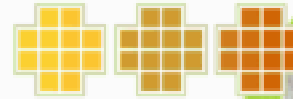


Добрый день!

Good Afternoon!



Regional GOFC-GOLD workshop

Detection And Validation of Land-cover Change

Картирование и валидация изменений в
растительном покрове

December 15-16, IKI, Moscow, Russia

Workshop Objectives

- Review land-cover mapping activities:
 - At global/continental scale (moderate resolution)
 - At regional/local scale (higher resolution)
- Discuss approaches to using high resolution maps to validate moderate resolution products
 - Generally and within NELDA project
- Discuss legends, methods, and work plans for NELDA test sites (Open meeting of NELDA team)
- Plan future activities for NERIN network

List of abbreviations

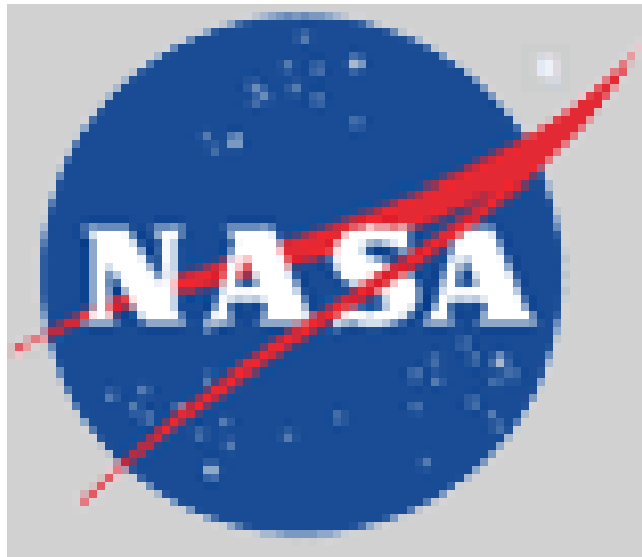
- **GOFC-GOLD**
 - Global Observations of Forest Cover – Global Observations of Land Dynamics
- **NERIN**
 - Northern Eurasia Regional Information Network
- **NELDA**
 - Northern Eurasia Land Dynamics Analysis

Workshop Agenda

- November 15 (pm):
 - Speakers:
 - Krankina, Baccini, Kharuk, Maslov, Vandysheva, Zalogin, Polischuk
 - Coffee break
 - Discussion (20 min)
- November 16 (am)
 - Speakers
 - Bartalev, Combal, Elsakov, Muratova, Krankina
 - Coffee break
 - Discussion (1 hour) – topics to be finalized
 - NELDA map legend / Легенда карты для проекта NELDA
 - Change detection methods at test sites / Методы определения изменений в растительном покрове на тестовых участках
 - Future workshop plans for NELDA and NERIN / Планы будущих семинаров по проекту NELDA и сети NERIN

Organizational Details

- Speakers please stay on time
- Questions and discussions – active participation strongly encouraged
- Cell phones
- Translation



START



Deeds Before Words



- A coordinated program of space-based and on-the-ground forest and land cover observations for global monitoring of terrestrial resources and the study of global change.
 - Координированная программа космических и наземных наблюдений за лесным и прочим растительным покровом с целью глобального мониторинга наземных ресурсов и исследования глобальных изменений
- Two implementation teams
 - Land Cover Characteristics and Change
 - Fire Monitoring and Mapping.
- Regional networks – NERIN is one of 6 or 7
- The GOFC-GOLD Project Office is located in Canada and is hosted by Canadian Forest Service and the Canadian Space Agency.

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 по глобальным изменениям

Thematic components - Land-cover and Fire

Тематические компоненты – Растительный покров и Пожары

What is NERIN?

Что такое NERIN?

- Network of people (Сеть специалистов)
- Network of institutions (Сеть организаций)
- Network of projects (Сеть проектов)
- Network of points of contact (Сеть точек контакта)
- <http://www.fao.org/gtos/gofc-gold/index.html>

Workshops

(or how we got ourselves organized)

- Global Observation of Forest Cover (GOFC) Boreal Forest Workshop (Novosibirsk, Russia, August 2000)
- Regional workshop for Western Russia-Fennoscandia region (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, IKI, Moscow, Russia
- ? Syktyvkar?

[Home](#) > [Regional Networks](#) > **NERIN**

NERIN - Региональная Информационная Сеть по Северной Евразии

English: <http://www.fao.org/gis/gofc-gold/net-NERIN.html> (оригинал данного сайта на английском языке)

Северная Евразия - крупнейший массив суши, расположенный вне тропиков, и обладающий самыми большими запасами органического углерода, а также являющийся областью активного изменения землепользования. Данный регион - один из основных источников неопределенности во многих крупномасштабных оценках, включая оценки поверхности земли, запасов и потоков углерода.



Основная цель NERIN - это содействие и координация проведения и поставки широкому кругу пользователей в Северной Евразии наблюдений за Системой Земля. NERIN также сотрудничает с агентствами по земле- и лесопользованию для обеспечения непрерывных высококачественных наблюдений для практических приложений и управления.

Сеть NERIN тесно связана с Инициативой Партнерства по наукам о Земле в Северной Евразии (**NEESPI**), которая является международной региональной программой научных исследований в области наук о Земле.

NERIN является неформальной сетью ученых и других специалистов, а также научных учреждений, сетей и проектов, работающих по тематике GOFC-GOLD и NEESPI.

На сайте размещены отчеты и другие материалы с семинаров NERIN, проведенных в [2001](#), [2004](#) и [2005](#) ([отчет](#) и [копии докладов](#)) годах. Новый сетевой проект **NELDA** планируется начать в 2006 году; семинар по проекту NELDA запланирован на 8 июля в рамках конференции [ENVIRONIS-2006](#) в Томске, (1-8 июля 2006 г.).

В настоящее время NERIN собирает информацию о содержании, качестве, состоянии и других характеристиках доступных наборов данных, необходимых для поддержки новых исследований в Северной Евразии. Доступен [поиск по базе метаданных](#). Также приветствуется [пополнение](#) этой базы. Источники данных дистанционных наблюдений по Северной Евразии можно найти в [ссылках](#) и [каталогах](#) GOFC-GOLD.

[Контактная и дополнительная информация](#)

METADATA

Bringing Scientific Data to Light

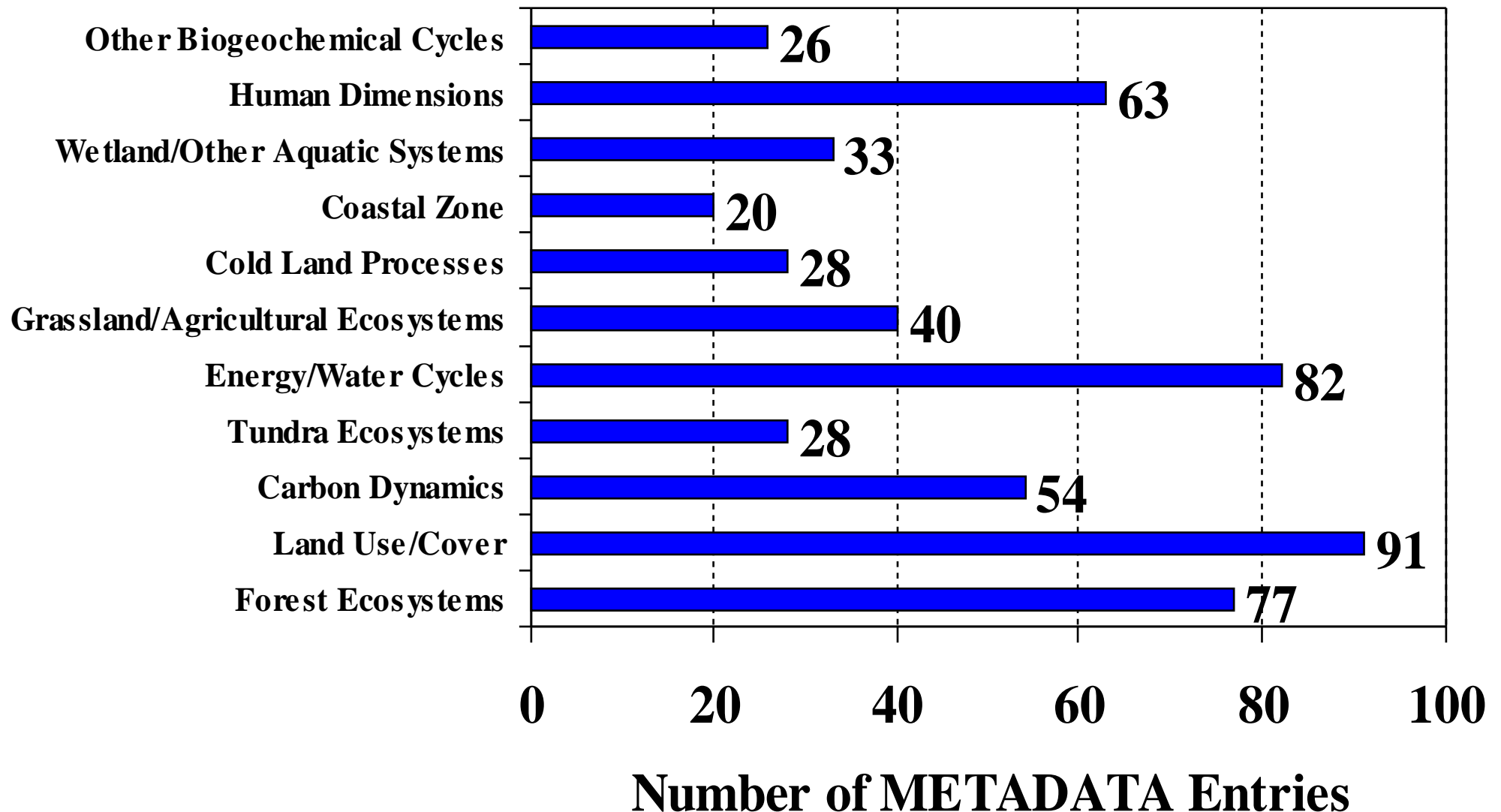
Make NERIN community aware of available data resources

