# November 1, 2000-March 1, 2001 Forecast

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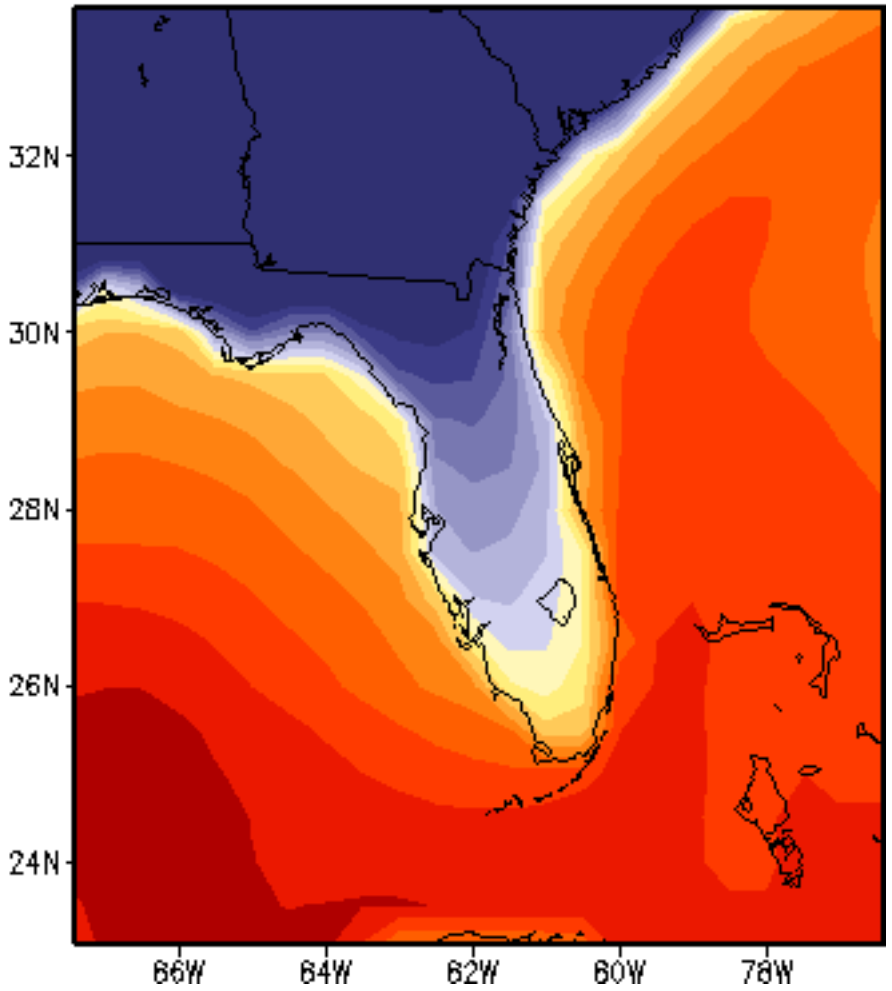
# Domain of RSM at 10km

~5 hours per season on 128 processors



# Highlights

This is one of the kind forecast in the following ways

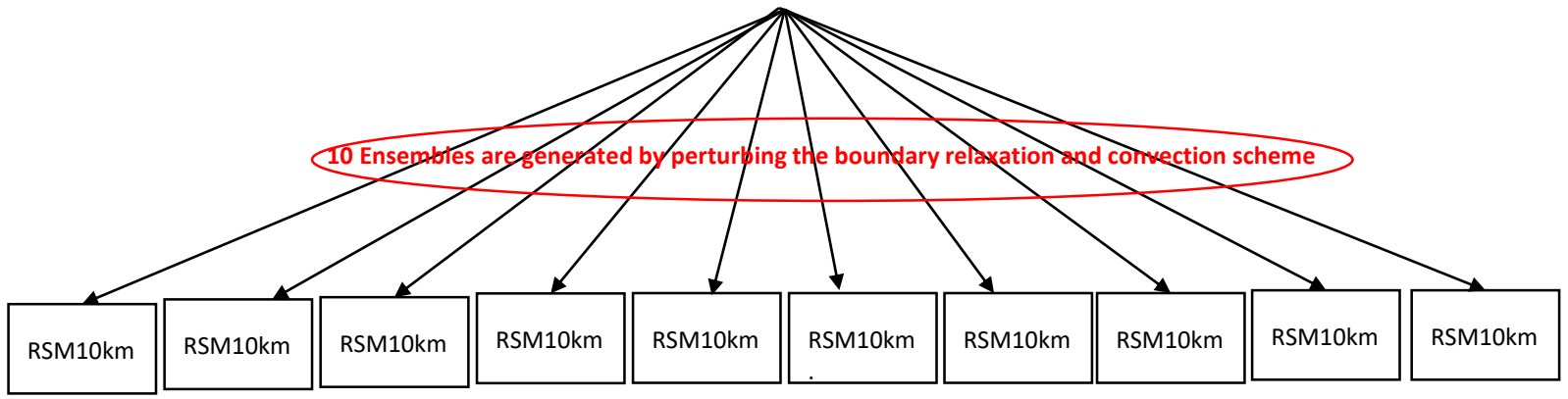
- Highest resolution seasonal climate forecast available
- Robust estimate of ensemble spread at such high resolution
- Dedicated forecast of not just seasonal mean but also daily rainfall and temperature distribution, extremes, and all other conceivable thresholds

