Multi-Model Prediction with CCSM4 (3.5,3.0) and CFS

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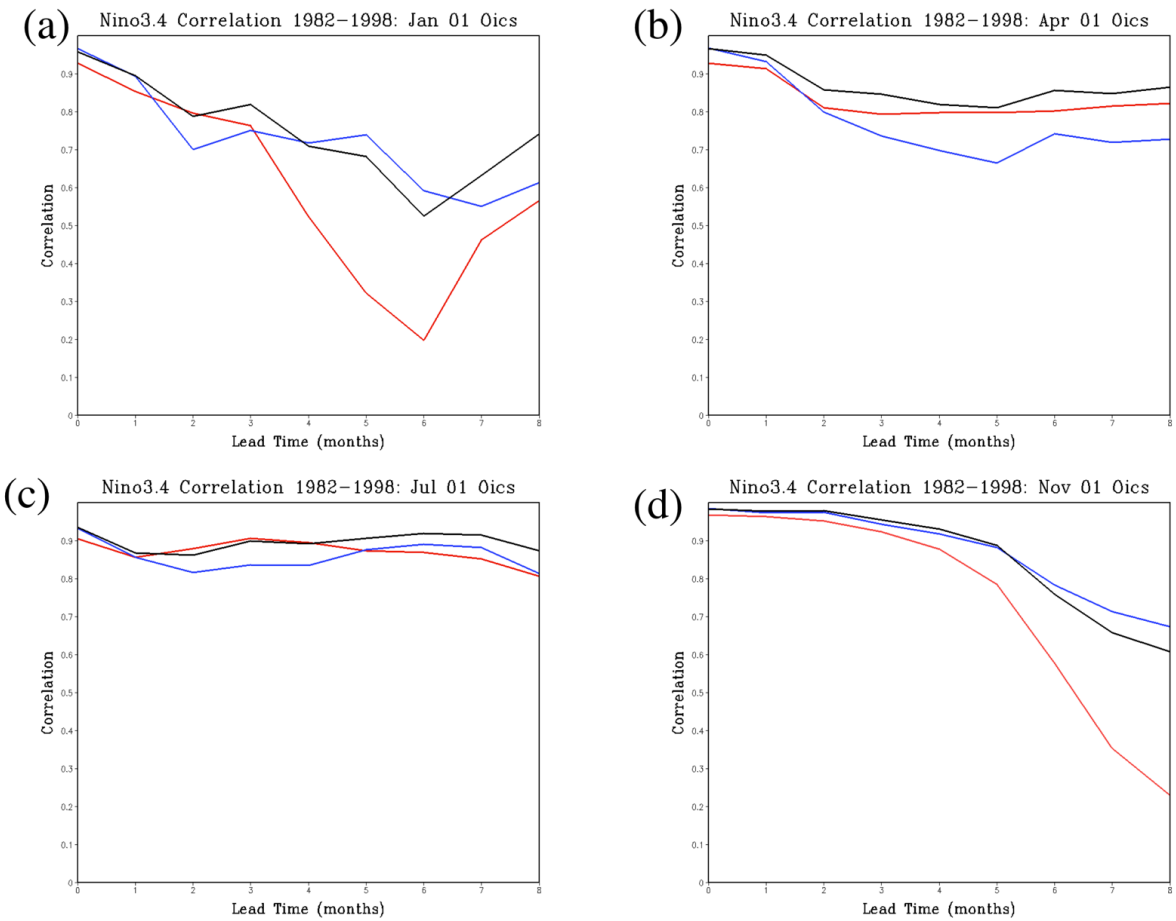
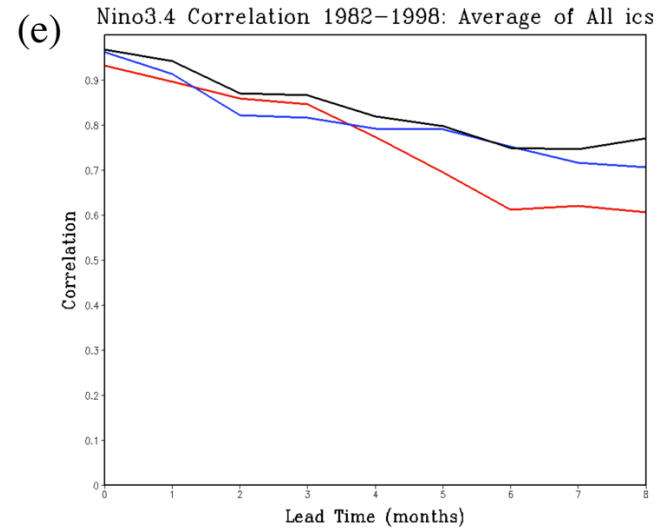
- **CCSM3.0 (GFDL OI ODA):**
  - Ocean-Only ICs, All months (1981-present), 6-member ensembles
  - O-L-A ICs, 21-30 Dec. 1981-97, 21-30, Jun. 1982-98, 10-member ensembles
- **CCSM3.5 (GFDL OI ODA):**
  - Ocean-Only ICs, Jan, Apr, Jul, Oct, 6-member ensembles
  - O-L-A ICs, 21-30 Apr., 22-31 Oct, 10-member ensembles
- **CCSM4.0 (GFDL OI ODA):**
  - Ocean-Only ICs, Jan 1982-1999, 1-member ensemble
- **CCSM4.0 (CFSRR ODA):**
  - Ocean-Only ICs May 1982-85, 1-member ensemble

Results

- **CCSM3.0 (Initialized Ocean)+CFS**
- **CCSM3.0 (O-L-A Initialized)**
- **CCSM3.5 (Initialized Ocean)**
  - Sub-Seasonal (O-L-A)
- **CCSM4.0 (Initialized Ocean)**
  - GFDL-ODA
  - CFSRR-ODA

