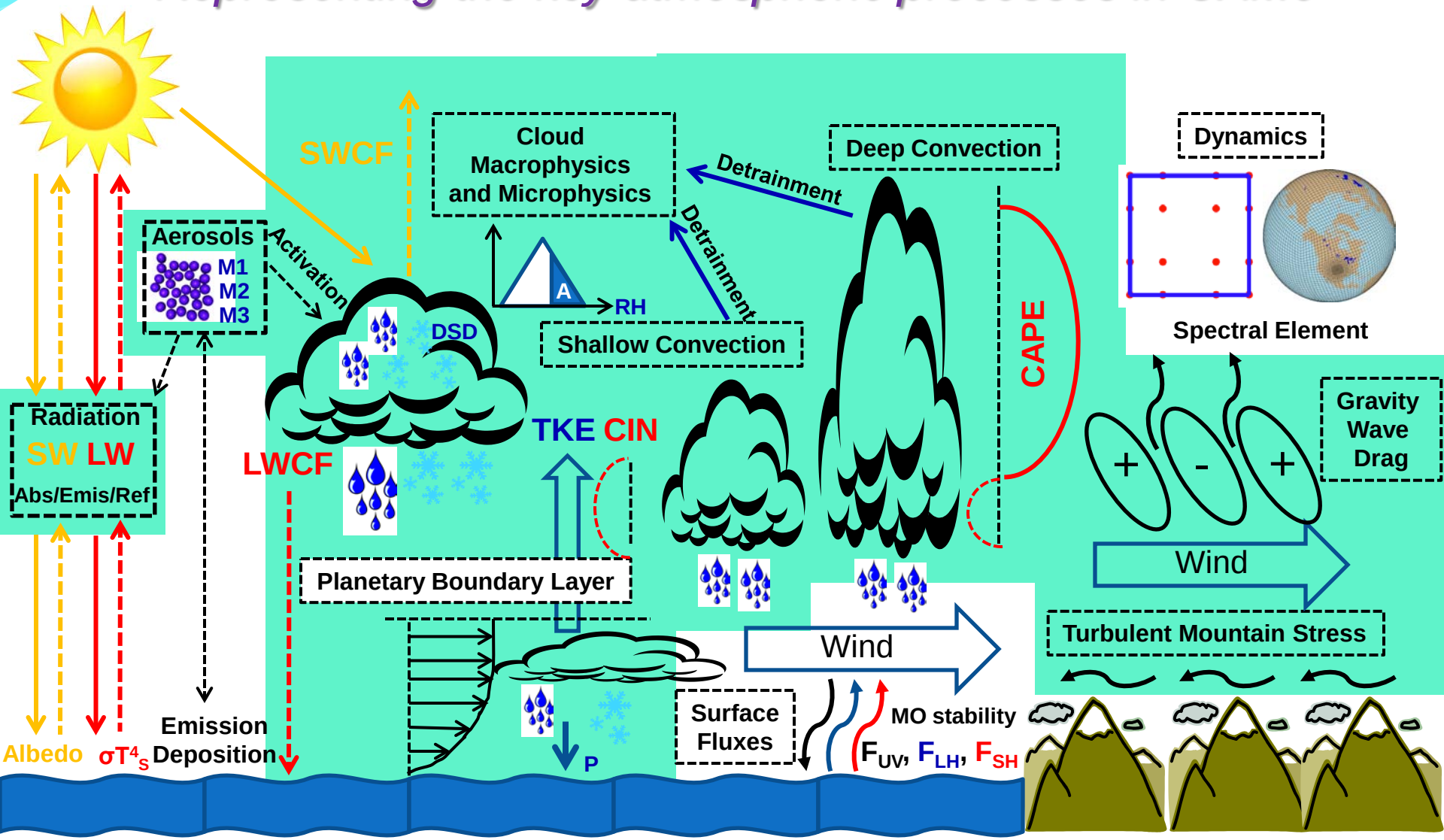
Community Atmosphere Model

Representing the key atmospheric processes in CAM5



Community Earth System Model

CESM

CAM Development Process

Strategic Science Plan For Input

- New science opportunities for CESM2
  (high-level questions, can be done in the next 2-3 years)
- AMWG specific science targets
- Cross-WG questions and performances
- Bias reduction and new functionalities to enable science research

CAM Development Process

Strategic Science Plan For Input

- New science opportunities for CESM2
  (high-level questions, can be done in the next 2-3 years)

  - high-resolution phenomena
  - sea-level rise
  - near-term prediction
  - enhanced biogeochemistry
  - climate-human interaction
  - ??

CAM Development Process

Strategic Science Plan For Input

- AMWG specific science targets

  - MJO and Intraseasonal variability
  - Diurnal variation of rainfall
  - Cloud feedback
  - Aerosol indirect effects
  - ENSO response
  - Regional climate statistics
  - ??

CAM Implementation Plan For Feedback

Draft documents

- CAM development protocols
- Simulation metrics
- Near-term development activities

http://www2.cesm.ucar.edu/working-groups/amwg

CAM Implementation Plan For Feedback

CAM development protocols

- ✓ Code base and requirement
- ✓ Test steps and validation requirements
- ✓ Review of code and results
- ✓ Decision process

CAM metrics

Near-term activities

Discussion

1. Addressing systematic errors; what are the priorities? (Tropical precipitation, high cloud, MJO, humidity field) Let us know what you find and what you can help
2. How do we move towards a supported high-res model (horizontal and vertical)?
3. How do we maintain a university available model?
4. Supported model versions
5. Path(s) forward on model development (esp. physics)
6. Timeline of model development for CMIP6

Supporting CAM5.2 configurations

Varying resolution, dynamical core and physics packages

Supported
CAM5-SE ne30 (1º)
General climate applications
CAM5-FV 2º
Paleo, chemistry and biogeochemistry applications
+ university users

In Development
CAM5-SE ne120 (0.25º)
High resolution simulations
CAM5-SE ne30_r_ne120
Regional climate applications

Functional
CAM5-FV 0.25º and 1º
CAM4-FV 1º and 2º
CAM5-SE ne16 (2º)
CAM5-SE ne240 (0.125º)
CAM4-EUL (T180,T360)

Other Applications
CAM5-EUL T31
CESM Tutorial configuration
CAM5-FV 4º
WACCM university users

Ocean
Mostly x1
x3 (university users)
x0.1 (experimental)

CAM Development Timelines

The path towards CMIP6

Physics

- Replace GWD with WACCM scheme
- Testing alternative cloud physics (UNICON,CLUBB, ??)
- MG2 implementation
- MAM4 implementation
- Test TMS and replace scheme with EC scheme
- RRTM radiation update
- MAM7 implementation
- Physics decisions for CAM6
- Control simulations with CAM6 physics
- **CAM6 model in CESM2 for CMIP6**

High Res.

- CAM5 0.25 deg tuning Vertical resolution testing (L60)? With CAM5 physics
- Decision for vertical resolution increase
- CAM5 0.25 deg tuning Vertical resolution testing With new physics options
- **0.25 deg CAM6 model**

Low Res.

- Prescribed MAM implementation
- Consistent sub-grid orography
- Prescribed MAM testing
- Efficiency improvements for 2deg CAM5
- Physics decisions for low-res CAM6
- **CAM6 low resolution model**

2013 (CESM1.2) — 2014 (CESM1.3) — 2015 (CESM1.4) — 2016 (CESM2)

Please give us your feedback

Potential questions

Will metrics be used to determine the candidate model components or configurations?

Will resources be available to support the implementation (computing and human)?

Can requests be made to support a particular configuration?

How can university people participate and contribute to the high-resolution efforts?