

**1/4 DEGREE CAM5 PRECIPITATION CHARACTERISTICS
IN THE EASTERN TROPICAL PACIFIC
IN SHORT FORECASTS**

David L. Williamson

and

Jerry G. Olson

**National Center for Atmospheric Research
Boulder, Colorado, USA**

Standard CAM 5.1

0.25 degree Finite Volume Dynamical Core

56.25 second time step

vertical remapping every 7.5 minutes

1 degree physics tuning parameters

15 minute physics time step

5-day forecasts initialized from

ECMWF YOTC analyses

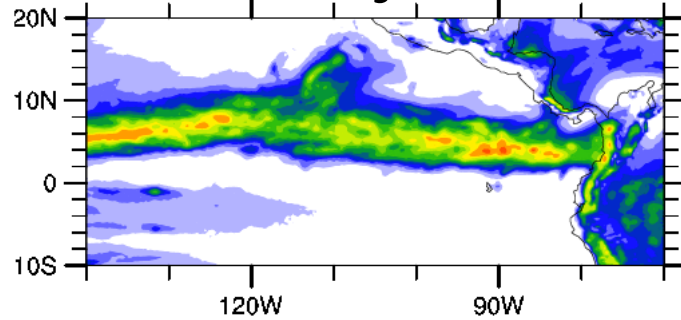
00Z January 3 to January 24, 2009

Compare to 3-hourly 0.25 degree TRMM (3B42)

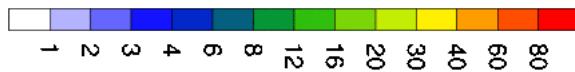
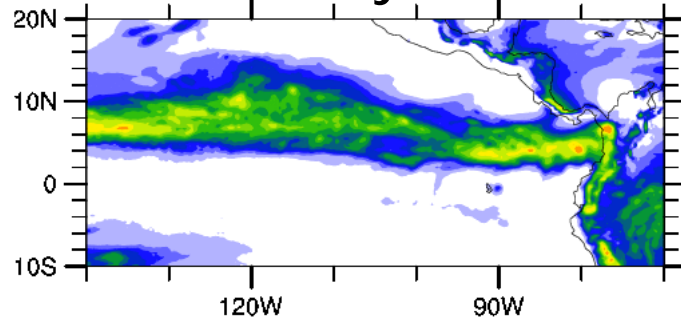
CLIMATOLOGICAL PRECIPITATION

CAM5.1

January 2003

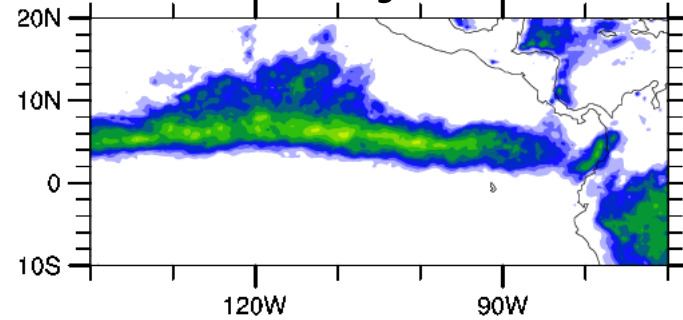


January 2005

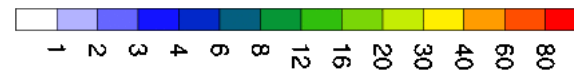
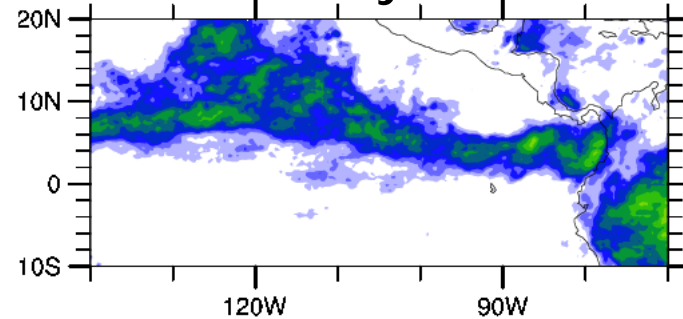


TRMM

January 2003



January 2009



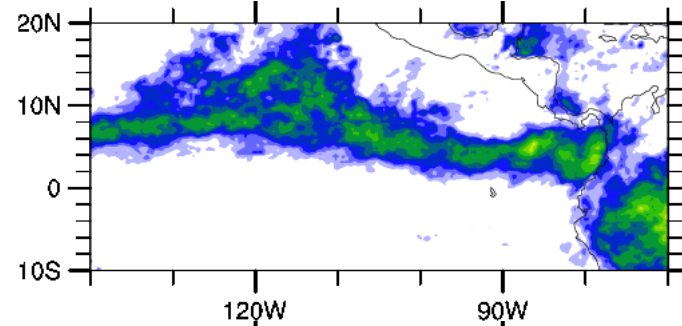
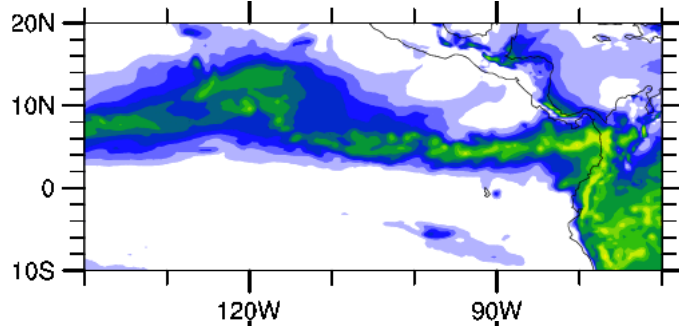
CAM5.1 climate courtesy of Mike Wehner

FORECAST ENSEMBLE 24-HR PRECIPITATION

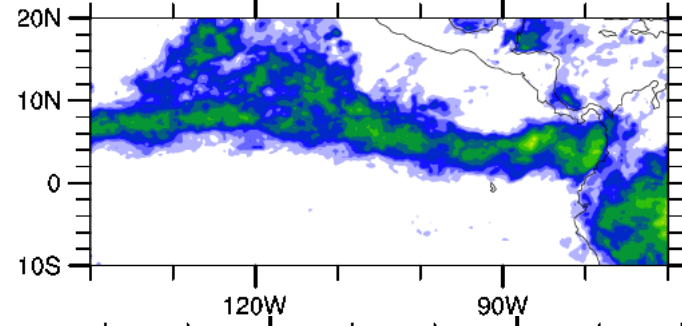
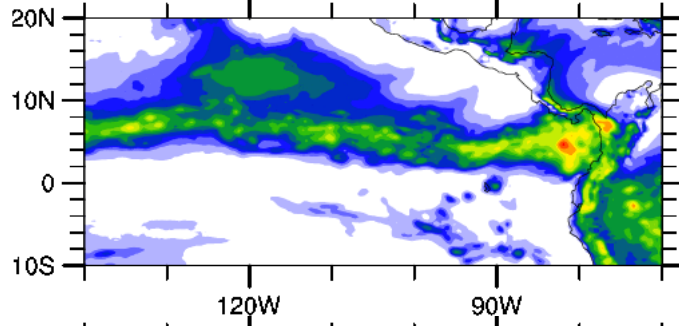
CAM 5.1

TRMM

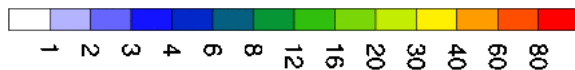
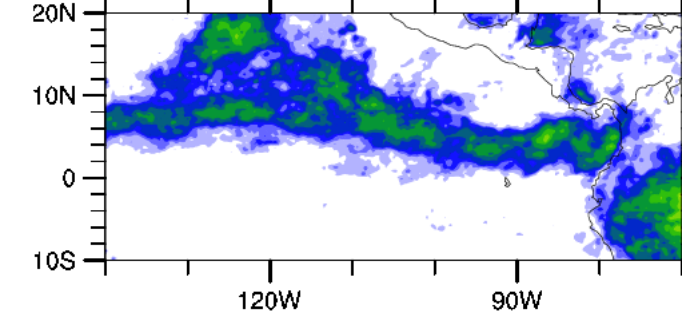
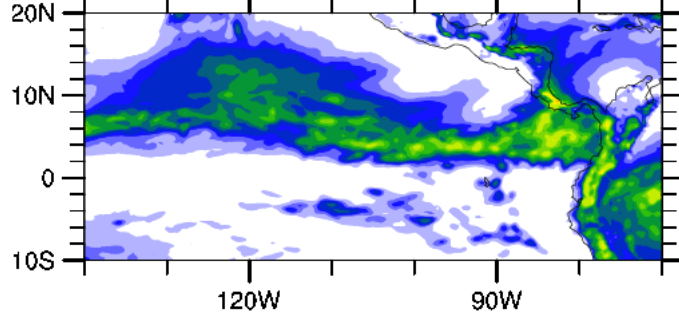
DAY 1



