National Park Service Visibility Monitoring Network

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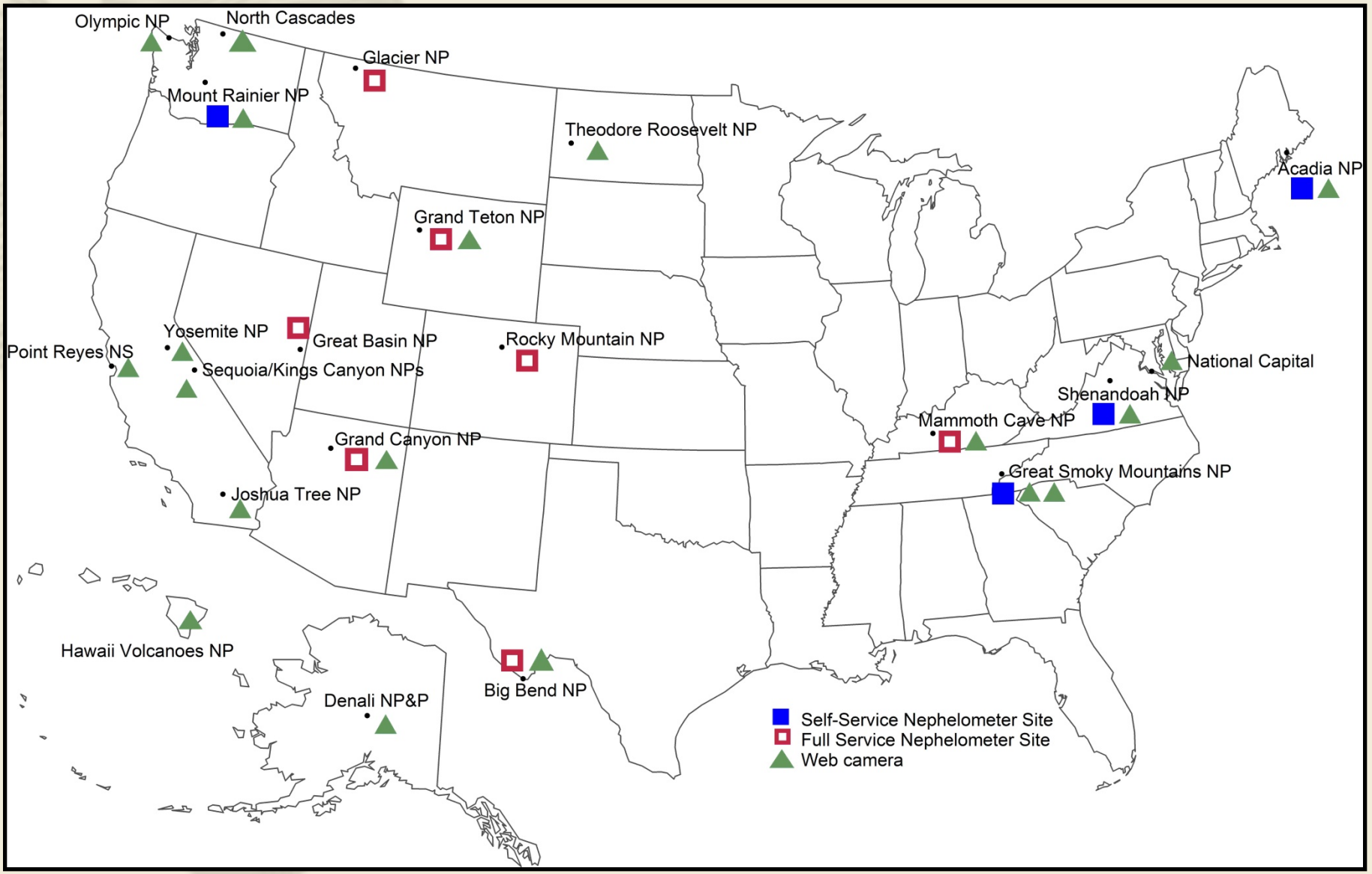
Nephelometer & Web Camera Locations

