

Regional Scale Forest Mapping with Medium Resolution Satellite Data

Dmitry E. Aksenov

Elena S. Esipova

Natalia V. Kuksina

Mikhail L. Karpachevsky

Russia's Forests

Dominating Forest Types and Their Canopy Density



References:

1. Barabas S.A., Gorbunov A.C., Erlikh D.V., Israfil A.S., A New (2004) Aerial (1:14 000 000) Land Cover Map of the Russian Federation. - International Society for Remote Sensing. - 2005. - Vol. 2. - No. 2. - P. 1371-1382.
2. Harbeck W., Dethke K., Pohlmann J. W., Gossel M., Oehlmann C., Schubert F. A. Quantitative Tree-Cover and a Spatial Land Cover Map of Northern Eurasia. - In: Proceedings of the 2003 International Conference on Geoinformatics (IGI). - Moscow, 2003. - P. 105-112.
3. The Projects of the (2004) Map Scale 1: 14 000 000 prepared by the department of the Federal Service of Geodesy and Cartography (Rosgvimtopografiya). - Moscow, 2004. - 7500 p.
4. Population of the USSR (1989) The basic statistical information. - Moscow, 1990. - 1177 pages.
5. Digital chart of the world. International Science-Research Institute. 1989.

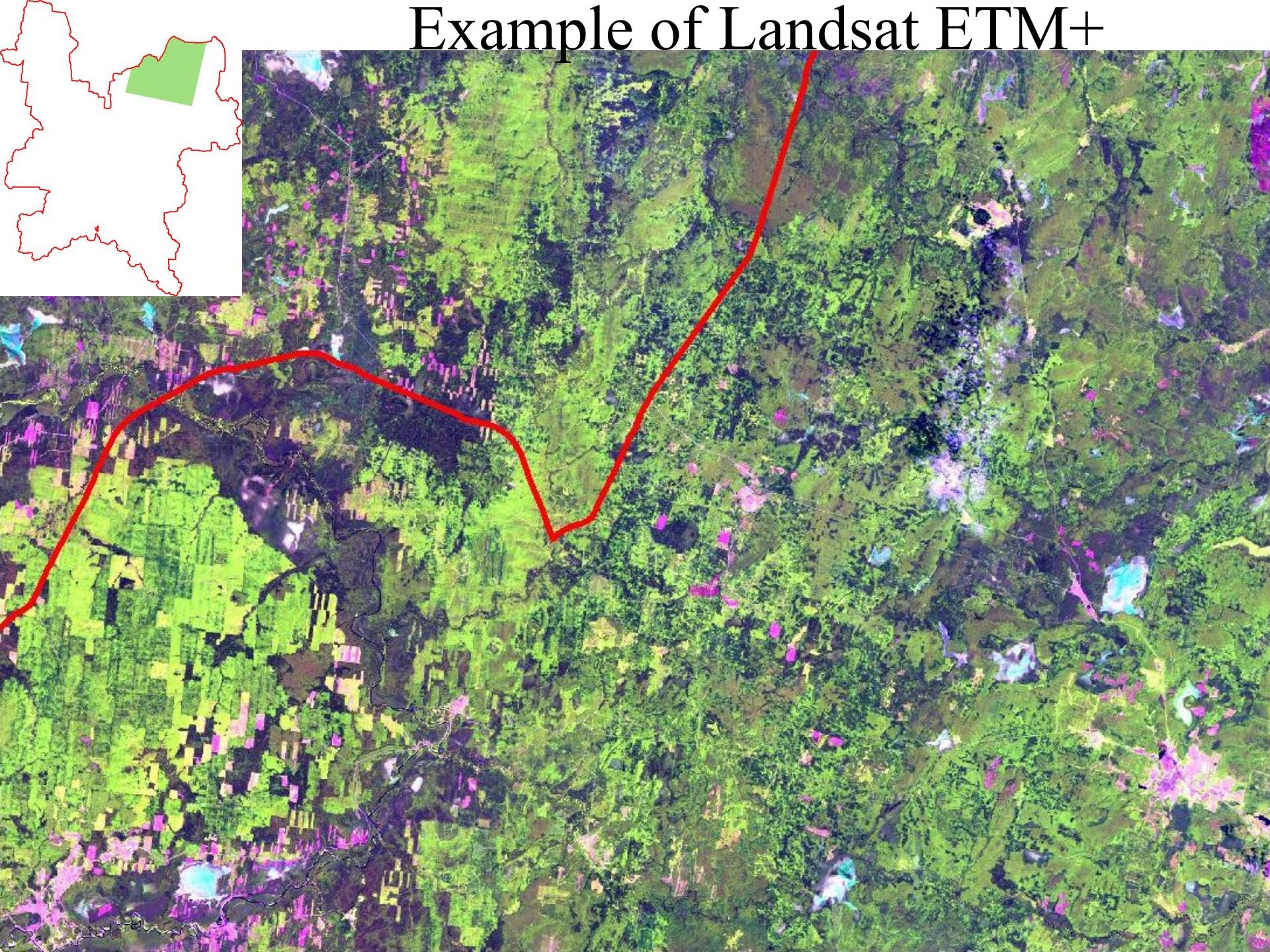
Minimum set of information includes:

- Forest cover
- Dominant tree species
- Age of the upper canopy
- Productivity / growing stock estimation

Options for the forest cover and tree species:

- Modis data (like UMD TreeCover) + official forest survey data (lesoustroistvo)
- Landsat TM/ETM+ classification
- IRS-P6 AWIFS classification

Example of Landsat ETM+



...and its classification by tree species

dark coniferous (spruce, fir)

