

# BESM/INPE

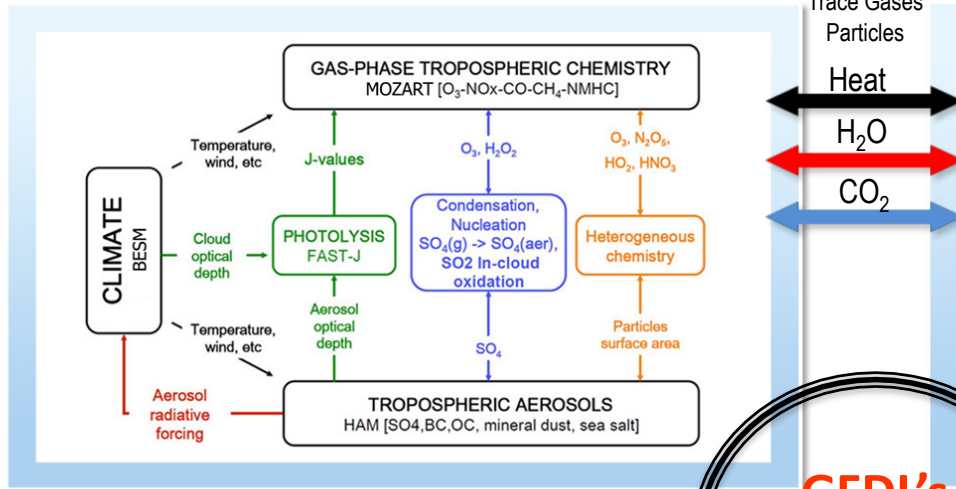
## Brazilian Earth System Model

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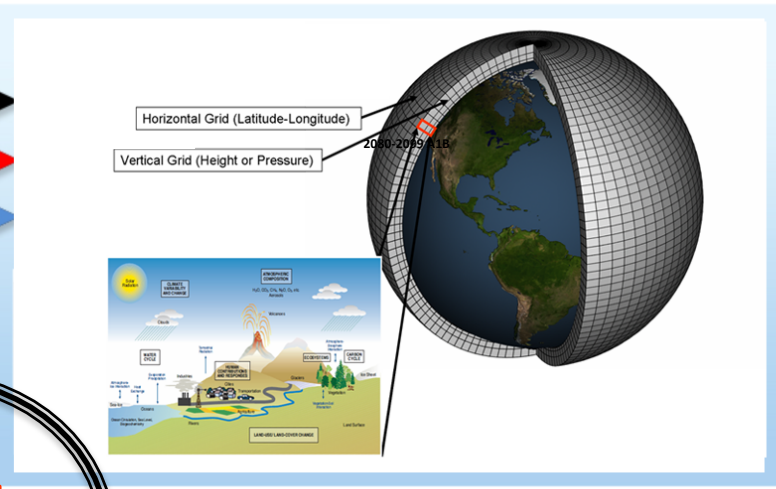
For WGCM meeting on CMIP6  
04 October 2014

# BESM Component Models

## ATMOS CHEMISTRY (HAMMOZ - MPI)

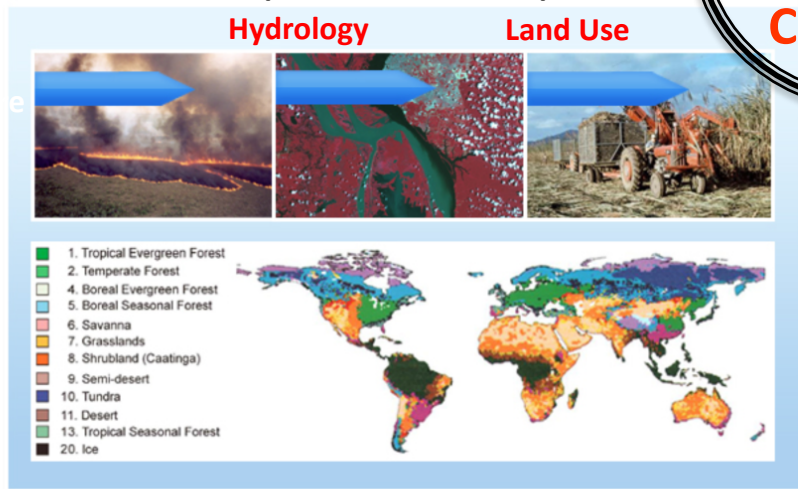


## ATMOSPHERE (INPE/CPTEC)

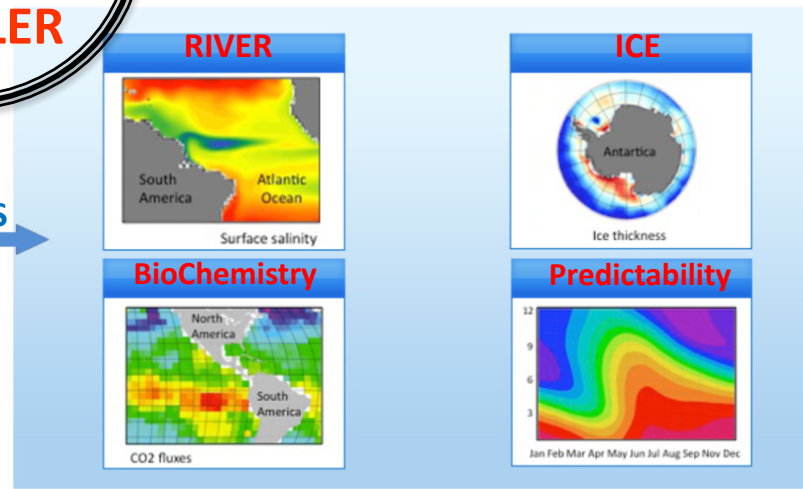


**GFDL's  
FMS  
COUPLER**

## LAND (IBIS - INPE/CCST)



## OCEAN (MOM4p1 - NOAA/GFDL)



# BESM component models:

- **Atmos:** CPTEC global spectral model, originated from COLA model, with new physical parameterizations (deep and shallow cumulus convection, short and longwave radiation, RRTMG, modified CLIRAD);
- **Ocean:** GFDL's MOM4p1 with marine ice and biogeochemistry; River discharges;
- **Surface:** INPE's version of NCAR's IBIS with improved representation of tropical biomes, forest fires and continental hydrology;
- **Chemistry/Aerosol:** from MPI HAMMOZ implemented at INPE's AGCM.
- **Coupler:** Hourly coupling via GFDL's FMS.

# INPE's CMIP6 Resources

- BESM
  - CPTEC AGCM
  - GFDL OGCM
  - INPE's IBIS
  - MPI HAMMOZ
  - GFDL FMS coupler
- Resolution (up to):
  - Atmos T266L64
  - Ocean  $\frac{1}{4} \times \frac{1}{4}$  L64
  - Surface  $1/10 \times 1/10$ .
- References:
  - Nobre et al (2013) J.Climate
  - Nilo et al (2014, tbs)
- Computer Resources
  - CRAY EX6 at INPE/CPTEC
    - 30K processors
    - 16 TFlops sustained
    - 10 PBytes disk storage
    - (ESGF)
  - Next supercomputer
    - ~1 Pflop sustained
    - ~1,000 Pbytes disk storage
    - ESGF
  - CMIP6 Experiments:
    - DECK
    - DCPD
    - HighResMIP