GOFC-GOLD

Global Observation of Forest and Land Cover Dynamics

Program Overview

NERIN and other Regional Networks

Dr. Olga Krankina
Regional Networks Coordinator

GTOS

The Basics

GOFC-GOLD

GLOBAL OBSERVATION FOR FOREST AND LAND COVER DYNAMICS

Global Observation of Forest Cover (GOFC)

+

Global Observation of Land cover Dynamics (GOLD)

=

GOFC-GOLD

A science panel of the
Global Terrestrial Observing System

GTOS

The Basics

• GOFC-GOLD is a coordinated program of space-based and on-the-ground observations of forest and land cover for global monitoring of terrestrial resources and the study of global change.

• GOFC-GOLD это координированная программа космических и наземных наблюдений за лесным и прочим растительным покровом с целью мониторинта наземных ресурсов и исследования глобальных изменений

• Tony Janetos, Chair

• Michael Brady, Director

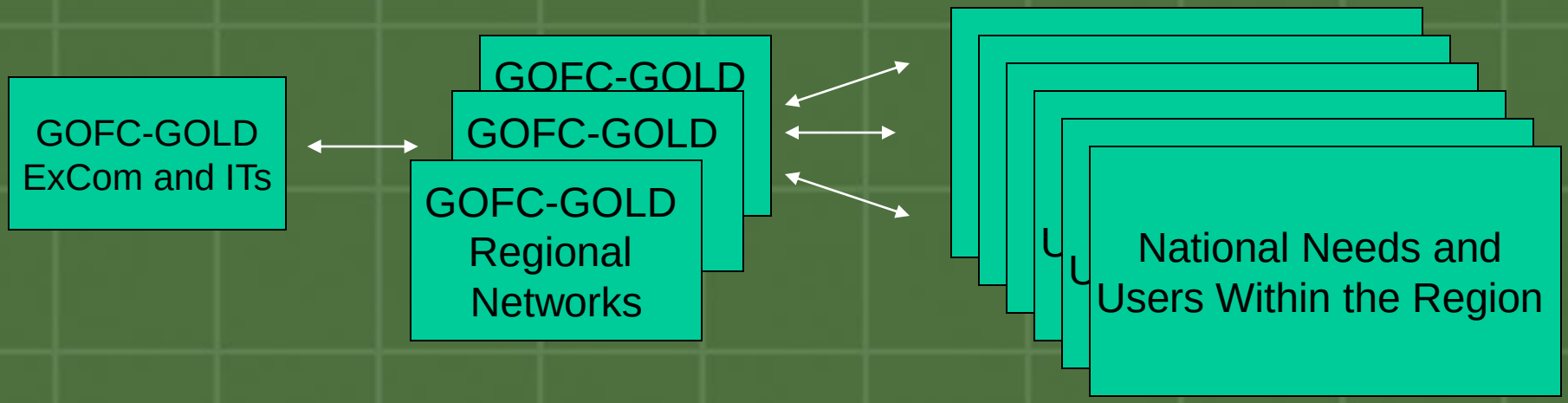
Organizational Structure

- Executive committee
- Two implementation teams
  - Land Cover Characteristics and Change
  - Fire Monitoring and Mapping
- Two working groups
  - Working Group on Biomass Monitoring
  - Working group on Reducing Emissions from Deforestation and Forest Degradation (REDD)
- Regional networks

Regional Networks

a critical component of the implementation of GOFC-GOLD

Providing the interface between the Implementation Teams and data users in the regions



1. NERIN – Northern Eurasia – Olga Krankina
2. SEARRIN - South East Asia – Mastura Mahmud
3. OSFAC - Central Africa – Patrick Lola Amani
4. Miombo - Southern Africa – Dominick Kwesha
5. SAFNET – Southern Africa – Blessing Siwela and Philip Frost
6. RedLatiF - Carlos DiBella
7. WARN – West Africa – Cheikh Mbow
8. CARIN – Central Asia (Lev Spivak)

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Role of Regional Networks in GOFC-GOLD

- **Articulate and document regional earth observation requirements**
  - Observations (measurements)
  - Derived products and their associated accuracy requirements
  - Distribution systems
- **Evaluate the utility of global LC and Fire products for regional use**
  - Participate in regional product inter-comparison and validation initiatives (providing local expertise)
  - Feedback to producers
- **Facilitate the use of remotely sensed data and products**
  - Web site – e.g. links to GOFC-GOLD-Fire and land cover websites
  - Establish regional data dissemination nodes
  - Encourage standardization and harmonization of regional products
  - Outreach workshops with regional practitioners and decision makers
  - Coordinate regional capacity building and training of users
- **Promote lateral transfer of technology and collaborations within countries and regions**

Current Activities

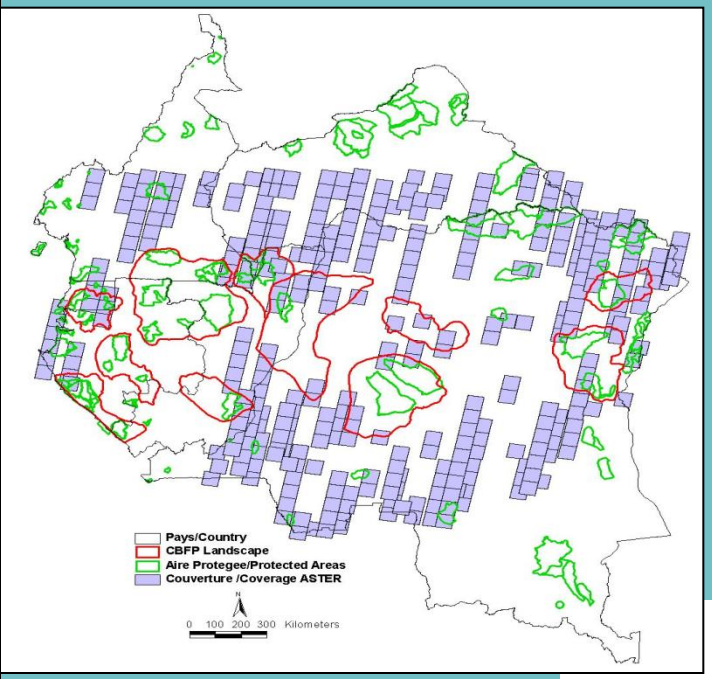
- Regional Workshops are the main activity; they proved very effective in accomplishing many of the network's goals
  - Build momentum for network activities and regional cooperation
  - Share information about data availability, methodology, and findings
  - Provide methodological and technical training
- The GOFC-GOLD Regional Network Data Initiative
  - Disseminate Landsat data to regions with inadequate internet access
  - Broaden regional data collections to include land cover and fire products
  - Provide training in use of remotely sensed data
    - Africa Pilot Workshop in 2009
    - Data Initiative Asia in May-June 2010 (follow-up activities in progress)