180 data sets

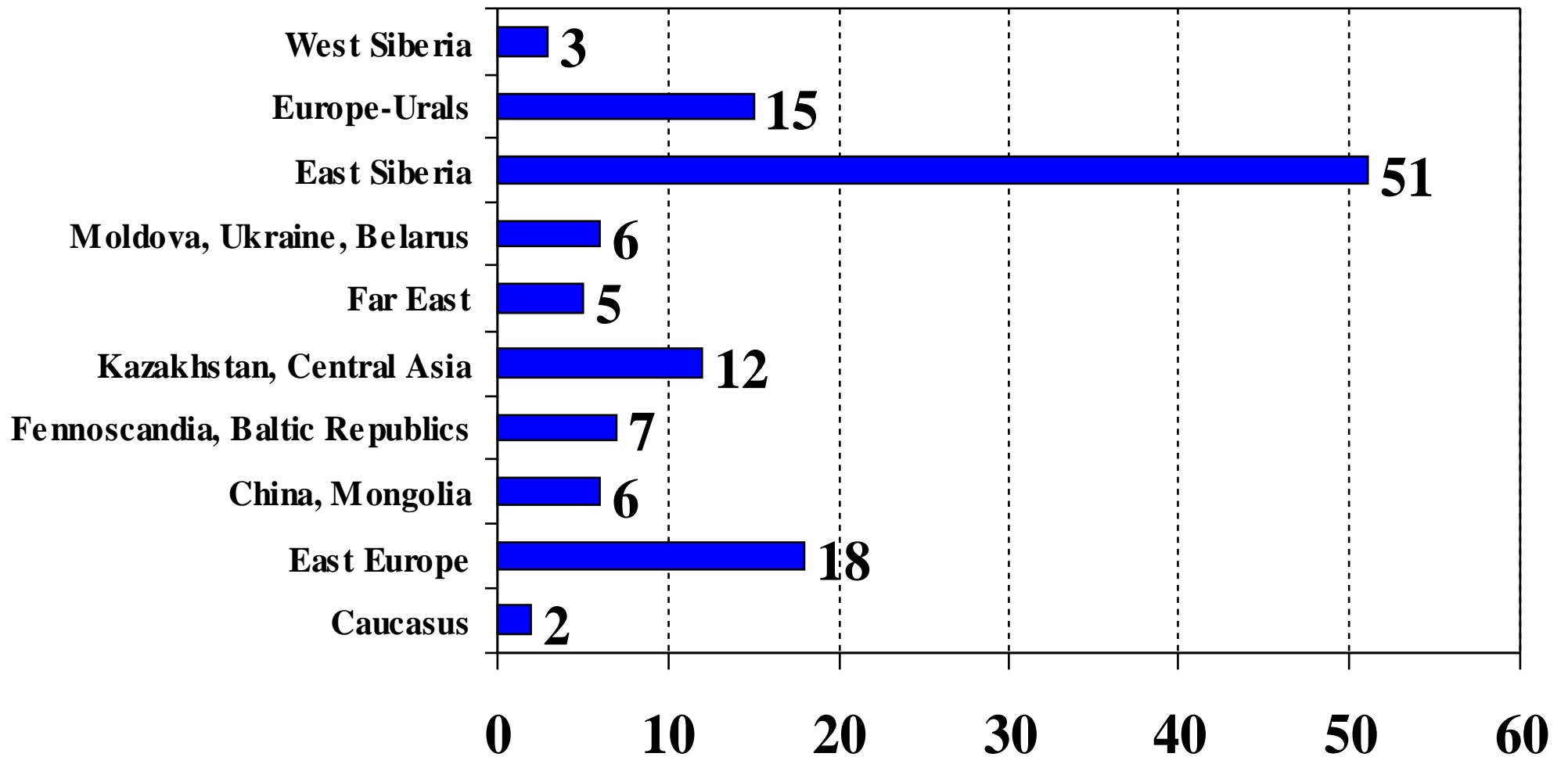
<http://wwwwdata.forestry.oregonstate.edu/MDEEDIT/index.aspx>

<http://nerin.scert.ru>

METADATA by Science Theme



METADATA by Region



Number of METADATA Entries

Olga N. Krankina, OSU

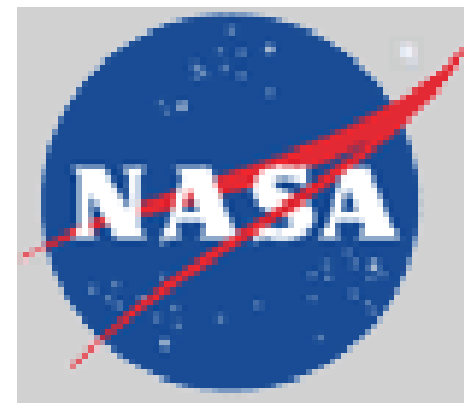
NERIN



Northern Eurasia Regional Information Network

NEELDA

(Northern Eurasia Landcover Dynamics Analysis)



2/2/2007

Olga N. Krankina, OSU

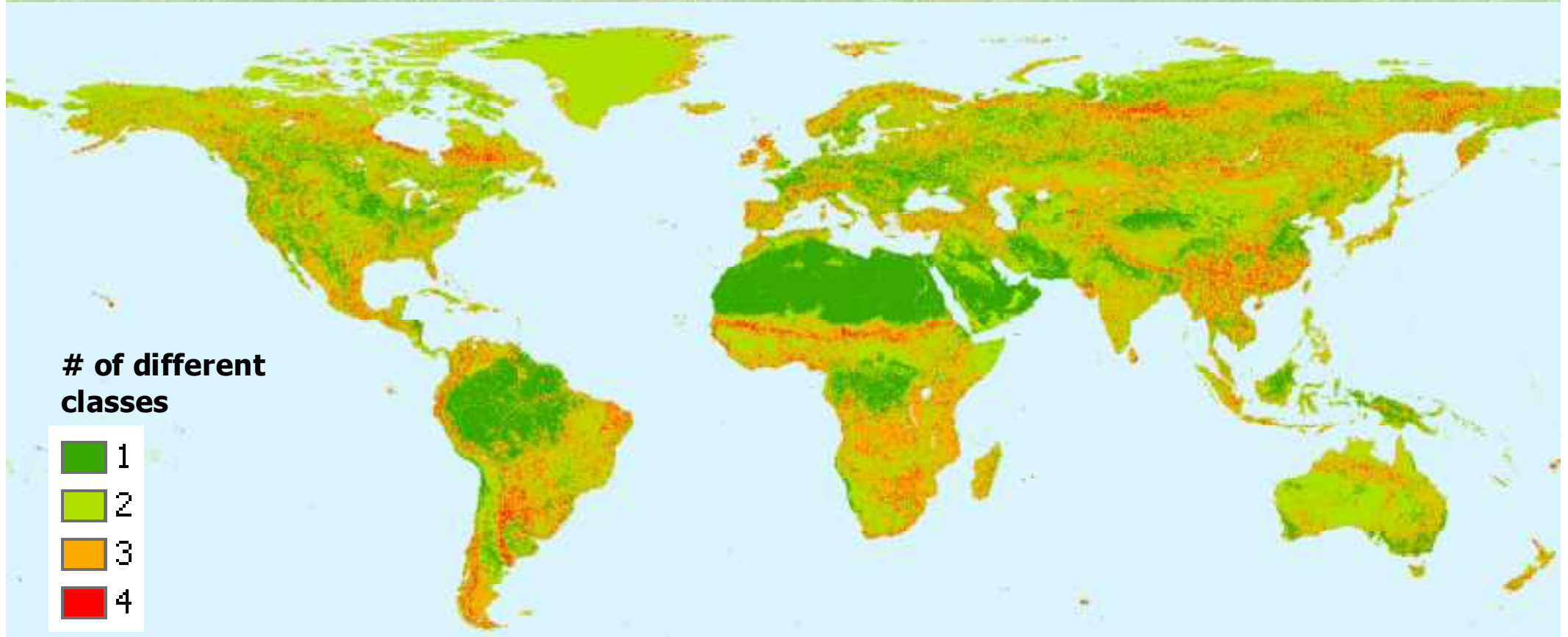
WHAT?

