



Synergies between future Landsat and European satellite missions for better understanding coupled human-environment systems

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Overall goals

- **Exploring dense and long time series**
- **Creating Landsat-based products across large areas**
- Integrating Landsat with future Sentinel-2 and EnMAP data
- Central and Eastern Europe, SE-Asia, S-America



Land change monitoring in Eastern Europe

- Background: Drastic changes in socio-economic conditions in Eastern Europe after collapse of socialism & accession to EU
- Limited understanding from case study evidence, bigger picture missing



August 16th 1989



July 10th 1993



August 28th 2002



June 6th 2010



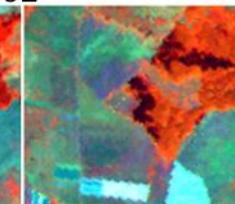
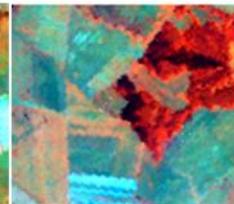
April 4th 1986



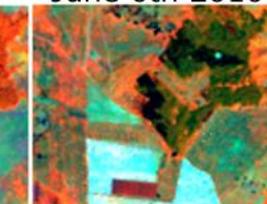
June 29th 1992



August 22nd 2000



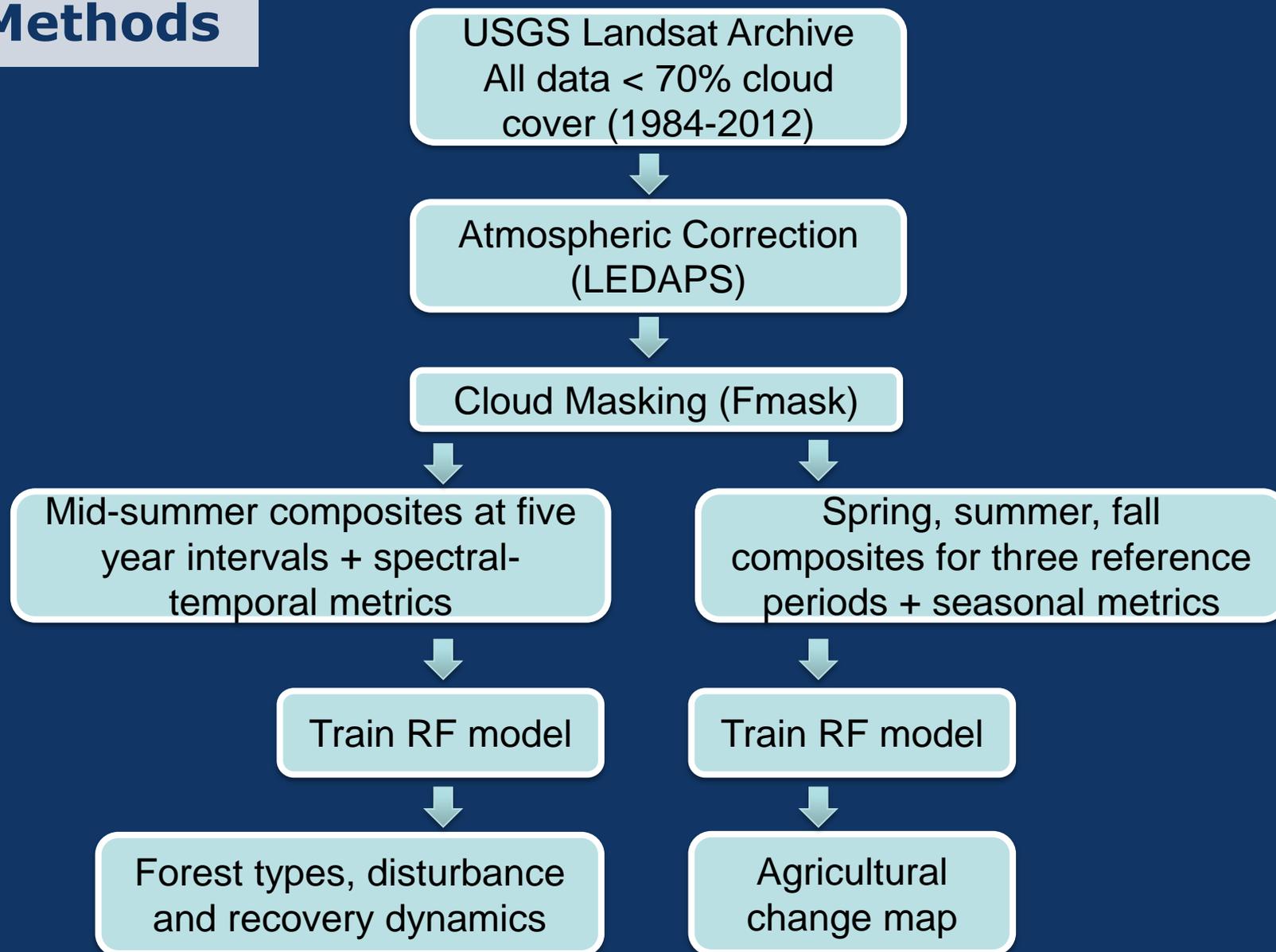
July 17th 2007

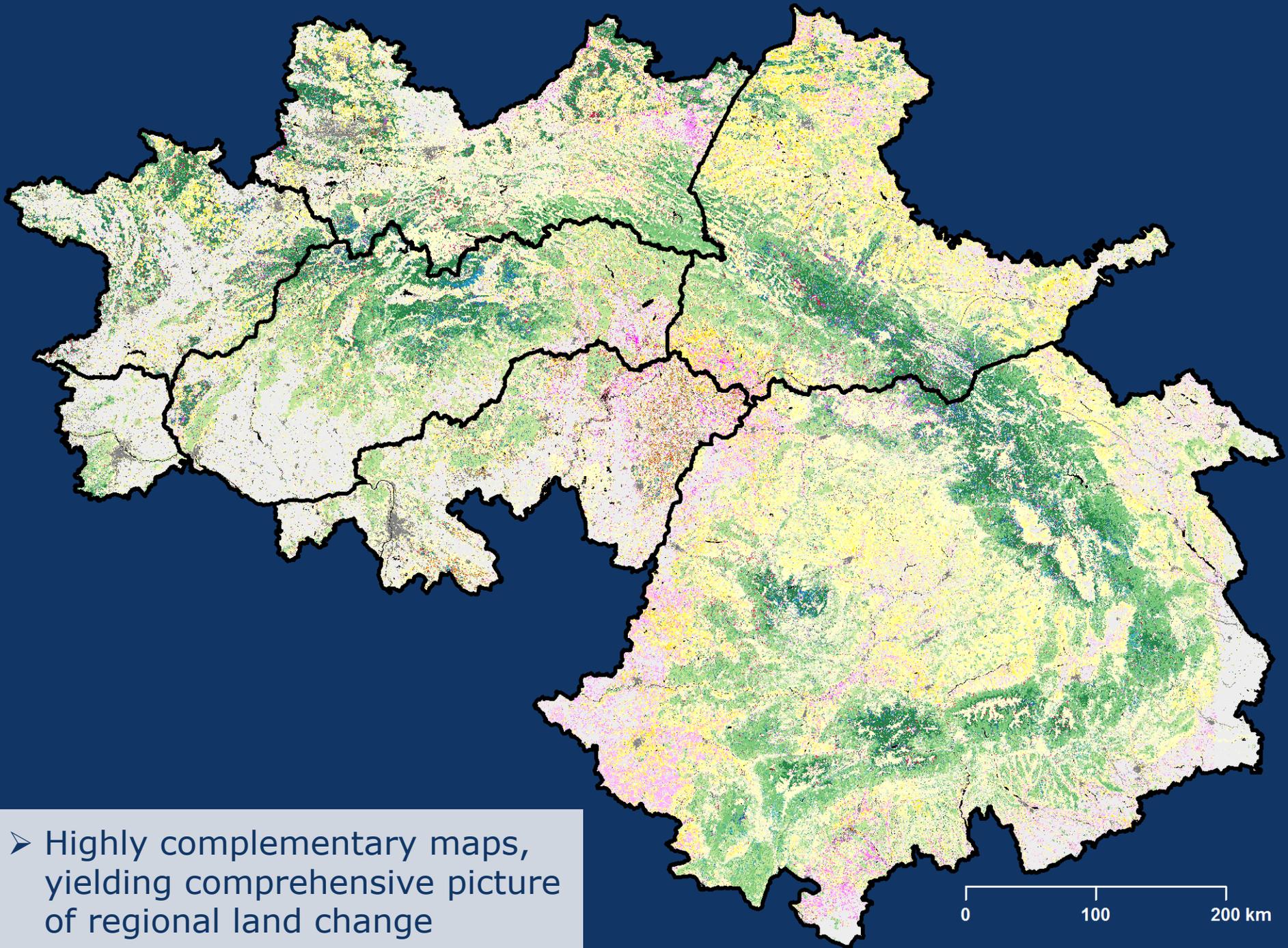


- Objective: Reconstruct forest dynamics & agricultural land change processes over 25 years for the Carpathian mountain range



