



# NERIN

## Northern Eurasia Regional Information Network

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# Motivation

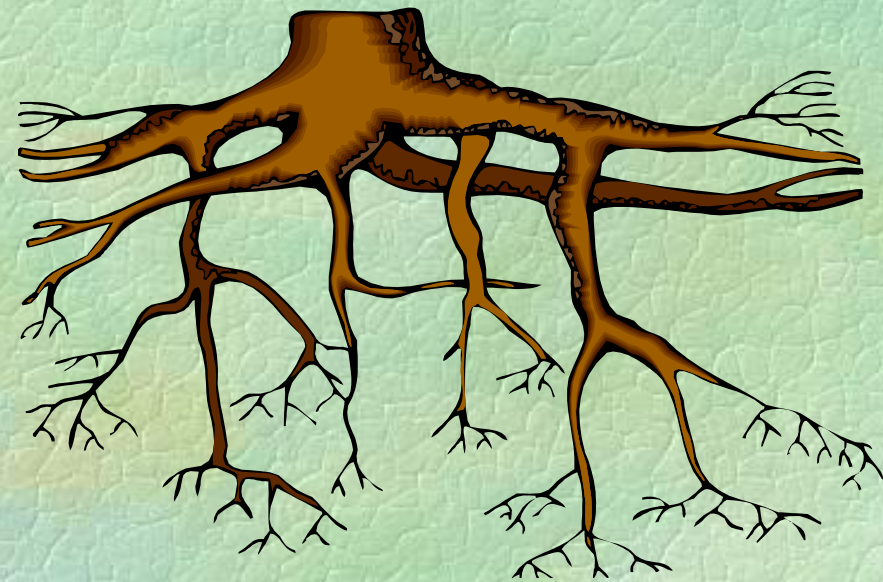
- Northern Eurasia (NE) is the largest landmass, the largest terrestrial reservoir of organic carbon
- Active land use changes and socio-economic transformations
- Northern Eurasia is believed to play a critical role in global change
- NE remains a major source of uncertainty in global estimates of
  - Area of forest, peatland, and other land cover types
  - Carbon pools and flux
  - Water discharge, etc.
- Opportunities for research
  - Data resources
  - Local experience and expertise
  - Infrastructure
- Challenging environment
  - Access to data resources, research expertise and infrastructure
- Need for coordination among project and synthesis of results

# GOFC-GOLD

## *Global Observation of Forest and Land Cover Dynamics*

- Coordinated international effort to provide ongoing space-based and *in-situ* observations of forests and other vegetation cover.
- Regional networks are an integral part of GOFC-GOLD

