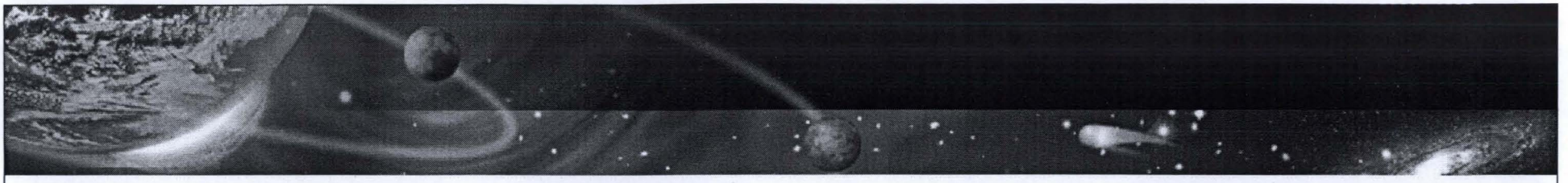
MSFC-768

Remote Sensing

Presentation for HELIX-Israel Kick-Off Workshop April 29, 2008

Doug Rickman
NASA/Marshall Space Flight Center/Earth Science Office

NASA



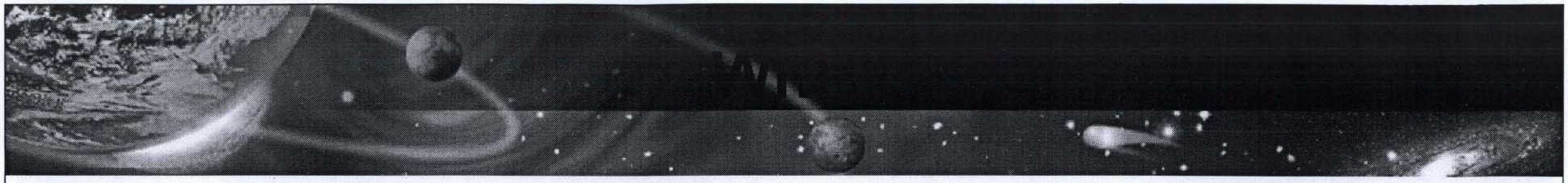
"Earth observations from satellites and in situ collection sites are critical for an ever-increasing number of applications related to the health and well-being of society."

From ***National Imperatives for the Next Decade and Beyond***: *Committee on Earth Science and Applications from Space: A Community Assessment and Strategy for the Future.* 2007, National Research Council of the National Academies, Washington, D.C.

"NASA's Applied Sciences program will continue the Agency's efforts in benchmarking the assimilation of NASA research results into policy and management decision-support tools that are vital for the Nation's environment, economy, safety, and security."

from NASA Strategic Goal 3A.

The Public Health application area focuses on Earth science applications to public health and safety, particularly regarding infectious disease, emergency preparedness and response, and environmental health issues. The application explores issues of toxic and pathogenic exposure, as well as natural and man-made hazards and their effects, for risk characterization/mitigation and improvements to health and safety.



Definition. Remote sensing is measuring something without touching it.

Basis…… Most methods measure a portion of the electro-magnetic spectrum using energy reflected from or emitted by a material.

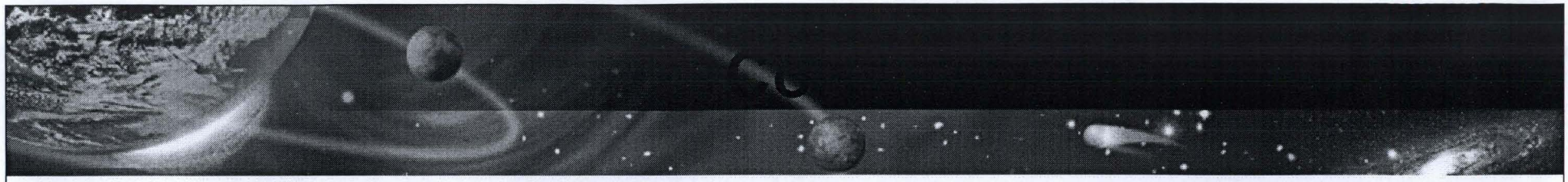
How 1… Moving the instrument away makes it easier to see more at one time. Airplanes are good but satellites are much better.

