

# VISTAS 2002 MPE and NAAQS SIP Modeling

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# VISTAS Annual Model Performance

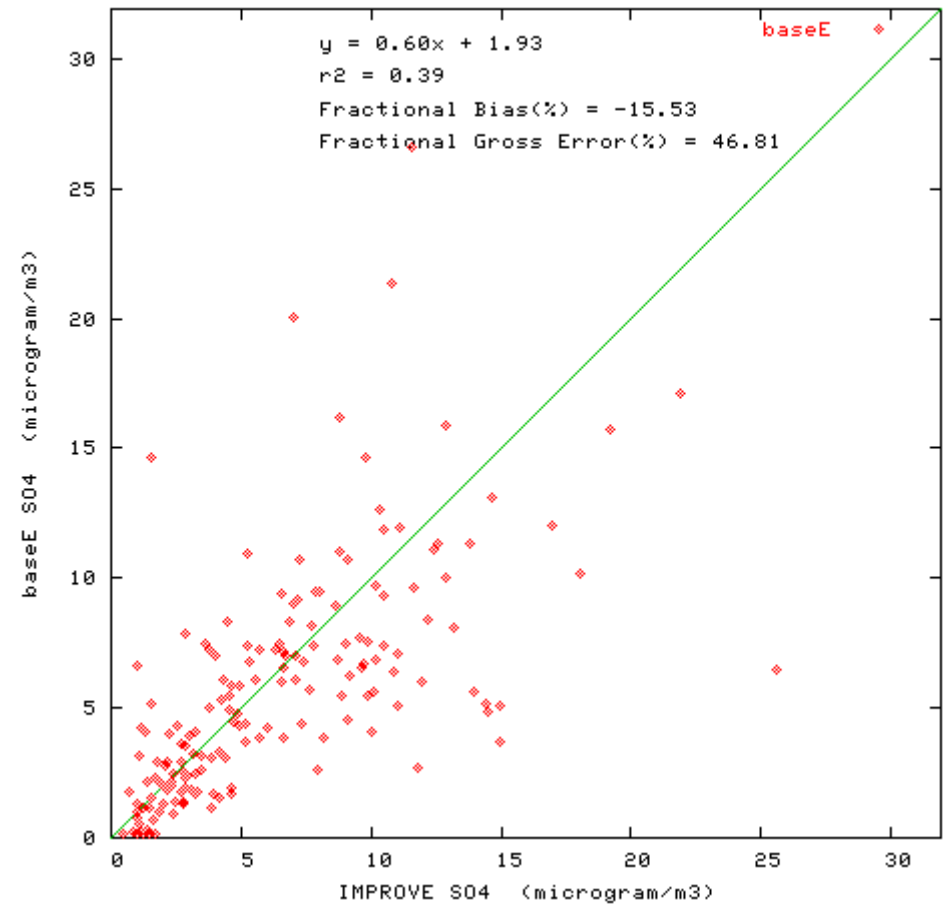
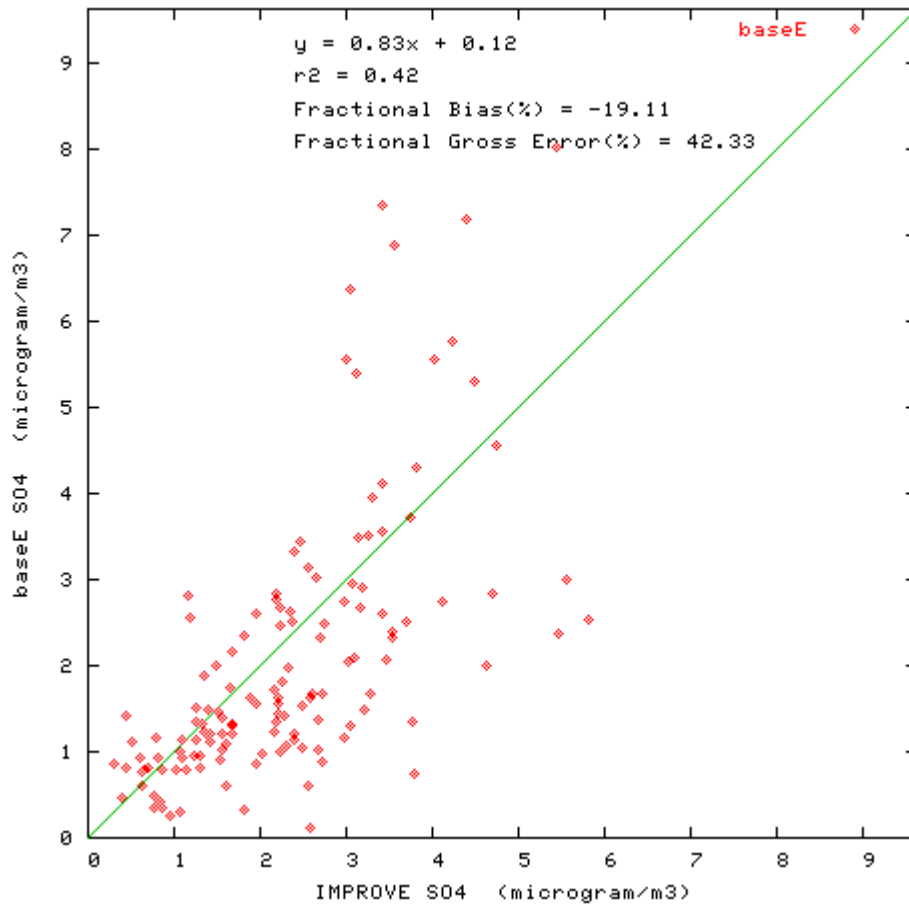
# Sulfate (IMPROVE)

**January 2002**

**July 2002**

IMPROVE vs. baseE S04 at 16 stations on 2002001-2002032

IMPROVE vs. baseE S04 at 16 stations on 2002182-2002213



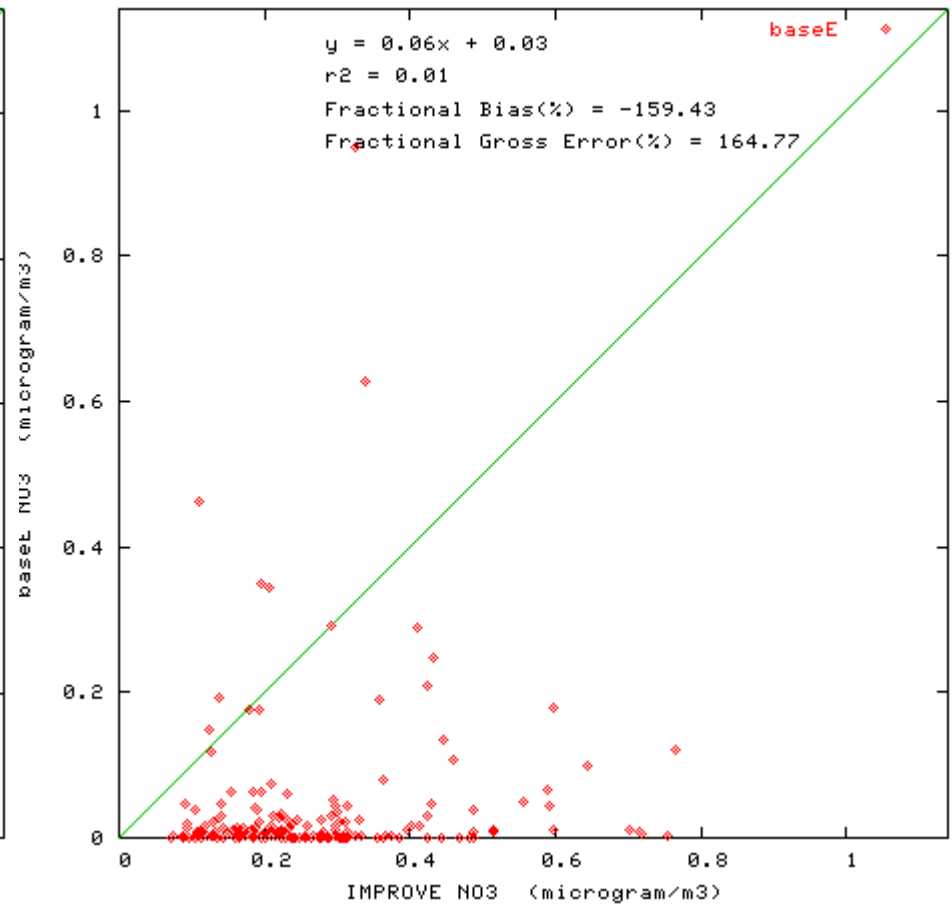
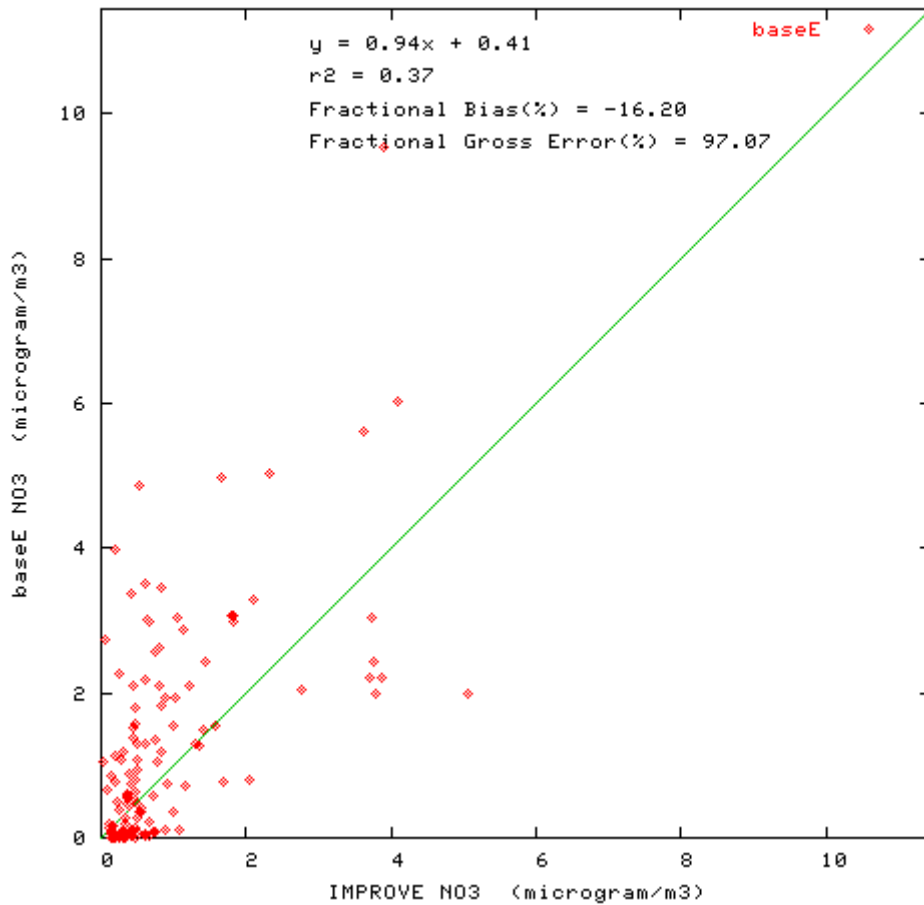
# Nitrate (IMPROVE)

January 2002

July 2002

IMPROVE vs. baseE N03 at 16 stations on 2002001-2002032

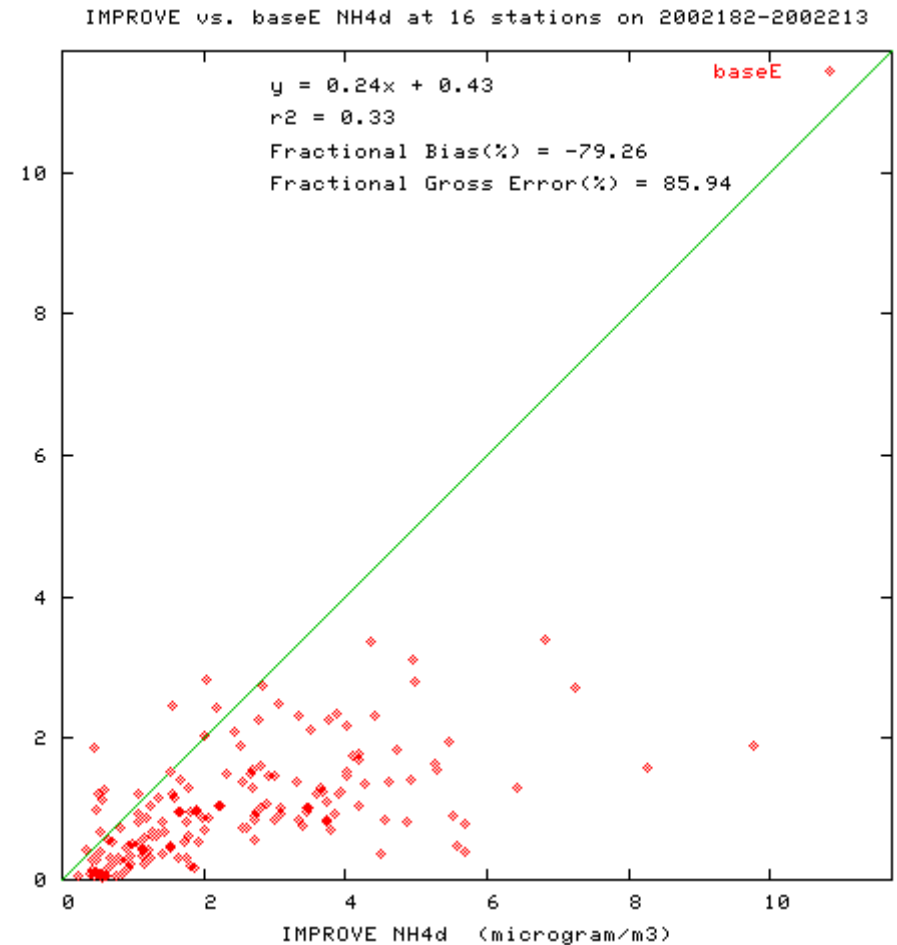
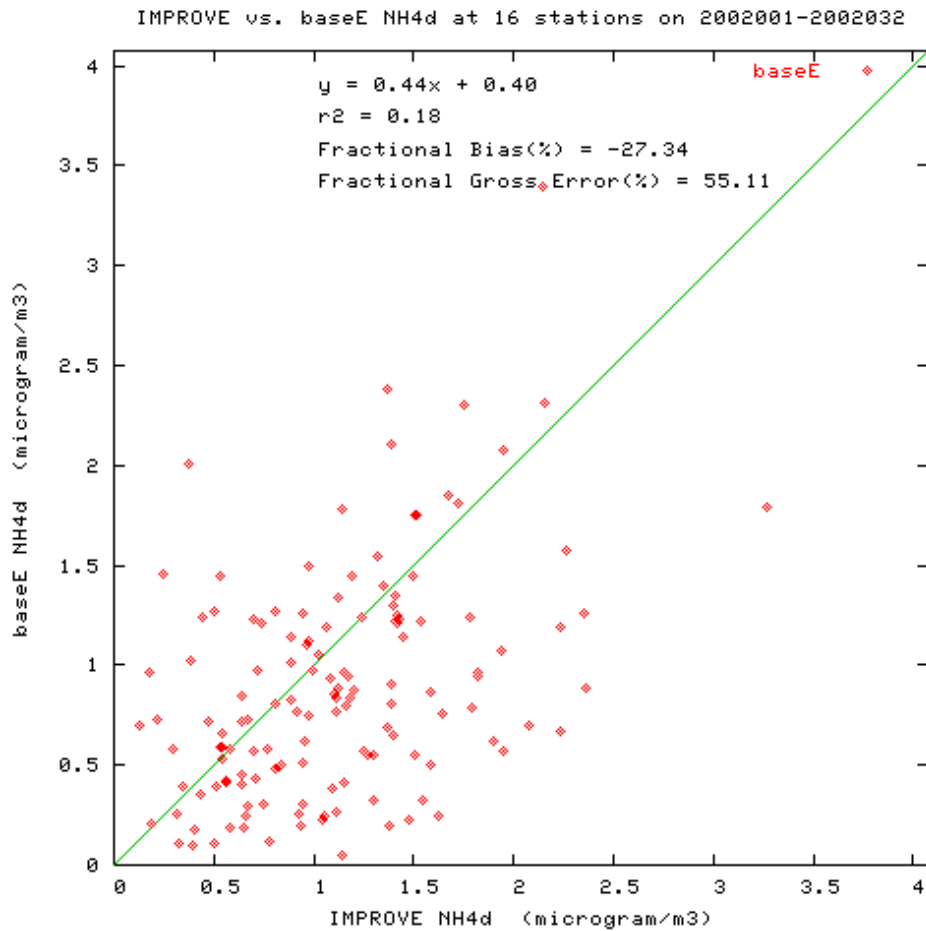
IMPROVE vs. baseE N03 at 16 stations on 2002182-2002213