DAY 3



DAY 5

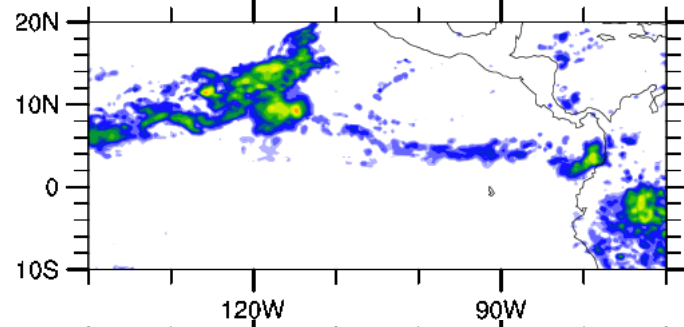
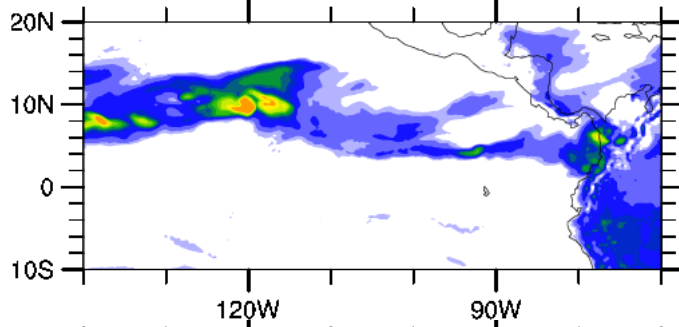


24-HR PRECIPITATION, IC = 03 January

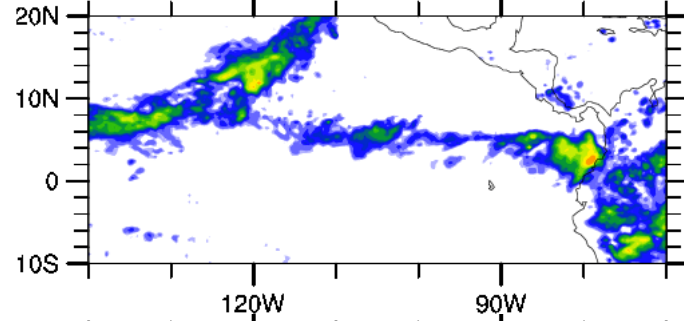
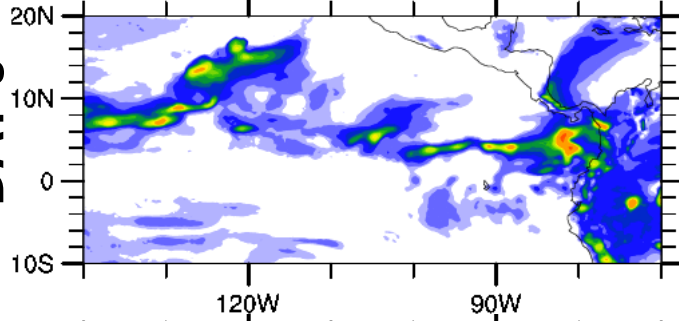
CAM5.1

TRMM

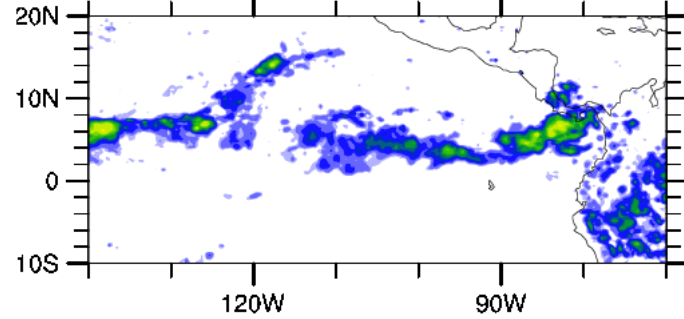
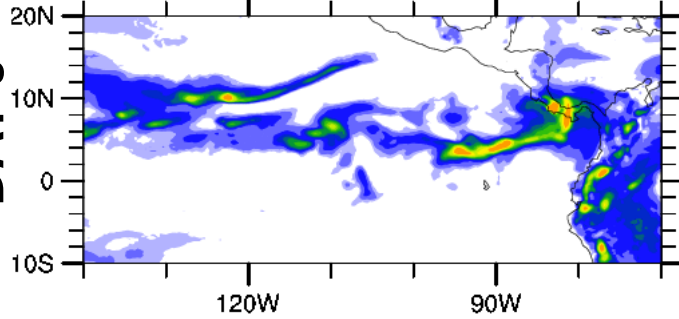
DAY 1



DAY 3



DAY 5

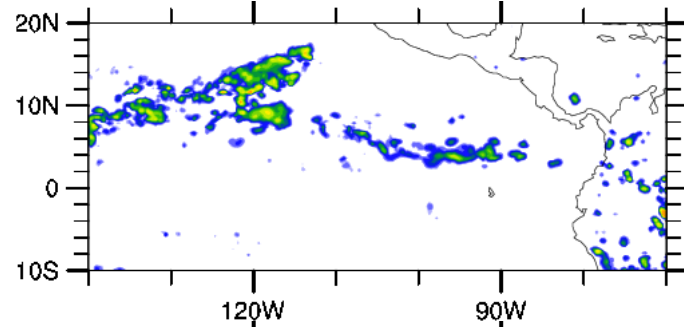
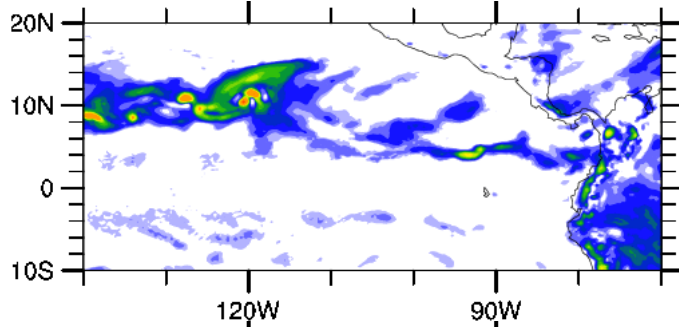


3-HR PRECIPITATION, IC = 03 January

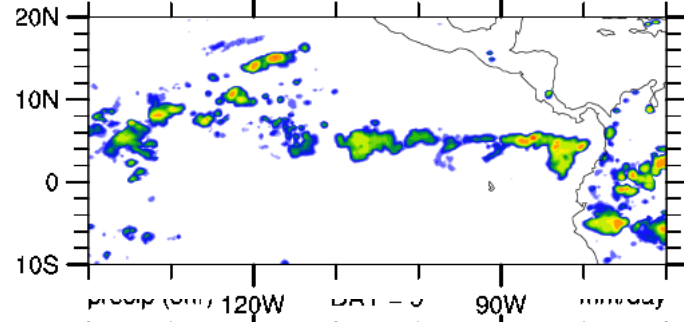
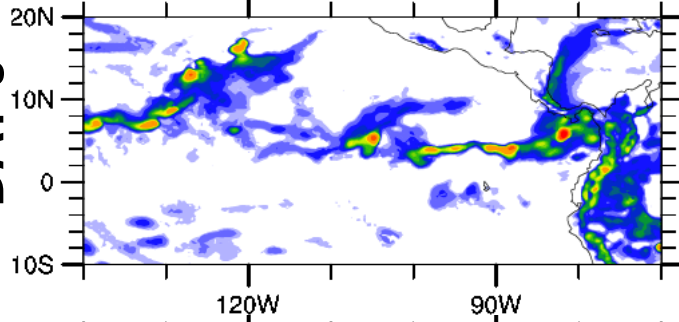
CAM5.1