Nino3.4 Correlation Coefficient



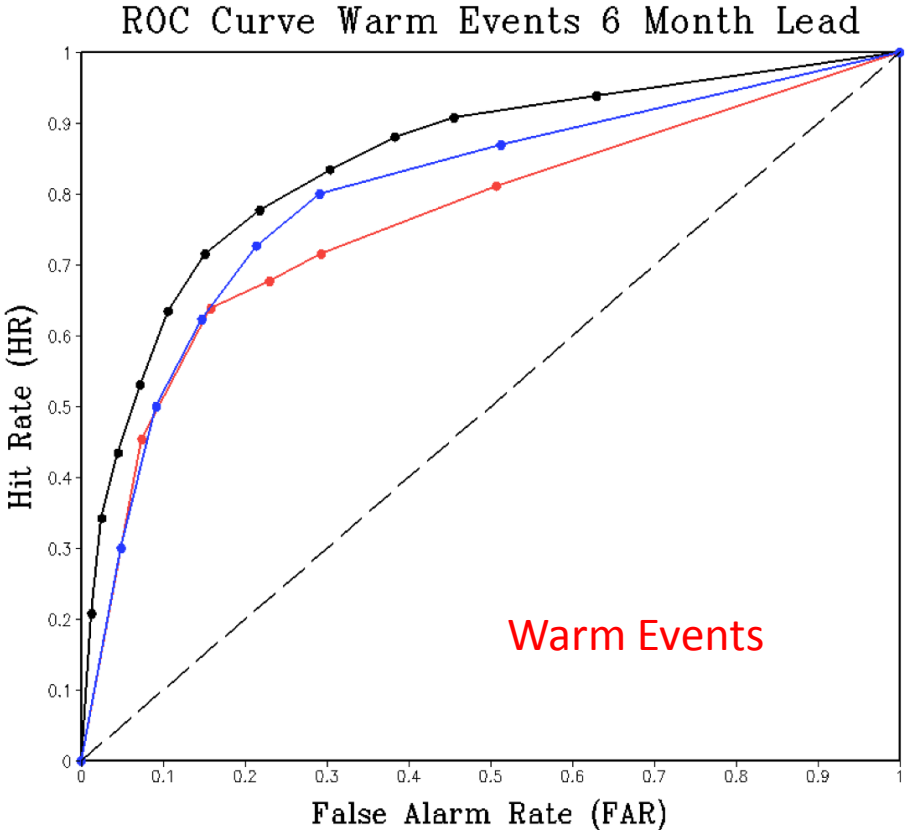


CFS

CCSM

Multi-Model

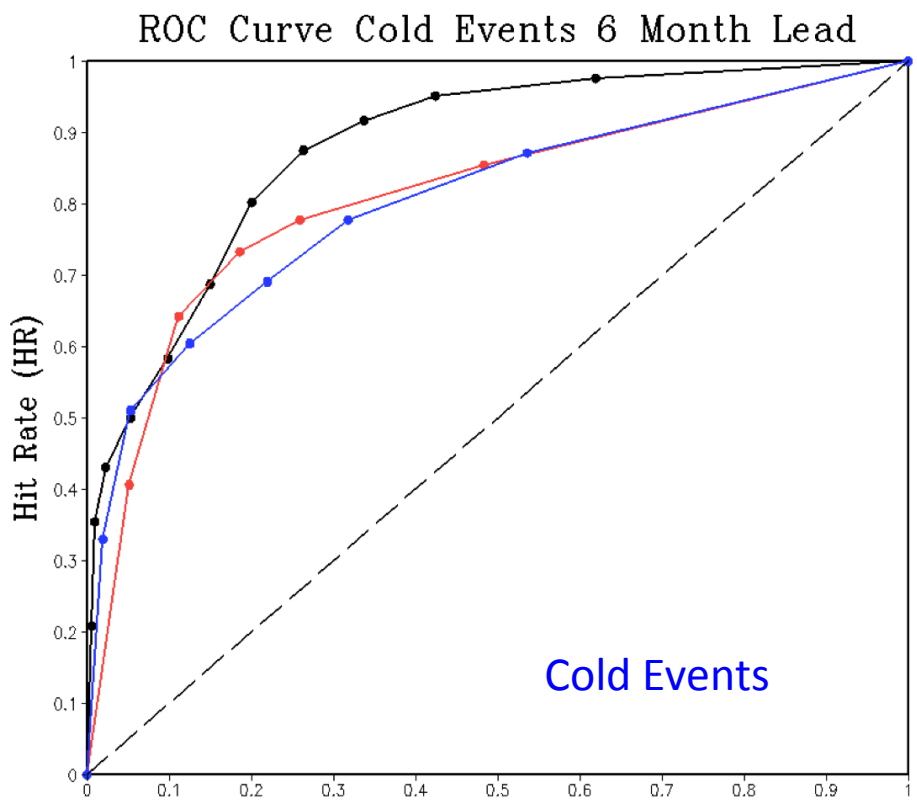
Relative Operating Characteristics



