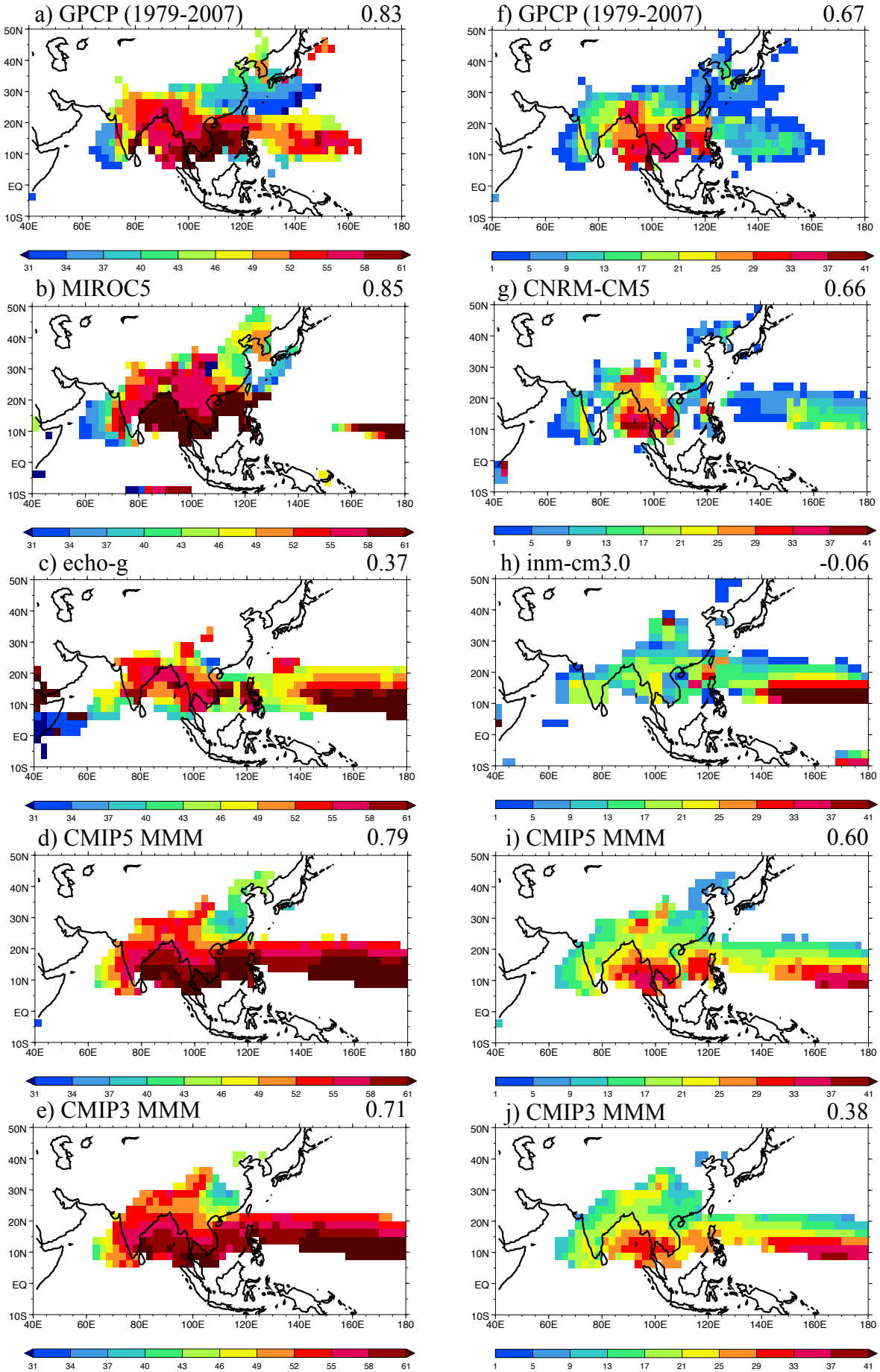


Fig. 7 Monsoon withdrawal pentad **a** GPCP, **b** MIROC5, **c** echo-g, **d** CMIP5 MMM, and **e** CMIP3 MMM. Monsoon duration **f** GPCP, **g** CNRM-CM5, **h** inm cm3.0, **i** CMIP5 MMM, and **j** CMIP3 MMM. Also given in **a** and **f** is the pattern correlation of GPCP with CMAP, and in **b-e** and **g-j** are the model pattern correlations with GPCP over the region 50°E-180°E, 0°-50°N. For withdrawal the units are pentad (Pentad 1 = January 1-5). For duration the units are the number of pentads based on (withdrawal) *minus* (onset) pentad. GPCP and CMAP data are from 1979-2007 and the model data is from 1961-1999

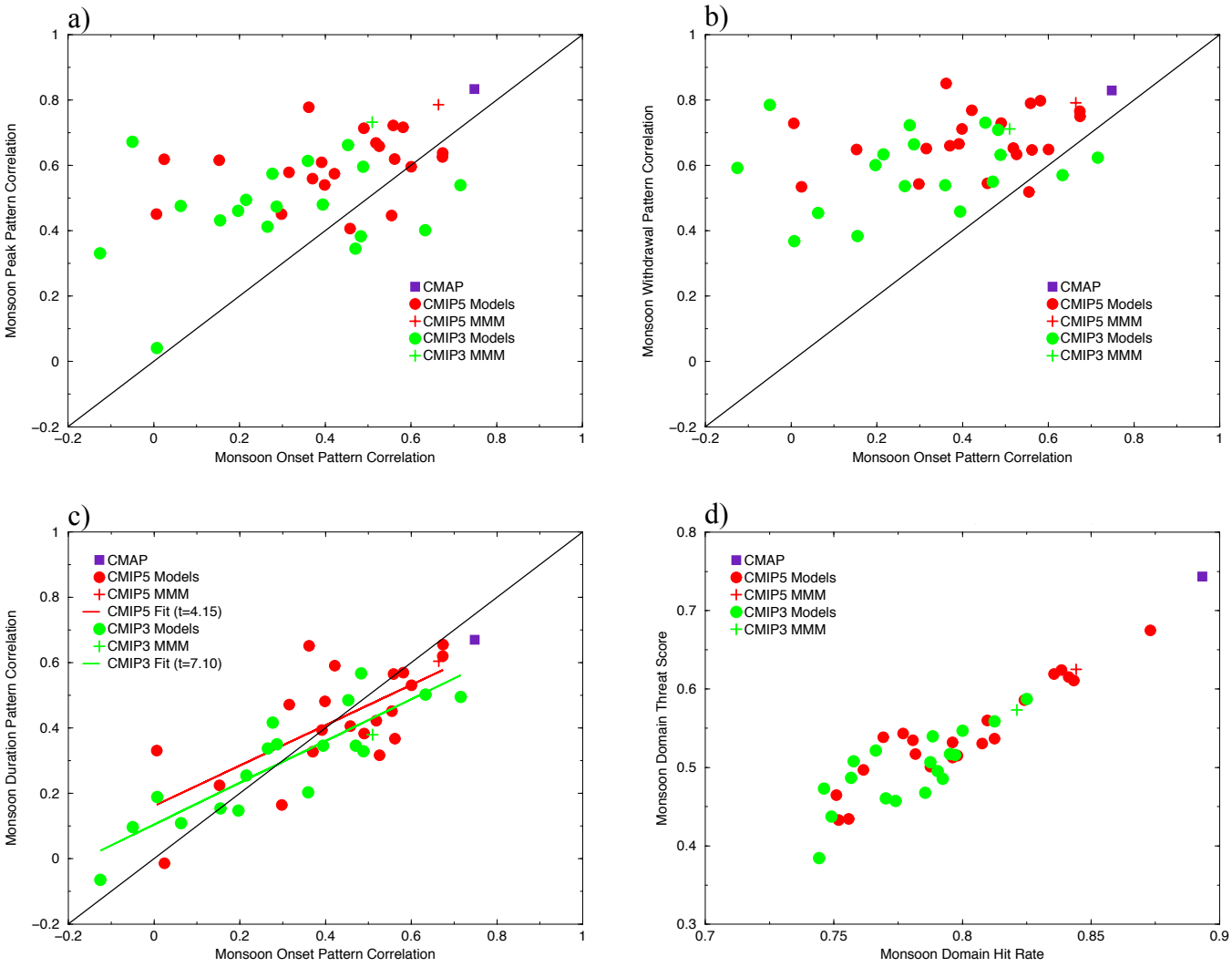
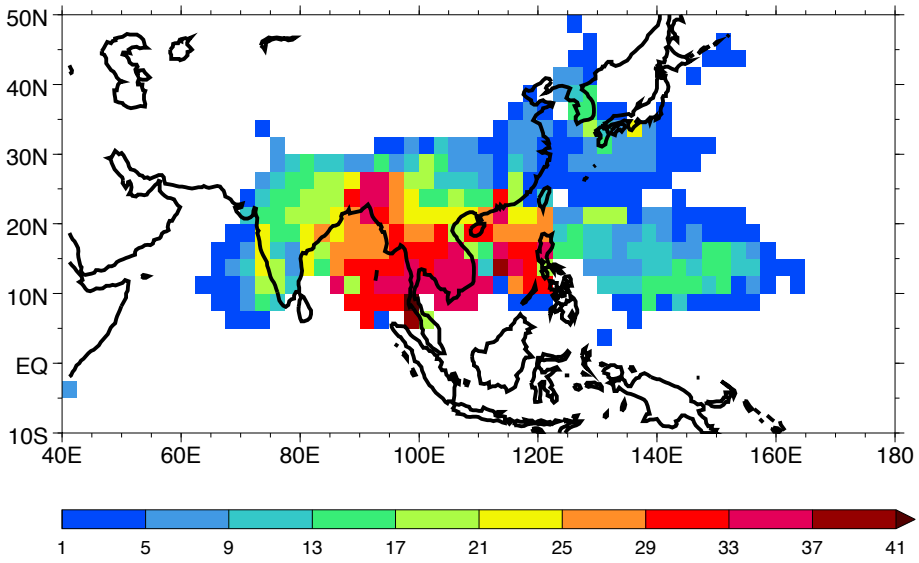
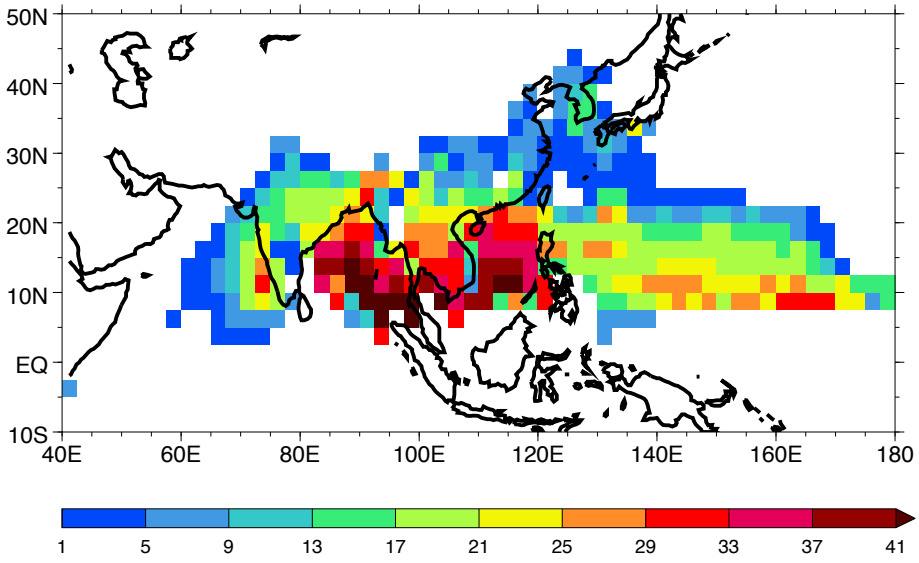


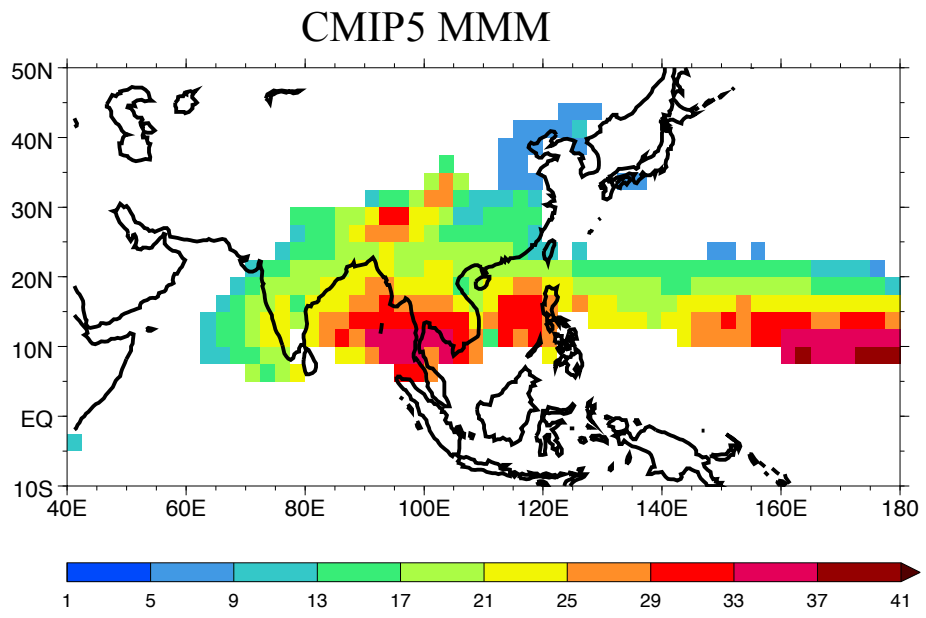