# The Roots

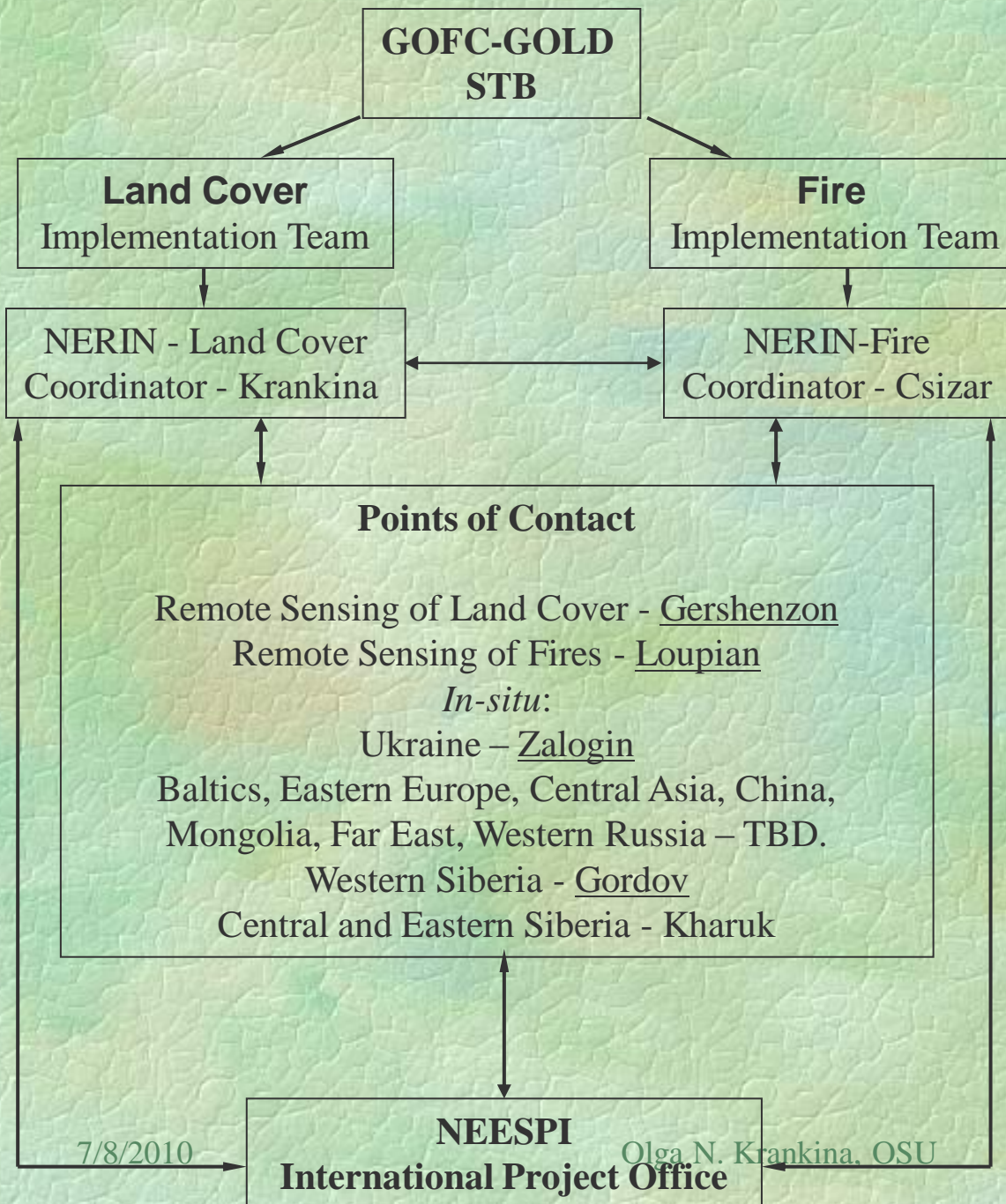


- Global Observation of Forest Cover (GOFC) Boreal Forest Workshop (Novosibirsk, Russia, August 2000)
- Regional workshop for Western Russia-Fennoscandia region (St. Petersburg, Russia, June 2001)
- Northern Eurasia Earth Science Partnership Initiative (NEESPI) workshops (Suzdal', April 2003; Yalta, September 2003)
