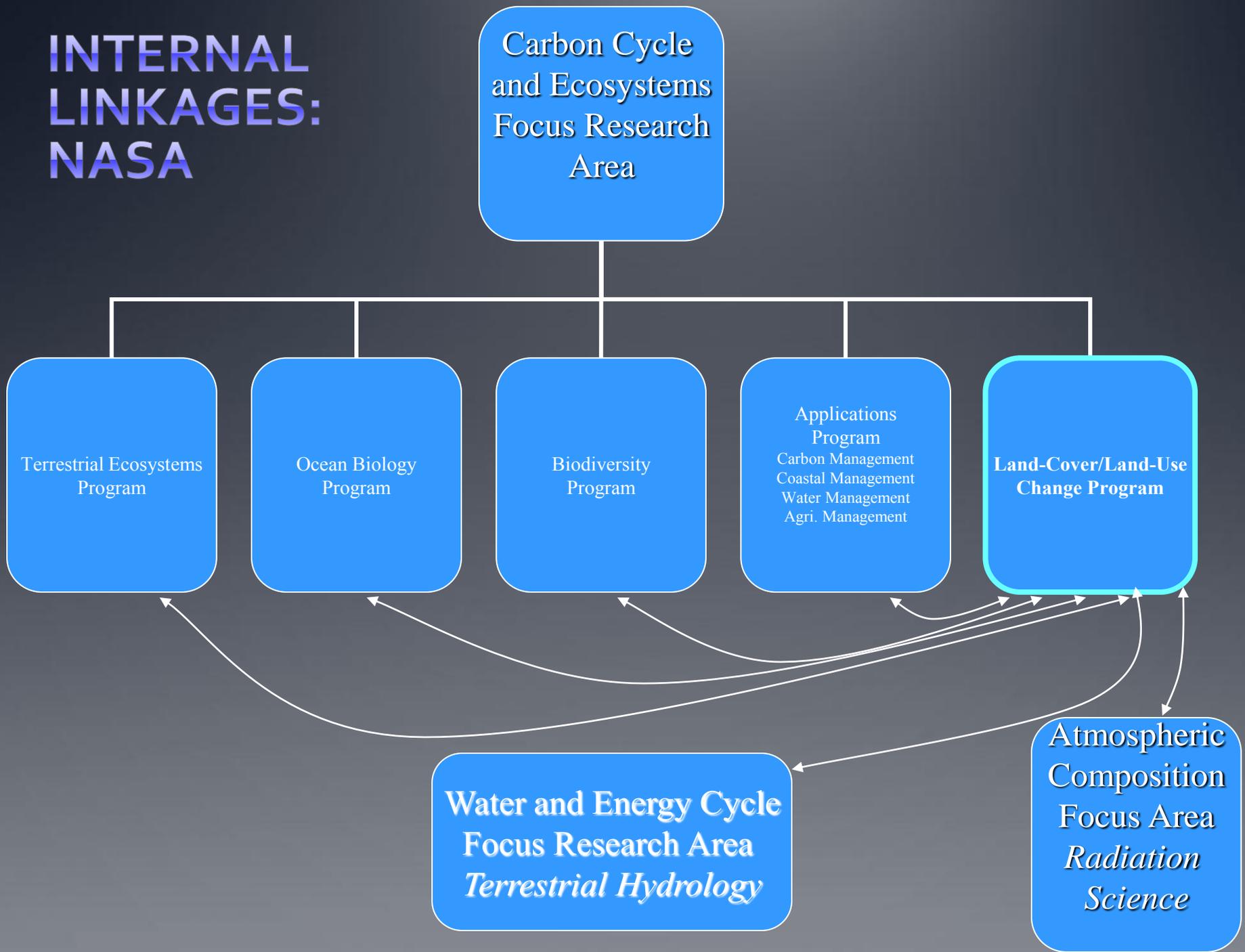


# NASA's Land-Cover/Land Use Change Program: Update

Garik Gutman,  
NASA Headquarters  
Manager, LCLUC Program



# INTERNAL LINKAGES: NASA



# External Linkages: National

- U.S. Global Climate Research Program
  - The LULCC Interagency Working Group (LUIWG) is no longer in the USGCRP structure
  - NRC review of land use models is ongoing and NASA LCLUC is one of the two major contributors
- USGS
  - Landsat program (ST meetings, telecons, LDCM, Education/Outreach)
  - Global Land Surveys (leading the project execution, partner funding)
  - USGS scientists lead and participate in some NASA-funded LCLUC projects
  - Preparation for LDCM launch including PR
  - Climate & Land Use Change Program