GOFC-GOLD Regional Network Data Initiative

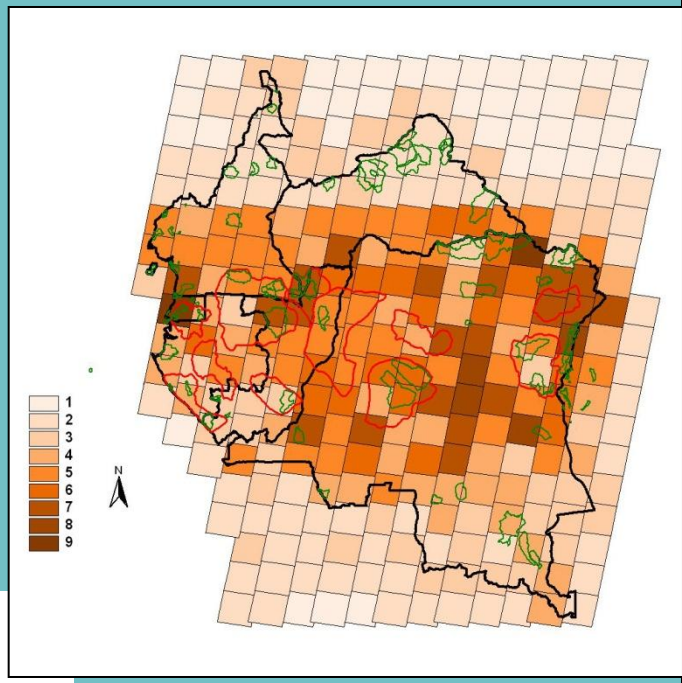
Pilot for Africa

- Involved 5 regional networks
- Network representatives received data and training over 3 weeks at USGS EDC and South Dakota State University (SDSU) in April-May 2009
- Support provided by NASA, START, USGS, UNEP, SDSU and CFS

Data available though OSFAC



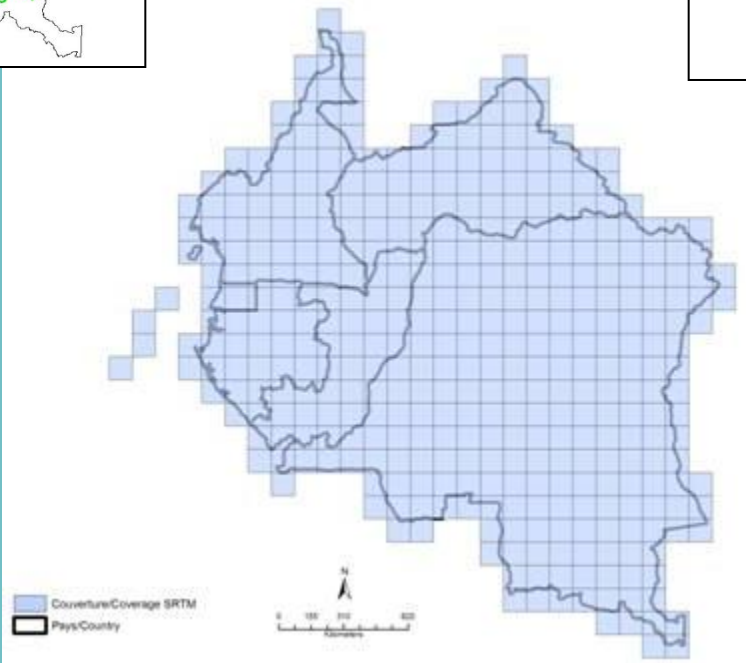
ASTER 2000-2008
Around 2600 granules



LANDSAT 1984-2008
Around 5000 scenes

Others :

- MODIS Data
- LANDCOVER maps
- Etc.



SRTM 2000
Around 600 granules

GOFC-GOLD Regional Network Data Initiative – Asia Workshop

Two regional networks: CARIN and SEARRIN (6 representatives)

- Training over 3 weeks at USGS EDC and SDSU or OSU in May 2010
- EDC set an all-time record for Landsat downloads in a single day at 8000 scenes
- E.g., Kazakhstan archive: >14 thousand images for 483 scene positions (1972-2010)
- Data distribution and training workshop planned for October 2010 in Tashkent

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Global Observation of Forest and Land Cover Dynamics

NERIN

Northern Eurasia Regional Information Network

The goal: to promote and coordinate the production and provision of Earth System observations for a wide range of user communities in the region and to the global Earth Science community.

Задача: поддержка и координация сбора и распространения наблюдений за поверхностью Земли для широкого круга пользователей в регионе и для специалистов поглобальным изменениям

Thematic components - Land-cover and Fire

Тематические компоненты – Растительный покров и Пожары

NERIN Workshops
(or how we got ourselves organized)

- Boreal Forest Workshop -Novosibirsk, Russia, August 2000
- Regional workshop for Western Russia-Fennoscandia -- St. Petersburg, Russia, June 2001
- Northern Eurasia Earth Science Partnership Initiative (NEESPI) workshops -- Suzdal', April 2003; Yalta, September 2003
- "Observational Data in Support of NEESPI", St. Petersburg, Feb. 23-26, 2004
- "Observations of land cover and needs of research projects in Northern Eurasia", June 18-19, 2005, St. Petersburg, Russia
- "NELDA project" July 8, 2006, Tomsk, Russia
- "Detection and Validation of Land-cover Change", December 15-16, 2006, Moscow, Russia
- "Requirements for Observations of Landcover Dynamics in Dryland Regions of Northern Eurasia", September 20, 2007, Urumqi, China
- "Land Cover Mapping at High Latitudes", July 9-11, 2008, Syktyvkar, Russia

- **"Monitoring land cover, land use and fire in agricultural and semi-arid regions of Northern Eurasia", September 15-21, 2009, Almaty, Kazakhstan**
- **Tartu!**

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Joint NASA LCLUC Science Team Meeting and GOFC-GOLD/NERIN, NEESPI Workshop

Monitoring land cover and land use in boreal and temperate Europe

August 25-28, 2010

- Definition of requirements for land-cover and land-use characterization that address the needs of users working on regional environmental issues
- Explore opportunities for coordination and collaboration among research teams and ongoing projects for improved understanding of ecosystem processes in boreal and temperate zones and their socioeconomic effects
- New GOFC-GOLD Network?