# Ammonium\* (IMPROVE)

January 2002

July 2002



\*Assumes  $(\text{NH}_4)_2\text{SO}_4$  and  $\text{NH}_4\text{NO}_3$

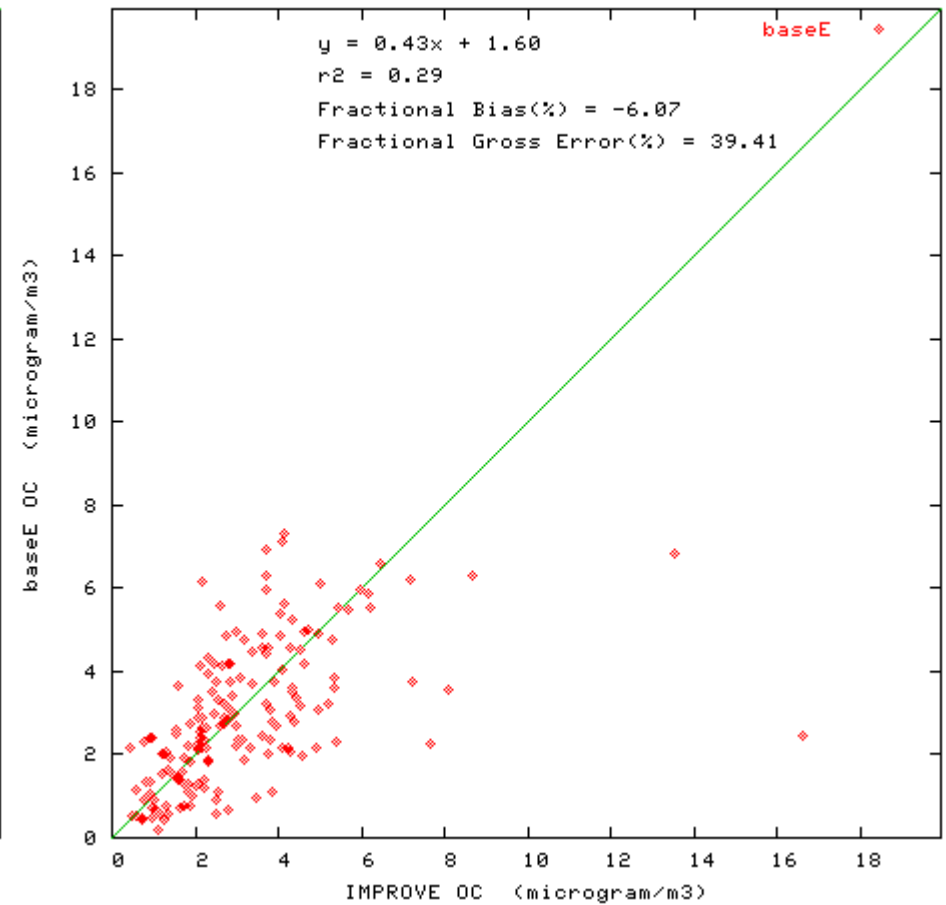
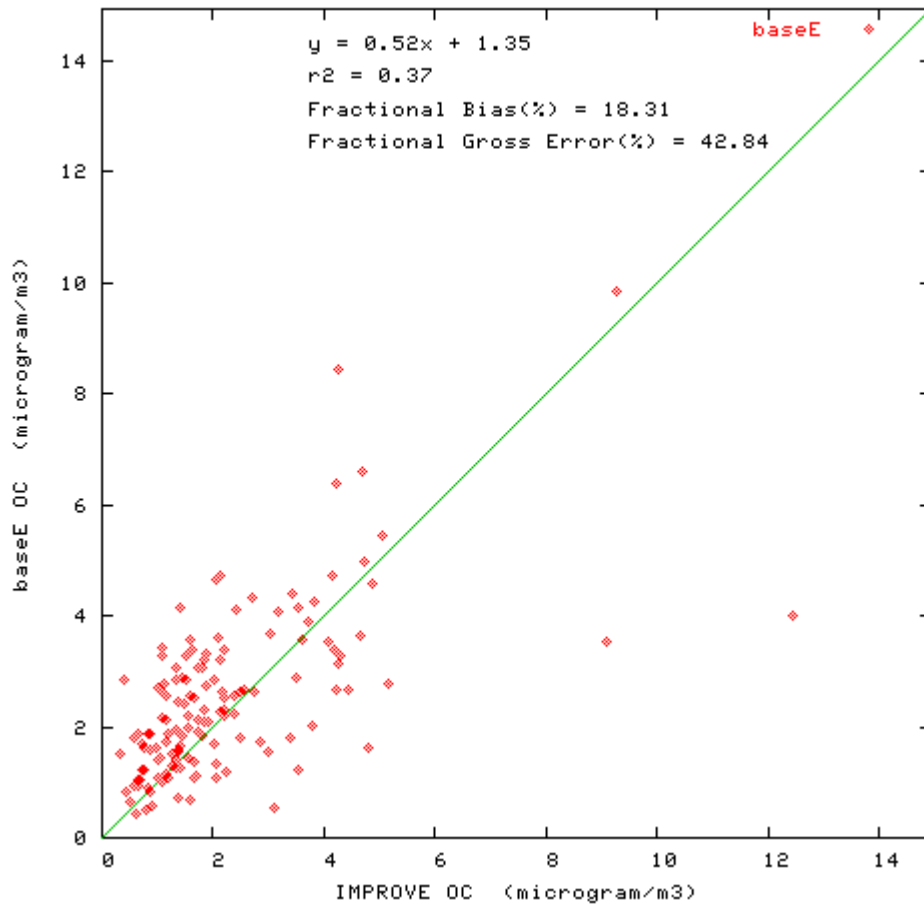
# Organic Carbon (IMPROVE)

January 2002

July 2002

IMPROVE vs. baseE OC at 16 stations on 2002001-2002032

IMPROVE vs. baseE OC at 16 stations on 2002182-2002213

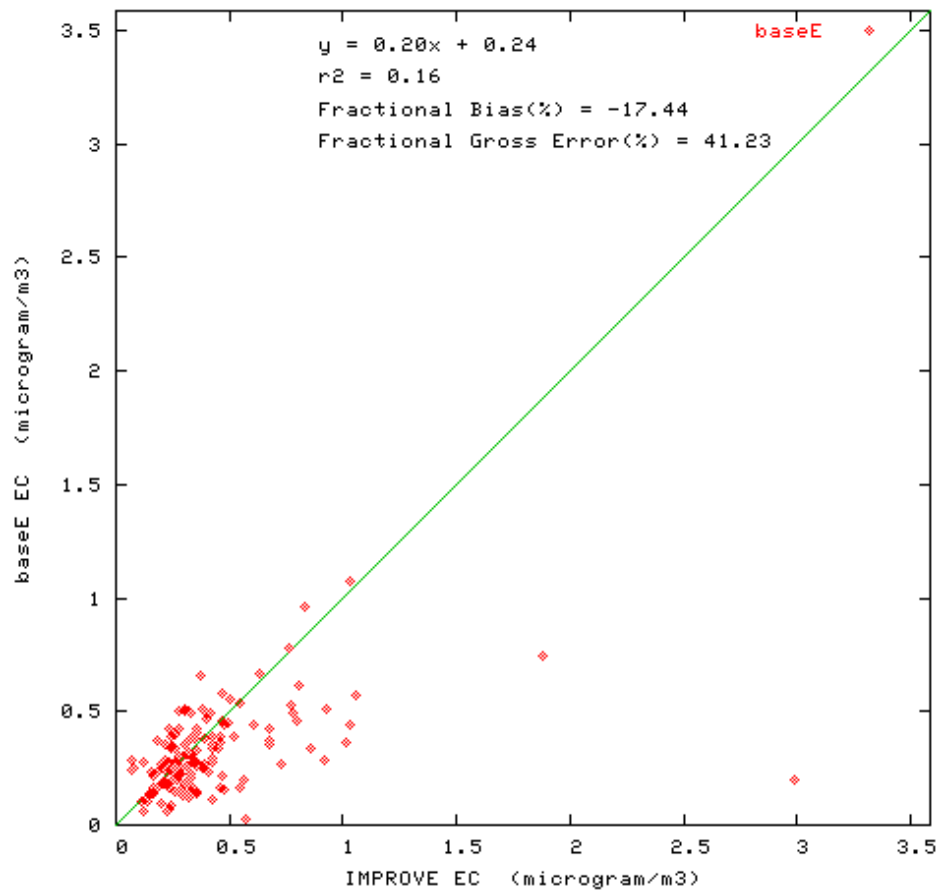


# Elem. Carbon (IMPROVE)

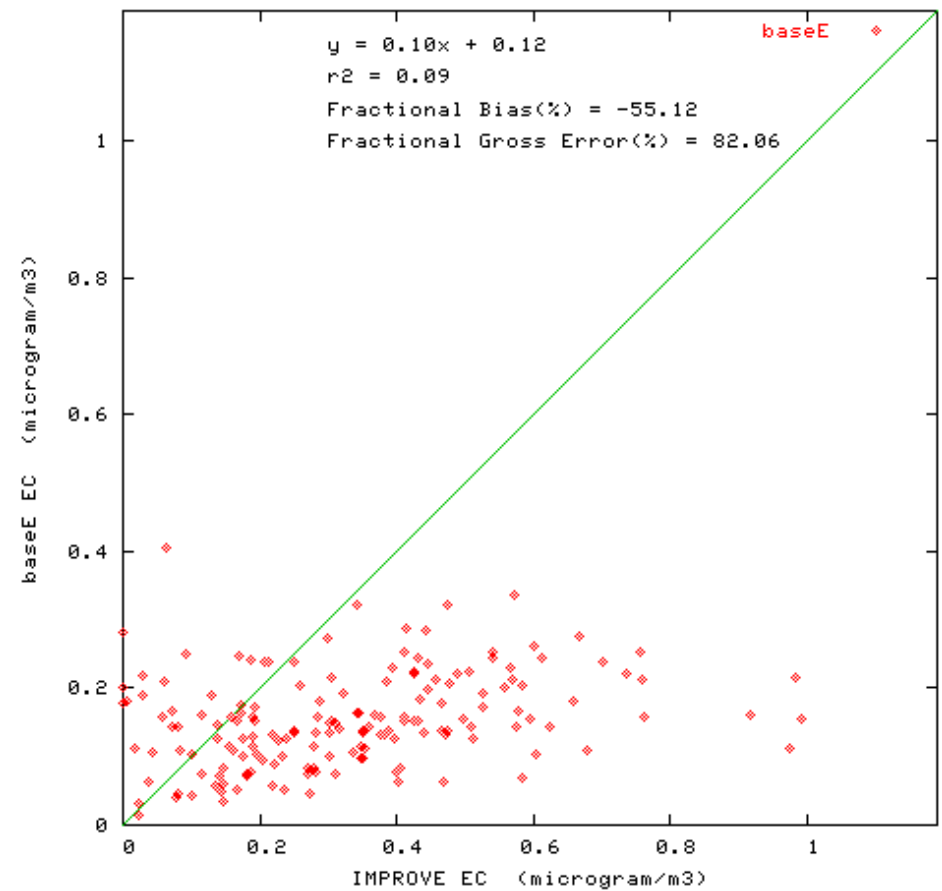
January 2002

July 2002

IMPROVE vs. baseE EC at 16 stations on 2002001-2002032



IMPROVE vs. baseE EC at 16 stations on 2002182-2002213

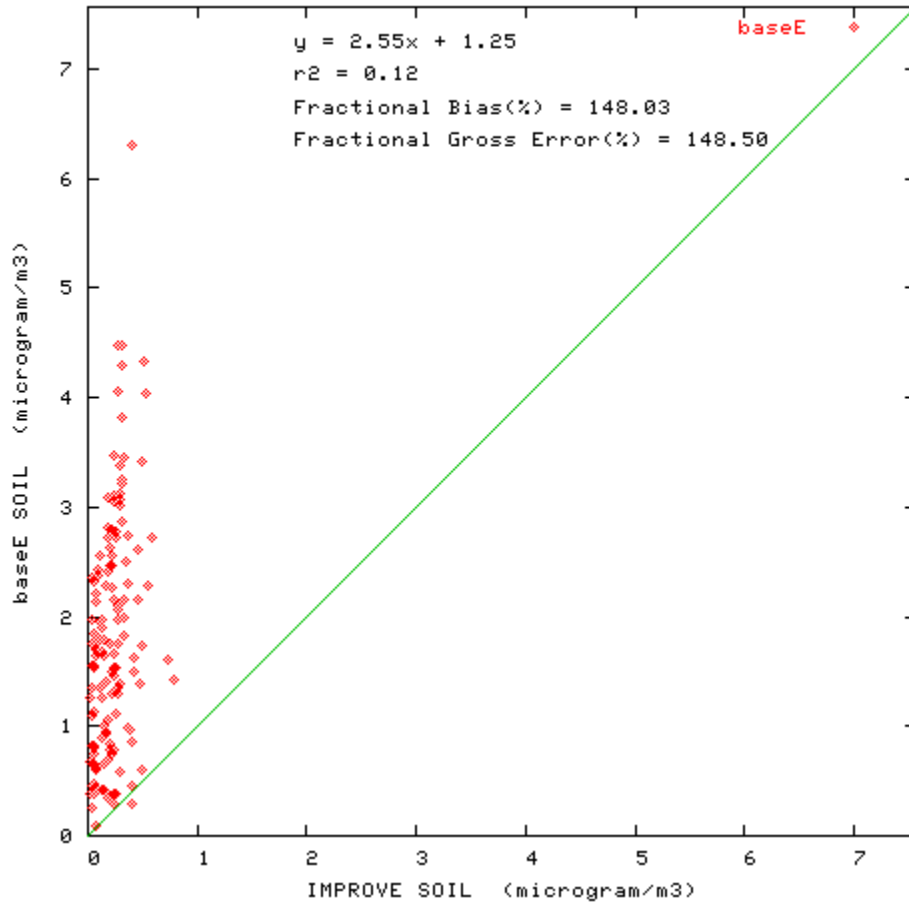


# Soils (IMPROVE)

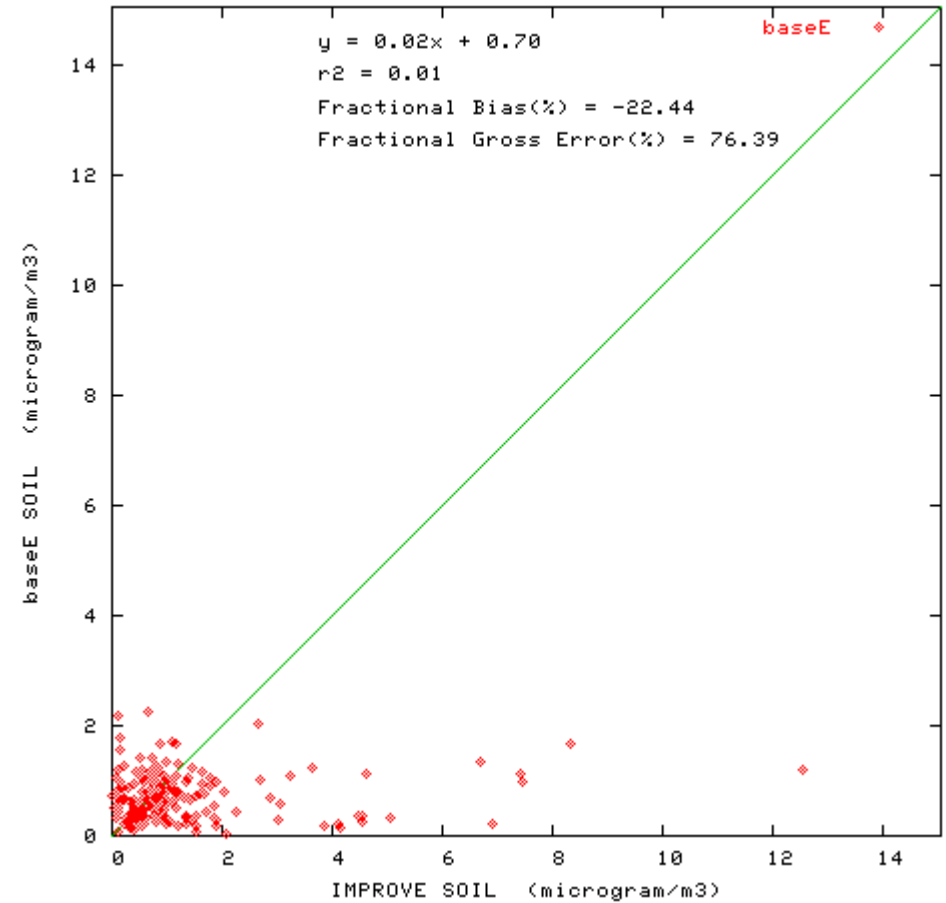
**January 2002**

**July 2002**

IMPROVE vs. baseE SOIL at 16 stations on 2002001-2002032



IMPROVE vs. baseE SOIL at 16 stations on 2002182-2002213



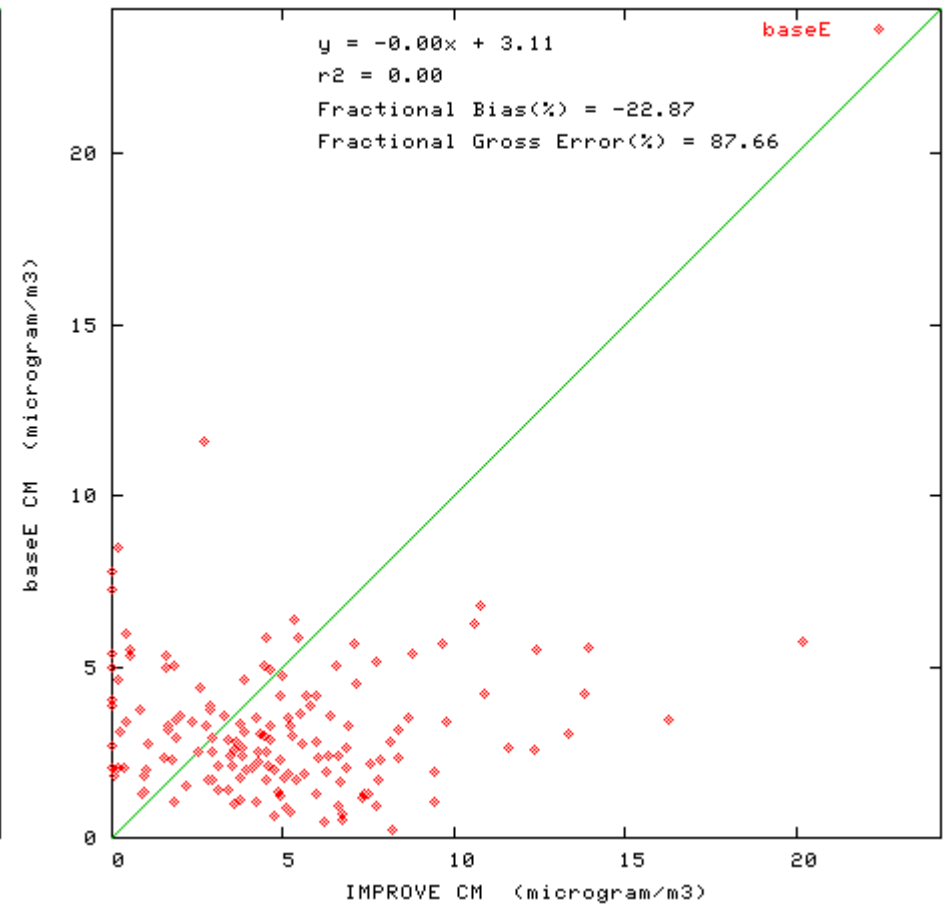
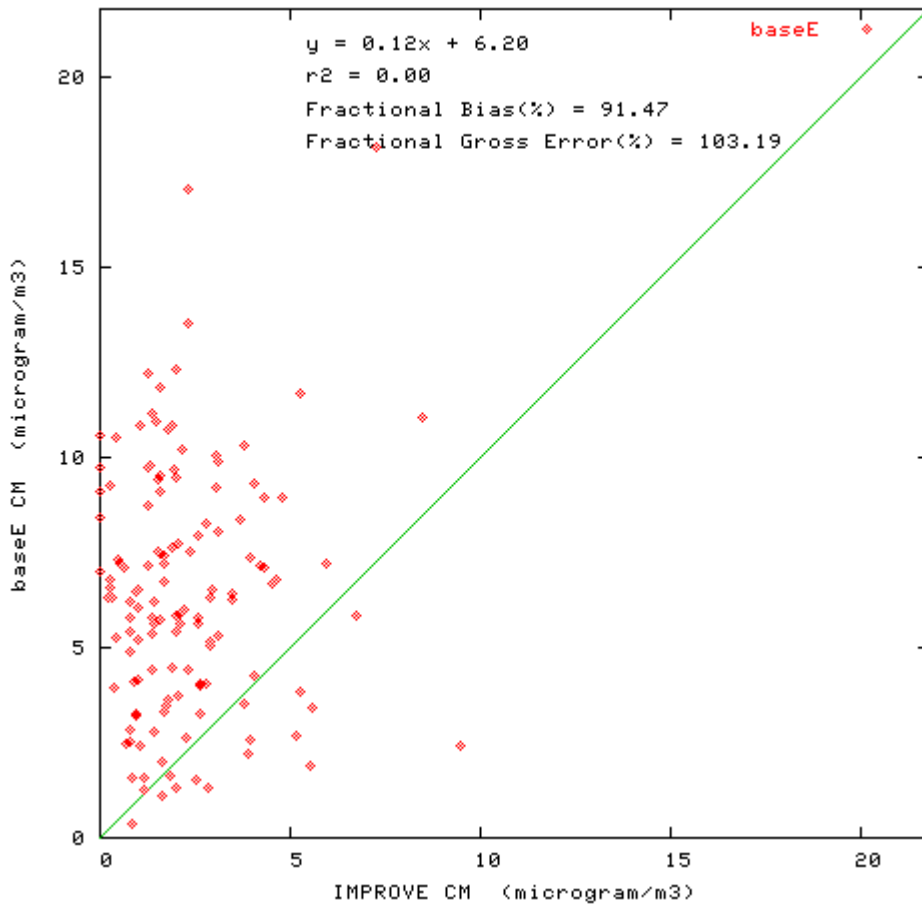
# Coarse Mass (IMPROVE)

