

Historic Data For Anthropogenic Emissions

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Interim Emissions Dataset for CMIP6

Because of CMIP6 timeline, the new CEDS historical dataset that contains the improvements requested by the community cannot be produced in time for CMIP5 model runs starting in 2015

The proposed solution is to produce an interim emissions data product that updates the current historical dataset in time for CMIP6. This approach:

- Provides recent emissions that are consistent with most recent data
- Can be done relatively quickly (by fall 2015), and vetted by community
- However, does not contain all the improvements needed by the community (see later)

The full historical CEDS data product would then be produced

- For use in analysis that requires more detailed data
 - If produced ~2016, could be used for AerChemMIP, decadal prediction
 - Future research

Overview: Interim CMIP6 Dataset

- Use RCP historical anthropogenic and land-use (fire) emissions (Lamarque et al. 2010) from 1850-1990
 - Would still be using 0.5°C grids
 - Downscale to 0.1° using HTAP V2 sub-grid distribution
- Extend to more recent years using:
 - Country + regional inventory data w/ EDGAR 4.3 for other countries (as in Lamarque et al. 2010 and HTAP)
 - Aggregate to RCP 40-region breakout (e.g., static spatial grids f/ region)
 - Adjust trends to match RCP history in 1990 where needed
 - *The need for this will, hopefully, be small*
 - Could consider providing grids at 5-year intervals starting in 1995

Most of the work required for the interim product, is also needed for the full CEDS dataset

Details - Interim CMIP6 Emissions Dataset

- Collect & Provide emissions at the sector level as in RCP
 - Needed for IAM calibration and harmonization
- Extended to 2014 using reported fossil fuel drivers
 - Detailed IEA data to about 2012; less detailed BP data to 2014
 - Non-fossil emissions would likely be held constant after last inventory year

Features, **not in** the interim product (but will be available in the full CEDS data product)

- **Uncertainty** by emission and sector -> historical emissions ensembles
- Consistent historical trends
- Seasonality in anthropogenic emissions
- Consistent CO₂ emissions
- Annual emissions by country (& state)
- Additional sectoral detail

Interim CMIP6 Data: Timeline

Can use current pre-industrial emissions: same 1850 starting point

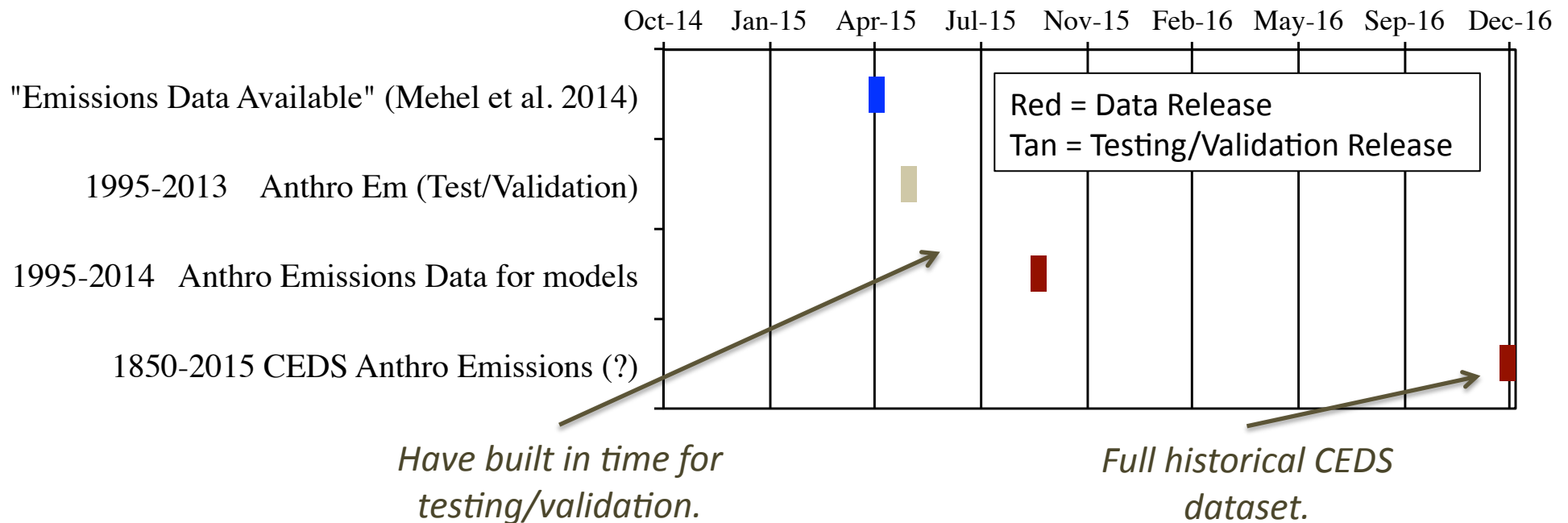
- Would need to downscale current 1850-1990 emissions data to 0.1°

Test dataset (gridded and region/sector) available for review, Spring 2015.