A token of recognition from USGCRP (formerly CCSP) for leadership of the LULCC element during its early years

# External Linkages: International



## • GTOS/GOFC-GOLD

- Fire Implementation Team office at UMD funded by LCLUC
- SE Asia Network (SEARIN) has got a boost at the Hanoi (Vietnam) LCLUC ST meeting
- South-Central Europe Regional Information Network (SCERIN) is being formed - kick-off meeting in Sofia (Bulgaria) later this month
- South Asia Regional Information Network (SARIN) will be initiated at the next LCLUC ST meeting in Dehradun, India
- C. Russia (Volga) Regional Information Network will be initiated at the meeting on Volga in June

## • CEOS/GEO

- International Working Group on Calibration and Validation – membership and Land Product Validation WG Contributions
- Land Surface Imaging (LSI) Constellation Working Group – membership

## • Partnerships

- ESA Sentinel-2 Program
- ScanEx – Satellite Data Center (Moscow, Russia)

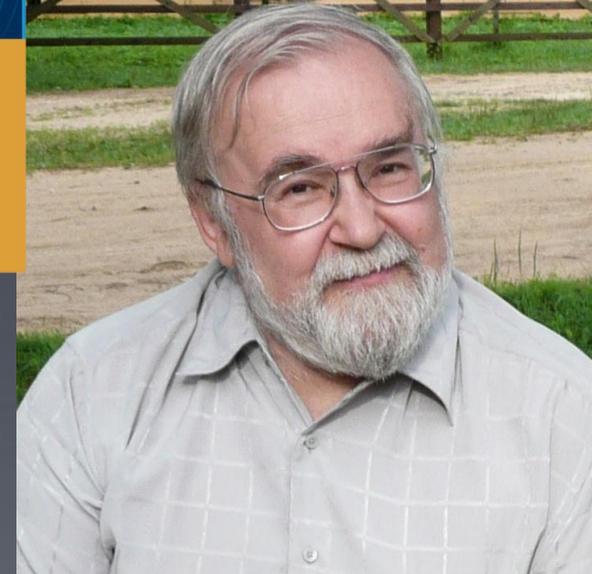
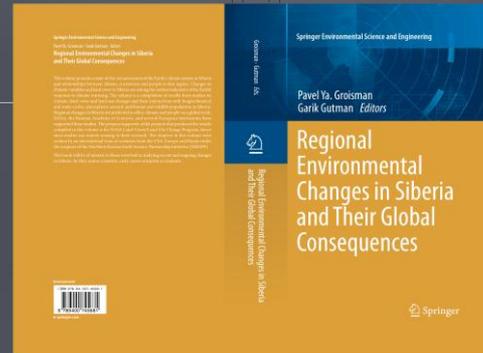
## • IGBP/IHDP

- Global Land Project (GLP) office moved to INPE, Brazil
- Northern Eurasia Earth Science Partnership Initiative (NEESPI) - support of Project Scientist, meetings and research projects
- Monsoon Asia Integrated Regional Study (MAIRS) - support of Project Scientist, meetings and research projects

# Support of Regional Programs

## ■ NEESPI (Northern Eurasia)

- "Siberia book" in press
  - a joint effort of US, EU and RAS scientists
- AGU and EGU sessions
- 2 new LCLUC Synthesis projects
- 2 new Carbon projects
- South-Central Europe Regional Information Network (SCERIN) is being formed - kick-off meeting in Sofia (Bulgaria) later this month



## ■ MAIRS (Monsoon Asia)

- 3 new LCLUC projects
- GOF-C-GOLD regional information networks for Asia
- Regional Workshop in Kaifeng, China – book on East Asia drylands is getting ready for submission (led by Chen)
- Drylands special issue is getting ready for publication (led by Qi)



