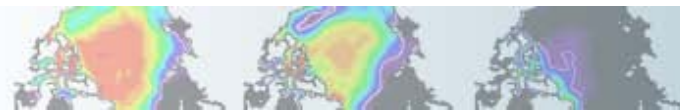


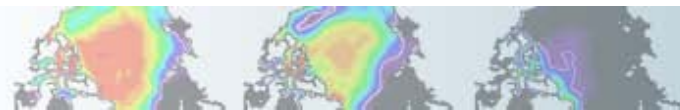
# Monday Discussion

- What (new?) science do we want to do with CAM5.5?
  - Tropical variability; sub-seasonal predictability (not in CAM5)
  - Cloud microphysical/microphysical/radiative processes
- How do we get to CAM5.5 from here? – **more certain**
  - GWD: Implement scheme from WACCM (fronts/convection)
  - MG2: prognostic precipitation
  - Mac/Mic Sub-stepping
  - Ice microphysics (particle sizes, nucleation and activation)
  - Updated RRTM (radiation)
  - CSLAM: Efficient tracer advection
  - EC blocking + form drag parameterization
- How do we get to CAM5.5 from here? – **less certain**
  - UNICON+MG2: Tropical variability, scale-awareness
  - CLUBB-ZM+MG2: Cloud transitions, feedbacks, tropical variability
  - What do they not do well (Metrics)?
  - Parallel tracks; combining; choose now; choose later; don't choose?
  - Time is limited (model by 2015, 1 deg?)
- Physics capability (metrics)
  - High vertical and horizontal resolution
  - Regional refined grid



# Wednesday Discussion

- Metrics of performance to aid model choices
  - Process-level diagnostics
  - SCAM/CRM case studies
  - AMIP, coupled (1850, 20<sup>th</sup>C) – Moments, AIE, etc.
  - Variability (ENSO, NAO, AO, PDO, Monsoons, MJO, rainfall diurnal cycle, mid-west propagation systems, atmospheric rivers, tropical cyclones, blocking, baroclinicity, pdf precip.)
  - Diagnosis easy, metrics hard (PCMDI?, small panel?)
  - Propose limited list of metrics soon (feedback)
- Documenting developments
  - Make simulations available for all proposed changes for CAM5.5
- Physics development (by Breckenridge)
  - UNICON+MG2 → Convective micro
  - CLUBB+MG2 → Convective micro
  - ‘More certain’ physics (aerosols categories 1 and 2) add progressively
- Supported resolutions
  - At 1 deg: FV versus SE; cost, speed, simulations, support?
  - ¼ deg SE: Combine DOE/NCAR CAM5 configurations if appropriate
  - Beyond Breckenridge; test with new physics (not for CAM5.5?)