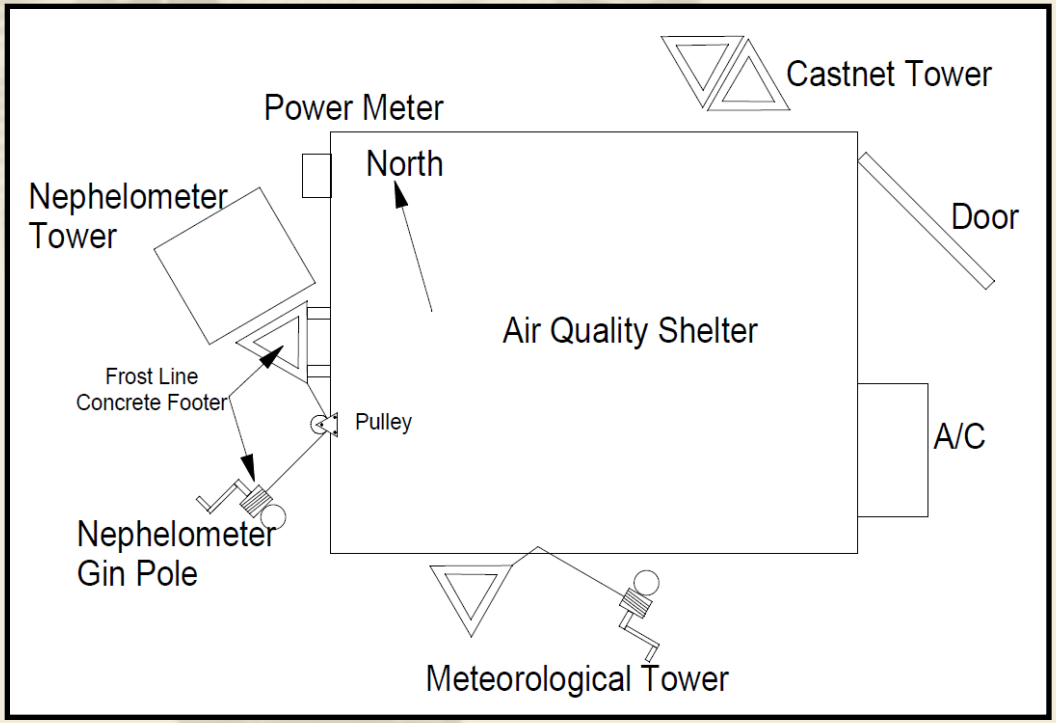


Neph Data Collection Statistics (Oct ’17 – Sep ‘18)

Site	Percent Data Collected
Acadia	98.5
Big Bend	89.8*
Glacier	97.0
Great Basin	97.8
Great Smoky Mountains	97.3
Grand Teton	97.3
Grand Canyon (Hance)	97.5
Mammoth Cave	99.0
Mount Rainier	100.0
Rocky Mountain	99.5
Shenandoah	95.0
* Multiple power outages	
Bridger Transmissometer	96.9

Neph Network Enhancements

- All cell modems have been upgraded to 4G due to the planned discontinuation of 3G by major carriers in late 2019
- Funding allowed us to build up 2 refurbished neph/datalogging systems using donated Arizona DEQ equipment
- Glacier will receive a tipping tower this month at the request of the park