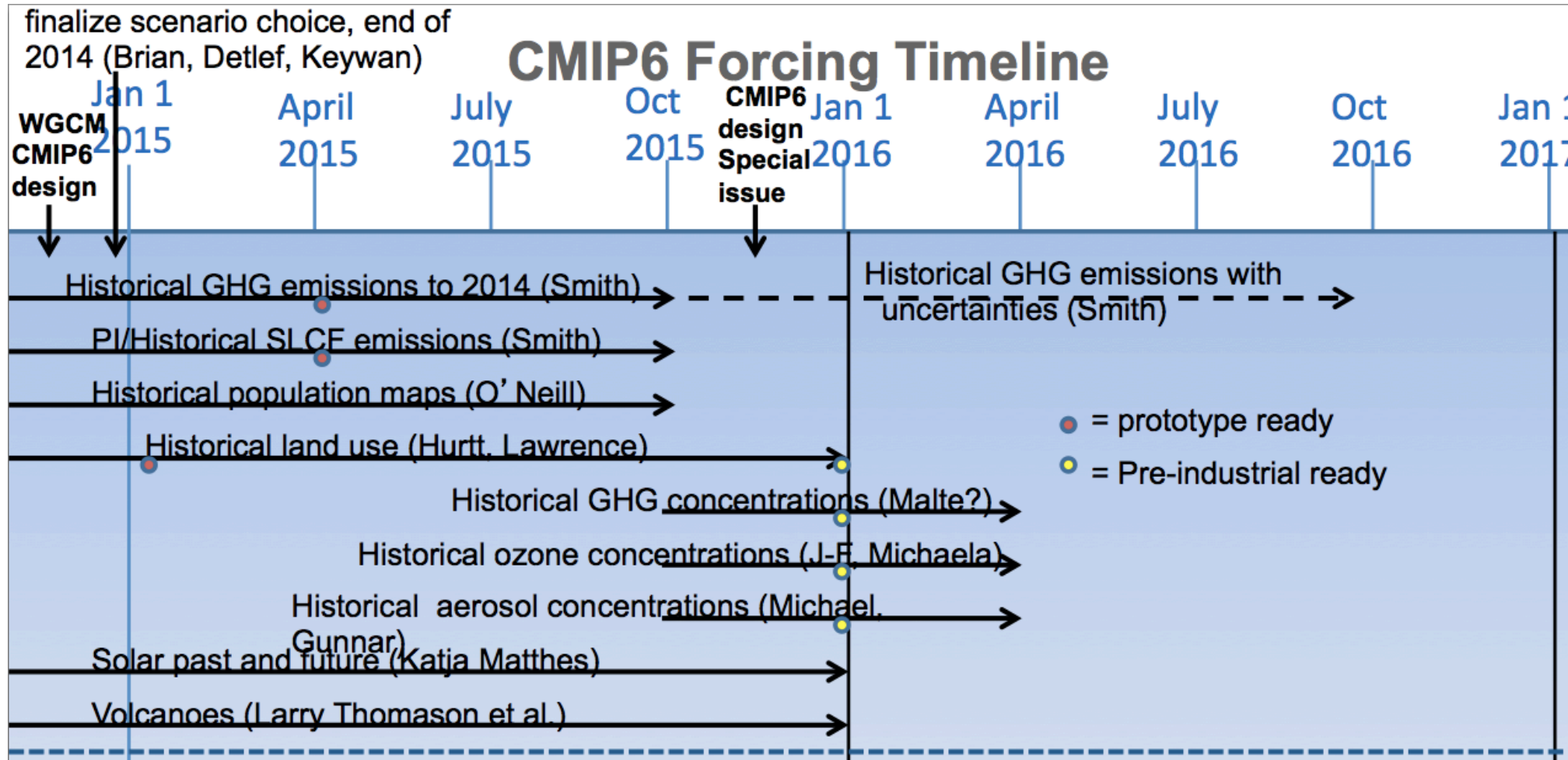
- Estimates out to 2013 in review release
- Updated to 2014 by early fall 2015 for final release

Final dataset, published and available to models Fall 2015

CMIP6 Plan "C" Deliverable Timeline



Historical concentrations (AerChemMIP)



AerChemMIP Time line

2014

August Land Use – AerChemMIP feedback workplan draft
Mid September Description send to CMIP panel

29.9. - 2.10. AeroCom meeting, Steamboat Springs, Co
3 monthly Autumn/winter telecons on AerChemMIP/ScenarioMIP/LUMIP planning

2015

January: Preindustrial Concentration fields ready
Summer/Autumn: Historic/Future Concentration fields ready
Autumn AerChemMIP description submission to GMD

**5.10. – 9.10. 2014 AerChemMIP/CCMI/AeroCom joint meeting
Frascati, Italy --- RFMIP is invited to come and meet**

2015/16: First pilot studies on forcing documentation
2016/17: CMIP6 runs start