2009-10 IMPROVE Quality Assurance Activities

2011 IMPROVE Steering Committee Meeting

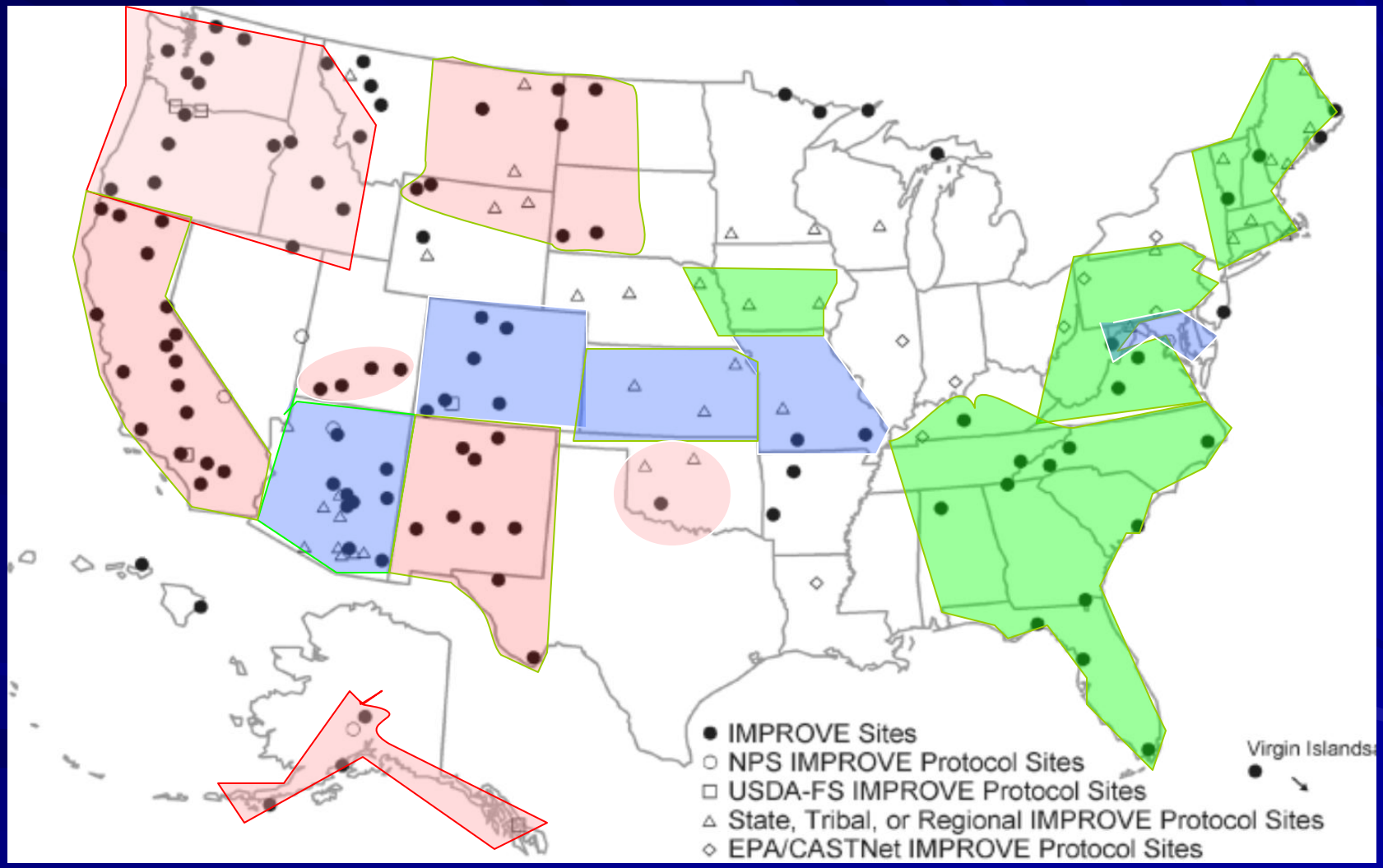
Frostburg, MD

October 26, 2011

Overview

- Field Audits in 2009-10?
- Significant Conclusions or findings
- Annual Performance Evaluation and Lab Technical System Results
- October 25 Training Course Outcomes