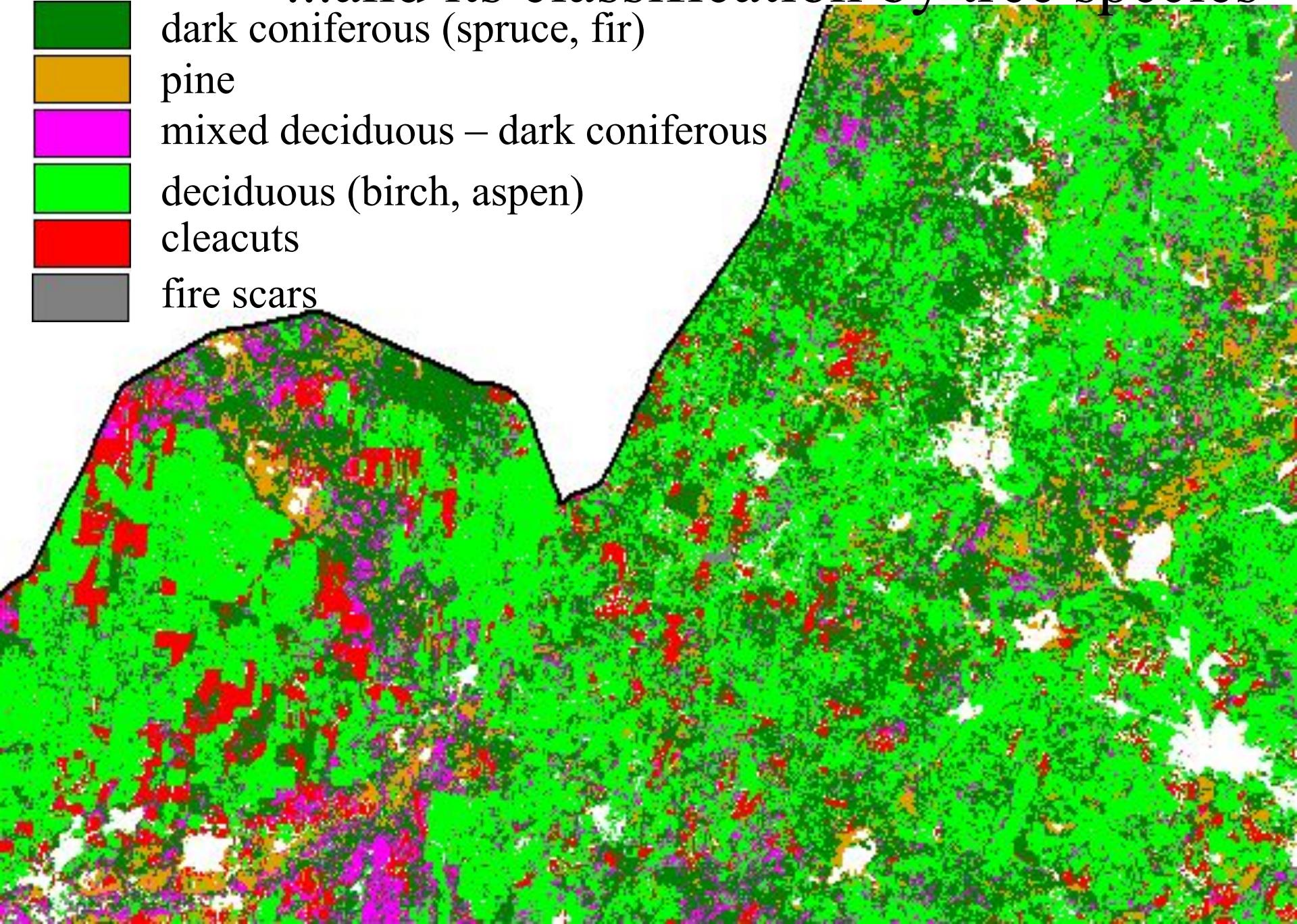
pine

mixed deciduous – dark coniferous

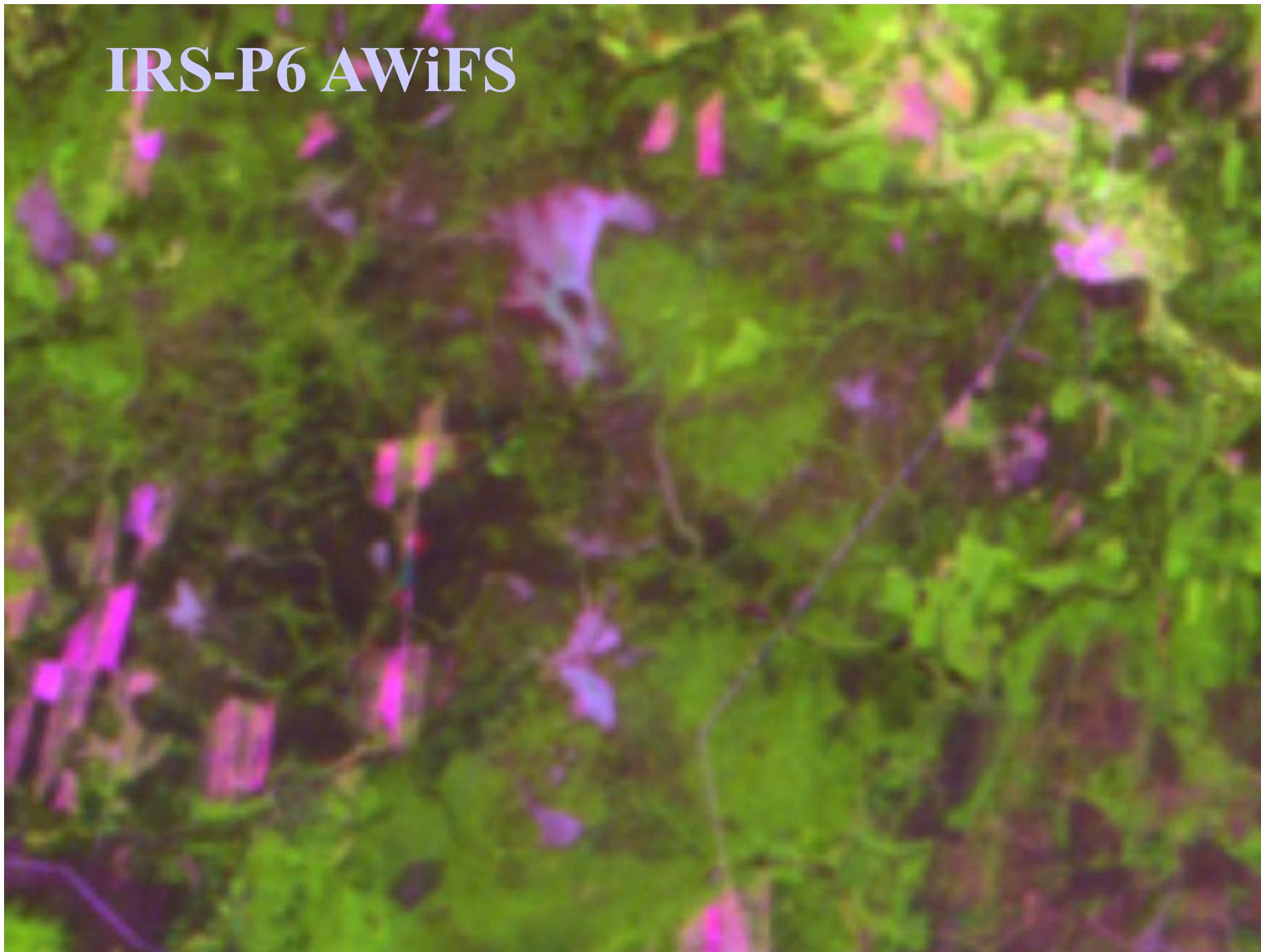
deciduous (birch, aspen)