January 2002

July 2002

IMPROVE vs. baseE CM at 16 stations on 2002001-2002032

IMPROVE vs. baseE CM at 16 stations on 2002182-2002213



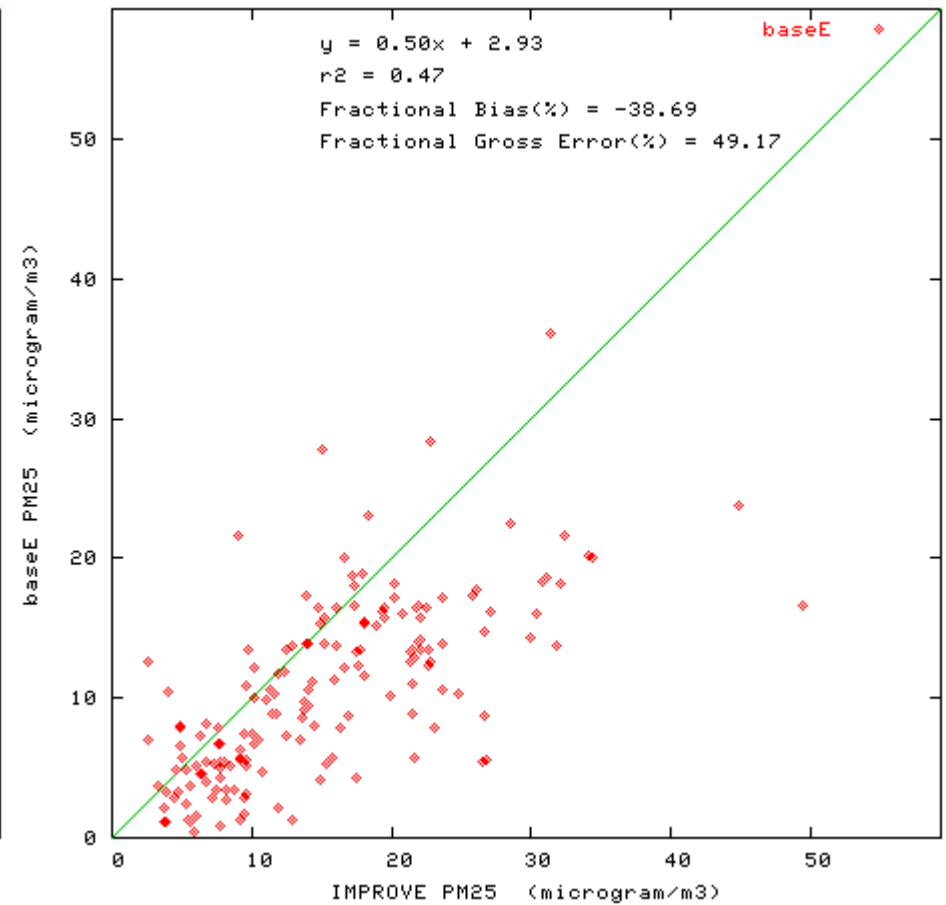
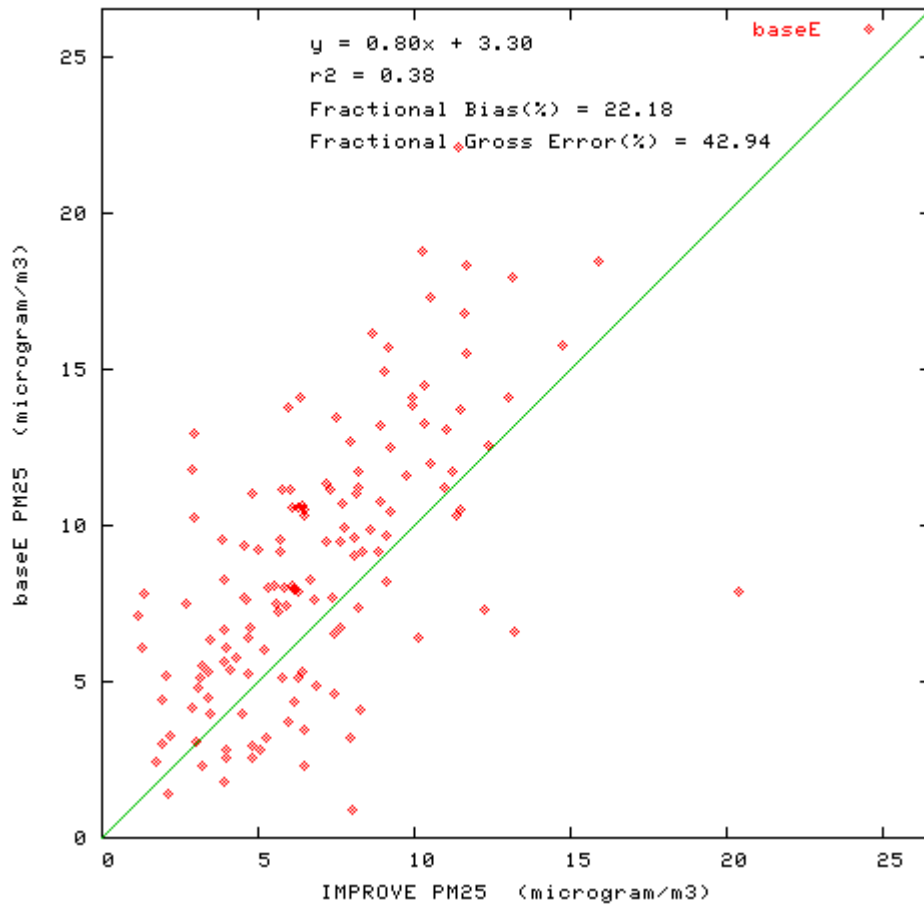
# Fine PM (IMPROVE)

**January 2002**

**July 2002**

IMPROVE vs. baseE PM25 at 16 stations on 2002001-2002032

IMPROVE vs. baseE PM25 at 16 stations on 2002182-2002213



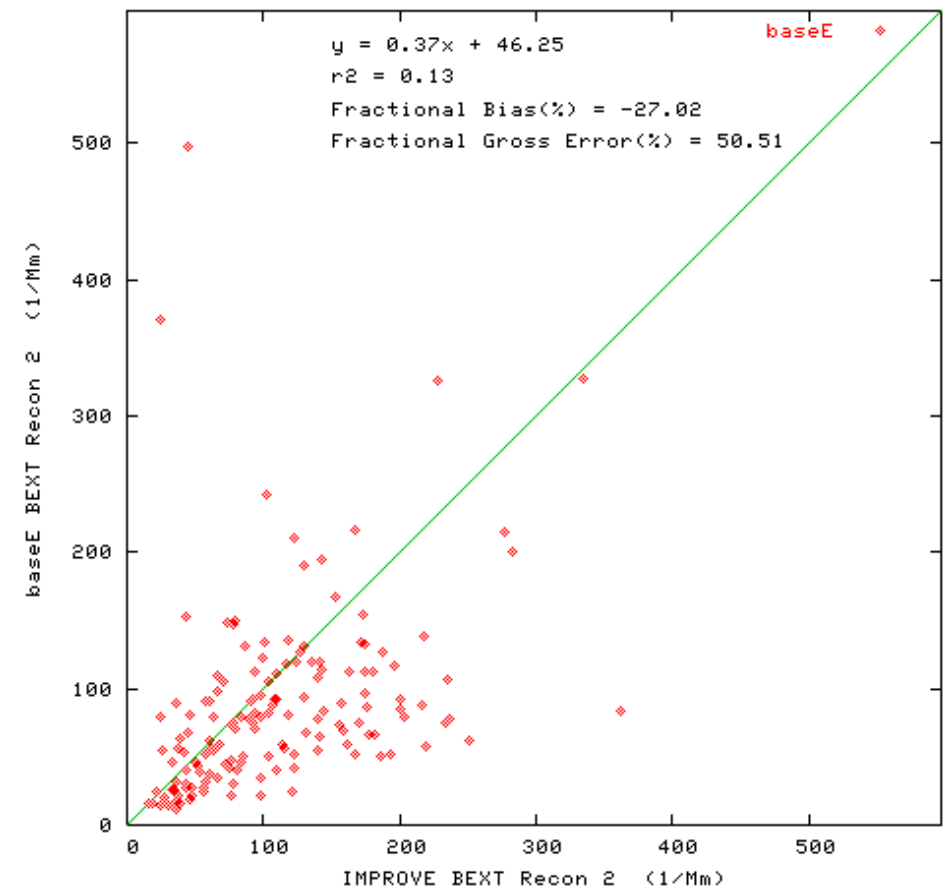
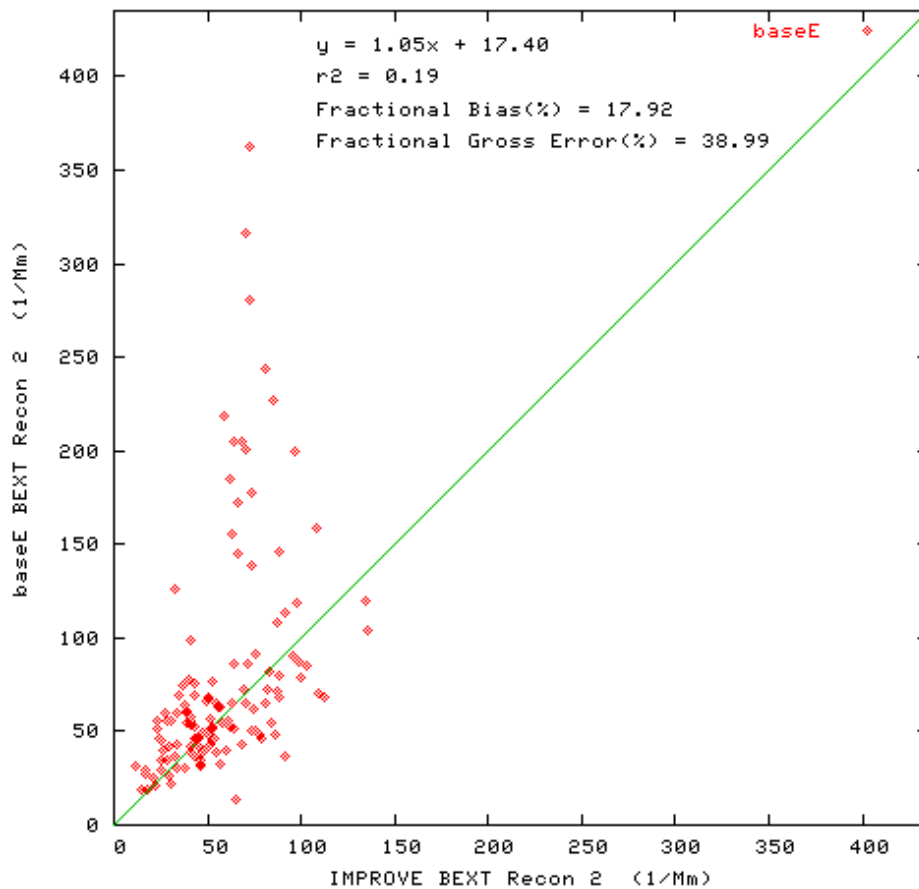
# Light Extinction (IMPROVE)

January 2002

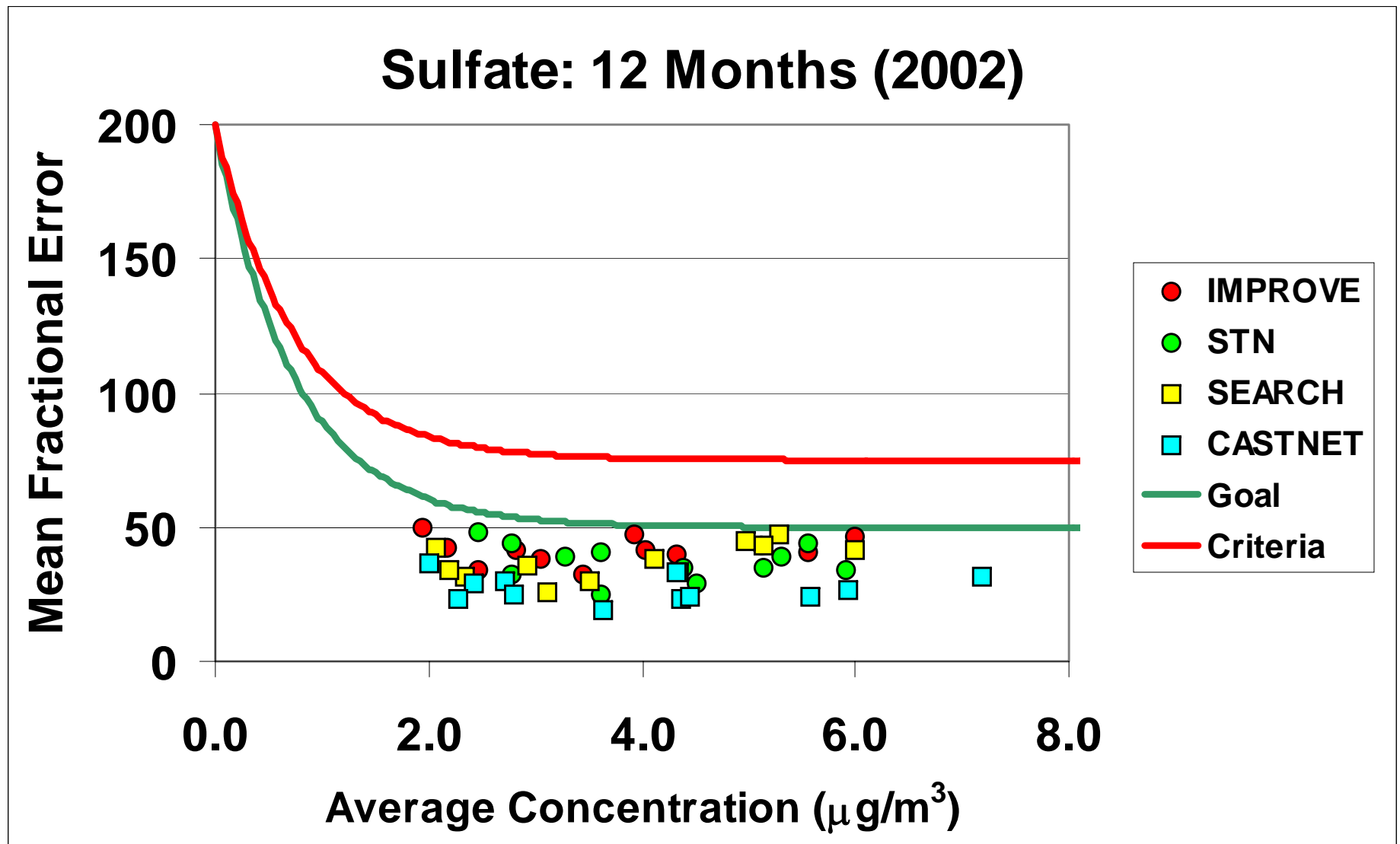
July 2002

IMPROVE vs. baseE BEXT Recon 2 at 16 stations on 2002001-200203

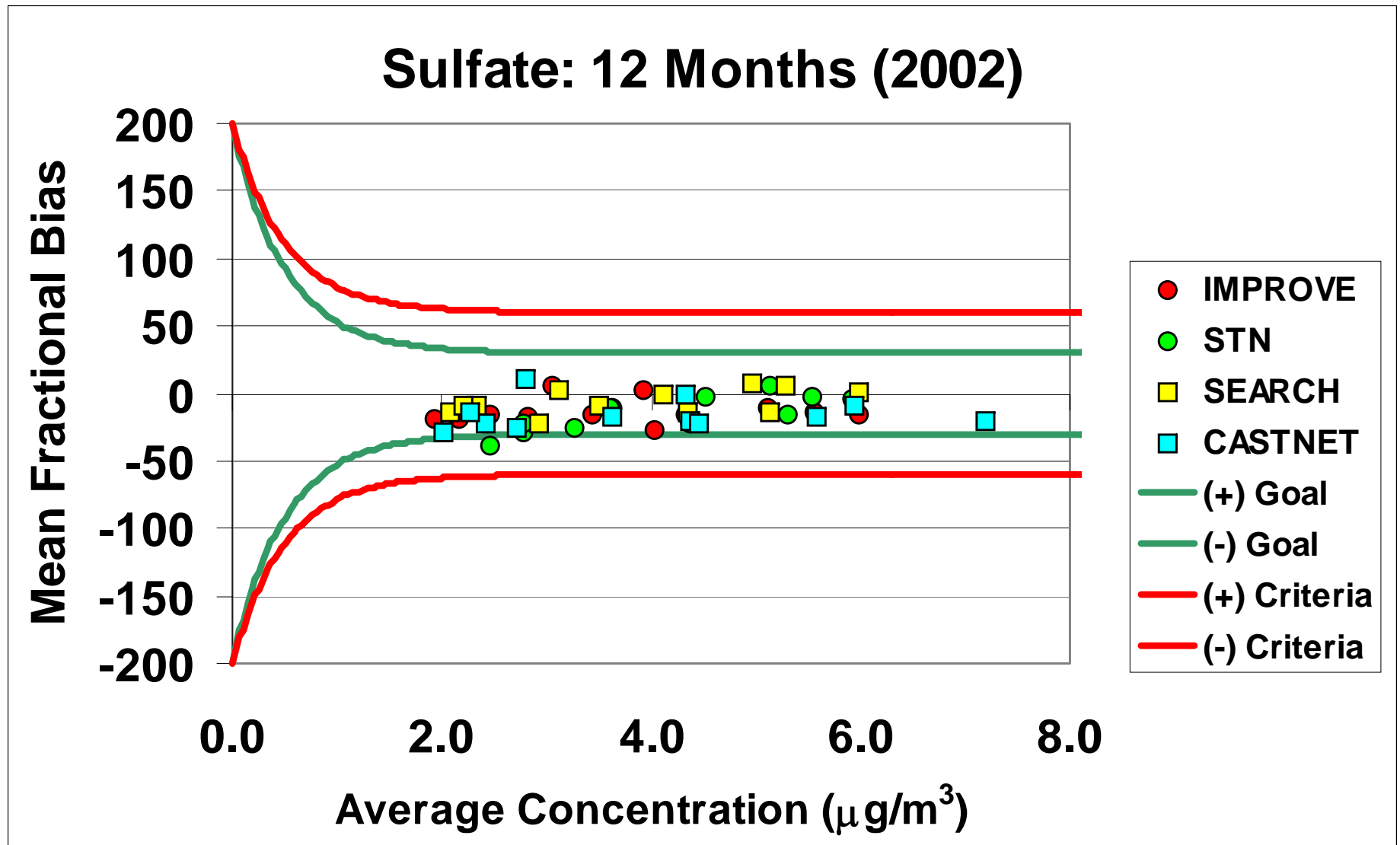
IMPROVE vs. baseE BEXT Recon 2 at 16 stations on 2002182-200221



