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Asian Summer Monsoon Diagnostics for CAM5.1

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Asian Summer Monsoon Diagnostics for CAM5.1

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Table 1: Pattern correlations between models and observations. For precipitation, the models are validated against GPCP, and for winds the models are validated against JRA25. For the precipitation and 850hPa JJAS wind climatologies the pattern correlations are calculated over the region region 40°E-160°E, 20°S-50°N. For the annual cycle of 70°E-90°E averaged rainfall the pattern correlation is over the domain10°S-30°N, for May-September. For the JJAS El Nino precipitation anomalies the pattern correlation is over the region 60°E-100°E, 0°-30°N. For the East Asian Summer Monsoon the JJA precipitation and 850hPa wind anomalies are calculated over the region 100°E-140°W, 0°-50°N. For rainfall, the observational pattern correlation is between CMAP and GPCP. For 850hPa wind climatology, the observational pattern correlation is between ERA40 (1961-1999) and JRA25. For 850hPa wind anomalies over the East Asian Summer Monsoon region, the observational pattern correlation is between NCEP-NCAR Reanalysis and JRA25. Bold entries indicate the model with the highest pattern correlation.

	Pr Clim.	850hPa Clim.	Pr Ann. Cycle	Pr vs. Nino3.4 SSTA	Pr vs. EASM WF index	850hPa vs. EASM WF index
Obs	0.924	0.985	0.883	0.778	0.959	0.989
0.25°	0.657	0.898	0.696	-0.030	0.672	0.913
1°	**0.769**	**0.958**	**0.730**	**0.166**	0.780	**0.917**
2°	0.739	0.948	0.640	-0.033	**0.794**	0.901