TRMM

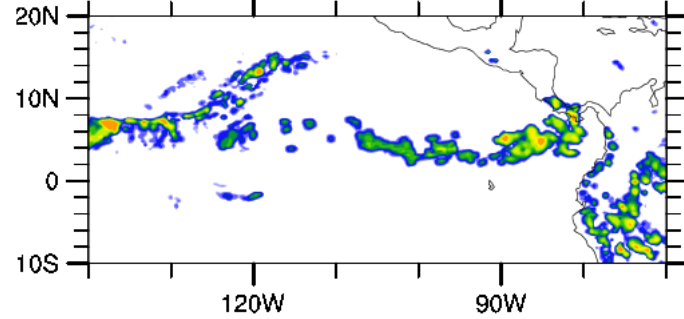
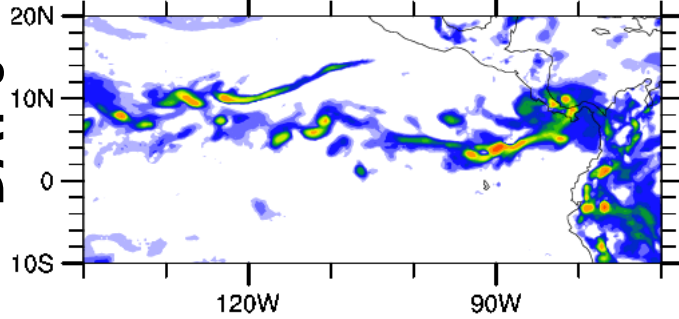
DAY 1



DAY 3



DAY 5

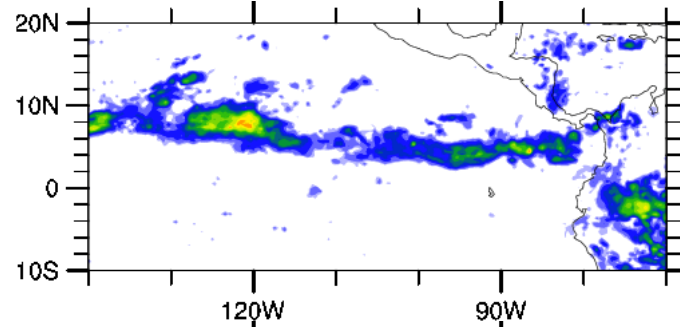
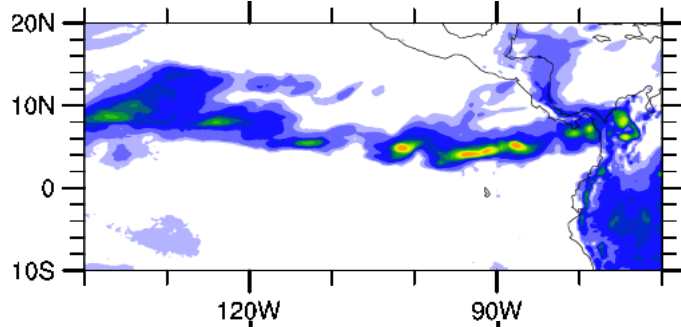


24-HR PRECIPITATION, IC = 09 January

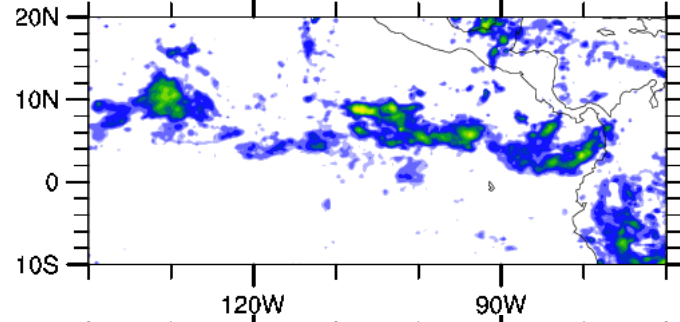
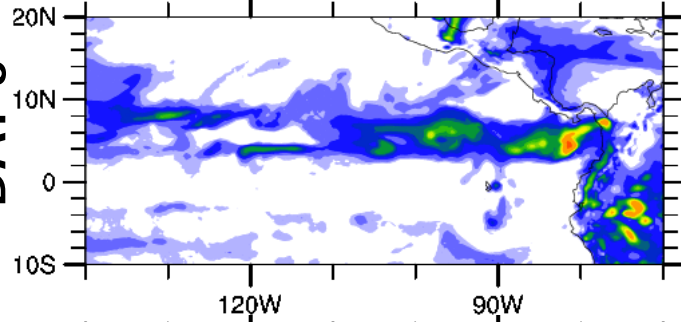
CAM5.1

TRMM

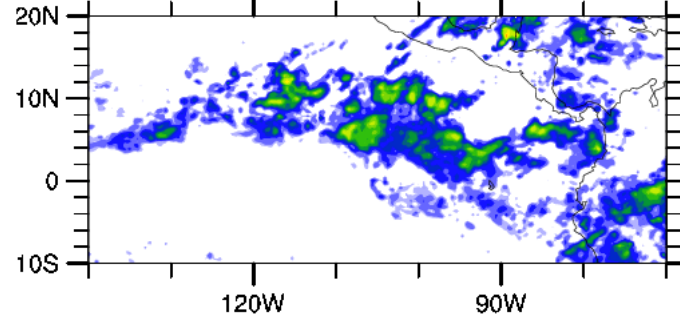
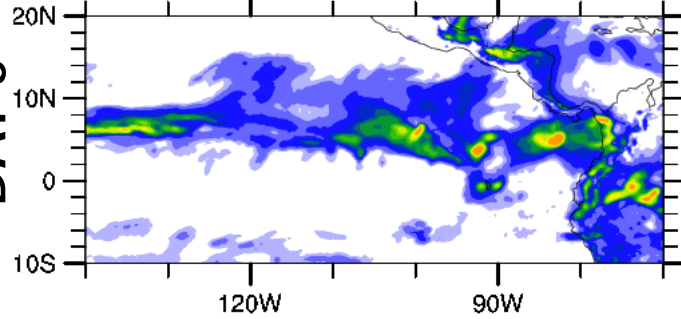
DAY 1



DAY 3



DAY 5

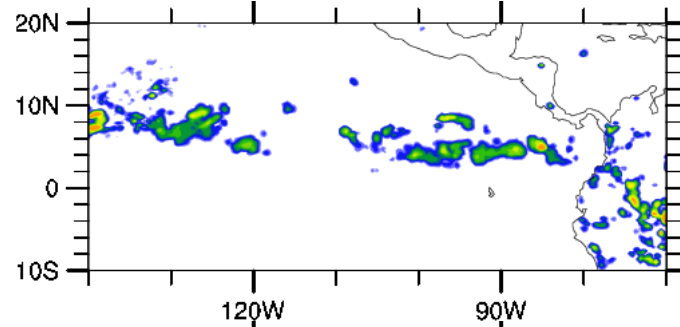
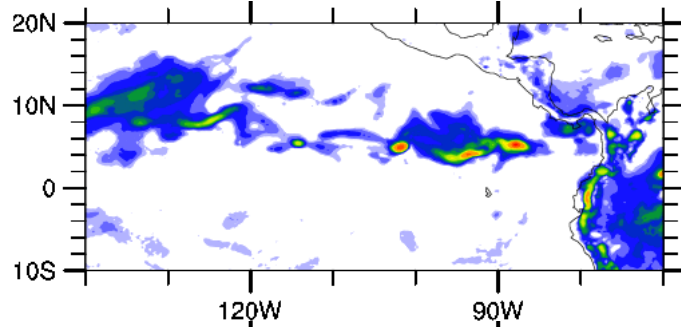