Why…….. Many things can not be easily measured on the scale of an individual person. Example – measuring all the vegetation growing at one time in even the smallest country.

When…… A satellite can see things over large areas repeatedly and in a consistent way.

How 2…... Data from the detector is reported as digital values for a grid that covers some portion of the Earth. Because it is digital and consistent a computer can extract information or enhance the data for a specific purpose.

Data for each grid point can be linked to anything else that can be related to that grid point.



Why Israel? NASA looks beyond our border when it benefits the nation.

1) NASA participates in GEOSS.

2) Health applications needs health information, which is very hard to obtain in the US due to legal constraints.

What can NASA do and not do with foreign colleagues?

We can collaborate where disclosure of restricted information will not happen.

NASA can not provide money for work done outside of the United States.

We can work so long as the effort is supported by NASA Headquarters, which means at a minimum it must clearly benefit the nation **and** satisfy NASA goals.

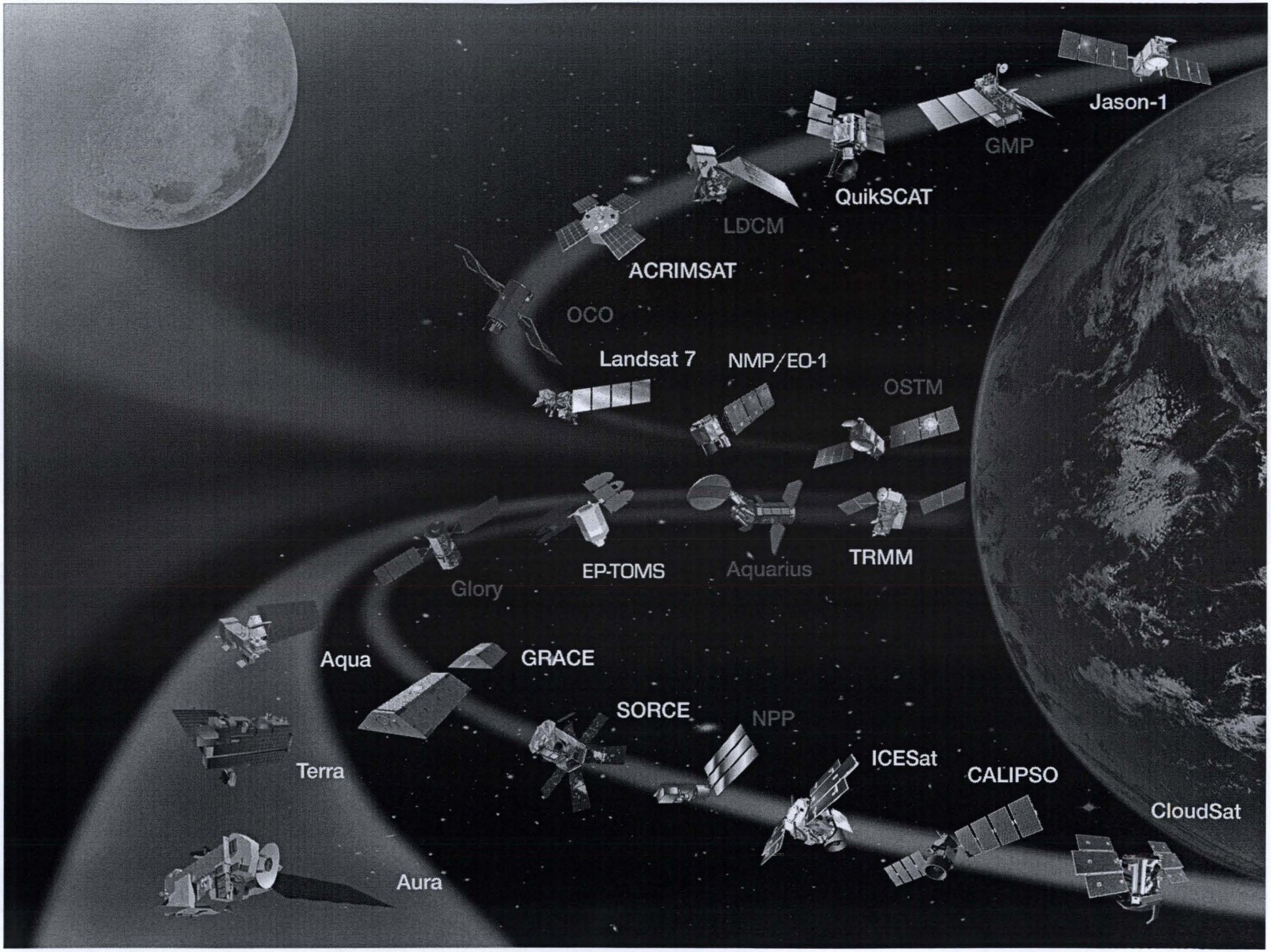
What NASA offers?