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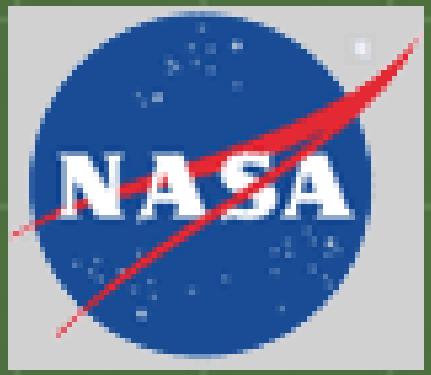
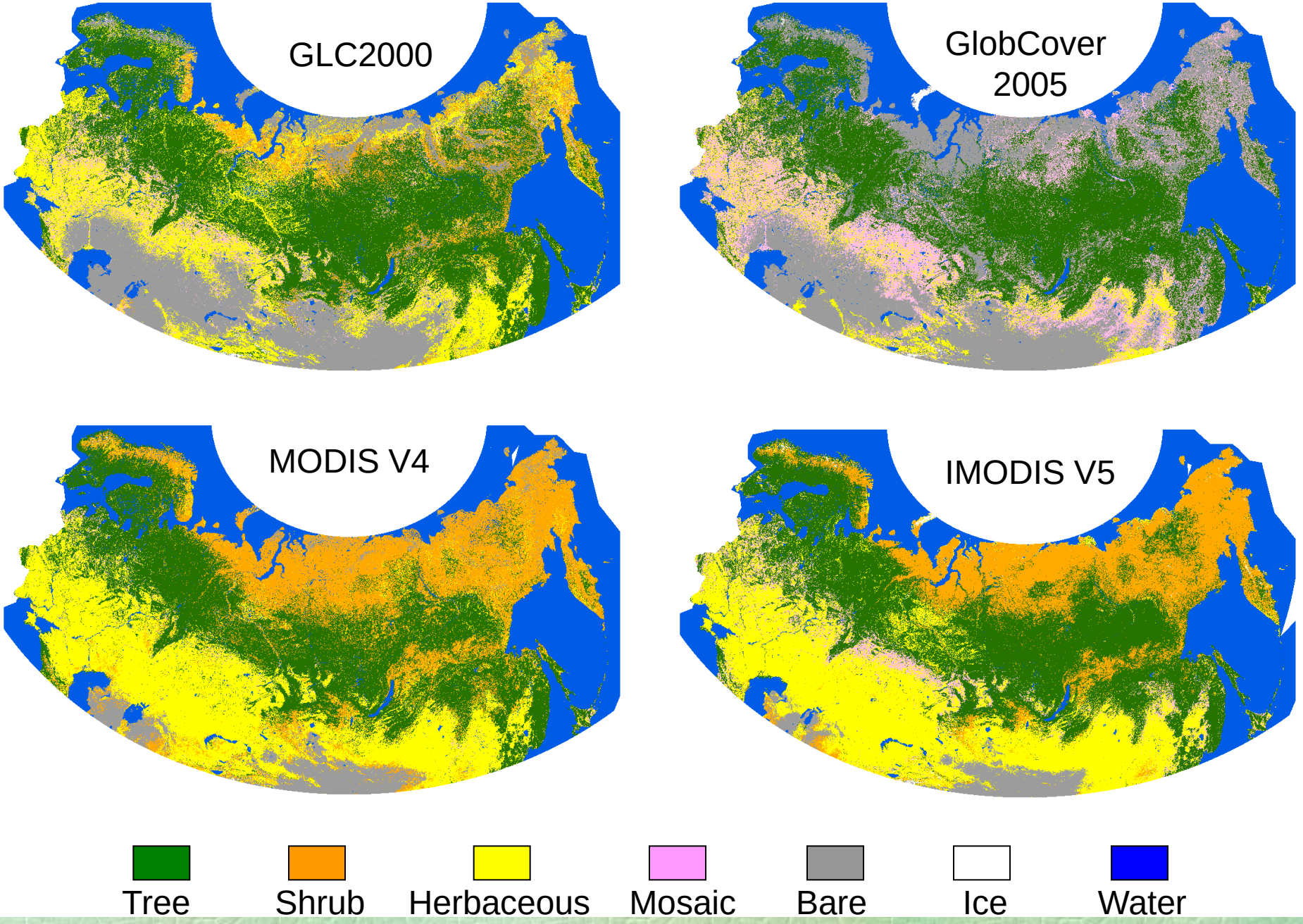
NELDA

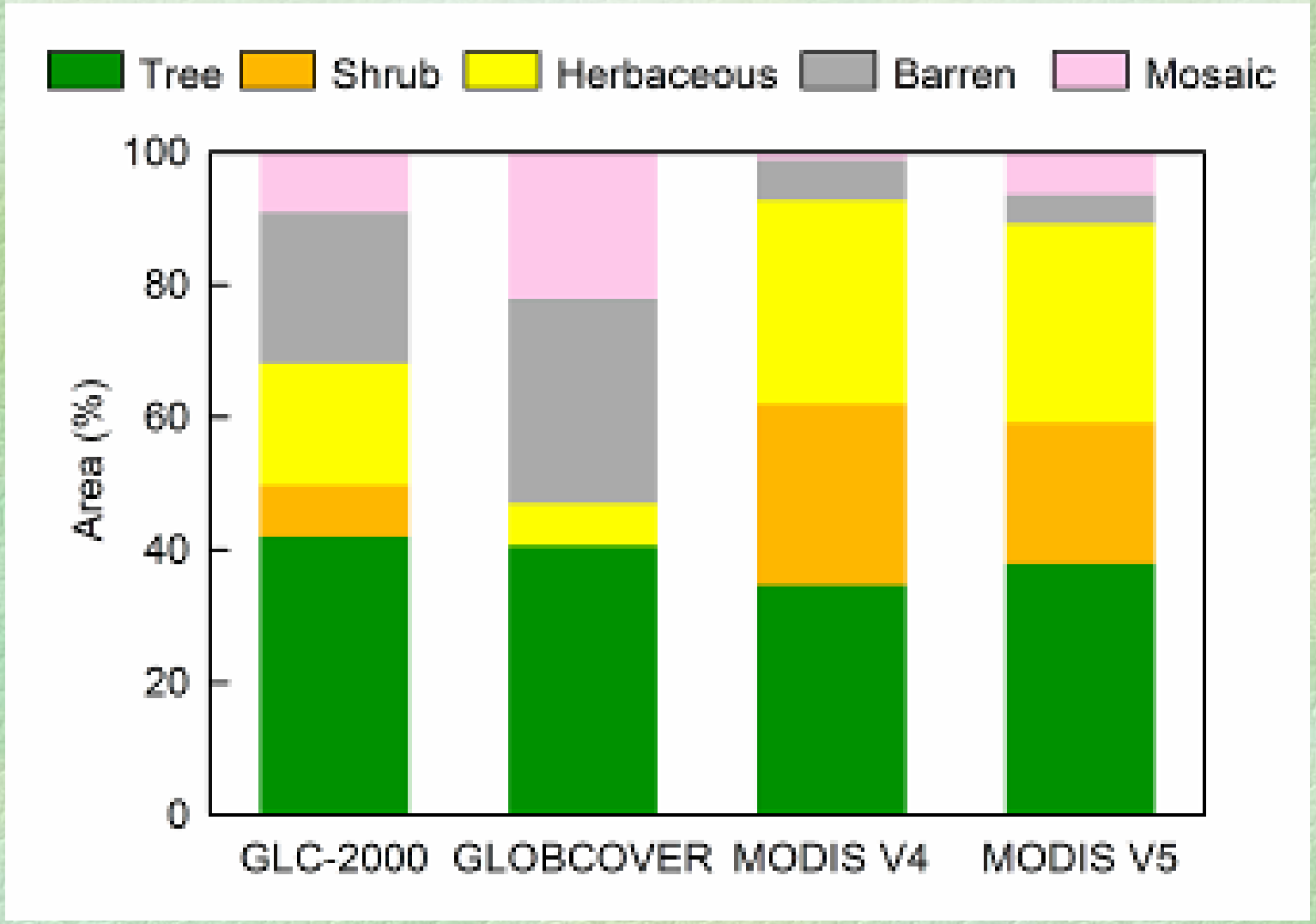
(Northern Eurasia Landcover Dynamics Analysis)