Fig. 8 Scatterplot of the pattern correlation with observations of the simulated pentad of monsoon onset vs. **a** the pattern correlation with observations of the simulated pentad of monsoon peak, **b** the pattern correlation with observations of the simulated pentad of monsoon withdrawal, and **c** the pattern correlation with observations of the simulated number of pentads of monsoon duration. **d** Scatterplot of the Monsoon Domain Hit Rate vs. the Monsoon Domain Threat Score. In **a-d** the skill is with respect to GPCP for the region 50°E-180°E, 0°-50°N

GPCP (1979-2007)



CMAP (1979-2007)




CMIP5 MMM
50N
40N
30N
20N
10N
EQ
10S
40E
60E
80E
100E
120E
140E
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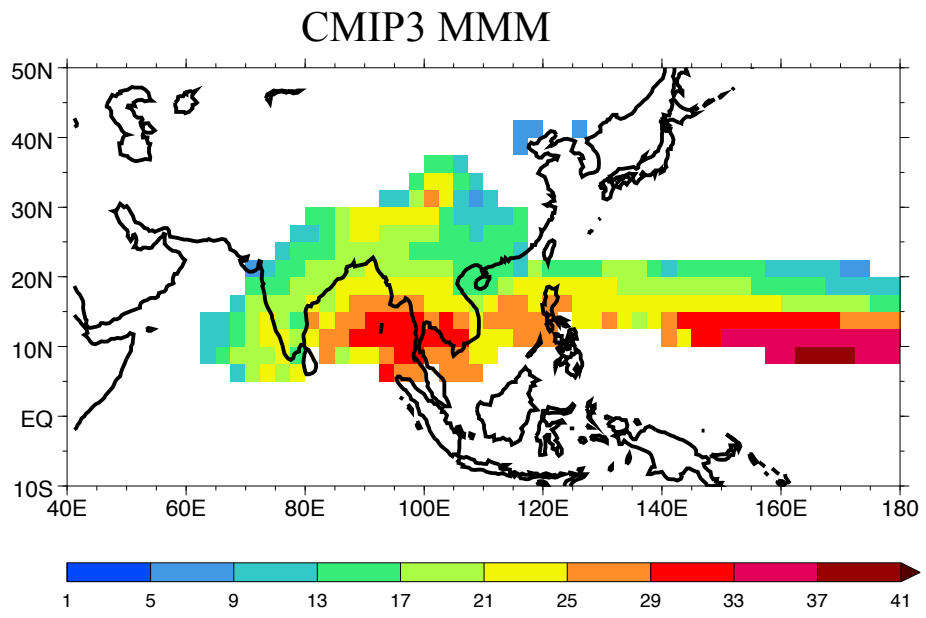
29
33
37
41


CMIP3 MMM
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40N
30N
20N
10N
EQ
10S
40E
