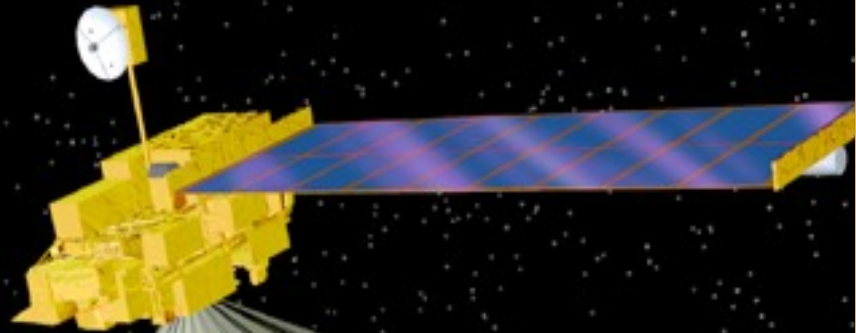




ARCTAS
Spring & Summer
2008



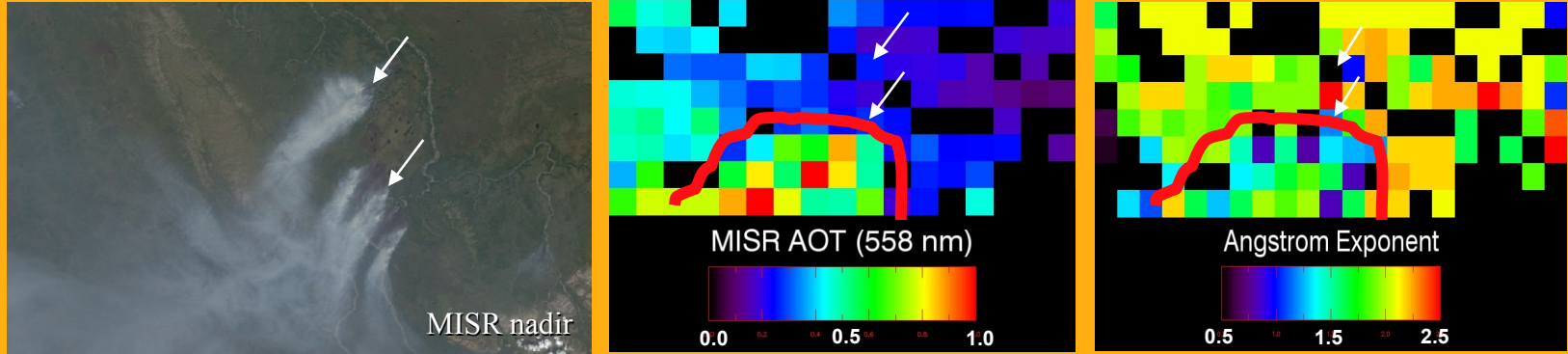
Ralph Kahn
NASA Goddard Space Flight Center
and the MISR Team
JPL/Caltech, GSFC, UIUC