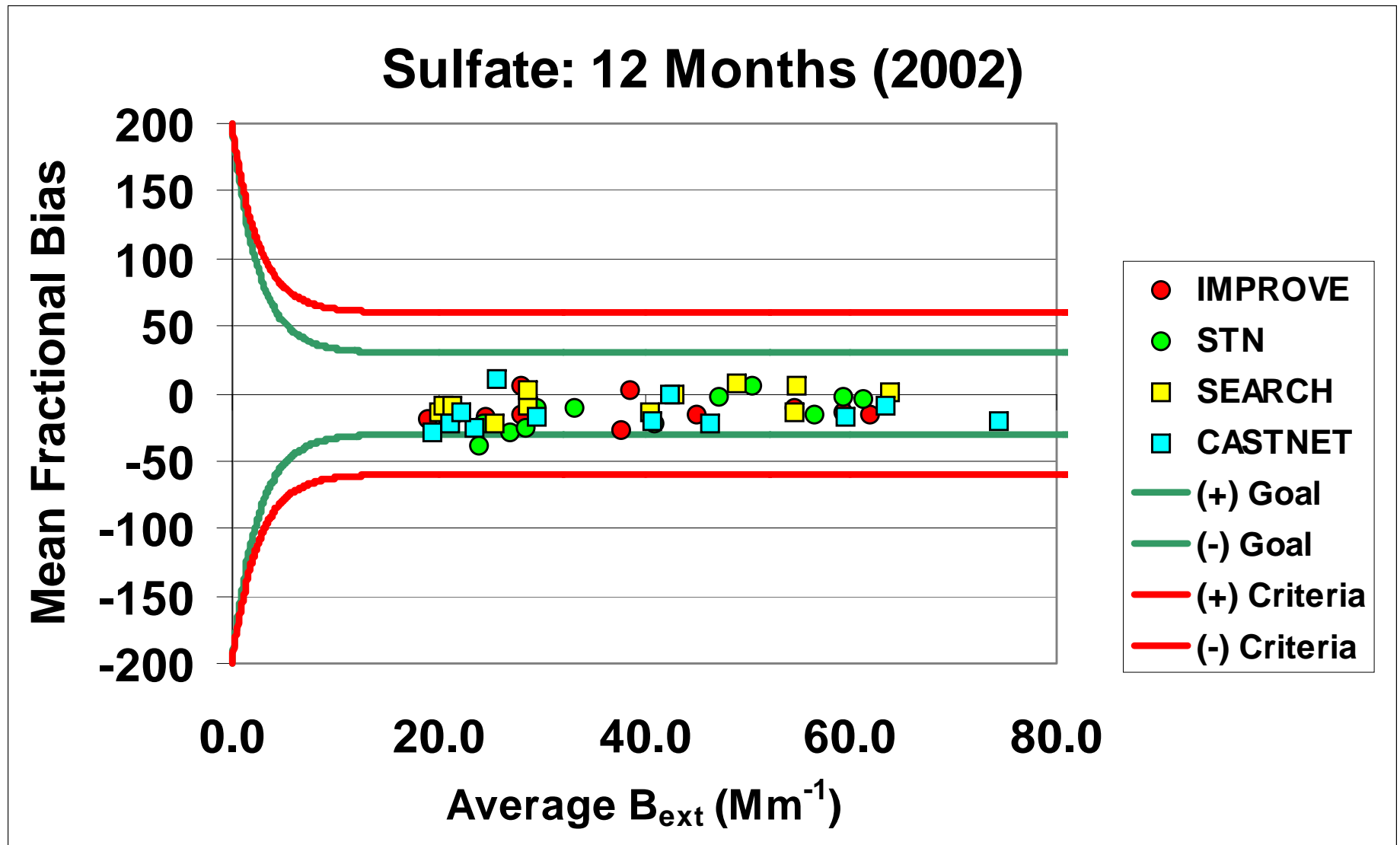
# Sulfate PM Fractional Error



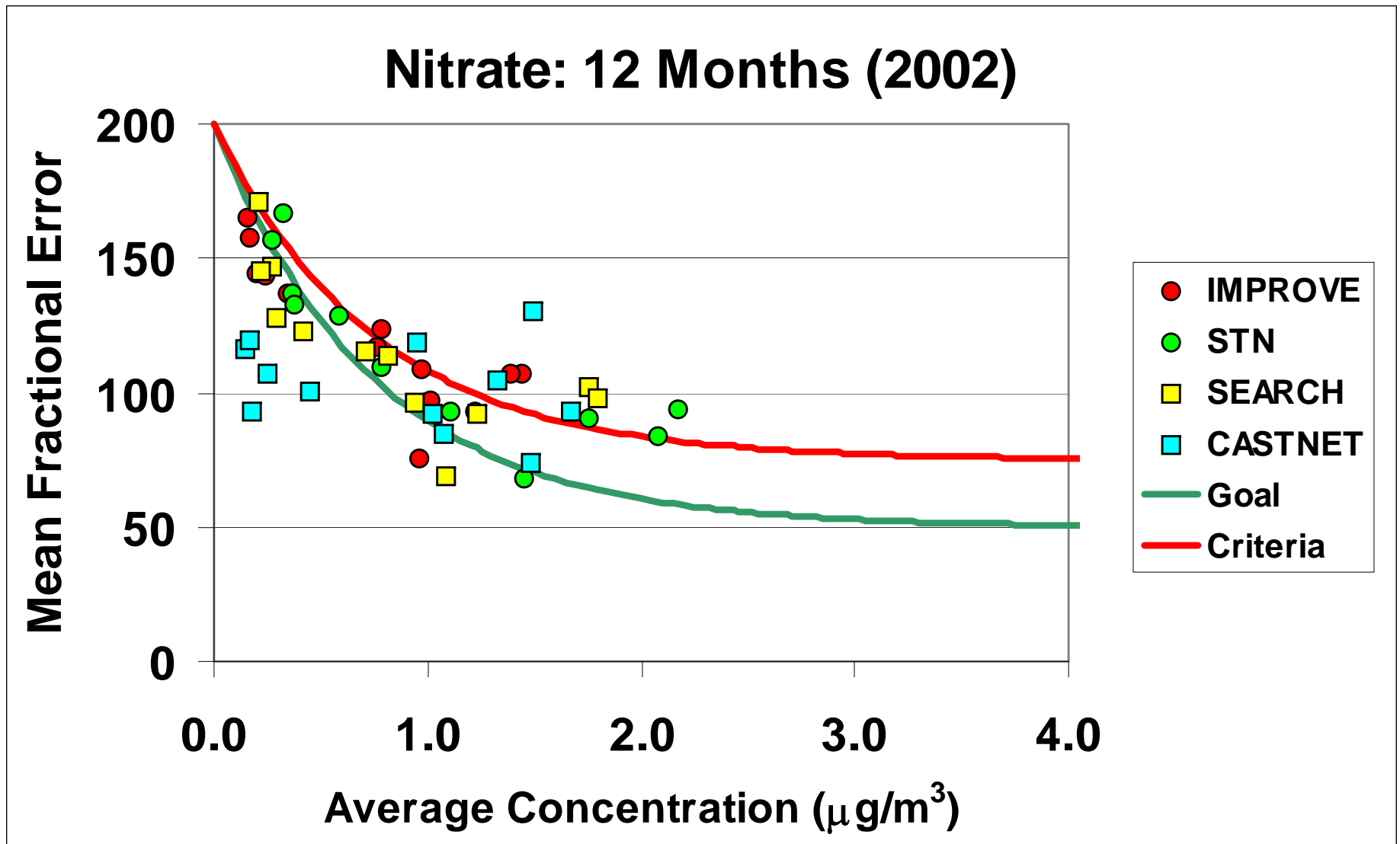
# Sulfate PM Fractional Bias



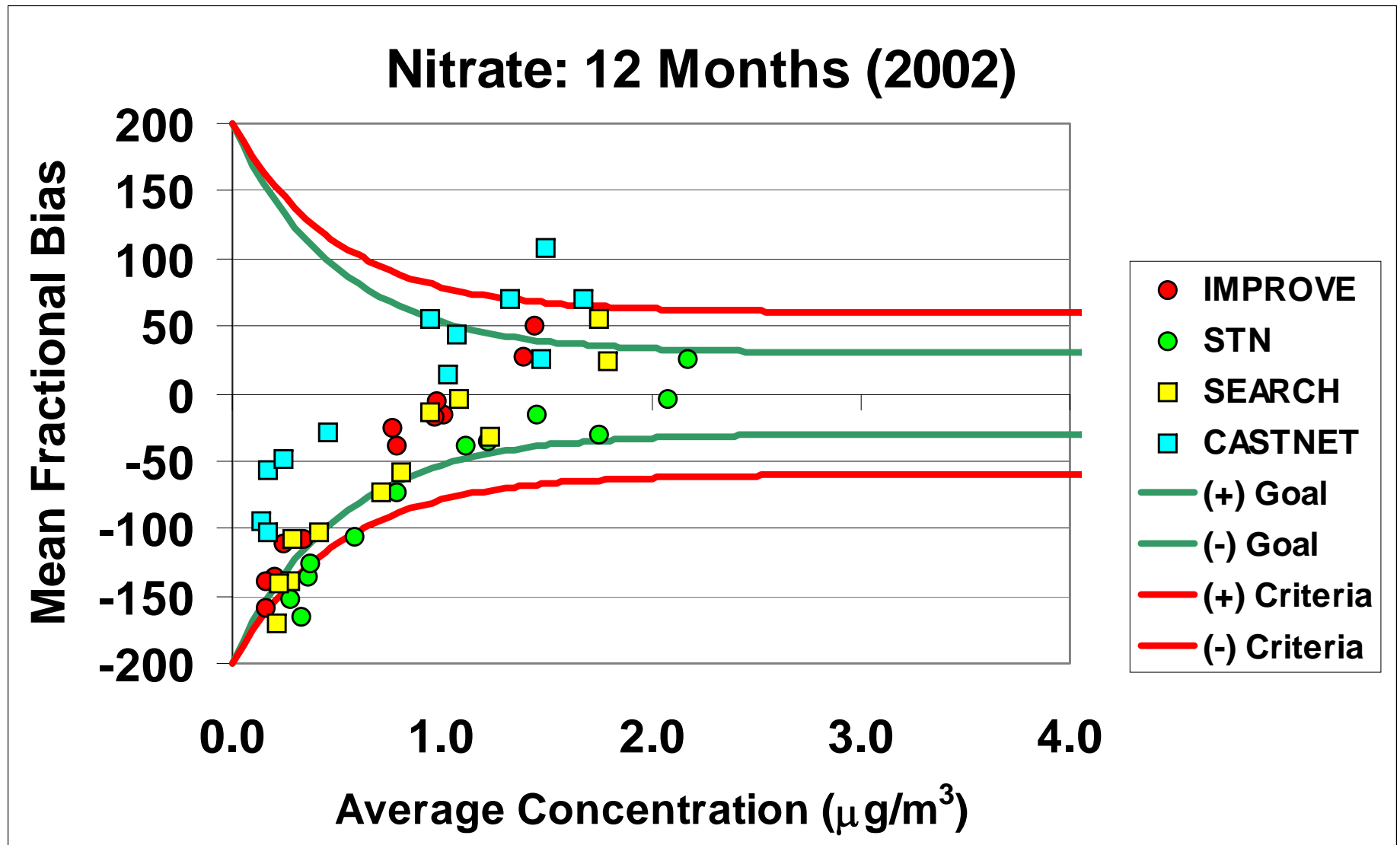
# Sulfate $B_{ext}$ Fractional Bias



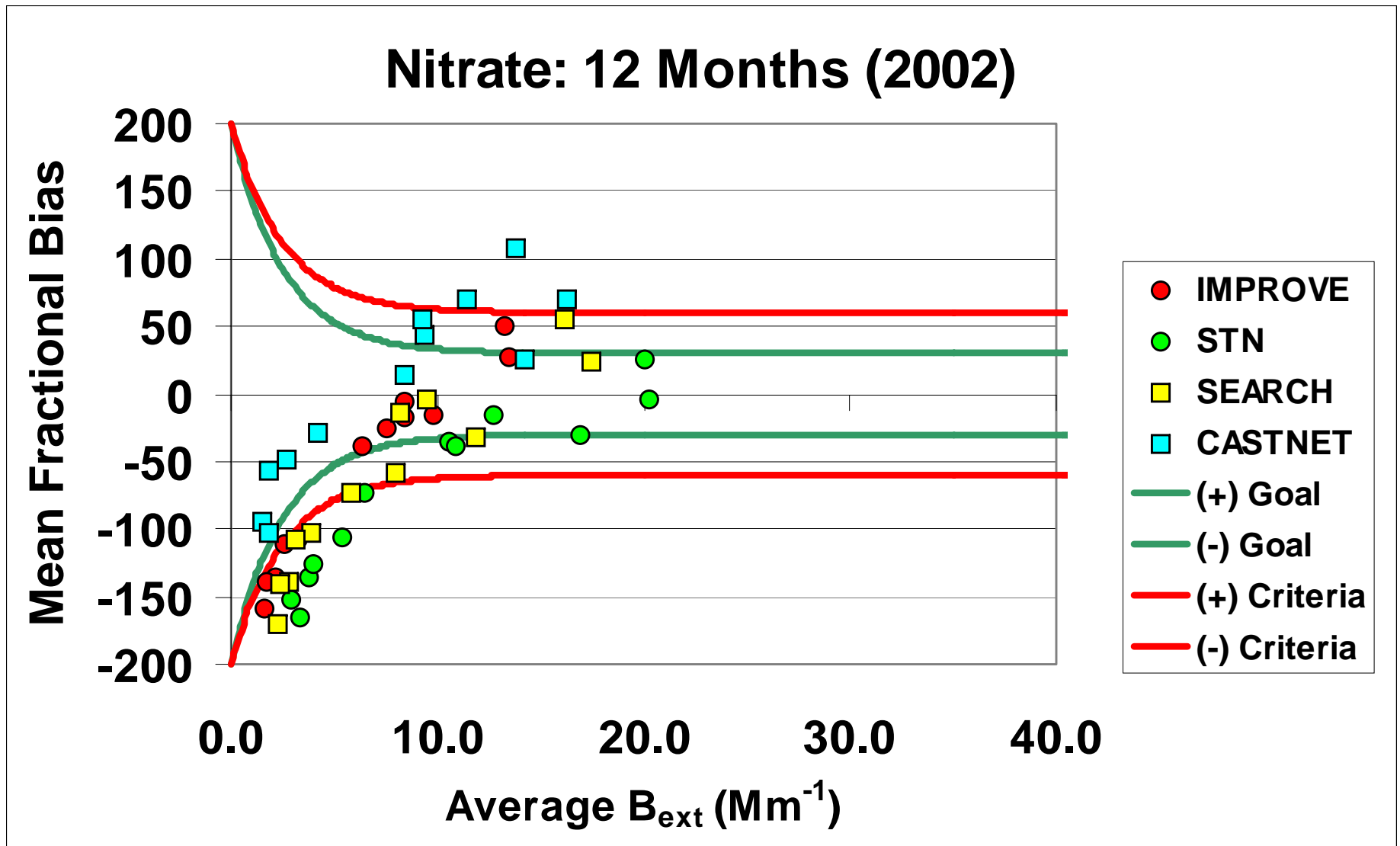
# Nitrate PM Fractional Error



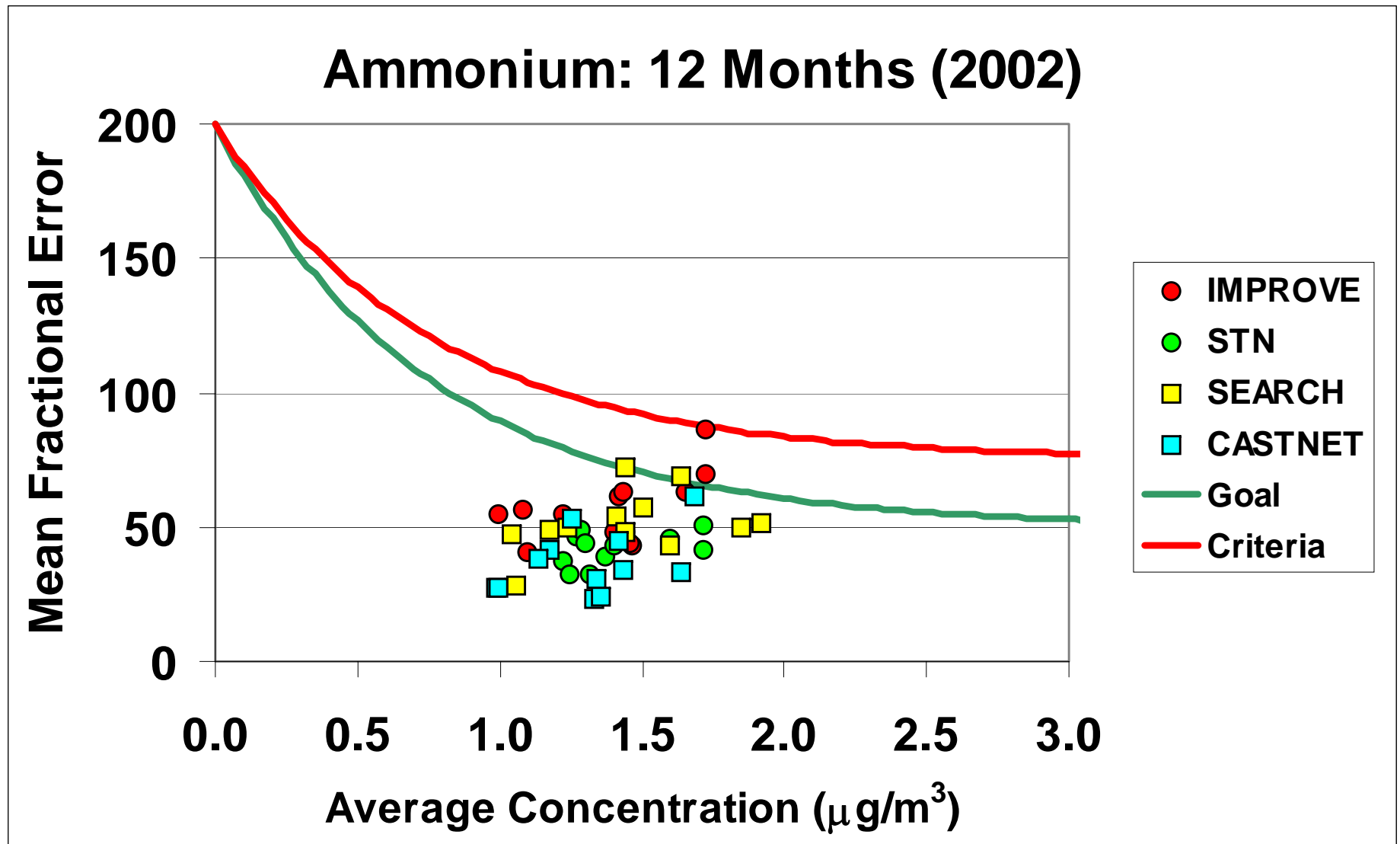
# Nitrate PM Fractional Bias



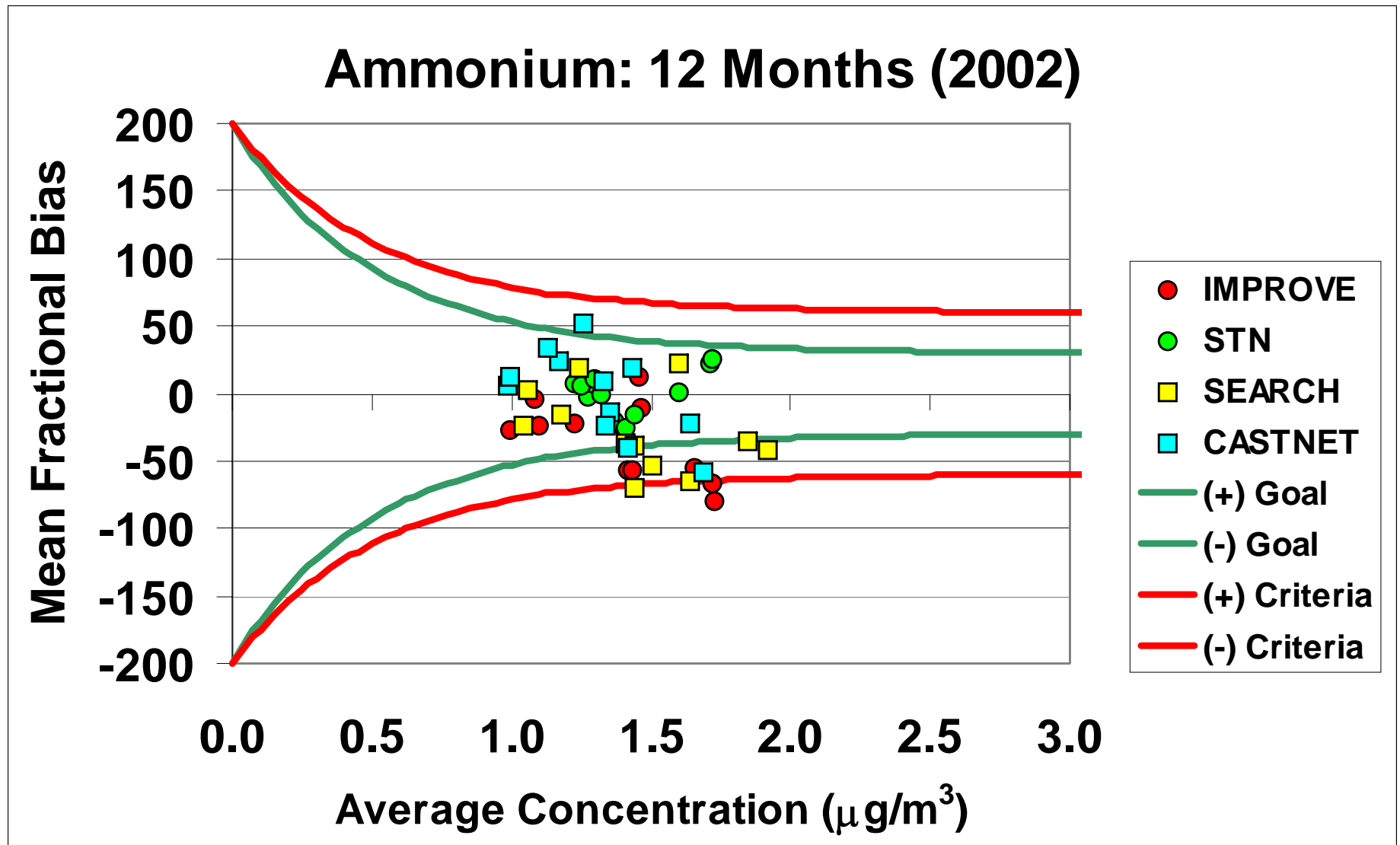
# Nitrate $B_{\text{ext}}$ Fractional Bias



