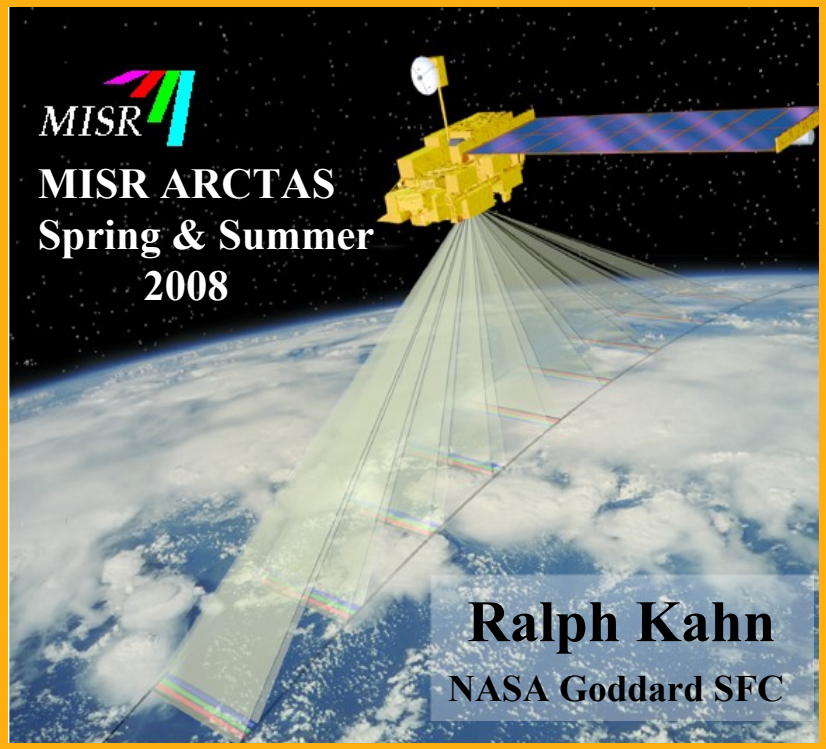
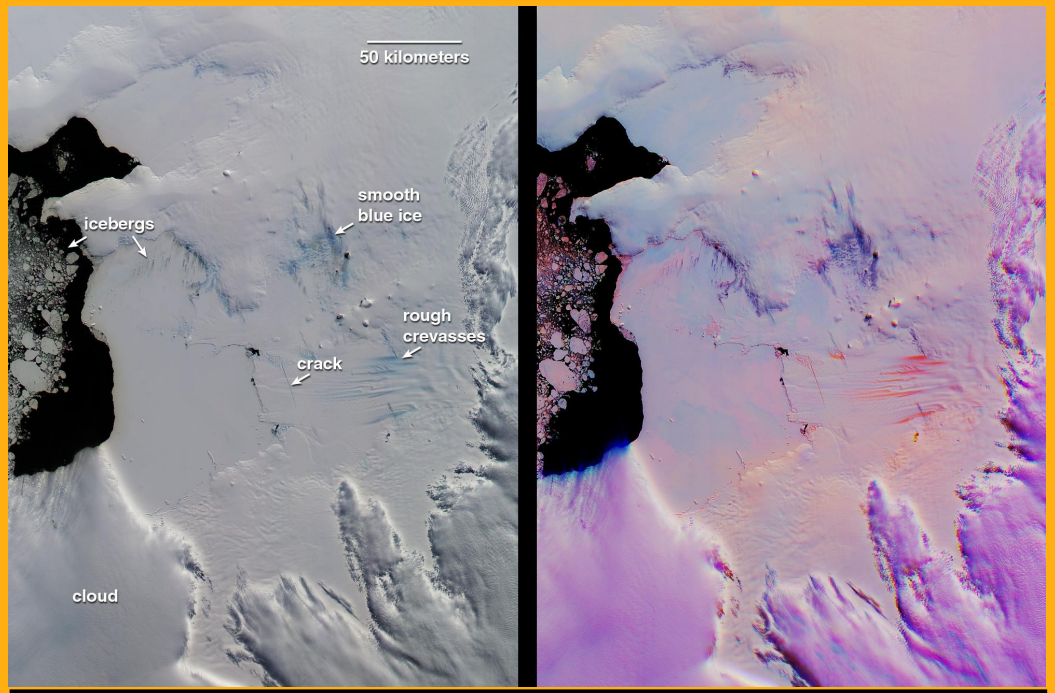