Schematic for Glacier tipping tower with gin pole


Webcam Network
Aurora at Denali NP

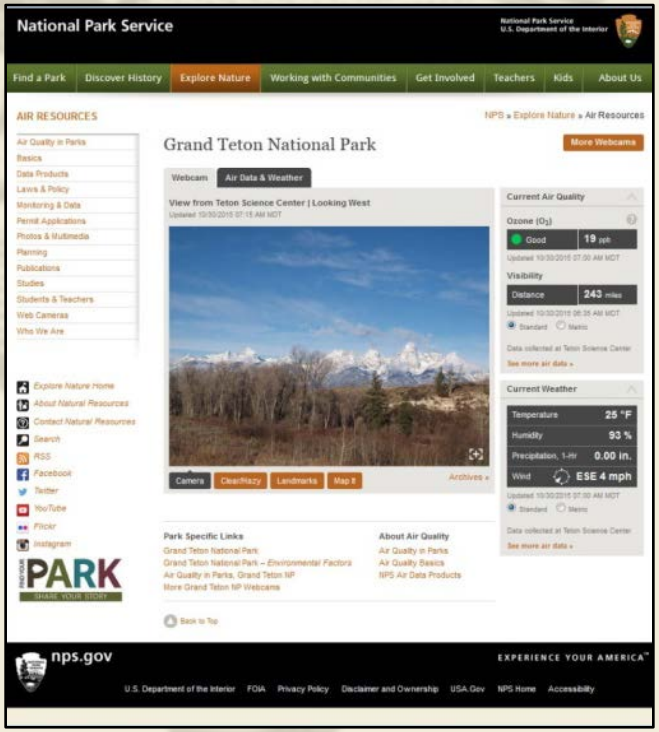
Webcams – Recent Work (1)

Top 5 camera sites:

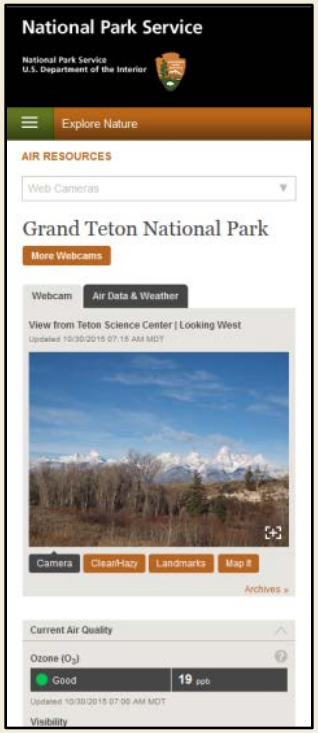
- Great Smoky Mtns NP - Look Rock
- Great Smoky Mtns NP - Purchase Knob
- Grand Canyon NP
- Shenandoah NP
- Point Reyes NS

> Network began in 1998 at Great Smoky Mountains National Park
20 years and running!

> Web site logs more than 8 million visits annually; > 40% from mobile devices



Website views
← Desktop and Mobile →



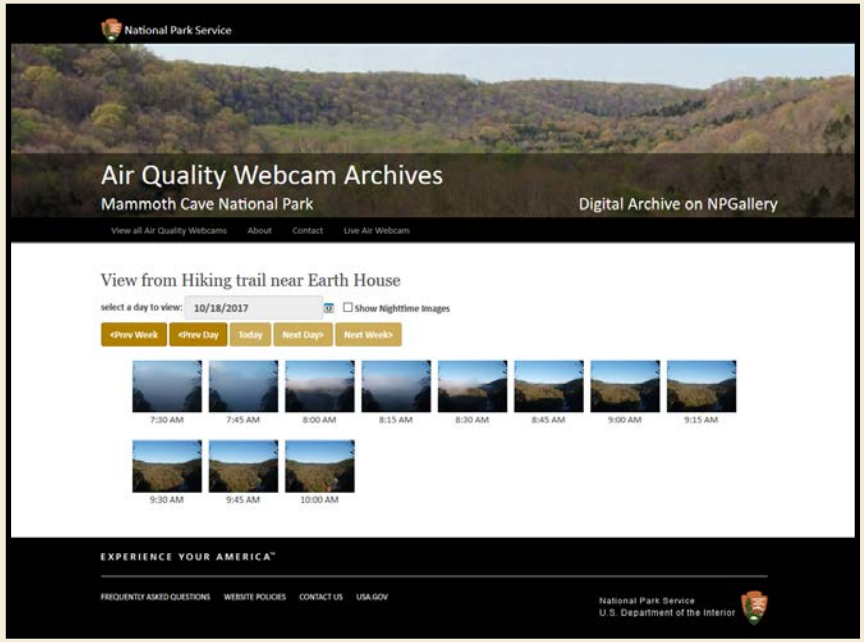
https://www.nps.gov/subjects/air/webcams.htm