- Develop a system for monitoring and validating the distribution and change in land cover across Northern Eurasia (Разработать систему мониторинга и валидации карт растительного покрова и его изменений)

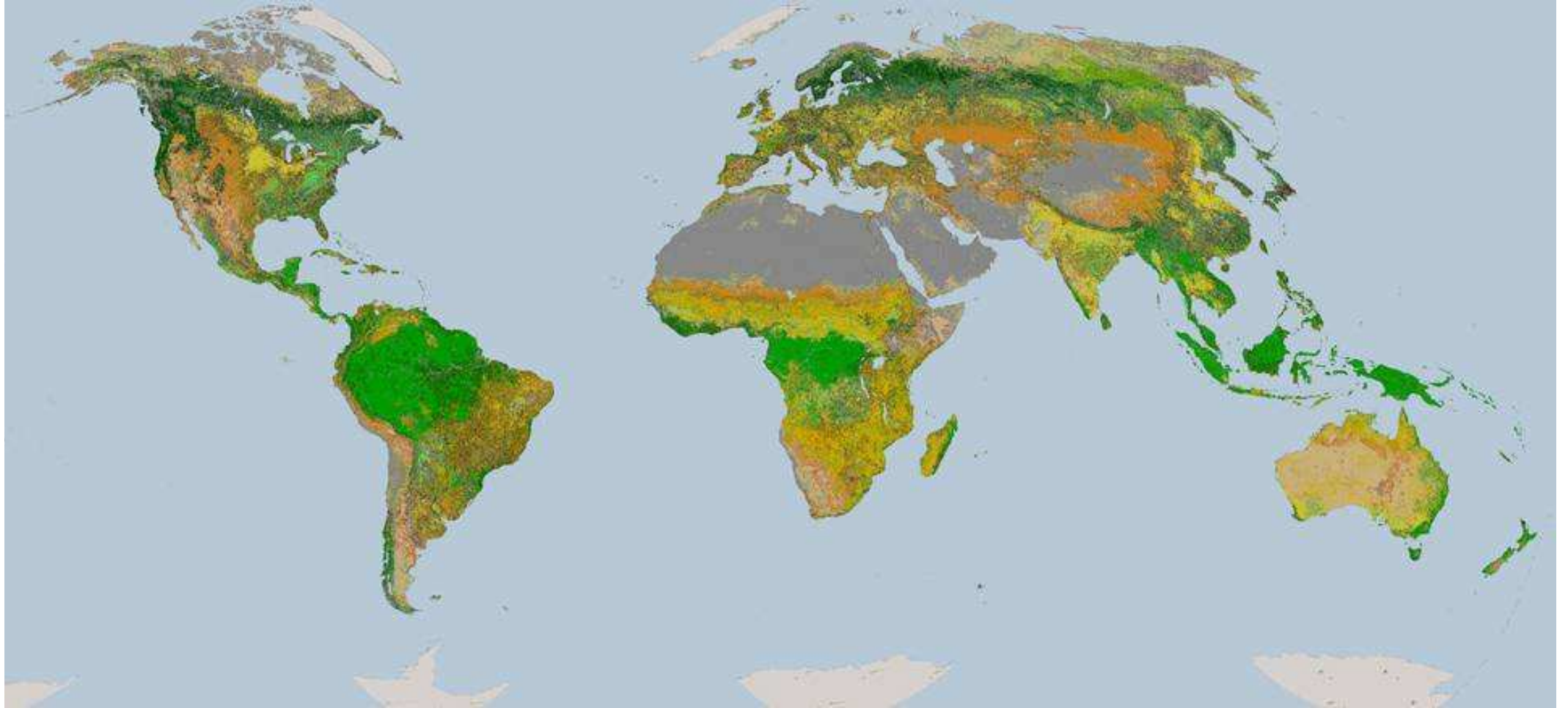
WHY?

- All maps are lies, some lie more than others (Все карты лгут, одни – больше, другие – меньше)
- Which maps work better for specific applications? (Какие карты лучше применять для конкретных задач?)
- It is possible to make a better map for Northern Eurasia (Есть возможность улучшить карты для Северной Евразии)

Agreement among land cover products



Describes number of different classes for each pixel in GLC2000, MODIS, IGBP-DIS, UMD based on a generalized legend (Image credit: M. Herold & C. Schmullius, GOFC-GOLD Land Cover Implementation Team Project Office)

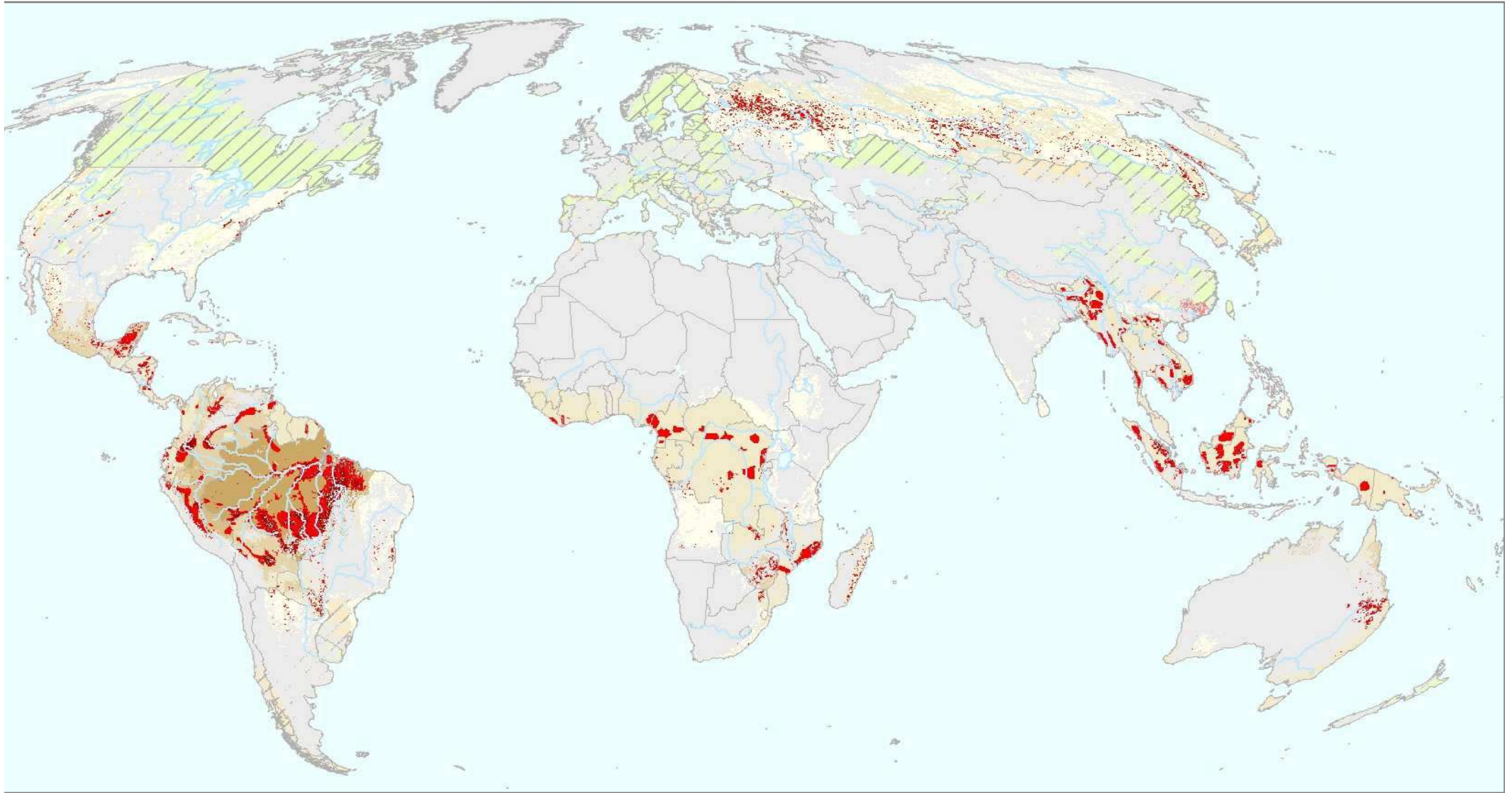


MODIS 2001 Land Cover Map

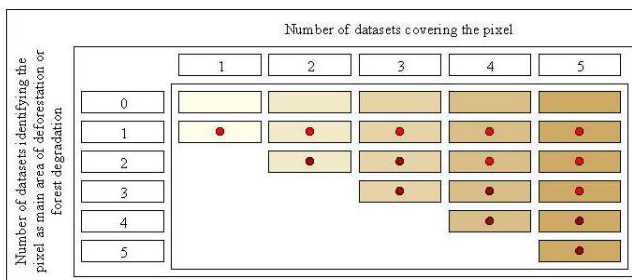
Image credit: Curtis Woodcock, BU

	0 Water
	1 Evergreen Needleleaf Forest
	2 Evergreen Broadleaf Forest
	3 Deciduous Needleleaf Forest
	4 Deciduous Broadleaf Forest
	5 Mixed Forests
	6 Closed Shrublands
	7 Open Shrublands
	8 Woody Savannas
	9 Savannas
	10 Grasslands
	11 Permanent Wetlands
	12 Croplands
	13 Urban and Built-Up
	14 Cropland/Natural Vegetation Mosa
	15 Snow and Ice
	16 Barren or Sparsely Vegetated

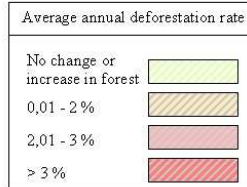
Figure 1: Main areas of deforestation and forest degradation over the last twenty years (1980-2000)



Forest covered by one or more studies based on remote sensing data or expert opinion



Forest covered only by national statistics



Unforested areas



Millenium ecosystem assessment

- Millenium Ecosystem Assessment carried out a first cut analysis of global land cover change.
 - **A Synthesis of Rapid Land-Cover Change Information for the 1981-2000 period.**
 - E. Lepers, E. F. Lambin, A. C. Janetos, R. DeFries, F. Achard, N. Ramankutty and R. J. Scholes