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140E
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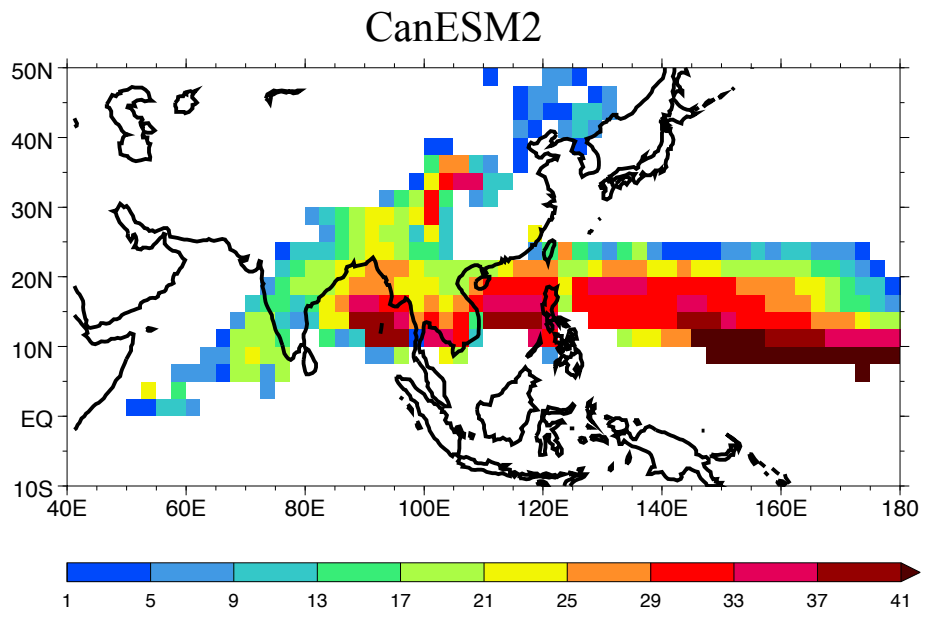
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40N
30N
20N
10N
EQ
10S
40E
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140E
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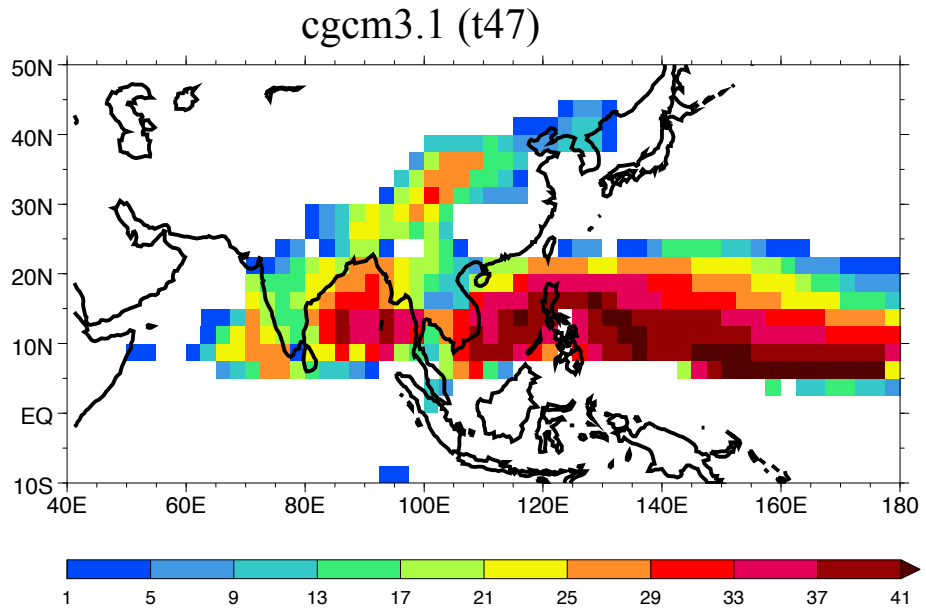
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10N
EQ
10S
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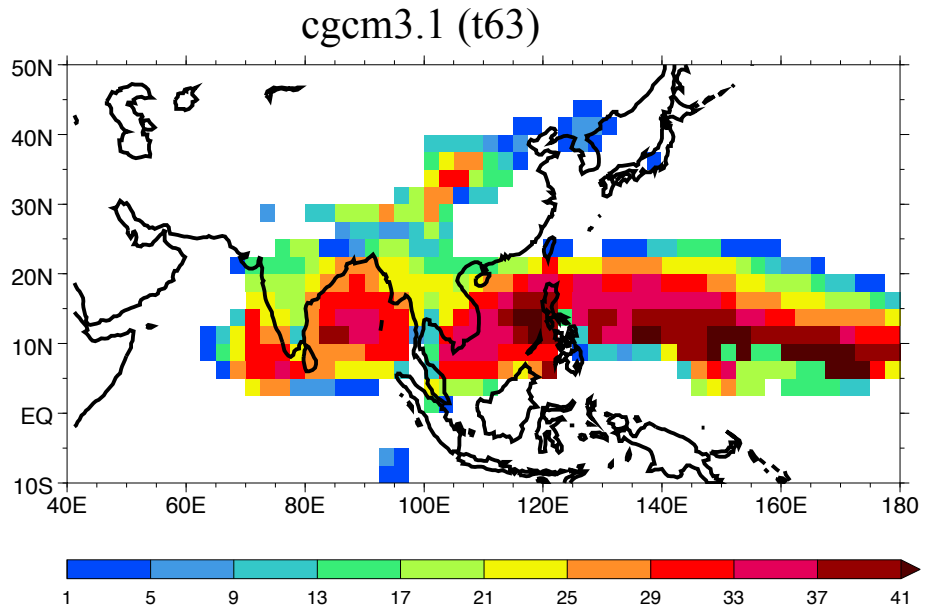
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20N
10N
EQ
10S
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140E
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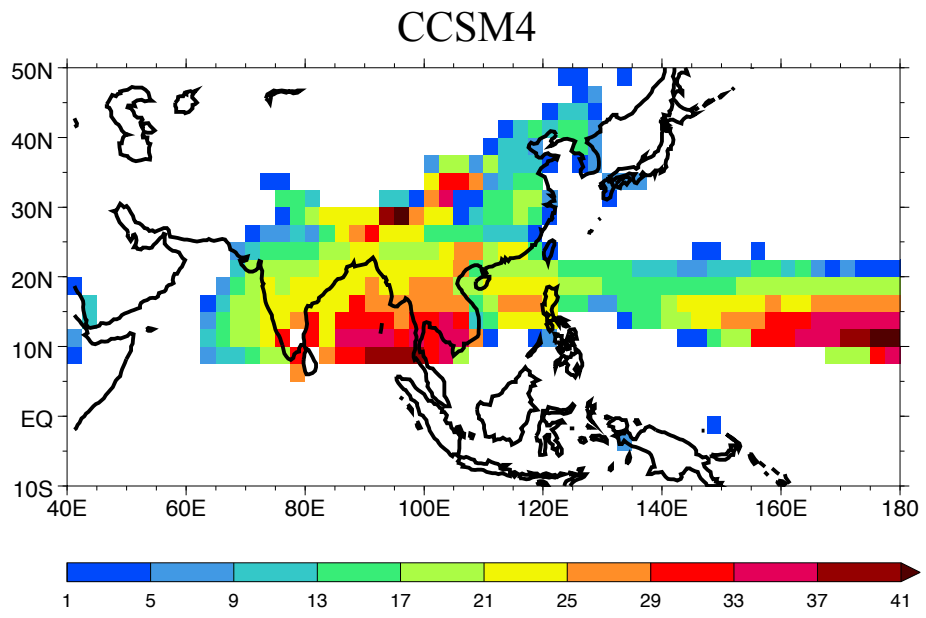
41


CCSM4
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40N
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EQ