MISR ARCTAS Campaign Goals

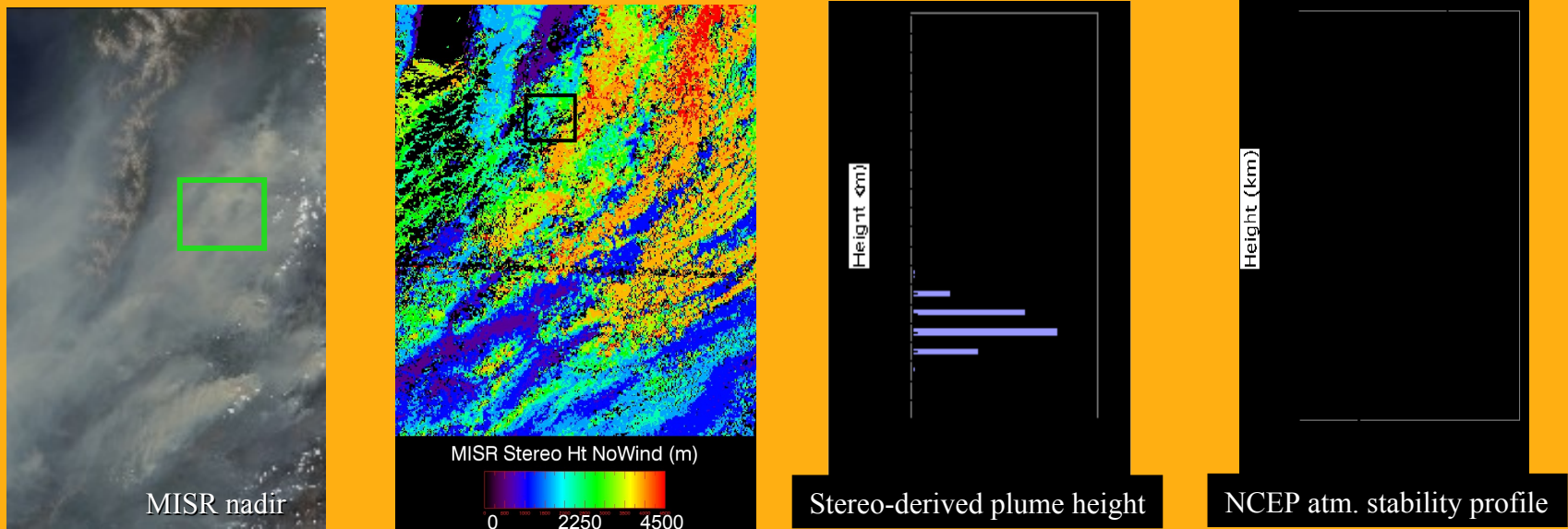
- *Contribute* MISR maps of ***Boreal Fire Plume Height***, **Optical Depth**, and **Smoke Type**
- *Quantify* MISR's ability to retrieve ***Aerosol Optical Depth*** over **Snow and Ice** (aerosol *validation*)
- *Contribute* MISR maps of high-latitude ***Aerosol Optical Depth***, ***Air Mass Type & Extent***, as much as possible
- *Contribute* MISR multi-angle maps of high-latitude ***Surface Structure***
- ***Work Collaboratively*** to realize the Aerosol Transport and Aerosol Forcing campaign goals

MISR maps of Boreal Fire Plume Height, Optical Depth, and Smoke Type

Alaska Wildfire July 02, 2004

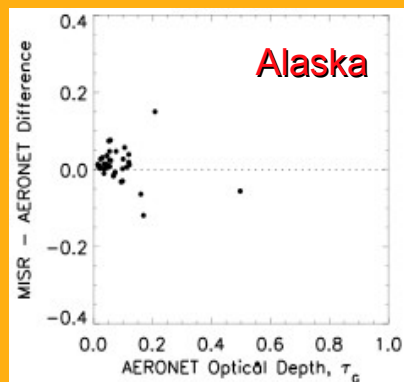


Siberian Wildfire June 11, 2003

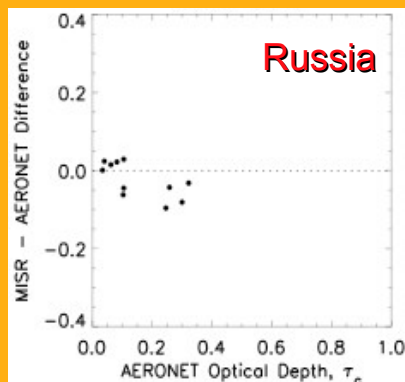


Validate MISR Aerosol Optical Depth Retrievals over Boreal Surfaces

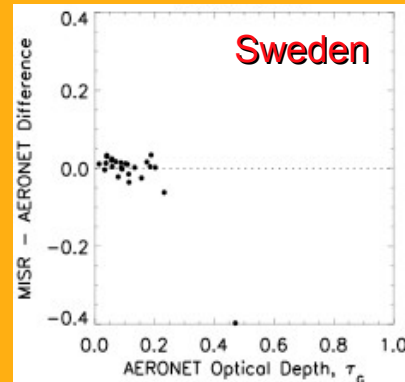
[MISR Green band - AERONET Comparisons]



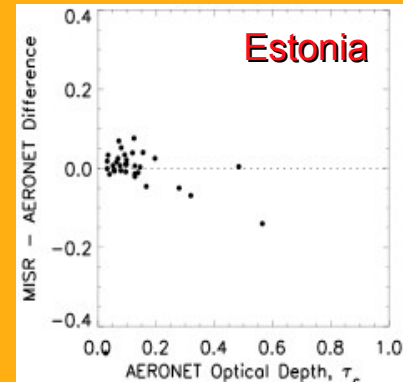
Alaska
Bonanza Crk (64.7, -148.3)
7 years, 40 coincidences