NASA has the premiere collection of environmental data in the world. We also have data products, models, the technical expertise to use the above, and the ability to link these with health data.

Current Call: (Notice of Intent June 17, proposal due August 13, 2008)

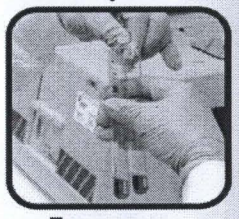
ROSES 08 A.19 requests proposals on the potential benefits and impacts of future satellite observations (e.g., Glory, NPP, GPM, LDCM, NPOESS, and SMAP) and models (e.g., ecological forecasting models, Global Climate Models (including regional downscaling)) on decision making in the areas of infectious disease, emergency preparedness and response, and environmental health.

ROSES 08 A.18 requests proposals about public health impacts of climate change. These proposals should utilize scenarios outlined by the International Panel on Climate Change as well as regional downscaling of Global Climate Models.


Jason-1
GMP
QuikSCAT
LDCM
ACRIMSAT
OCO
Landsat 7
NMP/EO-1
OSTM
TRMM
EP-TOMS
Aquarius
Glory
Aqua
GRACE
SORCE
NPP
ICESat
CALIPSO
CloudSat
Terra
Aura

Environmental Public Health Tracking

Hazard



Exposure

Health Effect

Data

Ongoing Evaluation

Tracking Network

COLLECTION → INTEGRATION → ANALYSIS → INTERPRETATION

Dissemination

Stakeholders*

Assessment • Research • Intervention • Policy

Prevention

Improved Public Health

Ongoing Evaluation

*Stakeholders Include	
Federal Agencies	Business and Industry
State and Local Agencies	Policy Makers
Academia	Media
Health Care System	Public
Non-Governmental Organizations	