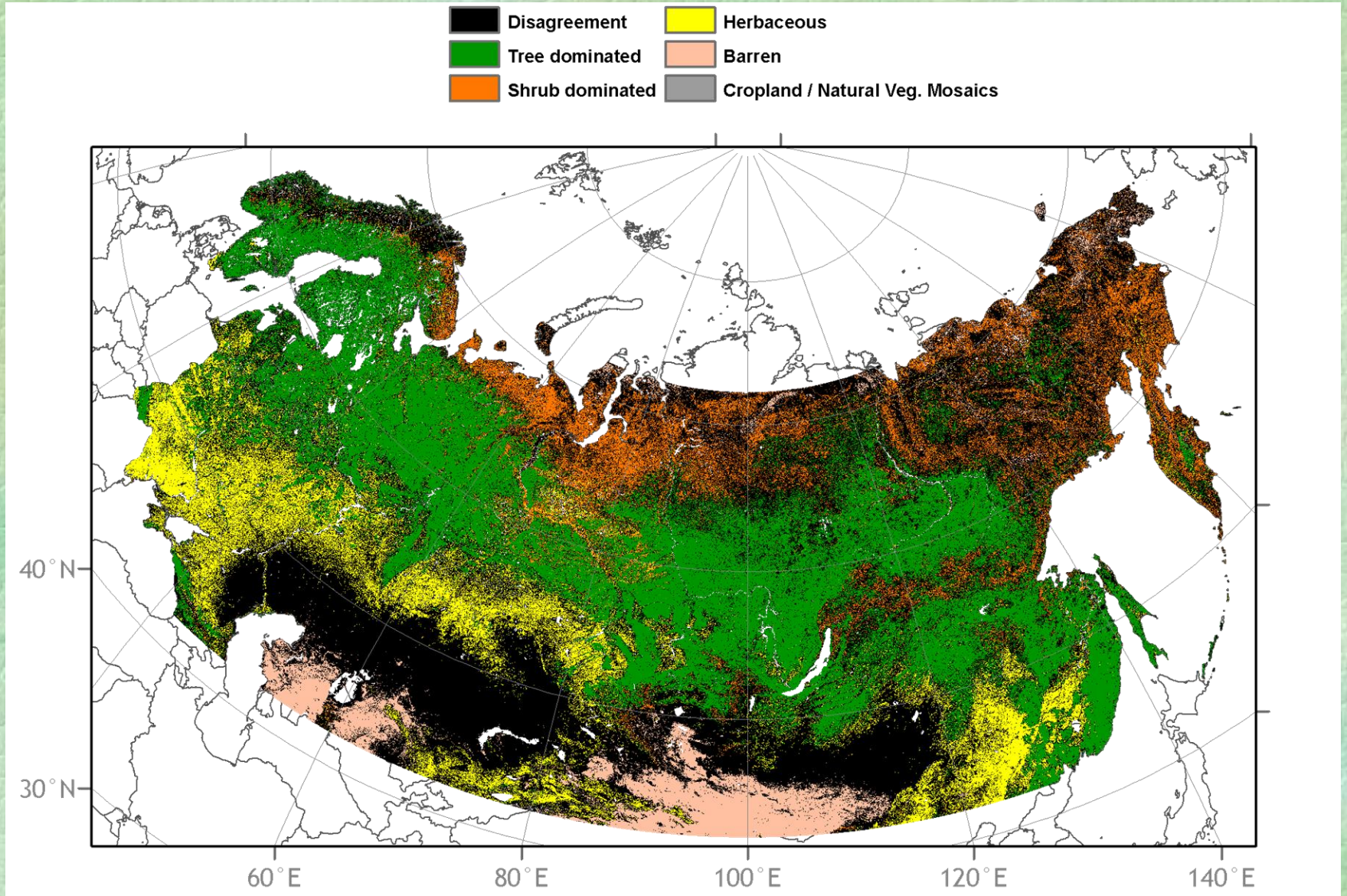
GOFC-GOLD


GLC2000
GlobCover 2005
MODIS V4
IMODIS V5
Tree
Shrub
Herbaceous
Mosaic
Bare
Ice
Water

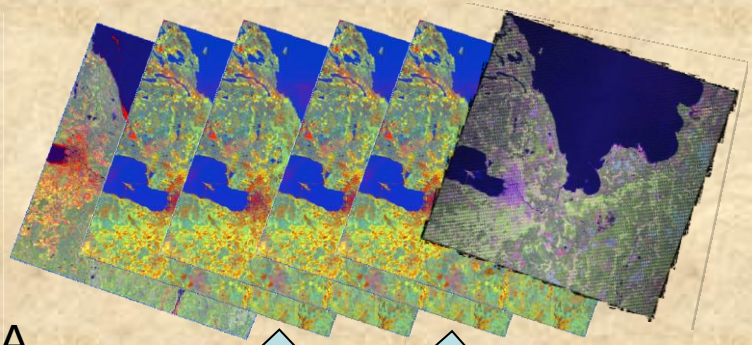
Relative frequency of dominant life form types