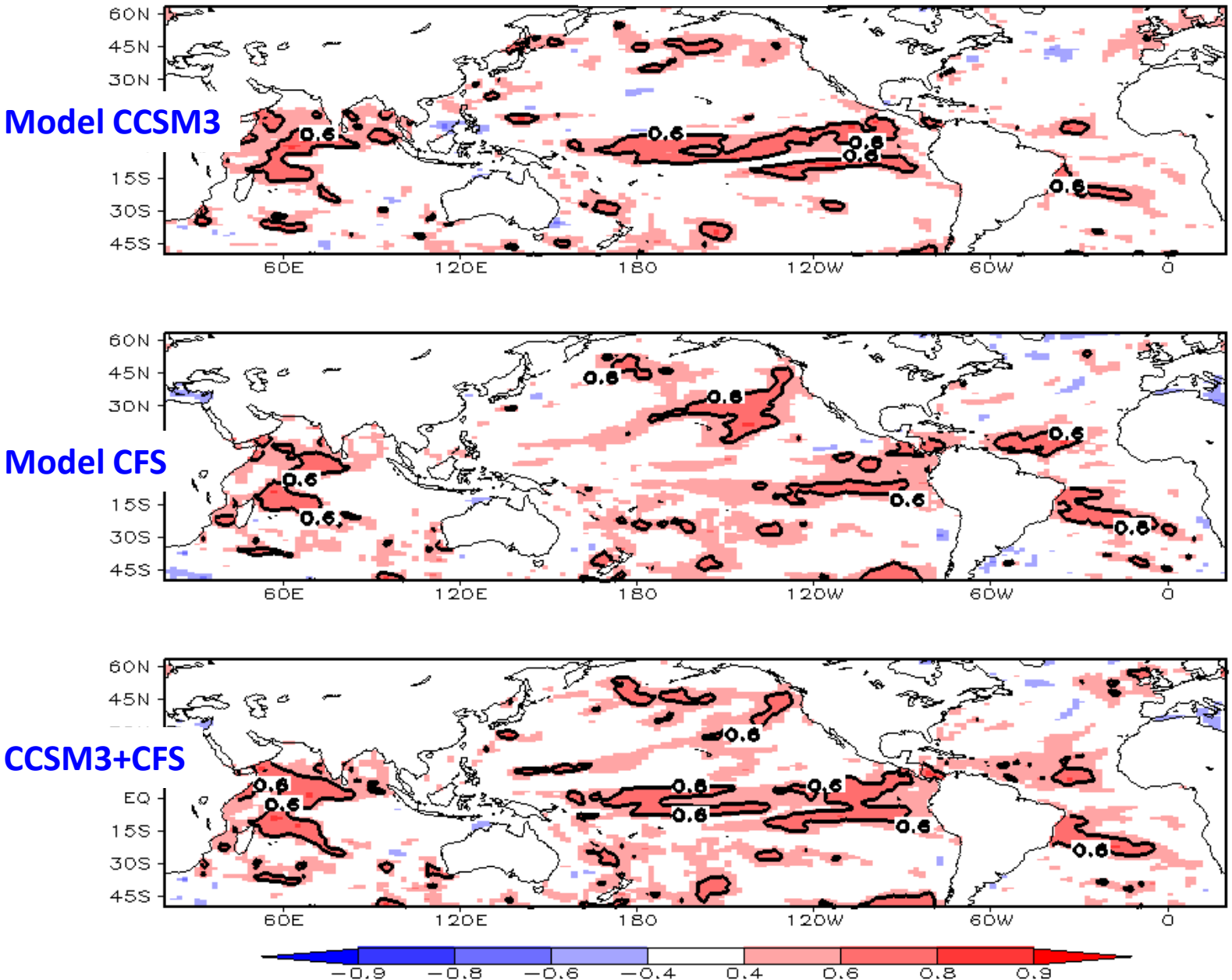
CFS

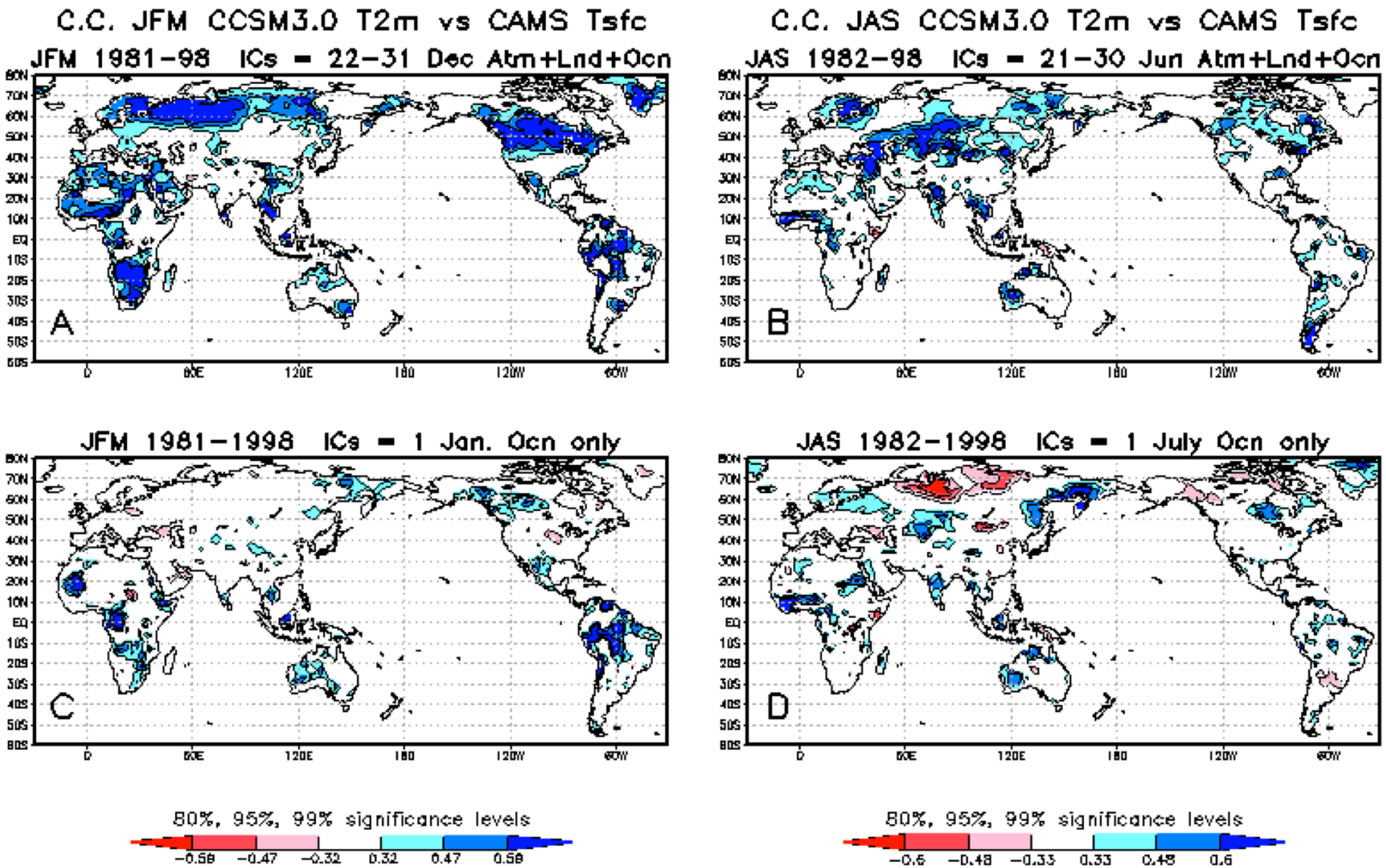
CCSM

Multi-Model



Correlation (Jan IC 6 Month Lead Time)