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
SAFER • HEALTHIER • PEOPLE

CDC
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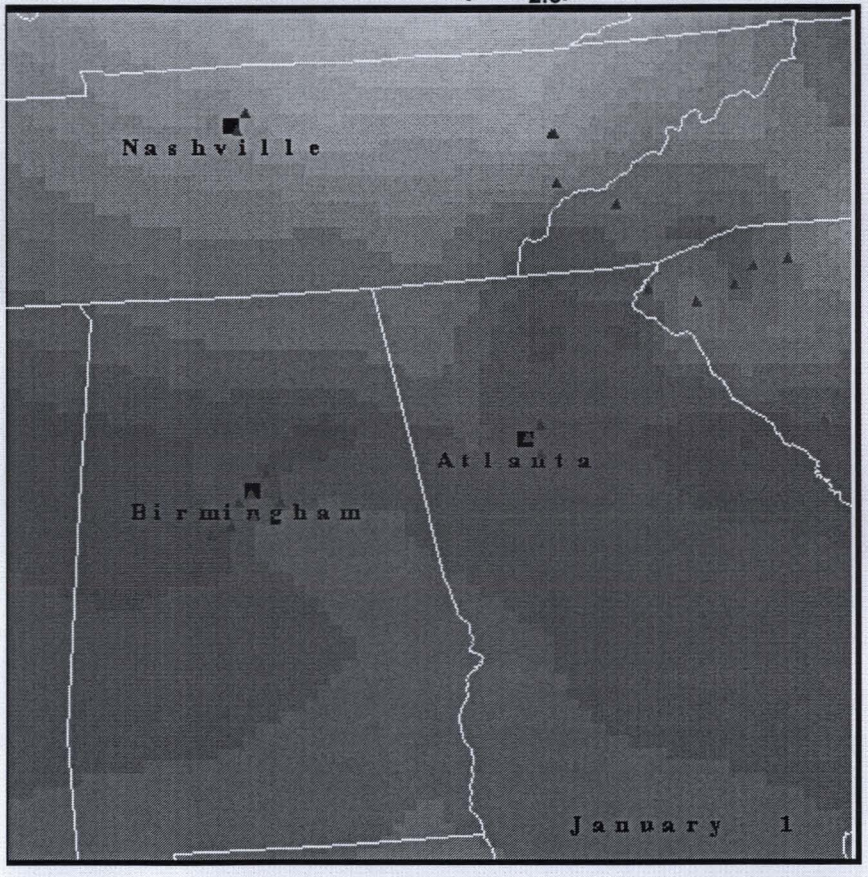
Particulate Matter ($PM_{2.5}$) in 2003



Data from scattered EPA monitoring sites were used to make daily surfaces of particulate matter (PM) concentrations. High concentrations of PM are associated with adverse health reactions, eg. respiratory and cardiovascular problems.

High : 50 μg/m³

Low : 0 μg/m³

▲ EPA sites

NASA and the CDC are partners in linking environmental and health observations to enhance public health surveillance through the Environmental Public Health Tracking Network (EPHTN)/HELIX-Atlanta project.

The integration of NASA earth science satellite observations, model predictive capabilities, and technology enhances the value of public health decision support. In the future, NASA MODIS aerosol optical depth observations will be combined with EPA monitoring data to create more representative particulate matter (PM) products.

Additional Earth science satellite observations, such as ozone and surface temperature, will also be used to enhance the EPHTN.

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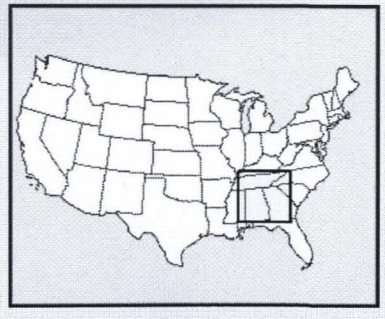

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REasons for Geographic And Racial Differences in Stroke

Hypothesized Reasons for the Stroke Belt:

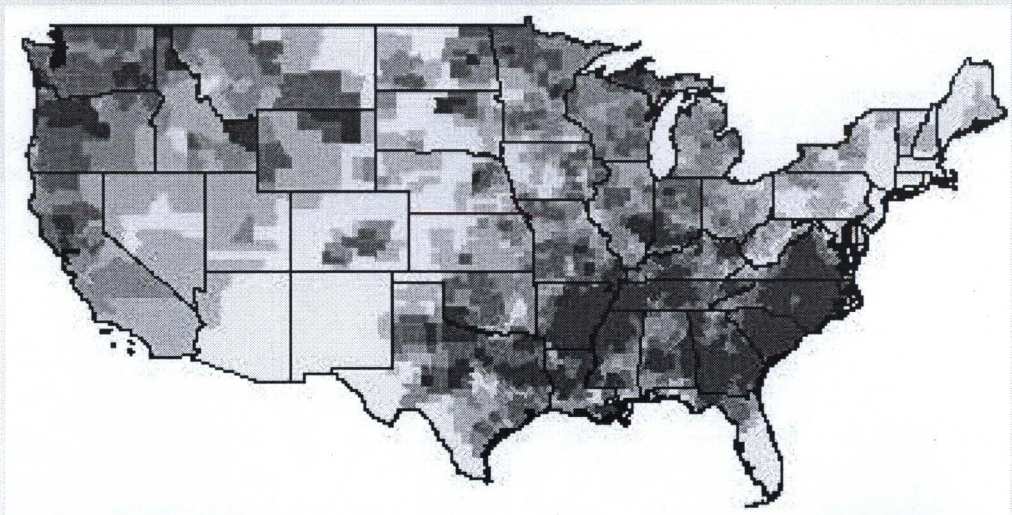
Geographic Difference in….