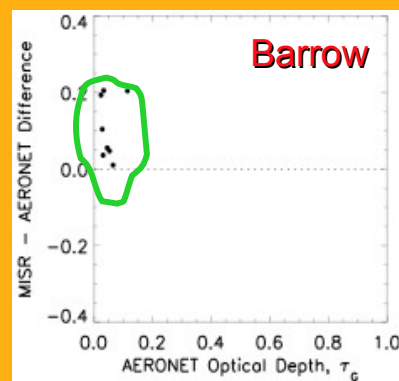
Russia
Yakutsk Ru (61.7, 129.4)
3 years, 12 coincidences



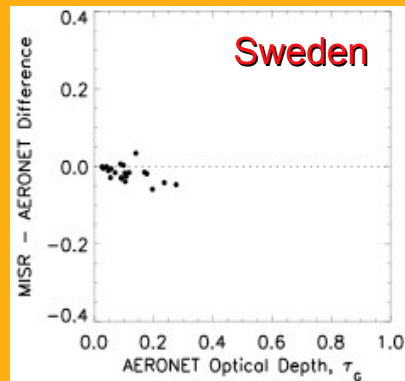
Sweden
SMHI Swdn (58.6, 16.2)
3 years, 25 coincidences



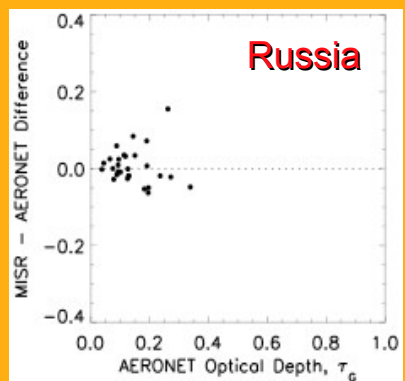
Estonia
Toravere Estna (58.3, 26.5)
5 years, 34 coincidences



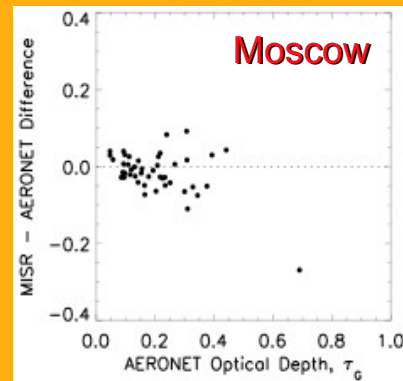
Barrow
Barrow AK (71.3, -156.7)
5 years, 8 coincidences