IMPROVE/IMPROVE Protocol Network Audit Coverage



Conclusions, Recommendations & Results

- **Still missing coverage in a couple of key states**
- **Audit Rate in 2010 held steady with 2009--33 vs 35.**
- **The incidence of calibration discrepancies and significant findings were in line with last 5 years but couple were serious meaning data loss.**
- **Procedure for providing auditors with site coefficients was pretty ragged but got much better in early 2011.**
- **A few of our auditors use old report forms which created small discrepancies—This has been addressed**
- **Actual results will be posted with SC minutes.**

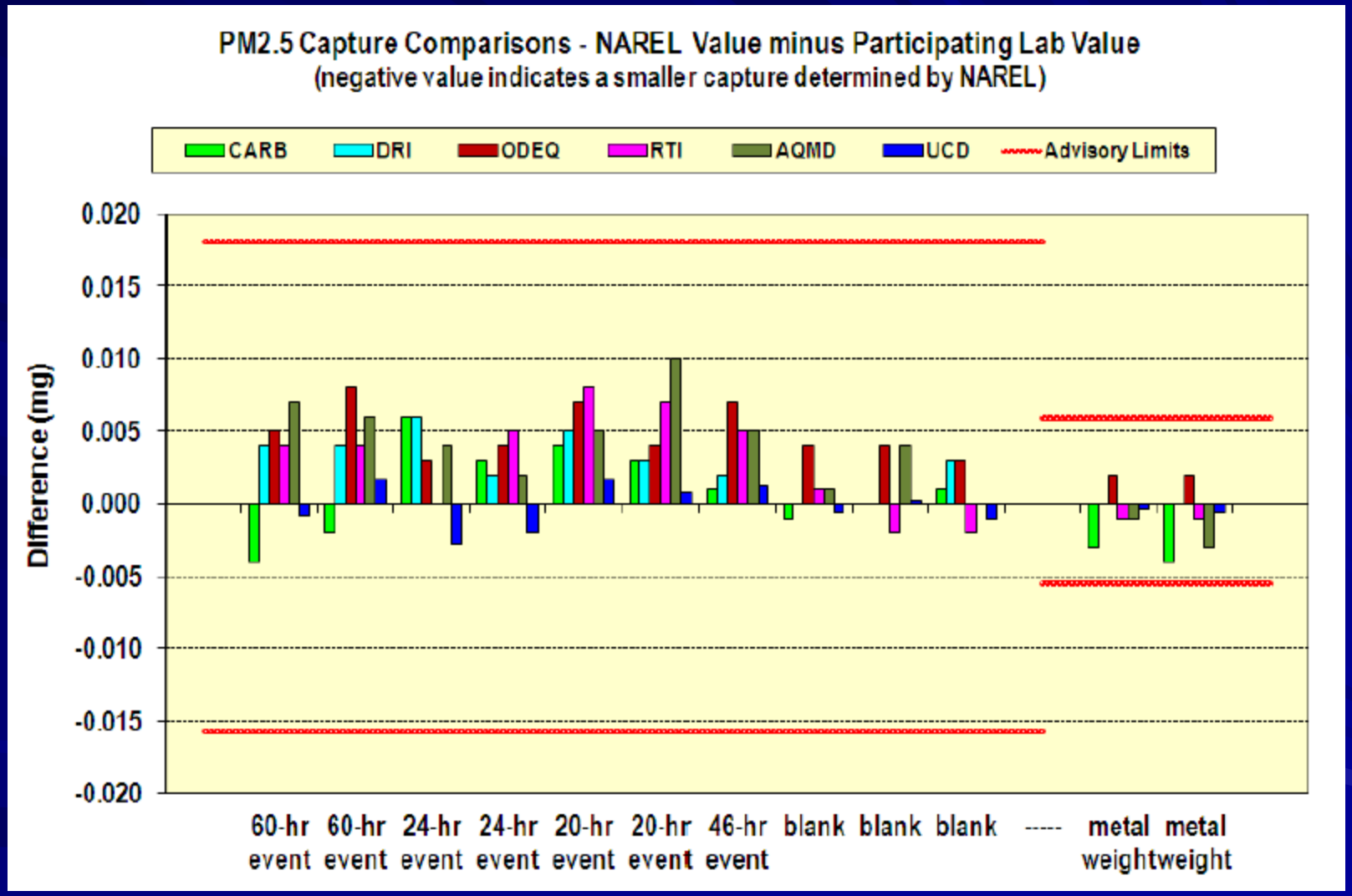
On-going Activities

- **Focus Auditors**
  - **Filter handling**
  - **Using correct coefficients and forms**
- **Review the equations for BP factor and Temperature in calibration**
- **Move training responsibilities to Regions**
- **We are developing a video to assisst**
- **Developing the QA web page**
- **Move toward more interpretation of audit data**
- **Develop methodology for challenging the IMPROVE data storage card**

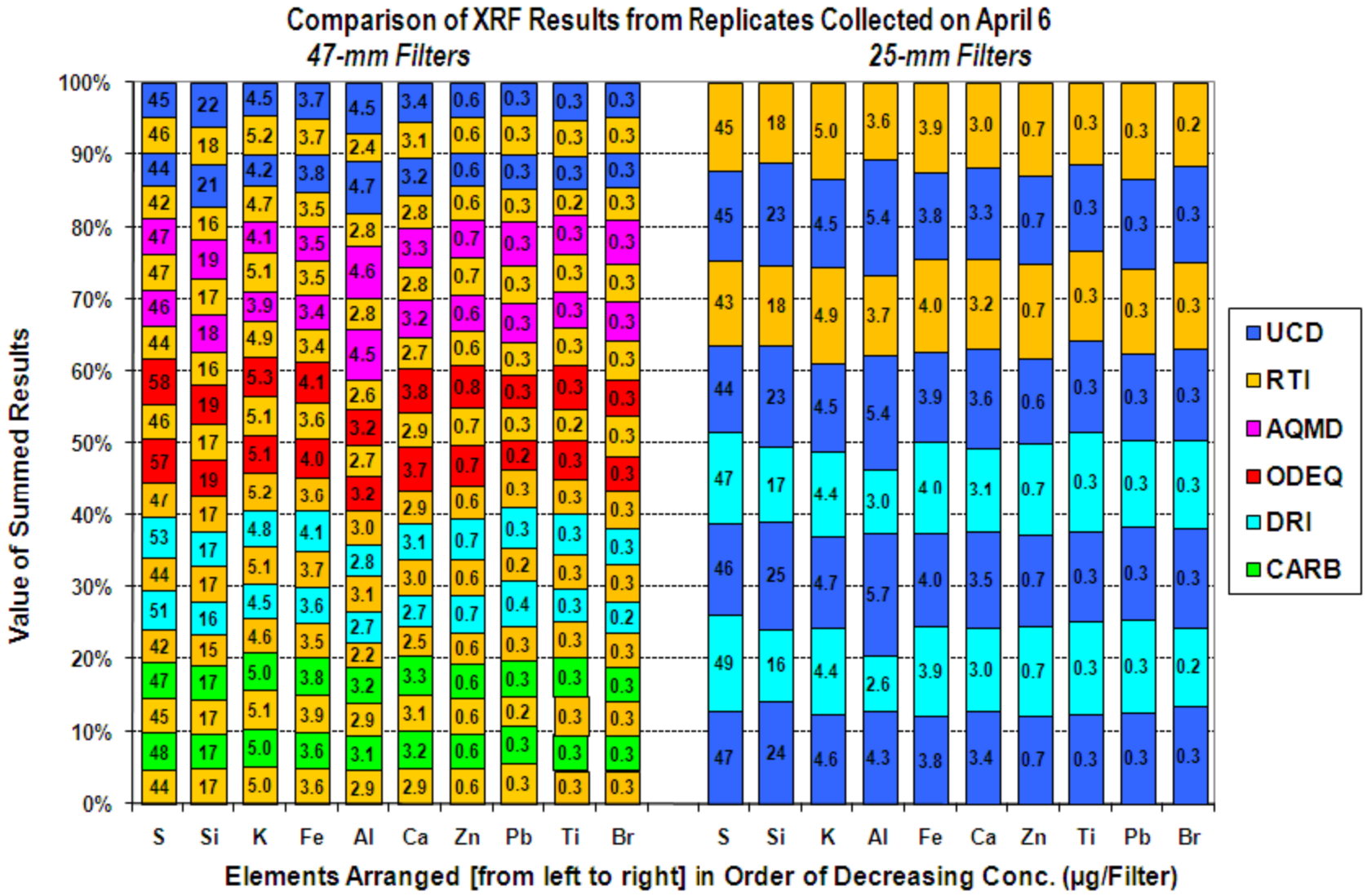
Round Robin Performance Evaluation and Lab Audits