- “Observational Data in Support of NEESPI”, St. Petersburg, Feb. 23-26, 2004

# What is NERIN?

- Network of people
- Network of projects
- Network of institutions
- Network of networks
- Network of points of contact
- <http://www.fao.org/gtos/gofc-gold/index.html>

# Proposed NERIN Structure



# Network projects

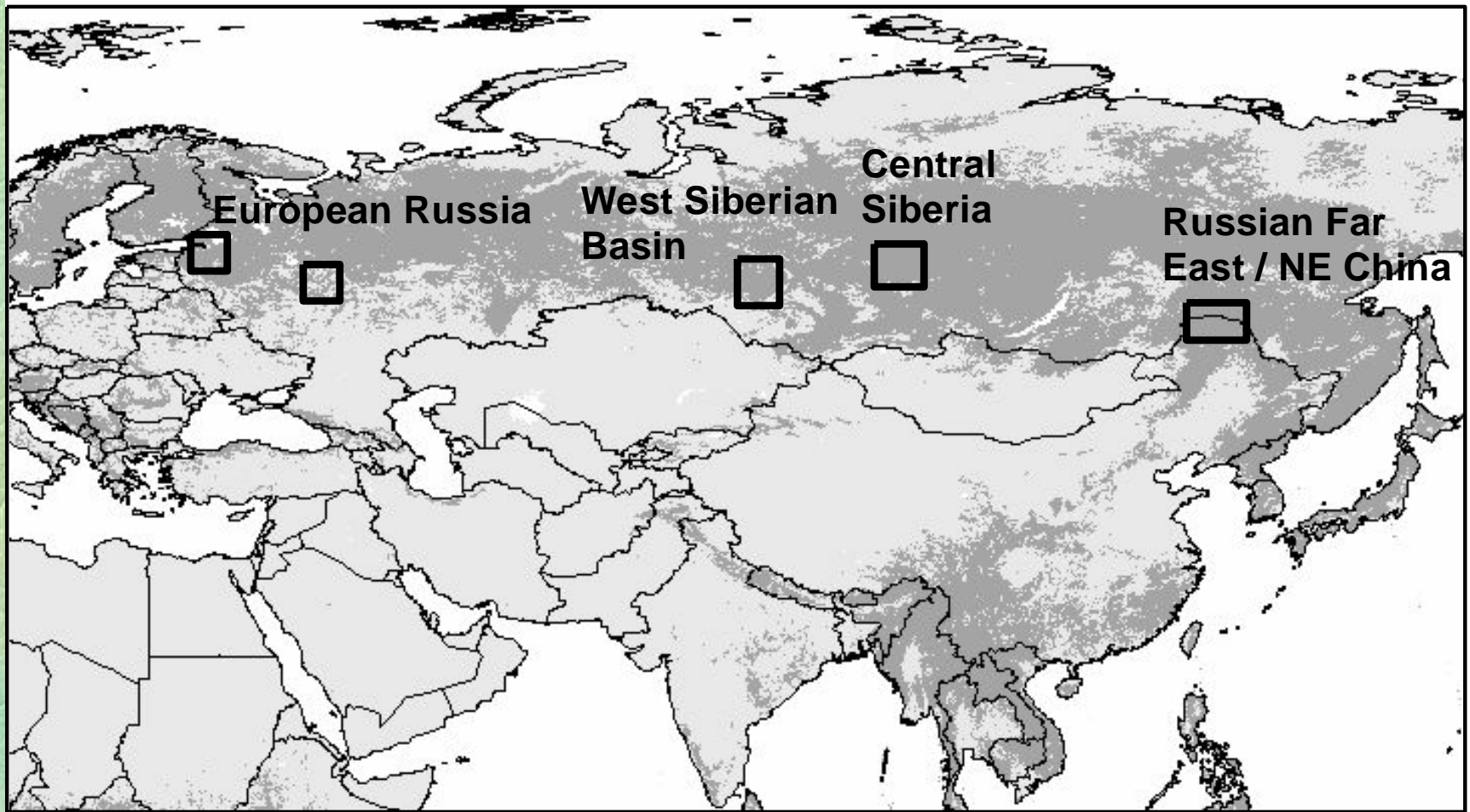
- Fire monitoring project
- Land cover change pilot project (NELDA)