• The Team

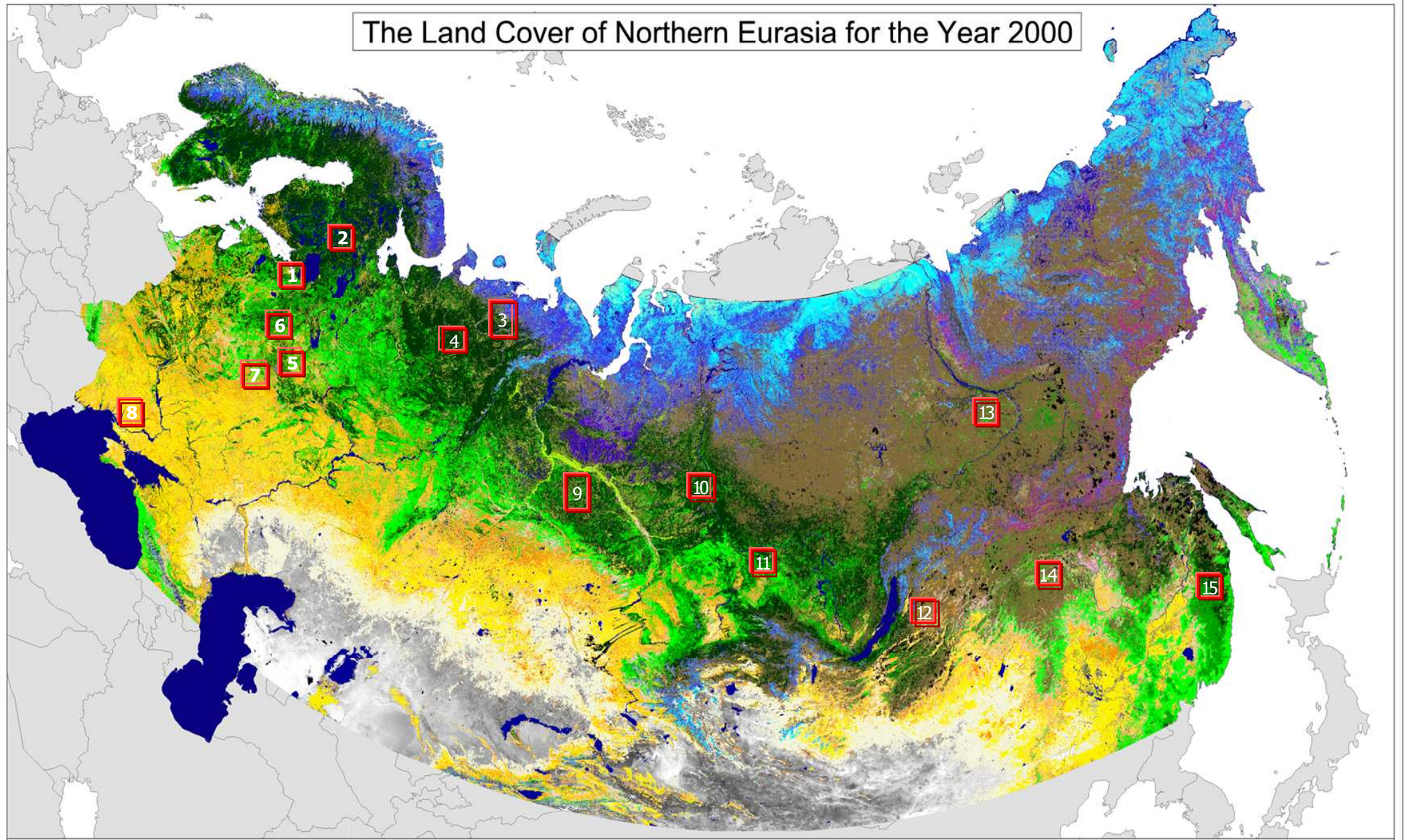
- US
 - Oregon State University - Olga N. Krankina
 - NASA Goddard Space Flight Center – Jeff Masek and Jeff Morisette
 - Boston University - Mark Friedl and Curtis Woodcock
 - University of Maryland - Ivan Csiszar, Guoqing Sun, and Tatiana Loboda
 - USDA FS Pacific Northwest Research Station – Warren Cohen
- Eurasia
 - Space Research Institute, Russian Academy of Sciences, Moscow – Eugeny Lupian, Sergey Bartalev, Dmitry Ershov
 - Center for Information Technologies Development, Moscow – Alexander Maslov and Natalia Vandysheva
 - Institute of Monitoring of Climatic and Ecological Systems, Tomsk – Evgeny Gordov
 - V.N. Sukachev Institute of Forest, Krasnoyarsk – Slava Kharuk
 - Institute of Biology, Komi Scientific Center, Syktyvkar – Vladimir Elsakov
 - Institute of Sustainable Development of Ukraine, Kiev – Mykola Zalugin



Approach

- Combine remote sensing data (Landsat, MODIS) and local knowledge of land-cover conditions and change to validate and improve land cover / land-cover change products for Northern Eurasia
 - establish a set of test sites for land cover / change analysis
 - use these sites to validate global and regional land cover / change products
 - develop methods for continental mapping of vegetation disturbance
 - produce a new, updated land cover map for Northern Eurasia based on MODIS data