Pine Island Glacier, Antarctica December 12, 2000
MISR nadir and three-angle red-band composite
Surface structure & cloud identified by angular scattering differences

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**
- 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

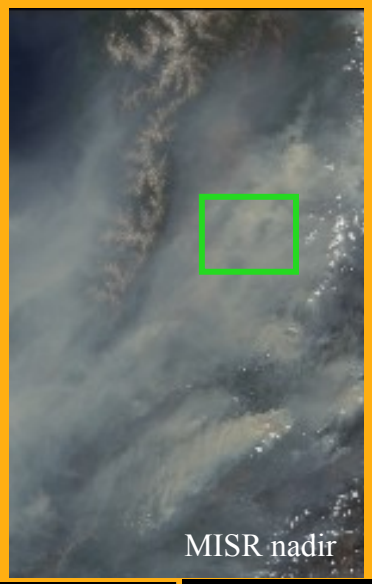
MISR Will Measure:

- **Boreal fire plume height**, aerosol optical depth, smoke type
- High-latitude **aerosol optical depth, air mass type & extent**, as much as possible
- Multi-angle maps of high-latitude **surface structure**

MISR Data Availability and Constraints

- **Daylight** only, up to **82°** latitude (Platform: Terra Satellite)
- Approximately **48-hour** latency for MISR data delivery
- Frequent coverage, thanks to polar orbit: ~ **Once every two days**
- No surface or aerosol retrievals in the presence of **cloud** (most serious in summer)
- AOD and aerosol type **retrieval uncertainty unknown** over snow & ice, low sun, low AOD (Quantifying this is a MISR goal for the campaign)

MISR ARCTAS **Web Site**:
http://eosweb.larc.nasa.gov/PRODUCTS/misr/arctas/table_arctas.html



Siberian Wildfire June 11, 2003
MISR image & stereo-derived plume height
+ NCEP atmospheric stability profile

MISR Data Will Contribute To:

- **Poleward transport** studies of smoke, pollution, and other aerosols
- Aerosol **direct radiative forcing** calculations, with AOD, aerosol type, & surface type maps
- **Ice-albedo feedback**, by providing regional surface type maps to modelers

Operational Considerations

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

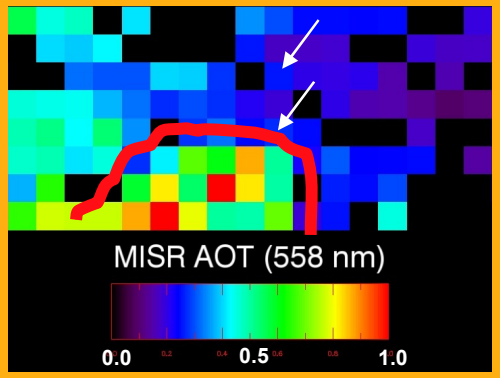
- **Aerosol *Transport* & Direct *Radiative Forcing* at High Latitudes**
  - ***Coincident measurements*** of ***aerosol vertical distribution & SSA***
  - ***Collaborations*** with ***aerosol transport modeling***, using MISR data as constraints
- **Aerosol Optical Depth and Type *Validation* over snow & ice**
  - ***Coincident field measurements***: ***AOD***, aerosol ***vertical distribution*** & ***height-resolved type*** (layer-by-layer aerosol characterization)
  - ***Coincident measurements*** of ***surface albdeo 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***

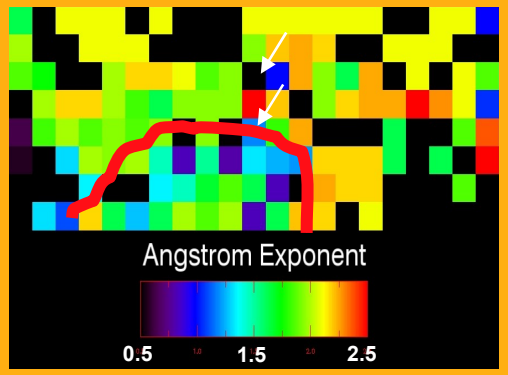
  To take advantage of flight opportunities, need:
  - ***Multiple flight plan options*** in advance for each flight
  - Good ***Multi-platform in-flight communication***