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In memoriam

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# Anatoly Sukhinin

July 31, 2011

- He was the lead scientist at the Forest Monitoring Laboratory at Sukachev Institute of Forest, Siberian Branch of Russian Academy of Sciences, in Krasnoyarsk.
- In 1995 with NASA's help Anatoly established the first Advanced Very High Resolution Radiometer downlink station in the Former Soviet Union.
- He developed algorithms largely on his own and he was always willing to work with the global community, to share information and data to expand our cumulative knowledge.
- One of his activities was to provide daily satellite and weather data to Avialesookhrana for fire management.
- His primary collaborators in the LCLUC Science Team were in Amber Soja, Sue Conard and Nancy French.
- See Memory Book to learn more and see the photo gallery  
<http://memorialwebsites.legacy.com/AnatolyIvanovichSukhinin/homepage.aspx>



# Gregory Leptoukh

- Dr. Leptoukh worked at Goddard DAAC since 1997
- Headed the MODIS data support team.
- Since May 2003, the Science Data Manager of the Goddard Earth Sciences Data and Information Services Center.
- In the past five years, PI of four NASA-supported projects and Co-I for six other NASA projects related to developing tools to support the advancement of Earth science data access, fusion, online analysis and visualization of atmospheric data.
- His projects provided important support to the Northern Eurasian Earth Science Partnership Initiative (NEESPI) and the Monsoon Asia Integrated Regional Study (MAIRS).
- His collaborators – Suhung Shen, Irina Gerasimov and Tatyana Loboda – will continue promoting the use of the GIOVANNI system.
- Read more on Greg's life and his contribution to NASA on <http://disc.sci.gsfc.nasa.gov/gesNews/ges-disc-nasa-mourn-passing-of-dr.-gregory-leptoukh>

Jan 12, 2012



# K.V.S.Badarinath

January 20, 2012

- GOFC-GOLD Fire-IT member from India
- Head, Atmospheric Science Section, NATIONAL REMOTE SENSING CENTRE, HYDERABAD



Frascati, Italy – March, 2010

# Program Components



Total ~40 projects : Forests, Ag, Urban, Wetlands

- Detection/Monitoring/Observations
- LCLUC Predictive Modeling
- LCLUC impacts on
  - Carbon Cycle and Water Cycle
  - Climate/Environment
- Drivers of Change
- Climate impact on LCLUC
- Vulnerability, Impacts and Adaptation
- Synthesis studies
- Early Career Scientists

External NASA Earth Science  
LCLUC-related programs  
contributing to LCLUC Program:  
Carbon Cycle, USPI, IDS, NIP

