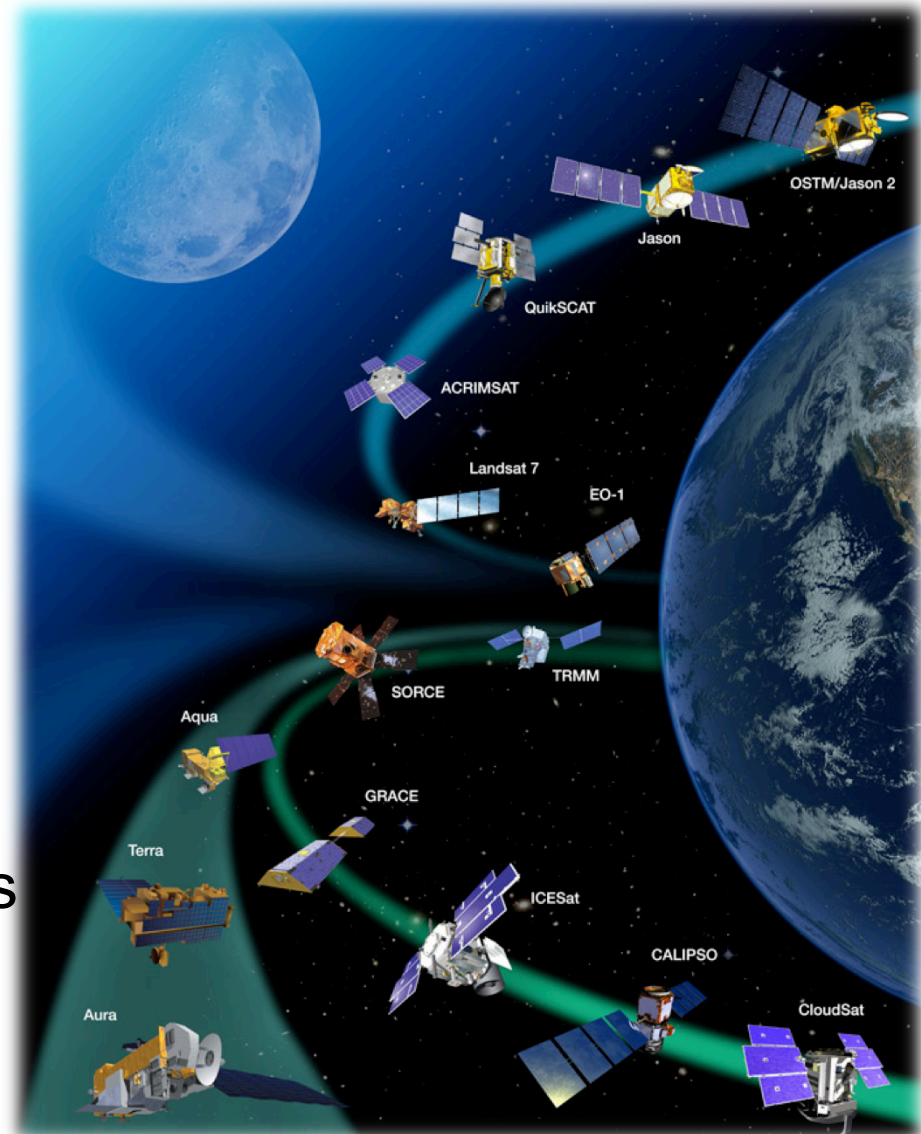


NASA Satellite Observations in Support of Regional Climate Change Research

Cristina Milesi

Ecological Forecasting Lab
CSU Monterey Bay / NASA Ames
Research Center



NASA Earth Science

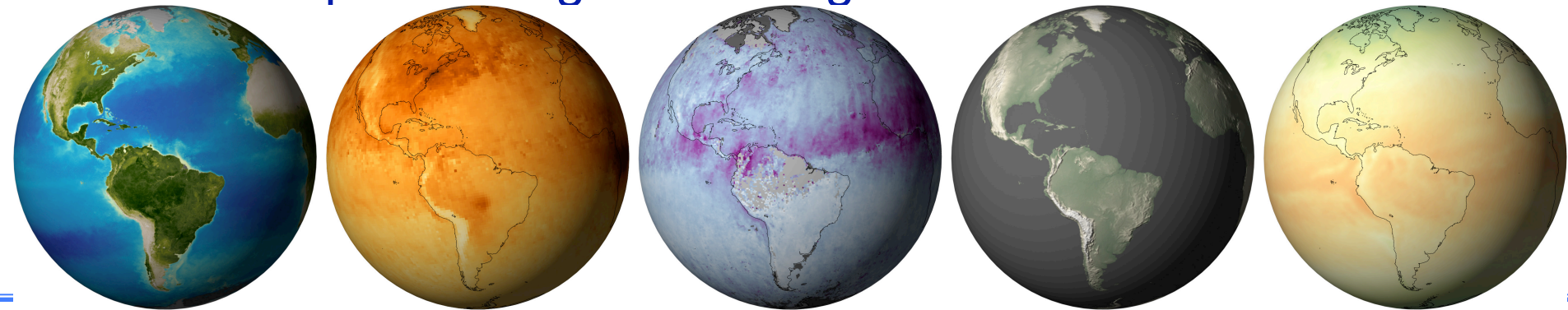
BIG Questions

- How is the global Earth System changing?

What are the sources of change in the Earth system and their magnitudes and trends?