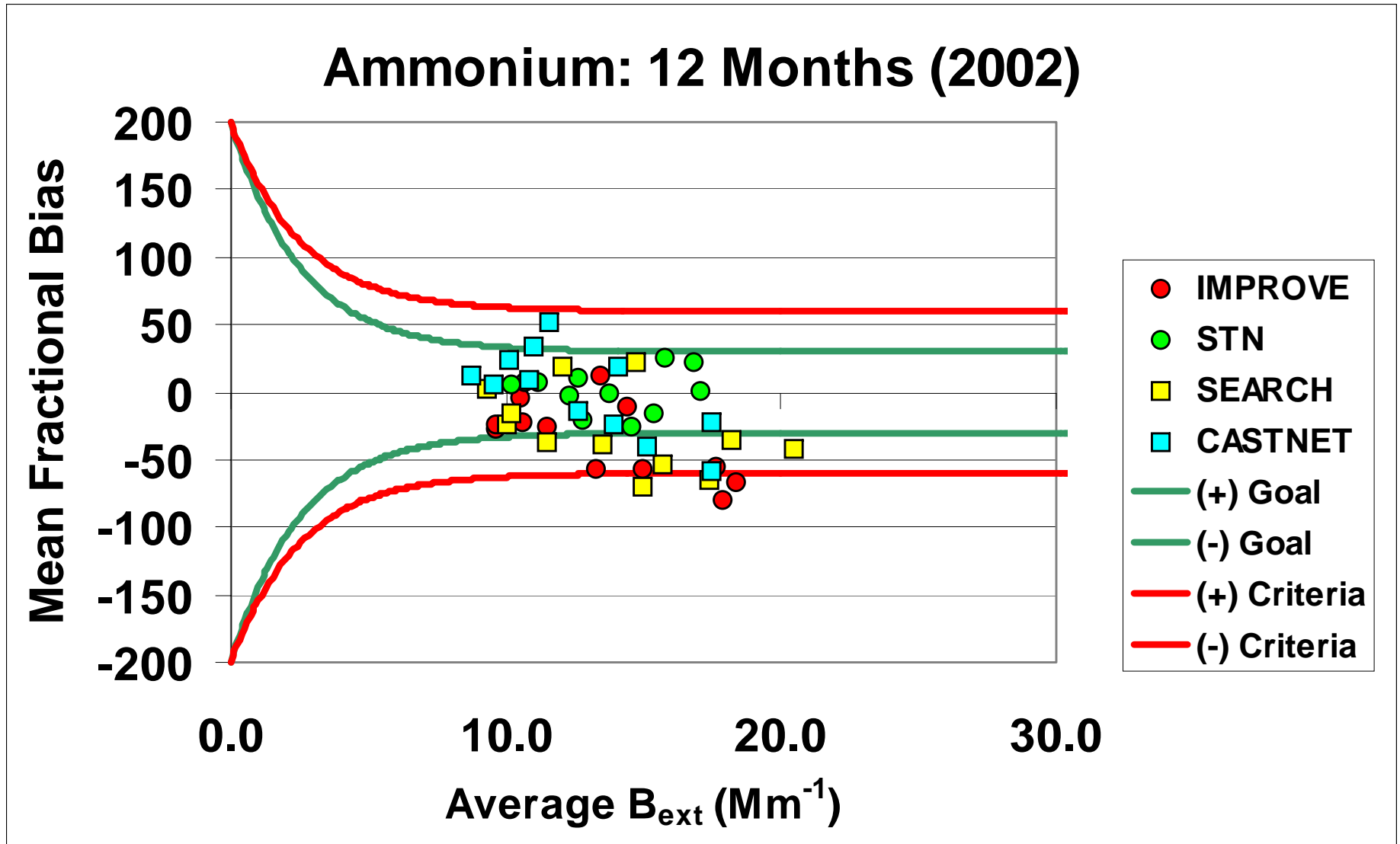
# Ammonium\* PM Fractional Error



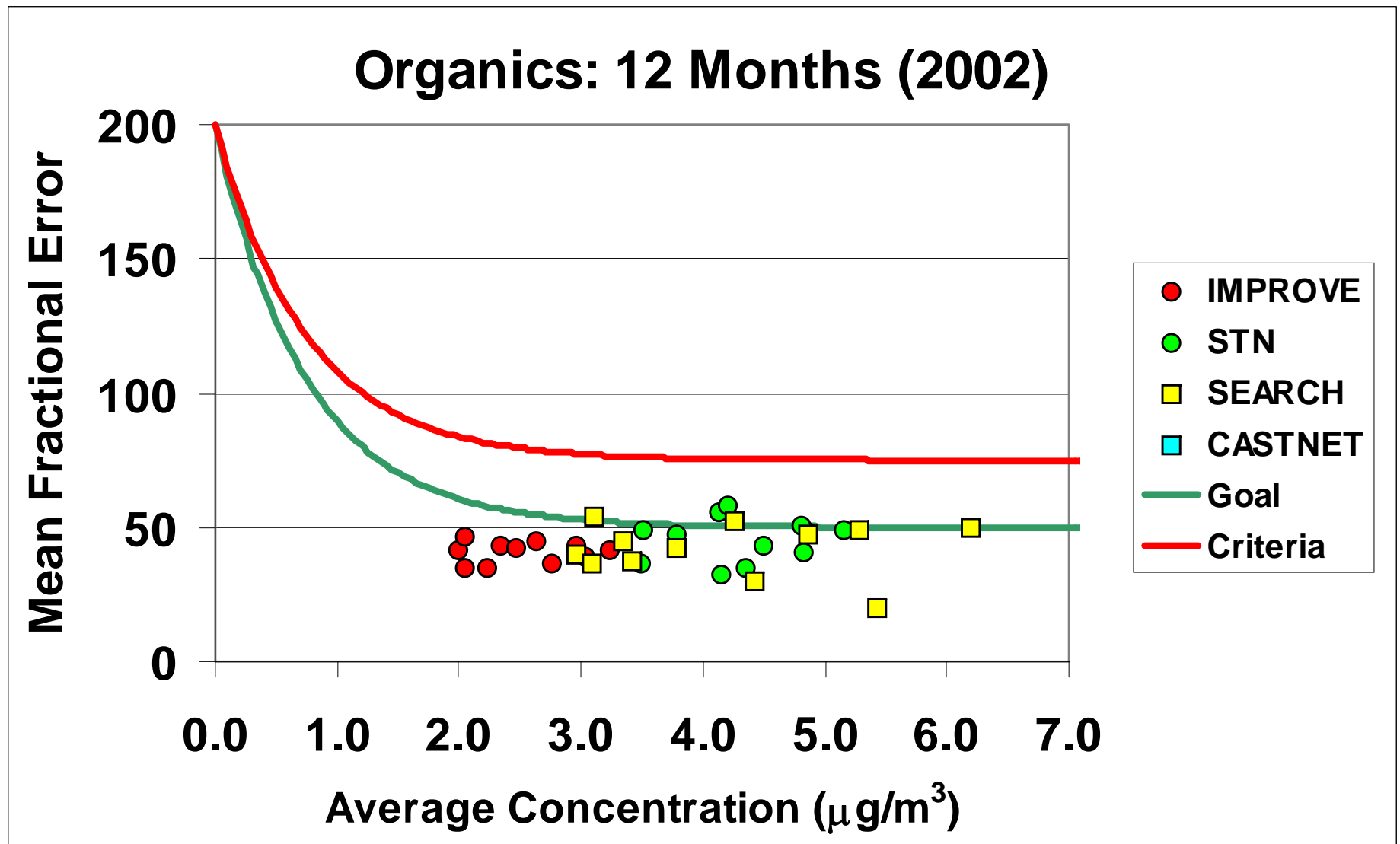
# Ammonium\* PM Fractional Bias



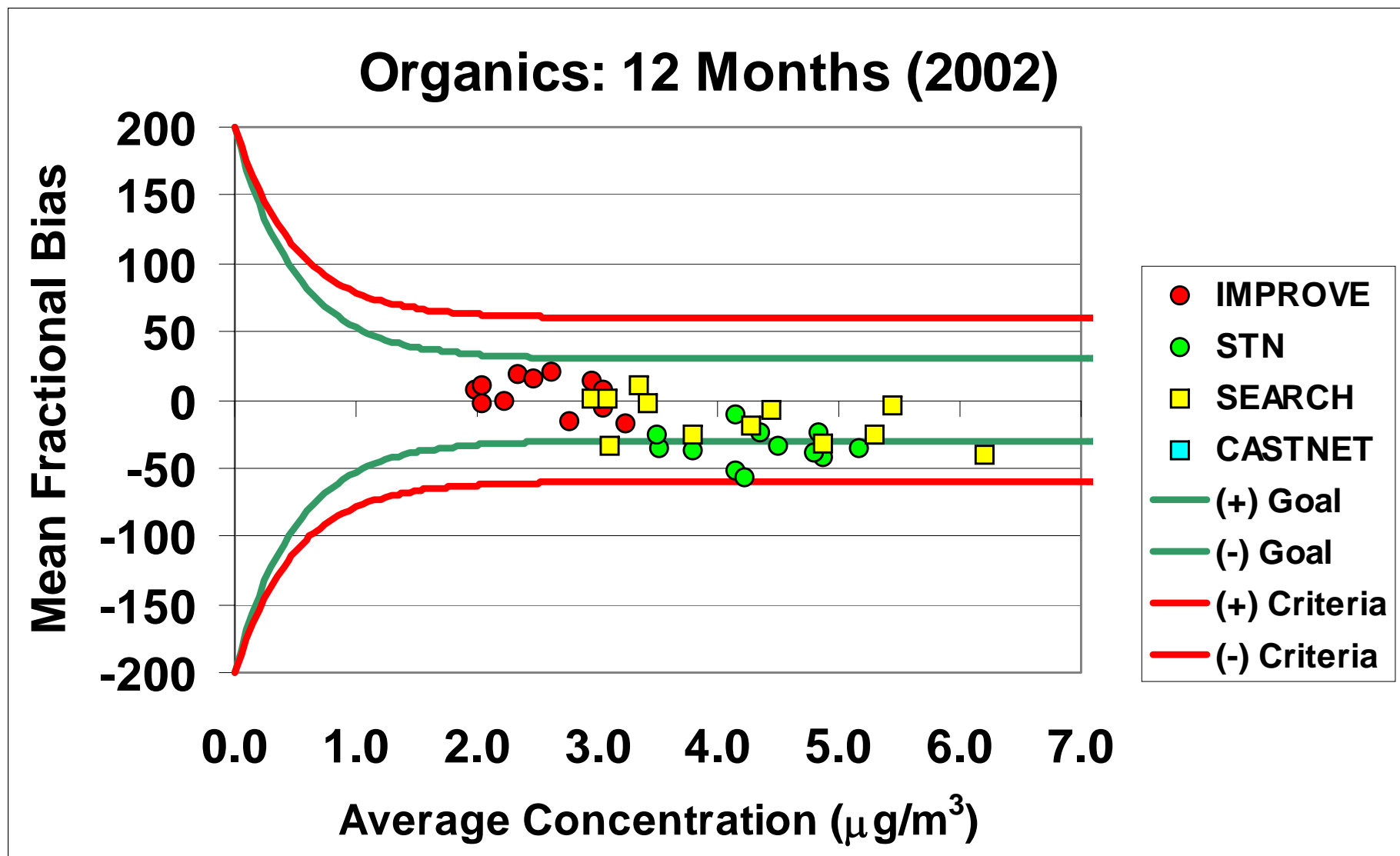
# Ammonium\* $B_{ext}$ Fractional Bias



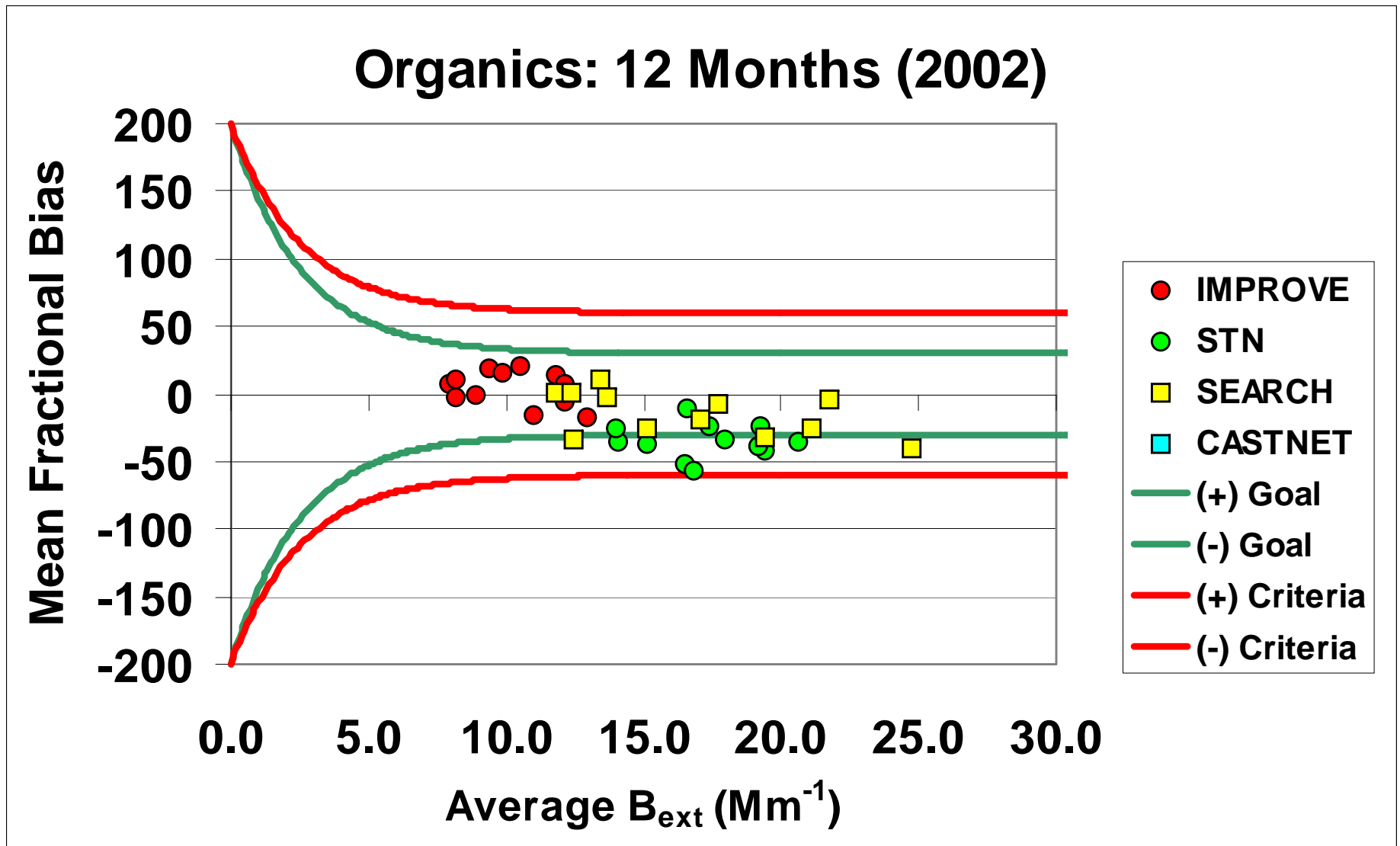
# Organics PM Fractional Error



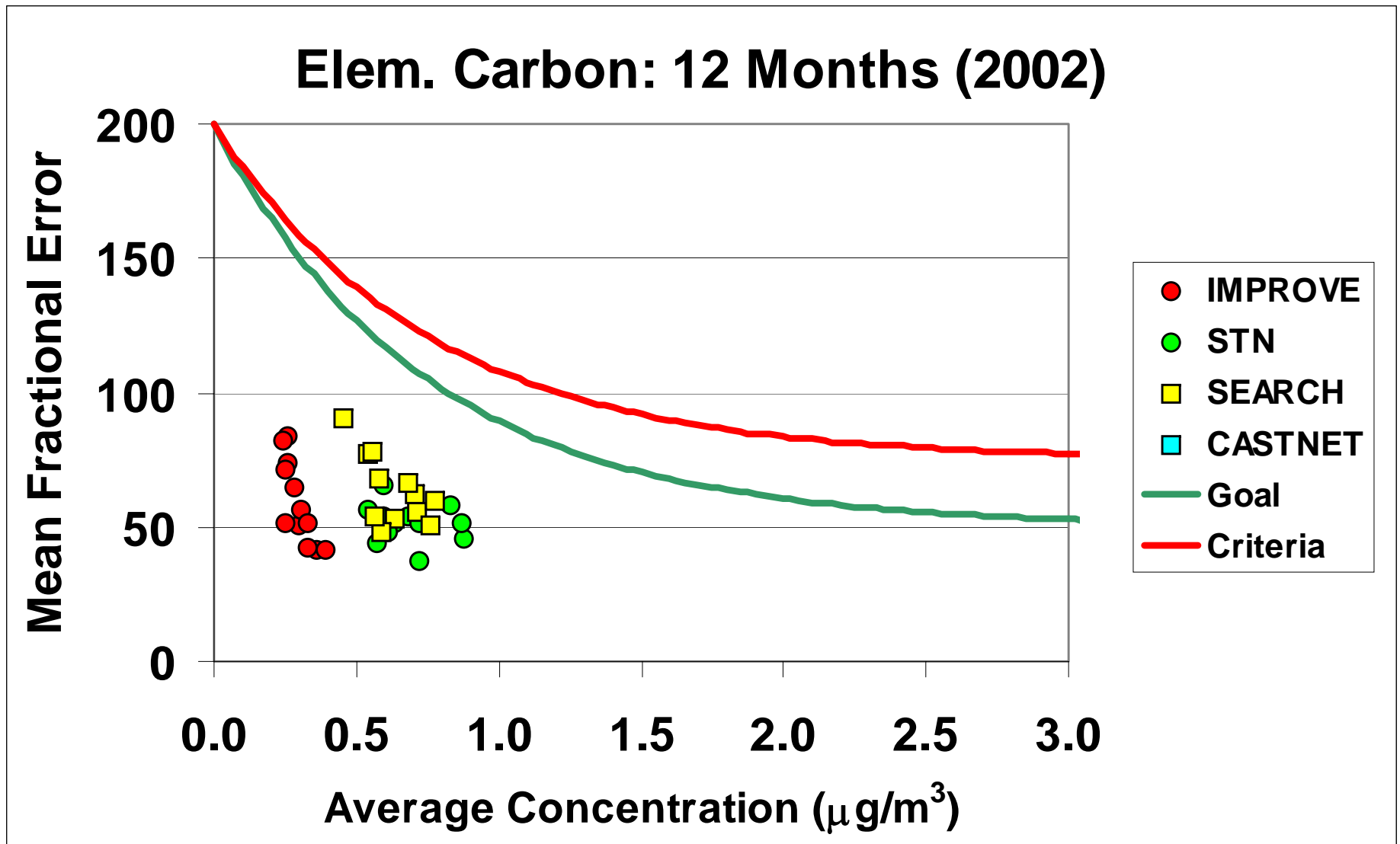