Work by EPA, ORIA NAREL, Montgomery, AL

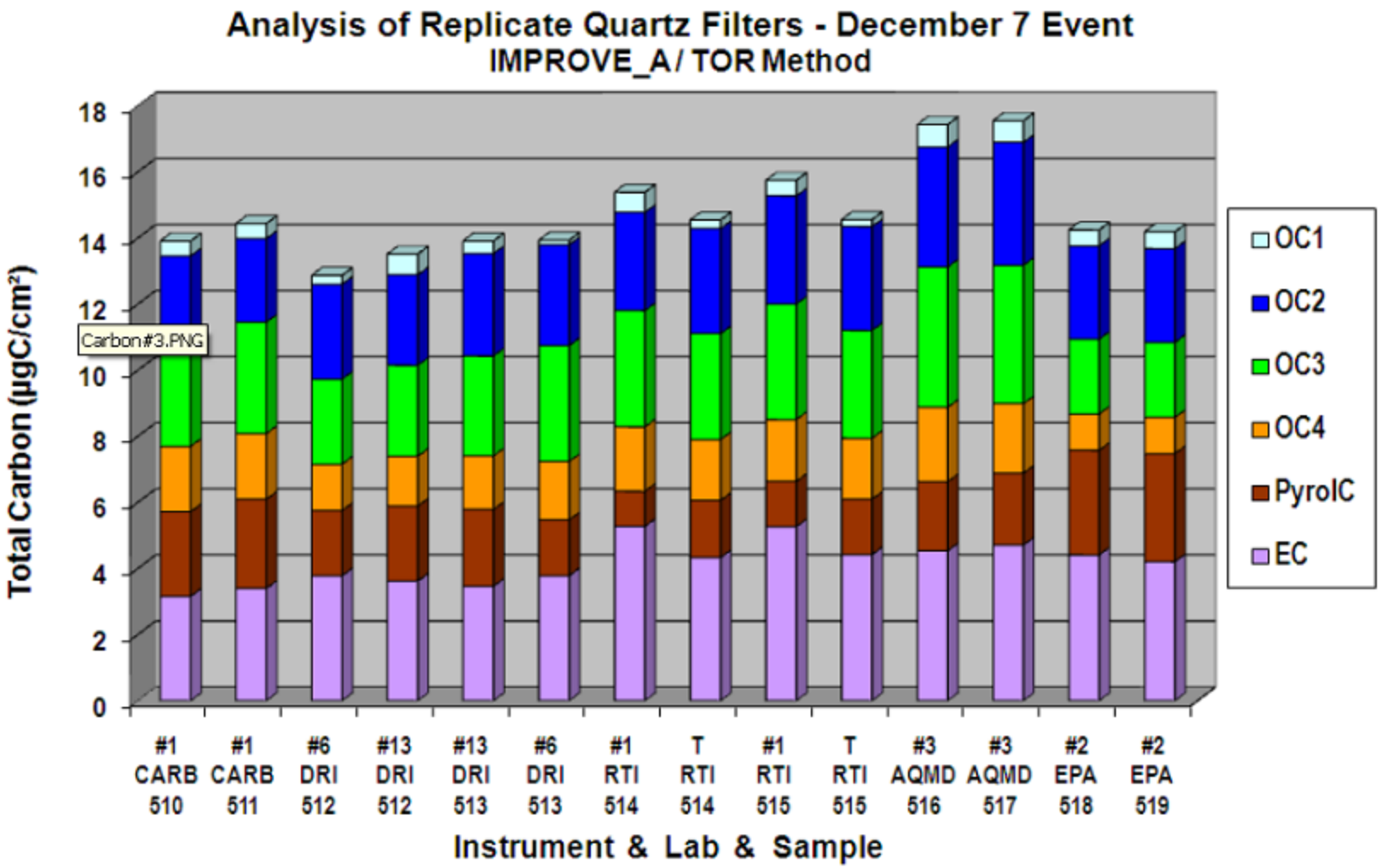
Inter-comparison Study – Gravimetric Mass