cleacuts

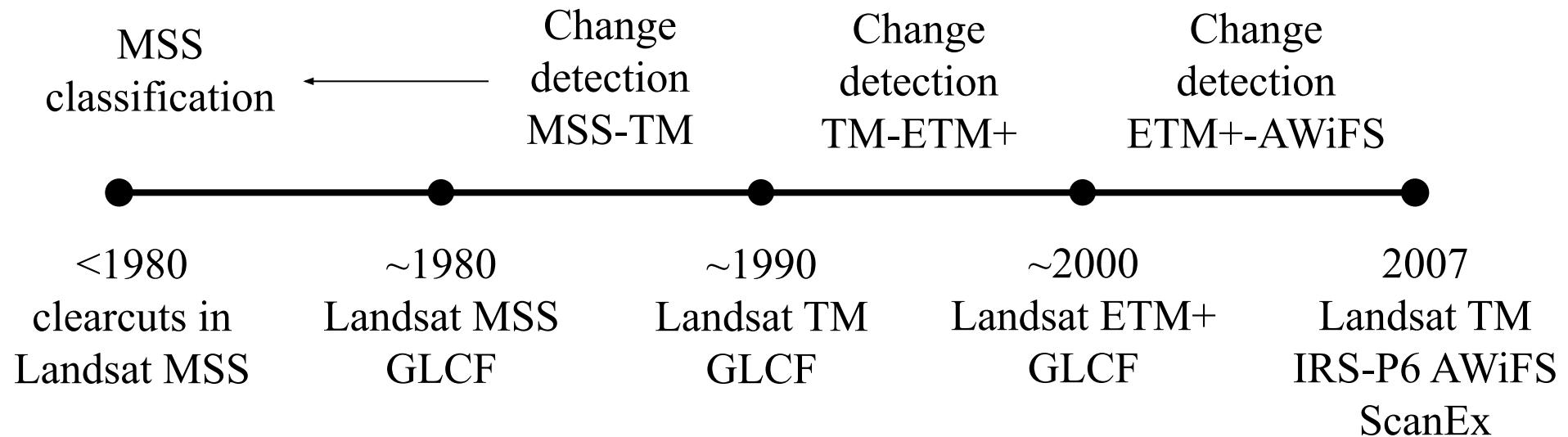
fire scars



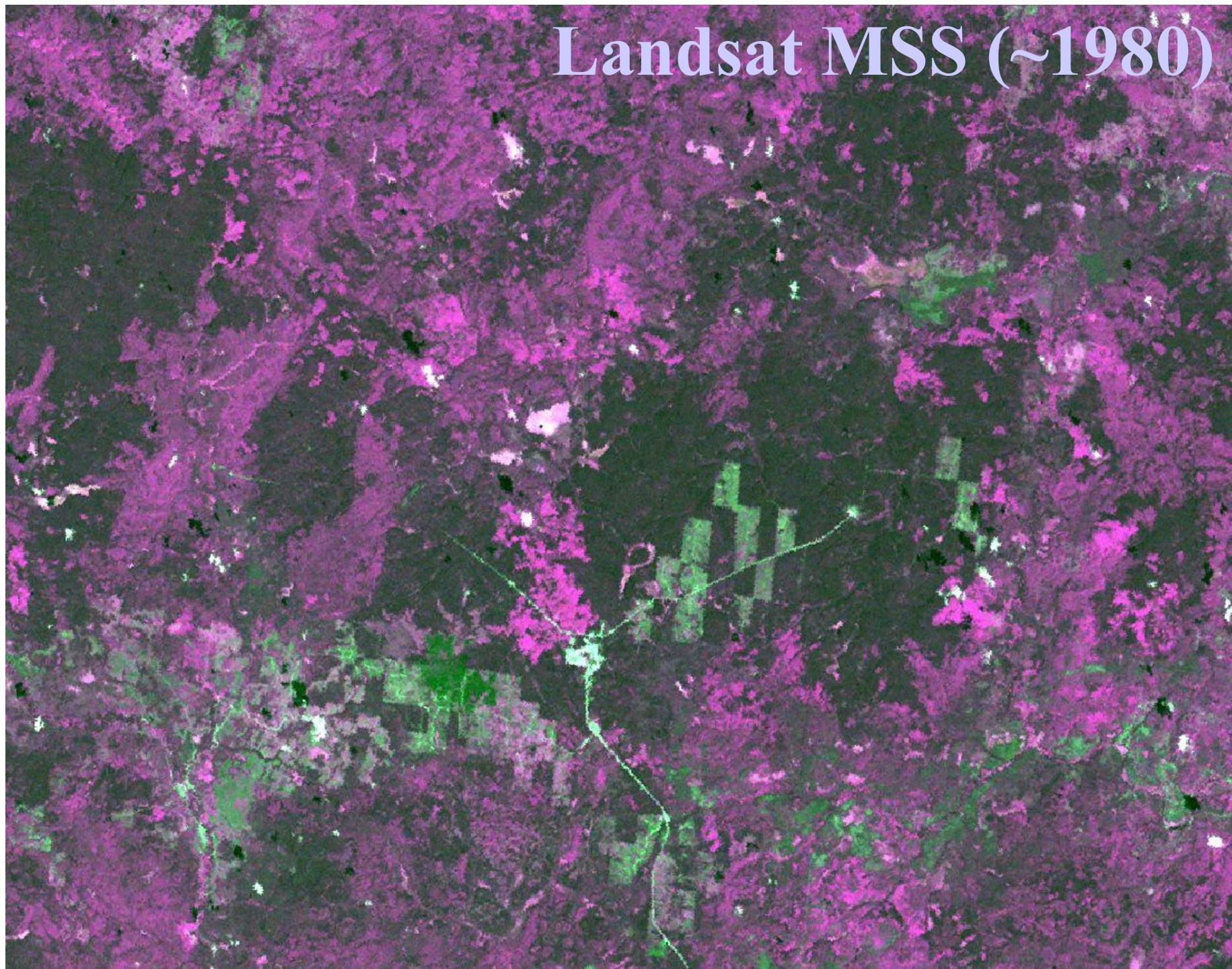
IRS-P6 AWiFS



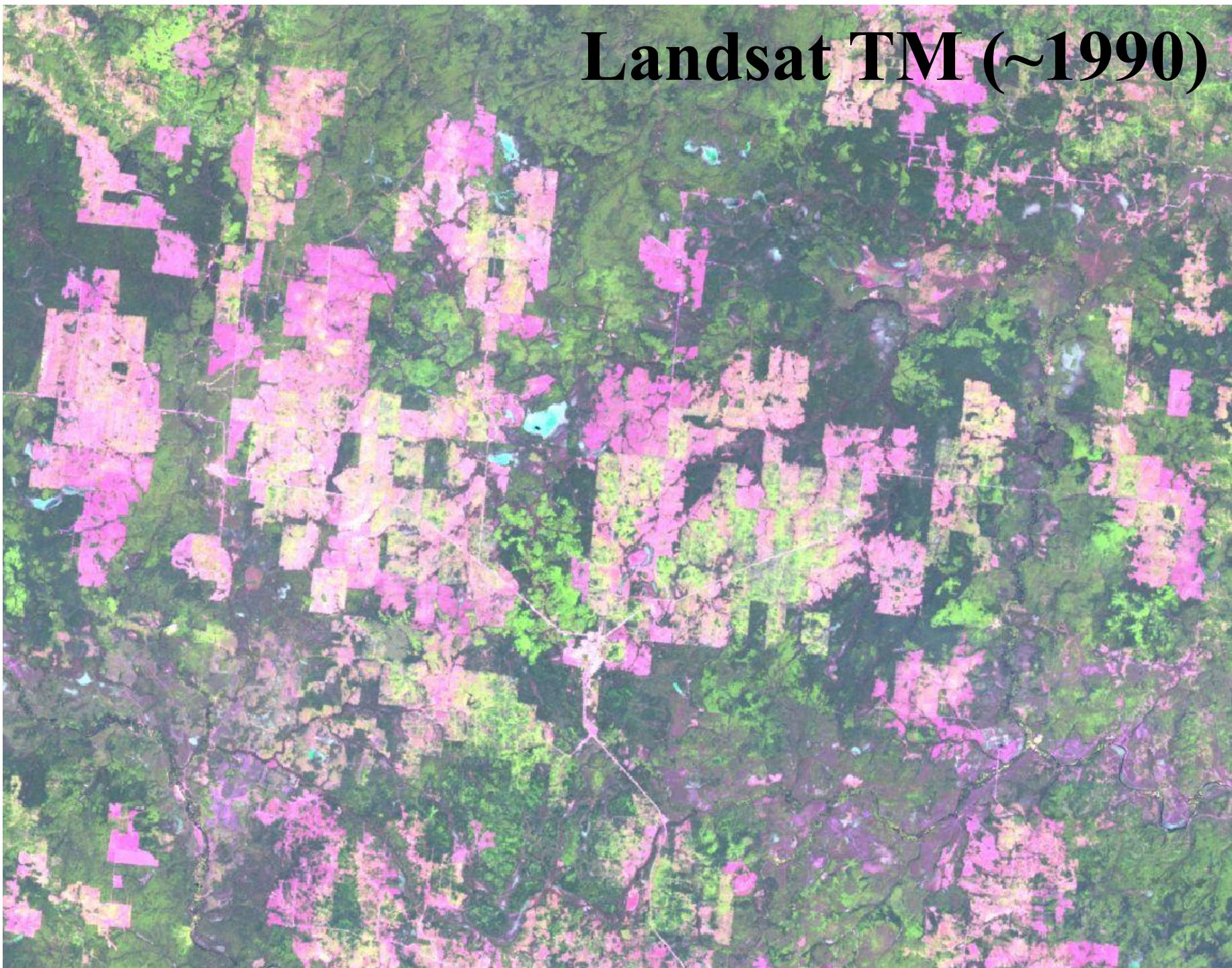
Retrospective data allow age classification



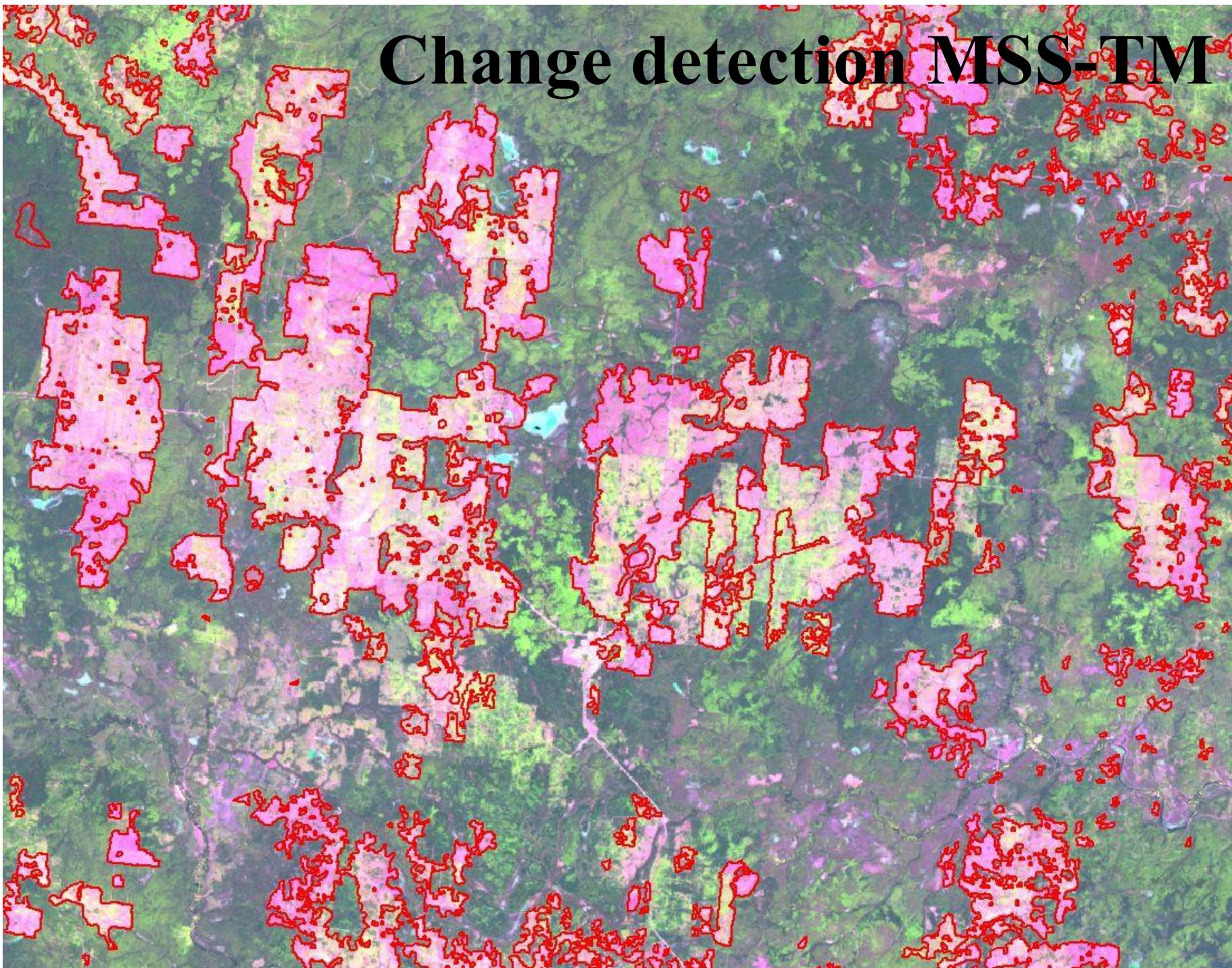
Landsat MSS (~1980)