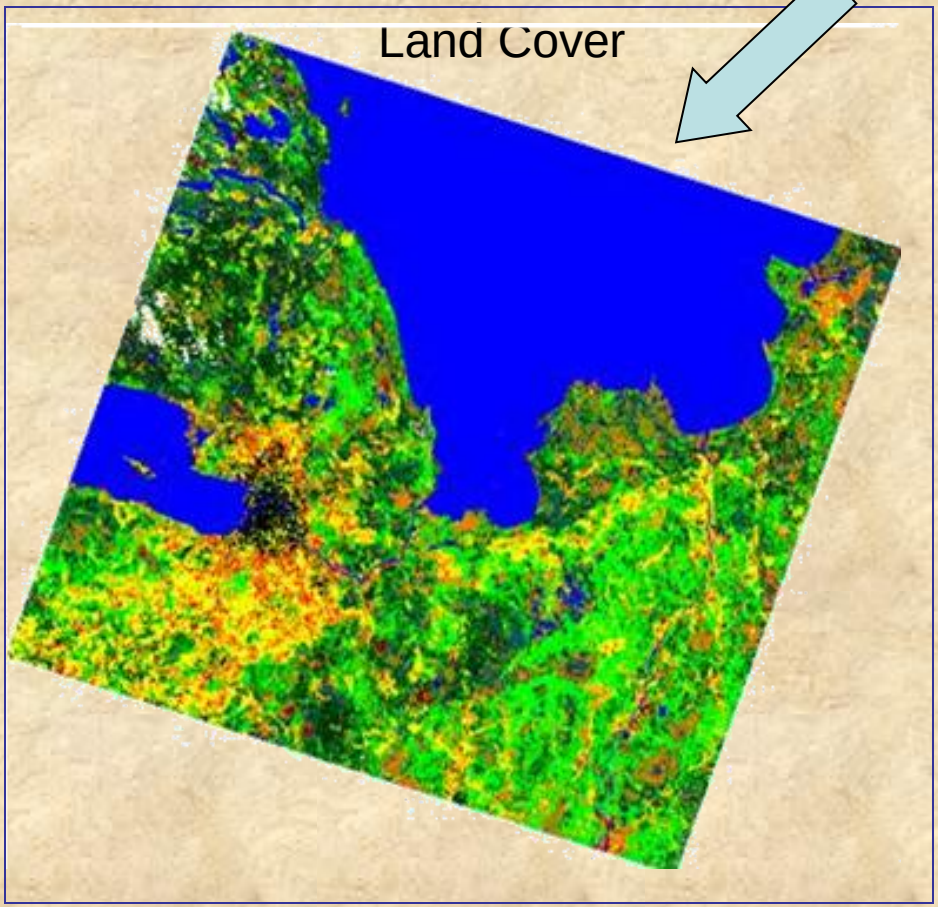
Agreement in dominant vegetation cover between GLC-2000 and MODIS V4 (54%)