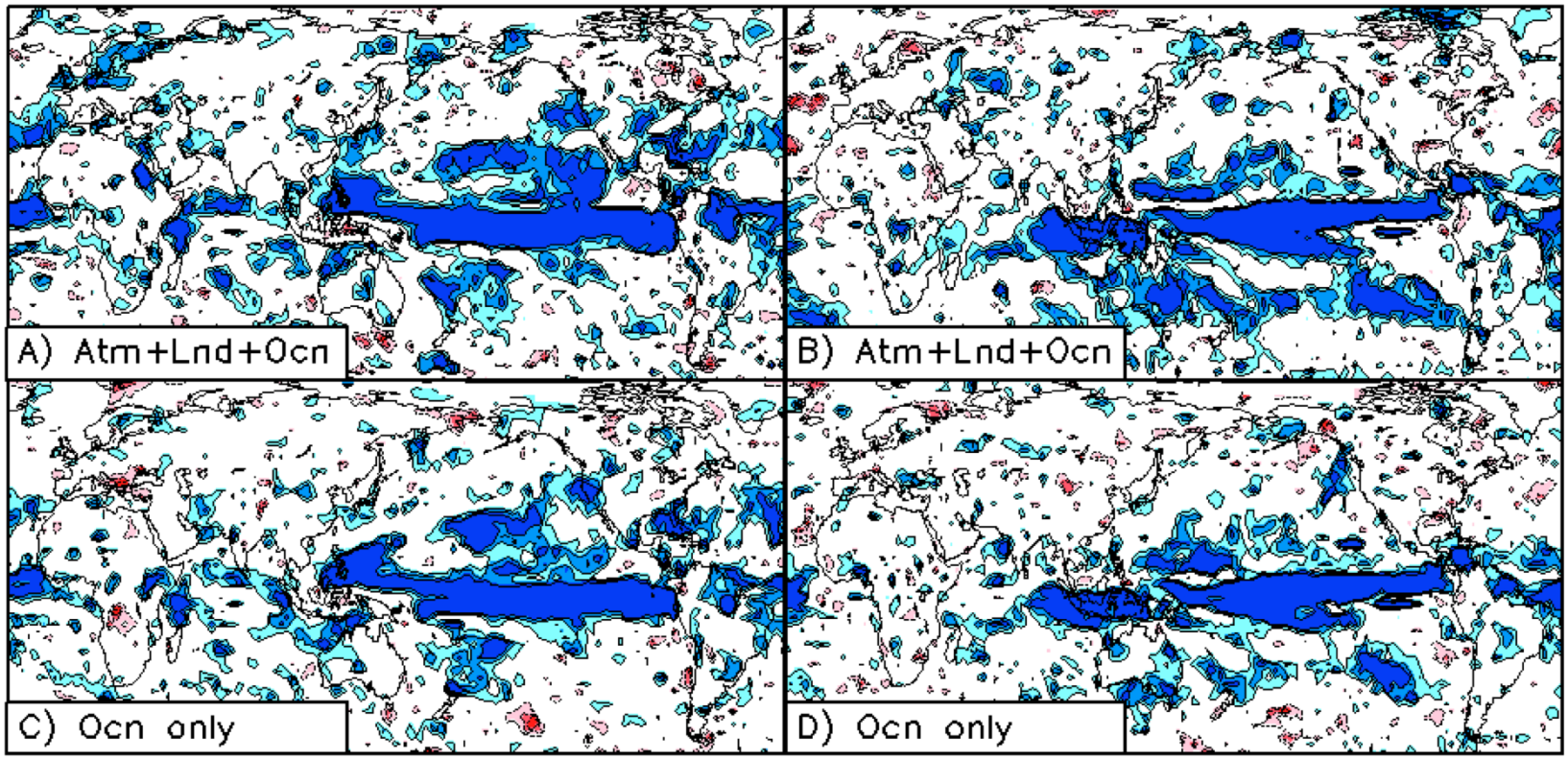

C.C. JFM CCSM3.0 T2m vs CAMS Tsfc
JFM 1981-98 ICs = 22-31 Dec Atm+Lnd+Ocn
A
C.C. JAS CCSM3.0 T2m vs CAMS Tsfc
JAS 1982-98 ICs = 21-30 Jun Atm+Lnd+Ocn
B
JFM 1981-1998 ICs = 1 Jan. Ocn only
C
JAS 1982-1998 ICs = 1 July Ocn only
D
80%, 95%, 99% significance levels
-0.58 -0.47 -0.32 0.32 0.47 0.58
80%, 95%, 99% significance levels
-0.6 -0.48 -0.33 0.33 0.48 0.6