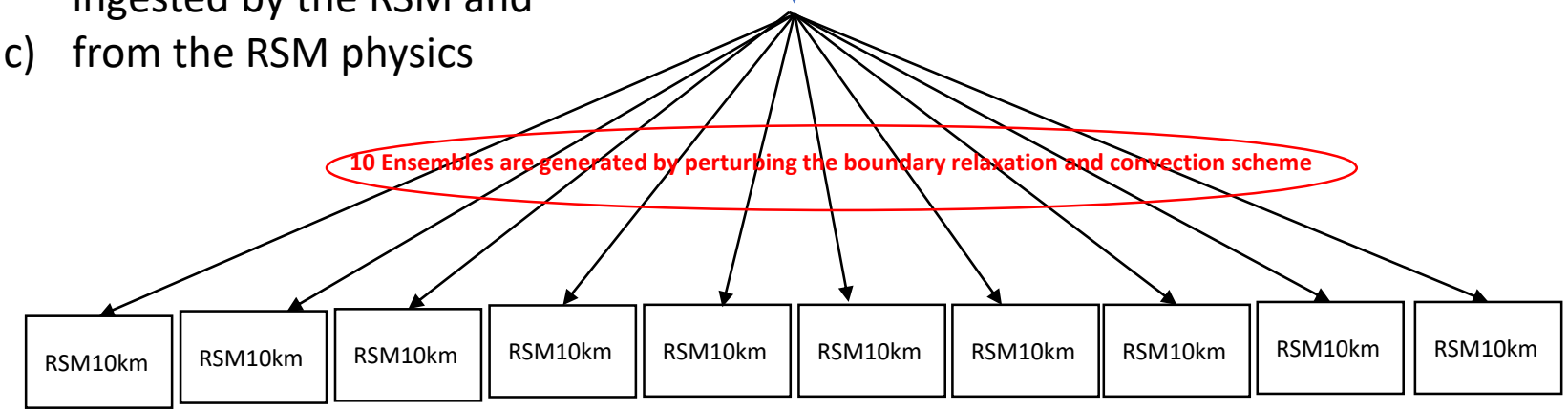
Ben Kirtman from U. Miami gave us daily SST from CCSM4 for one ensemble member