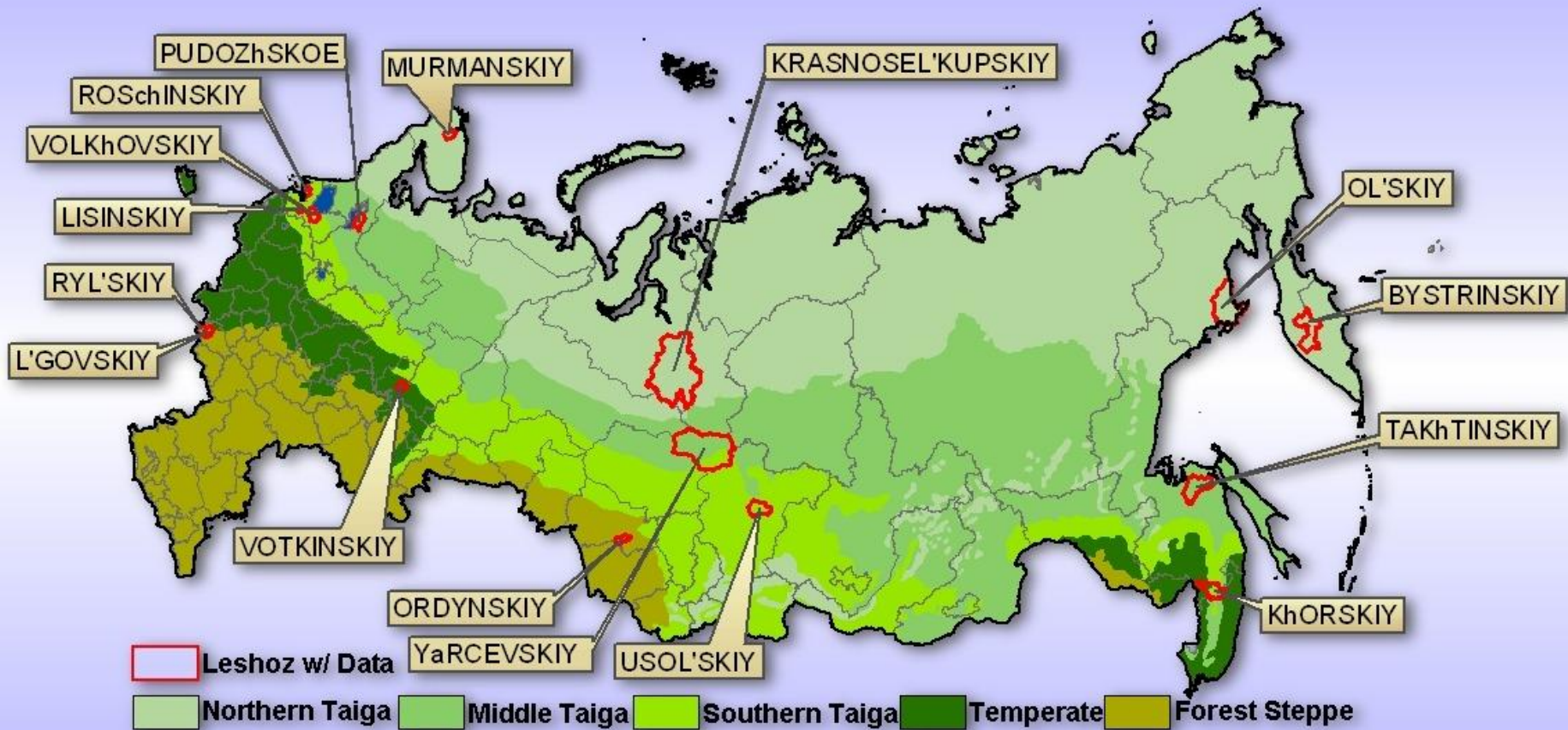
# NELDA

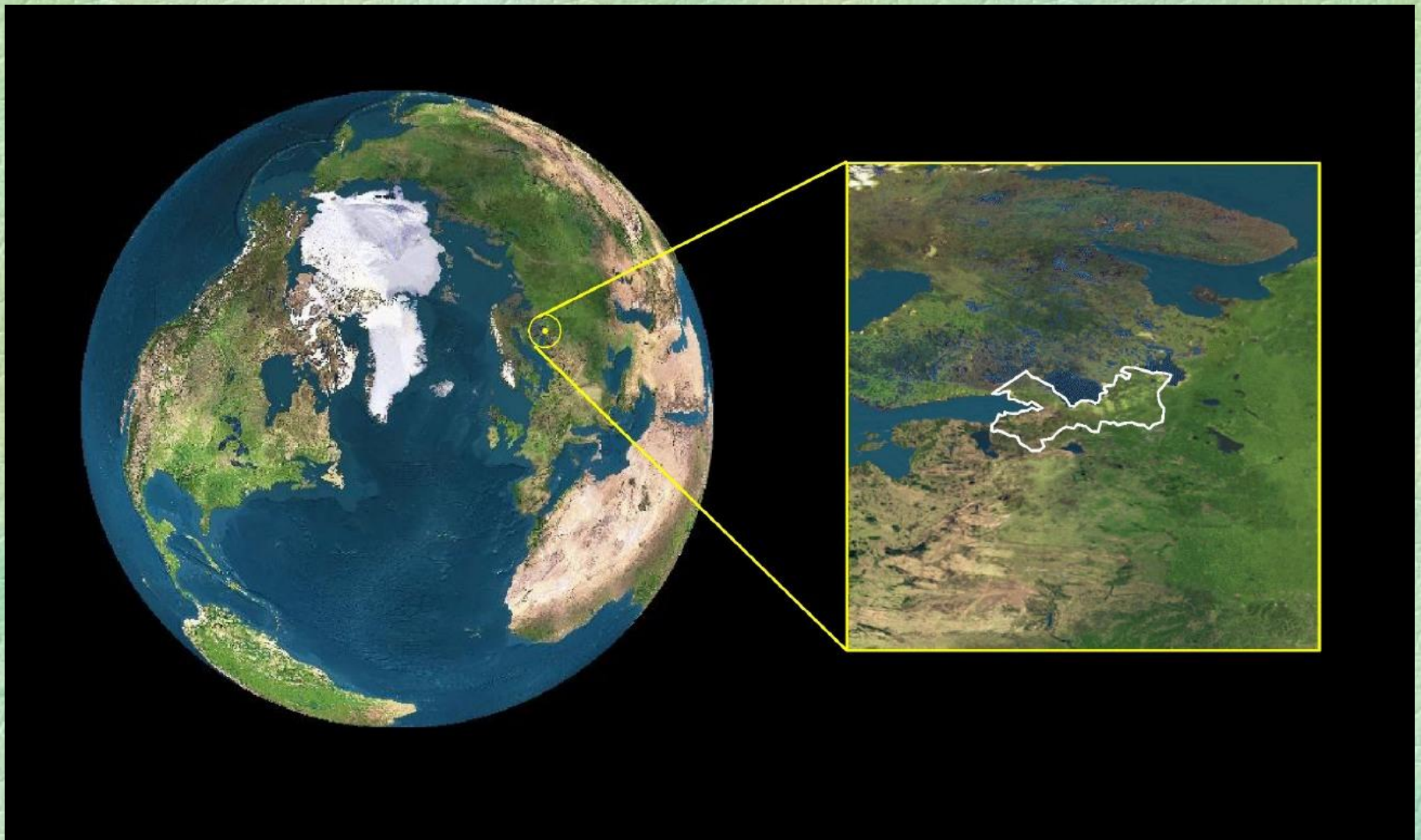
(Northern Eurasia Landcover Dynamics Analysis)