# Organics PM Fractional Bias



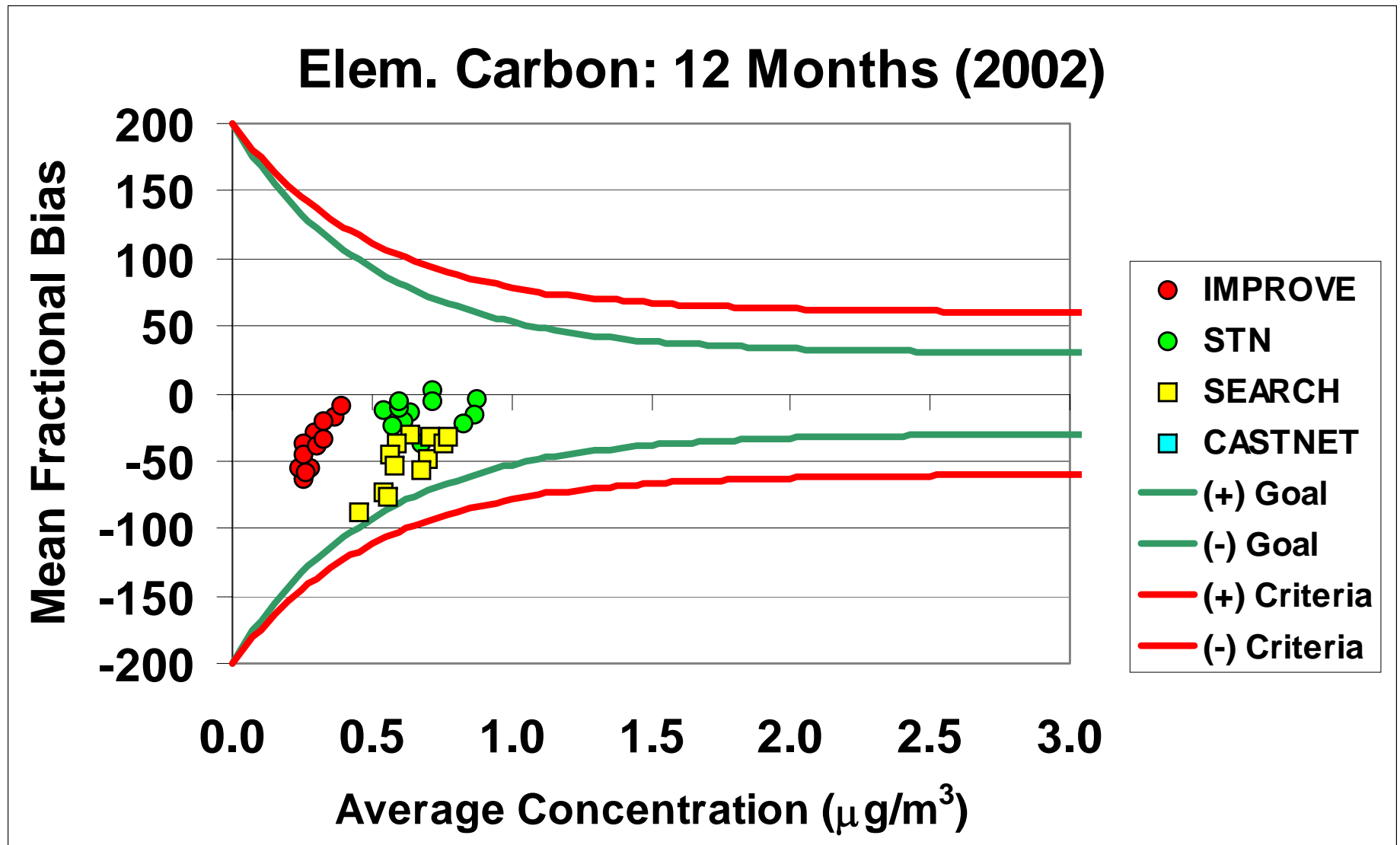
# Organics $B_{ext}$ Fractional Bias



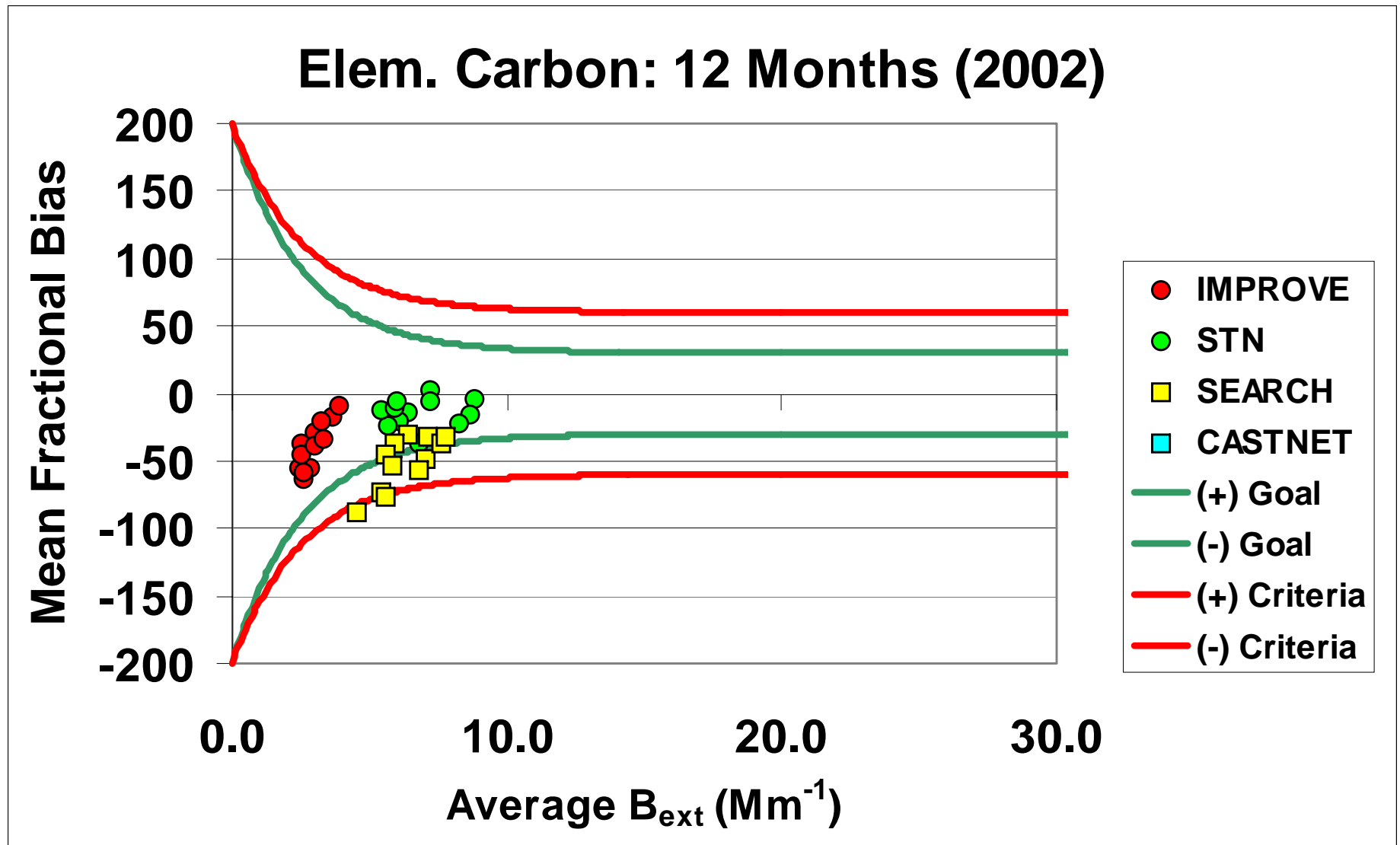
# Elem. Carbon PM Fractional Error



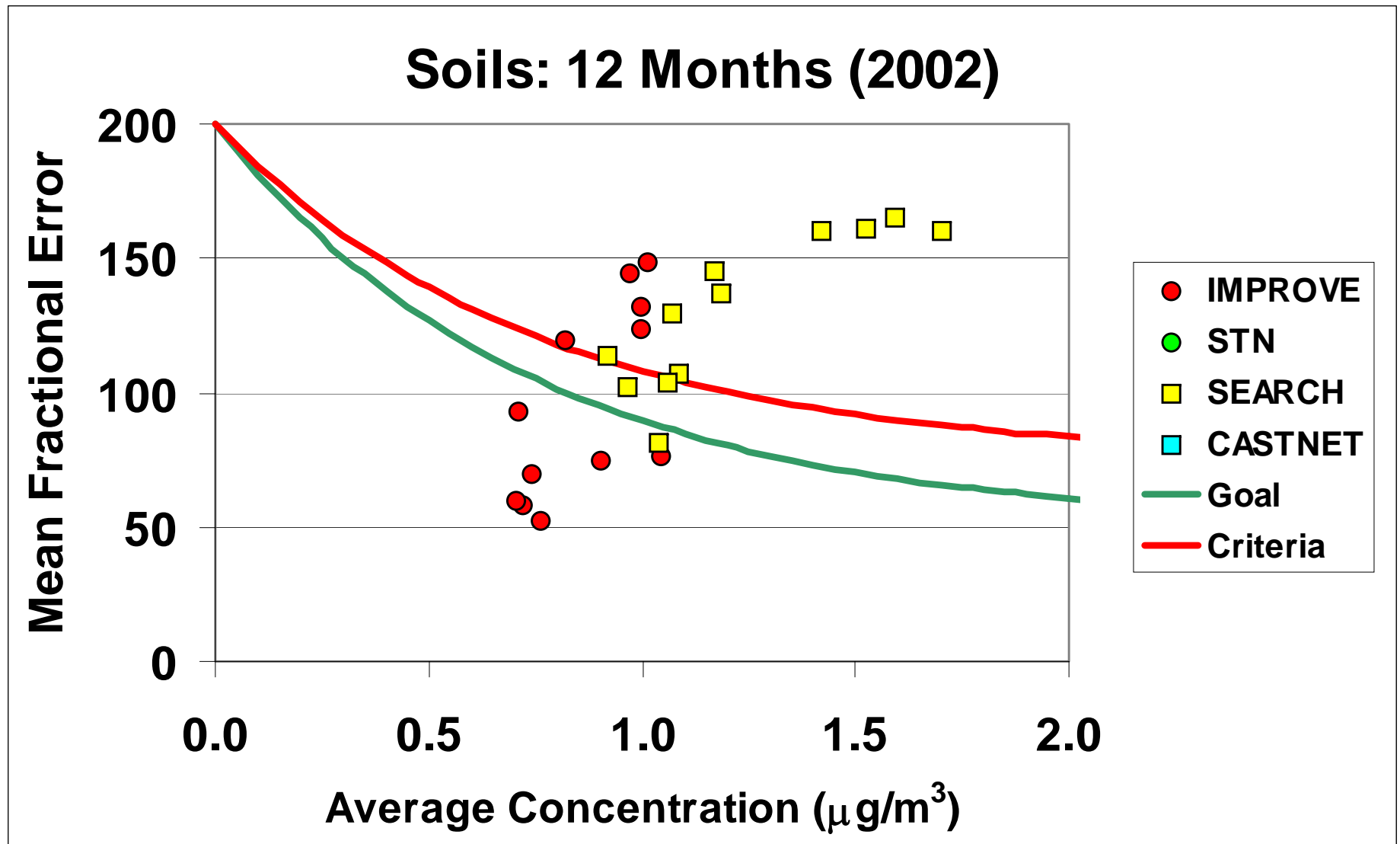
# Elem. Carbon PM Fractional Bias



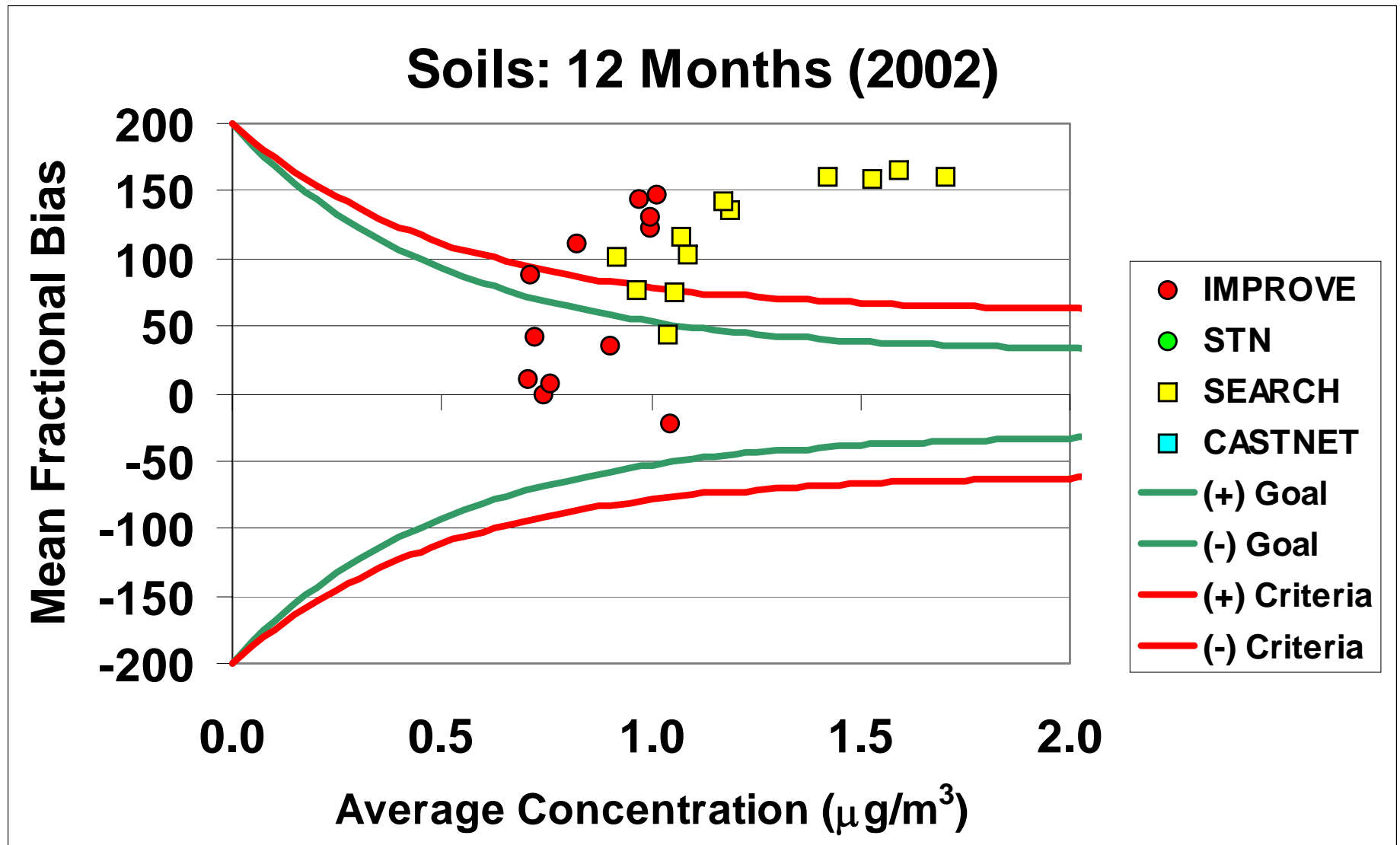
# Elem. Carbon $B_{ext}$ Fractional Bias