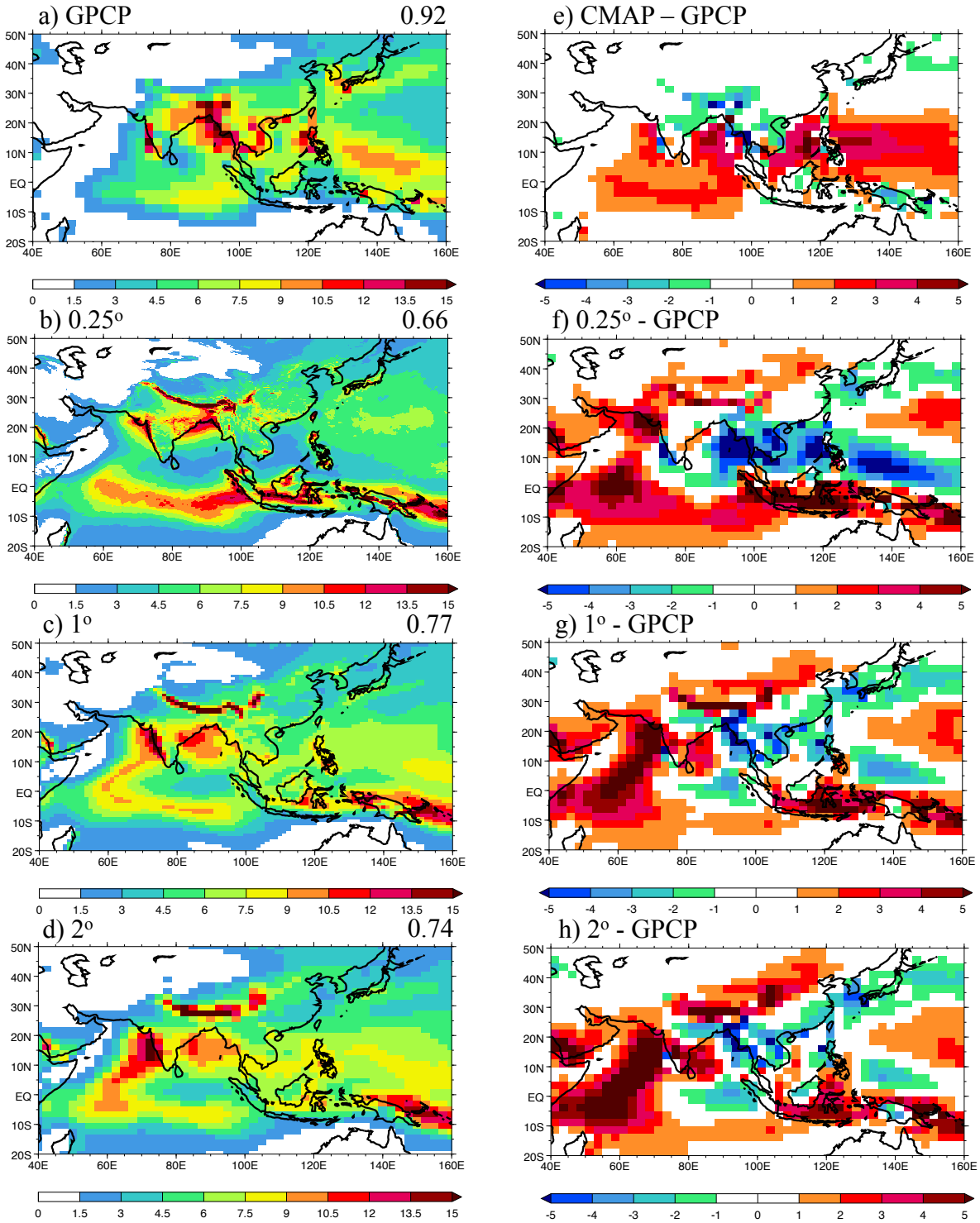

Fig. 1 a-d JJAS precipitation rate climatology from **a** GPCP, **b** 0.25° run, **c** 1° run, and **d** 2° run. Also given in **a** is the pattern correlation of CMAP with GPCP, and in **b-d** are the model pattern correlations with GPCP over the region 40°E-160°E, 20°S-50°N. **f** (CMAP) *minus* (GPCP), **f-h** as **b-d** but for (model) *minus* (GPCP). The units are (mm day^{-1}). The difference maps were calculated on the 2.5° x 2.5° grid used by GPCP.