- How will the Earth system change in the future?

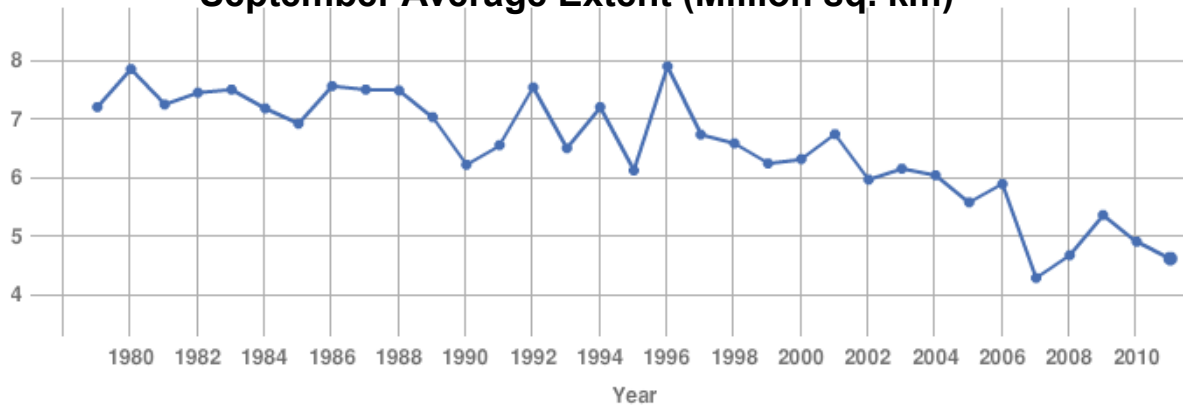
How can the Earth system science improve mitigation of and adaptation to global change?



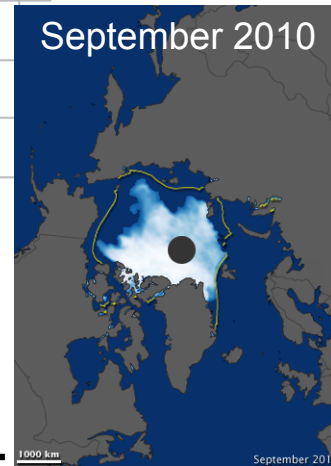
Arctic Sea Ice

September Arctic sea ice is declining at a rate of 11.5 percent per decade, relative to the 1979 to 2000 average

September Average Extent (Million sq. km)