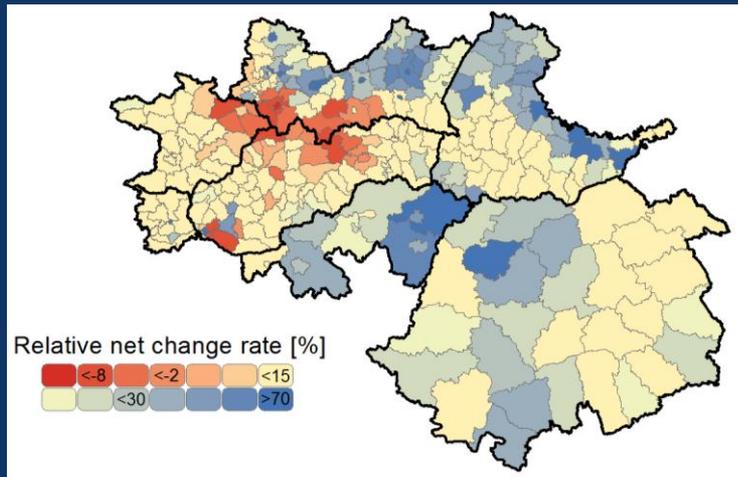
Methods



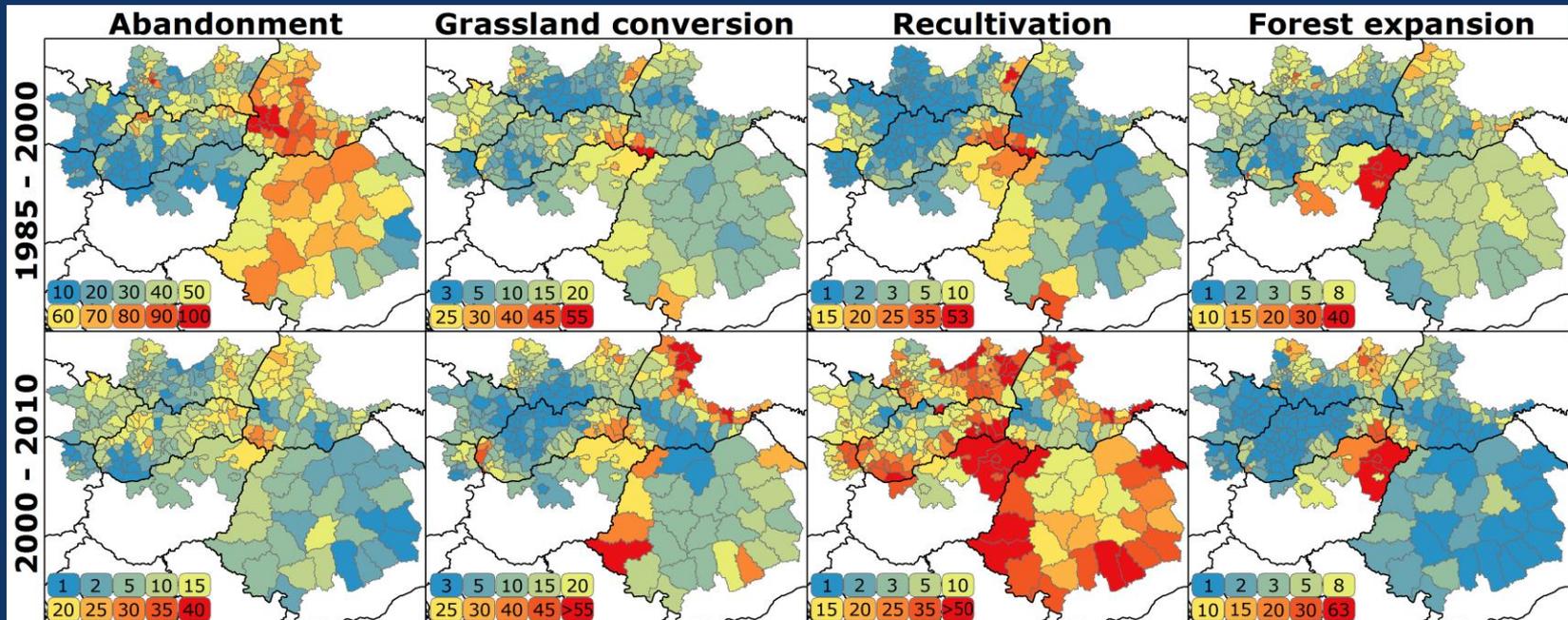
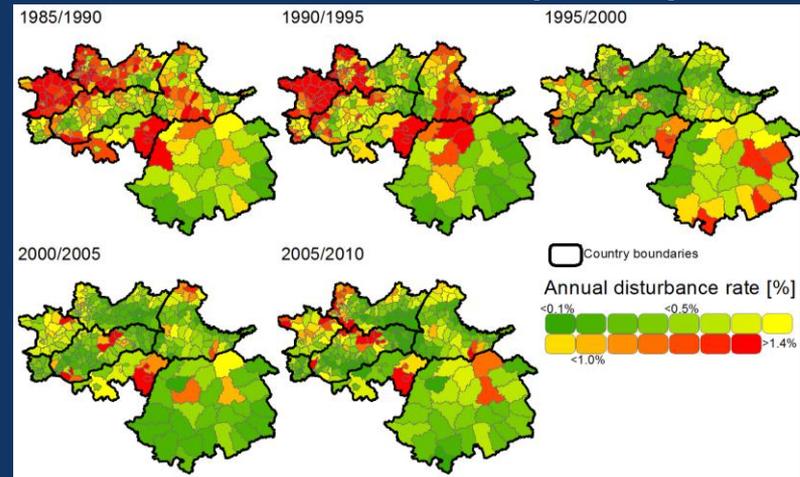