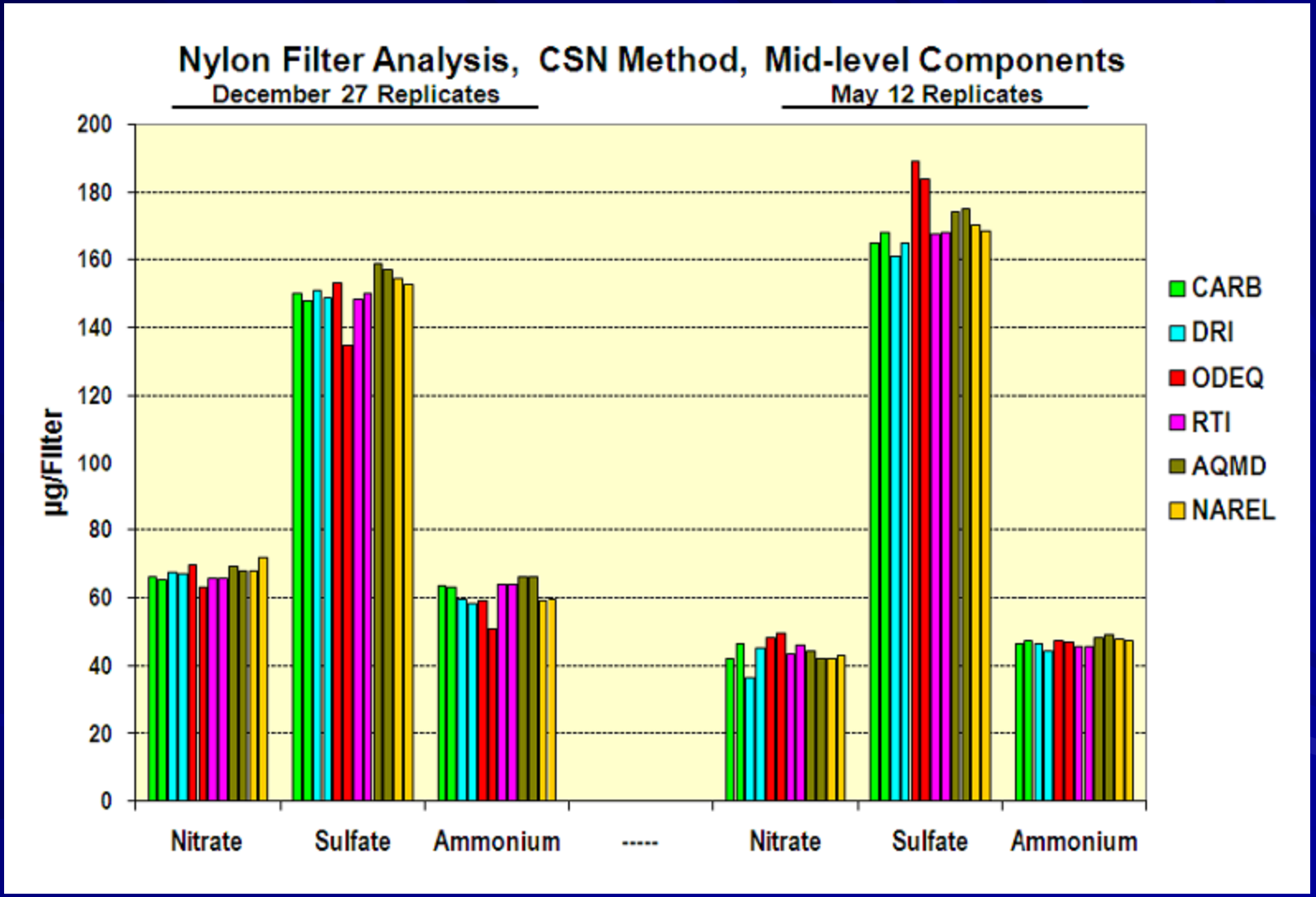
Inter-comparison Study – XRF



Inter-comparison Study – OC/EC



Inter-comparison Study – OC/EC



On-site Laboratory Audits (TSAs)

- Interviews with technical staff and supervisors
- Laboratory raw data examined
- Includes experimental activities
  - Single blind samples analyzed during audit
  - New filters randomly removed from laboratory stock for subsequent analysis at NAREL
  - Instrument calibration standards carried to NAREL for subsequent analysis at NAREL
- Lab audits currently performed every three years