10S
40E
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120E
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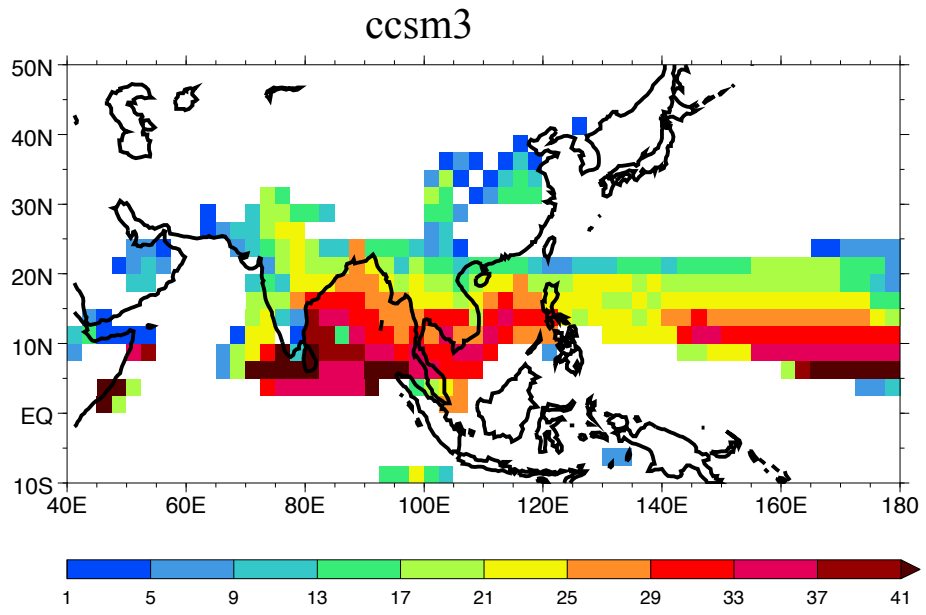
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20N
10N
EQ
10S
40E
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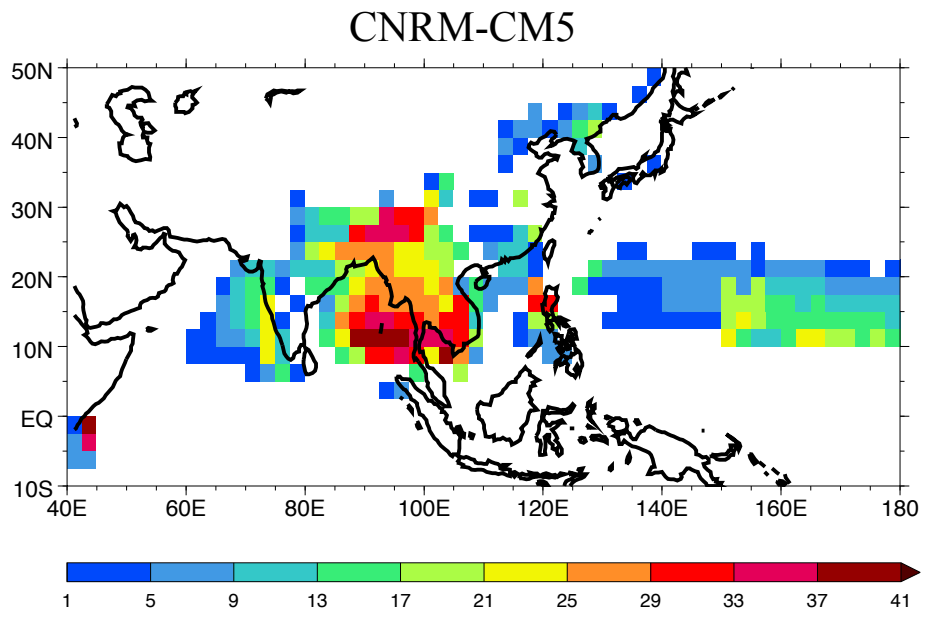
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10N
EQ
10S
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120E
140E
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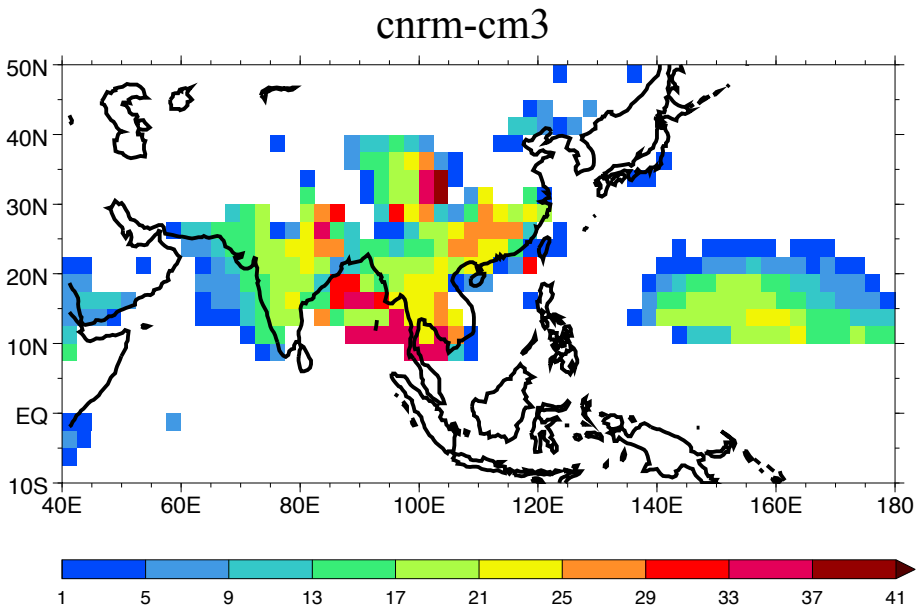
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10N
EQ
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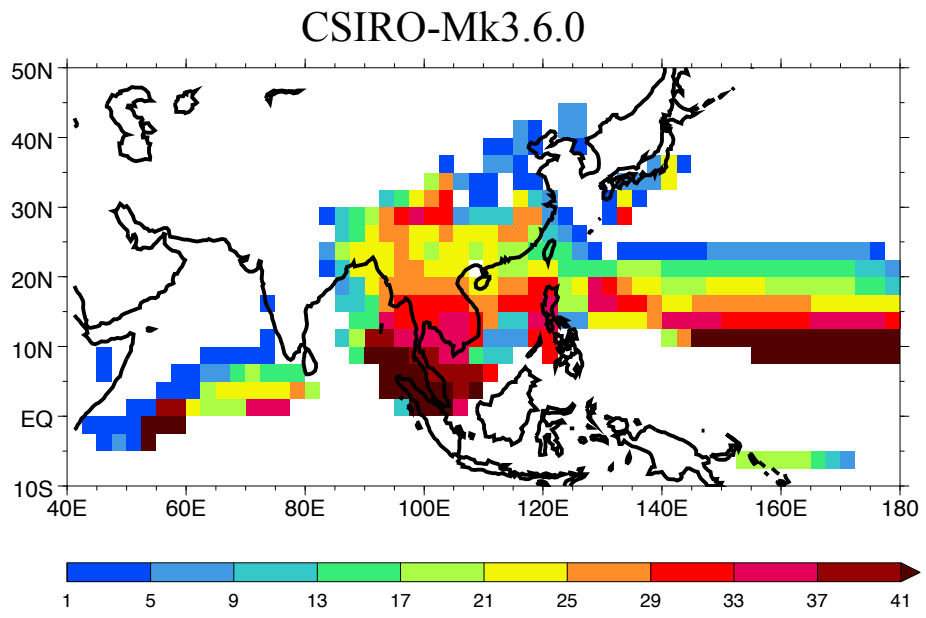
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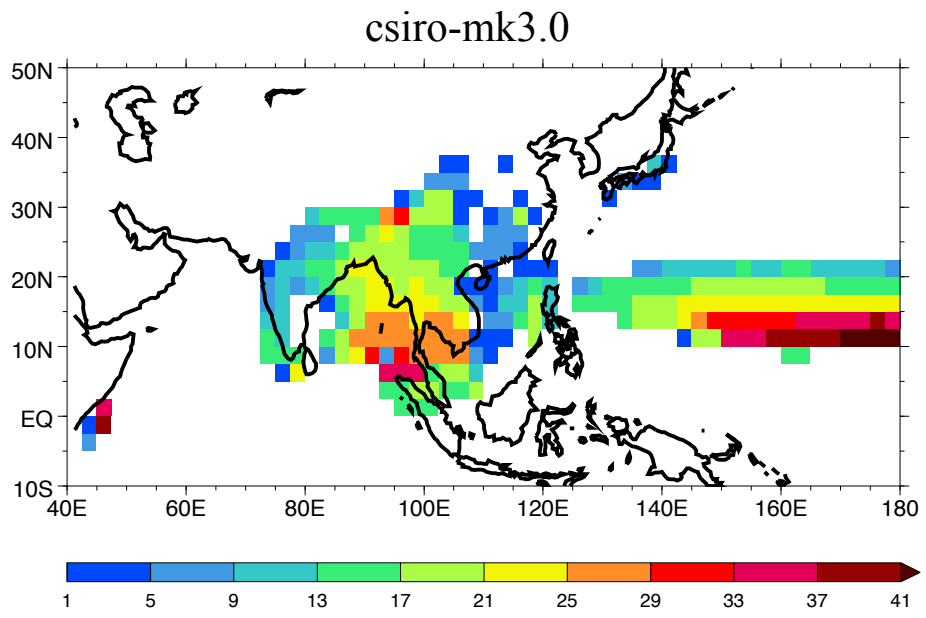
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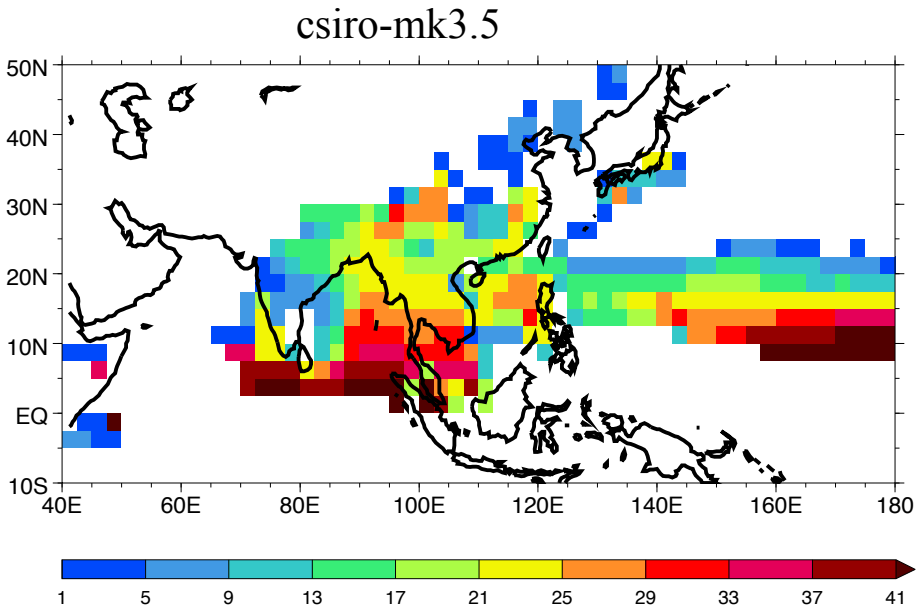