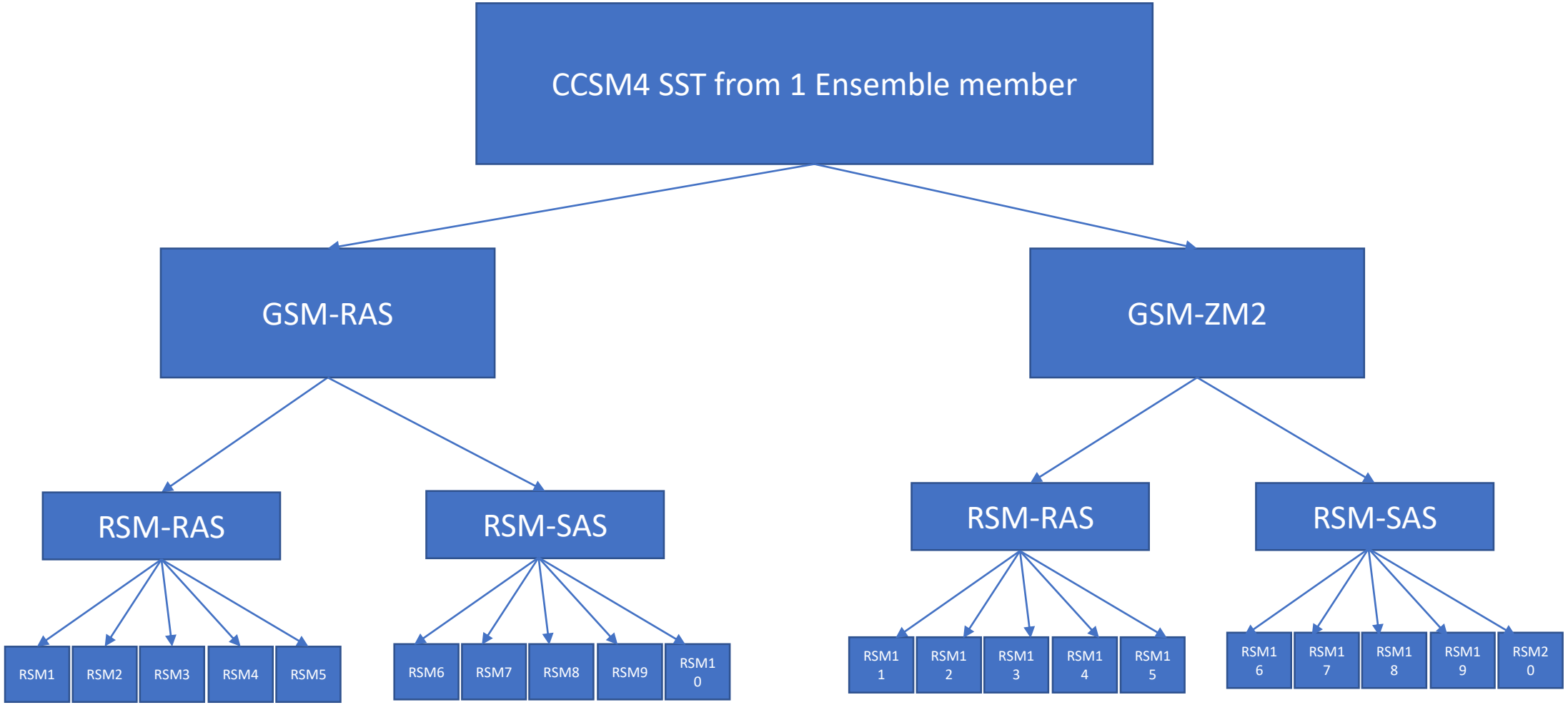
GSM1 | GSM2

**Ensemble generation philosophy**: What is the uncertainty of the RSM forecast at 10km from

a) the large-scale climate conditions produced by the global model
b) the way global model data is ingested by the RSM and
c) from the RSM physics






CCSM4 Community Climate System Model V4
GSM Global Spectral Model
RSM Regional Spectral Model
SAS Simplified Arakawa Schubert scheme
RAS Relaxed Arakawa Schubert scheme
ZM2 Modified Zhang McFarlane scheme
SST Sea Surface Temperature