The Land Cover of Northern Eurasia for the Year 2000

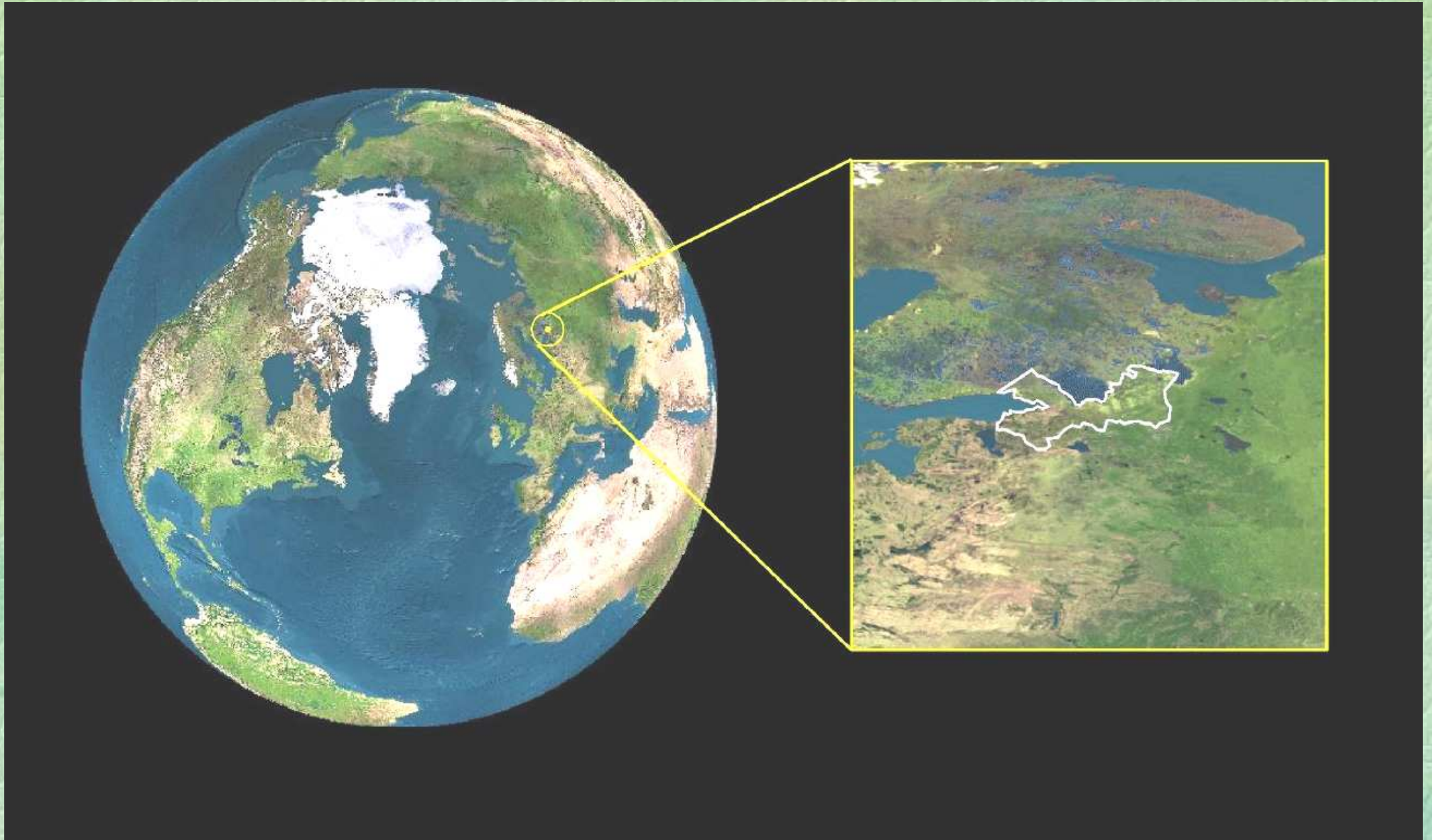


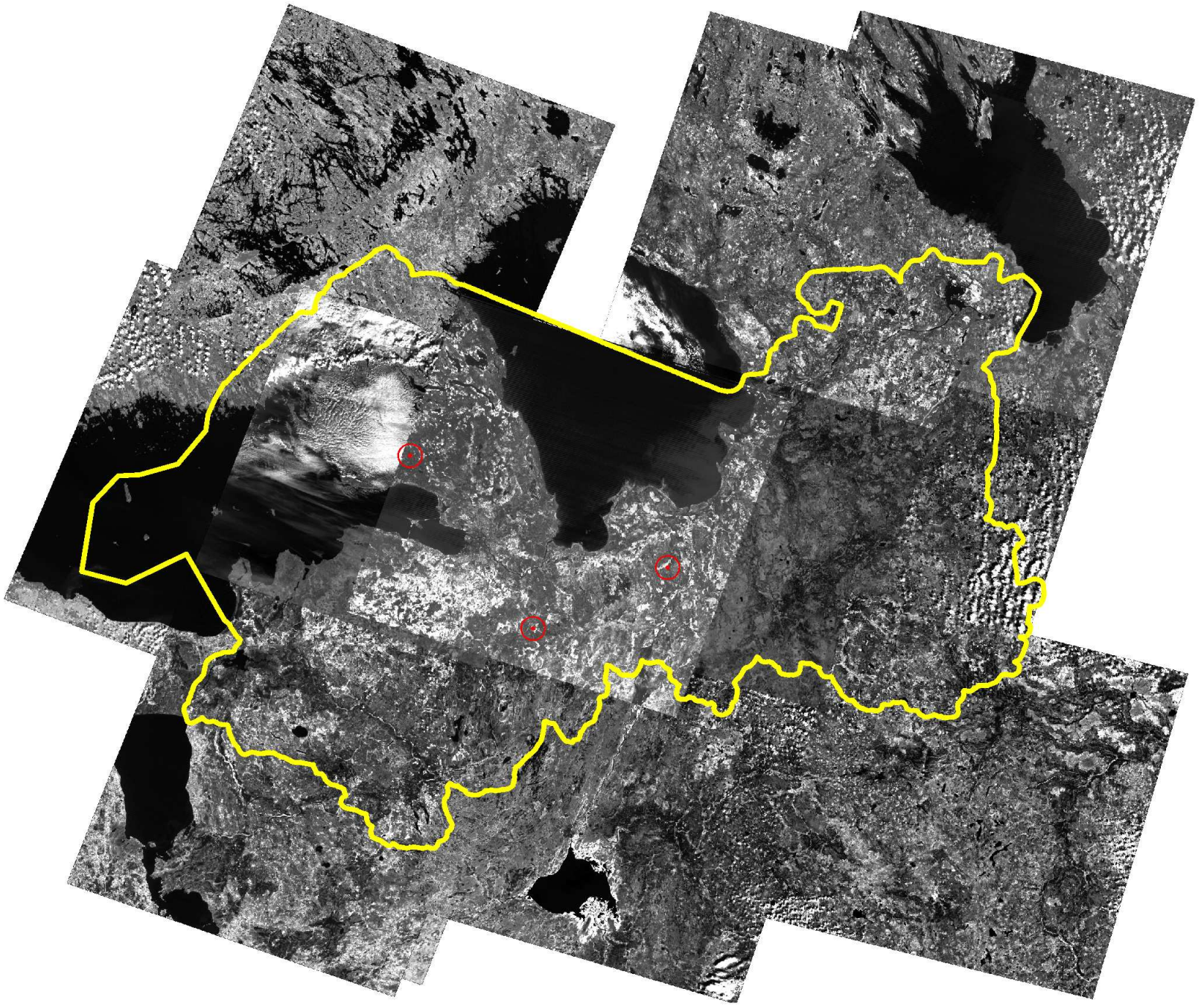
Location of NELDA test sites (Map was created at EC JRC as part of GLC 2000 project, Bartalev et al. 2003)

2/2/2007

Olga N. Krankina, OSU

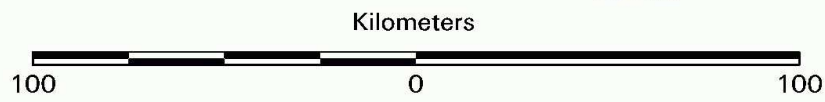
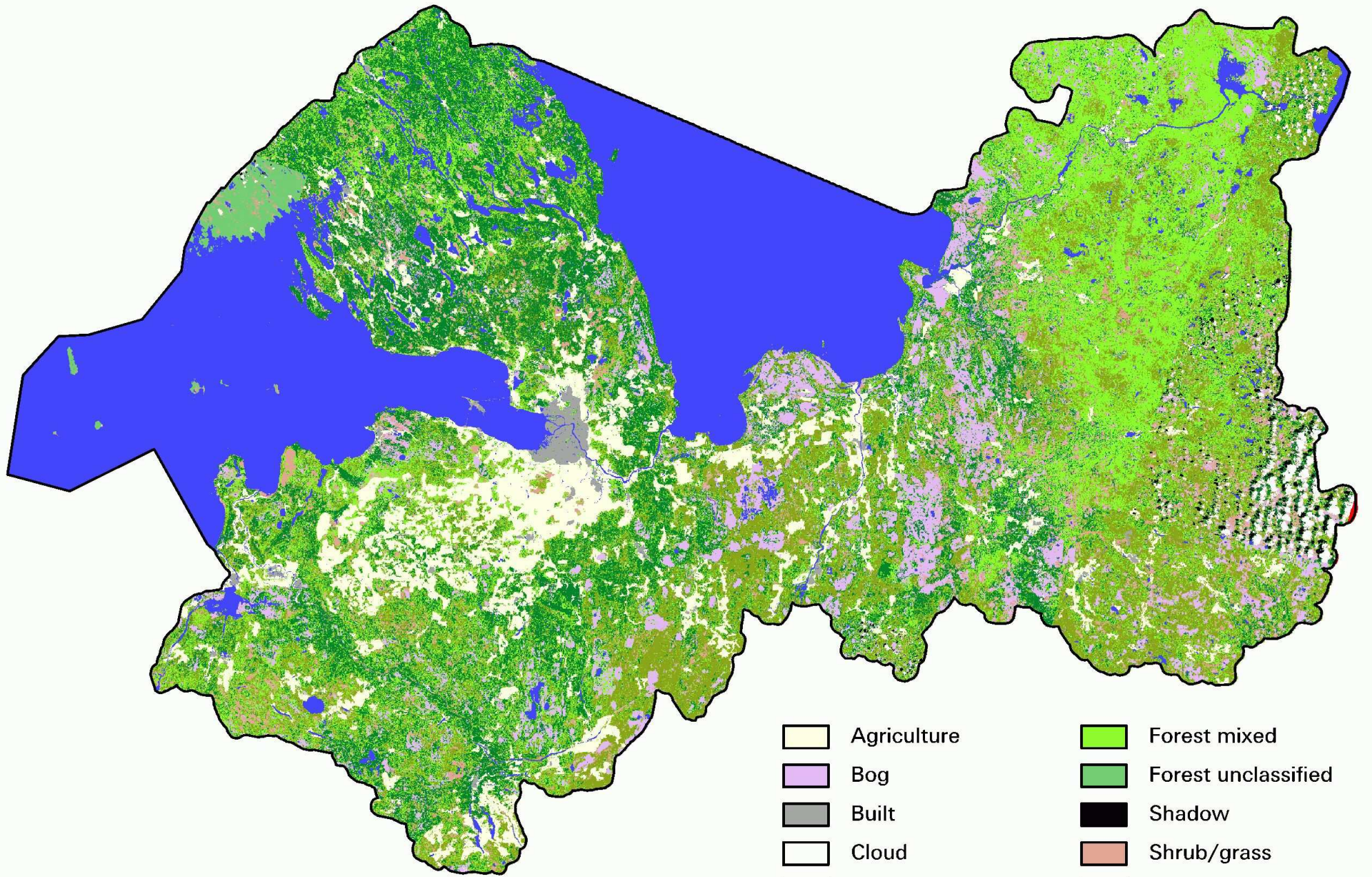
25