3-HR PRECIPITATION, IC = 09 January

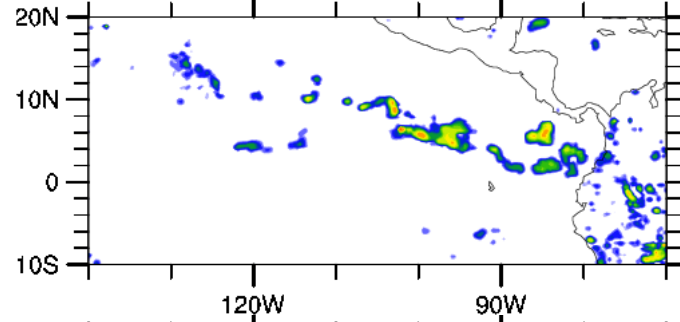
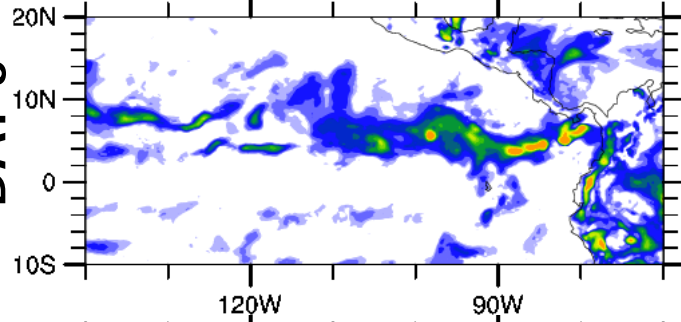
CAM5.1

TRMM

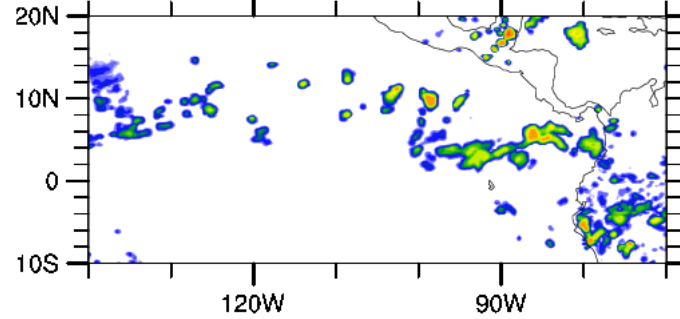
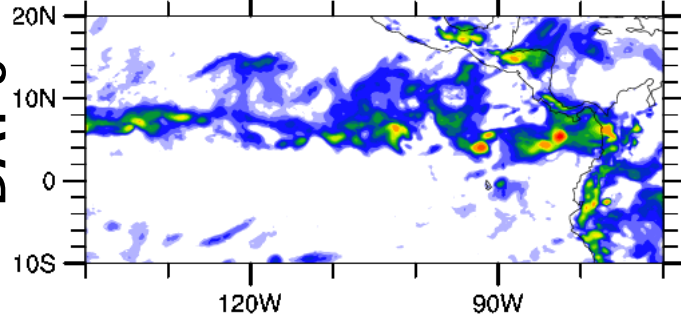
DAY 1



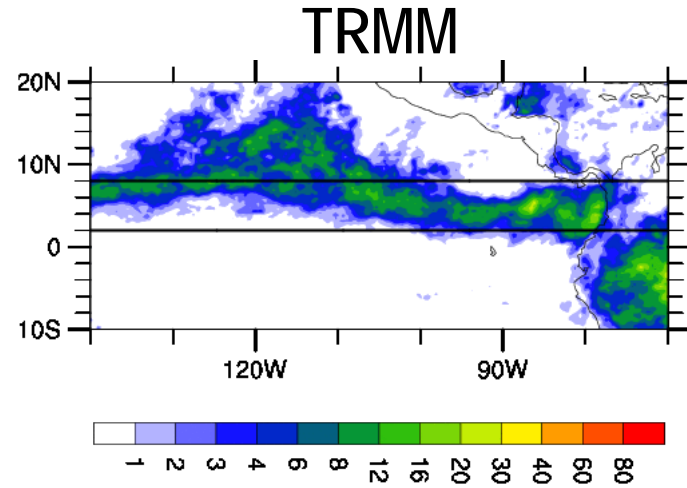
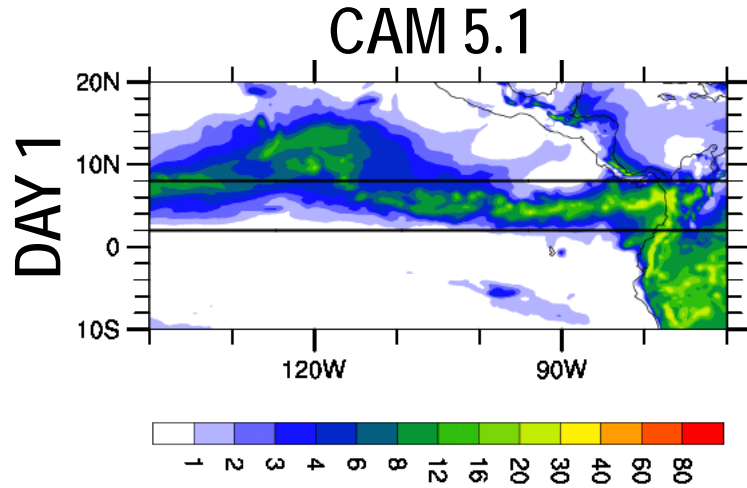
DAY 3



DAY 5



FORECAST ENSEMBLE 24-HR PRECIPITATION



INDIVIDUAL FORECASTS 2 to 8 DEGREES

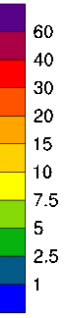
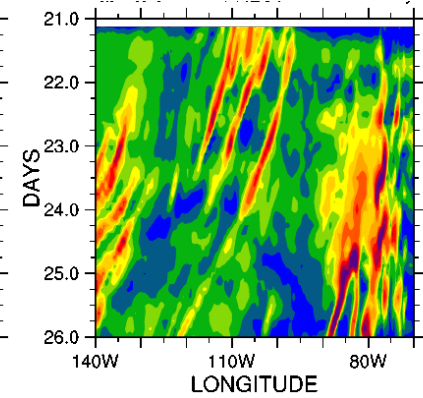
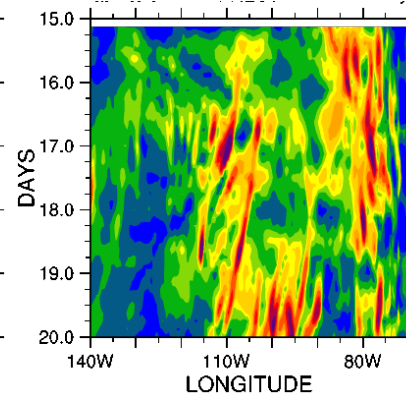
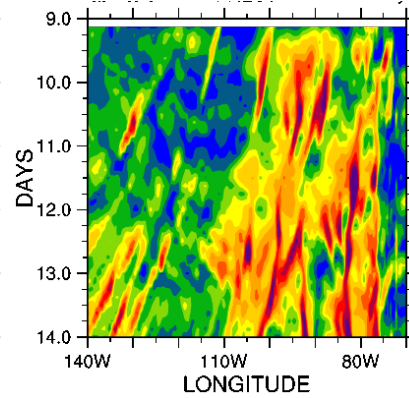
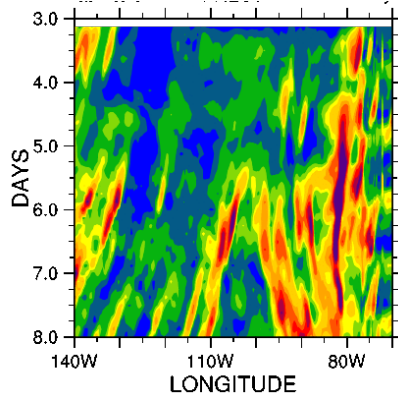
IC = 3 JAN

