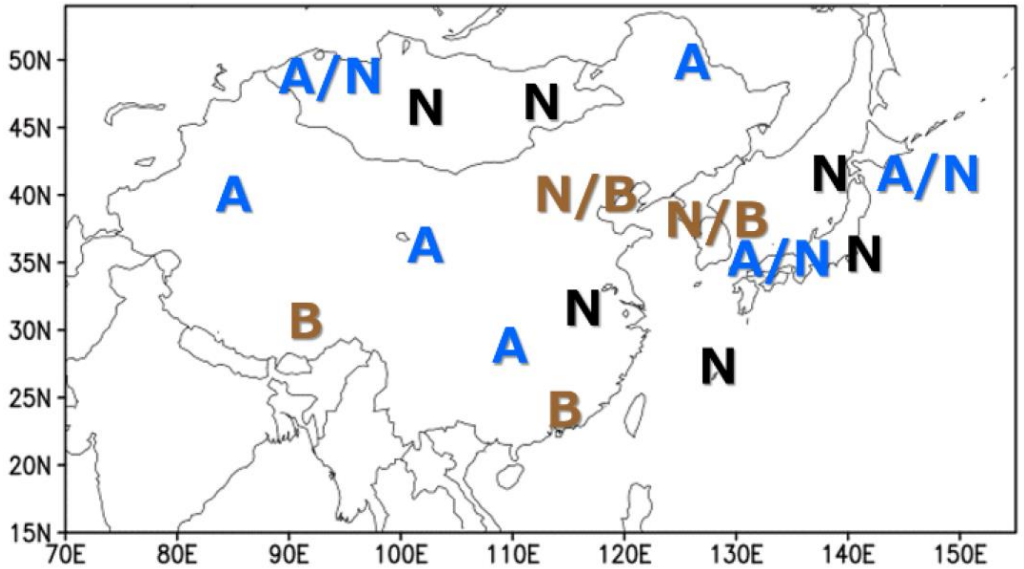
Observation





Prediction





Outlook for 2021/22 winter

	WEST	CENTER	EAST	GOBI
TEMPERATURE				
December	N	A	A	A
January	B/N	N	A	N/B
February	N	A	A	A
DJF	**N**	A/N	**A**	**A/N**
PRECIPITATION				
December	**N/B**	**B**	**B**	**B**
January	**A**	N	**B**	**A**
February	N	N	N	N
DJF	**N/A**	**N**	**B**	**N/B**

Thank you for your attention