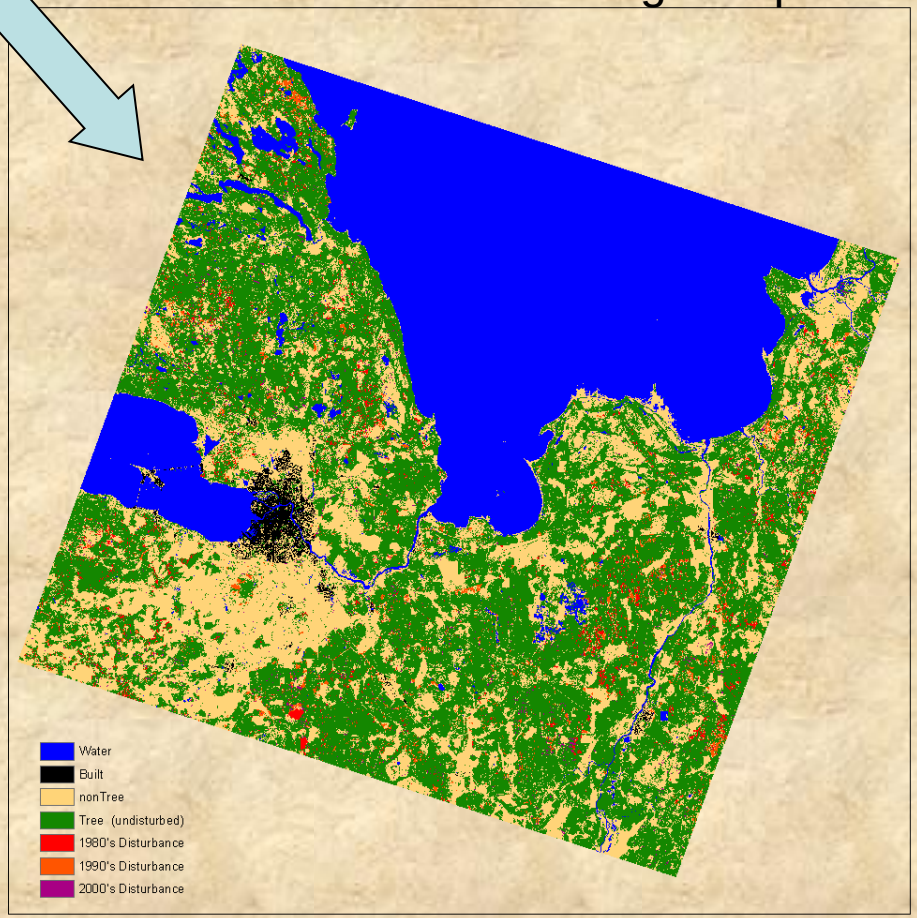
NELDA Test Sites

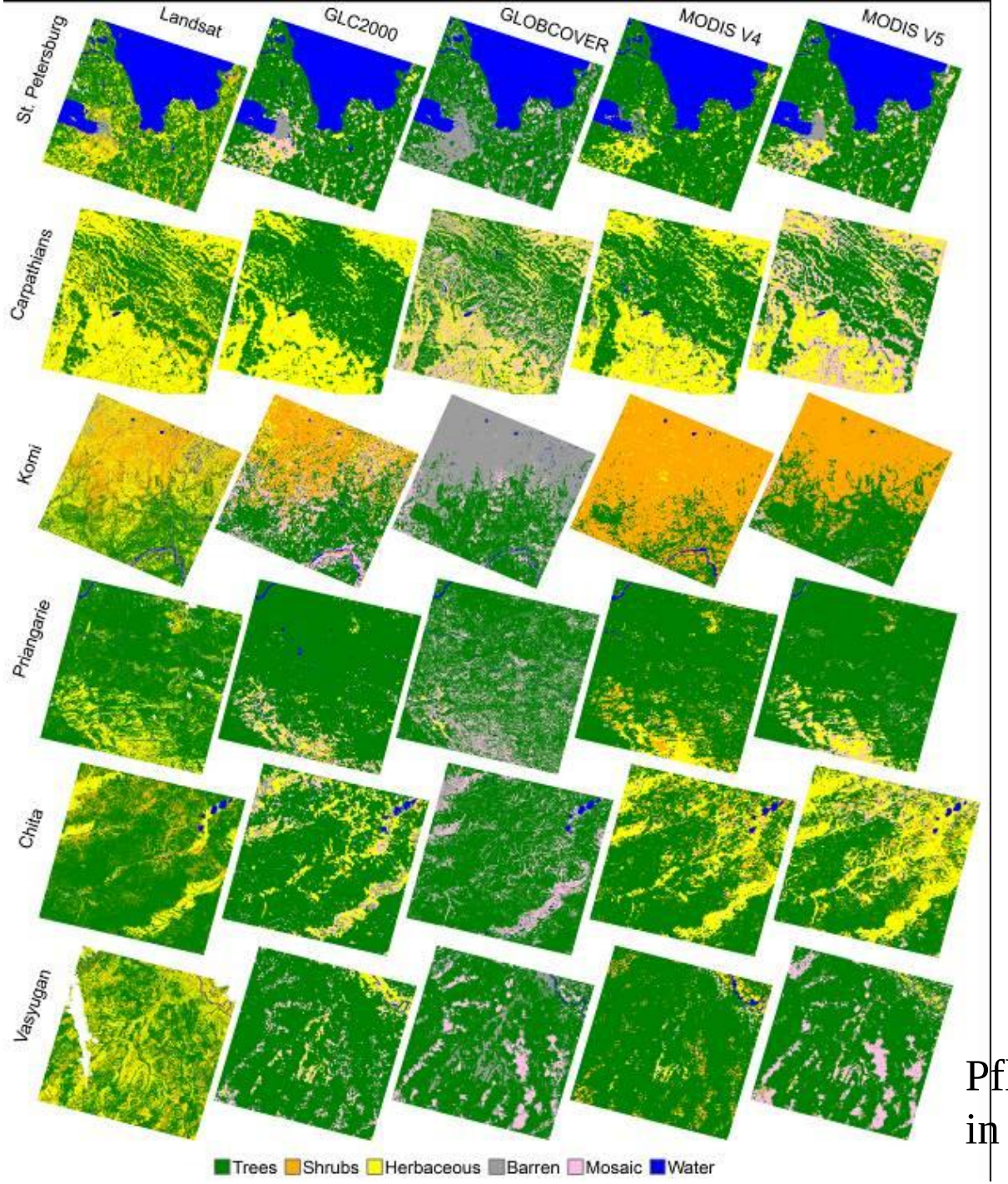


NELDA
Land Cover

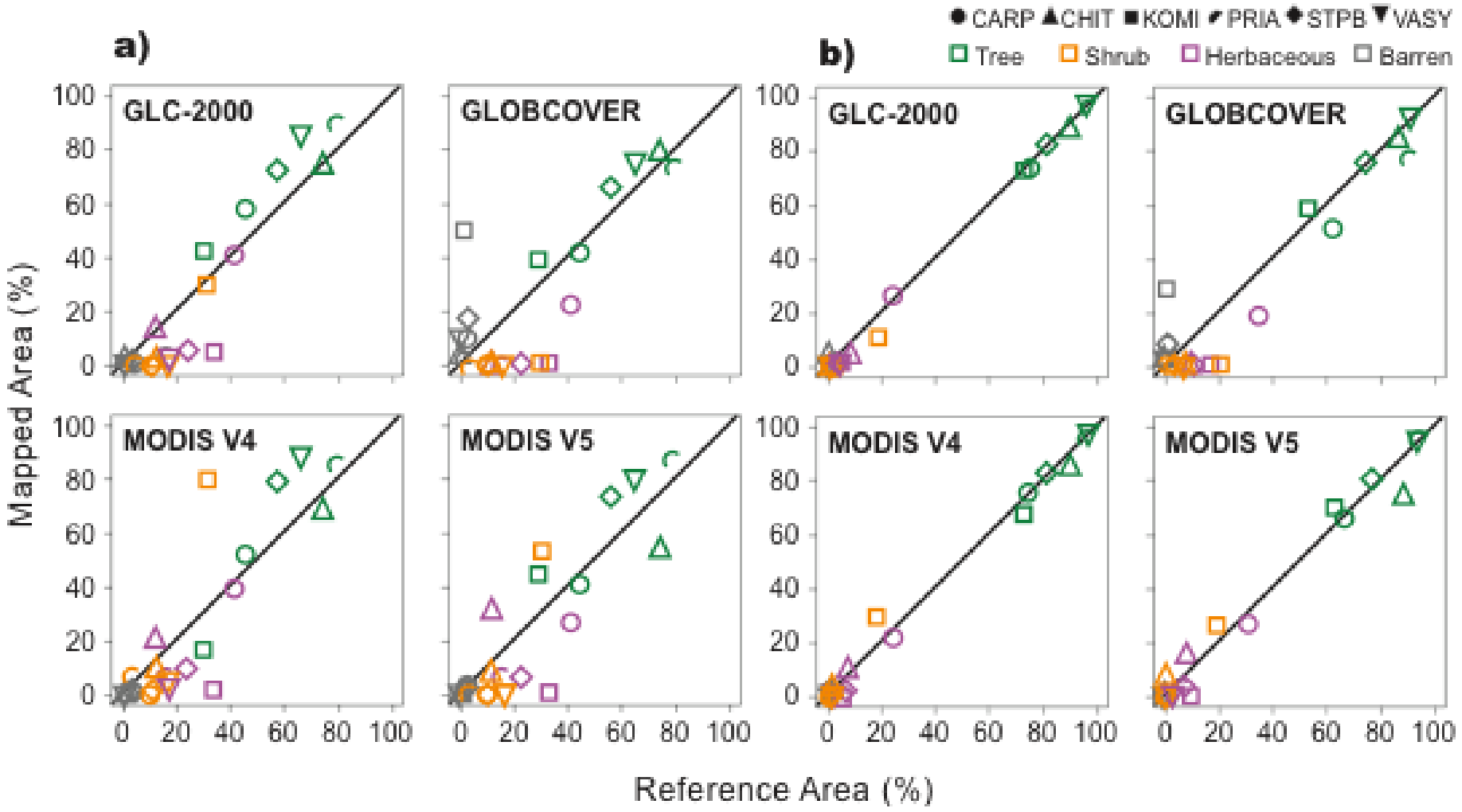


Change Map





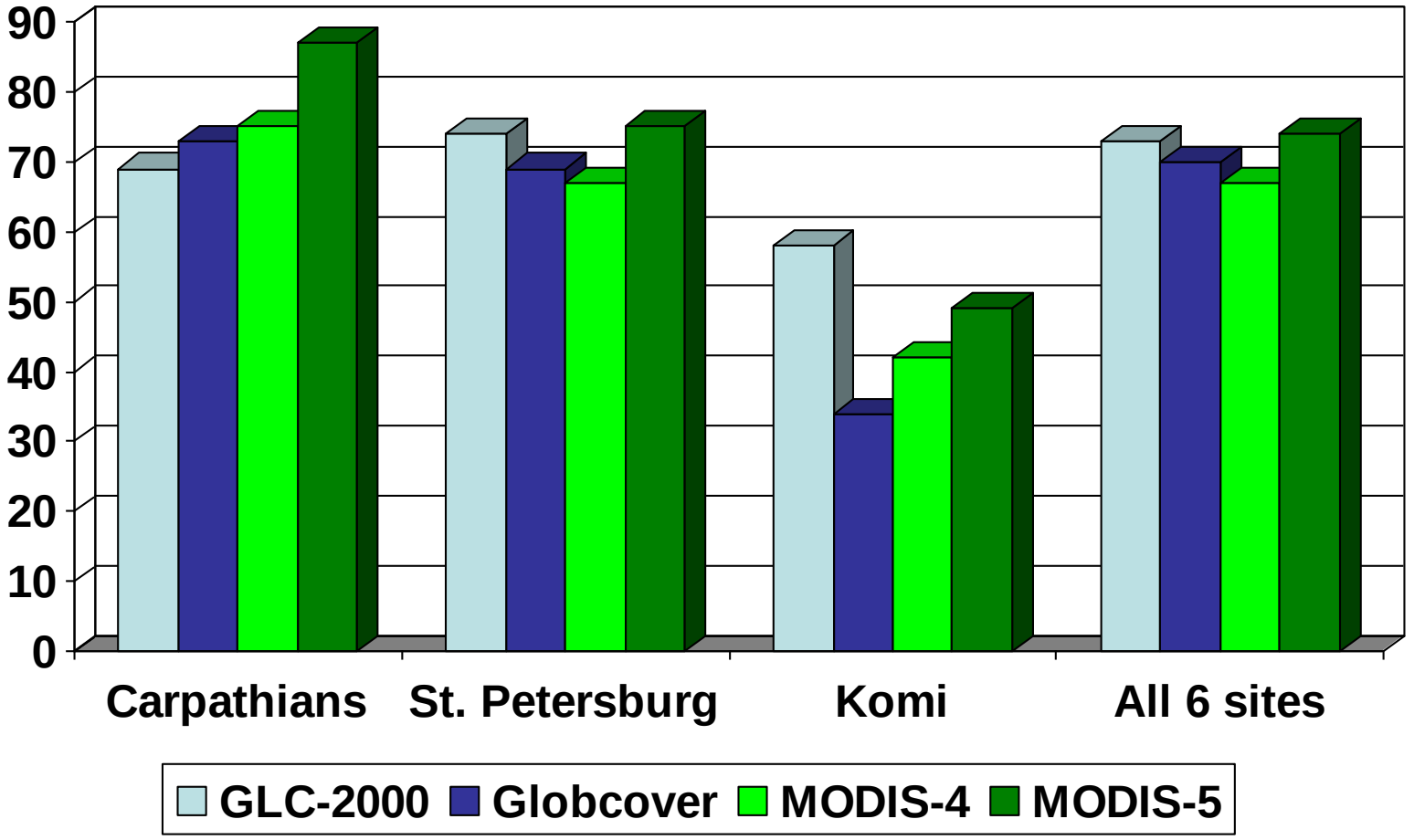
Pflugmacher et al., in review.