Source: JPL Global Climate Change



Source: NASA Earth Observatory

NASA missions that help monitor sea ice:
Grace • Terra • IceSAT

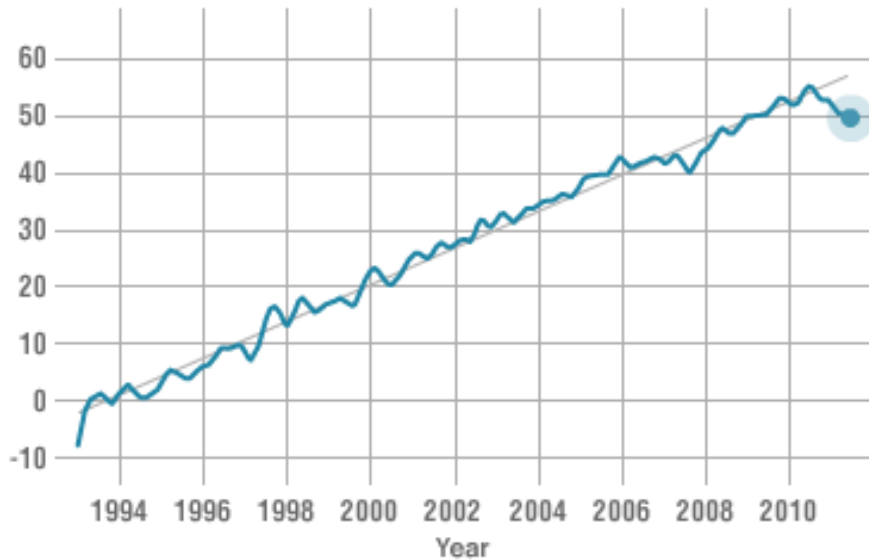
Sea Level Rise

SATELLITE DATA: 1993-PRESENT RATE OF CHANGE

Data source: Satellite sea level observations.

Credit: [CLS/Cnes/Legos](#)

↑ **3.27** mm per yr*

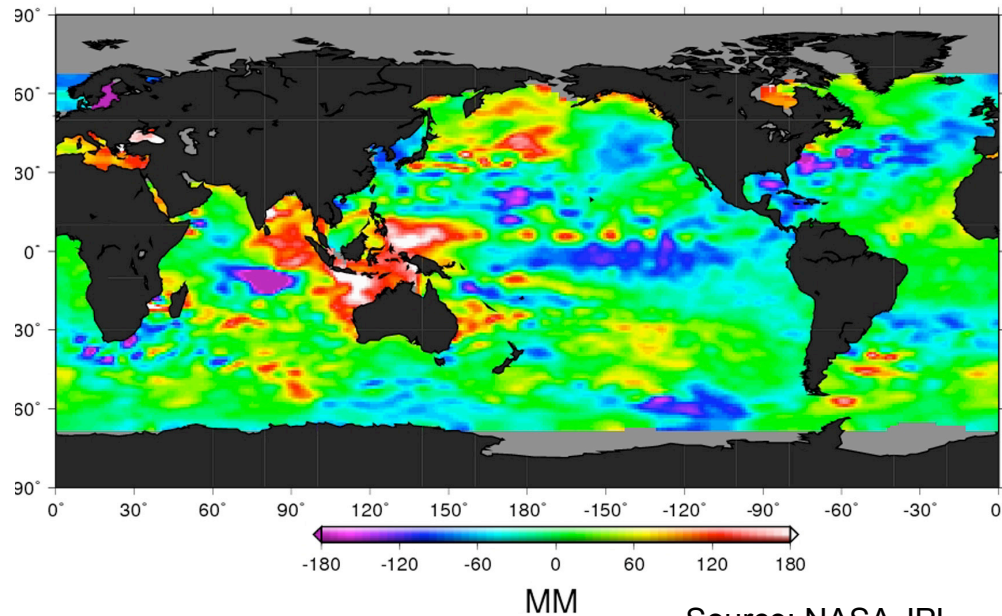


Inverse barometer applied and seasonal signals removed.

