

Adjoint and Data Assimilation WG

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Adjoint code updates

Development	Author (institution)	R	U
Update to OMI NO2 observation operator	Zhen Qu (CU Boulder)	1	3
Update to OMI SO2 observation operator for level 2	Zhen Qu (CU Boulder)	1	3
OMI SO2 for BIRA	Zhen Qu (CU Boulder)	1	3
OMPS observation operator for SO2 (and NO2)	Yi Wang (UI), Nan Lin (Tsinghua)	1	2
Updated isoprene and related VOC mechanism	Hansen Cao (Peking U., May Fu's group)	2	2
Updated MEOH simulation and emissions	Hansen Cao (Peking U., May Fu's group)	2	3
GCHP CO2/CH4 adjoint	Henze (CU Boulder)	3	1
NO3- photolysis, simple SOA	Jinkyul Choi (SNU)	1	2
Other			
NH3 updates	(Peking U., Lin Zhan'gs group)		
POMINO OMI and TROPOMI NO2 retrievals available for use	Mengyao Liu (Peking U., Jintai Lin's group)		
PM10 and AOD joint assimilation	Jaein Jeong (SNU, Rokjin Park's group)		

R = readiness (0=now, 1 = < 6 mo, 2 = 6-12 mo, 3 = > 12 mo)

U = urgency (1 = very high, 2 high, 3 = medium)

Adjoint and DA discussion

- Adjoint model code updates
- Update list of current projects
- GCHP adjoint development activities
- Cross-pollination of top-down findings with Emissions and Deposition WG

Inverse modeling and data assimilation: Recent and current projects

Aerosol and aerosol precursor emissions

- Aerosol with MODIS, CALIPSO ([Wang, UI](#); Lee, Dalhousie; Chen, Li, CNRS)
- Dust with surface PM₁₀ ([Jeong, SNU](#))
- NH₃ with TES and CrIS ([Zhang](#), Peking; Henze, CUB; Shim, KEI; Zhu, Sun Yat-Sen)
- SO₂ and NO₂ with OMI ([Wang, UI](#); [Qu](#), CU Boulder; Cooper, Dalhousie)

Greenhouse gases

- CH₄ (Turner, Harvard/UCB; Stanevich, UT;)
- CO₂ (Liu, Lee, Bowman, JPL; Deng, Jones, UT; Philips, NASA AMES)
- N₂O (Wells, U. Minnesota)

Reactive gas-phase species

- CO from MOPITT ([He, UT](#))
- Isoprene from OMI HCHO (Kaiser, Harvard)
- NMVOCs ([Cao](#), Peking)
- CO, NO₂ and O₃ ([Miyazaki](#), JAMSTEC/JPL; [Zhang](#), UT)
- Chem DA in GEOS (Keller, NASA GMAO)

Method advancement and comparisons

- Weak constraint 4D-Var ([He](#), Stanevich, UT)
- Resolution errors (Stanevich, UT)
- UQ and model reduction (Bousserez, CU Boulder)
- 4D-Var and EnKF ([Miyazaki](#), JAMSTEC/JPL; Liu, JPL)
- Mass balance vs 4D-Var ([Qu](#), CU Boulder; Cooper, Dalhousie)



Satellite design

- GEO-CAPE (Bousserez; CU Boulder)
- CLARREO ([Wang, UI](#))

Emissions and Deposition WG

Top-down findings germane to GEOS-Chem inventories:

The purpose of this Table is to summarize mature science findings that are specifically related to the emission inventories used in GEOS-Chem. The goal is to help keep the user community up-to-date on emission findings that may affect their work, and prevent duplicated effort. Please add results, either from your work or from other groups, that fits these criteria.

Inventory	Description of Findings (include details)	Source (e.g., citation, conference presentation, ongoing work)	Contact Person	Date Added

--Dbm (talk) 01:03, 1 September 2017 (UTC)