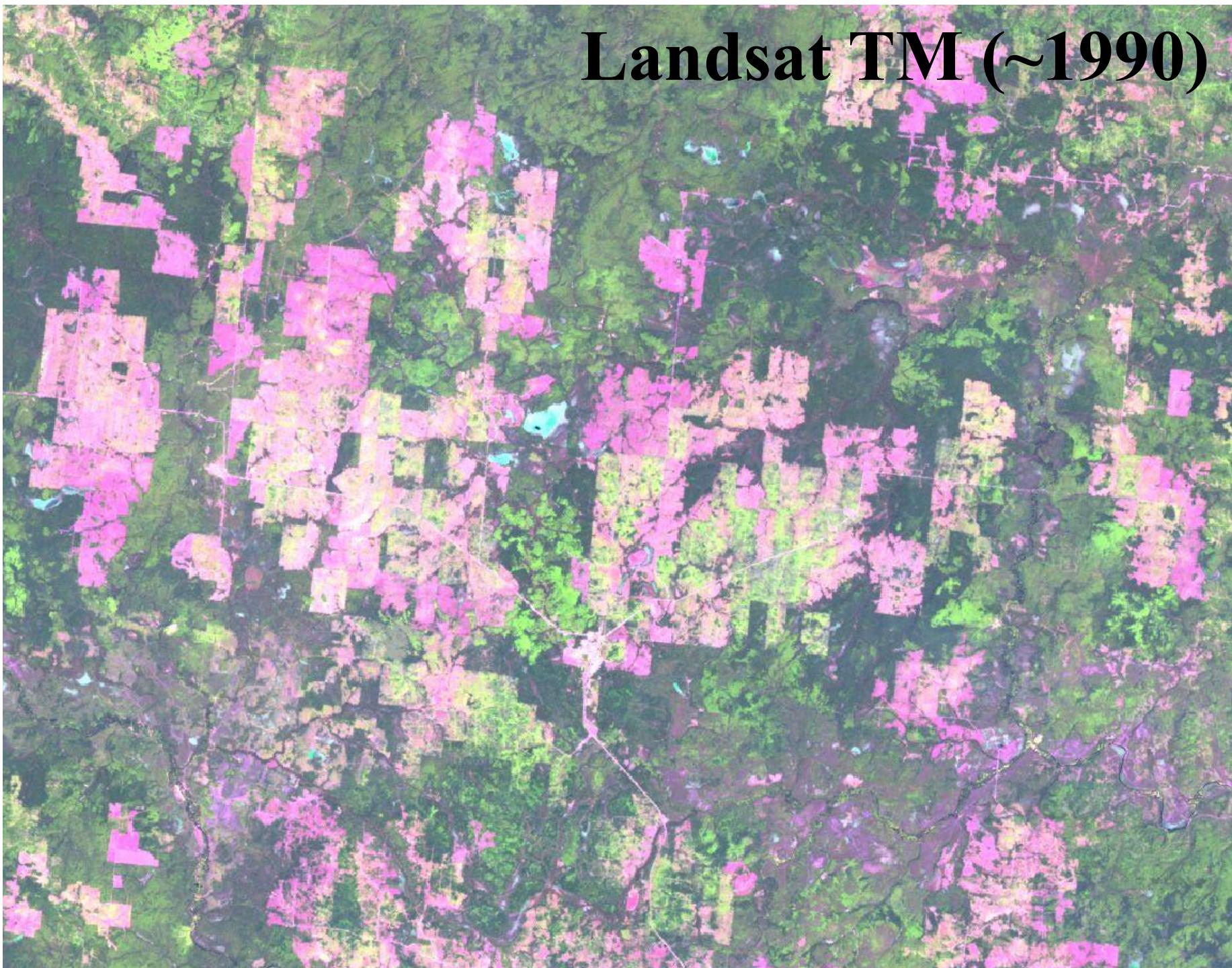
Landsat TM (~1990)