*estimate for 1993-2010

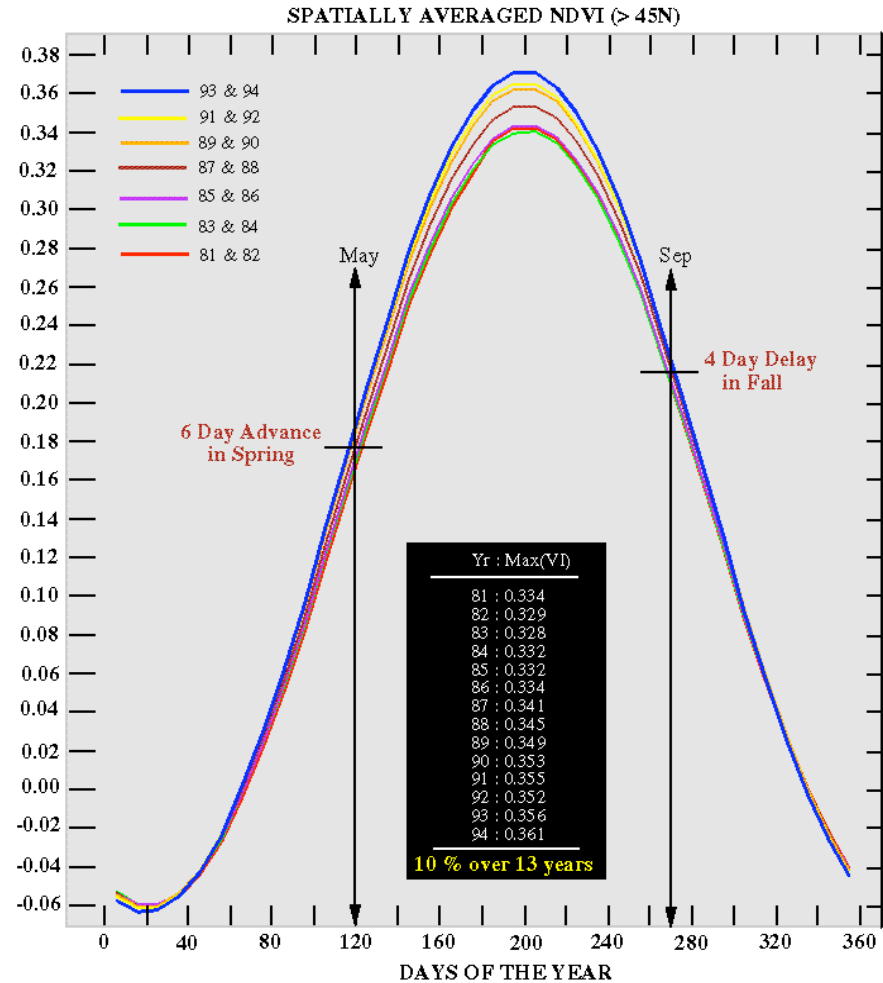
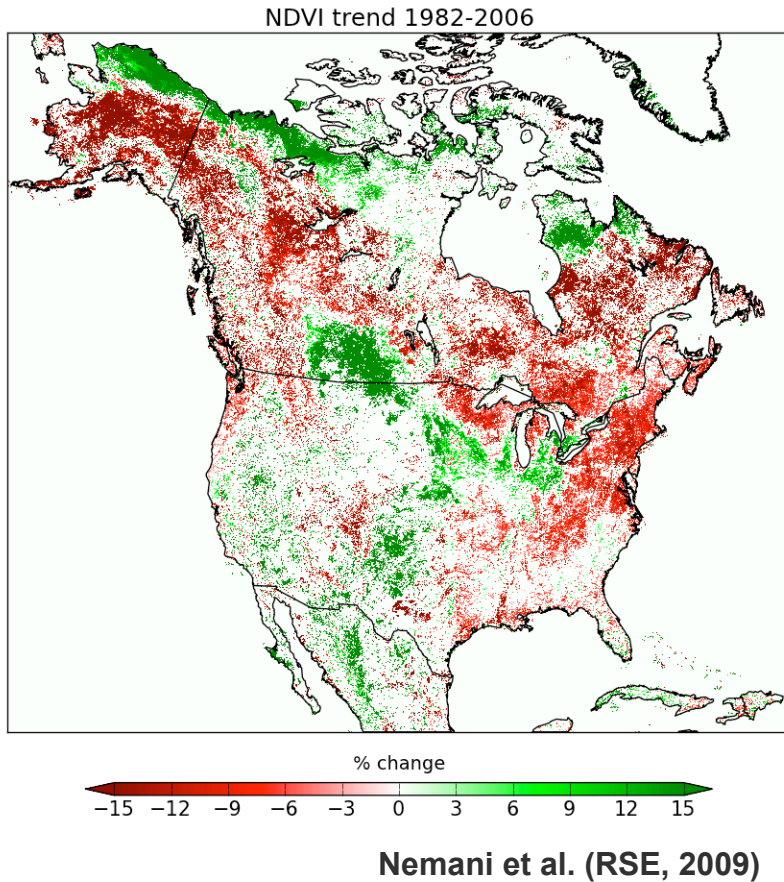
Source: JPL Global Climate Change