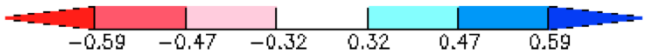
C.C. JFM CCSM3.0 Tppt vs CMAP

JFM 1981–98 ICs = 22–31 Dec Atm+Lnd+Ocn
JFM 1981–1998 ICs = 1 Jan. Ocn only

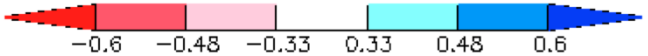
C.C. JAS CCSM3.0 Tppt vs CMAP

JAS 1982–98 ICs = 21–30 Jun Atm+Lnd+Ocn
JAS 1982–1998 ICs = 1 July Ocn only

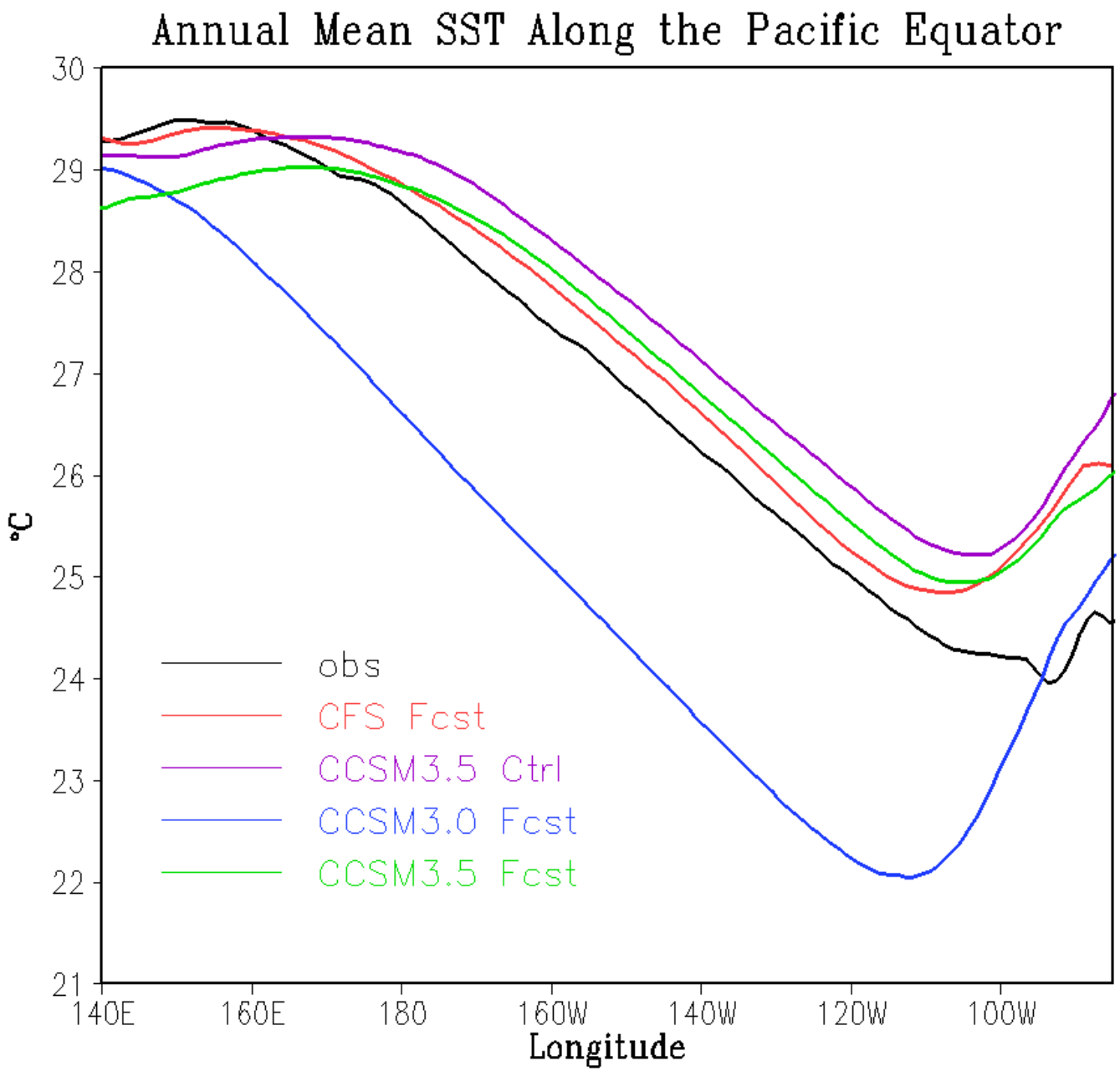




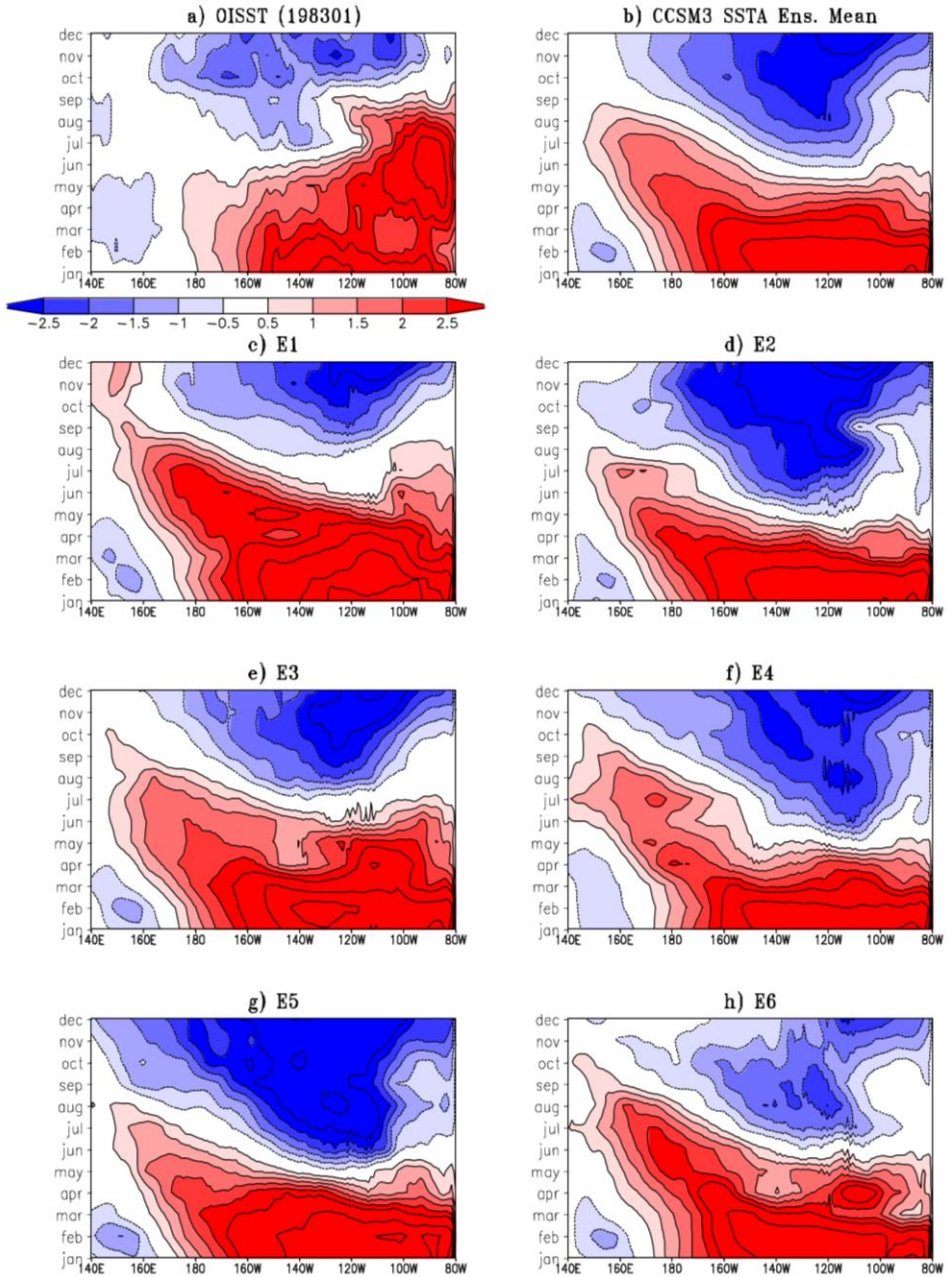
80%, 95%, 99% significance levels



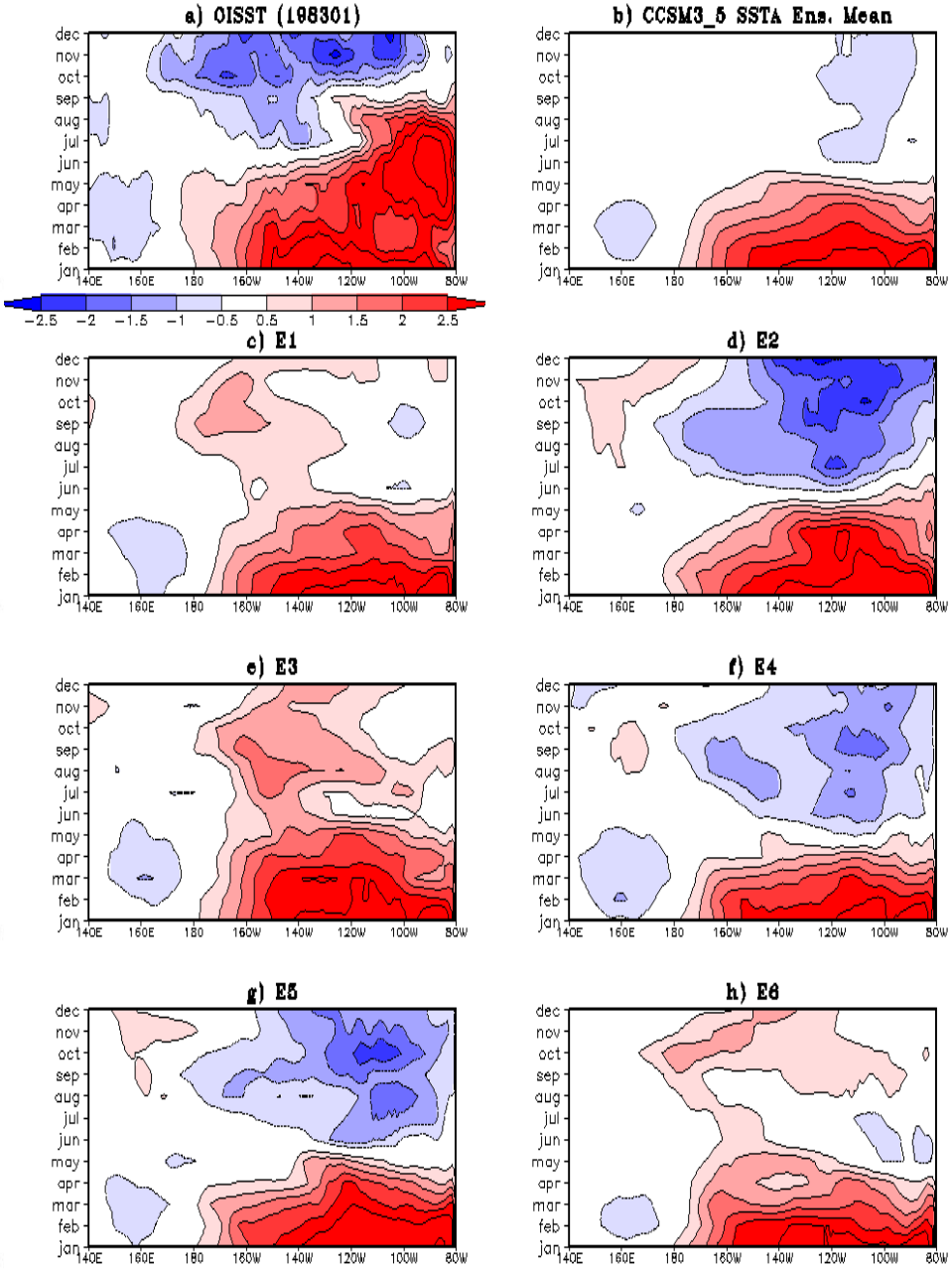
80%, 95%, 99% significance levels


Annual Mean SST Along the Pacific Equator
30
29
28
27
26
25
24
23
22
21
°C
140E
160E
180
160W
140W
120W
100W
Longitude
obs
CFS Fcst
CCSM3.5 Ctrl
CCSM3.0 Fcst
CCSM3.5 Fcst