IC = 9 JAN

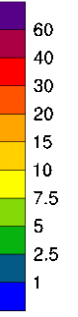
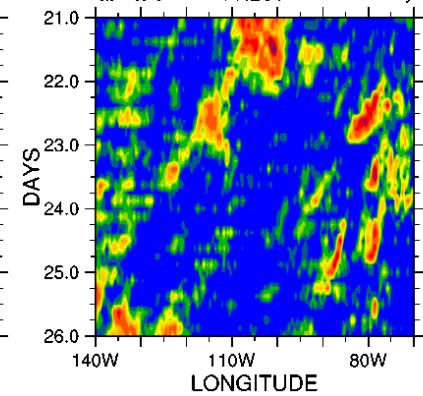
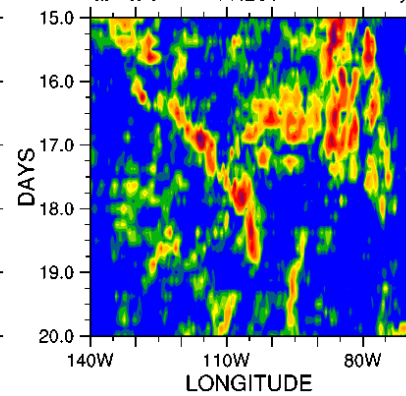
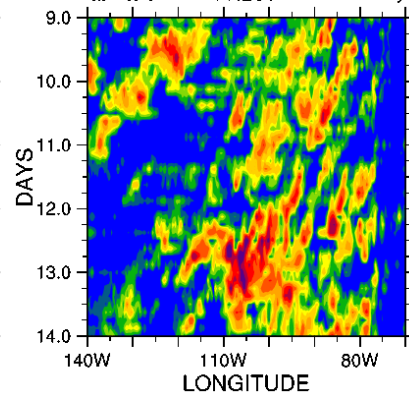
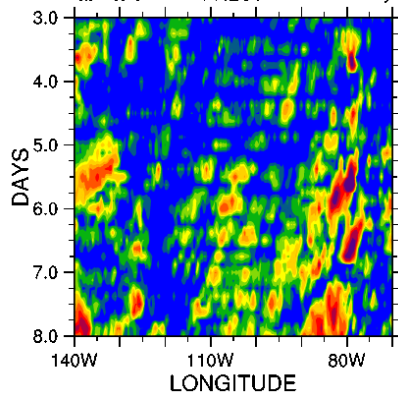
IC = 15 JAN

IC = 21 JAN

CAM5.1



TRMM



INDIVIDUAL FORECASTS 2 to 8 DEGREES

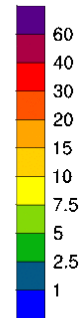
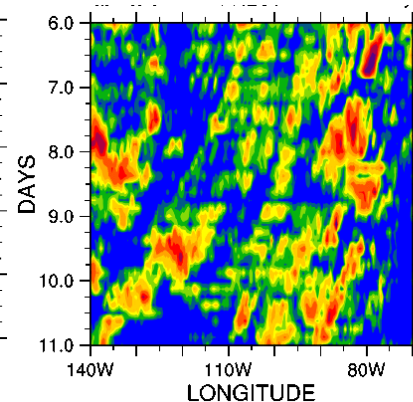
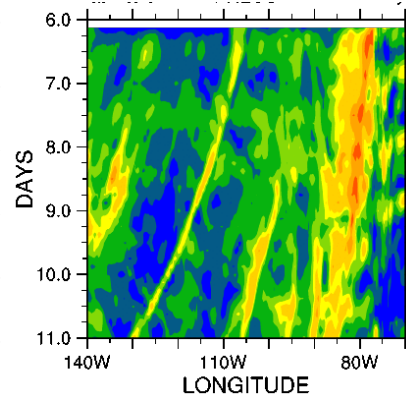
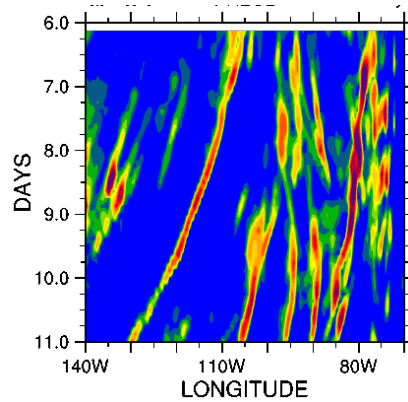
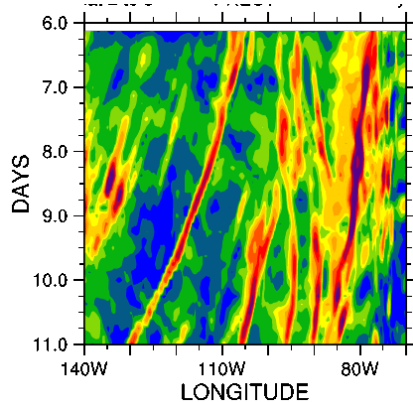
CAM5.1
PRECT

CAM5.1
PRECL

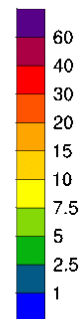
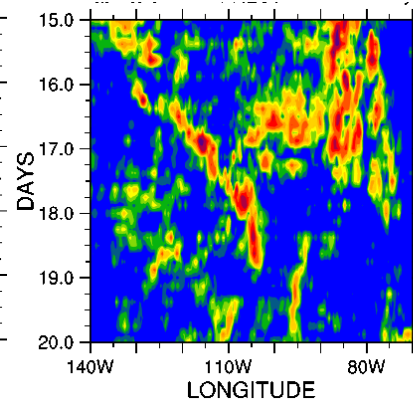
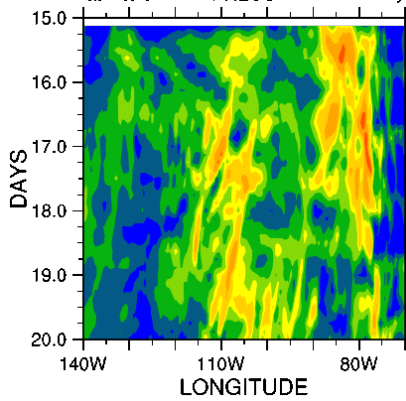
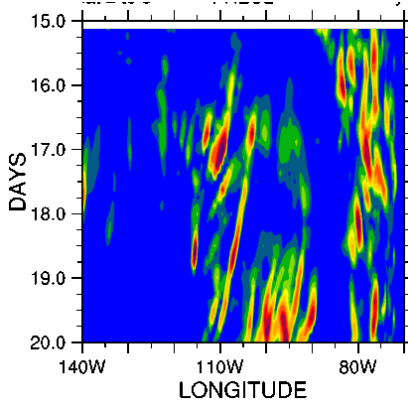
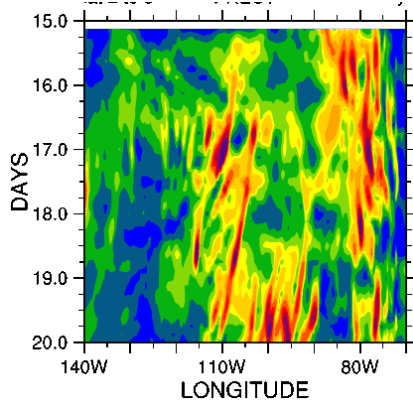
CAM5.1
PRECC

TRMM
PRECT

IC = 6 JAN

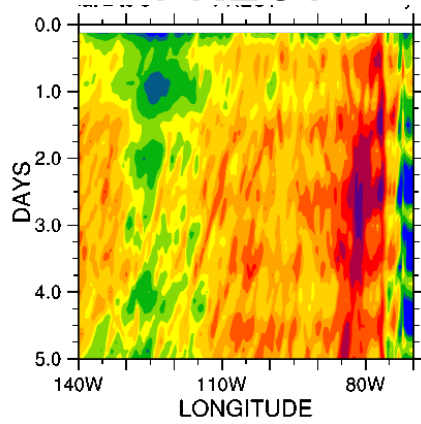


IC = 15 JAN

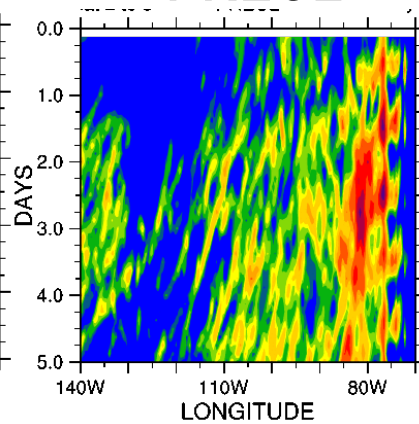


FORECAST ENSEMBLE 2 to 8 DEGREES

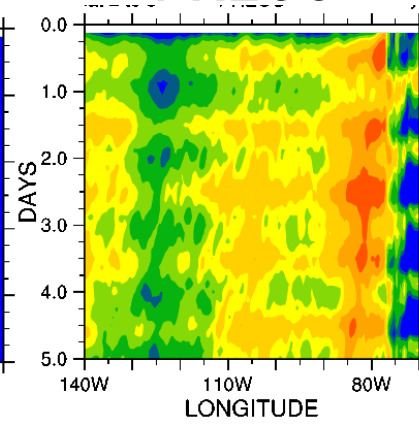
CAM5.1 PRECT



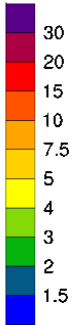
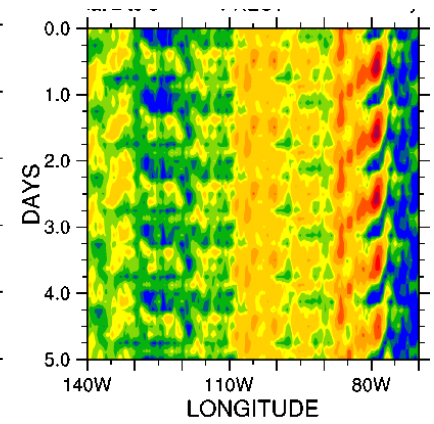
CAM5.1 PRECL