- Large-scale land cover change project with multiple validation sites distributed across the region
- Various types of land cover and land use change that are significant in different parts of Northern Eurasia
- Validate moderate and coarse resolution land cover and land cover change products for the region
- Establish a base for other studies of land-cover within the scope of GOFC-GOLD, and other interested programs such as NEESPI



NELDA study regions and sites. Dark gray shading indicates extent of forest and woodland cover (DeFries et al., 1998).





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**Videt Data**



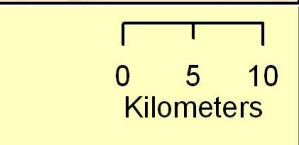
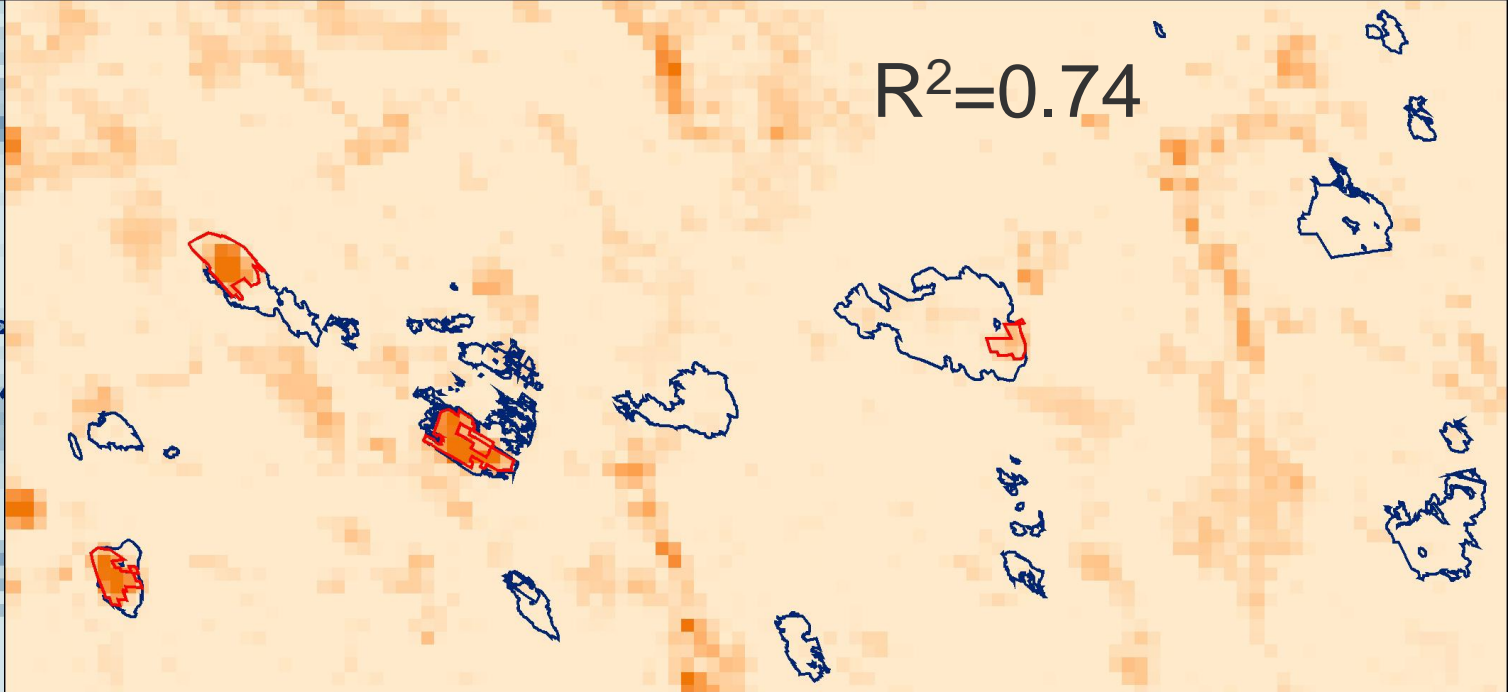
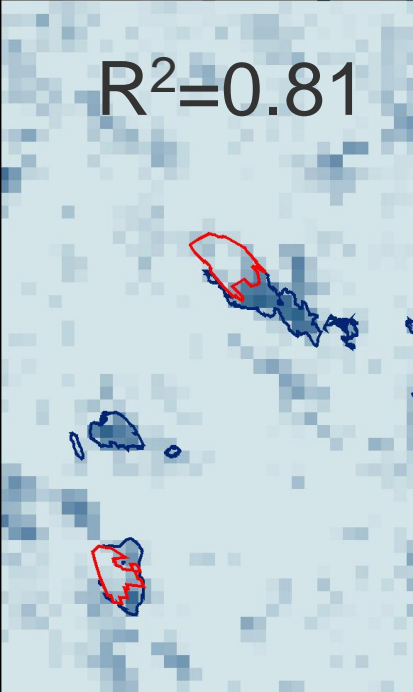
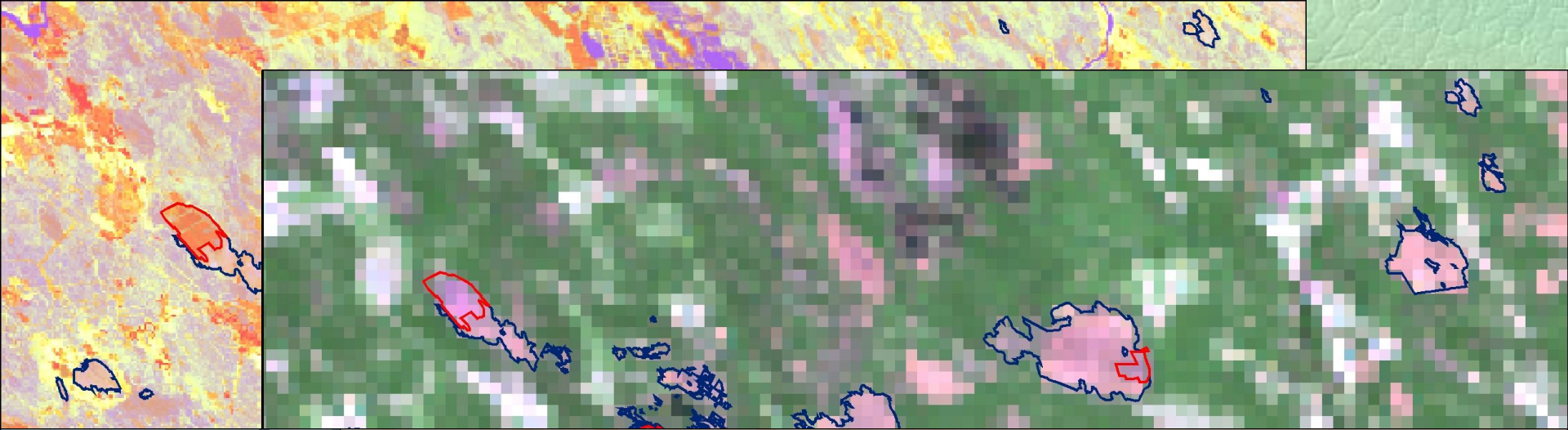
**Landsat 7 ETM+**