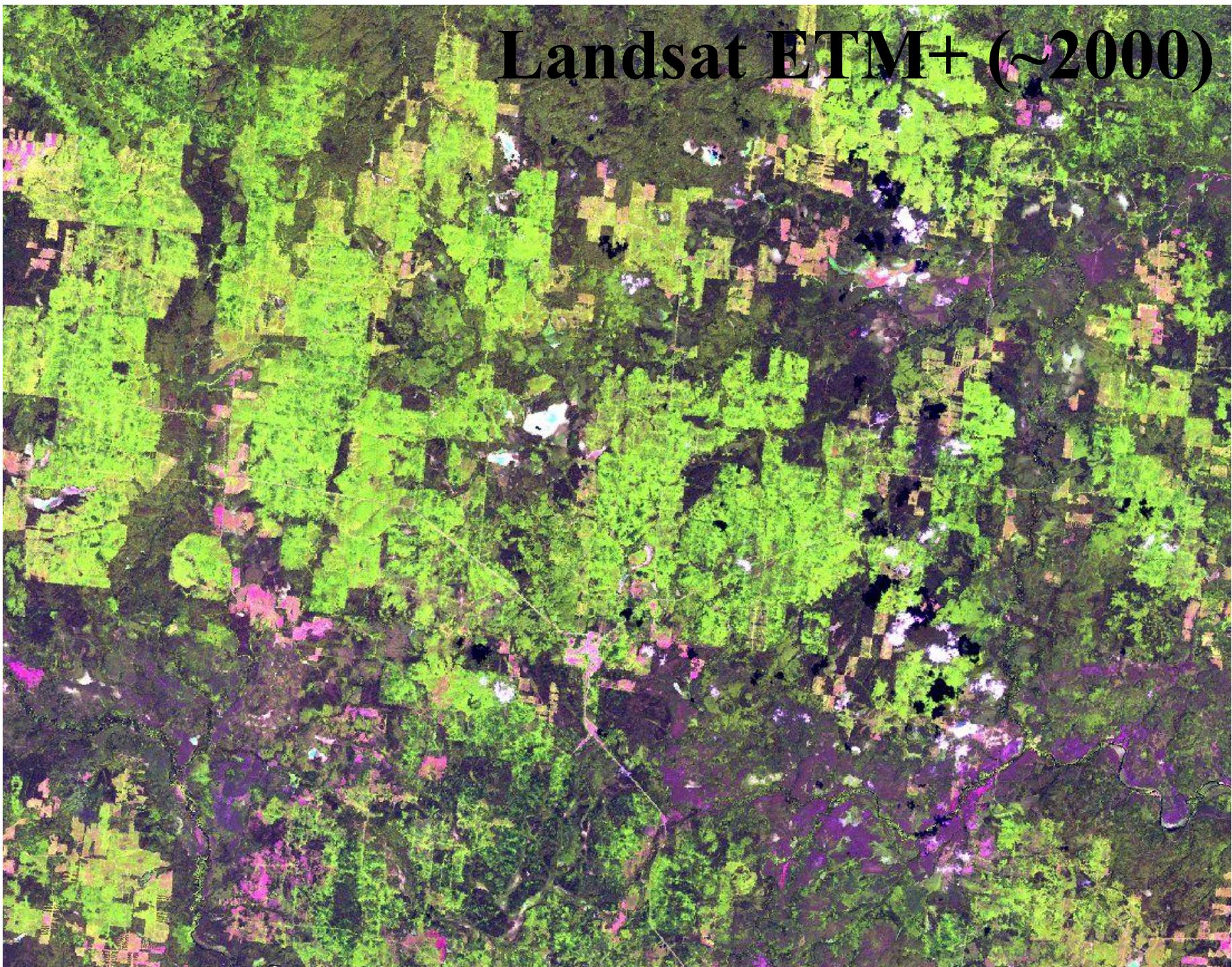
Change detection MSS-TM



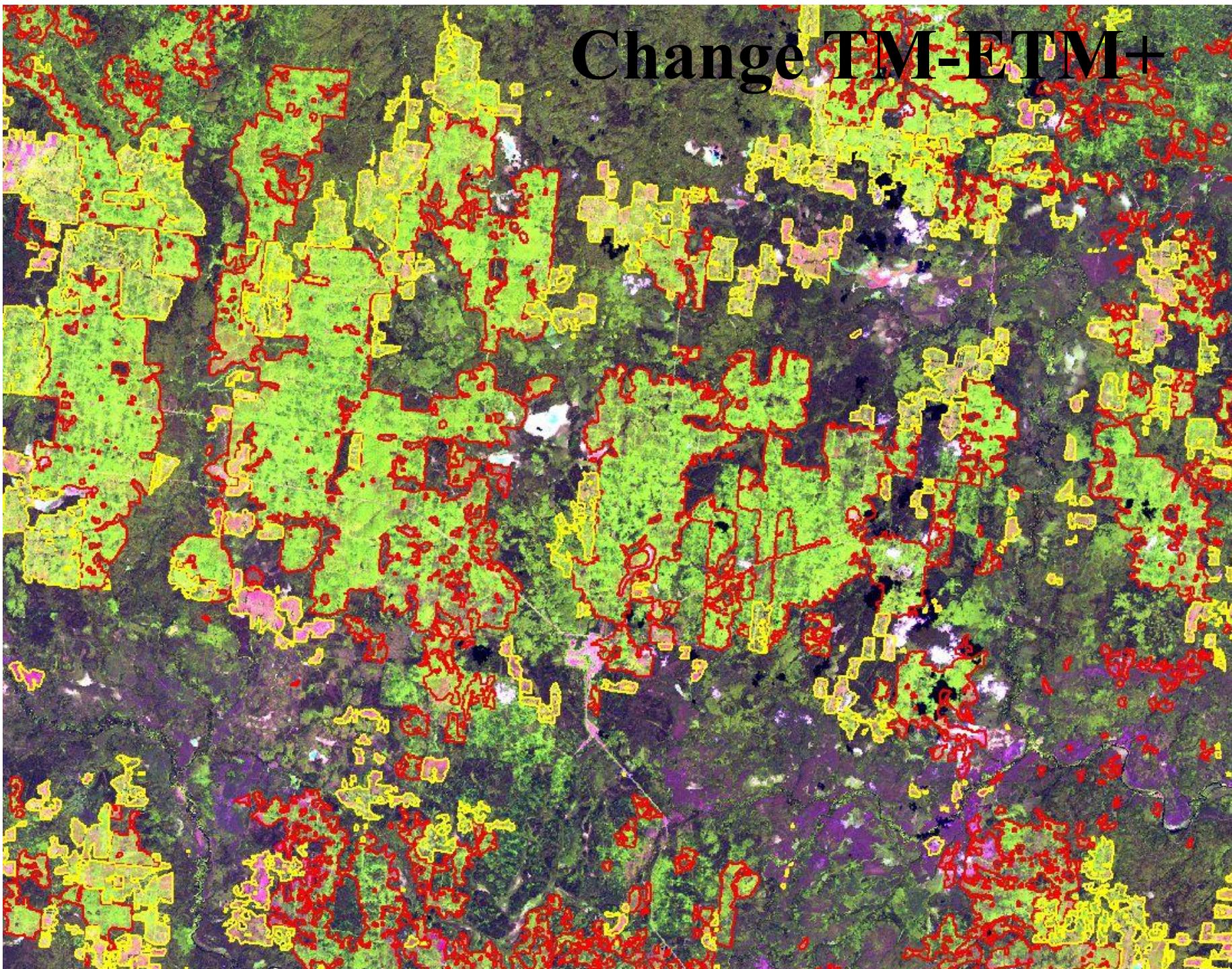
Landsat TM (~1990)



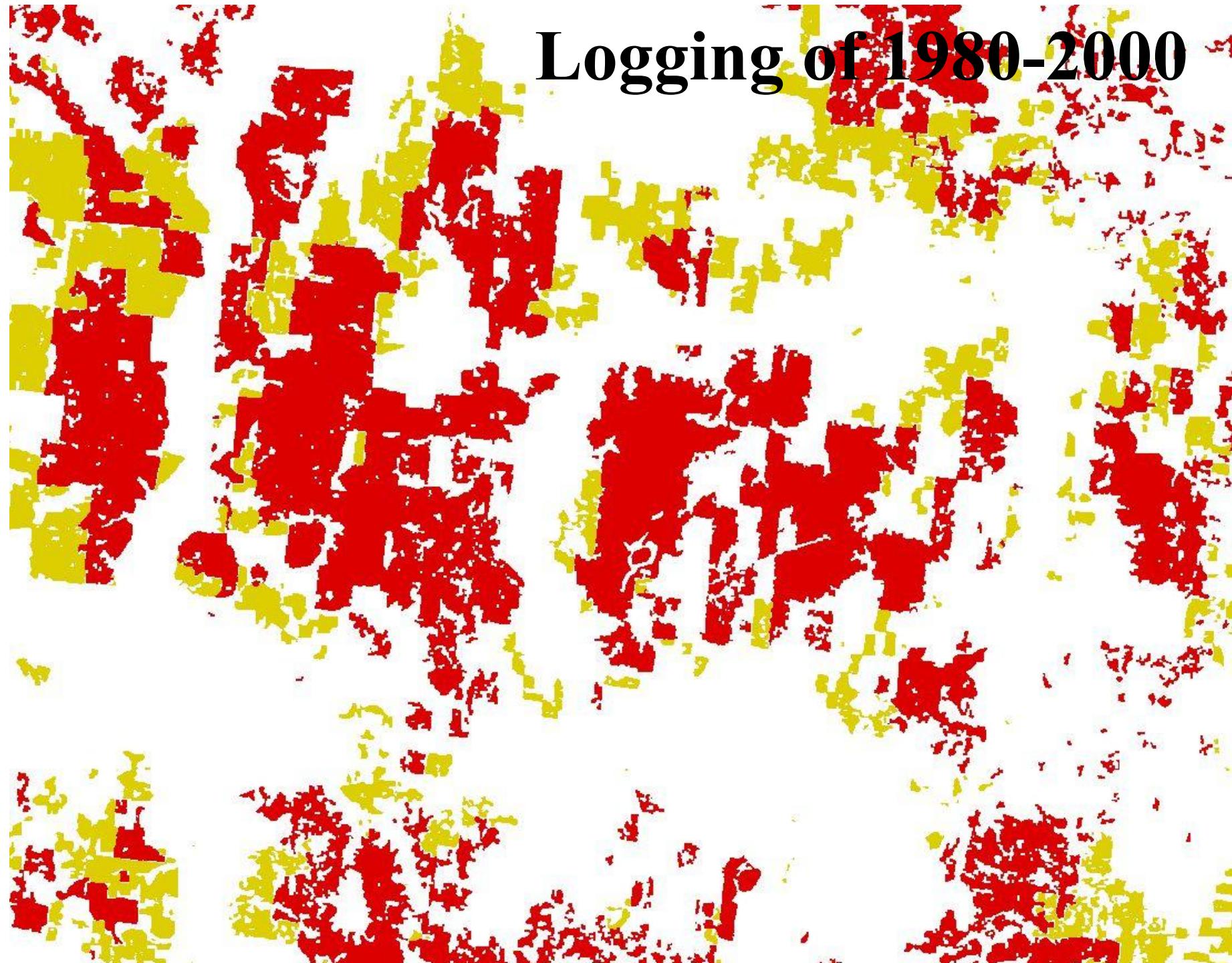
Landsat ETM+ (~2000)