# LCLUC Urban Component

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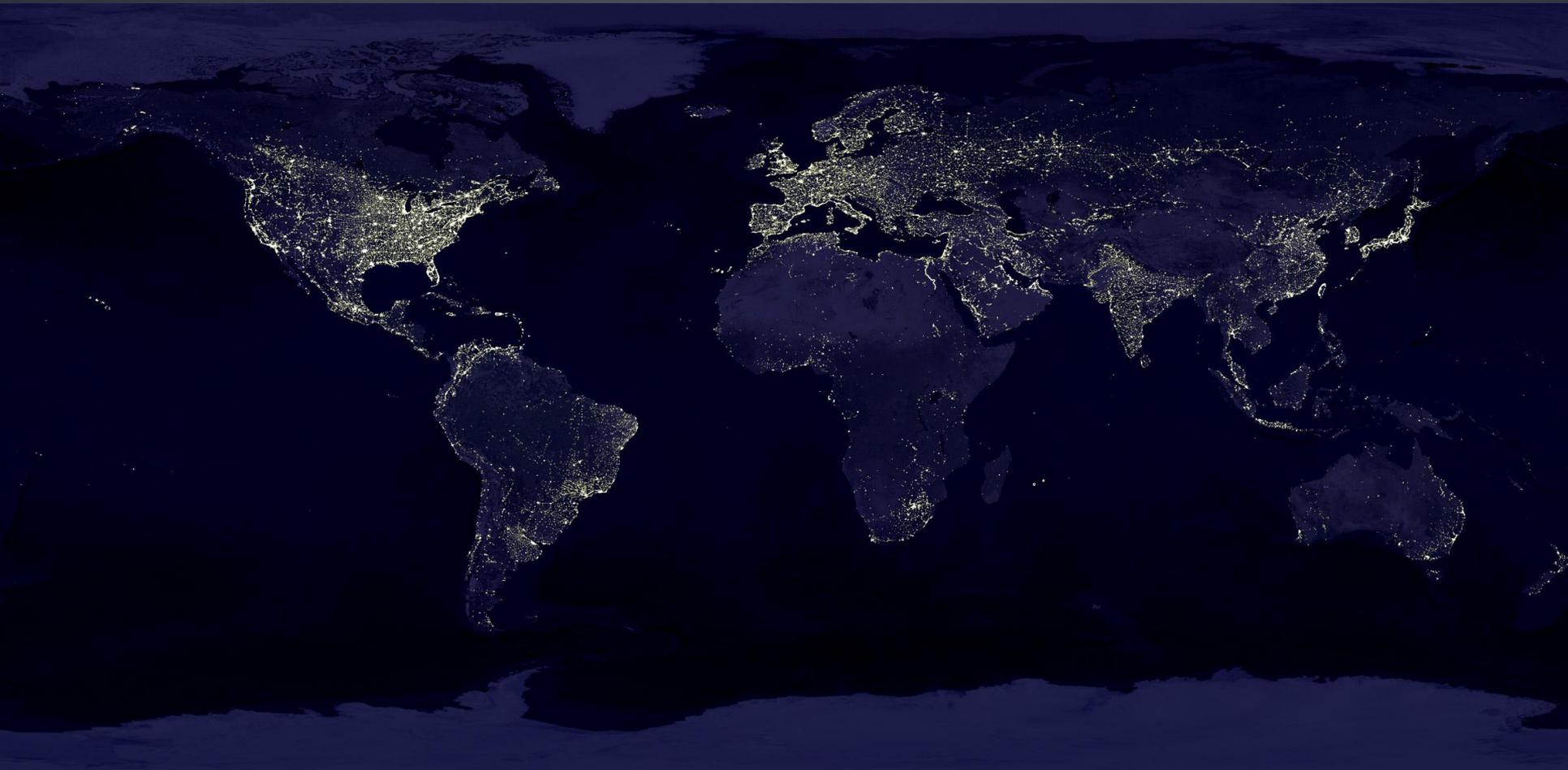
- Responsive to the International Human Dimensions Program (IHDP) Urbanization and Global Environmental Change (UGEC) Project
    - How does urban land-use change affect global environmental change?
    - How does the built environment affect energy use, carbon emissions, and climate?
-

# IPCC 4<sup>th</sup> Assessment Report

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- Prevailing climate change science has focused on effects of anthropogenic greenhouse gases
  - 4<sup>th</sup> Assessment Report of the IPCC notes emerging interest in *understanding the role of urban land use on the climate system*
  - Preparations for next IPCC report focus on urban form, structure, expansion, etc.
-