CAM5.1 PRECC



TRMM PRECT



0.25 degree CAM 5.1 precipitation compared to TRMM

Individual forecasts

XY maps

- Small amounts over too large an area

- Cells too strong and too many

Hovmoeller diagrams

- Too coherent in time

 - not enough variability on diurnal time scale

- Cells are too strong, too long lived

 - too coherent in time

- Less eastward propagation

0.25 degree CAM 5.1 precipitation compared to TRMM

Ensemble of forecasts

XY maps

- ICTZ too strong

 - but not as strong as climate

Hovmoeller Diagrams

- Overall pattern in PRECC similar to TRMM

 - Diurnal variation

 - Lack of westward propagation from South America

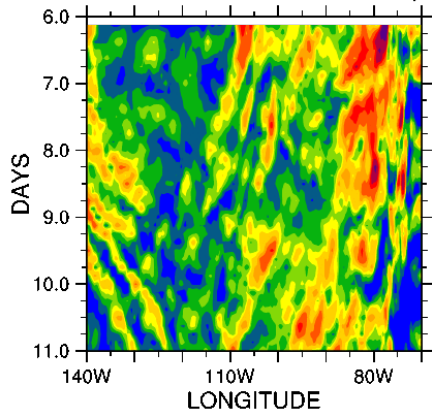
- Cellular activity dominates PRECL

 - Sample size too small to average it out

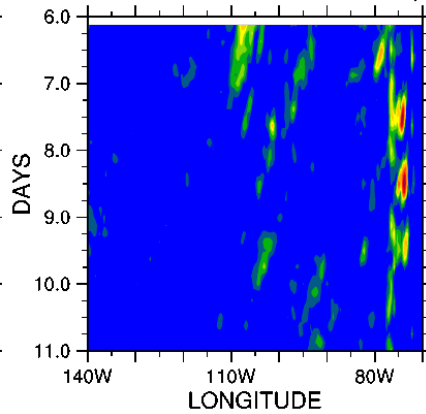
 - PRECL dominates PRECT

INDIVIDUAL FORECAST, IC = 6 JAN 2 to 8 DEGREES

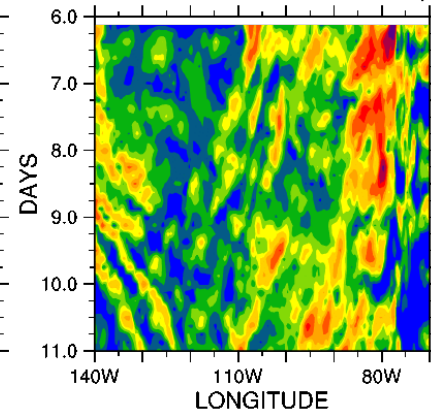
PRECT
5 MIN T-SCALE



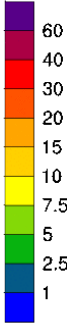
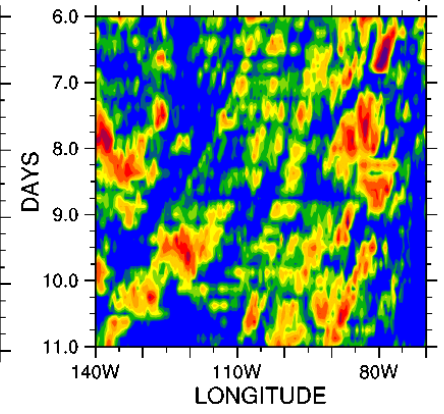
PRECL
5 MIN T-SCALE



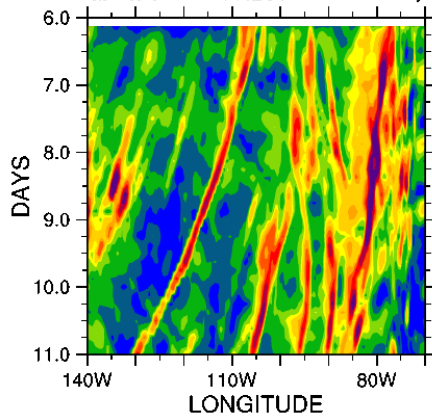
PRECC
5 MIN T-SCALE



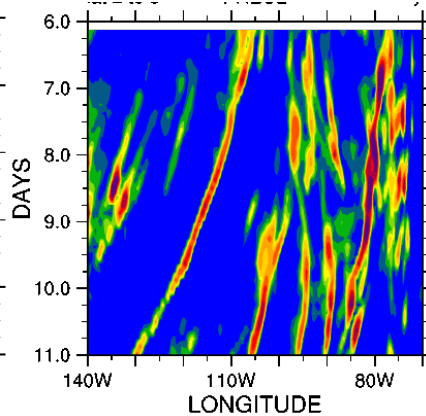
PRECT
TRMM



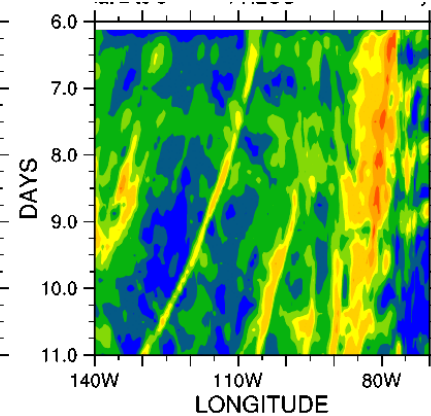
CAM5.1



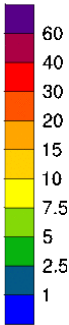
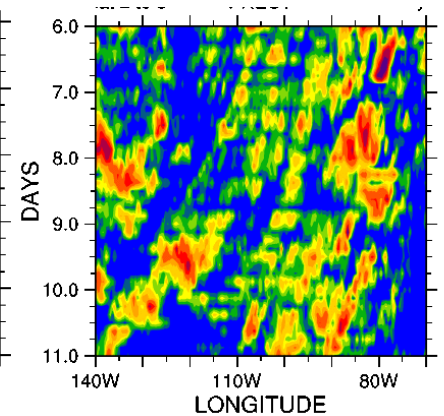
CAM5.1



CAM5.1

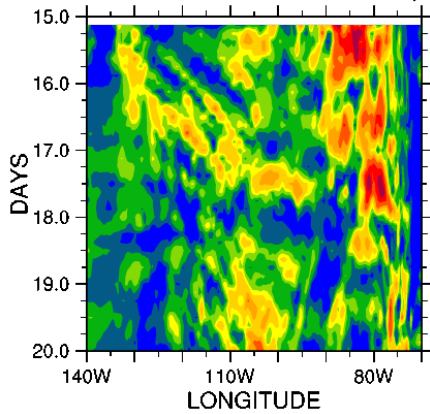


TRMM

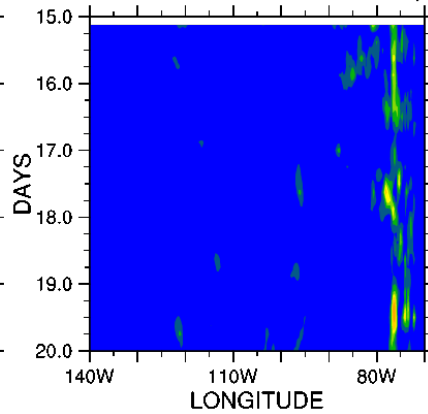


INDIVIDUAL FORECAST, IC = 15 JAN 2 to 8 DEGREES

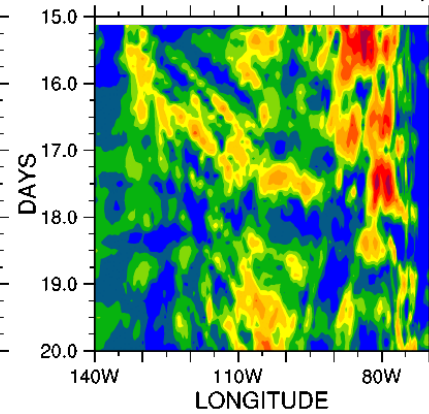
PRECT
5 MIN T-SCALE



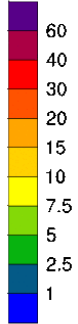
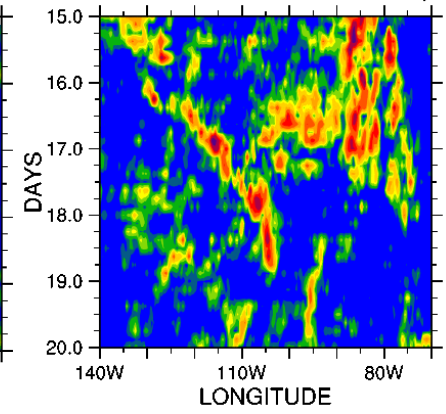
PRECL
5 MIN T-SCALE