Change TM-ETM+



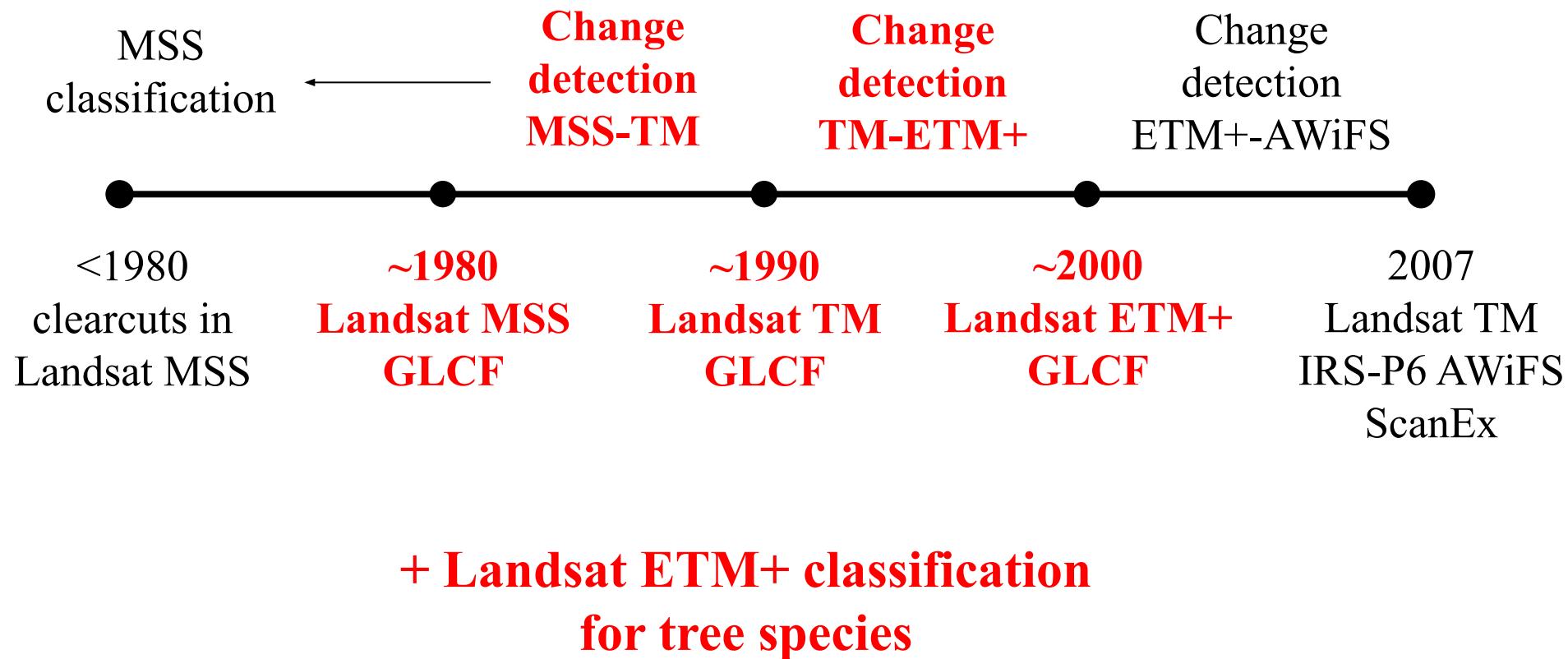
Logging of 1980-2000



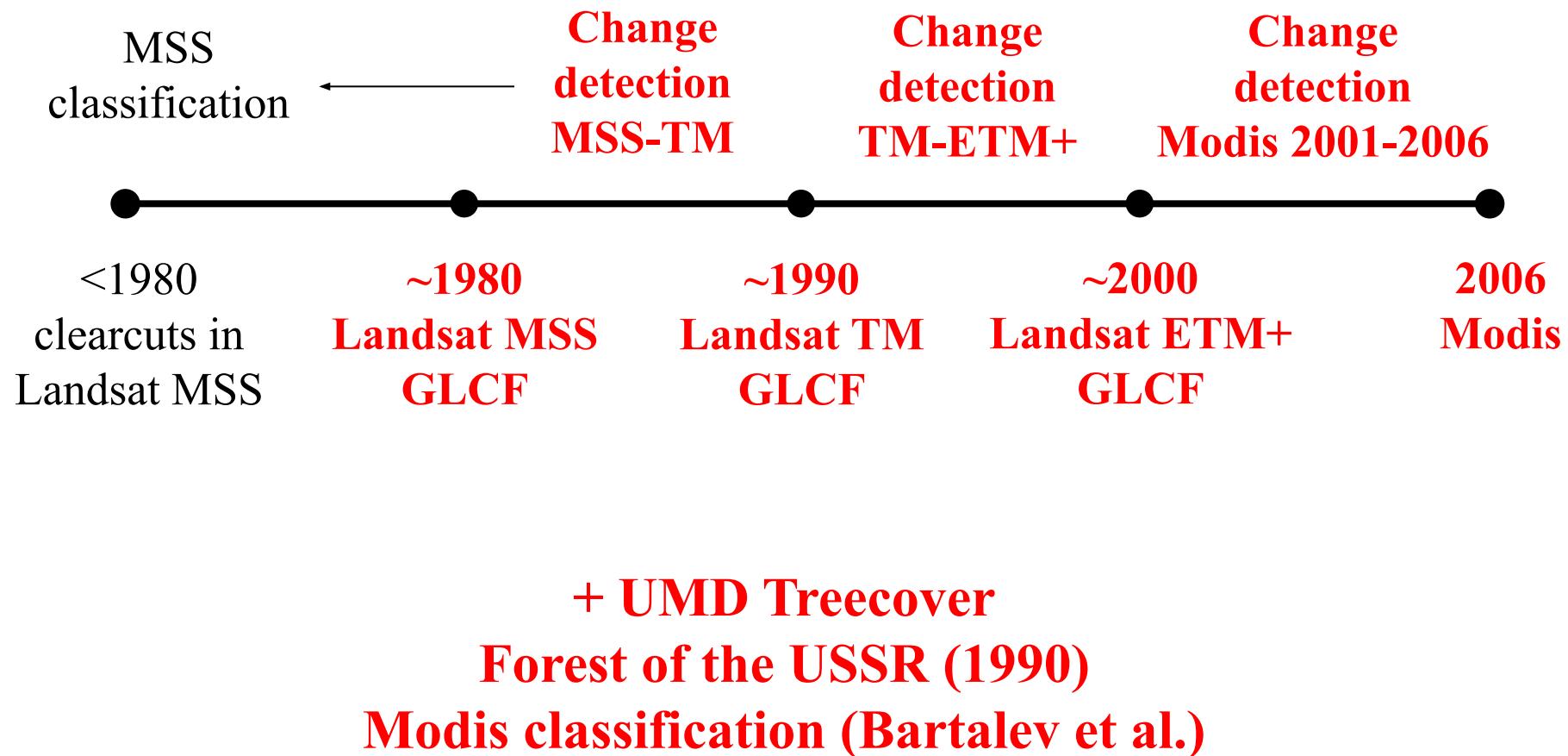
Productivity / growing stock is still a problem

- NDVI in combination with official data?
- Radar data for sparse forests?
- Landsat imagery classification in combination with ground data (kNN-method)?

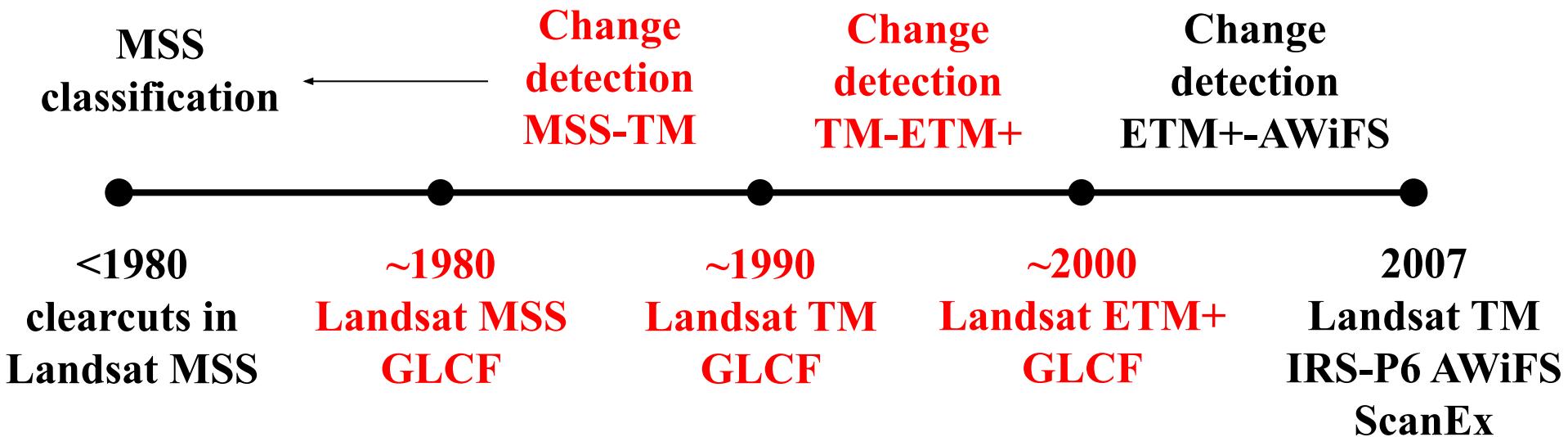
Kirov Oblast Mapping (2004-2006)



European Russia Mapping (2006-2007)