- Percent of African Americans
- Death Certificate Coding
- Stroke Case Fatality
- Risk Factors
- Environmental
- Socio-Economic Status
- Quality of Health Care
- Prevalence of "stroke genes"
- Lifestyle Choices
- Infection Rates

Stroke Mortality Rates

United States, Total Population Ages 35+

Stroke Death Rates, 1991 - 1998

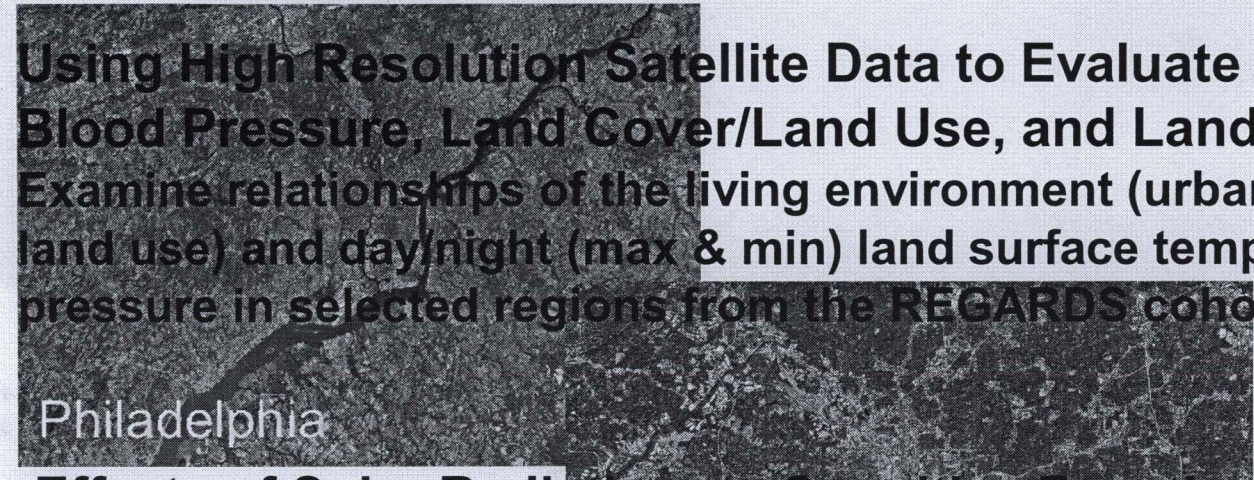


Of the deaths the 780,385 stroke deaths 1968 to 1996, 25% or 194,549 were "extra" deaths

Using the REGARDS cohort and NASA data, products and models -

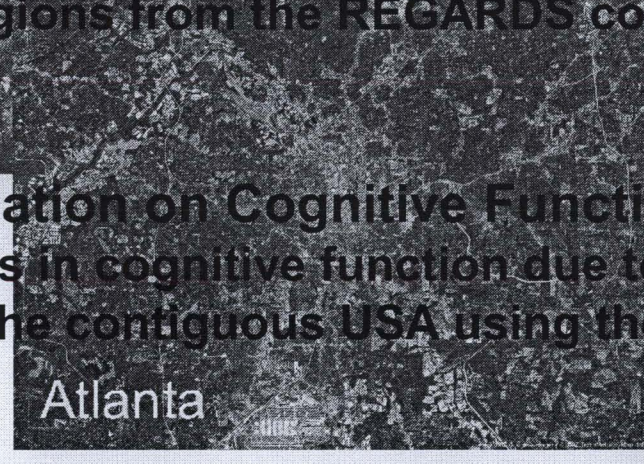
Using High Resolution Satellite Data to Evaluate Linkages Between Blood Pressure, Land Cover/Land Use, and Land Surface Temperature