Sweden
Gotland Swdn (57.9, 19.0)
3 years, 21 coincidences



Russia
Tomsk Ru (56.5, 85.1.7)
5 years, 29 coincidences

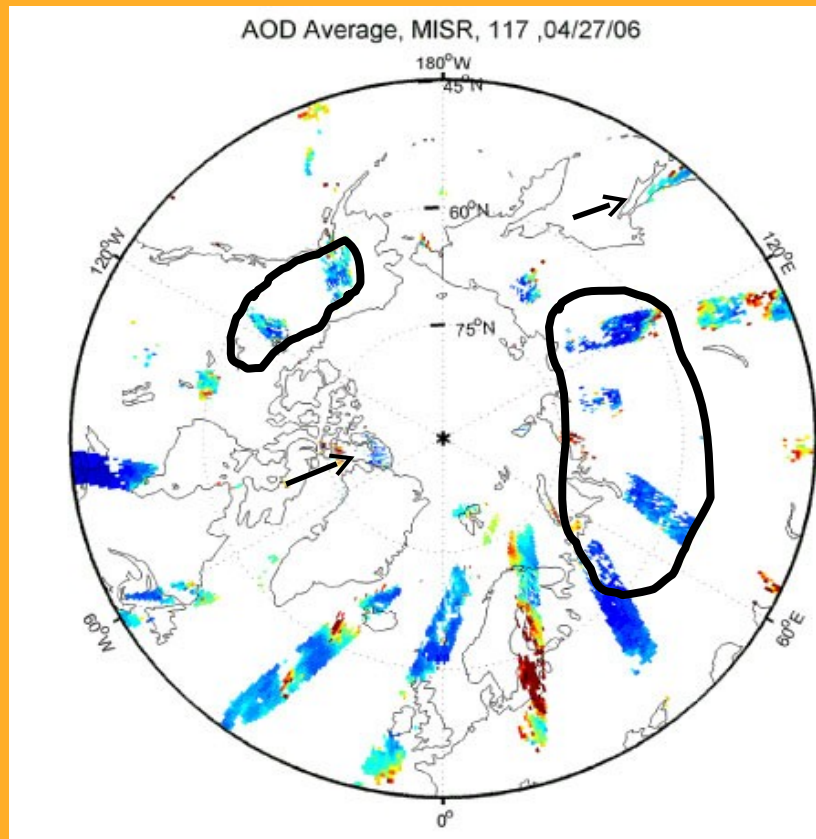


Moscow
Moscow Ru (55.7, 37.5)
6 years, 46 coincidences

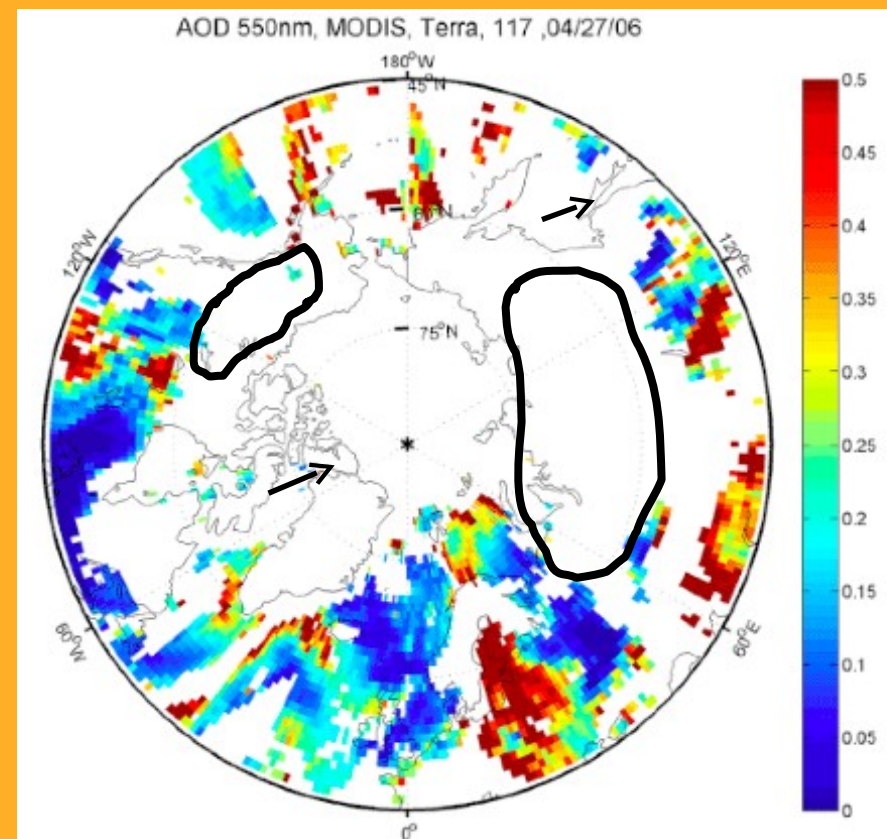
- Mid-visible **AOT's are generally <0.4**, and most are $<\sim 0.2$
- Most AERONET sites are **snow-free** during operation; **only one site** exists from 61°N to 69°N
- **67%** of coincident cases have no MISR or AERONET retrieval -- **probably cloudy**
- At latitudes **above around 70°N**, **low sun angle** is an issue

MISR & MODIS High-latitude Aerosol Optical Depth Maps

Single-day mid-visible AOT observations *April 27, 2006*



MISR



MODIS

Complementary Observations:

MODIS provides large-swath **Coverage**

MISR fills in cloud-free **Continents, Nadir Glint** over water, some **Snow surfaces**

Operational Considerations

In my view, the MISR science goals can be achieved only as collaborative efforts

- Aerosol *Transport* & Direct *Radiative Forcing* at High Latitudes
 - Coincident measurements of *aerosol vertical distribution & SSA*
 - Collaborations with *aerosol transport modeling*, using MISR data as constraints
- Aerosol Optical Depth and Type *Validation* over snow & ice
 - Coincident field measurements: *AOD*, aerosol *vertical distribution* & *height-resolved type* (layer-by-layer aerosol characterization)
 - Coincident measurements of *surface albedo or BRDF*
- *Ice-albedo* Feedback
 - Coincident *surface* measurements of *surface albedo and structure*
 - Coincident *aircraft* measurements of *surface albedo* and *BRDF*
- *Frequent Cloud Cover*, but there are *also Frequent MISR Observations*
To take advantage of flight opportunities, need:
 - *Multiple flight plan options* in advance for each flight
 - Good *Multi-platform in-flight communication*