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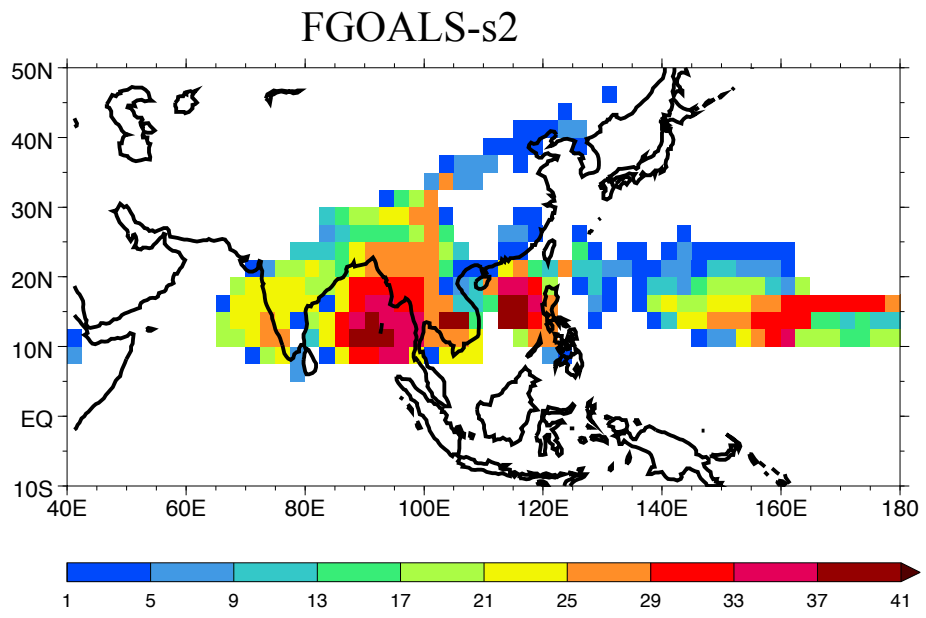
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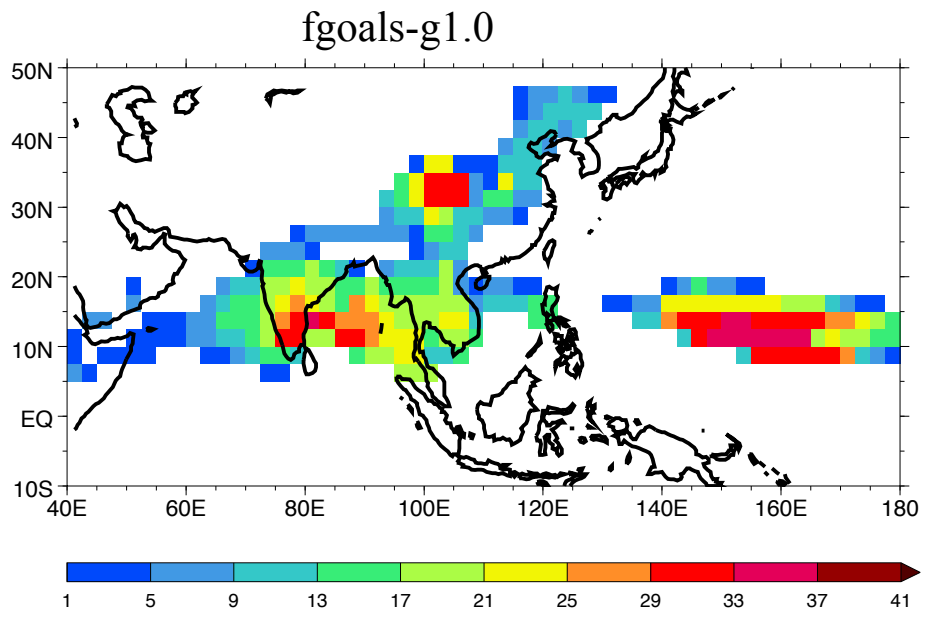
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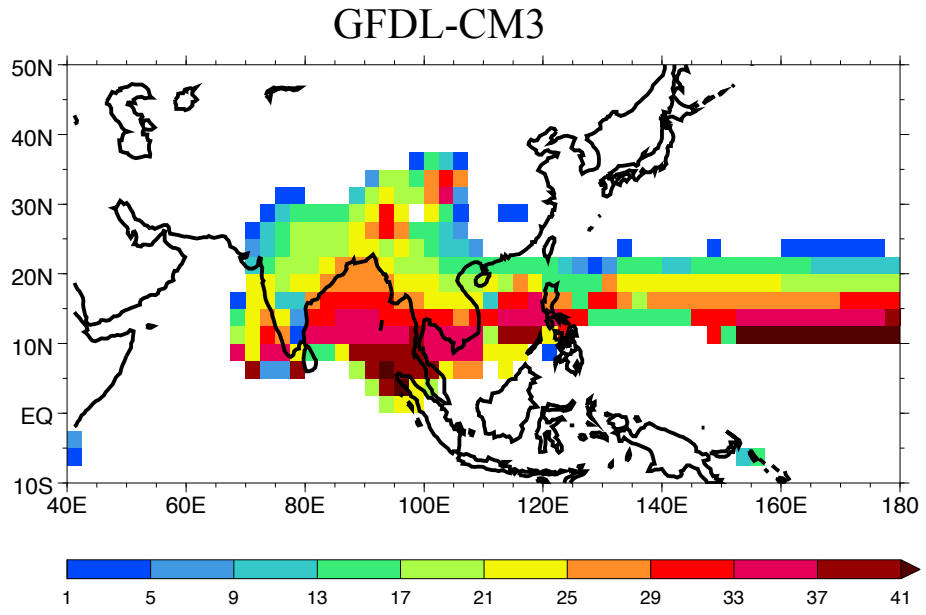
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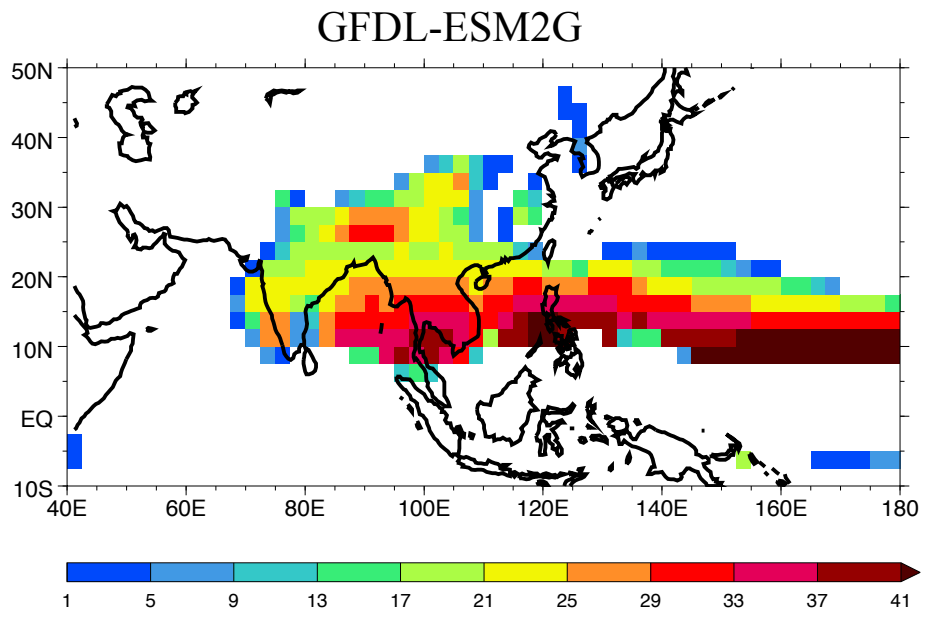
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EQ
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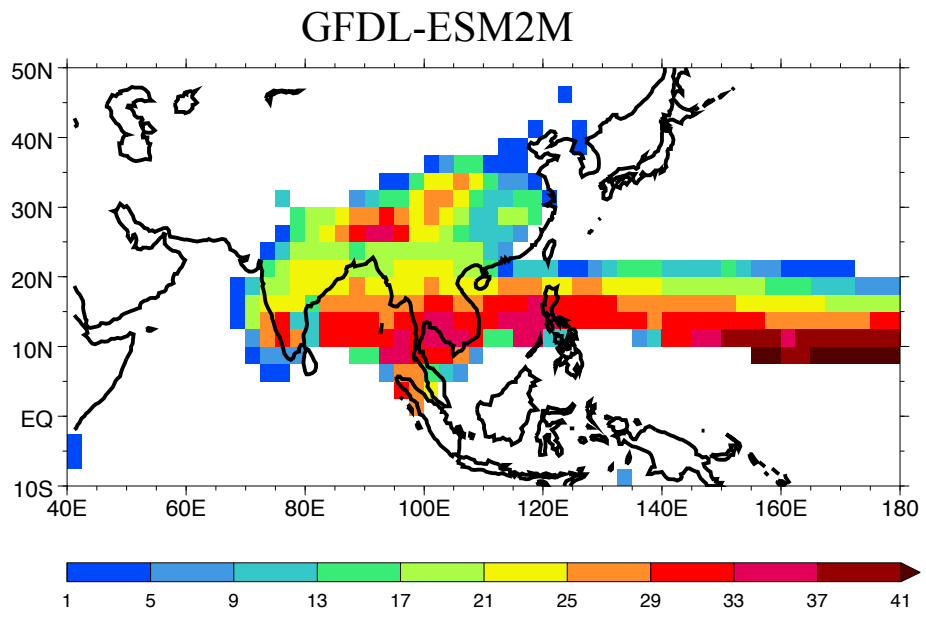
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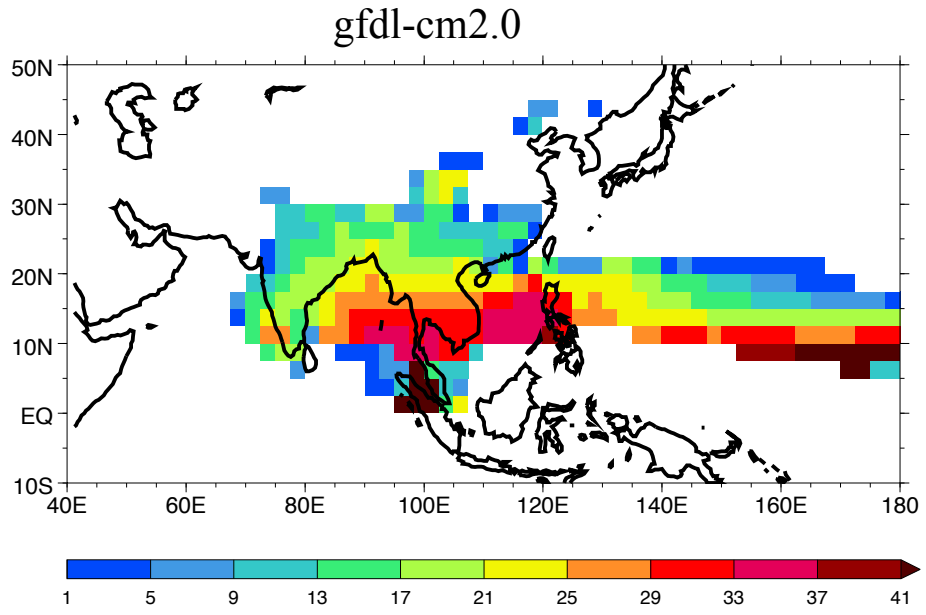
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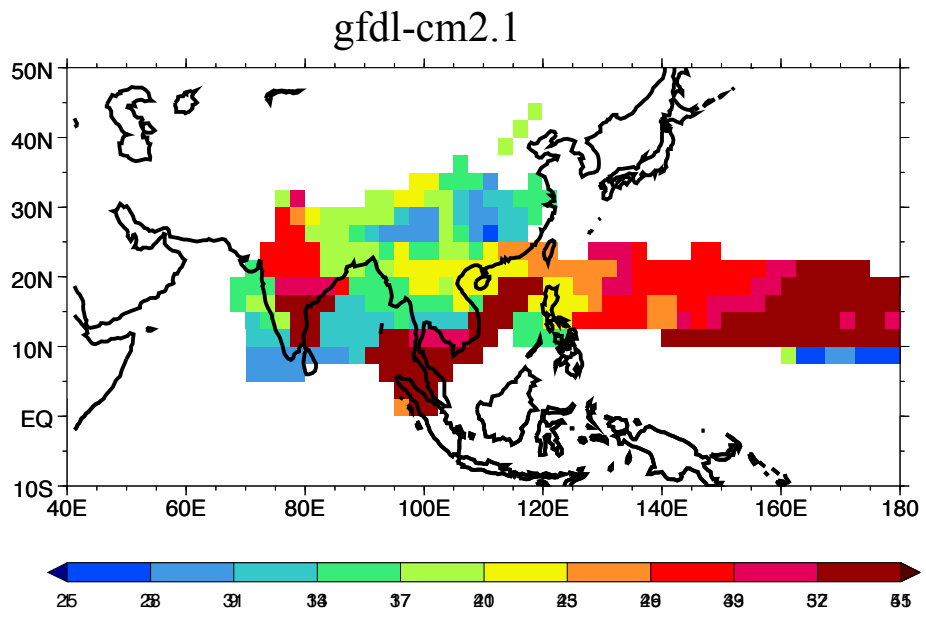
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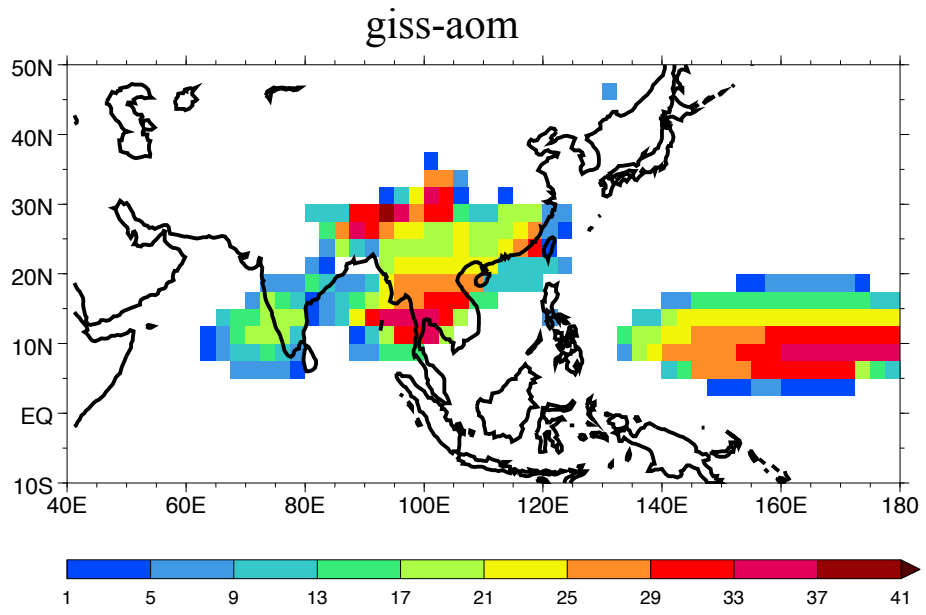