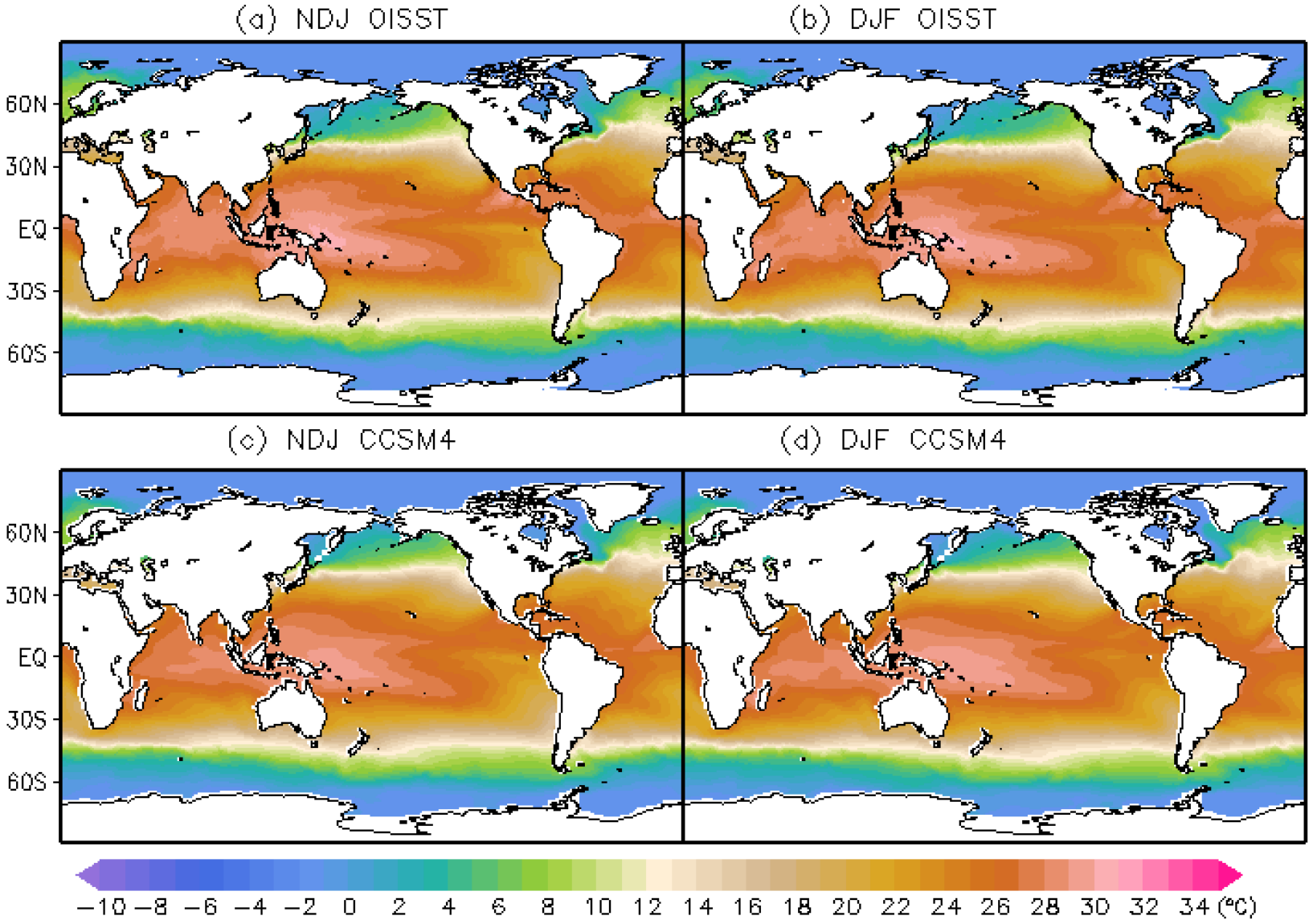



Figure 1: Seasonal mean (a, c) Nov-Dec-Jan (0-month lead) and (b, d) Dec-Jan-Feb (1-month lead) for SST (C) for 2000-01 from (a, b) observations, and (c, d) CCSM4 used in GSM/RSM.

