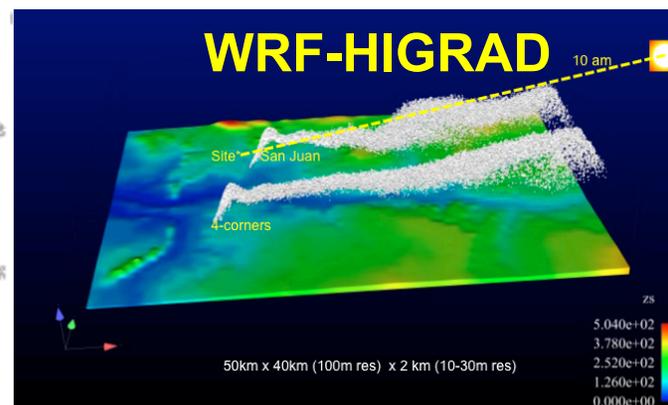
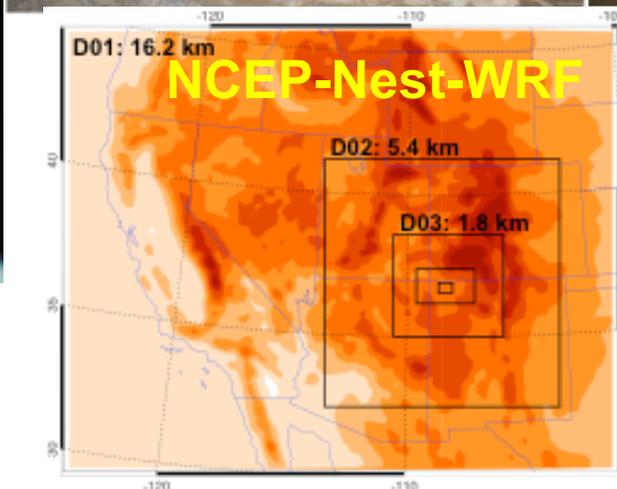


# Multi-Scale Air Quality & Greenhouse Gas Monitoring at 4 Corners

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MEAS.



MODEL

REGIONAL

LOCAL

# US Regulates Pollutants to Protect Human Health (NO<sub>x</sub>, PM, SO<sub>2</sub>, CO, Hydrocarbons)

NO<sub>x</sub> + HCs + (time (distance, flow)) => O<sub>3</sub>

- Reporting Emissions
- Monitoring Emissions (in situ)
- Verifying Emissions
- Monitoring Air Quality (Trends-Long Term)
- Forecasting Air Quality
- Verifying Air Quality
- Point to Local to Regional Scales

## US Considering Permitting Greenhouse Gases

(CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)

# Objectives: Source to Regional Scale

- Monitor air quality ( $O_3$ ,  $NO_x$ ,  $SO_2$ ) at local to regional scales
- Observe changes in the concentration of greenhouse gases (GHG =  $CO_2$ ,  $CH_4$ ,  $N_2O$ )
- Trace GHG fluxes with co-emitted pollutant signatures and attribute them to sources
- Verify if the emissions comply with Clean Air Act
- Demonstrate environmental PP upgrades are effective
- Monitor fugitive methane and HC leaks from coal/gas

# Economy and Policy Transitions at 4 Corners

- Effective air quality enforcement: NOx scrubber upgrade at San Juan PP (2006) & agreements to shut boilers at San Juan & 4-Corners PP (2013)
- Displacement of coal by gas nationally. San Juan behind in unconventional oil & gas. It has significant coal bed methane.
- Four Corners is a large natural gas distribution hub.
- Oil and gas boom can increase pollution from fossil fuel mining, processing and distribution. Despite emission controls of NOx ozone is constant.
- Economy is improving, energy sector is expanding and public environmental awareness is high

# Pollution Sources

- NO<sub>x</sub> (Power, Transport, O&G)
- SO<sub>x</sub> (Power)
- CO & HC'S (Trans, Coal, **Gas Wells/Fields**, Refineries, Fires)

Changes:  
Coal PP controls?  
O&G Prod  
growing?