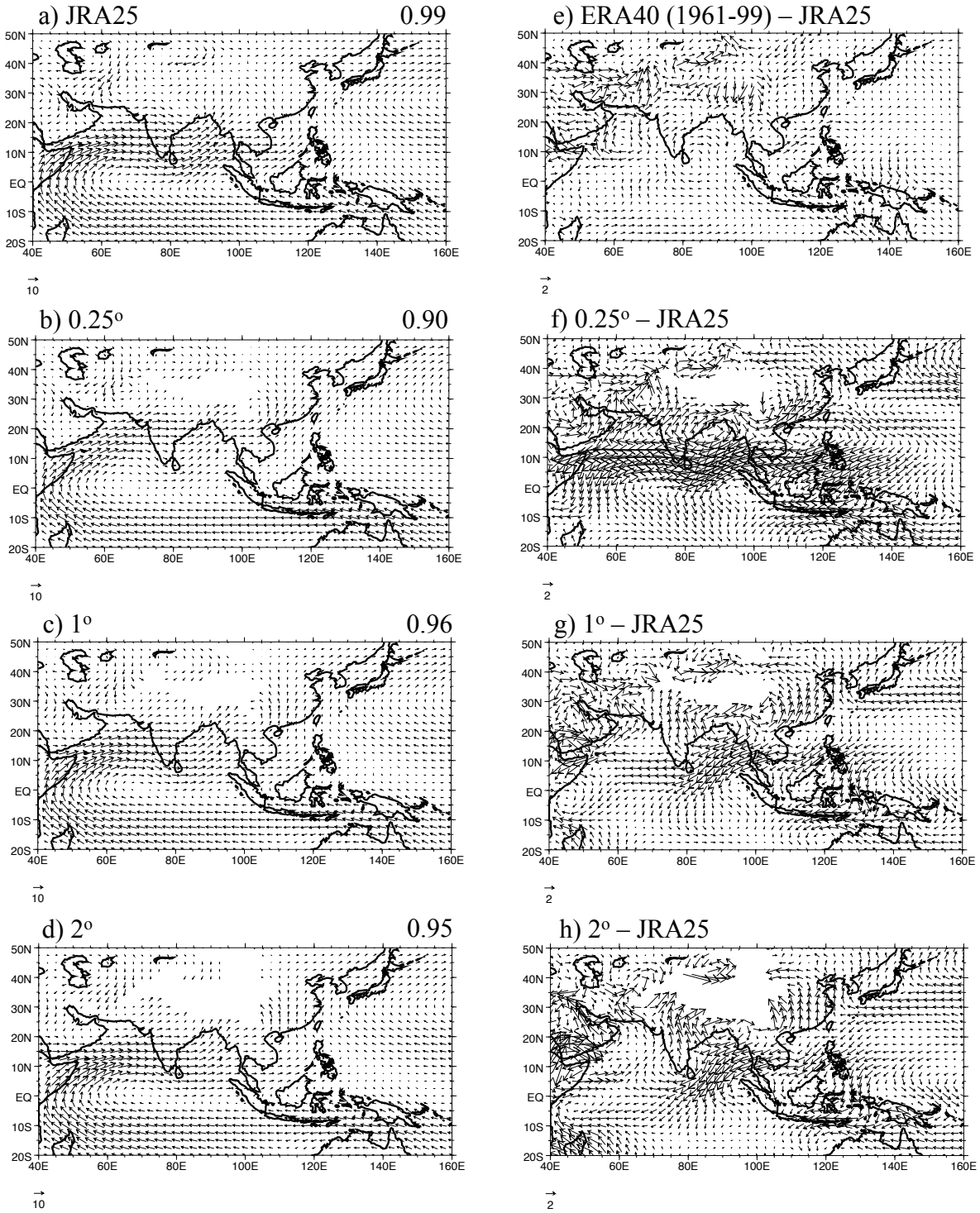

Fig. 2 a-d JJAS 850hPa wind climatology from **a** JRA25, **b** 0.25° run, **c** 1° run, and **d** 2° run. Also given in **a** is the pattern correlation of ERA40 with JRA25, and in **b-d** are the model pattern correlations with JRA25 over the region 40°E-160°E, 20°S-50°N. **e** (ERA40) *minus* (JRA25), **f-h** as **b-d** but for (model) *minus* (JRA25). The units are (ms^{-1}). JRA25 and model data are from 1979-2005, ERA40 is from 1961-1999. The data has been regridded to a 2.5° x 2.5° grid prior to analysis.