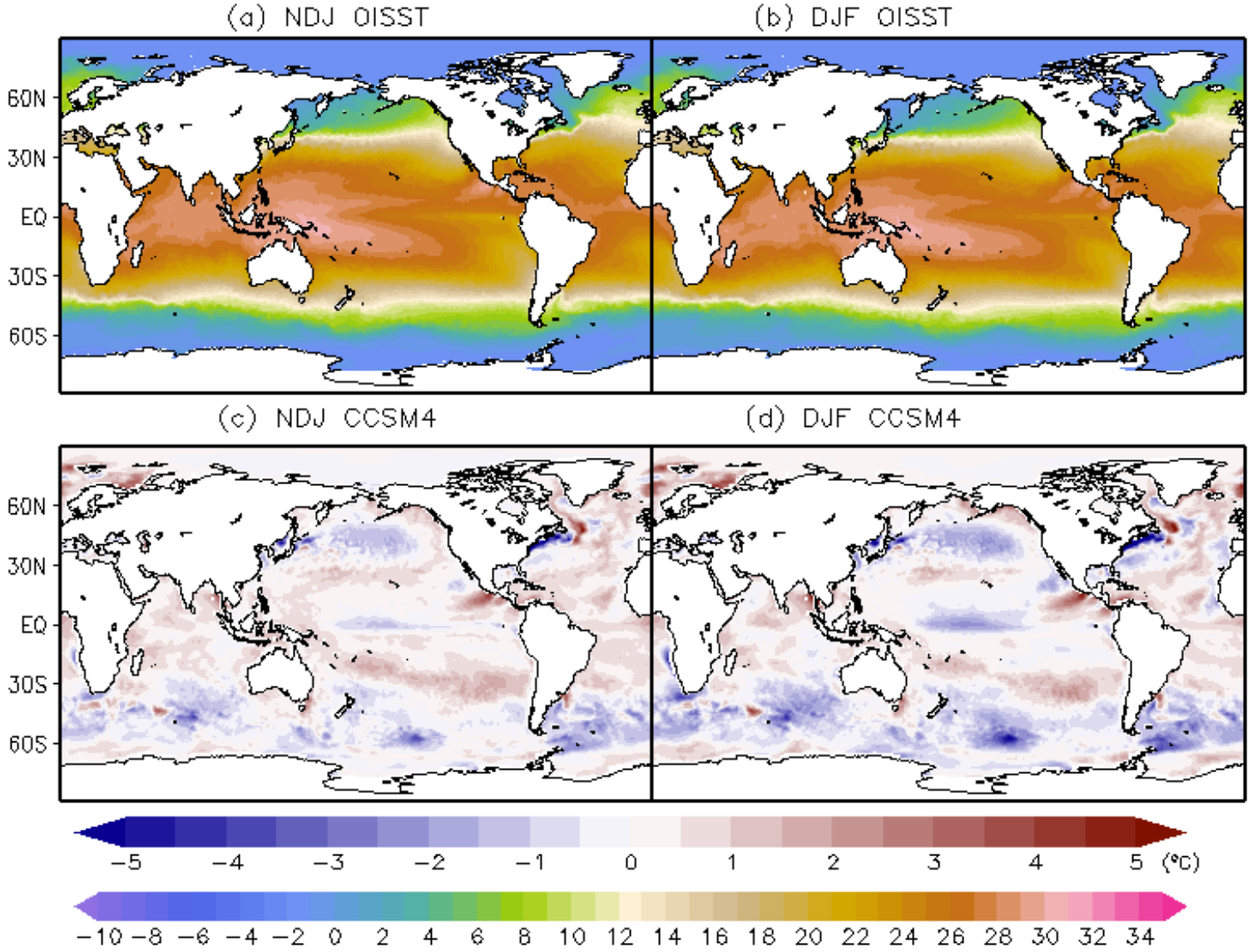
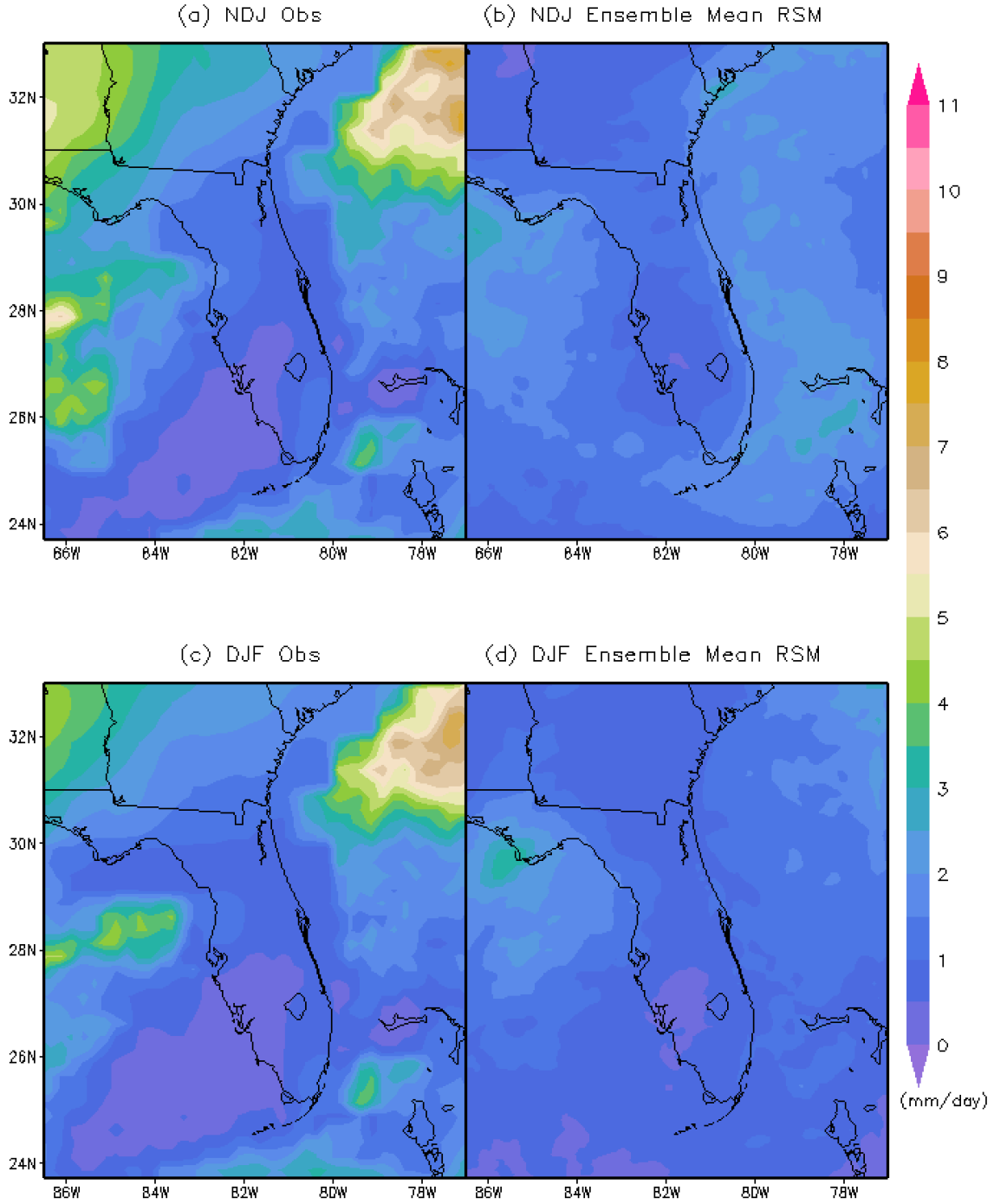



Figure 2: Seasonal mean and SST errors (a, c) Nov-Dec-Jan (0-month lead) and (b, d) Dec-Jan-Feb (1-month lead) for 2000-01 (C) from (a, b) OISST and (c, d) CCSM4 used in GSM/RSM.