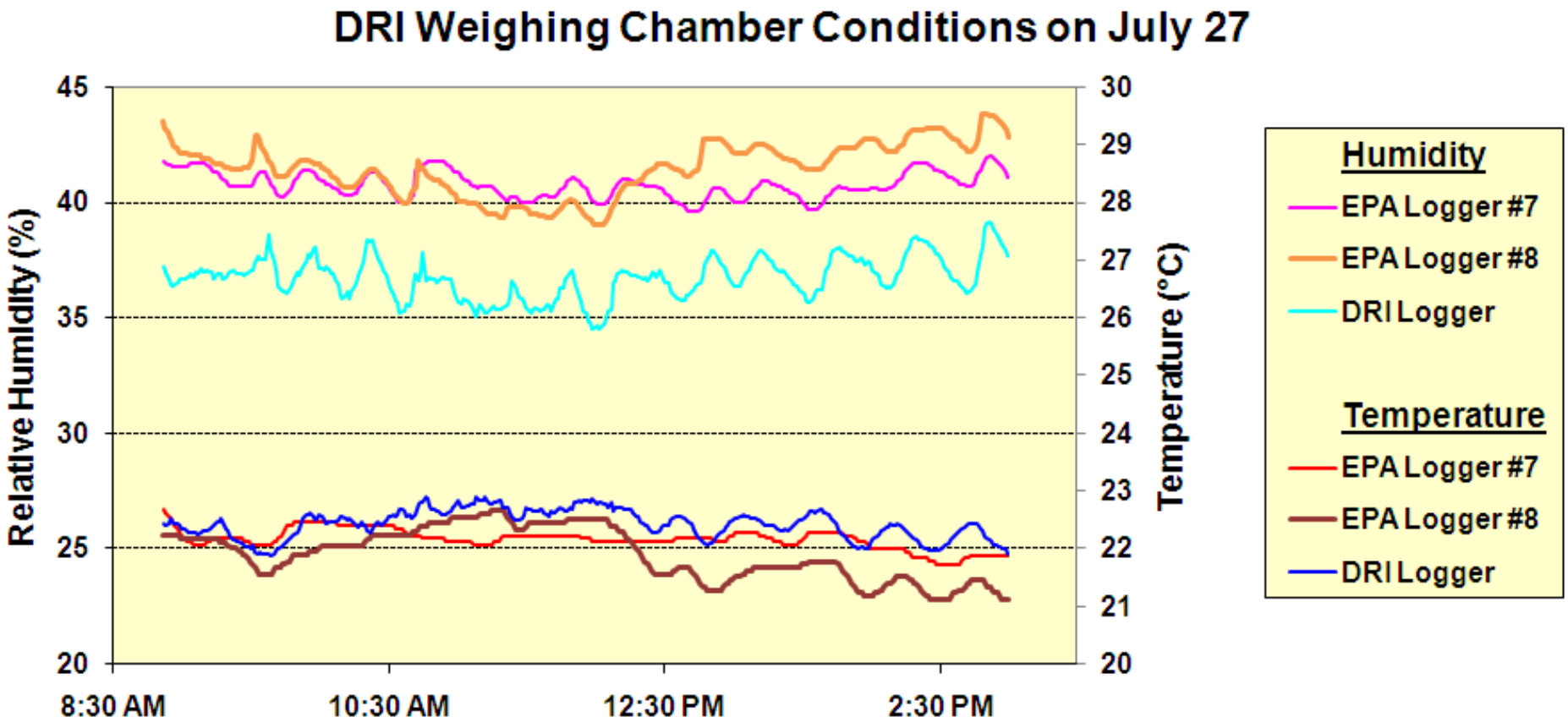


Figure shows reasonably good agreement among the loggers for temperature, but a small bias was observed for humidity.

Results from Gravimetric Demonstration

Sample ID	Sample Description	Conventional Mass (mg)			True Mass (mg)		
		NAREL	DRI	Difference	NAREL	DRI	Difference
MW10-13547	Metallic weight provided by NAREL	191.062	191.060	0.002	191.062	191.060	0.002
MW10-13548	Metallic weight provided by NAREL	96.353	96.351	0.002	96.353	96.351	0.002
T10-13549	Teflon® filter provided by NAREL	143.715	143.738	-0.023	143.867	143.864	0.003
T10-13550	Teflon® filter provided by NAREL	146.889	146.915	-0.026	147.044	147.044	0.000
T10-13551	Equilibrated Teflon® filter provided by DRI	146.406*	146.434	-0.028	146.559	146.562	-0.003
T10-13552	Equilibrated Teflon® filter provided by DRI	146.961*	146.982	-0.021	147.115	147.111	0.004
T10-13567	Teflon® filter removed from DRI stock	147.075*	147.098	-0.023	147.229	147.227	0.002
T10-13568	Teflon® filter removed from DRI stock	146.286*	146.306	-0.020	146.439	146.434	0.005