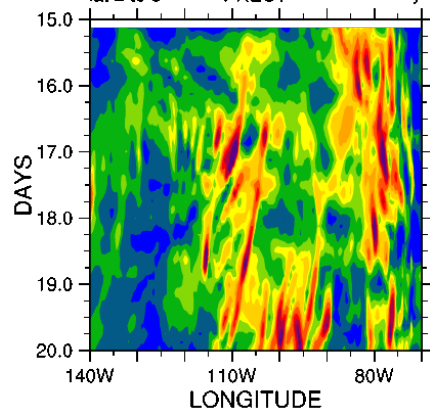
PRECC
5 MIN T-SCALE



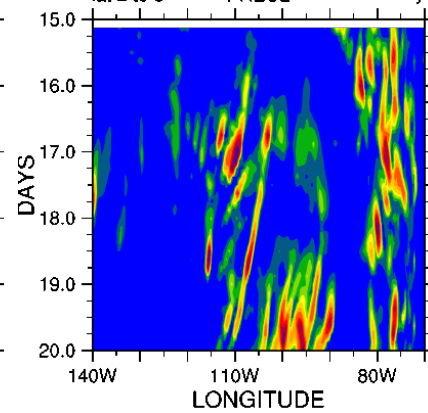
PRECT
TRMM



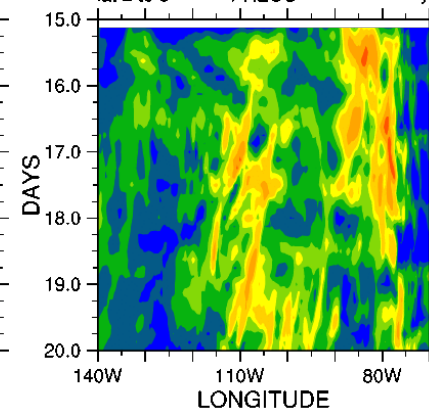
CAM5.1



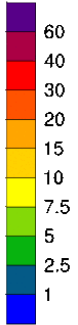
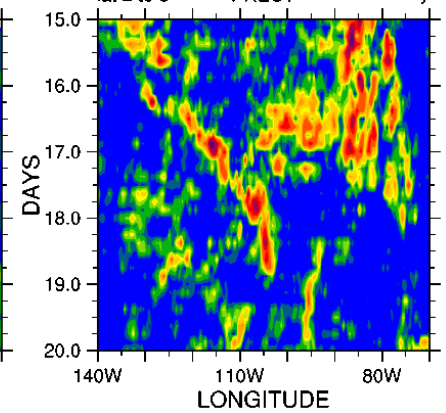
CAM5.1



CAM5.1

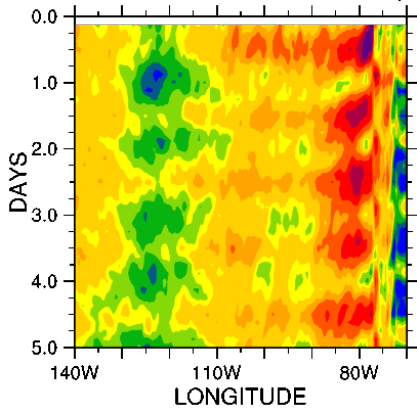


TRMM

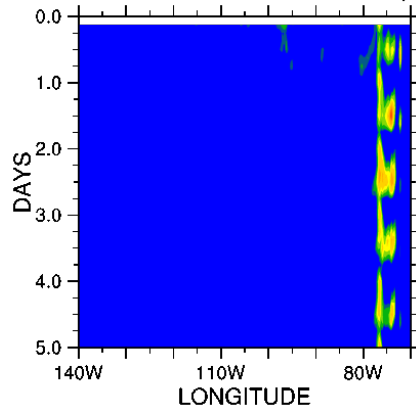


FORECAST ENSEMBLE 2 to 8 DEGREES

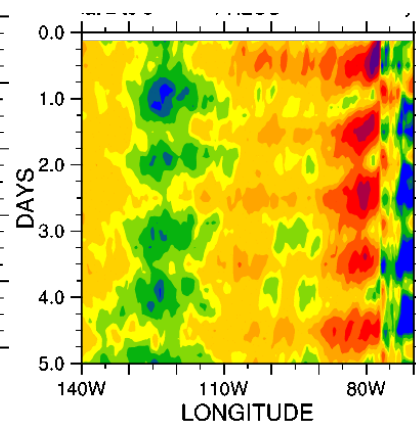
PRECT 5 MIN T-SCALE



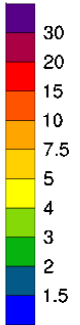
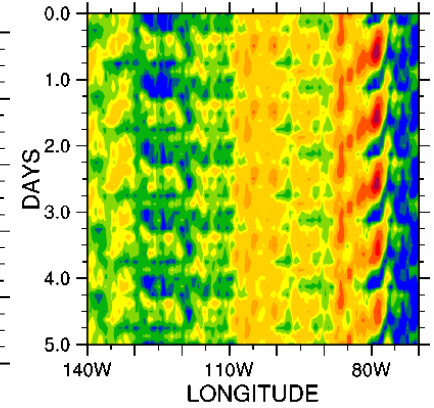
PRECL 5 MIN T-SCALE



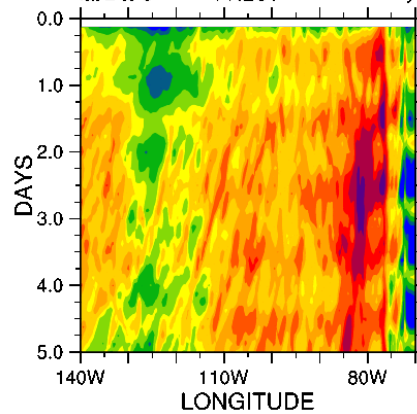
PRECC 5 MIN T-SCALE



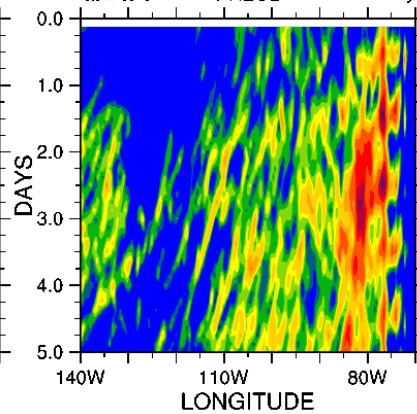
PRECT TRMM



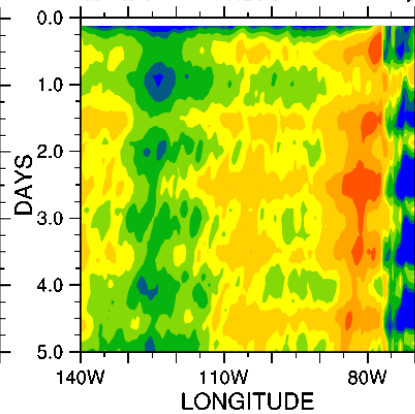
CAM5.1



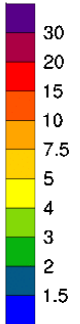
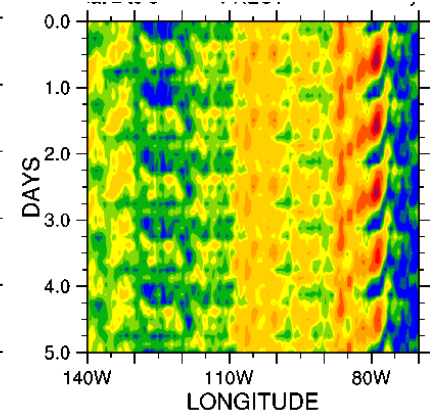
CAM5.1