# Non-NASA Mission DMSP: OLS Night Lights



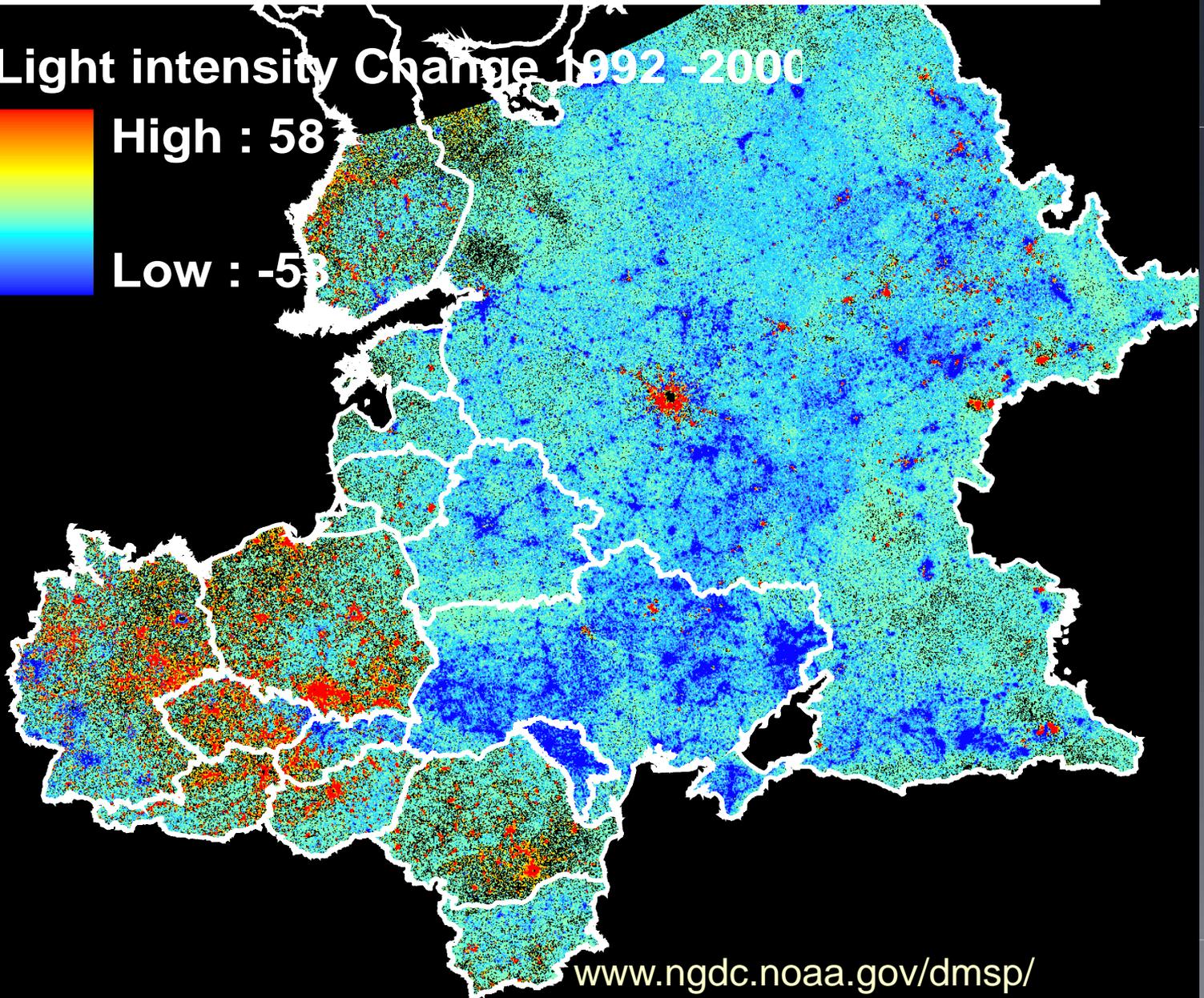
Change in Nighttime Lights 1992 to 2000  
From DMSP/OLI Products

Light intensity Change 1992 -2000



High : 58

Low : -58

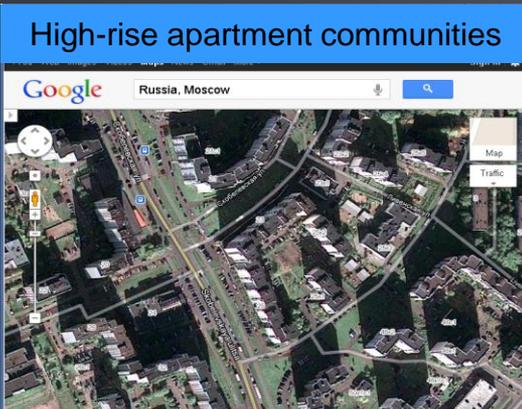
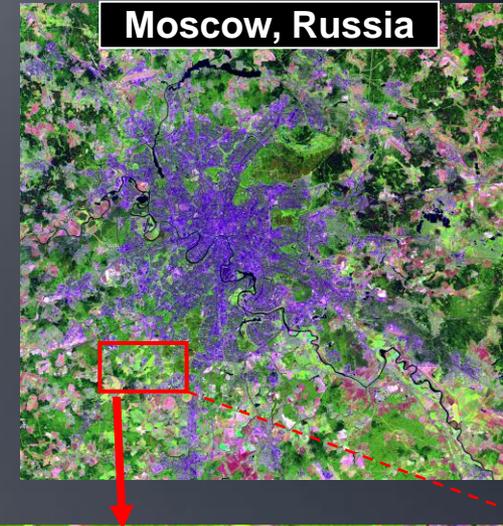


# Changes of Moscow, Russia

Courtesy of Chengquan Huang, UMD

Conversion of large tracts of agricultural land to urban due to urban sprawl in south-western suburban Moscow, Russia.