**Predicted Biomass**

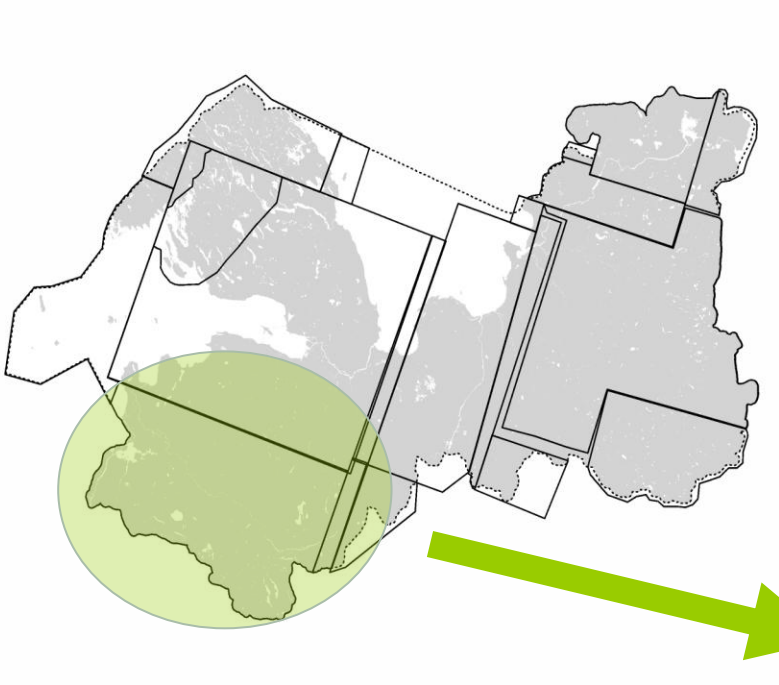


**MODIS**

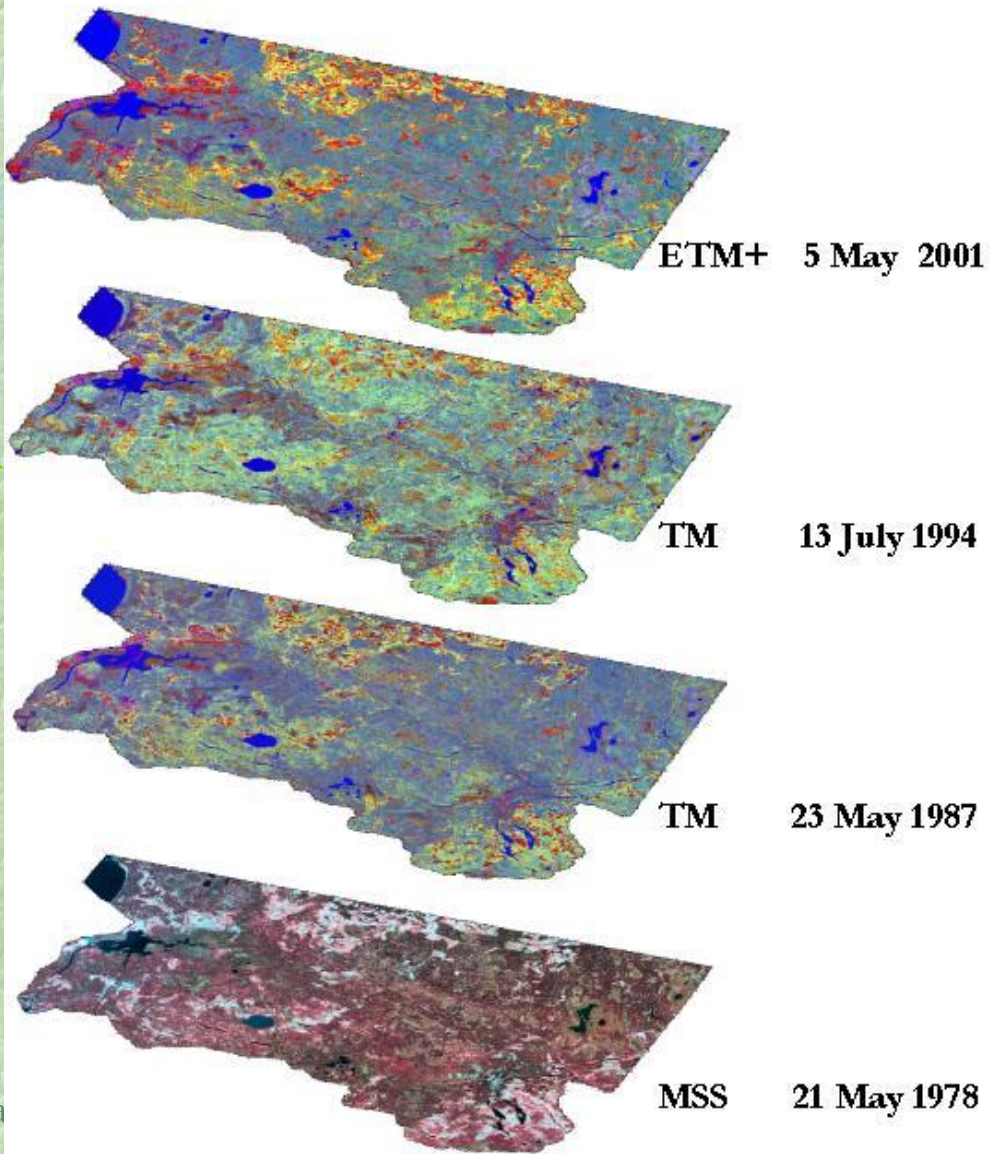


Spatial Resolution: 1 km; Proj

Spatial Resolution: 1 km; Projection: Sinusoidal

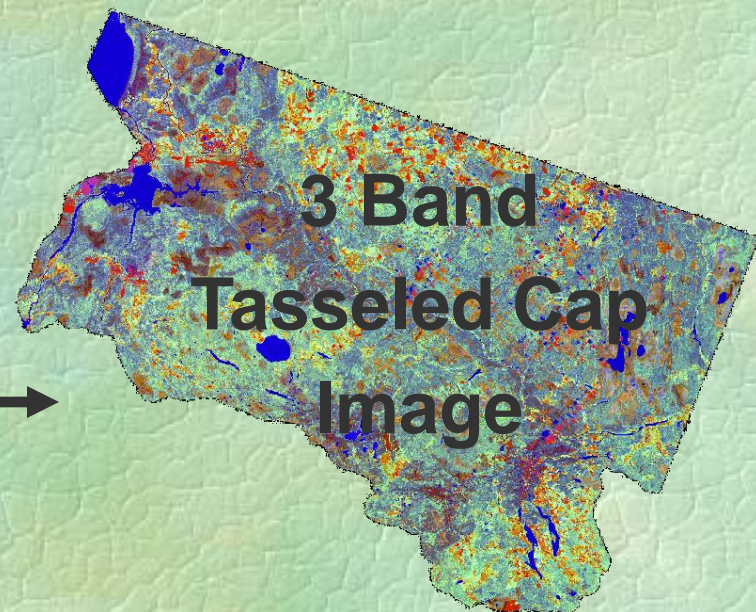
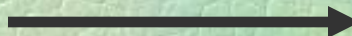
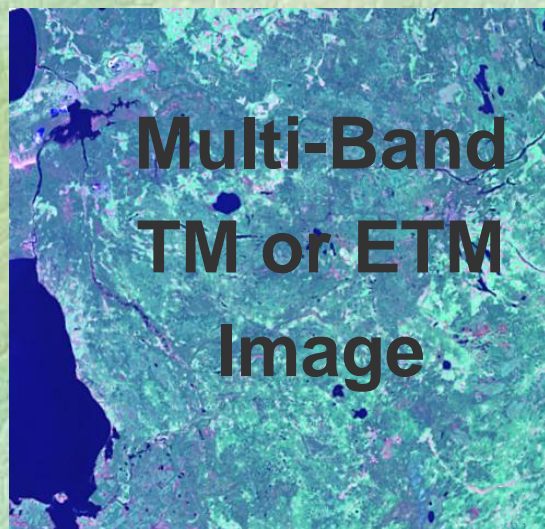