**This value was determined at NAREL a few days after the audit.*

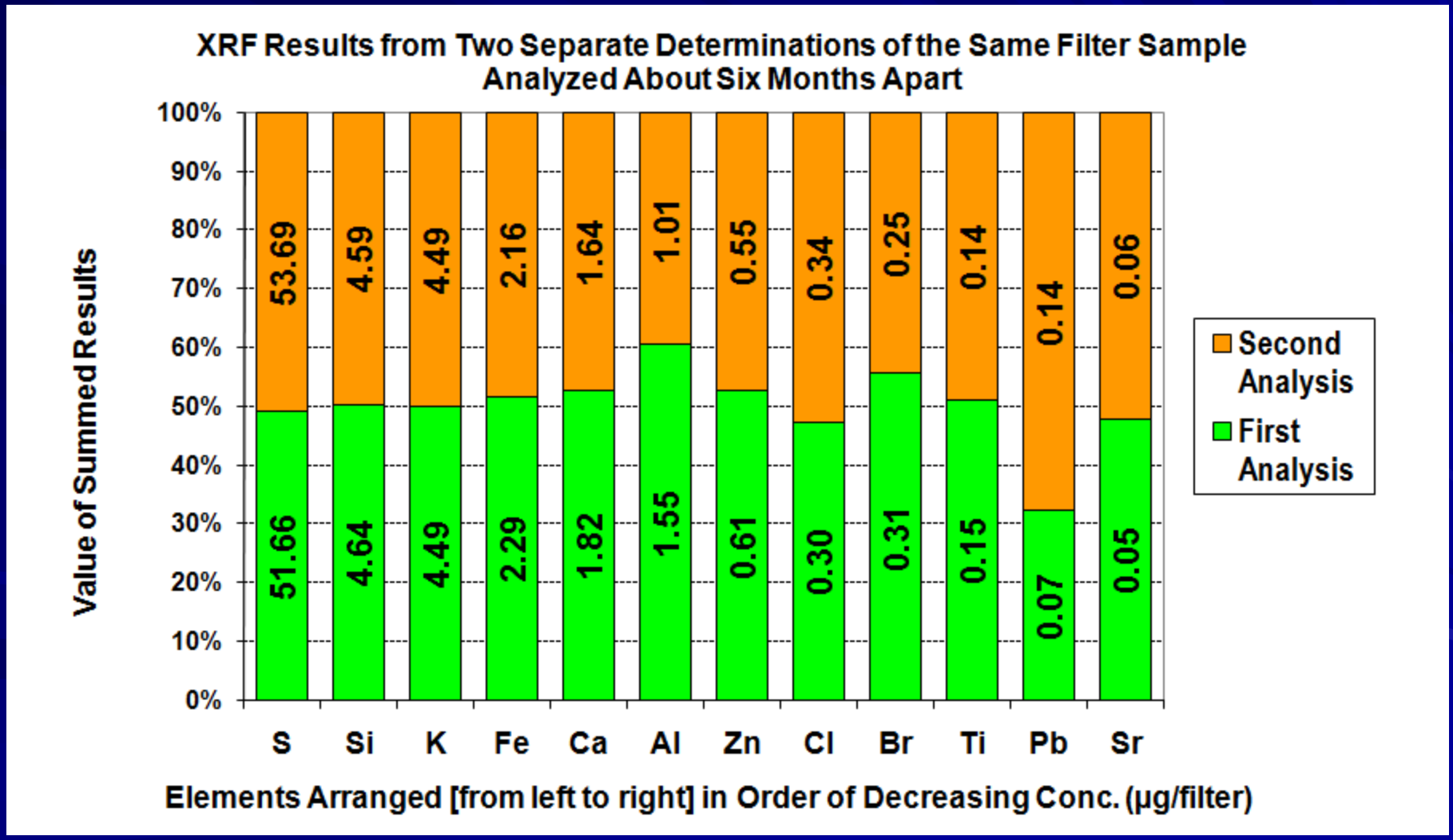
Demonstration of Anion and Cation Analysis During the Audit

Sample_ID	Sample Description	Parameter	Expected Value (ppm)	DRI Result (ppm)
SS10-13553	Anion solution provided by NAREL	Fluoride	1.00	1.04
		Chloride	1.00	0.94
		Nitrite	1.00	not reported
		Nitrate	2.00	2.09
		Sulfate	2.00	2.09
SS10-13554	Cation solution provided by NAREL	Lithium	0.25	0.29
		Sodium	1.00	1.03
		Ammonium	2.00	2.08
		Potassium	1.00	1.02
		Magnesium	1.00	1.01
		Calcium	5.00	5.09

DRI Calibration Standards Analyzed at NAREL After the Audit

Sample_ID	Sample Description	Parameter	Expected Value (ppm)	NAREL Result (ppm)
SS10-13555	Anion standard provided by DRI	Fluoride	1.00	0.95
		Chloride	1.00	1.00
		Nitrate	1.00	0.97
		Sulfate	1.00	0.97
SS10-13556	Cation standard provided by DRI	Lithium	1.00	0.84
		Sodium	1.00	0.98
		Ammonium	1.00	1.08
		Potassium	1.00	0.96
		Magnesium	1.00	1.00
		Calcium	1.00	1.04

Demonstration of XRF Analysis



Demonstration of Carbon Analysis

Sample ID	Sample Description	Carbon Fraction	Spike Level ($\mu g/cm^2$)	DRI Result ($\mu g/cm^2$)	NAREL Result ($\mu g/cm^2$)
Q10-13557	Blank Quartz	OC	0.00	0.20 ± 0.27	0.25 ± 0.21
		EC	0.00	0.00 ± 0.06	0.01 ± 0.20
Q10-13558	Spiked Quartz	OC	40.0	37.58 ± 3.05	39.21 ± 2.16
		EC	0.00	0.75 ± 0.06	0.51 ± 0.23

Final Reports for Laboratory Audits and Laboratory Inter-comparison Studies

http://www.epa.gov/ttn/amtic/pmspec.html