Examine relationships of the living environment (urban, suburban, and rural land use) and day/night (max & min) land surface temperatures) vs. blood pressure in selected regions from the REGARDS cohort.



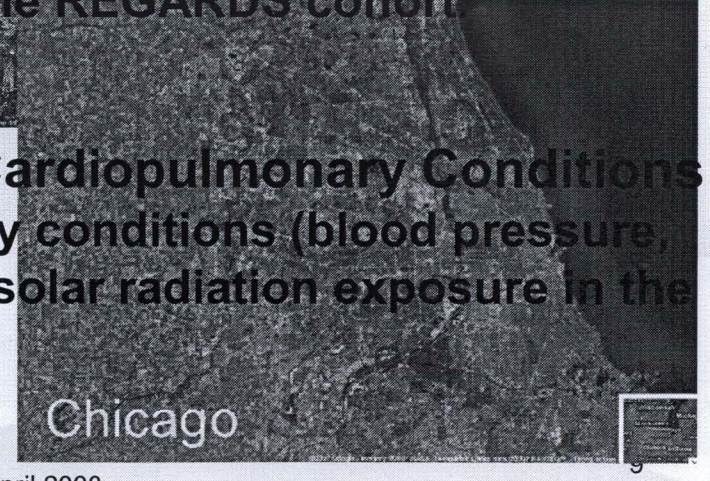
Effects of Solar Radiation on Cognitive Function

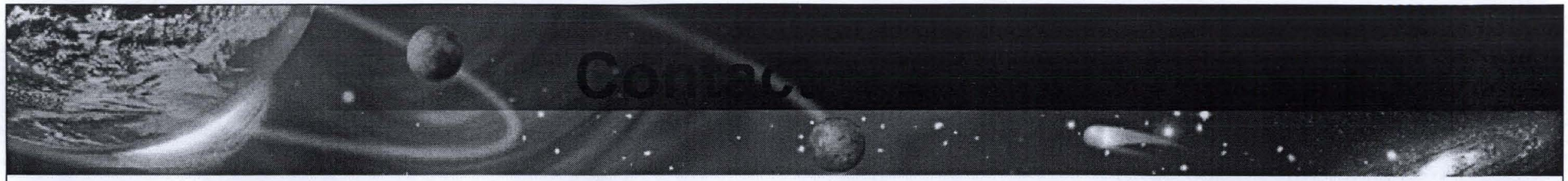
Examine for differences in cognitive function due to variation of solar radiation exposure in the contiguous USA using the REGARDS cohort.



Effects of Temperature & Heat Index on Cardiopulmonary Conditions

To examine for differences in cardiopulmonary conditions (blood pressure, stroke incidence) attributable to variations in solar radiation exposure in the contiguous USA using the REGARDS cohort.





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Applied Sciences Program
NASA Science Mission Directorate

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Maury Estes	Ashutosh Limaye	Maudood Khan

Illustrative Website

http://www.ghcc.msfc.nasa.gov/ follow Applications: Health and Environment link to
http://weather.msfc.nasa.gov/helix/helix_home1.html

Current Significant Public Health Partners

Leslie McClure, University of Alabama, Birmingham
Judith Qualters, Centers for Disease Control and Prevention
Amanda Niskar, Tel Aviv University
Bill Sprigg, University of Arizona
Stan Morain, University of New Mexico

SDMetrics Entry - Presentations

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Conference End Date:	4/29/2008
Date Presented:	
Conference Proceedings to Follow:	Yes
Organization:	VP61

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Use A Different Associates List

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