**Landsat imagery (path 185 row 19)  
used in change detection**



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

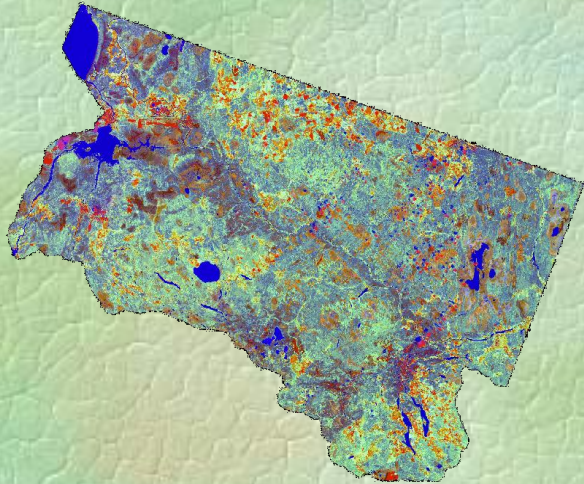
# Tasseled Cap Transformation



Each image was transformed into the tasseled cap (TC) indices of brightness, greenness and wetness

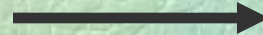


# Disturbance Index Transformation



**3 Band  
Tasseled Cap  
Image**

Standardized with reference to  
its mean value



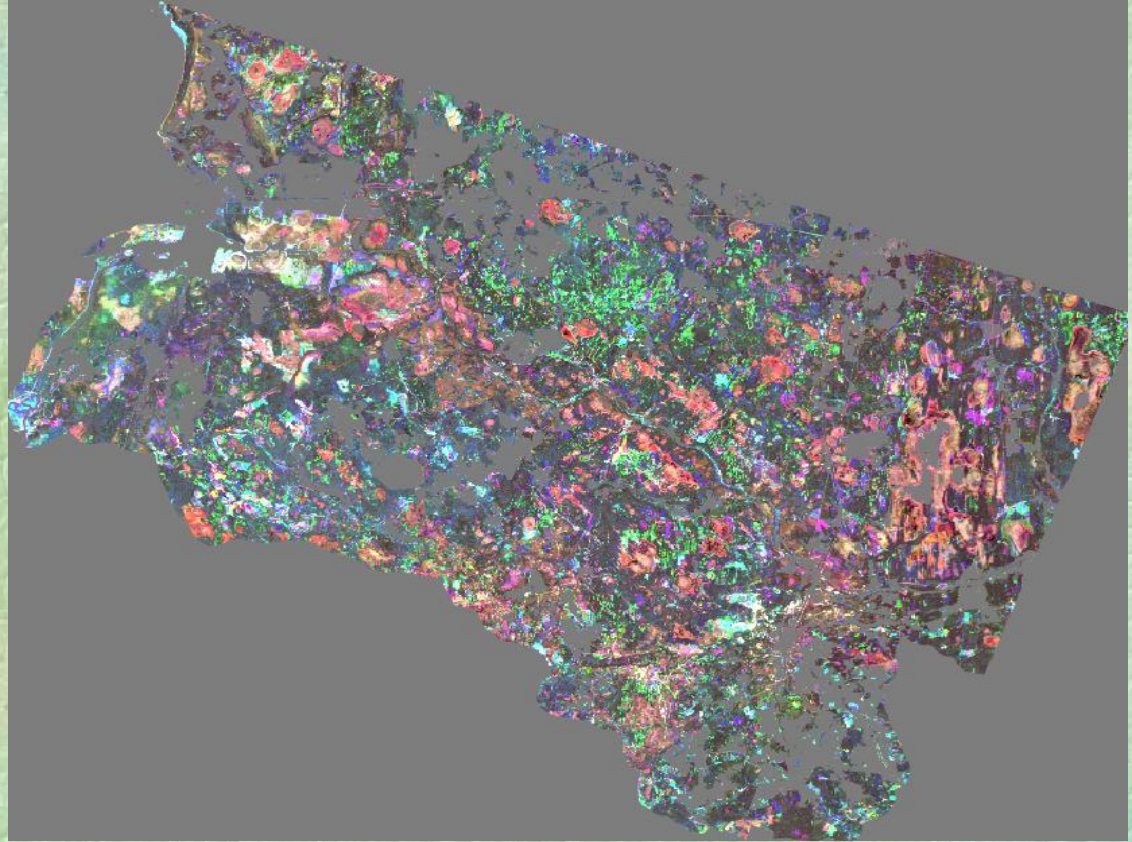
**“Disturbance Index”  
Transformation**

$$\text{Brightness} - (\text{Greenness} + \text{Wetness}) = \text{Disturbance Index}$$