Recent Work (2)

Web cam archive site >>>>>

- Standard resolution images added shortly following image capture
- High resolution images added twice annually

https://npgallery.nps.gov/AirWebCams/



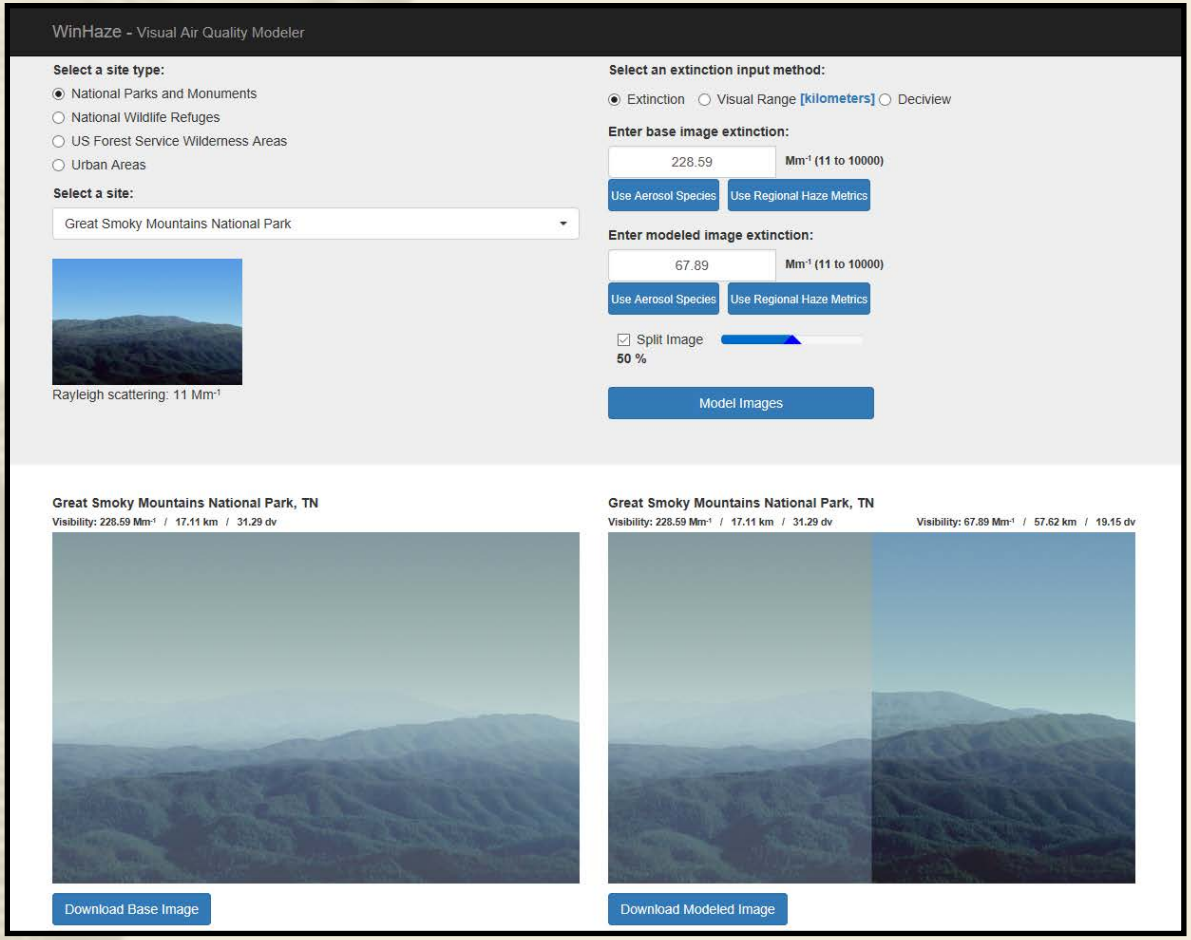
<<<<< Raw nephelometer data web site

- Near real time assessment of air quality during smoke events
- Visual Range and estimated PM2.5 concentration