December 26 2010



NASA missions that help monitor sea level:
Jason-1 • Jason-2/OSTM

Photosynthetic Activity and Growing Season length



Myneni et al. (Nature, 386:698-701, 1997)

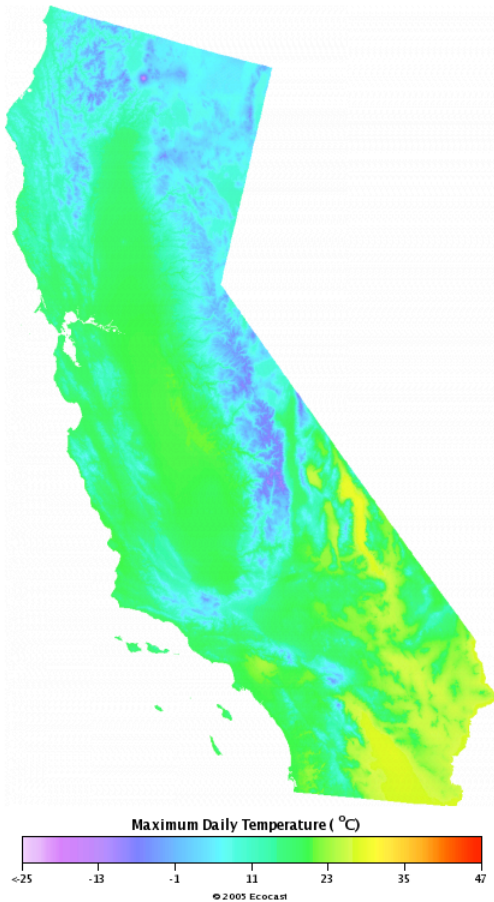
NASA missions and datasets that help monitoring vegetation activity:
 AVHRR • MODIS • NPP • Landsat