CAM5.1



TRMM

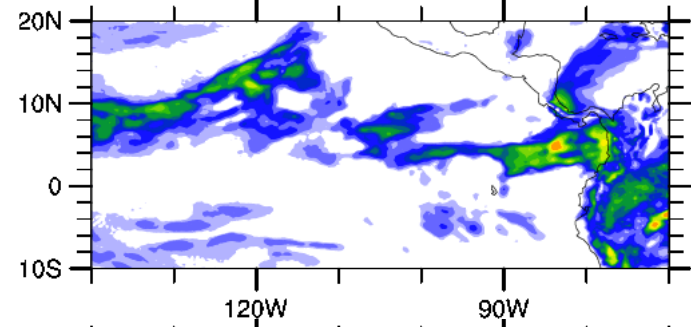
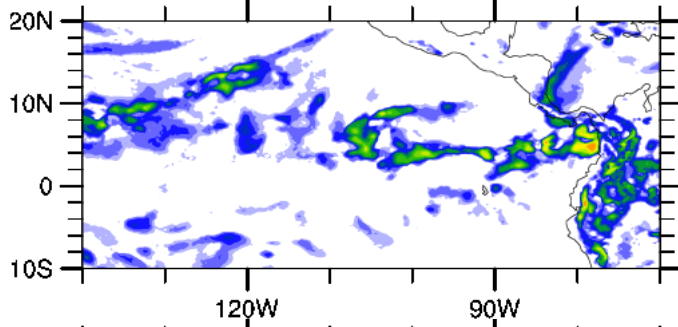


IC = Jan 3, DAY 3 FORECAST

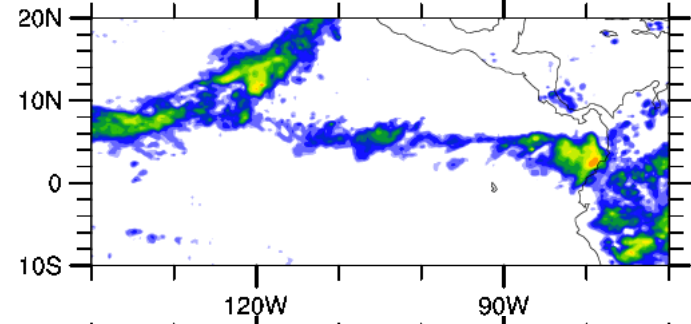
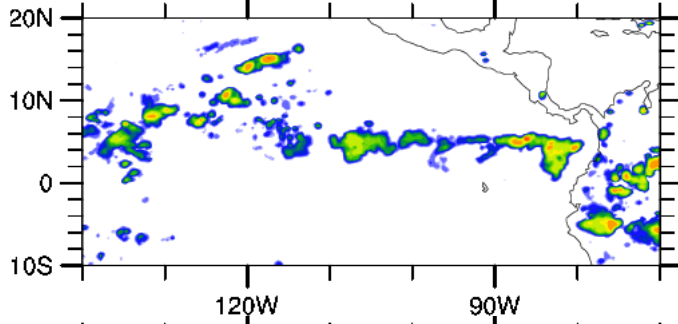
3-HR PRECIPITATION

24-HR PRECIPITATION

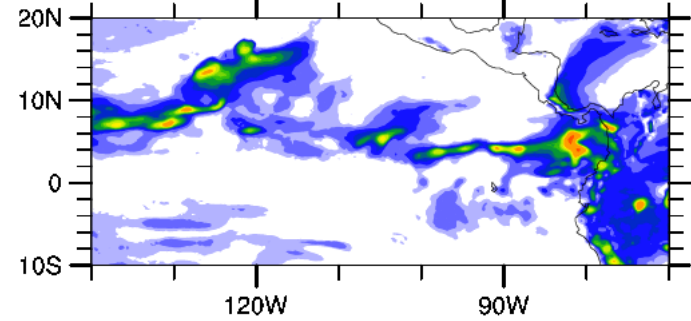
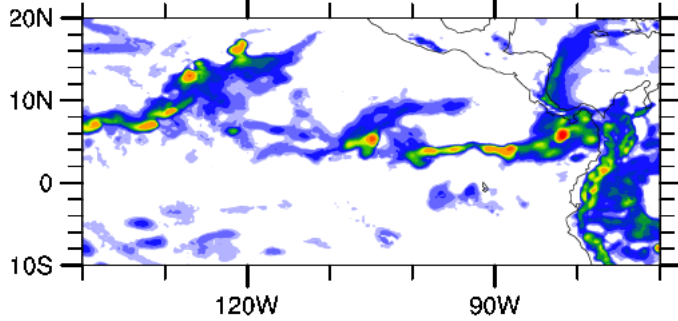
5 MIN T-SCL



TRMM



CAM5.1

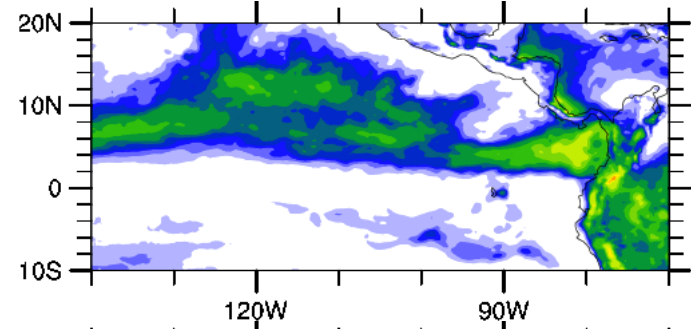
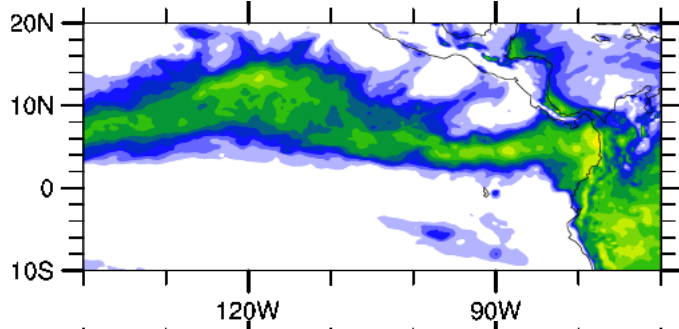


FORECAST ENSEMBLE 24-HR PRECIPITATION

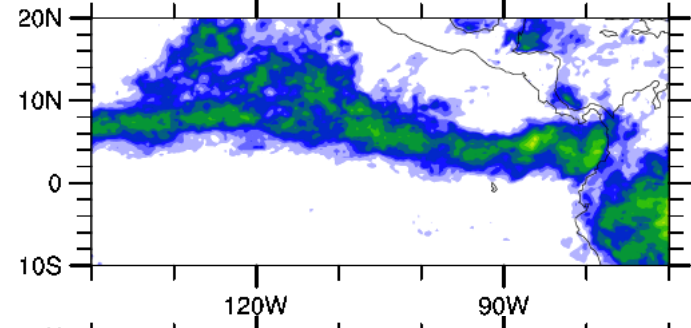
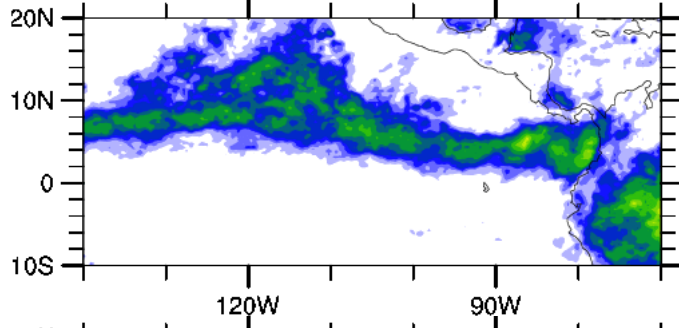
DAY 1

DAY 3

5 MIN T-SCL



TRMM



CAM5.1