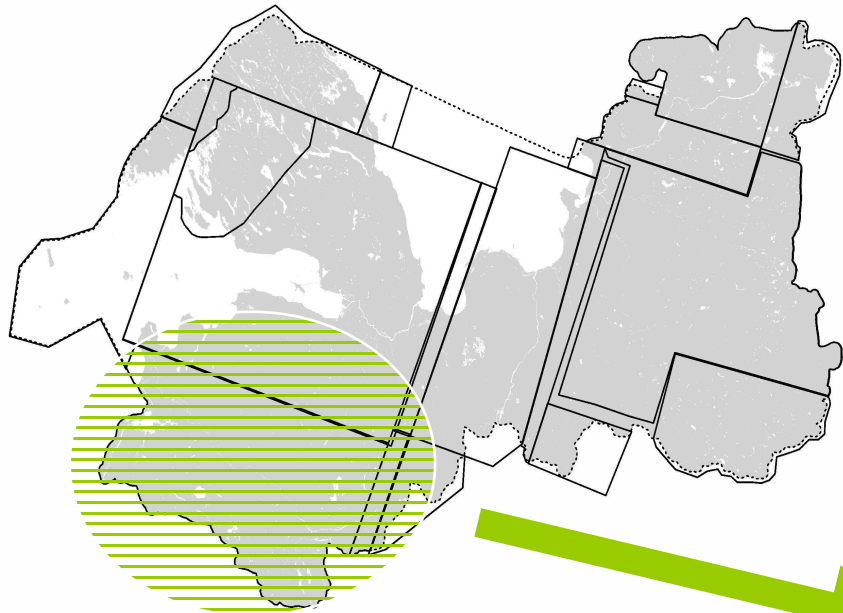


2/2/2

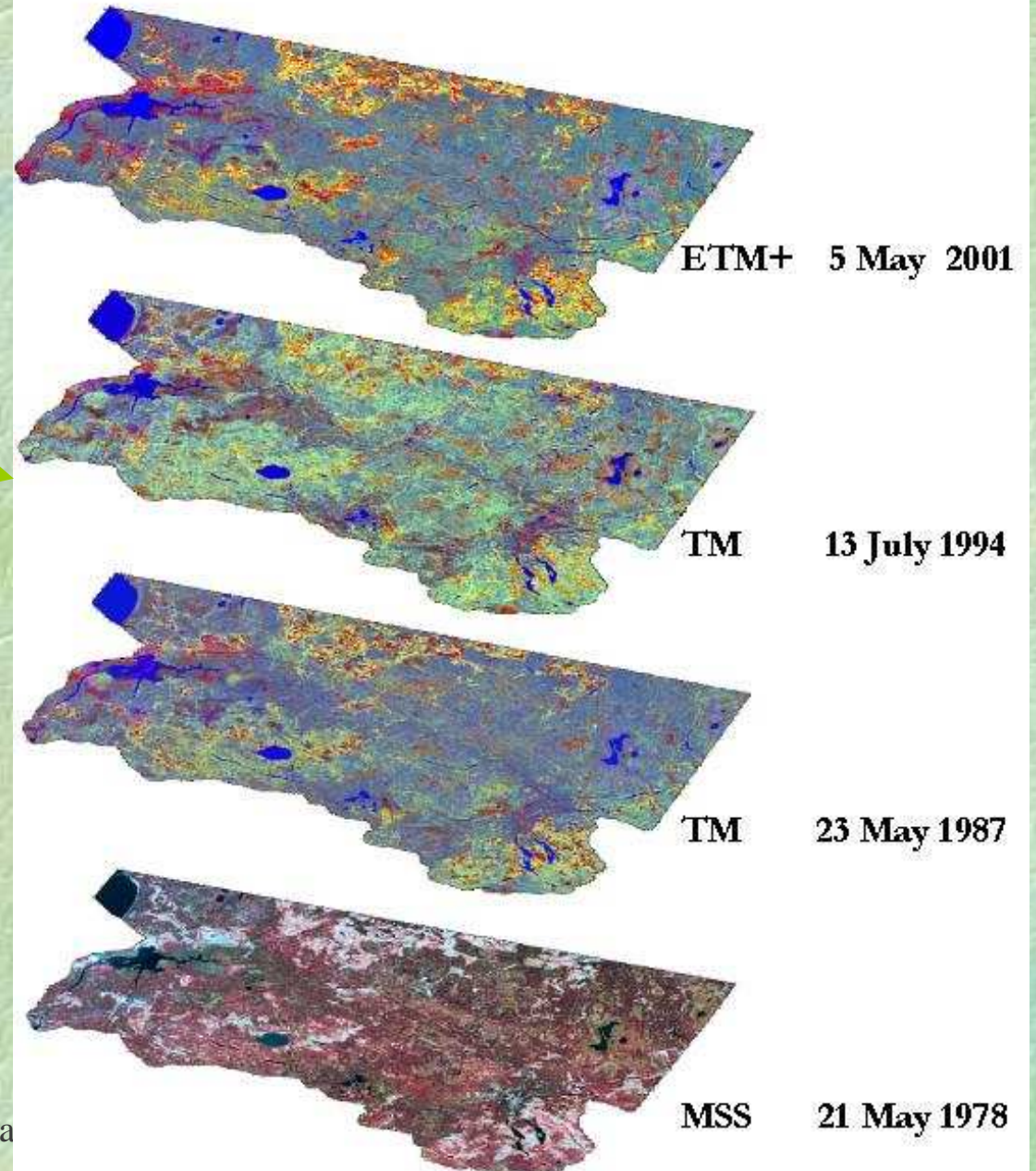




- | | | | |
|---|-----------------|---|---------------------|
|  | Agriculture |  | Forest mixed |
|  | Bog |  | Forest unclassified |
|  | Built |  | Shadow |
|  | Cloud |  | Shrub/grass |
|  | Forest conifer |  | Water |
|  | Forest hardwood |  | Unmapped |

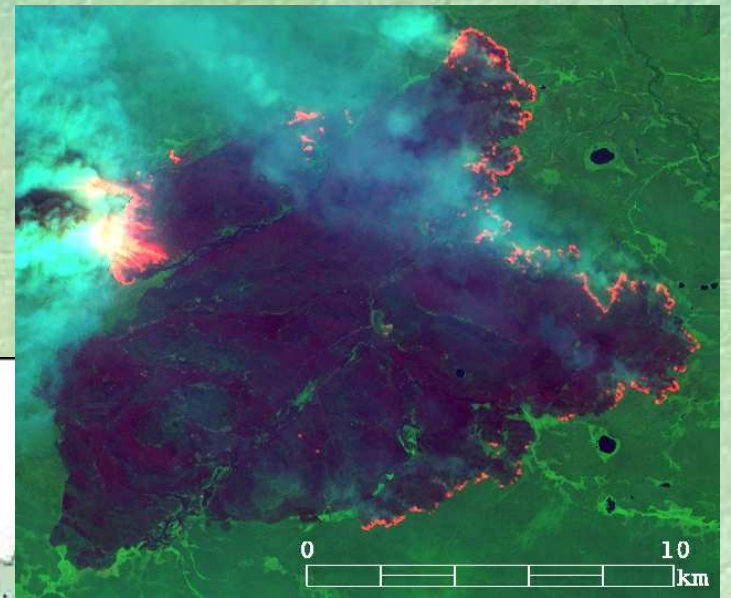
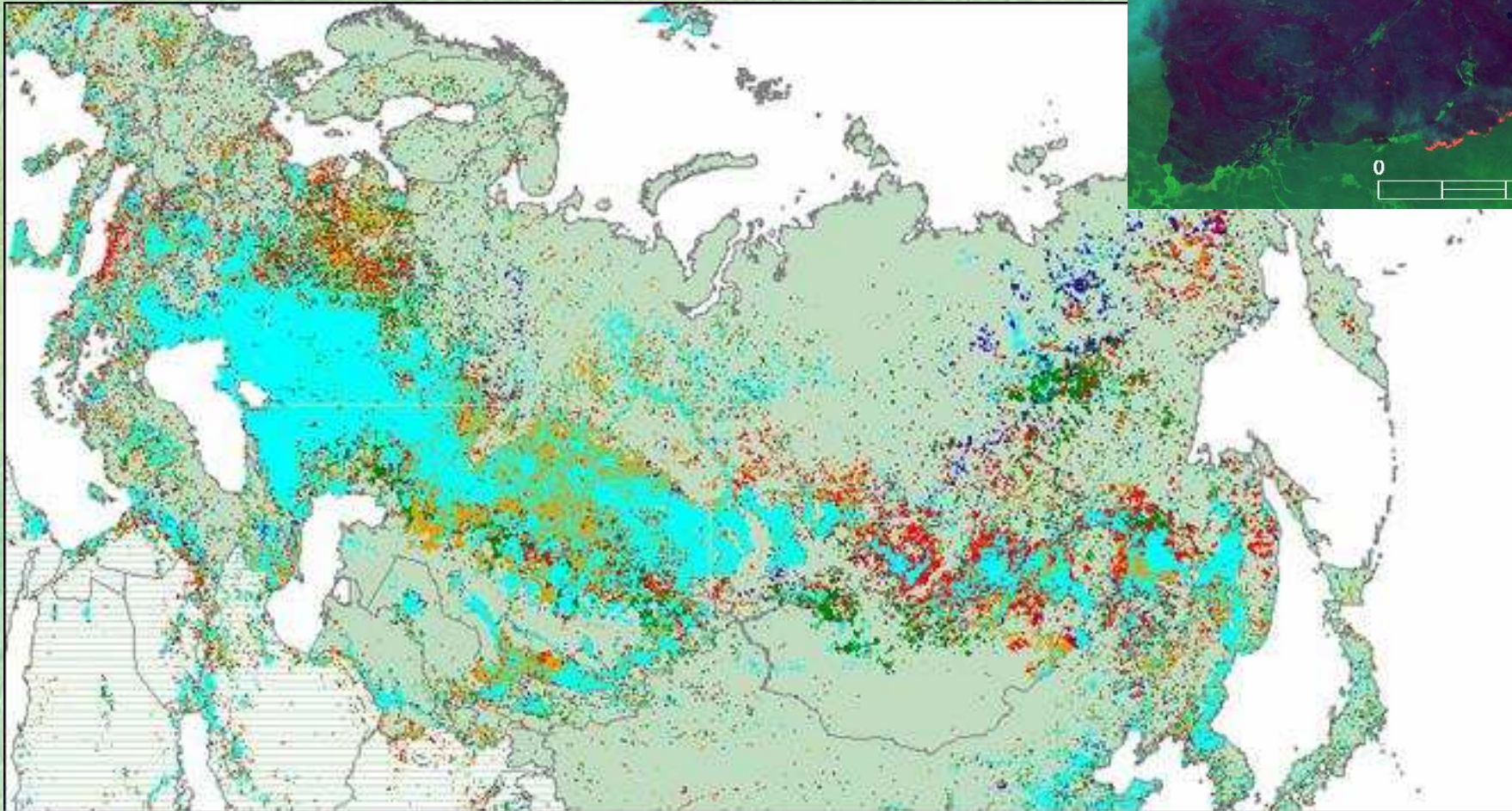


**Landsat imagery (path 185 row 19)
used in change detection**



Each stack of
images included
3-4 dates
(or layers)