(a) NDJ Obs
(b) NDJ Ensemble Mean RSM
(c) DJF Obs
(d) DJF Ensemble Mean RSM
32N
30N
28N
26N
24N
86W
84W
82W
80W
78W
11
10
9
8
7
6
5
4
3
2
1
0
(mm/day)

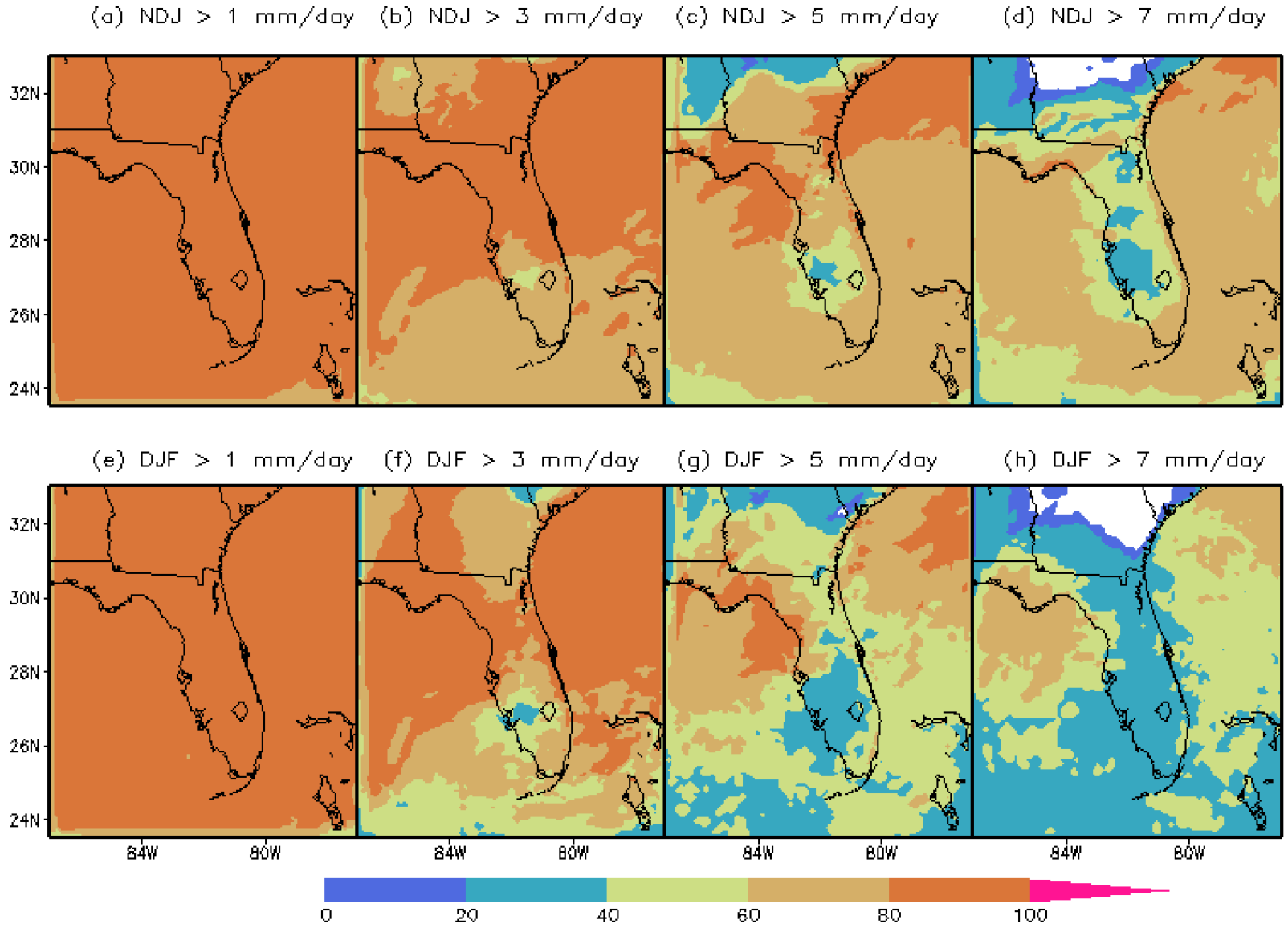
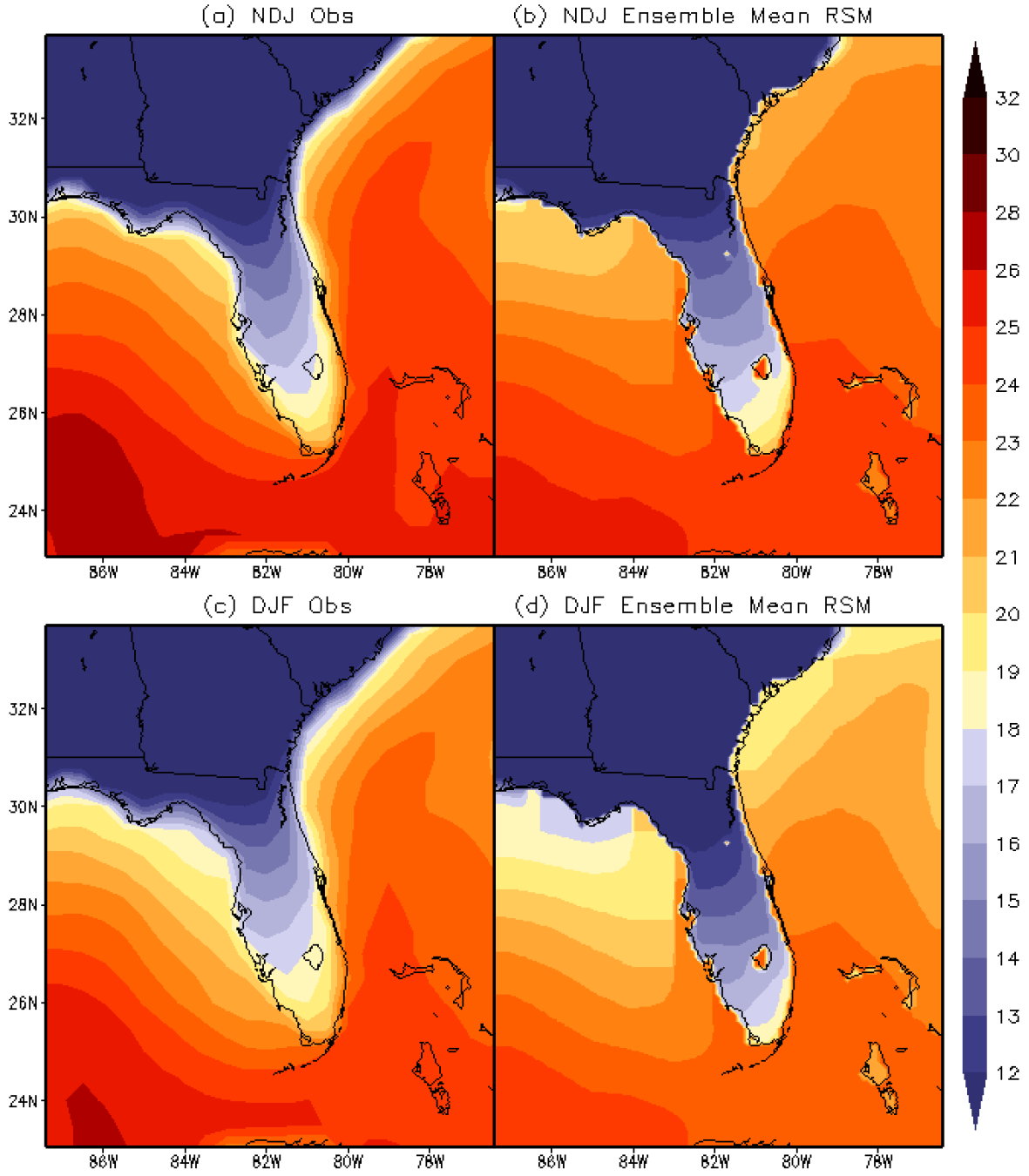



