

2011 WRF-Chem Tutorial Agenda

Monday, July 18

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|----------------|---|
| 8:00 to 8:30 | Welcome and general overview (G. Grell, ESRL/GSD) |
| 8:30 to 9:00 | Introduction to Photolysis (S. Madronich, NCAR/ACD) |
| 9:00 to 9:30 | MEGAN and biogenic emissions in WRF-Chem (Duhl, NCAR/ACD) |
| 9:30 to 10:00 | Gas-phase Chemistry with emphasis on KPP (R. Ahmadov, ESRL/CSD) |
| 10:00 to 10:15 | Coffee Break and Reception |
| 10:15 to 10:45 | Aerosol in WRF-Chem (R. Ahmadov, ESRL/CSD) |
| 10:45 to 11:30 | aerosol-radiation-microphysics interactions (J. Fast, PNNL) |
| 11:30 to 12:00 | Set-up and running WRF-Chem (S. Peckham, ESRL/GSD) |
| 12:00 to 13:00 | LUNCH |
| 13:00 to 18:00 | 13:00 to 18:00 Introduction to tutorial exercises (S. Peckham) and hands-on practical exercises : WRF-Chem basics (S. Peckham, G. Grell, R. Ahmadov, M. Hewson) |

Tuesday, July 19

- 8:00 to 18:00 Practice session on various aspects of the modeling system

Some general info on the modeling system

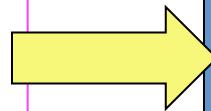
WRF-Chem is a community effort: developed nationally and internationally

Largest developer groups:

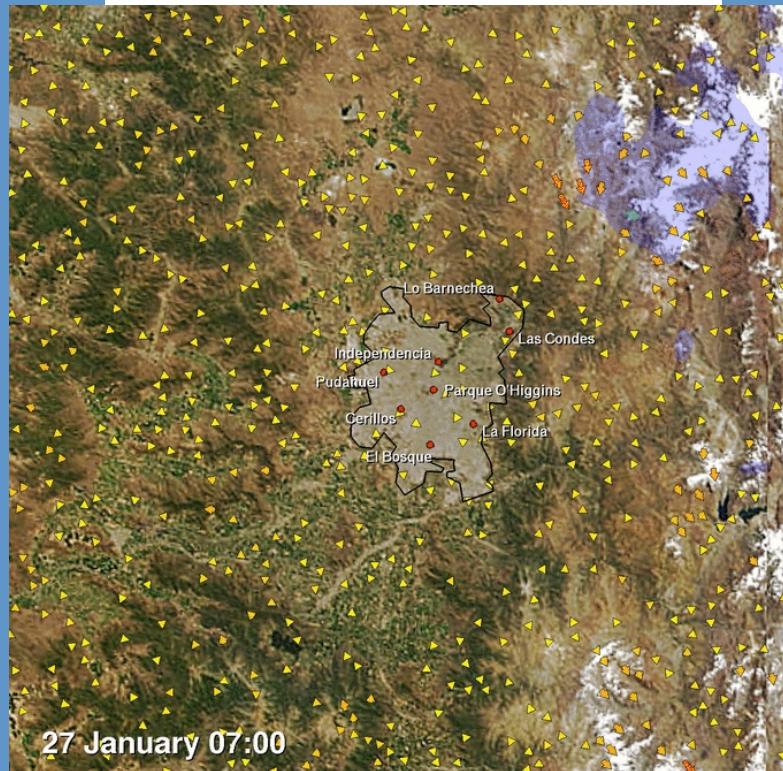
- NOAA/ESRL (wrfchemhelp)
- PNNL
- NCAR
- **Significant recent other contributions:**
- INPE/CPTEC (Brazil)
- NASA
- University of Alaska in Fairbanks

WRF-Chem: Online coupling of modeling systems

**Weather Data
Analysis &
Assimilation &
Emissions**

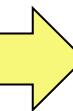


**Simultaneous forecasts
of weather and air
quality**



**Chemistry, Aerosols,
radiation, clouds,
temperature, winds**

**Weather and
AQ-Forecast**



Full interaction of meteorology and chemistry

WRF-Chem: wide range of capabilities

- Many different chemical mechanisms (the part of the model that treats the interactions of the chemical species with each other),
- Multiple aerosol models (simple to very complex)
- Aerosol direct and indirect effect included
- Biogenic emissions from BEIS3.13 and MEGAN
- Coupled with a sophisticated fire plumerise model
- Regional to local scale (Large Eddy Simulation and cloud-resolving) applications, 1- and 2-way nesting capabilities
- Volcanic ash and dust, dispersion, and other tracer applications

Applications range from real-time prediction of dispersion, air quality, and weather to challenging and relevant research applications

Ongoing real-time examples

- http://ruc.noaa.gov/wrf/WG11_RT/
WRF-Chem WEB site, full ozone chemistry, aerosols, chemical data assimilation (**currently on “pause”**)
- <http://rapidrefresh.noaa.gov/RRchem/>
Rapid Refresh (ARW-WRF) with aerosols, wildfires, North American domain, $dx=13\text{km}$, including chemical data assimilation
- <http://ruc.noaa.gov/rr/hrrrchem/>
High Resolution Rapid Refresh (ARW-WRF) with aerosols, wildfires, Western US ($dx=3\text{km}$), including chemical data assimilation

Ongoing research examples

Aerosol direct and indirect effect, impact of wildfires, chemical composition, lightning NOx, emissions, transport of ash and ash-fall predictions.....

Some of the ongoing development work

- Chemical data assimilation
- Aerosol direct/indirect effect (more options as well as research applications)
- Volcanic SO₂ emissions
- Better SOA in existing aerosol modules
- New aerosol modules
- Aerosol modeling test bed and analysis toolkit
- Improvements on wet-scavenging
- Improvements to modal aerosol scheme

Please consider: no support currently exists for preparation of tutorials and documentation. The wrfchem help desk is also only minimally supported. If you plan to provide development work back to the community, please make it easy for us (provide documentation, follow coding standards)

Thank you for coming

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