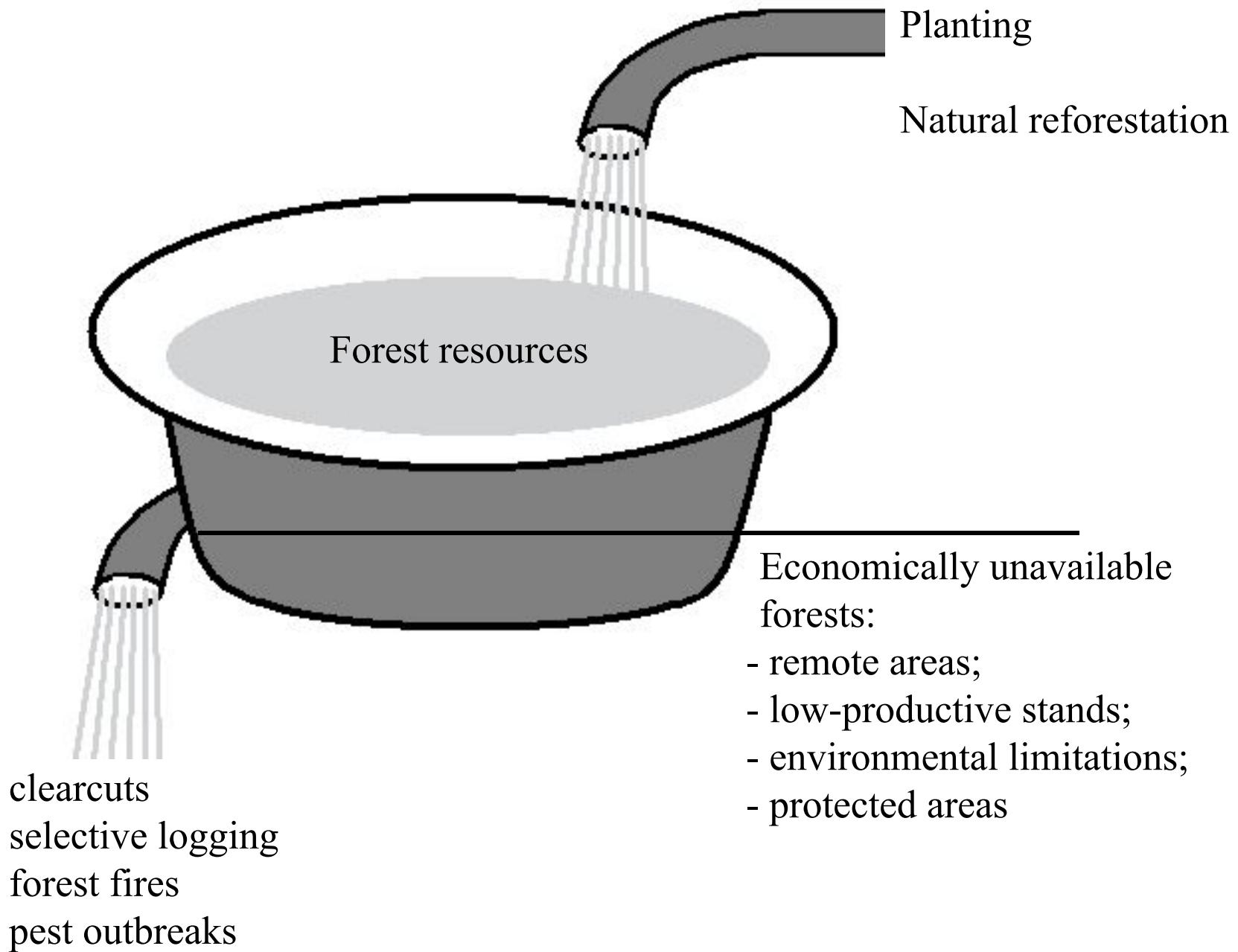


European Russia Mapping (plans for 2008)