Figure 5: Probability of seasonal mean (a, b, c, d) Nov-Dec-Jan (0-month lead) and (e, f, g, h) Dec-Jan-Feb (1-month lead) precipitation exceeding (a, e) 1 mm/day, (b, f) 5mm/day, (c, g) 10 mm/day, and (d, h) 20 mm/day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24N
86W
84W
82W
80W
78W
32
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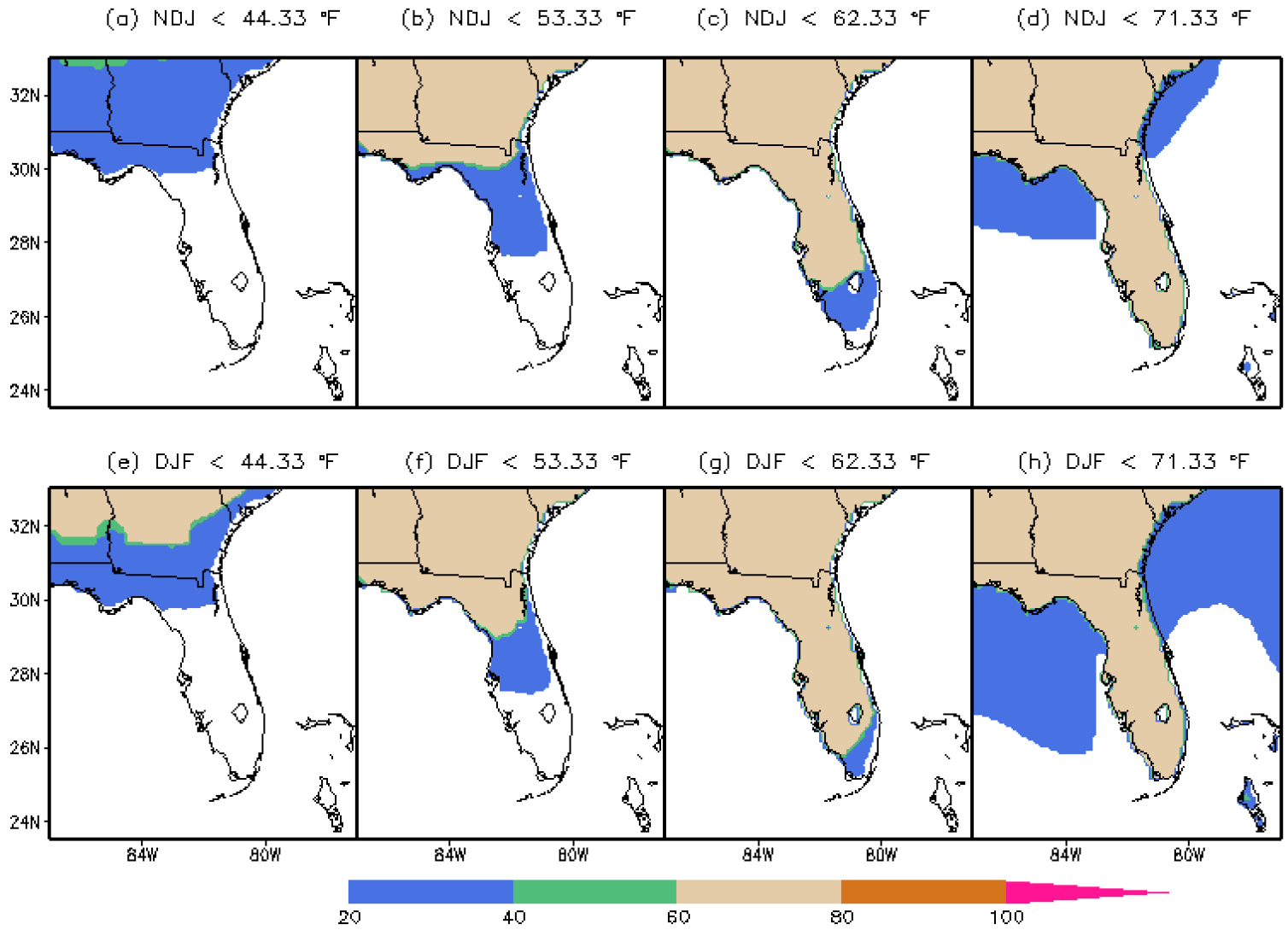


