

What are the major problems/limitations in the current standard model?

- Lack of tagged CO₂ and CH₄ (and others?) functionality in the standard model
- Hardwired regional definitions for tagged CO, which are difficult to modify
- Inconsistencies in inventories and PBL mixing in tagged CO (CO₂?) runs
- Old tropospheric OH fields and stratospheric chemistry - stratospheric chemistry based on Harvard 2-D model
- Inability to run with GEOS-5 before 2004 with MERRA fields (especially critical for CO₂, which require long runs)
- Biogenic emissions - CO too high in the southern hemisphere

What are on-going development activities in this area?

- Updated tagged CO simulation with newer OH and flexible tags (Duke)
- Updated tagged CO₂ (with flexible tags) and new anthropogenic CO₂ emissions (Toronto)
- Forward modeling of CH₄ - new emission inventories (Purdue, Edinburgh, and Harvard)
- CH₄ isotope fire anomalies (UC Irvine/Duke)
- COS simulation (East Anglia)
- Development of tagged CH₄ (Harvard, Edinburgh) and CH₄ isotopes simulation (EPFL)
- Forward model simulation for ethanol and acetaldehyde (Minnesota)
- Development of a tagged methanol simulation (Minnesota)
- Development of a generic tagged tracer simulation (Duke)

Priorities

- Implement a flexible region mask for the tagged simulations
- Update stratospheric production and loss rates using fields from the GMI COMBO model
- Ensure that the variable tropopause feature works with the tagged simulations
- Ensure consistency in emissions/PBL mixing in tagged simulations
- Examine mismatch between the total CO tracer and the sum of the tagged tracers to ensure there is no mass conservation issue
- Archive OH fields from 1-year benchmarks and make them available to users for the tagged simulations
- Incorporate tagged CO₂, CH₄, and methanol capability into the standard model
- Develop a combined forward model simulation for CO and CO₂
- **Add capability for MERRA fields**
- Generic tagged tracer module?