https://www.air-resource.net/NPSnephdata/

WinHaze Web Site

- Replaces standalone PC WinHaze software developed by John Molenar
- Enter concentrations manually, use aerosol species , or use regional haze metrics
- Mobile friendly
- Work in 2018 focused on enhancing new image upload functionality



https://www.air-resource.net/winhazeweb/

ARS Involvement with the Western Regional Air Partnership (WRAP)

- Evaluation of IMPROVE data set
  - Work with Scott Copeland to document several Regional Haze data processes
  - Identify which WRAP IMPROVE sites have moved since the baseline period
  - Identify which WRAP site-years do not meet data completeness (years of interest are: 2008, 2011, 2013-16)
  - Prepare data substitutions for identified site-years, using statistical comparisons between recipient and selected donor sites

- Support Natual Conditions analyses
  - The WRAP Monitoring Data and Glide Path Subcommittee has this topic on their plate, but has not yet defined what ARS will do for them

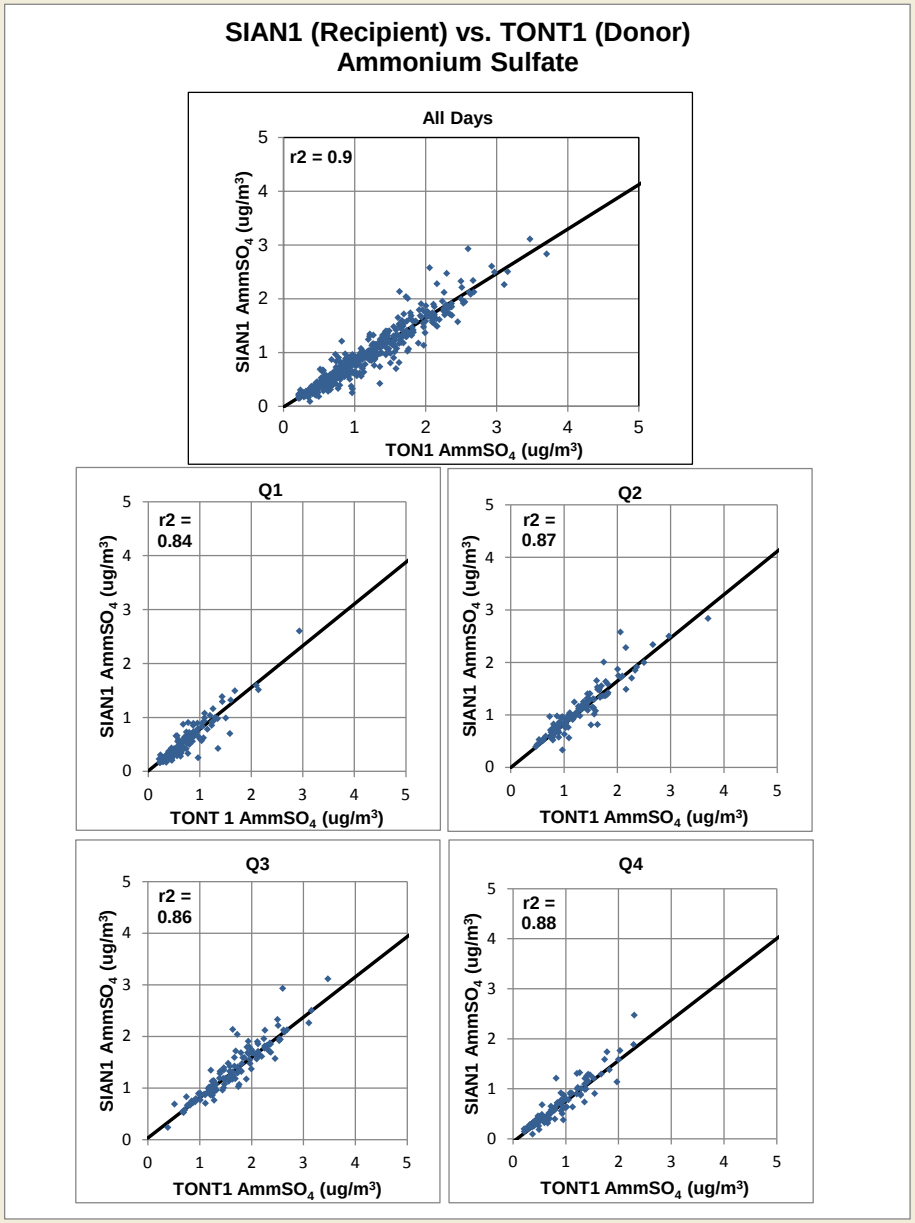
- Support Technical Support System (TSS) website version 2
  - Prepare documents for CIRA programmers to support coding the new Regional Haze metric on the TSS ver. 2