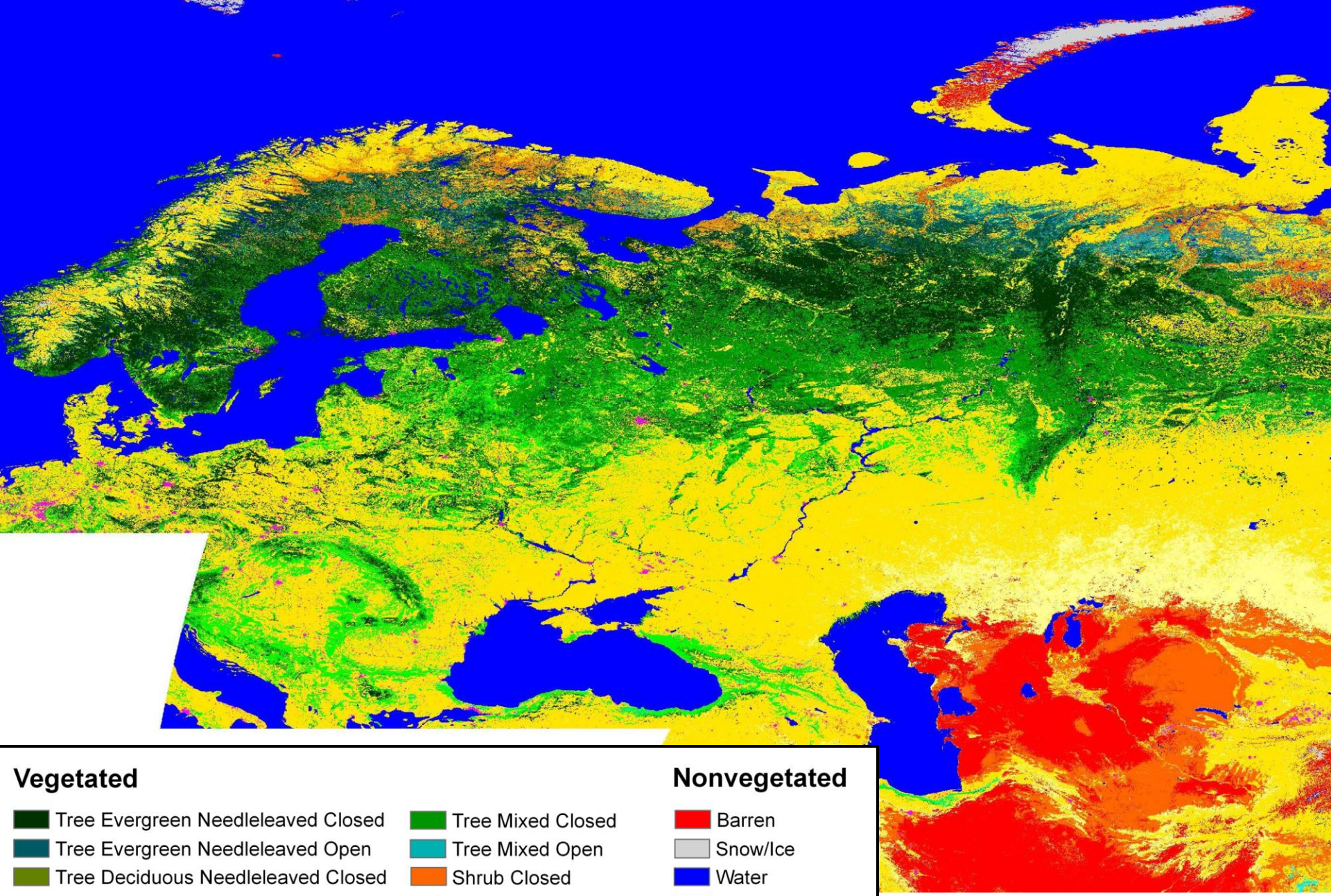
Pflugmacher et al., in review.

Agreement between reference maps at test sites and global products:

per-pixel comparisons of dominant life form types



Pflugmacher et al., in review.