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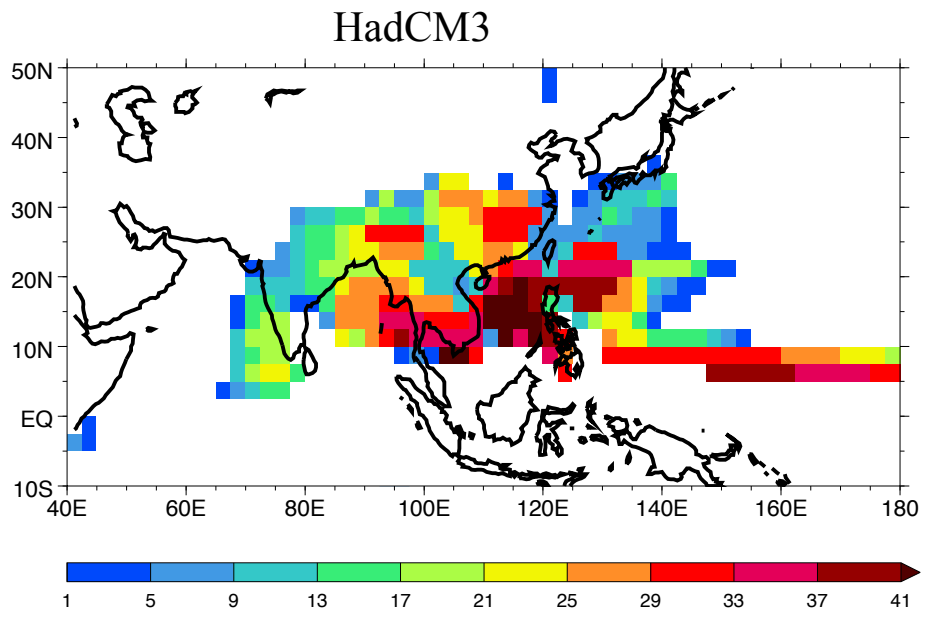
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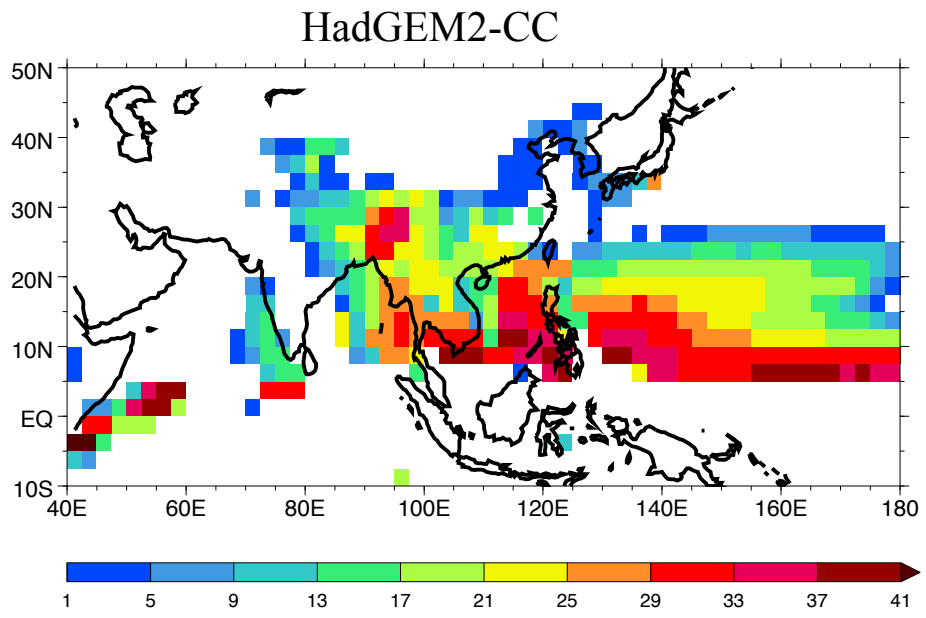
HadGEM2-CC
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140E
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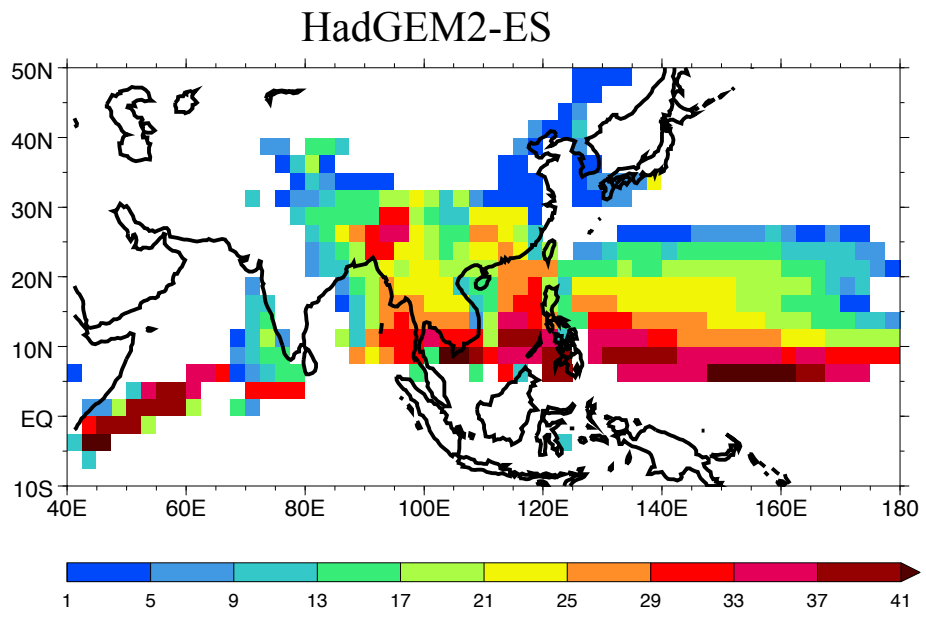
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EQ
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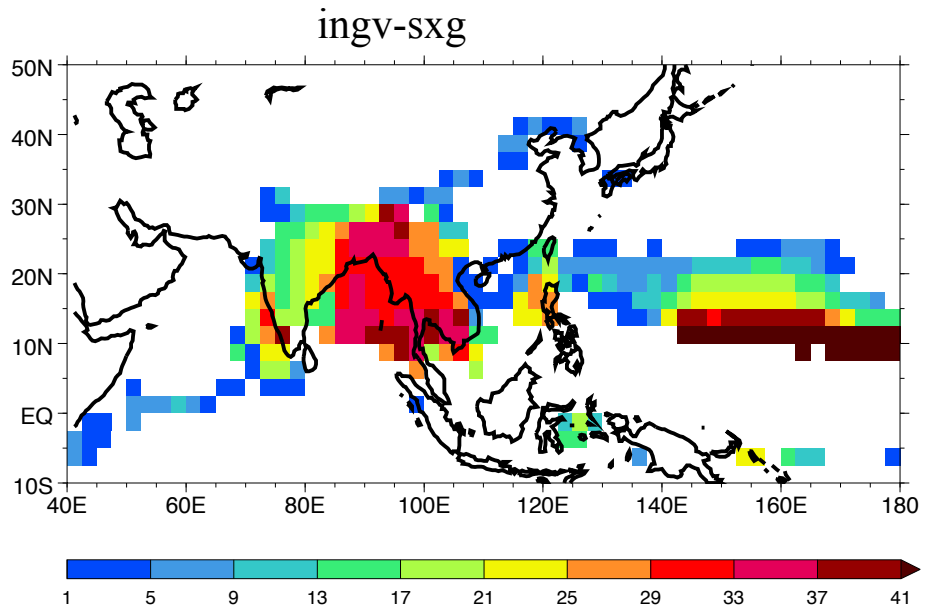
ingv-sxg
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EQ
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60E
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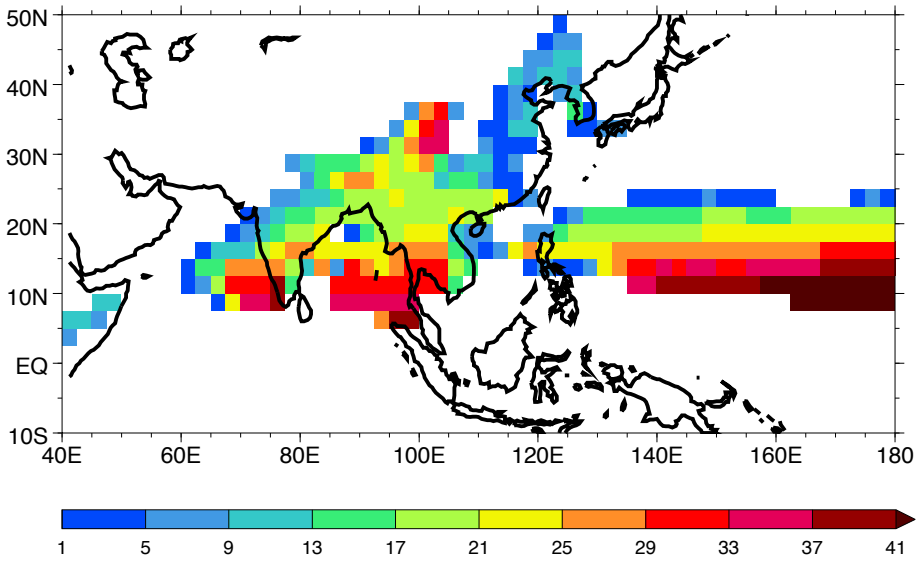
INM-CM4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40N
30N
20N
10N
EQ
10S
40E
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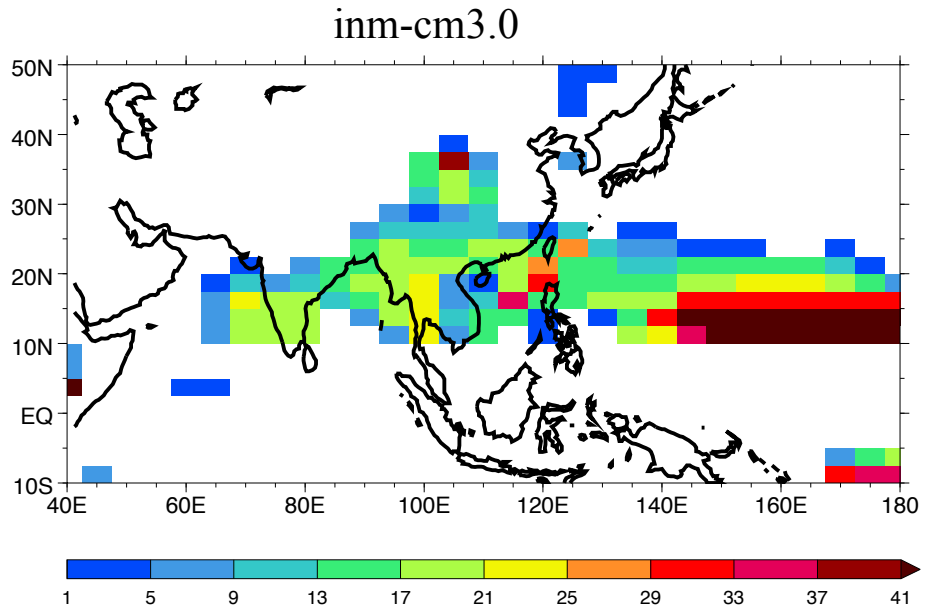