Backup Slides

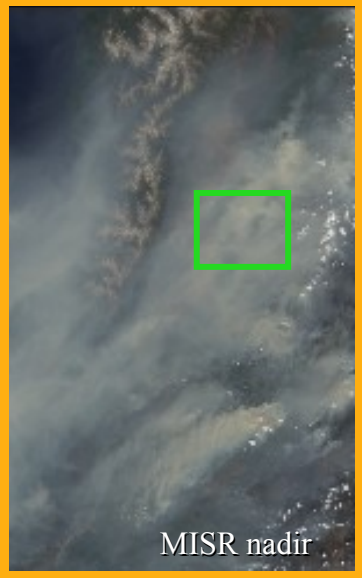
MISR maps of Boreal Fire Plume Height, Optical Depth, and Smoke Type

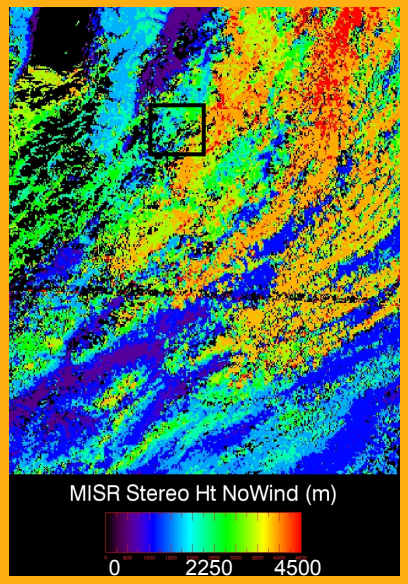
Alaska Wildfire July 02, 2004

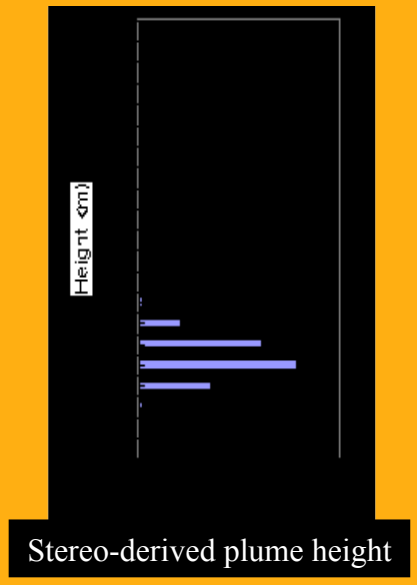


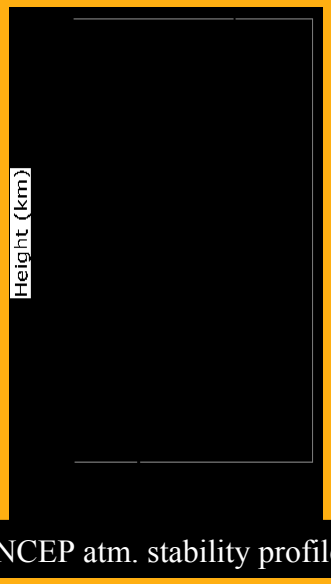


Siberian Wildfire June 11, 2003



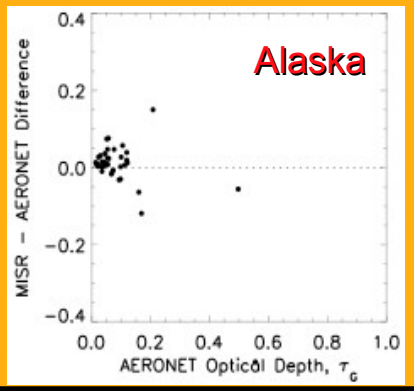




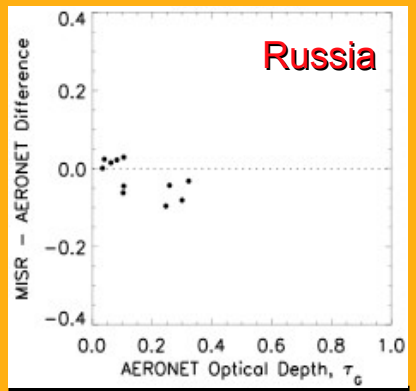


Validate MISR Aerosol Optical Depth Retrievals over Boreal Surfaces

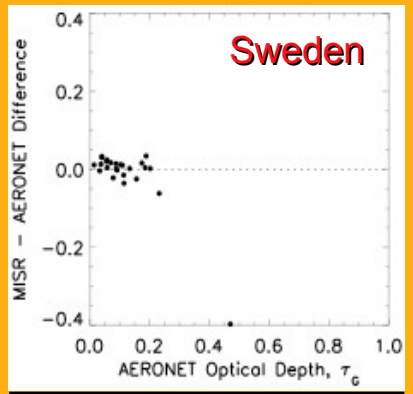
[MISR Green band - AERONET Comparisons]