Sulla-Menashe et al., in review (see poster)

NELDA

(Continued)

- NELDA-II: Contribution to studies of LCLUC in Northern Eurasia
  - Supports continued collaboration with scientists at Humboldt-Universität zu Berlin, the Siberian Branch of the Russian Academy of Science, Tomsk, National University of Mongolia, Space Research Institute in Kazakhstan
  - Understanding continental-scale patterns of land-cover change, their socio-economic drivers and environmental controls
- New NELDA test site in the republic of Mari-El (Yoshkar-Ola)
  - Grant from Russian Federal Agency on Science and Innovation to Mari State Politechnical University, PI Dr. Eldar Kurbanov
- Ongoing planning for a new proposal to synthesize past LCLUC research in Central Asia (Kirsten DeBeurs)
  - Additional sites in Central Asia (and southern part of Russia?)
  - Develop a new land cover map for the region in line with requirements formulated at Almaty workshop.

NELDA Sites

1 St Petersburg (p184 r18)
2 Carpathians (p186 r20)
3 Komi (p171 r13)
4 Priangarje (p141 r20)
5 Chita (p129 r24)
6 Kazakhstan (p160 r24)
7 Vasyuganje (p149 r20)
8 Amur (p122 r23)
9 Sikhote-Alin (p111 r25)
10 Khanty-Mansi (p159 r17)
11 Mongolia (p132 r26)
12 Yoshkar Ola (p172 r20)

NELDA

Northern Eurasia Land Dynamics Analysis

Project | Sites | Global Map Analysis | New Continental Map

- Overview
- St. Petersburg
- Carpathians
- Komi
- Chita
- Priangare
- Kazakhstan
- Amur
- Vasyugan
- Sikhote-Alin
- Mongolia
- Yoshkar Ola

Global Land Cover

To identify specific needs and possibilities for improved mapping of land cover across boreal and temperate Northern Eurasia, we compared the performance of recent land-cover products derived from different sensors: MODIS (MODIS IGBP Land Cover Collection 4 and 5), SPOT VEGETATION (GLC-2000) and MERIS (GLOBCOVER).

What are the differences and similarities between global datasets?

We examined the level of agreement among these data sets across the entire region. On a qualitative level, the assessment of general patterns indicates the highest degree of disagreement in transitional zones at the northern and southern fringes of boreal forest, in mountainous regions, and in areas of extensive wetlands, agricultural development, and urban land use. The quantitative analysis measured the level of disagreement between land-cover classes aggregated according to dominant life form type of vegetation (trees, shrubs, herbaceous, bare land, and permanent snow/ice).

What is the accuracy of global maps at NELDA test sites?

Validation of global datasets was performed with higher resolution, Landsat-based land cover maps from NELDA test sites. Fractional land cover was calculated for coarse resolution pixel and used to construct fractional error matrices. Most errors were associated with "mixed" coarse-resolution pixels (i.e. those having nearly equal percentage of multiple class types), while errors in "pure" (single class) pixels were low. In addition to actual differences in land-cover classifications, other sources of discrepancy among these land cover products include class definitions, map projections, and spatial resolution.

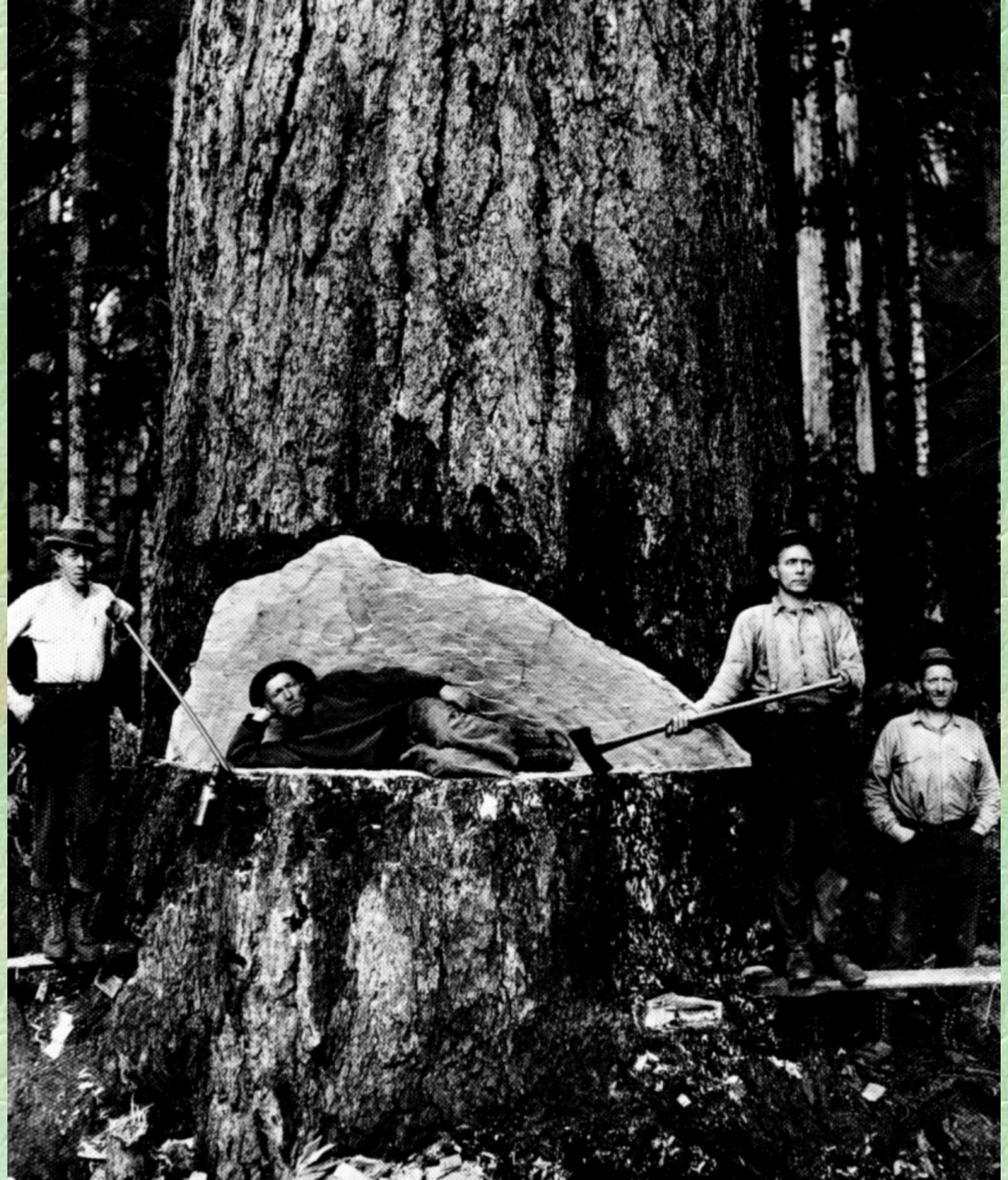
Dominant Live Form Types

Differences in class definitions and legends between maps are a major difficulty for comparing global land

http://www.fsl.orst.edu/nelda/index.html

NERIN

Northern Eurasia Regional Information Network



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http://www.fao.org/gtos/gofc-gold/index.html

http://nerin.scert.ru

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