inm-cm3.0
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10N
EQ
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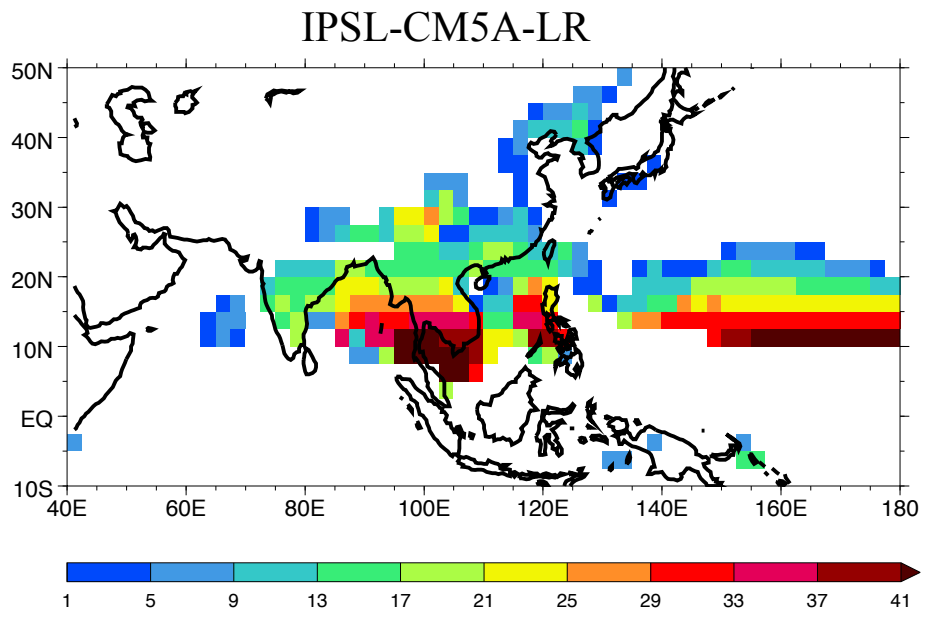
IPSL-CM5A-LR
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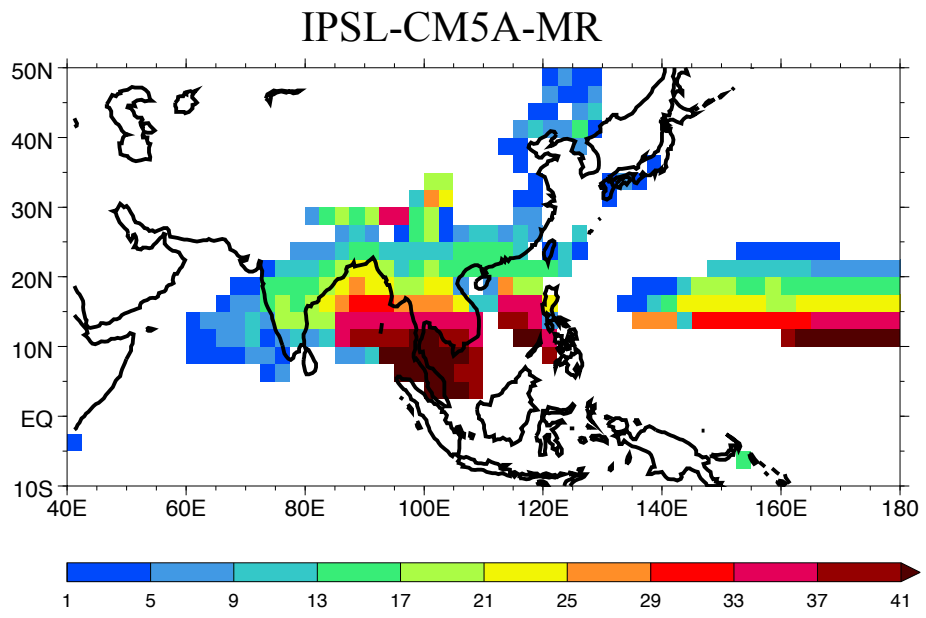
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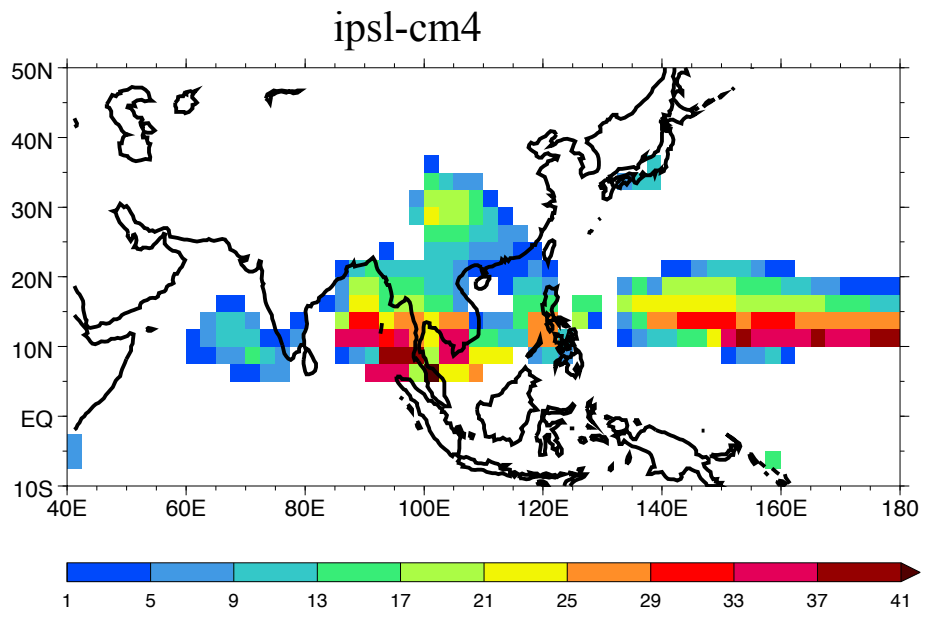
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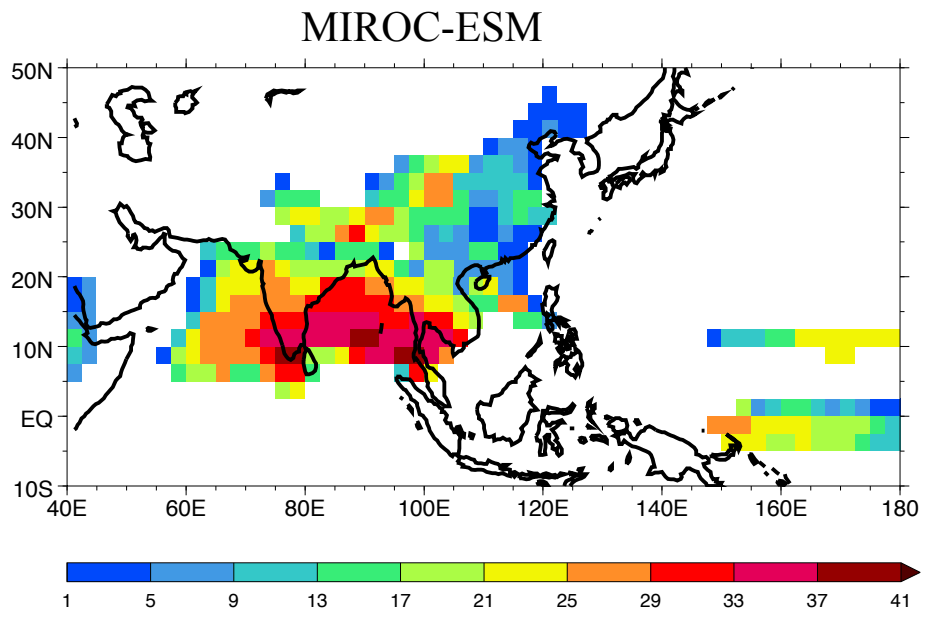
MIROC-ESM
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EQ
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100E
120E
140E
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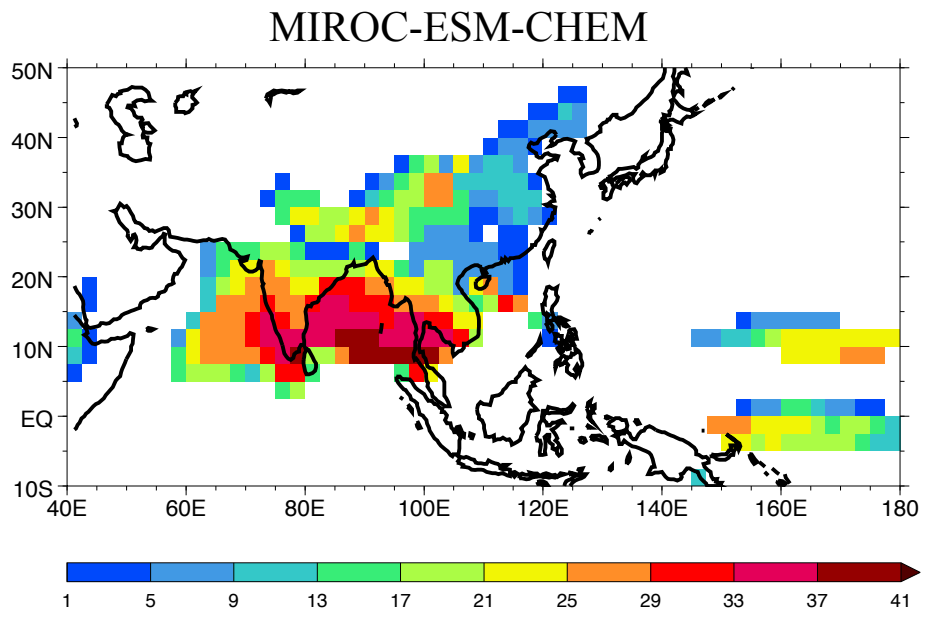
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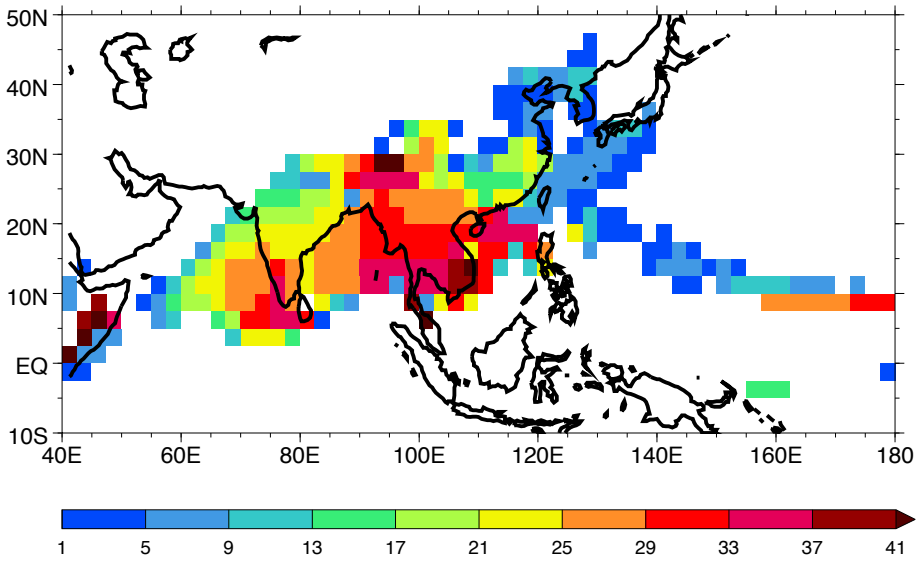