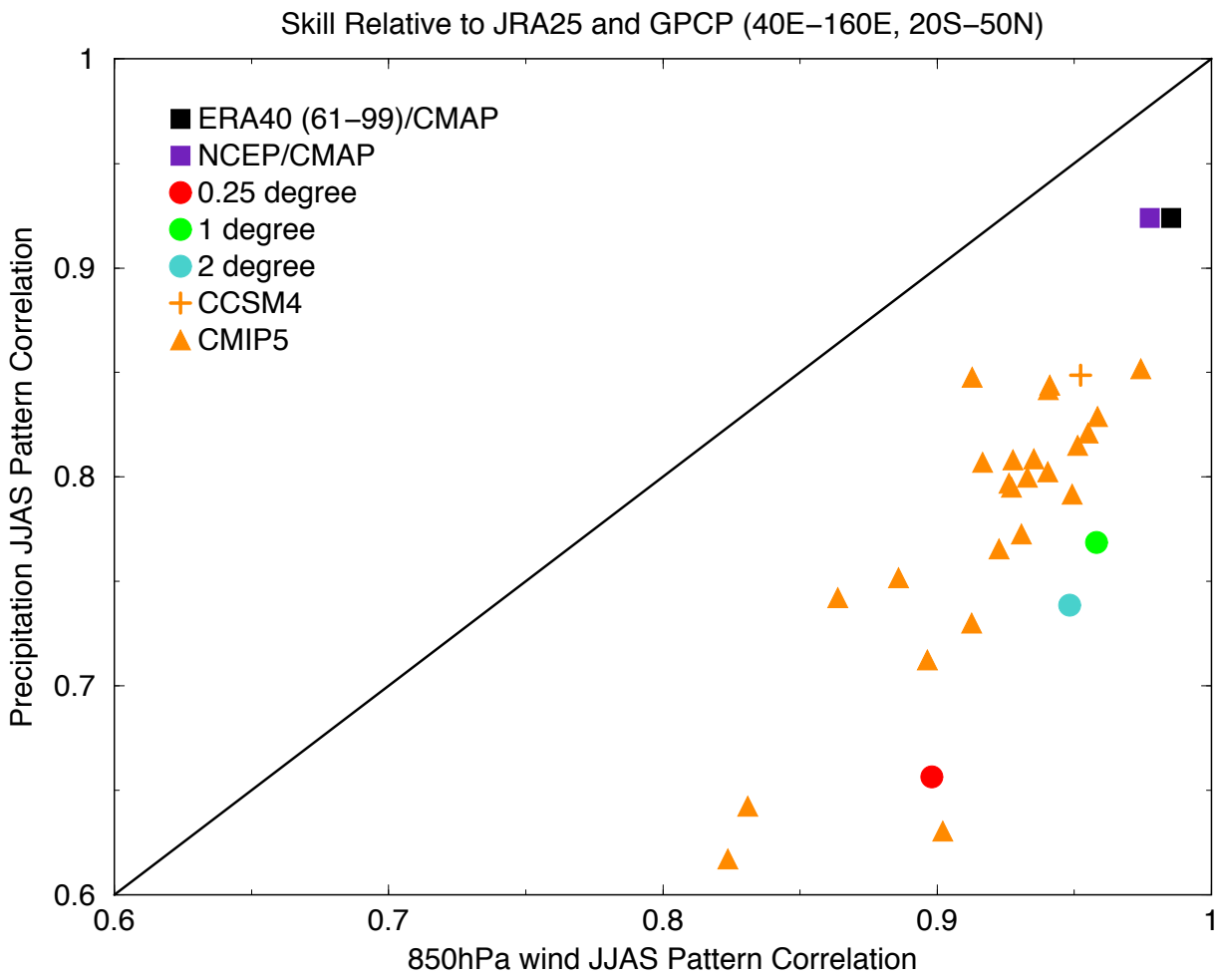

Fig. 3 Scatterplot of the pattern correlation with observations of simulated JJAS 850hPa wind climatology vs. the pattern correlation with observations of simulated JJAS precipitation climatology. The skill is relative to JRA25 and GPCP over the region 40°E-160°E, 20°S-50°N.