Moscow's population increased from 9M in 1990 to 10.5M in 2010.



# LCLUC Urban Projects

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- **Fan, Michigan State U.**

China's urbanization and its sustainability under future climate change

- **Seto, Yale University** (+ U. Wisconsin, Arizona State U.)

Multi-Scale and Multi-Sensor Analysis of Urban Cluster Development and Agricultural Land Loss in India

- **Brown de Colstoun, NASA GSFC** (with UMD)

Using Landsat Global Land Survey Data to Measure and Monitor Worldwide Urbanization

- **Milesi, NASA Ames/CA State U.**

Mapping of Urban Mapping Expansion Using Multi-Decadal Landsat and Nightlights Data Over North America

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# Reporting and Communication



- The Web site: <http://lcluc.hq.nasa.gov>
  - Abstracts, progress reports, presentations
  - Lists of publications and references
  - Project metadata and data set links
  - Announcements, events, job ops, news
  - Outreach (journal covers, media coverage, books)
- To our web curator (LeeAnn King):
  - all of the above on an ongoing basis
- To me: sensitive info, project updates
  - 1 slide in bullets + visual
- PI's are encouraged to host their own websites to showcase their results in more detail and to make their data sets available - provide links (and faces!)



# Data Aspects



Rama Nemani,  
NASA Ames

- NASA Earth Exchange (NEX) portal
  - state-of-the-art supercomputing
  - Earth system modeling
  - All LCLUC projects are listed on the NEX site -- PI's are encouraged to register
- NASA promotes the free and open sharing of data
- USGS - Landsat data for free distribution including GLS
- International cooperation on Landsat-like data
  - ESA Sentinel-2 data are to become accessible and free of charge
  - Some progress on Indian (IRS) mid-resolution data accessibility
- NASA LCLUC program expects its PI's to make their data and products available to the broader community
- High resolution data for NASA-affiliated scientists
- PI's datasets will be reflected on the LCLUC metadata page

# Education and Outreach

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- Bringing in early career scientists (ECS) into the program
  - Continue with ECS sessions at LCLUC ST meetings
  - Continue with ECS solicitations
  - Keep training as an integral part of each international LCLUC ST meeting
  - New Trans-Atlantic Training Initiative (US-EU)
- PR and interactions with a wider community
  - New brochure
  - Further improve the LCLUC site and Facebook page

# Current Year Solicitation

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## ◎ROSES-2012

- ◎*Global mapping of industrial forests from Landsat-class observations*
  - ◎*Synthesis of LCLUC studies in Eurasia (social science is a requirement)*
-

# Synthesis: Putting Together A “Big Picture” – for Discussion



- Enhancing the Conceptual Underpinning of LCLUC Science
  - Summarizes state-of-the-art knowledge
  - Advances our understanding of the processes, drivers and impacts of LCLUC
  - Develops new understanding and conceptual framework
- Possible Components
  - Theory and Hypothesis testing
  - Compilation of available relevant datasets; comparative research analyses
  - Data integration and model development
  - Identify in data and research gaps and proposed ways to fill these gaps and new research areas
  - Articulating/publishing refined/new conceptual framework for an aspect of LCLUC

# Social Science Component For Discussion

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- Social Science in the context of the NASA LCLUC program is defined broadly as the study of human behavior at the individual, household, social group or community, firm, organization and/or governmental levels
  - The LCLUC program evaluates proposals' social science responsiveness in terms of the meaningful integration of social science theories, methods and data (quantitative and/or qualitative) into the proposed research
  - Proposals must also be responsive to the remote sensing and other LCLUC criteria
  - Alone, simple atheoretical correlations involving social variables, descriptions of societal benefits, or applied policy questions are not considered responsive to the program.
-



# Enjoy Washington in Bloom

Thanks to everyone.  
Special thanks to our  
international partners!