Fire



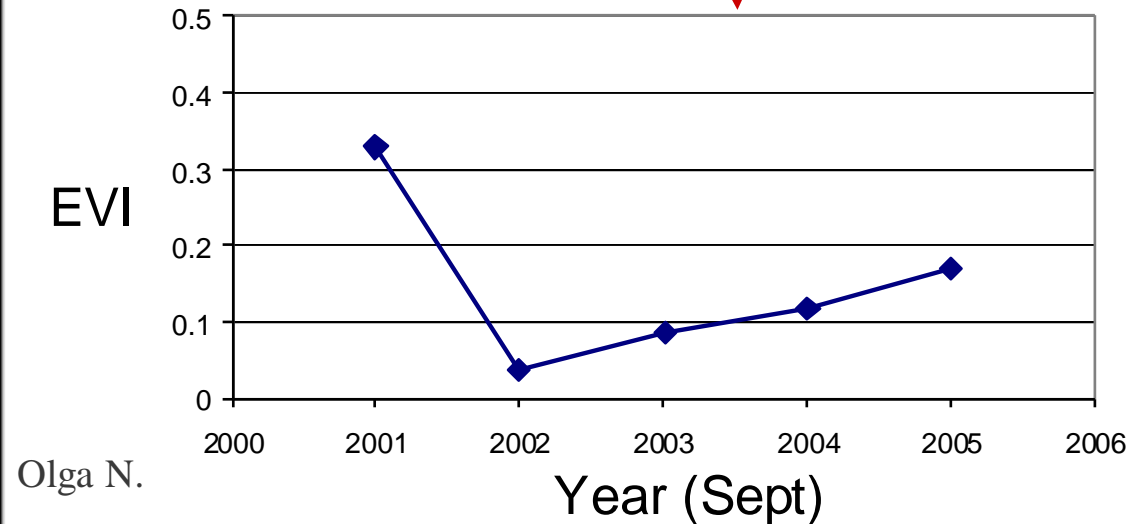
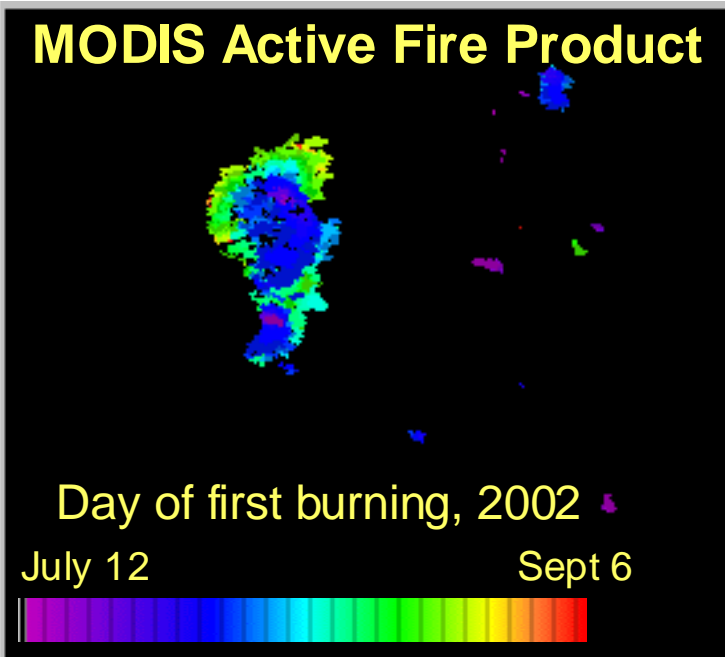
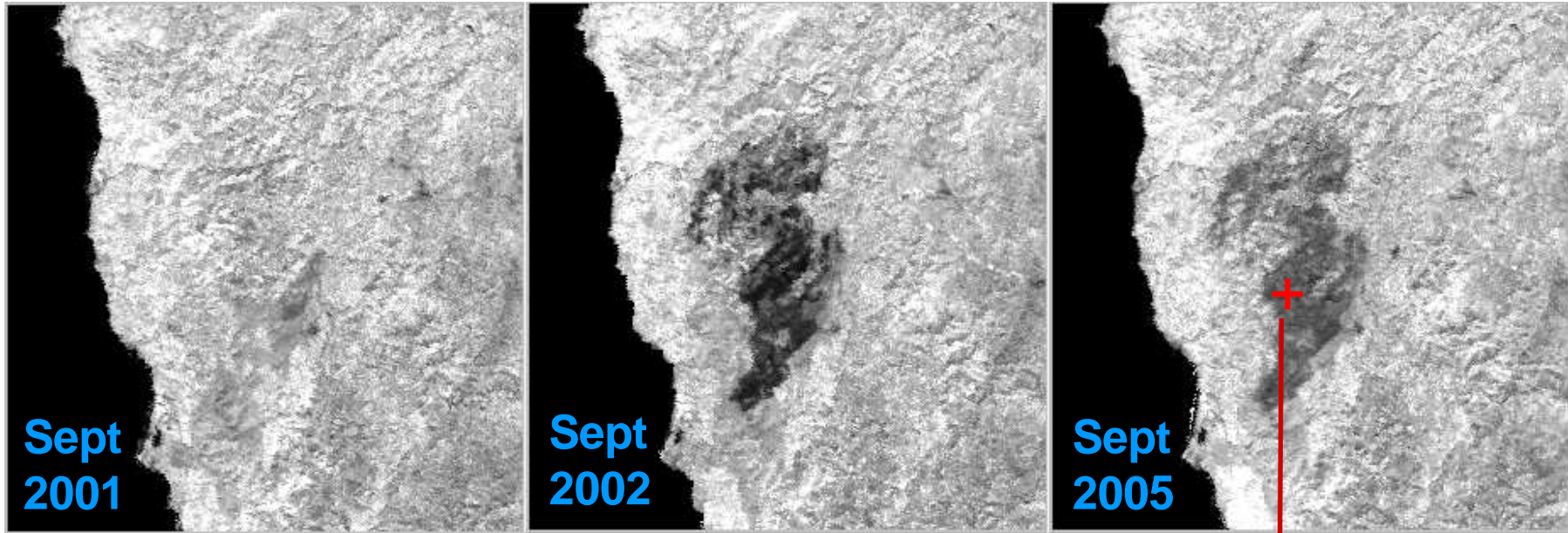
Burnt forest – 25 million ha