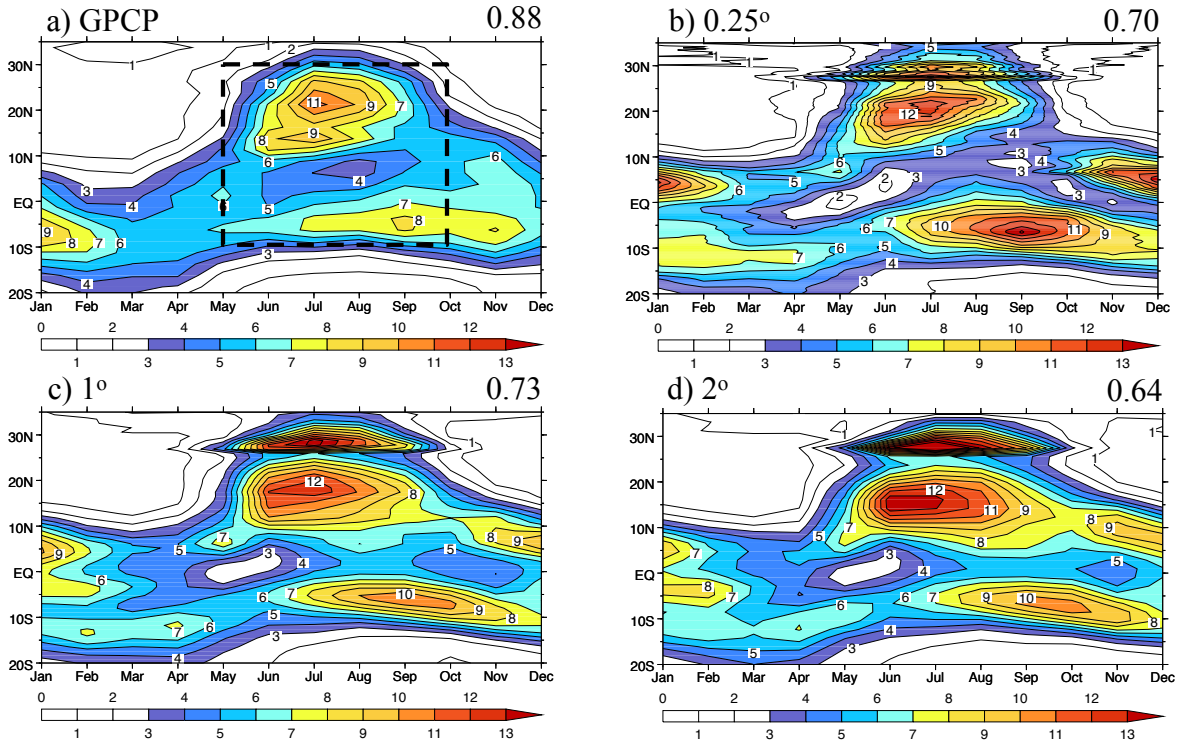

Fig. 4 a-f Annual cycle climatology for rainfall rate averaged between 70°E-90°E from **a** GPCP, **b** 0.25° run, **c** 1° run, and **d** 2° run. Also given in **b-d** is the pattern correlation of the model with GPCP over the region 10°S-30°N, for May-September (the dashed region in **a**). The units are (mm day^{-1}).

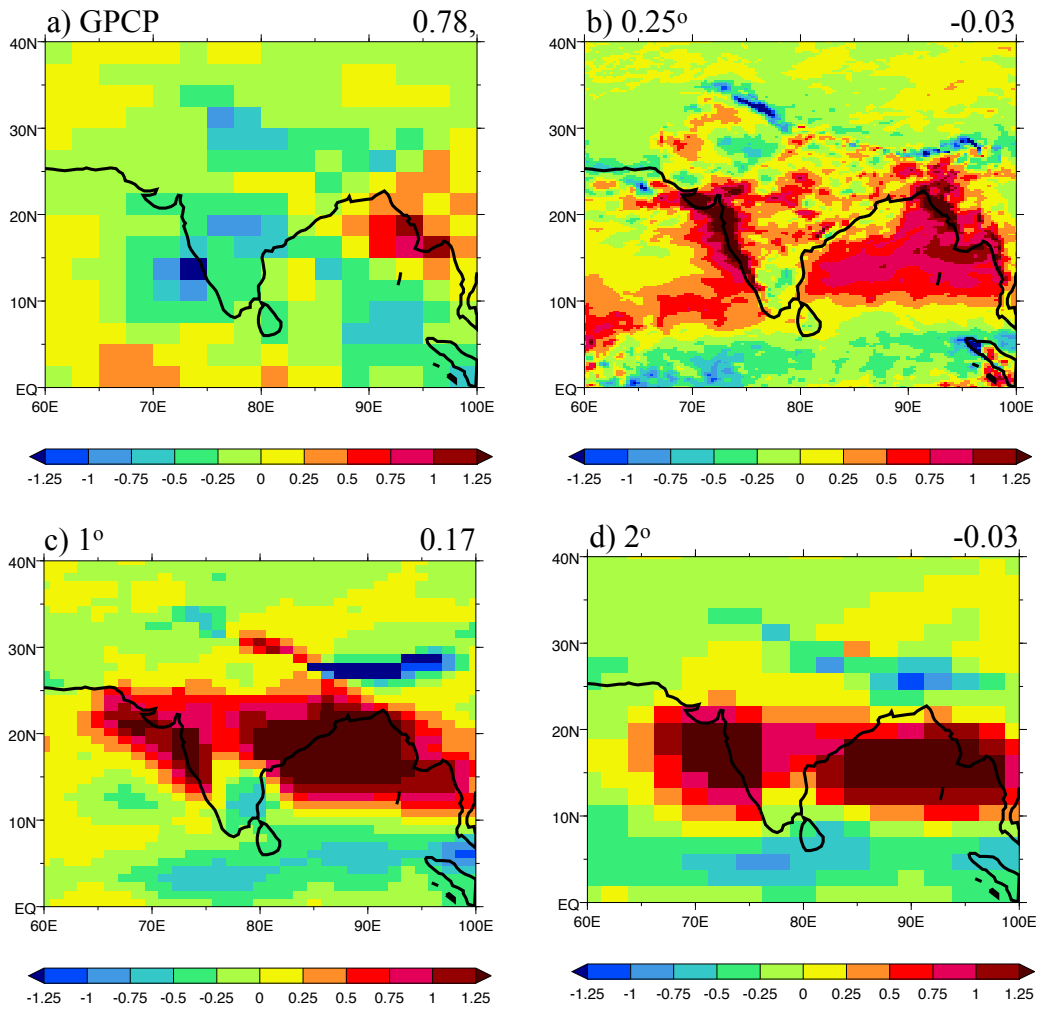

Fig. 5 Interannual JJAS precipitation anomalies (mm day^{-1}) based on linear regression with JJAS NINO3.4 SST anomalies used in the NCEP-NCAR Reanalysis **a** GPCP rainfall, **b** 0.25° run, **c** 1° run, and **d** 2° run. The regressions are scaled by one standard deviation of the NINO3.4 SST anomalies. The value in **a** is the pattern correlation of CMAP with GPCP. **b-d** the model pattern correlation with GPCP. The skill metrics are calculated over the region 60°E-100°E, 0°-30°N.