MIROC4h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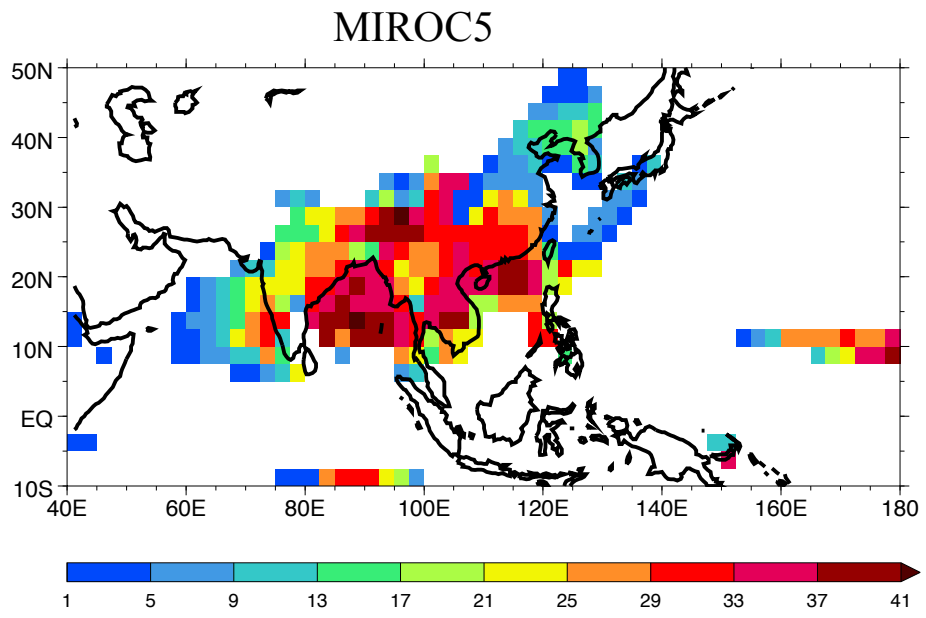
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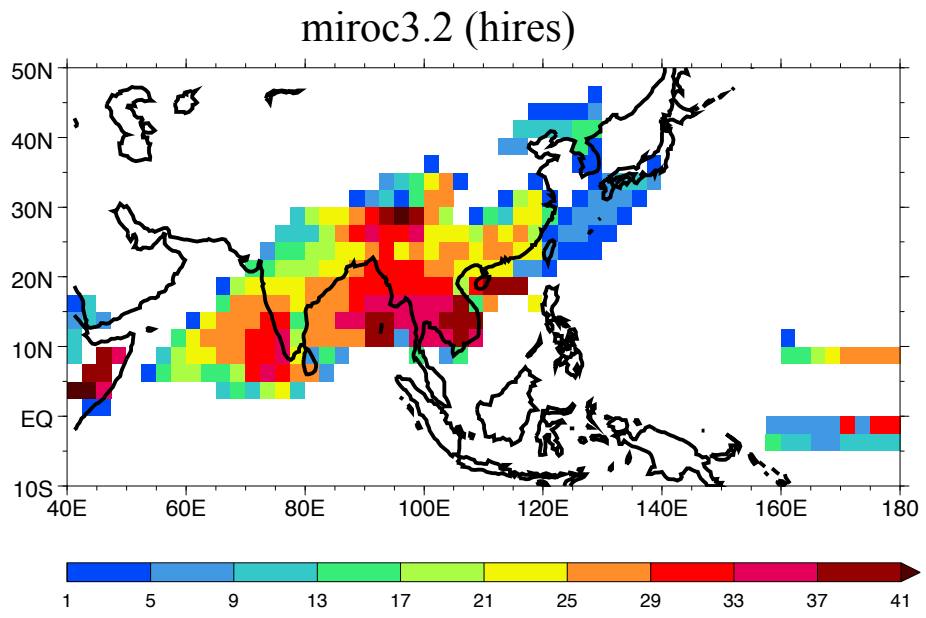
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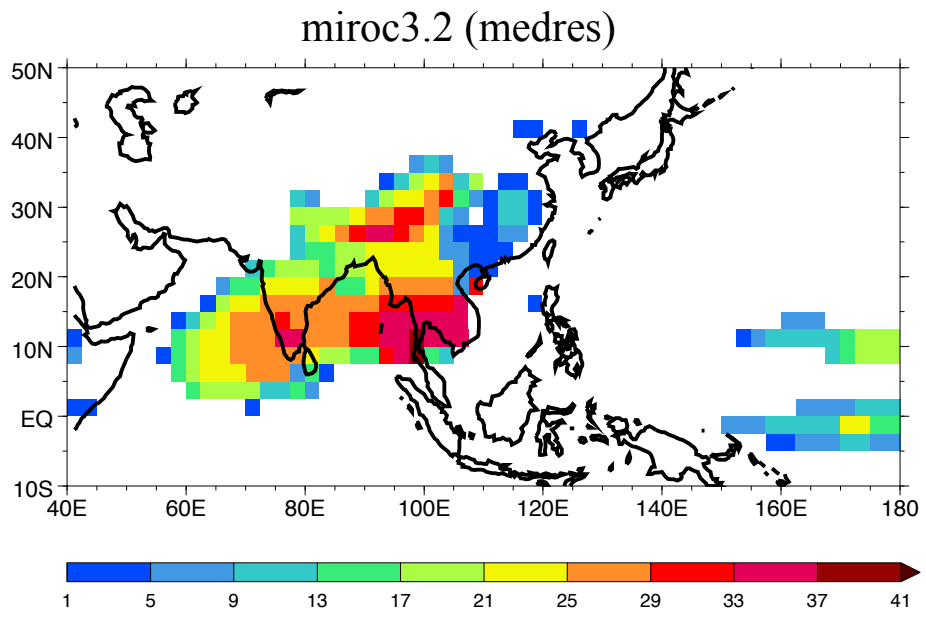
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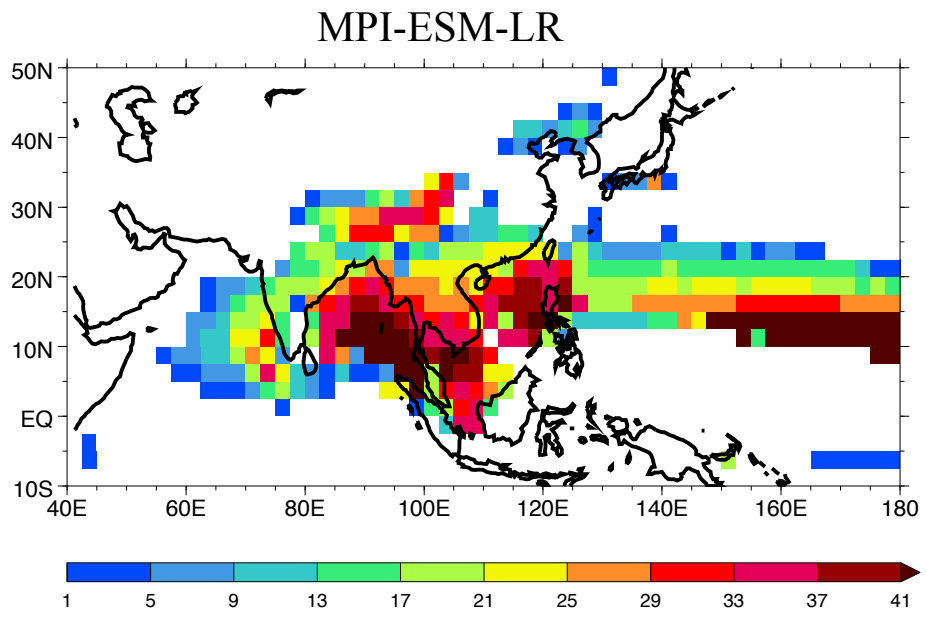
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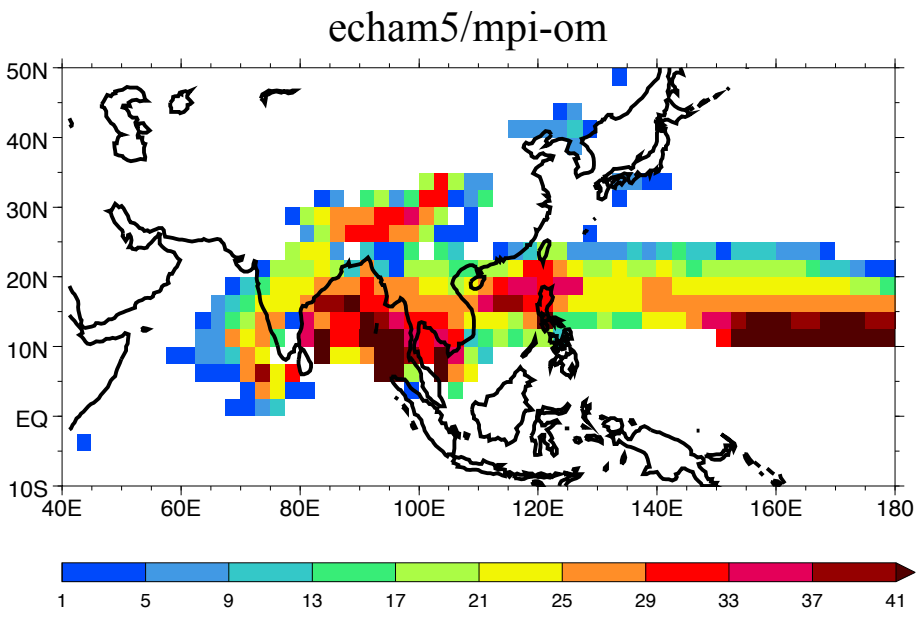
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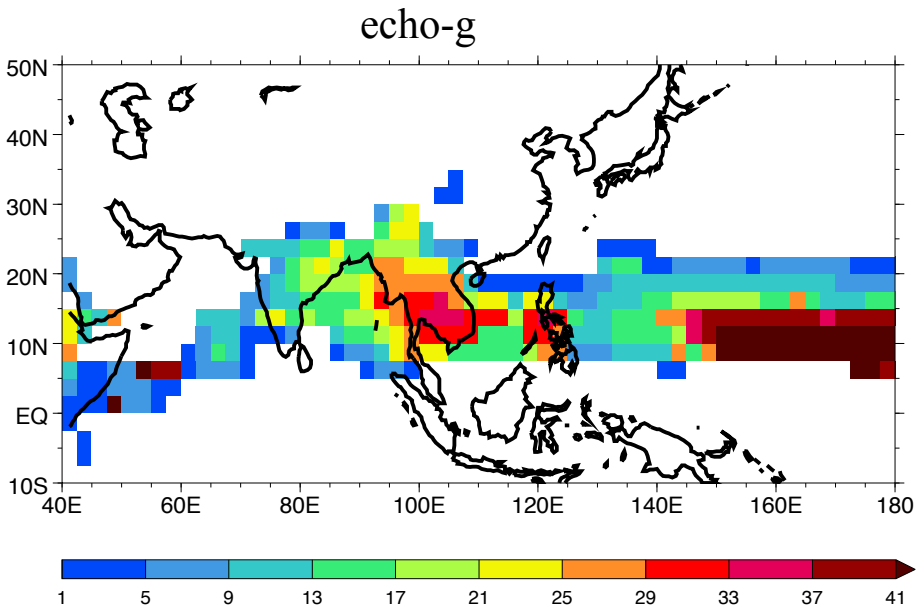
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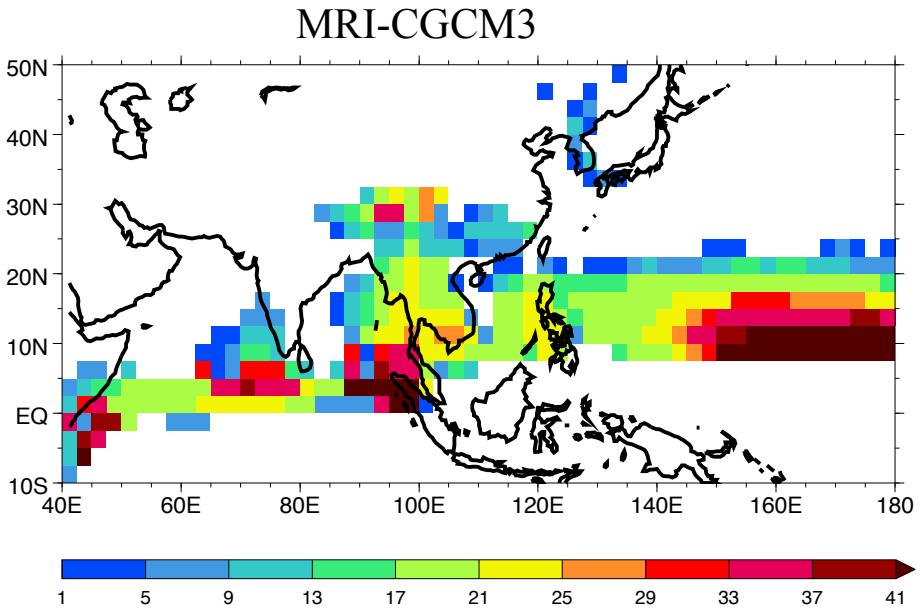
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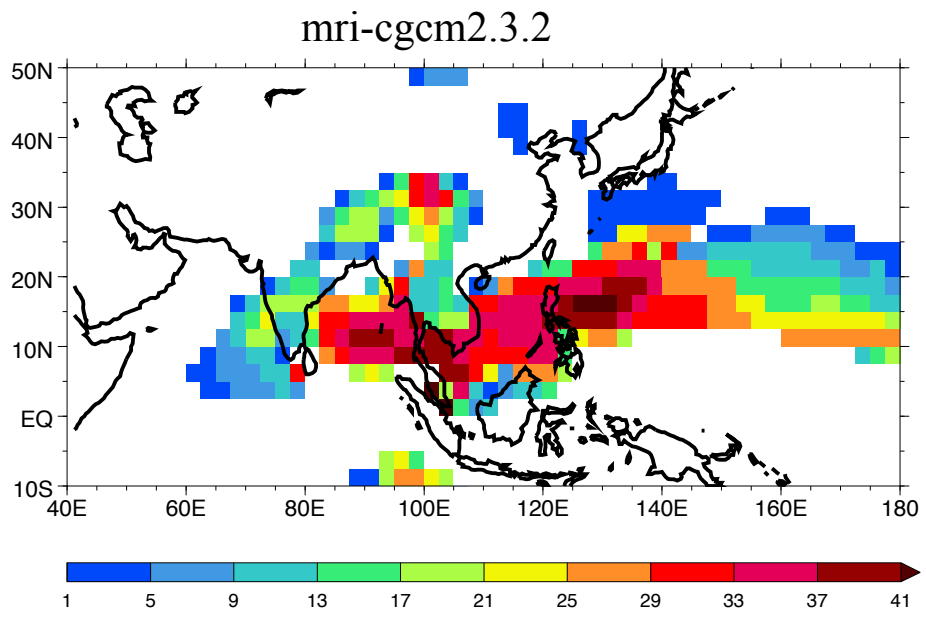
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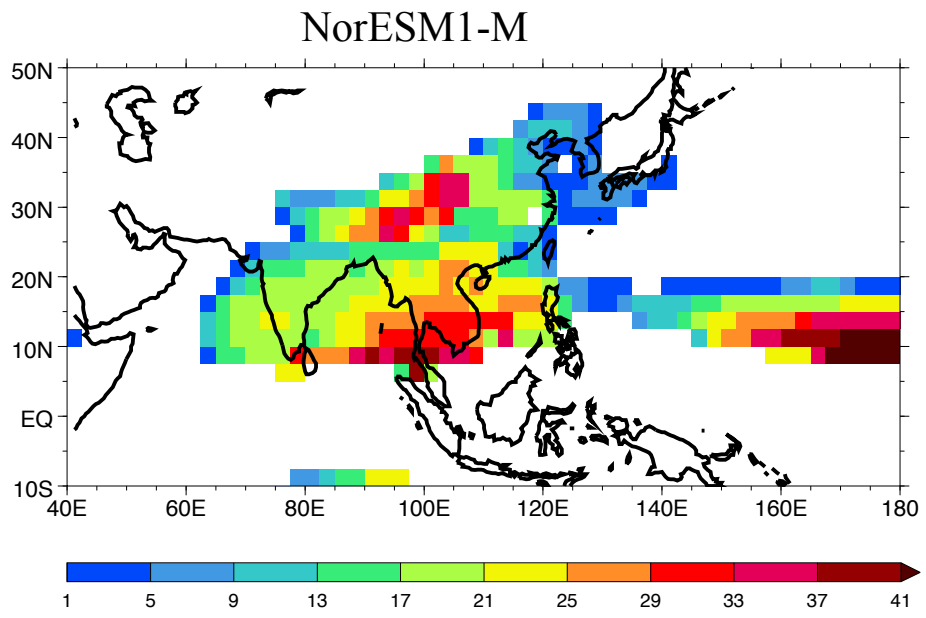
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