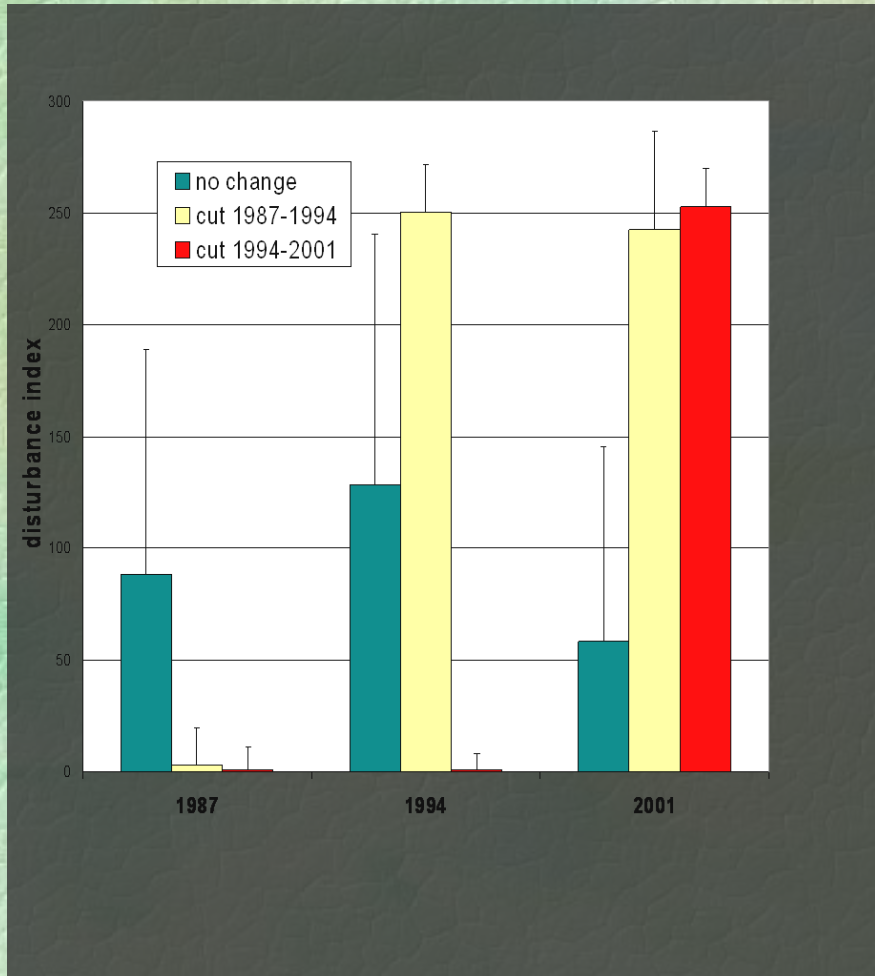
Recently disturbed forests exhibit a higher brightness reflectance value, while greenness and wetness are typically lower.

# Multi-Temporal Disturbance Image

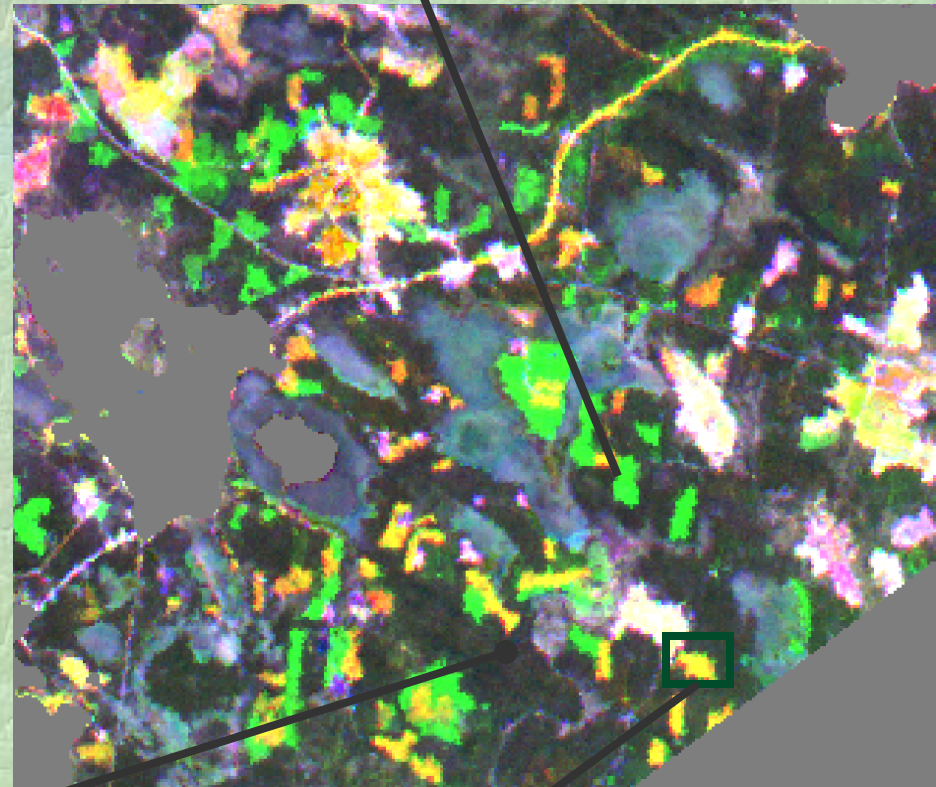
Disturbance  
indices for each  
date combined  
into a multi-  
temporal image



# Classification of disturbed sites by time intervals



**Cut 1994-2001**



**Undisturbed**

**Cut 1987-1994**

Next NERIN Workshop

**OBSERVATIONS OF LAND COVER AND  
NEEDS OF RESEARCH PROJECTS  
IN THE BOREAL ZONE OF NORTHERN EURASIA**

June 18 - 19, 2005,  
Saint Petersburg, Russia

Pre-symposium workshop at the 31st International Symposium  
on Remote Sensing of Environment "GLOBAL MONITORING  
FOR SUSTAINABILITY AND SECURITY"

7/8/2010

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# Workshop agenda

- Introduce new large-scale research projects
- Present FAO Land Cover Classification System (LCCS-2)
- Discuss harmonization and validation of land cover maps
- Plans for NELDA
- Review and advance the inventory of observational data
- Discuss plans for new data acquisition and sharing
- Attract new research initiatives to join the network
  - Engage International LTER networks within the region and help Russian research sites join I-LTER network
  - Collaborate on a proposal to establish LIDAR trans sects and part of International Polar Year



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