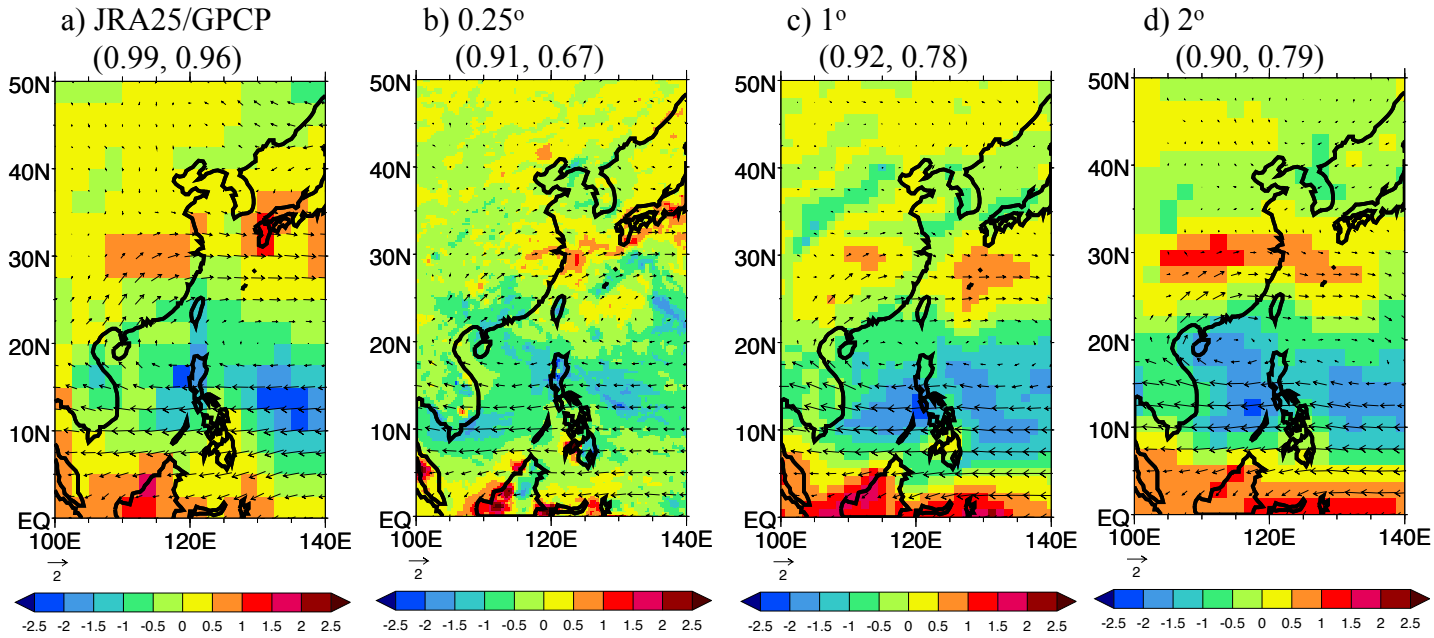

Fig. 6 Interannual East Asian summer monsoon JJA 850hPa wind anomalies and precipitation anomalies based on linear regression with the revised JJA Wang-Fan 850hPa zonal wind index for **a** JRA25/GPCP, **b** 0.25° run, **c** 1° run, and **d** 2° run. Also given in **a** is the pattern correlation of JRA25 with NCEP/NCAR Reanalysis and GPCP with CMAP, respectively, and in **b-d** are the model pattern correlations with JRA25 and GPCP over the region 100°E-140°W, 0°-50°N. The units for the 850hPa wind anomalies are ms^{-1} and for precipitation anomalies the units are mm day^{-1}. The wind vectors are shown on a 2.5° x 2.5° grid.

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