# CESM Planning

## CESM2 Timelines:

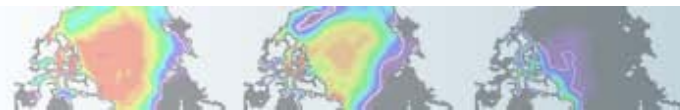
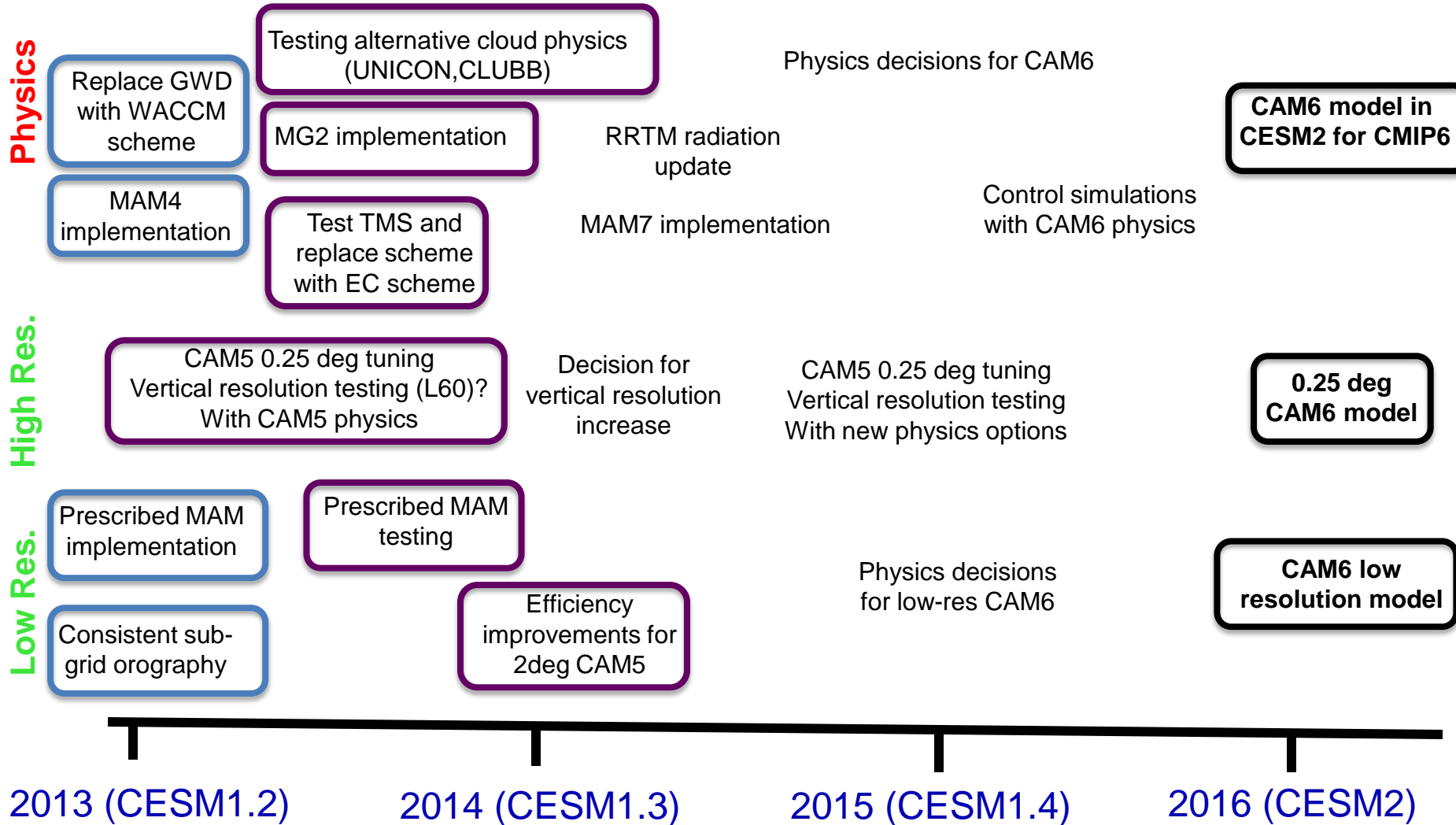
- **Early 2015: CAM5+ model version** finalized, subject to tuning modifications, for use in the WACCM, BGC/chemistry, and CISM configurations.
- **July 2015: Component models for CESM2 are nearly final**, subject to modification (tuning) based on coupled model performance.
- **July-Dec, 2015:** Perform coupled simulations with finalized components for supported configurations; **Tuning**/modification of component models as needed to maximize coupled simulation quality
- **Jan 2016: CESM2 supported configurations are finalized**, including final parameter settings, etc. for different component models
- **Jan-June 2016:** PI control runs and 20<sup>th</sup> century **runs performed** for supported CESM2 configurations
- **June 2016: CESM2 Model release**; To include PI control run, 20<sup>th</sup> century run, AMIP runs for supported configurations (at a minimum)
- **Post-June 2016:** CESM2 scenario runs (and others) performed

## CESM2 Targets:

- “Bleeding edge” physical climate model version (with CAM6)
- Physical climate model with WACCM
- Carbon cycle/BGC model version with enhanced atmospheric chemistry coupling
- Coupled ice sheet integrations

# CAM Development Timelines

## The path towards CMIP6



# Further CAM developments

## *Ongoing model developments and diagnoses (+ many more!)*

- ✓ Fix microphysics/activation liquid cloud fraction inconsistency + droplet mass/# inconsistencies – LLNL
- ✓ Implementing PDF-based macro/micro schemes – LLNL/NCAR
- ✓ Further development of 7-mode MAM (MAM7) – PNNL
- ✓ Unified scheme for aerosol vertical transport, activation, and removal in convective clouds – PNNL/LLNL
- ✓ Advanced microphysics in convection - UCSD/NCAR
- ✓ Applying new ice nucleation in mixed phase clouds – PNNL/LLNL/DRI
- ✓ Dust wet deposition and wet scavenging updates - Cornell
- ✓ Deriving vertical velocity variance from TKE - NCAR
- ✓ Implementing sub-columns for physics – NCAR/SBU
- ✓ Atmospheric nudging to diagnose biases - NCAR/LLNL/SBU
- ✓ CAPT experiments to diagnose biases - NCAR/LLNL
- ✓ Model for prediction across scales (MPAS) – NH core - NCAR/LANL
- ✓ Adaptive mesh refinement – LBNL
- ✓ CAM-SE regional mesh refinement – Sandia
- ✓ CSLAM tracer transport in flux form - NCAR/Sandia
- ✓ Blocked flows and turbulent mountain stress – NCAR
- ✓ Conserved energy changes required in physics - NCAR