CCSM3.0 Jan 1983 IC

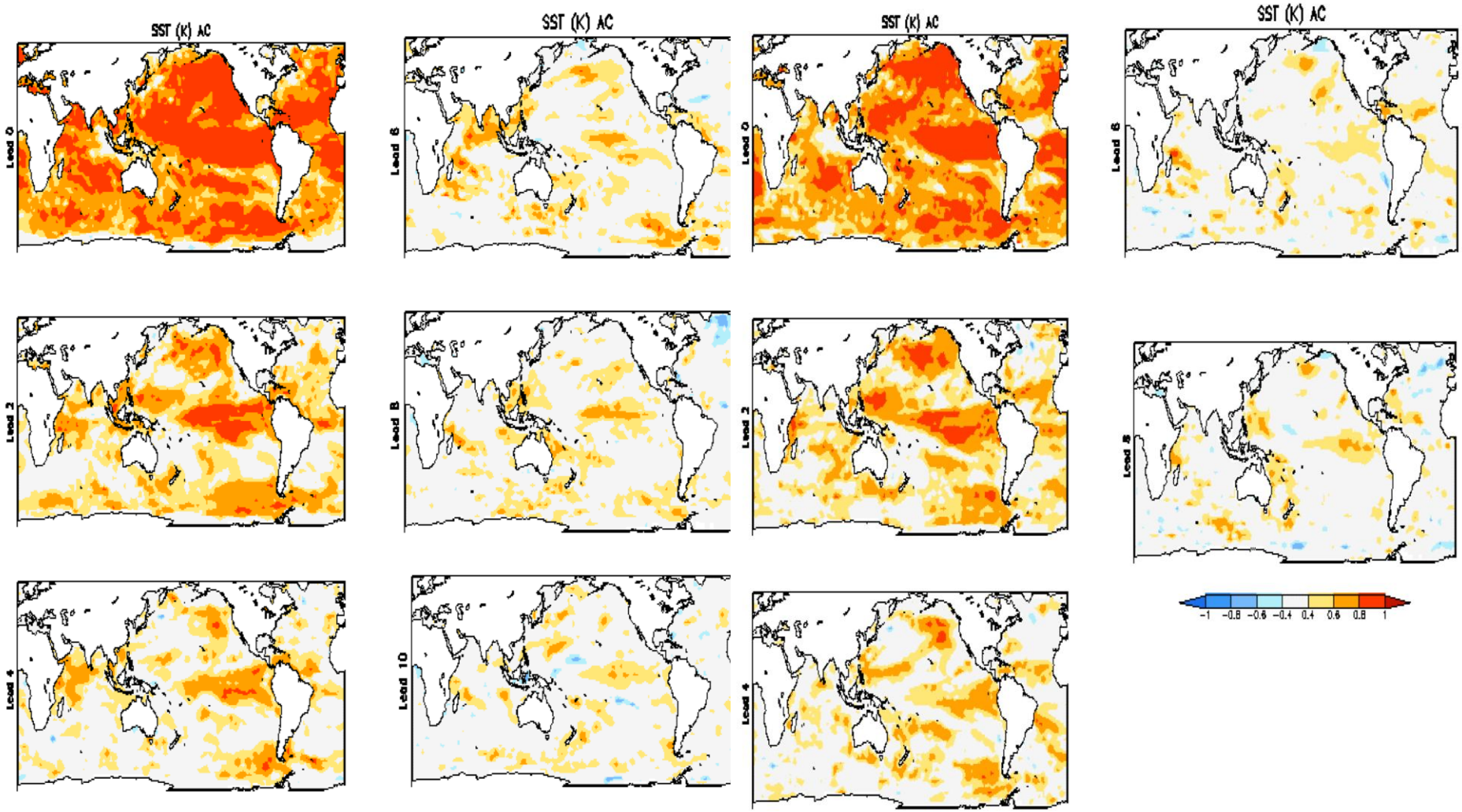


CCSM3.5 Jan 1983 IC

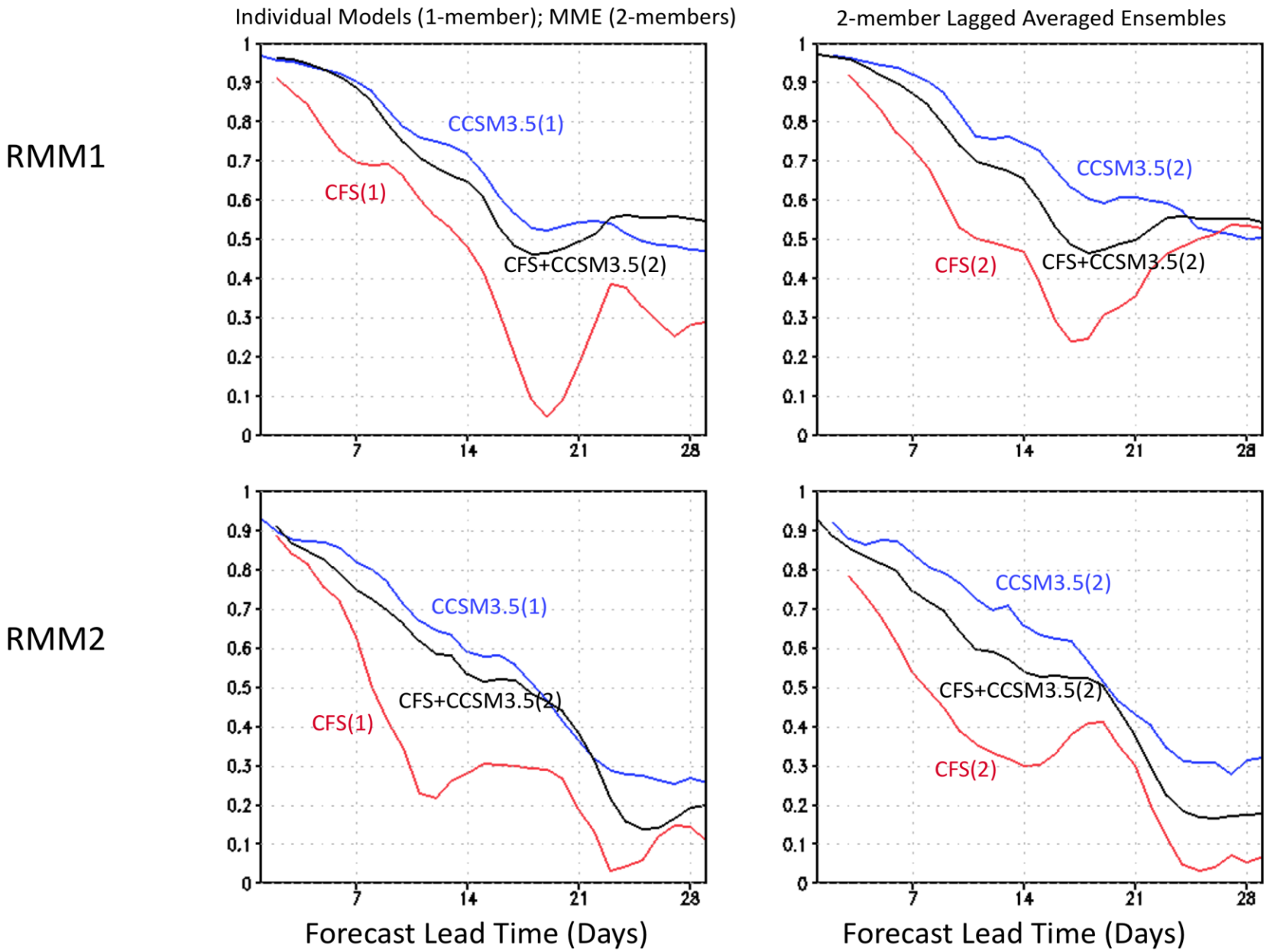


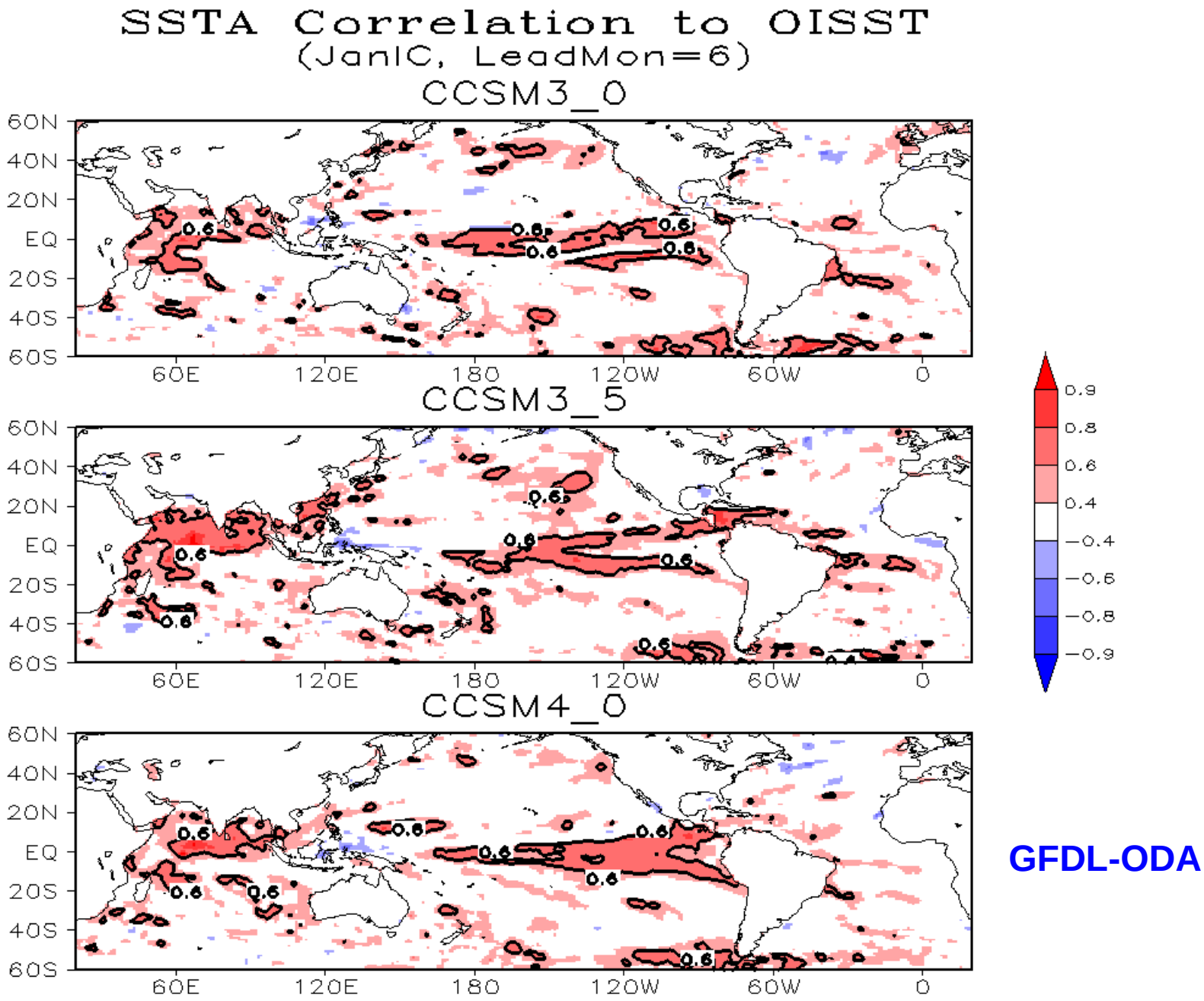
CCSM3.5

CFS

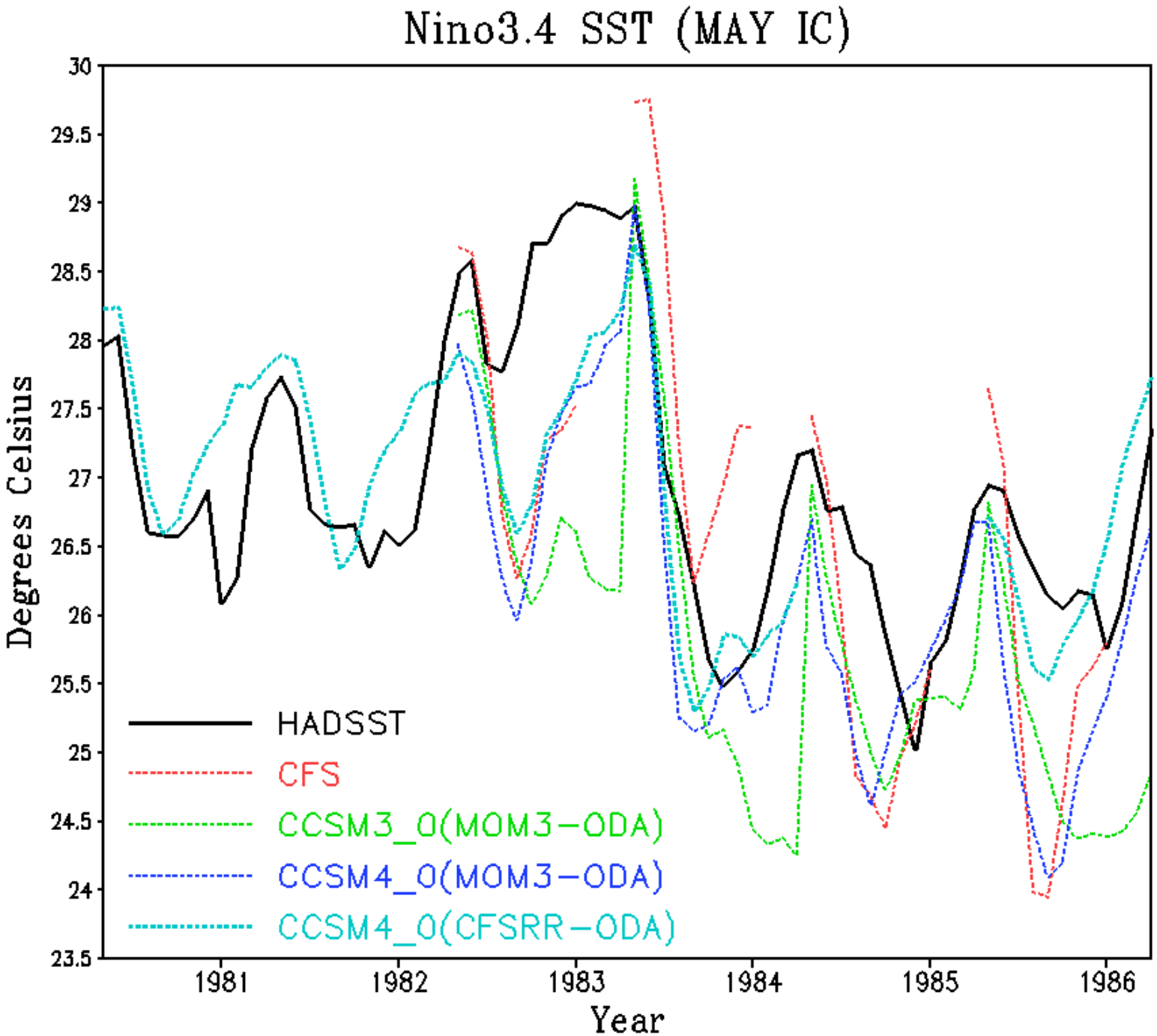

SST (K) AC
SST (K) AC
SST (K) AC
SST (K) AC
Lead 0
Lead 6
Lead 0
Lead 6
Lead 2
Lead 8
Lead 2
Lead 8
Lead 4
Lead 10
Lead 4
-1 -0.8 -0.6 -0.4 0.4 0.6 0.8 1

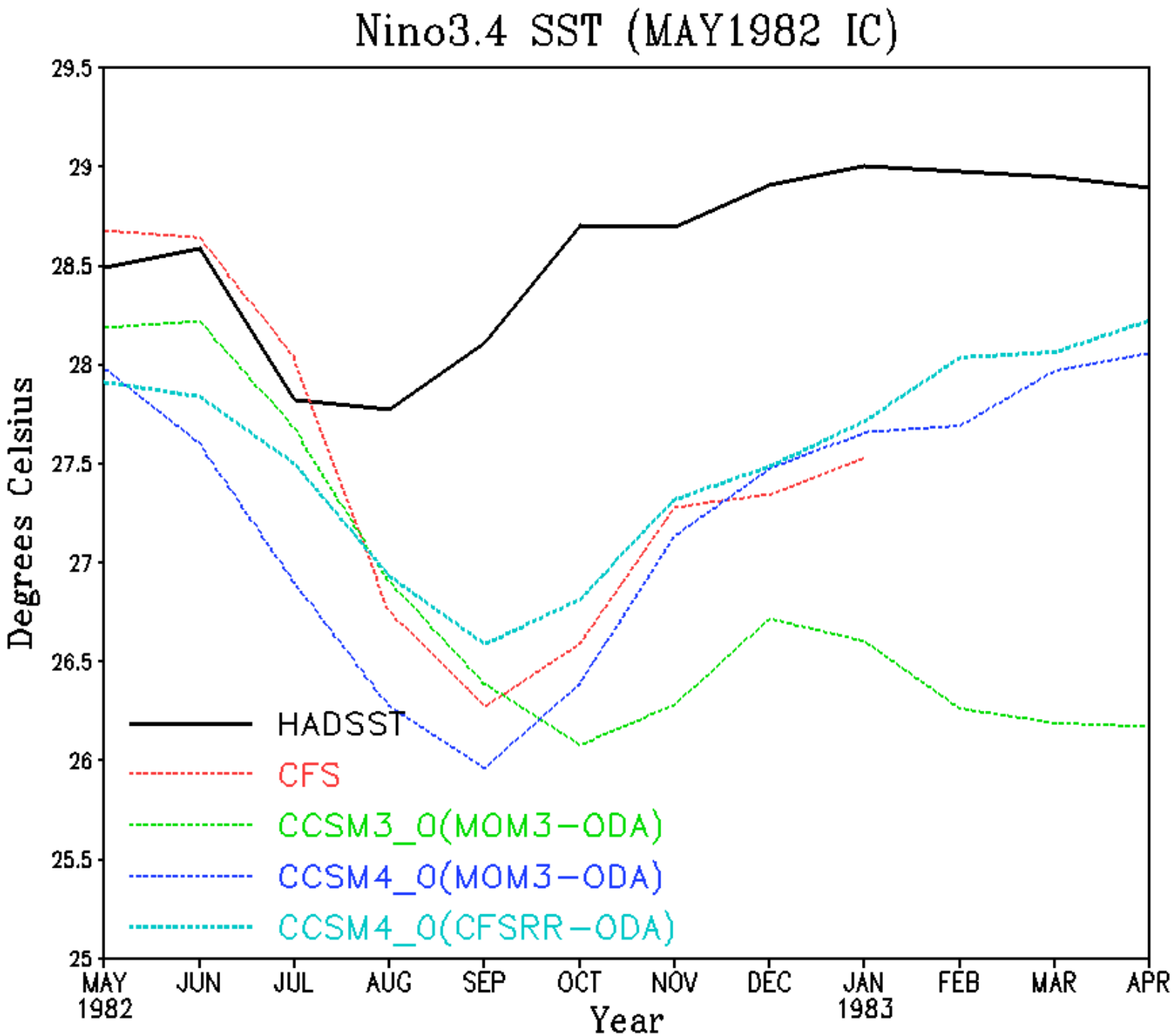