List of Incomplete Site Years

State	SiteCode	2008	2009	2010	2011	2012	2013	2014	2015	2016
AK	TUXE1	1	1	1	1	1	1	1		
AZ	BALD1	1	1	1		1	1	1	1	1
AZ	SAGU1	1	1	1		1	1	1	1	1
AZ	SIAN1	1	1	1		1	1			
AZ	SYCA1	1	1	1	1	1	1	1		
AZ	SYCA2									1
CA	PORE1	1	1	1	1	1	1	1	1	
CA	SAGA1	1				1	1	1	1	1
CA	TRIN1	1	1	1	1	1	1	1		
HI	HACR1	1	1	1	1	1		1	1	1
ID	SAWT1		1	1	1	1	1	1	1	1
MT	FOPE1	1	1	1		1	1	1	1	1
MT	GAMO1	1	1				1	1	1	1
MT	SULA1		1	1	1	1	1	1		1
ND	LOST1	1	1	1				1	1	1
NM	BOAP1	1	1	1	1	1	1		1	1
NM	GICL1	1	1	1		1	1	1	1	1
NM	SAPE1	1	1	1	1	1		1	1	1
NM	WHPE1		1		1	1	1	1		
OR	CRLA1	1	1	1	1	1		1	1	1
UT	BRCA1	1	1	1	1	1	1	1	1	
UT	ZICA1	1	1			1	1	1	1	1
WA	SNPA1	1	1	1	1	1		1	1	1
WA	SPOK1									
WY	NOAB1	1				1	1	1	1	1

Correlations: SIAN1 and Candidate Donor Sites

		TONT1	IKBA1	BALD1	PEFO1
AmmSO4	Slope=	0.83	0.89	1.01	1.07
	Intercept=	-0.01	0.06	0.10	0.01
	r2=	0.90	0.85	0.72	0.56
AmmNO3	Slope=	0.81	0.71	1.04	0.88
	Intercept=	-0.02	0.01	0.03	0.01
	r2=	0.66	0.46	0.40	0.35
EC	Slope=	0.76	0.78	0.41	0.38
	Intercept=	0.03	0.04	0.08	0.05
	r2=	0.04	0.05	0.00	0.08
OC	Slope=	0.78	0.79	0.44	0.67
	Intercept=	0.15	0.19	0.38	0.27
	r2=	0.04	0.05	0.00	0.08
SOIL	Slope=	0.73	0.85	1.07	0.88
	Intercept=	-0.01	-0.04	0.11	0.01
	r2=	0.72	0.54	0.66	0.56
CM	Slope=	0.61	0.77	0.98	0.69
	Intercept=	0.24	0.57	0.99	0.92
	r2=	0.65	0.38	0.42	0.35
SeaSalt	Slope=	0.65	0.65	1.17	1.12
	Intercept=	0.00	0.01	0.02	0.01
	r2=	0.87	0.82	0.53	0.86




Questions?
Kilauea light show at Hawaii Volcanoes NP