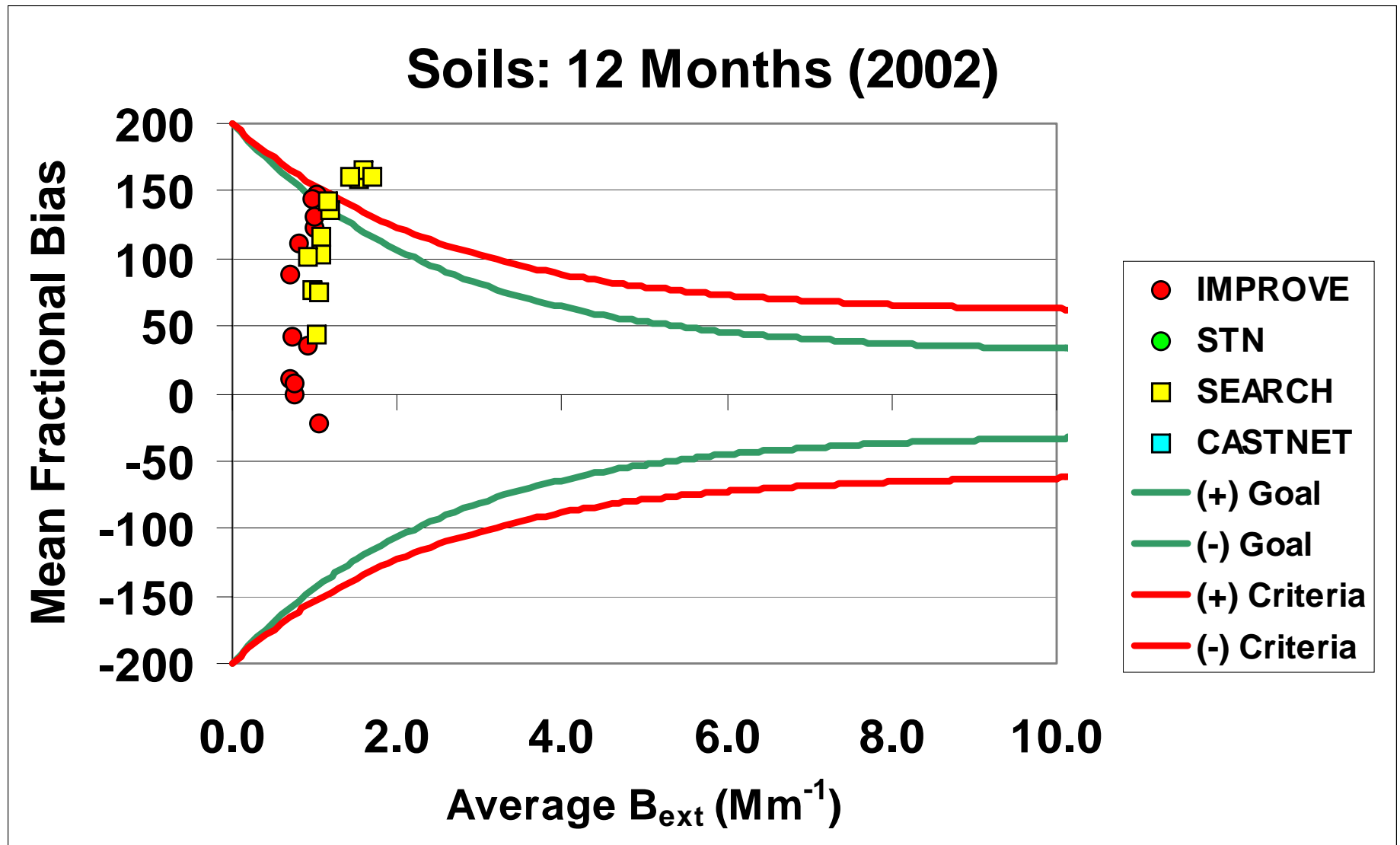
# Soils PM Fractional Error



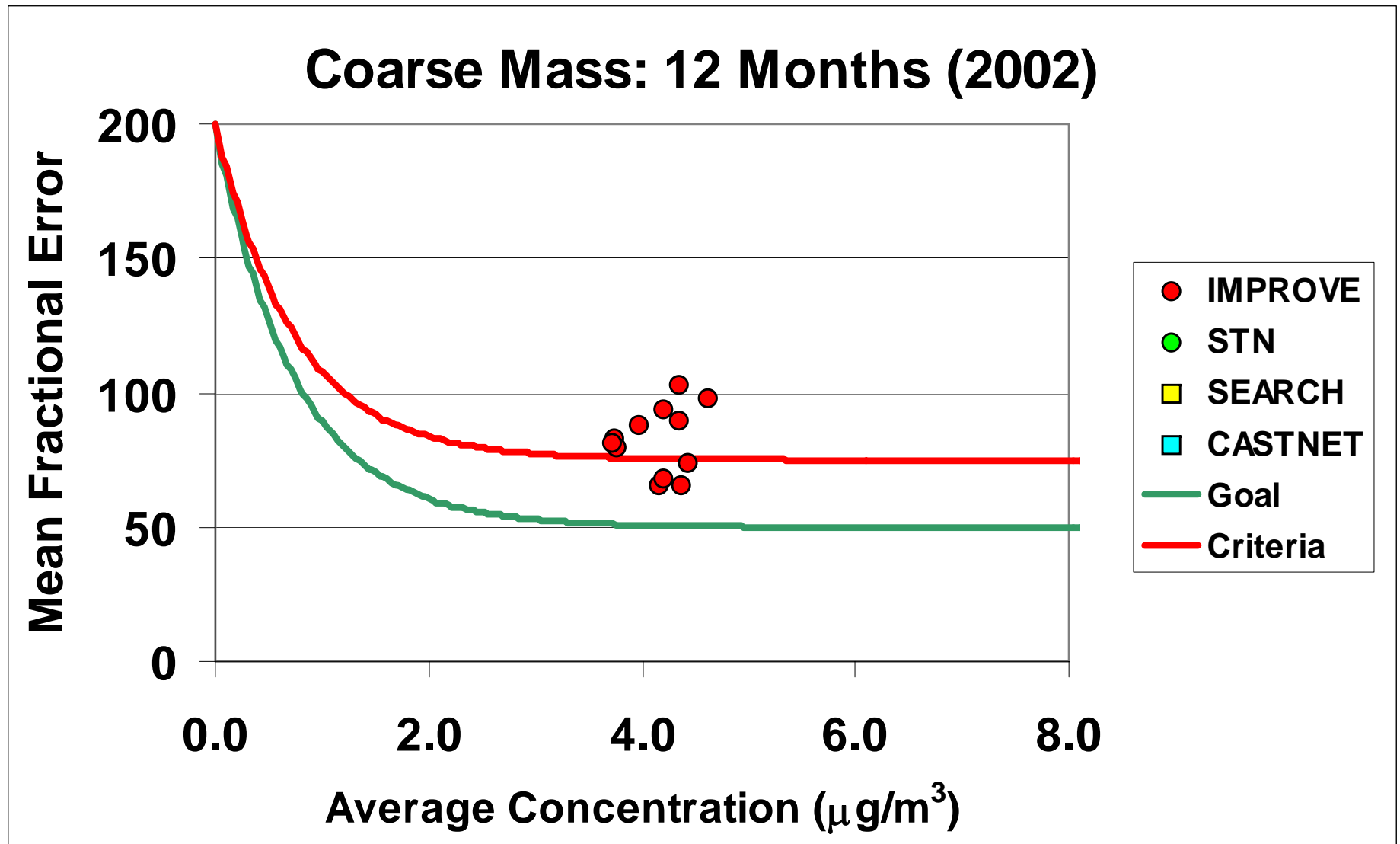
# Soils PM Fractional Bias



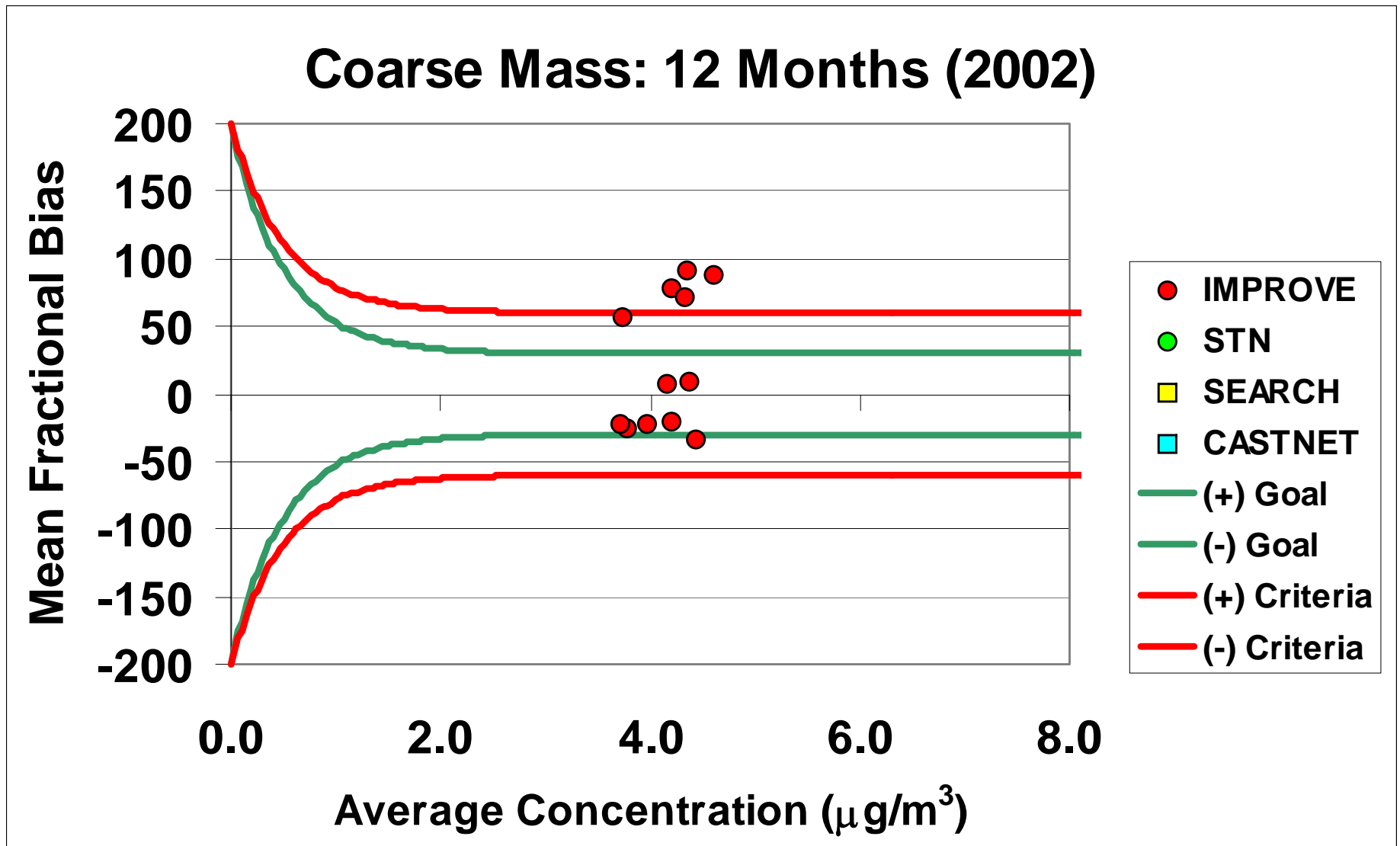
# Soils $B_{\text{ext}}$ Fractional Bias



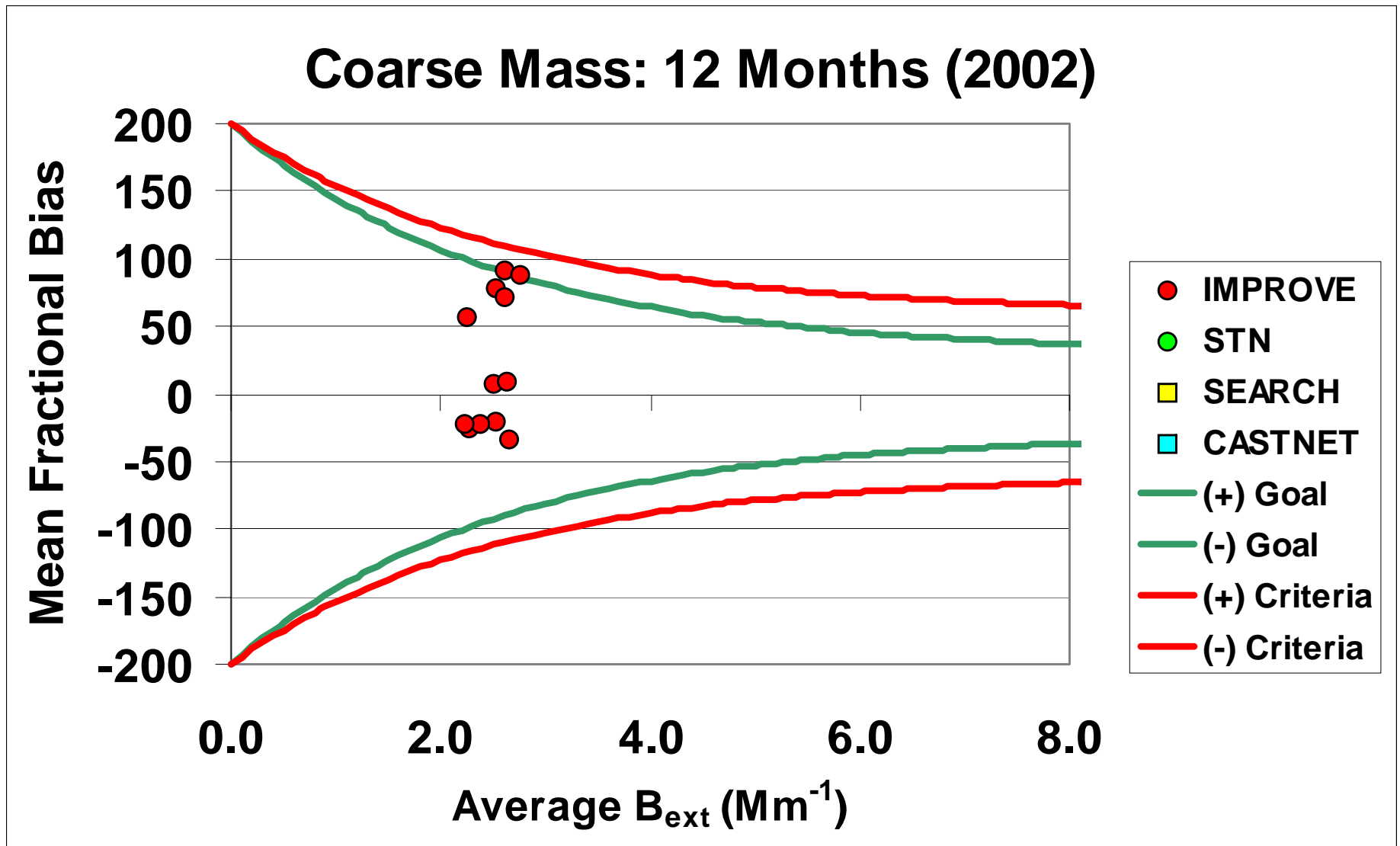
# Coarse Mass PM Fractional Error



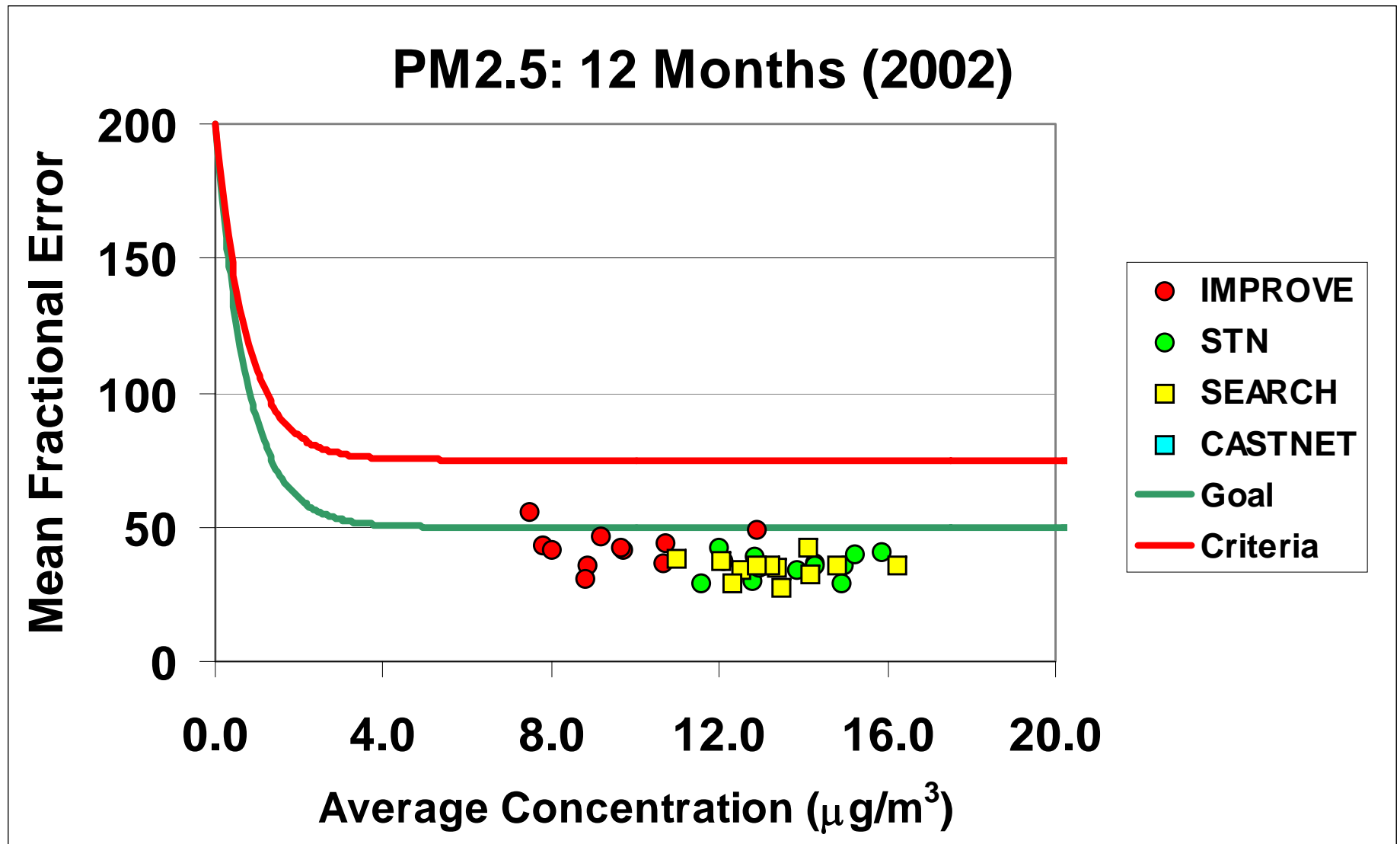
# Coarse Mass PM Fractional Bias



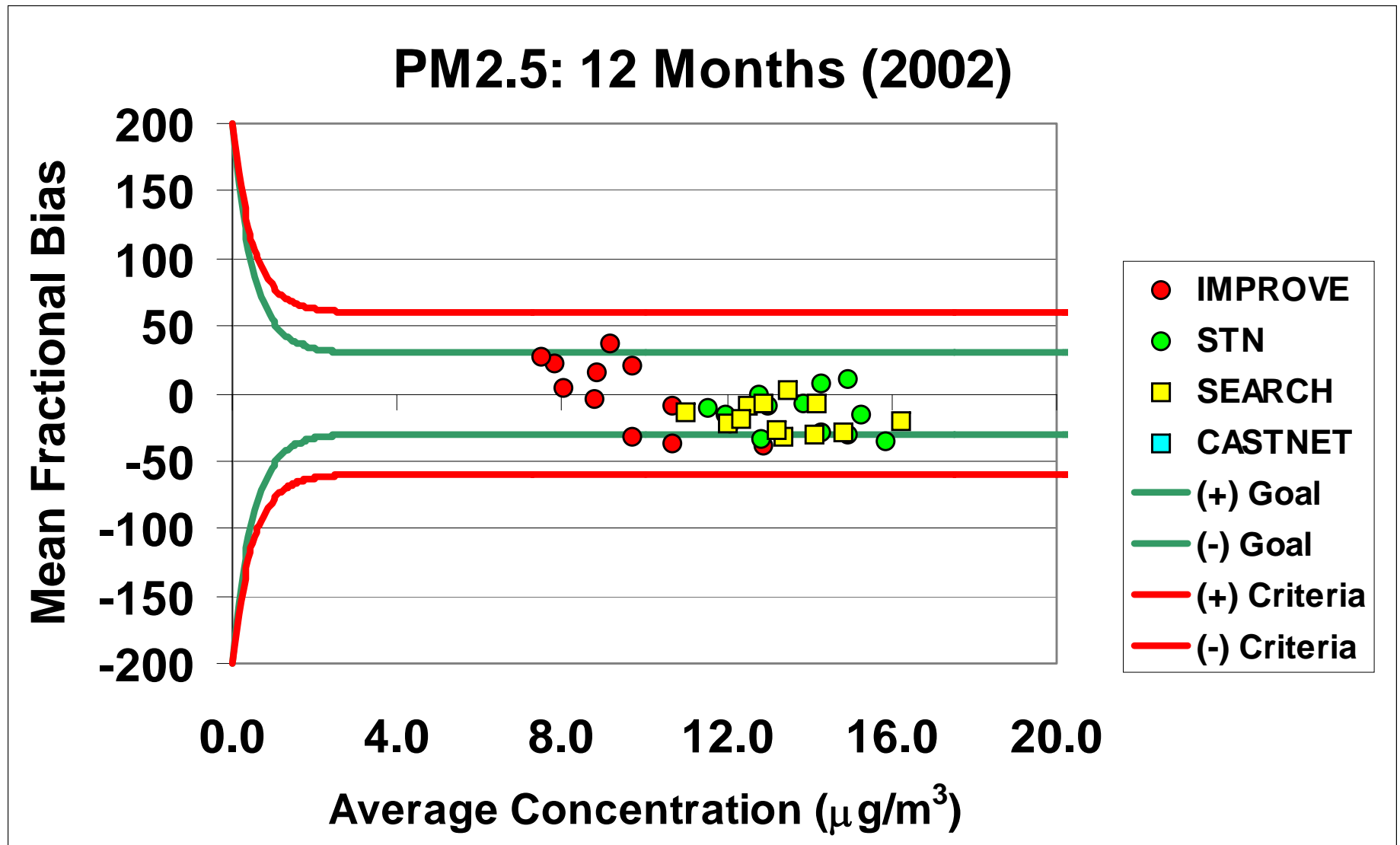
# Coarse Mass $B_{\text{ext}}$ Fractional Bias