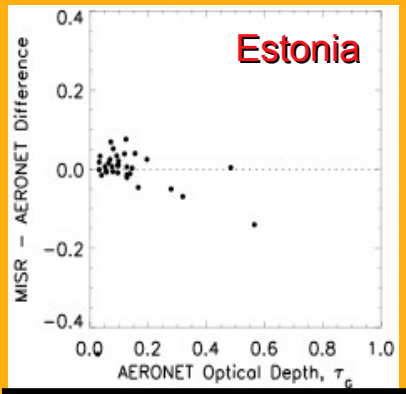
Bonanza Crk (64.7, -148.3)
7 years, 40 coincidences



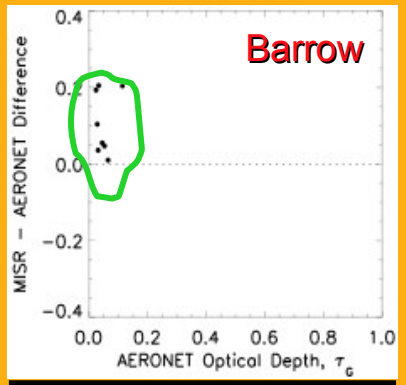
Yakutsk Ru (61.7, 129.4)
3 years, 12 coincidences



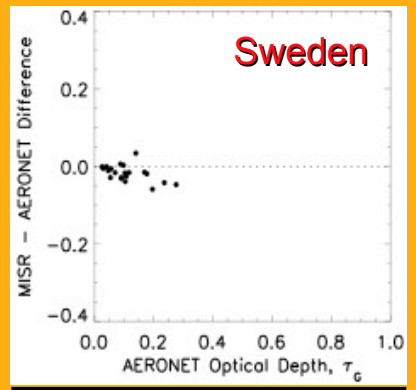
SMHI Swdn (58.6, 16.2)
3 years, 25 coincidences



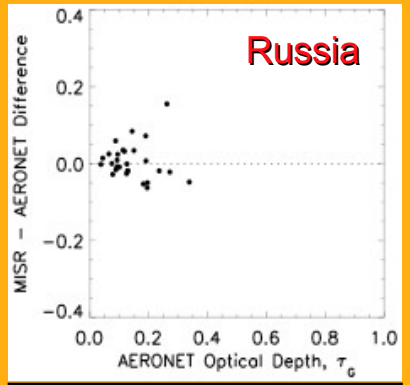
Toravere Estna (58.3, 26.5)
5 years, 34 coincidences



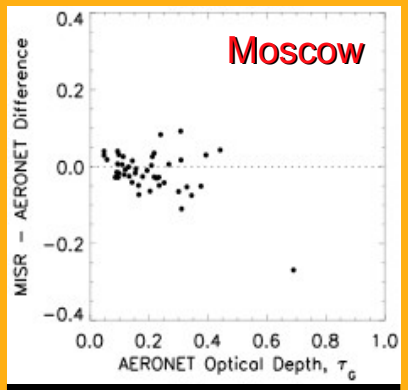
Barrow AK (71.3, -156.7)
5 years, 8 coincidences