2/2/2007

Example: Biscuit Fire Extent and Recovery, Oregon 2002

MODIS Enhanced Vegetation Index (EVI) Product

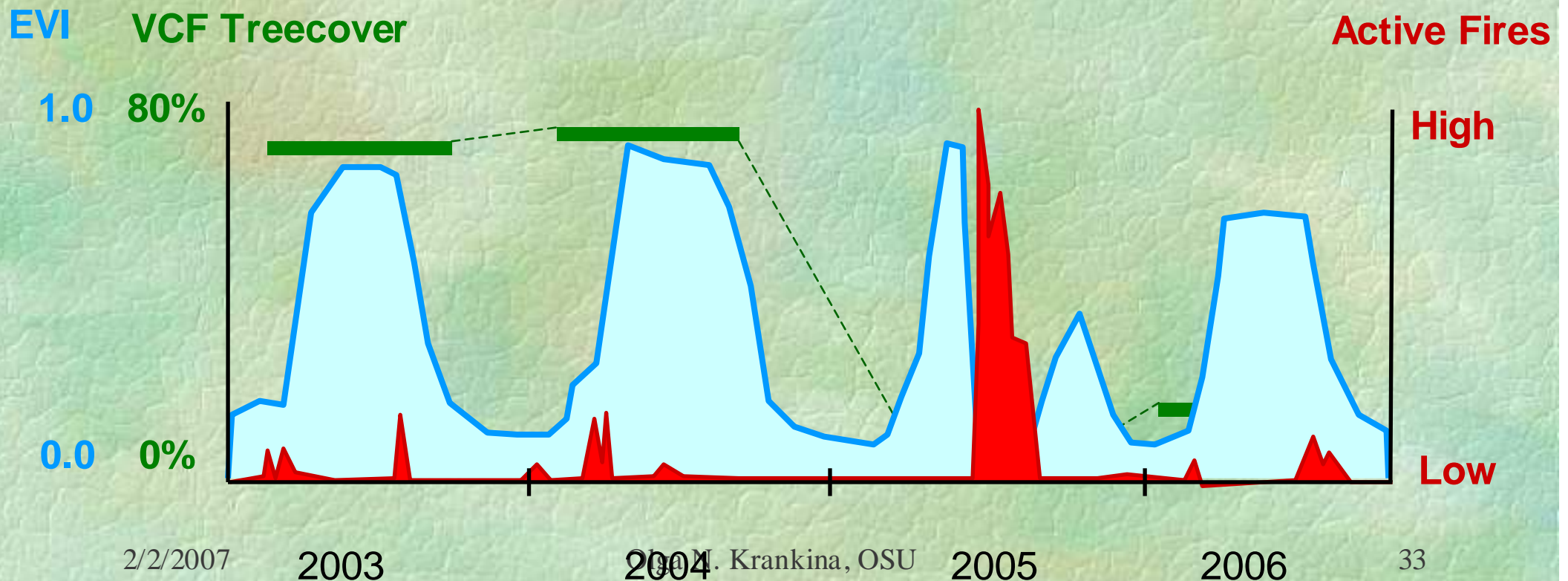


NELDA Objective: Continental Forest Disturbance Maps

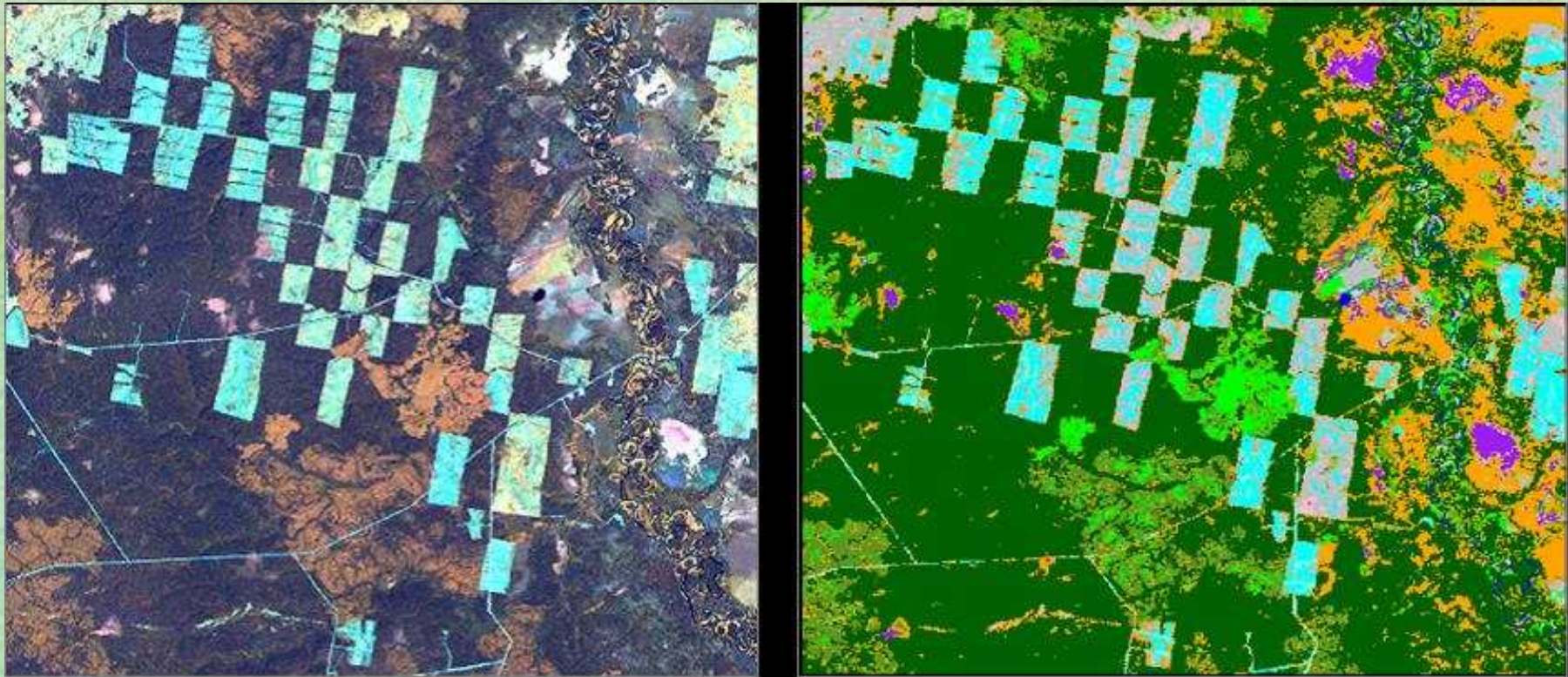
Several global MODIS products relate directly to ecosystem disturbance:

- Vegetation Continuous Fields (VCF) %Treecover/Herbaceous/Bare
- EVI / NDVI Vegetation Indices
- Active Fires, Burned Area

How can we use interannual records of these indicators to identify disturbance location, type, timing, and severity?

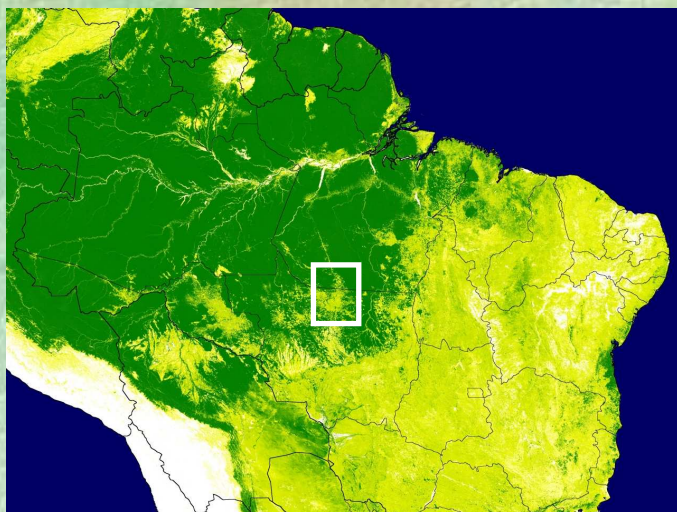


Timber harvest

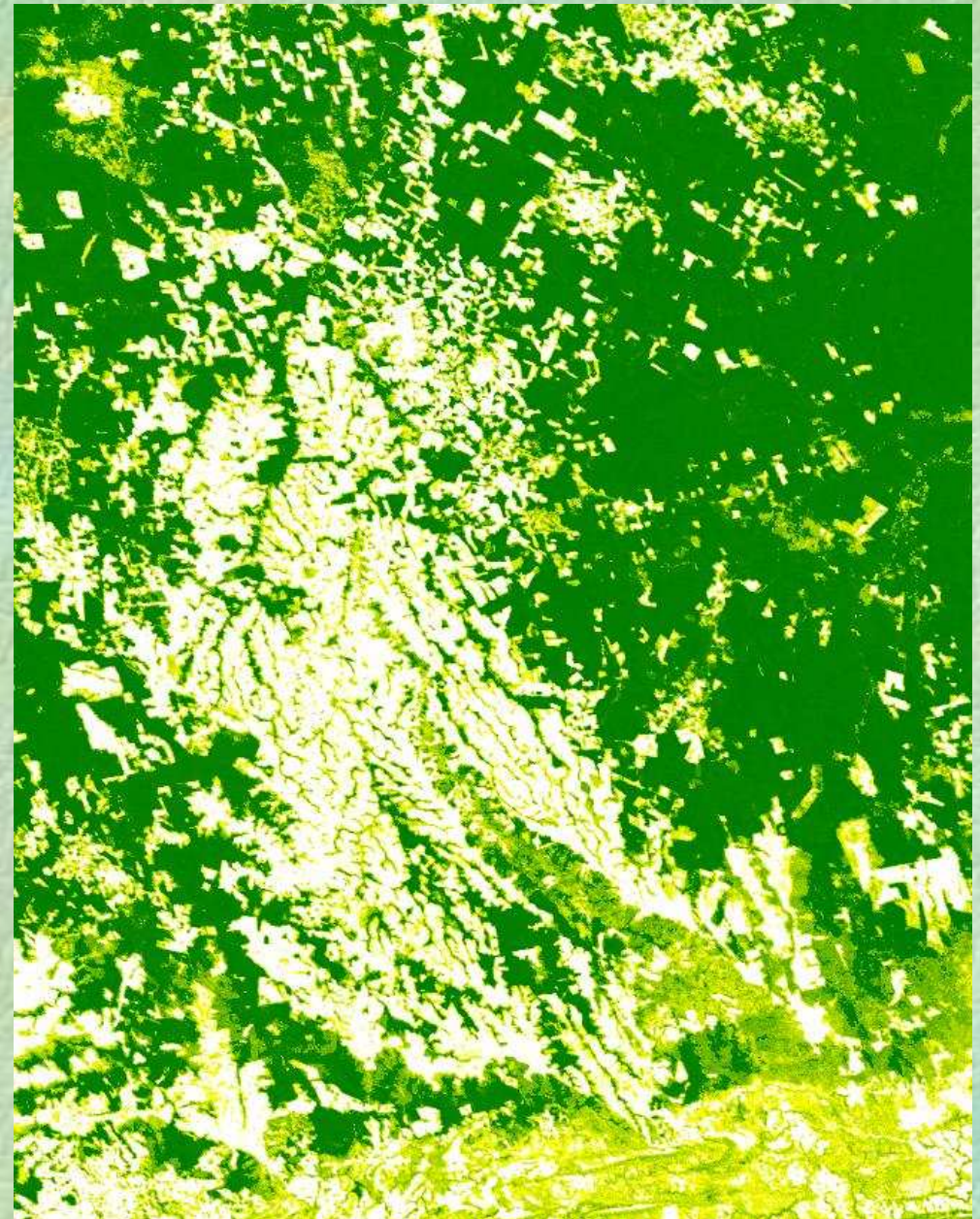
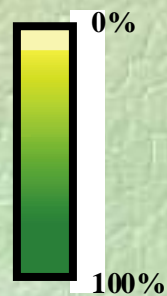


Example: MODIS VCF Treecover, Brazilian Amazon

Interannual changes from
2000-2002 correspond to recent
Forest clearing



Tree cover



Approach to Mapping Northern Eurasian Disturbance

1. Use NELDA test sites as high-resolution “truth” for typical forest disturbances in Northern Eurasia (fire, harvest/logging, insect damage, pollution damage)
2. Develop time series metrics for assessing probability of rapid changes in forest structure
 - Canopy leaf area (MODIS LAI, EVI product)
 - Canopy shadow fraction (MODIS SWIR reflectance)
 - Fractional tree cover (MODIS VCF product)
 - Fire activity (MODIS Active fire product)
3. Merge these indicators using a “fuzzy” or “voting” method to determine timing, type, and extent for forest disturbance at a regional (1-10km) scale.

Expected results

- 15 test sites – samples of land cover change histories
- MODIS-derived disturbance/ land-cover change map for Northern Eurasia for the period 2000-2006
- New regional land-cover map



New NELDA sites

- 20 additional sites proposed
- Cover additional vegetation types and regions within Northern Eurasia
- Searching for funding to support additional sites

NELDA contributes to broader regional and global programs

NEESPI

GOFC-GOLD

- NERIN
- Land Product Validation (<http://lpvs.gsfc.nasa.gov/>)

SIRS

- Siberian Integrated Regional Study

Works in parallel with other continental-scale and global efforts (NACP)