Land Climate Vegetation

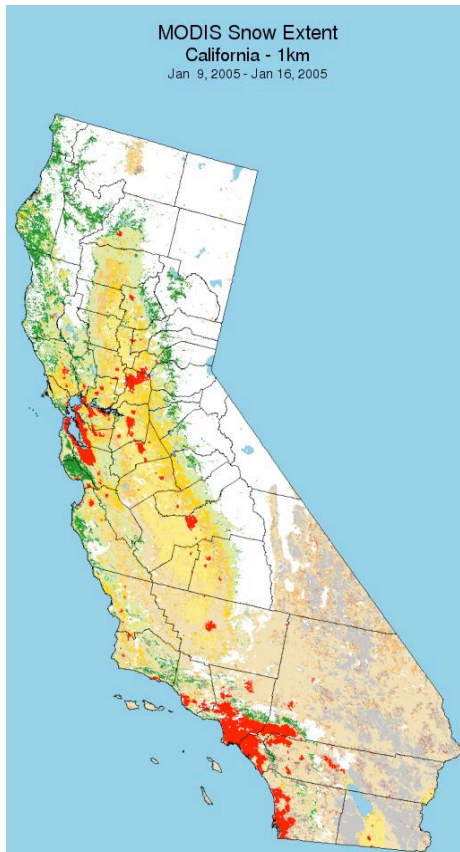
Air Temperature

Tmax November 04, 2005

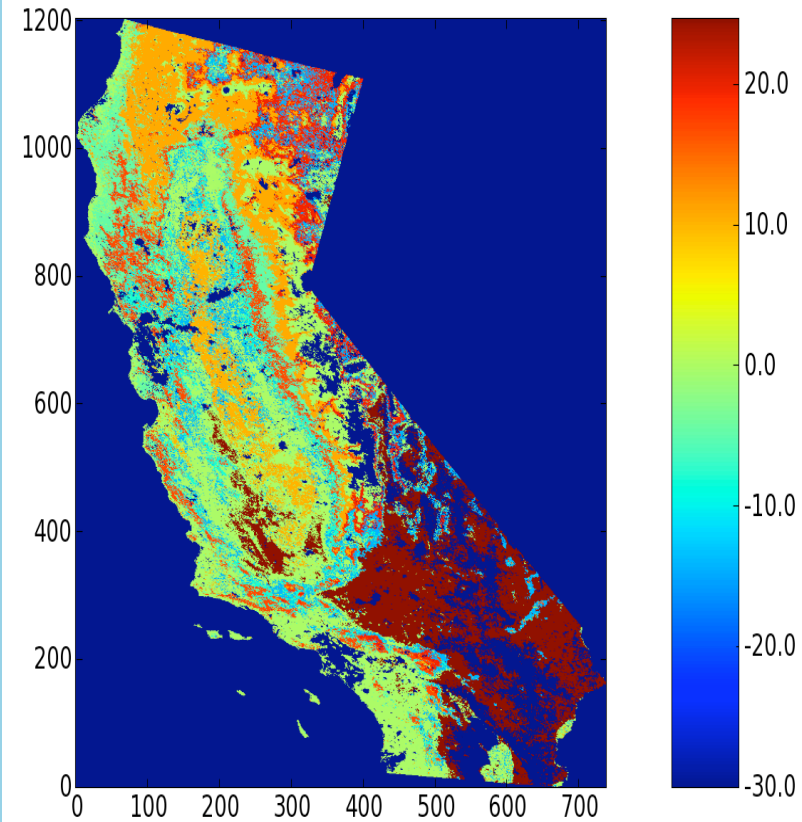


Snow cover

MODIS Snow Extent
California - 1km
Jan 9, 2005 - Jan 16, 2005

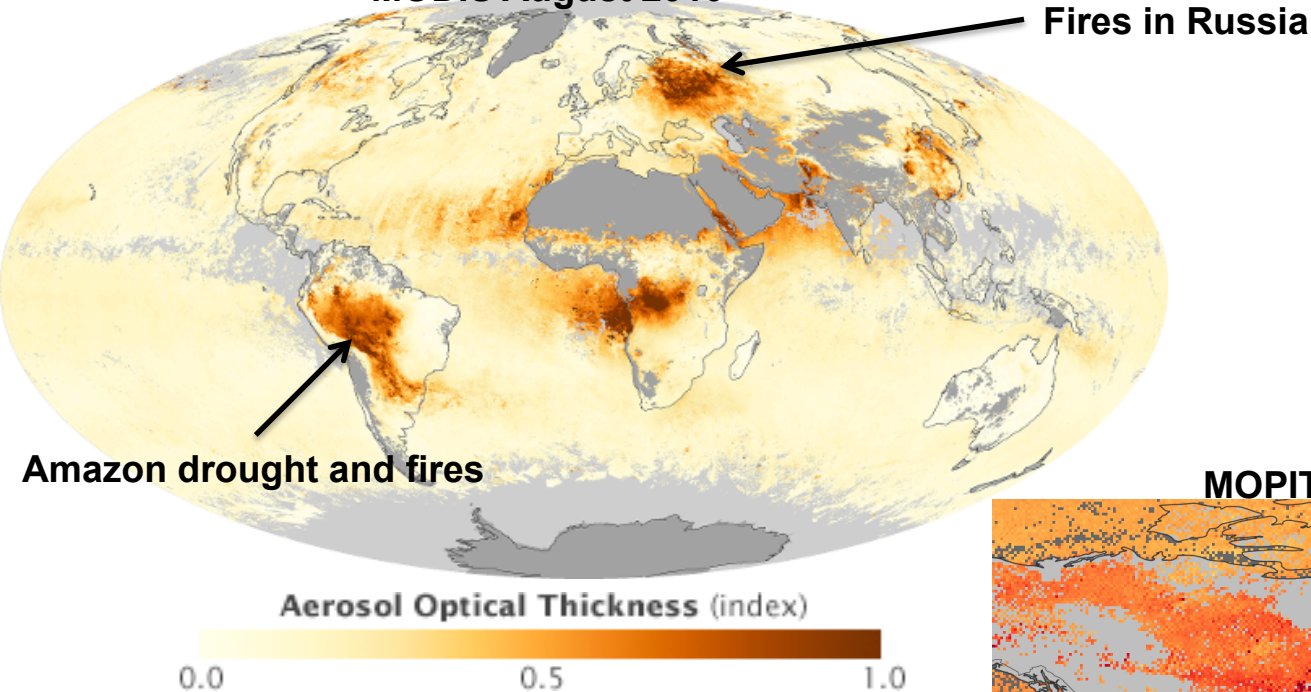


Changes in growing season onset (days)



Atmospheric Composition

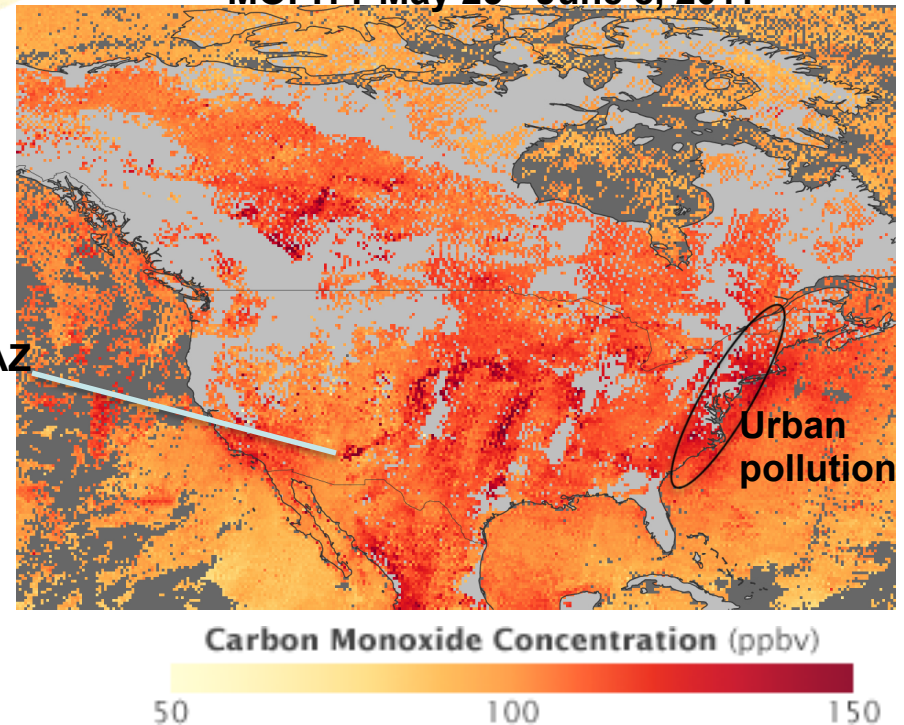
MODIS August 2010



Source: NASA Earth Observatory

MOPITT May 25 - June 8, 2011

Wallops fire, AZ



NASA missions and datasets that help monitoring atmospheric composition:

TERRA • AQUA • AURA



<http://gcmd.nasa.gov/>

Find Data Sets by Topic:



Agriculture

forest science, soils ...



Atmosphere

precipitation, air quality ...



Biosphere

vegetation, zoology ...



Climate Indicators

air temperature, drought ...



Cryosphere

frozen ground, sea ice ...



Human Dimensions

land use, population ...



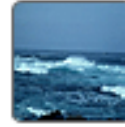
Hydrosphere

rivers/streams, water quality ...



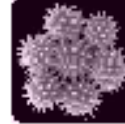
Land Surface

erosion, topography ...



Oceans

marine biology, salinity ...



Paleoclimate

ice cores, land records ...



Solid Earth

geochemistry, seismology ...



Spectral / Engineering

radar, visible imagery ...



Sun-Earth Interactions

auroras, solar activity ...



Data Centers - Locations -
Instruments - Projects -
Platforms/Sources