Average Anomaly Correlation Skill of MJO Index (RMM12)
Apr and Oct Initial Conditions (1981-1999) with CCSM3.5




SSTA Correlation to OISST
(JanIC, LeadMon=6)
CCSM3_0
CCSM3_5
CCSM4_0
60N
40N
20N
EQ
20S
40S
60S
60E
120E
180
120W
60W
0
0.6
0.9
0.8
0.6
0.4
−0.4
−0.6
−0.8
−0.9

GFDL-ODA


Nino3.4 SST (MAY IC)
Degrees Celsius
Year
30
29.5
29
28.5
28
27.5
27
26.5
26
25.5
25
24.5
24
23.5
1981
1982
1983
1984
1985
1986
HADSST
CFS
CCSM3_0(MOM3-ODA)
CCSM4_0(MOM3-ODA)
CCSM4_0(CFSRR-ODA)


Nino3.4 SST (MAY1982 IC)
Degrees Celsius
29.5
29
28.5
28
27.5
27
26.5
26
25.5
25
MAY 1982
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN 1983
FEB
MAR
APR
Year
HADSST
CFS
CCSM3_0(MOM3-ODA)
CCSM4_0(MOM3-ODA)
CCSM4_0(CFSRR-ODA)

Results

- **CCSM3.0 (Initialized Ocean)+CFS**
- **CCSM3.0 (O-L-A Initialized)**
- **CCSM3.5 (Initialized Ocean)**
  - Sub-Seasonal (O-L-A)
- **CCSM4.0 (Initialized Ocean)**
  - GFDL-ODA
  - **CFSRR-ODA**