# Development priorities and protocol

# “Protocol for inclusion in CESM trunk” document

- Available on the web:

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

- Main points are
  - Improvement of specific biases or added process representation
  - Approval by WG co-chairs and members before being included in the trunk and released

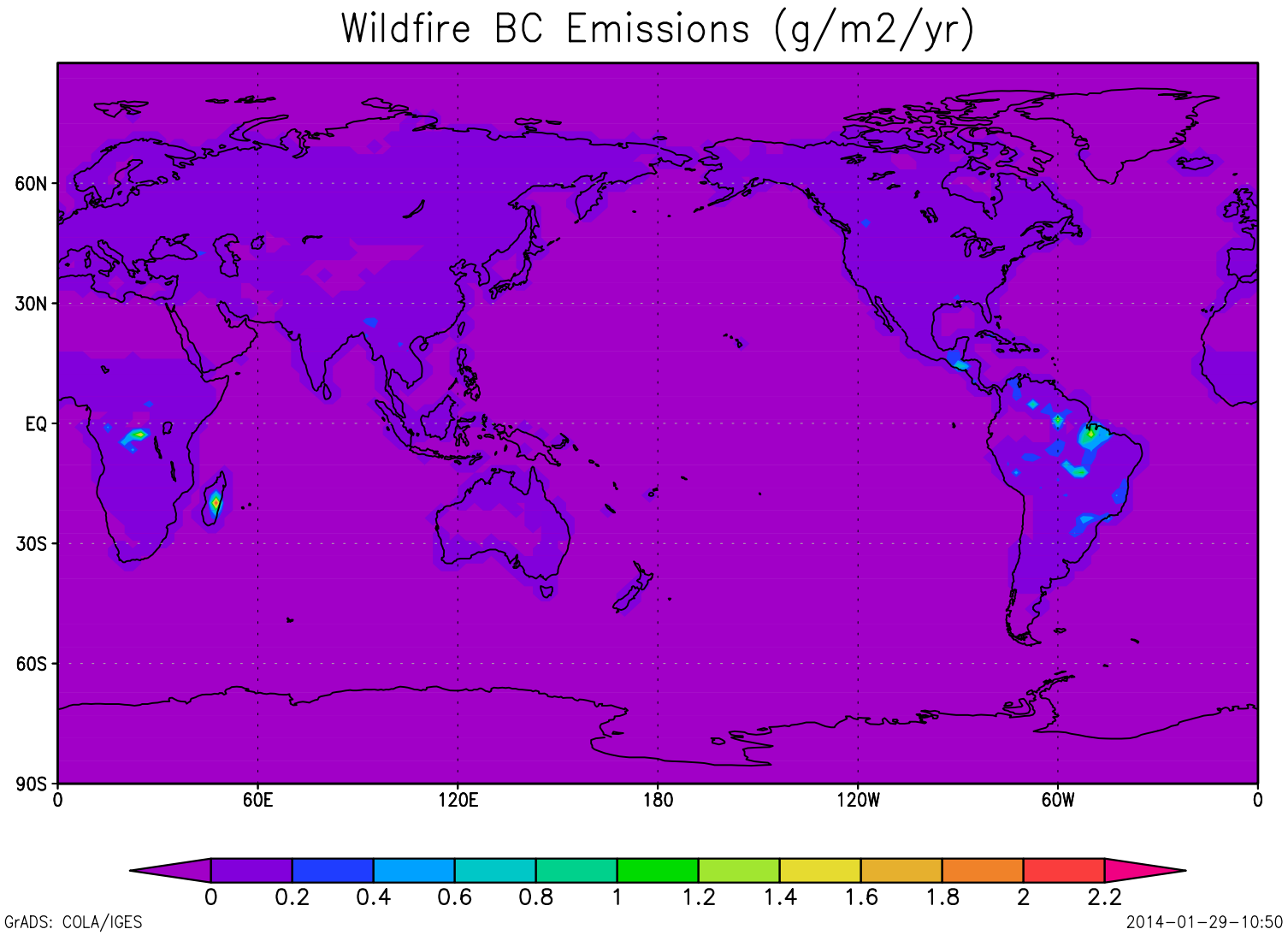
# ChemClimWG Development Plan (from June 2013 meeting)

- Top Priority
  - Update to MEGANv2.1/include maps when possible (in cesm1.2)
  - Improvements/bug fixes to the dry deposition (Thanks to Maria Val Martin and Steve Arnold!)
  - Coupling chemistry with MAM and CAM5 physics (in cesm1.2)
  - Prescribed aerosol option (in cesm1.3)
  - Diagnostic radiation for any MAM species (in cesm1.3)
  - MAM4: primary hydrophobic carbon mode added to MAM3
  - Dust speciation, optics, and ice nucleation (Cornell, PNNL)
  - Improved aerosol scavenging (H. Wang talk later)
  - Superfast in CAM5 (LLNL)
  - Implementation of FAST-J photolysis rate computation (DOE funding: M. Prather/P. Cameron-Smith)
  - Mie calculation s for inclusion of aerosols (Neely/Ghan/Prather)
  - MAM4 vs MAM3 + what about strat. Aerosols?
  - 
  - SE/FV dynamical core comparison: on-going tracer tests based on SD configuration
  - Specified dynamics in FV and SE (pressure fixer)
  - kPP mechanism + master list of chemical reactions
  - Box Model or SCAM w/ chemistry
  - Fire emissions: of what? (number?) (NCAR., Cornell, PNNL)

# Wildfire Emissions

- Francis Vitt branch of CESM
- Li et al. (2012) wildfire model in CLM4.5 estimates fuel burn rate (kg $m^{-2}$ $s^{-1}$)
- fire_emis_factors.nc has g/kg for $CO_2$, CO, $CH_4$, NHMC, $H_2$, $NO_X$, $N_2O$, $PM_{2.5}$, TPM, TC, OC, BC, $SO_2$ for all PFTs from Hoelzemann et al. JGR (2004)
- Namelist controls which emissions go to CAM
- Vertical distribution presently prescribed
- Maria Val Martin working on plume model

# 4 Tg/yr Pre-Industrial BC Emissions in First Year Dominated by Amazon



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- Medium Priority
  - Update SOA mechanism, including VBS (MIT, NCAR, PNNL, LLNL, UM, PSU, NCSU) intercomparison
  - More general aerosol thermodynamics (PNNL, NCSU)
  - Ammonium & nitrate (NCAR)
  - Speciation of POM: hygroscopicity (PNNL)
  - Ion-induced nucleation (SUNY-Albany, PNNL,NCSU)
  - Marine organic sources (NCSU, Harvard, LANL, Scripps, PNNL)
  - Coupled DMS emissions (LANL, ORNL, LLNL, PNNL)
  - Coupling MAM to SNICAR (Flanner & PNNL)
  - MAM volcanic aerosol (NCAR, PNNL)
  - Geoengineering stratosphere, CCN (NCAR, PNNL)
  - Frost flower sources (Scripps, LANL)
  - Conversion of preprocessor to KPP?
  - Vertical resolution
  - WACCM lite?
- Low Priority
  - "Coarse resolution" FV
- (2 degree)
- Diagnostics:
  - Tools for model result differencing
  - Aerosol diagnostic package (PNNL)
  - Benchmark numbers: methyl chloroform lifetime, ozone budget terms, methane lifetime, mass-weighted tropospheric OH, lightning NOx, sf(co/nox/isoprene)