# Fine PM Fractional Error

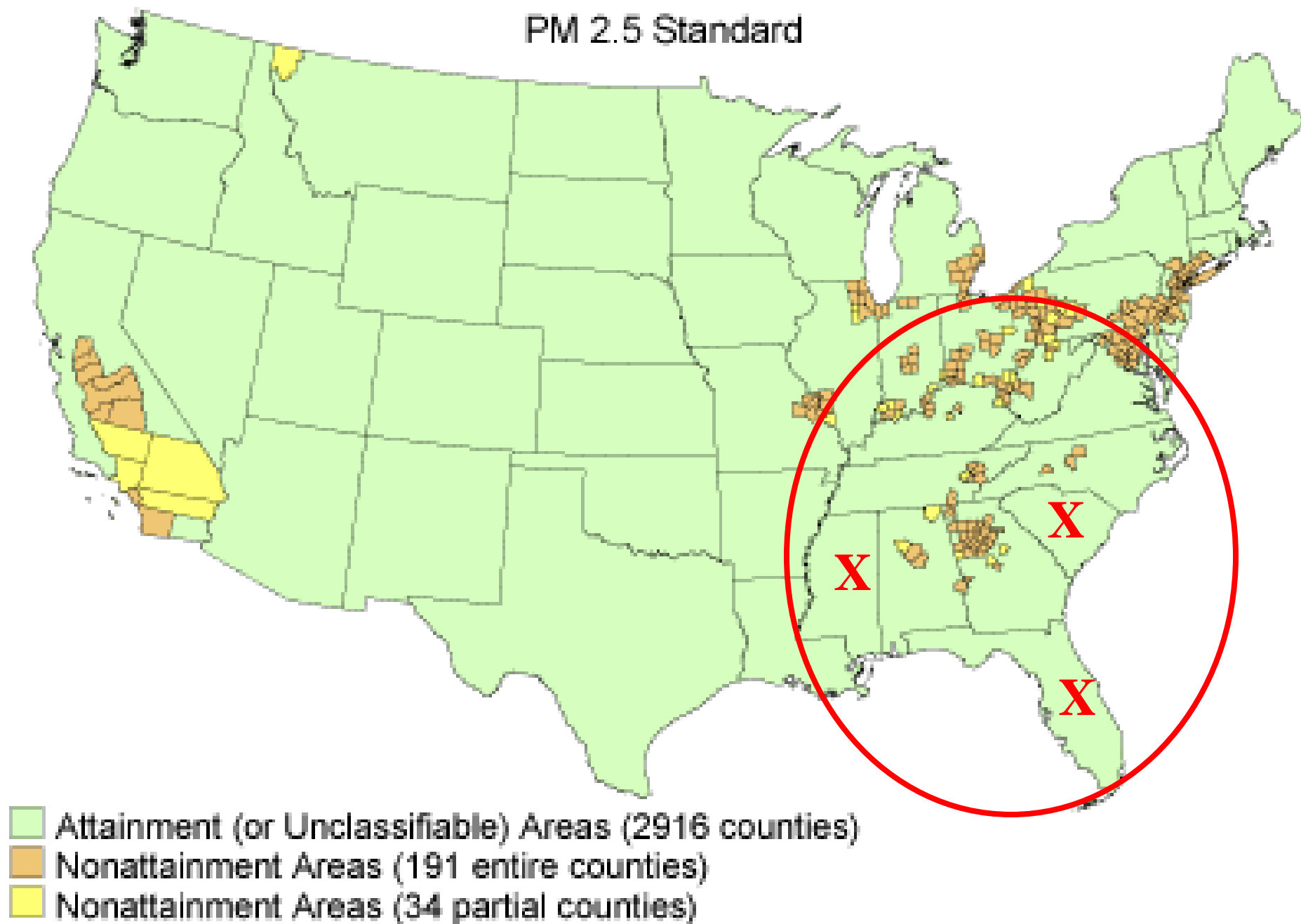


# Fine PM Fractional Bias

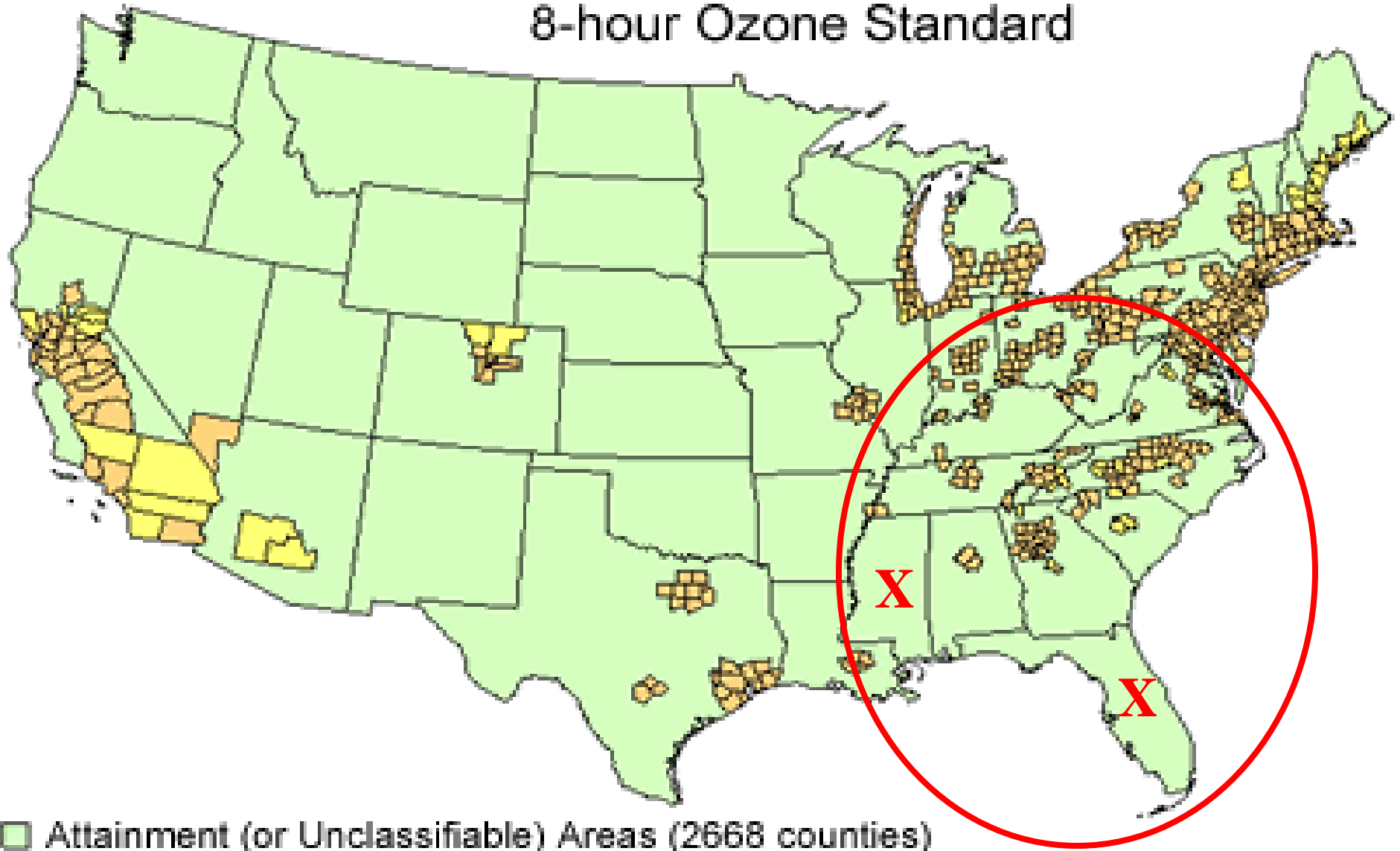


# NAAQS SIP Modeling in VISTAS

# Attainment and Nonattainment Areas in the U.S. PM 2.5 Standard



# Attainment and Nonattainment Areas in the U.S. 8-hour Ozone Standard

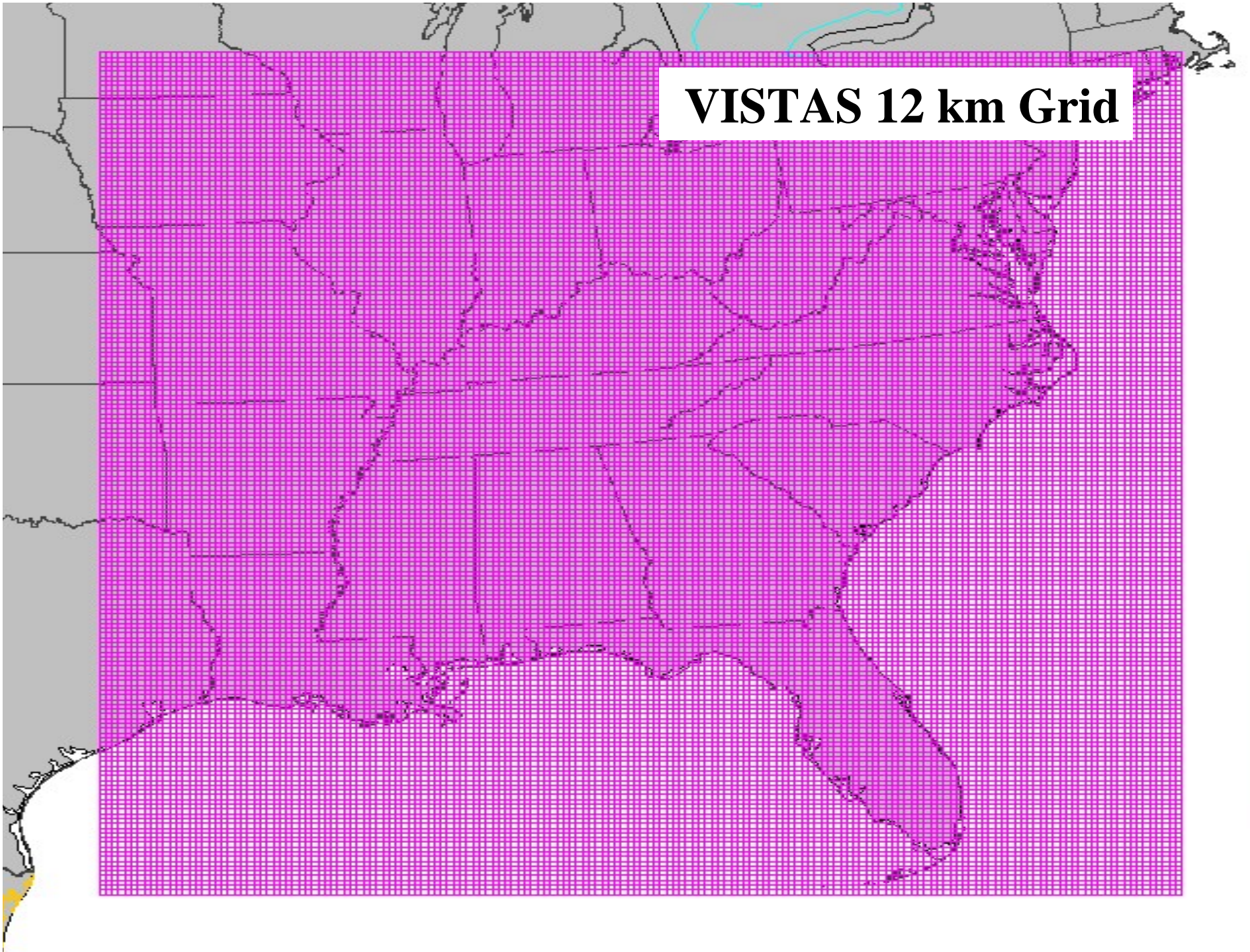


- Attainment (or Unclassifiable) Areas (2668 counties)
- Nonattainment Areas (432 entire counties)
- Nonattainment Areas (42 partial counties)

# VISTAS Modeling Schedule

- Completed initial 2002 annual modeling (36 and 12 km)
  - MM5, SMOKE, CMAQ
  - Actual (Performance) and Typical (RRFs) Emissions
- Completed initial 2018 OTW annual modeling (36 km)
  - 2018 OTB and OTW episodic emission sensitivities (12 km)
- Working on revised 2002 and 2018 SMOKE emissions
- Will have revised 2002 CMAQ modeling and revised 2018 OTW modeling (revised IPM) done by mid-summer
- Completed 2009 SMOKE modeling (36 and 12 km), CMAQ modeling by mid June
  - 2009 OTW episodic emission sensitivities (12 km)
- <http://pah.cert.ucr.edu/vistas/vistas2/>
- <http://www.ce.gatech.edu/research/vistas/products.htm>

**VISTAS 12 km Grid**



# VISTAS NAAQS SIP Modeling

- PM2.5 Non-Attainment Areas
  - AL, GA, KY, NC, TN, VA, WV
  - All VISTAS states with NAA will use VISTAS modeling for PM2.5 modeling
    - Annual 36 and 12 km modeling for 2002 and 2009
    - Some states will do additional modeling beyond VISTAS
- 8-Hour Ozone Non-Attainment Areas
  - AL, GA, KY, NC, SC, TN, VA, WV
  - Some VISTAS states with NAA states will use VISTAS modeling for 8-hr ozone modeling
    - Seasonal 36 and 12 km modeling for 2002 and 2009
    - Some states will do additional modeling beyond VISTAS
  - Association for Southeastern Integrated Planning (ASIP)
    - Seasonal 12 km modeling for 2008 (Basic ozone areas)

# Georgia NAAQS SIP Modeling

- Georgia PM<sub>2.5</sub> modeling (2009) will use ALGA 12 km sub-domain
  - VISTAS MM5 and SMOKE at 12 km
  - VISTAS 12 km for BCs
  - Annual simulations (GA DNR)
  - Pollutant and source specific sensitivities (GA DNR)
- Atlanta 8-hour ozone modeling (2009) will use GA 4 km sub-domain
  - MM5 and SMOKE at 4 km (GA DNR)
    - Improved GA mobile source emissions
  - ALGA 12 km for BCs
  - Modeling entire ozone season (05/20/02 – 09/20/02)
  - Pollutant and source specific sensitivities (GA DNR)

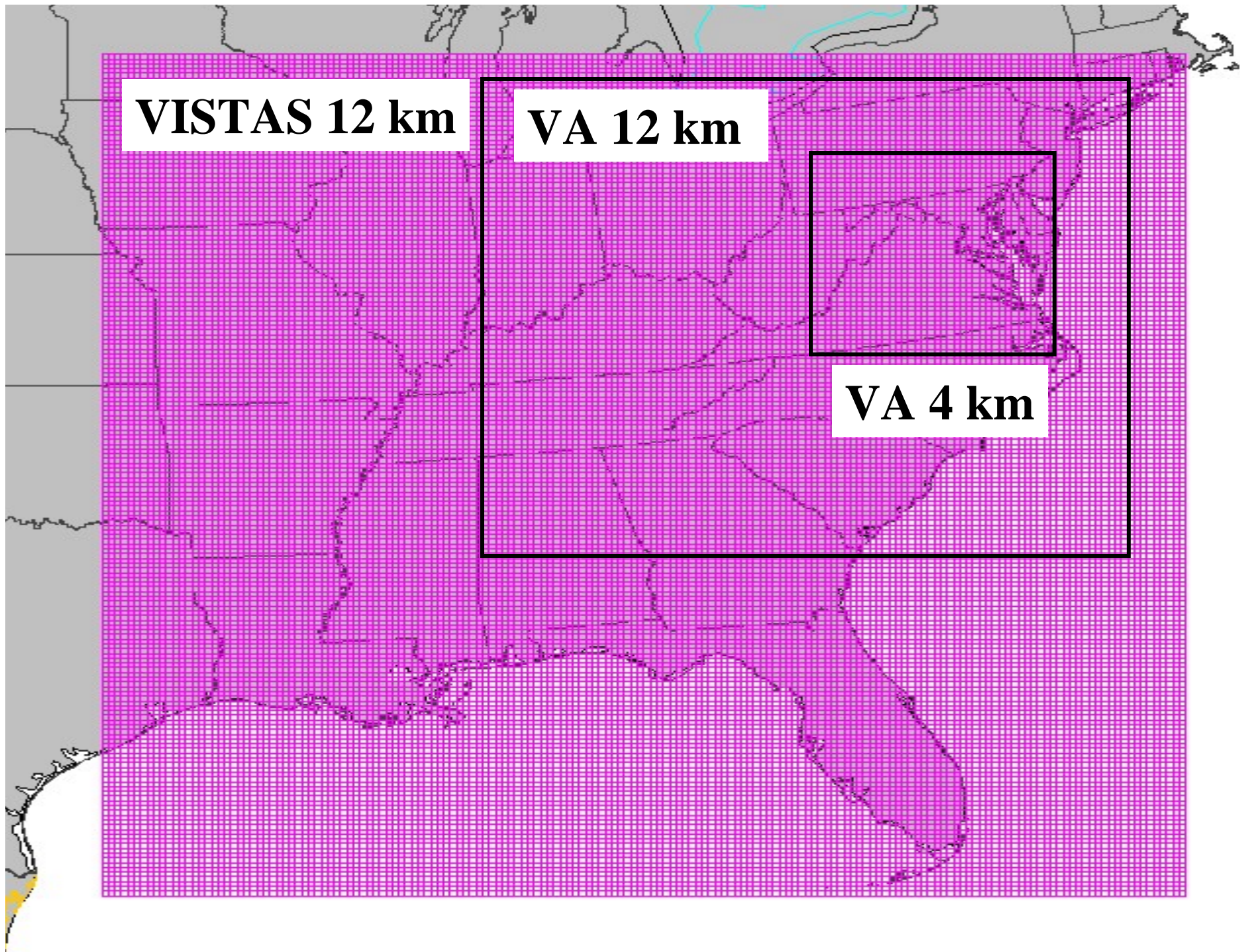


**VISTAS 12 km**

The image shows a map of the Southeastern United States, including parts of Virginia, North Carolina, South Carolina, and Georgia. A large purple grid covers the region from approximately 75°W to 80°W and 35°N to 33°N. Three nested rectangular boxes are overlaid on the map, each representing a different modeling domain. The outermost box is labeled 'VISTAS 12 km', the middle box is labeled 'ALGA 12 km', and the innermost box is labeled 'GA 4 km'. The map also shows state boundaries and major water bodies like the Atlantic Ocean and the Gulf of Mexico.

**ALGA 12 km**

**GA 4 km**



**VISTAS 12 km**

**VA 12 km**

**VA 4 km**

# Questions?



# Bugle Plot for Mike A.