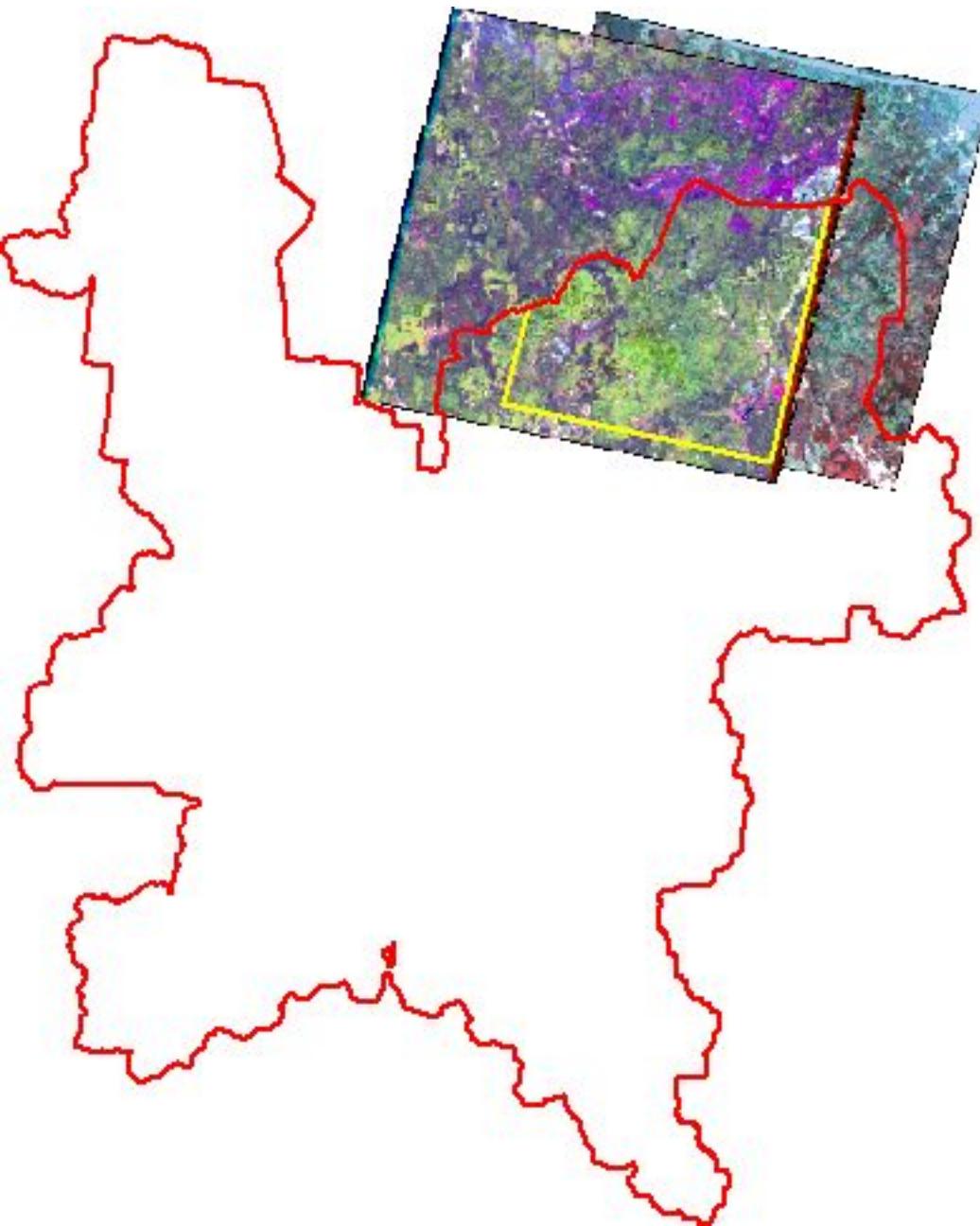


+ IRS-P6 AWiFS classification
for tree species

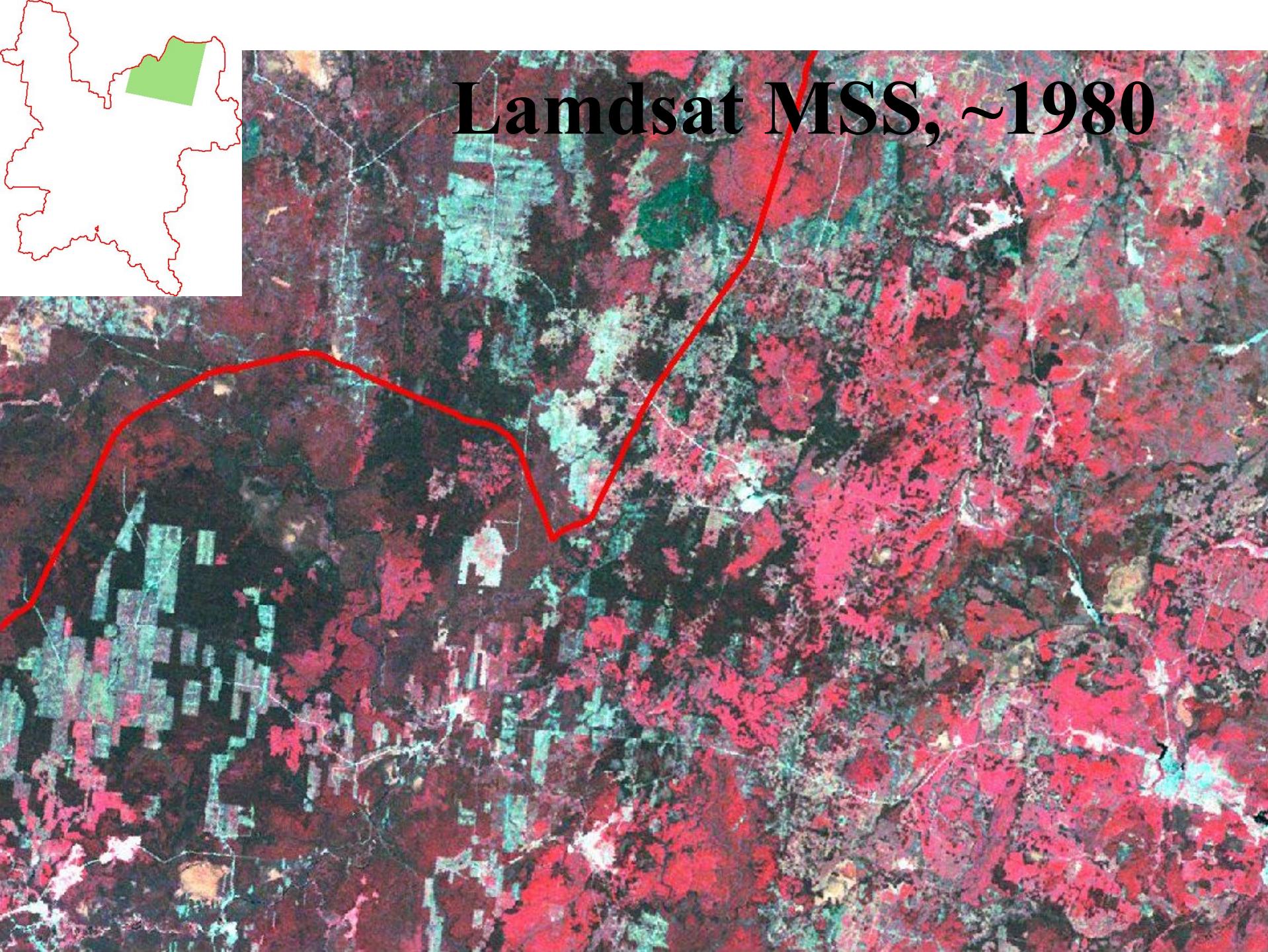
Logging sustainability



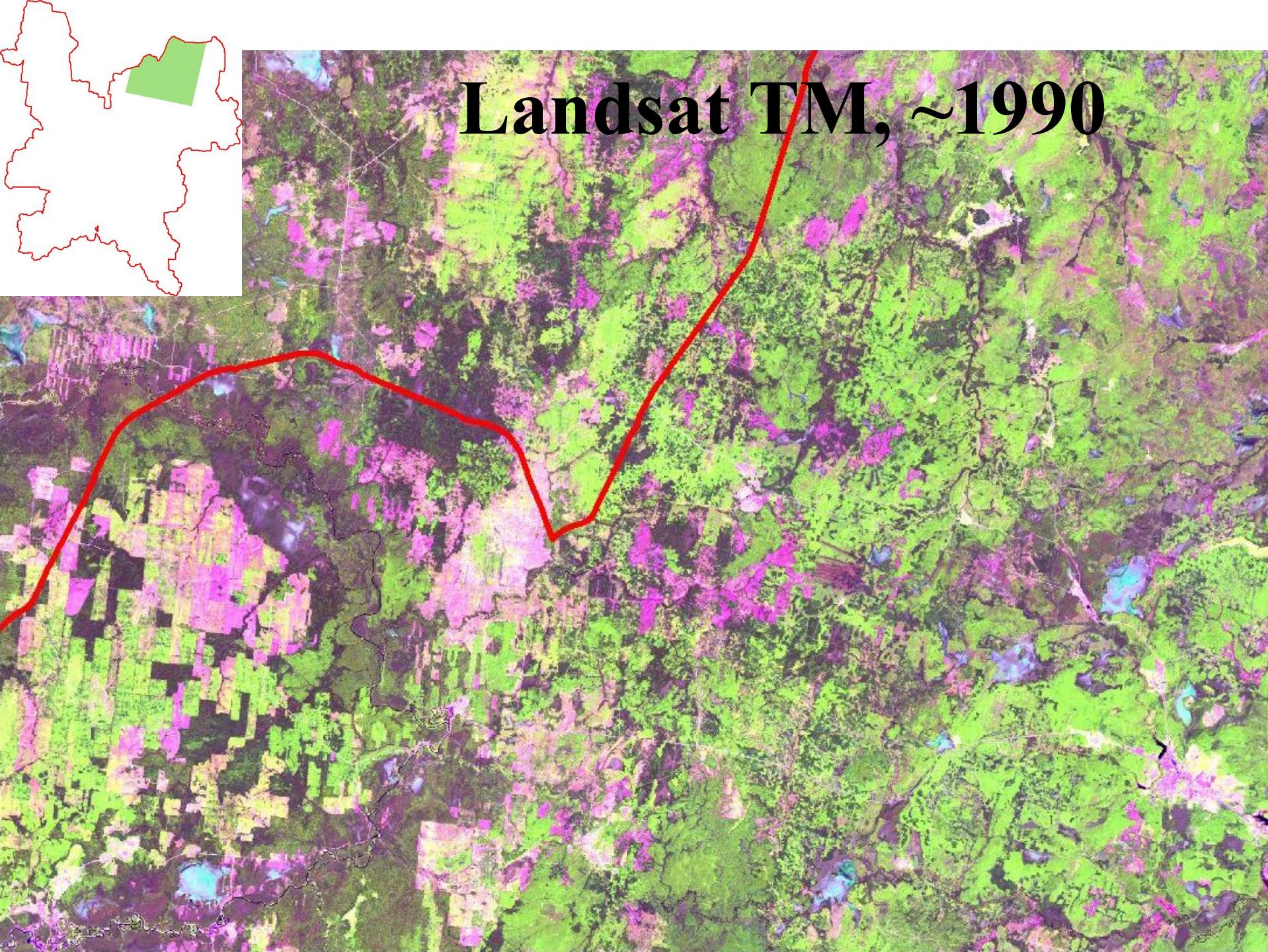
MSS-TM-ETM+ change detection



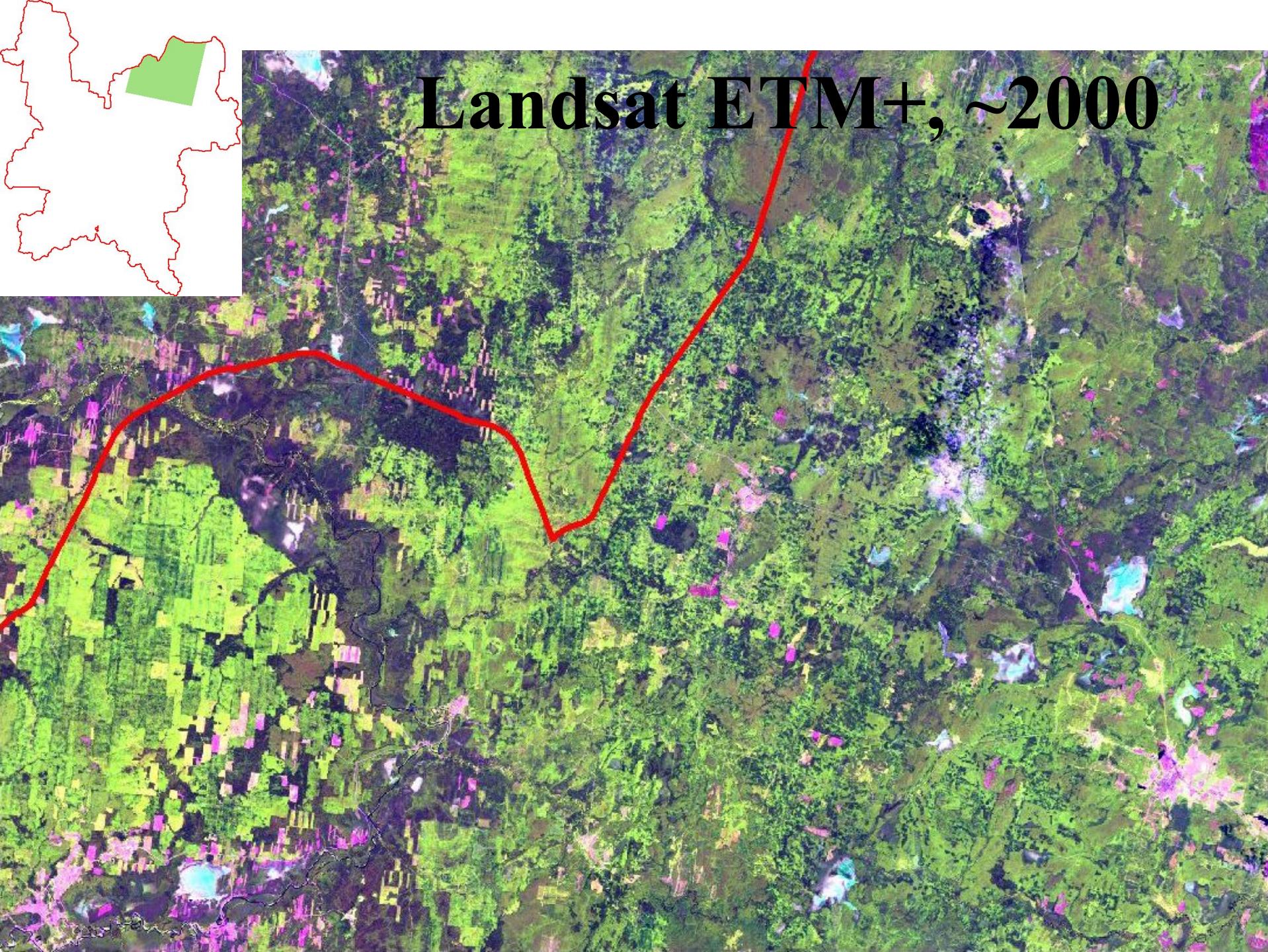
Northern Kirov
Oblast



Landsat MSS, ~1980



Landsat TM, ~1990



Landsat ETM+, ~2000