Figure 7: Probability of seasonal mean (a, b, c, d) Nov-Dec-Jan (0-month lead) and (e, f, g, h) Dec-Jan-Feb (1-month lead) surface temperature going below (a, e) 44F, (b, f) 53F, (c, g) 62F, and (d, h) 71F from RSM forecasts.

# Daily Variables

| | Variable | Acronym in RSM |
|---|---|---|
| 1 | Precipitation rate (mm/day) | pratesfc |
| 2 | Mean surface temperature (C) | tmpsfc |
| 3 | Maximum surface temperature (C) | tmpsfcmax |
| 4 | Minimum surface temperature (C) | tmpsfcmin |
| 5 | 10m above ground v wind (m/s) | vgrd10m |
| 6 | 10m above ground u wind (m/s) | ugrd10m |
| 7 | Surface upward shortwave flux (W/m^2) | uswrfsfc |
| 8 | Surface downward shortwave flux (W/m^2) | dswrfsfc |
| 9 | Surface upward long wave flux (W/m^2) | ulwrfsfc |
| 10 | Surface downward long wave flux (W/m^2) | dlwrfsfc |
| 11 | Surface evaporation (W/m^2) | lhtflsfc |
| 12 | Precipitable water (Kg/m^2) | pwatclm |
| 13 | Sensible heat flux (W/m^2) | shtflsfc |
| 14 | Mean sea level pressure (hPa) | prmslmsl |
| 15 | Winds at 850hPa (m/s) | Ugrdprs,vgrdprs |
| 16 | Geopotential height at 500hPa (Gpm) | hgtprs |
| 17 | Root zone soil moisture (volumetric moisture content | |