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



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



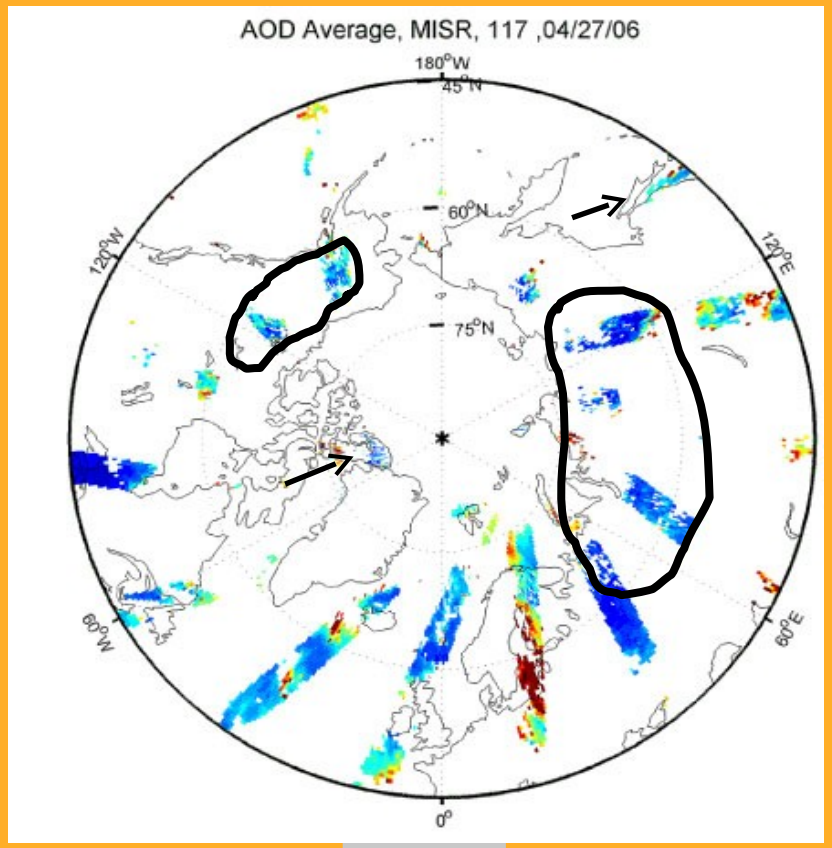
Moscow Ru (55.7, 37.5)
6 years, 46 coincidences

- Mid-visible **AOT's are generally <0.4**, and most are <~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

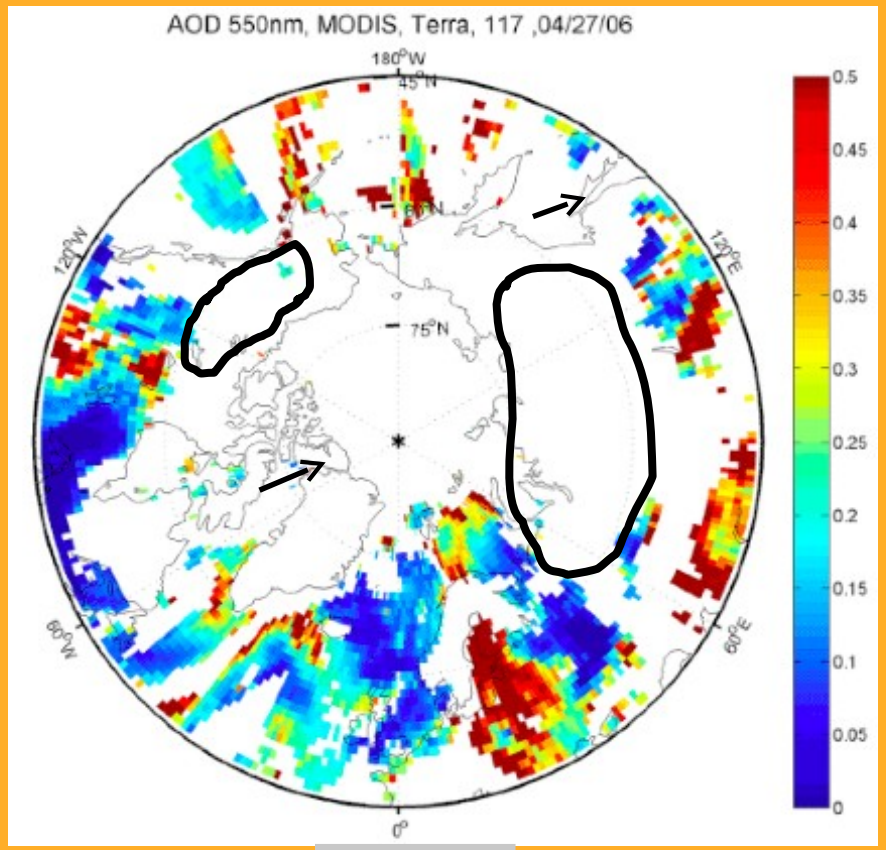
From B. Gaitley & R. Kahn

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**

Data mapped by J. Redemann