➤ Highly complementary maps, yielding comprehensive picture of regional land change

➤ Process summary maps:



Griffiths et al. RSE (2013)



Forest degradation in mosaic landscapes of Southeast Asia

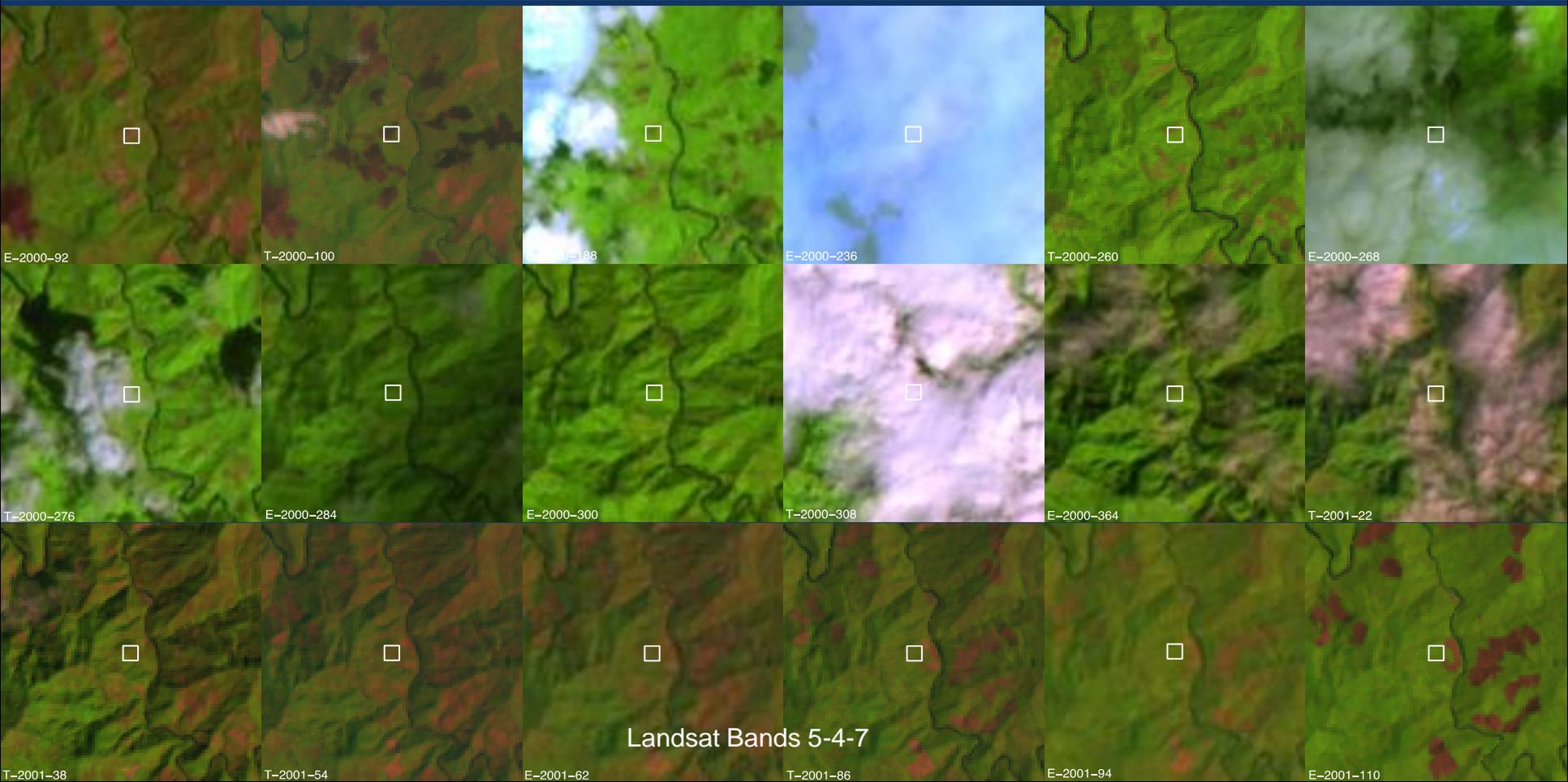


- Monitoring methods and guidelines largely developed for lowland rainforests
- Majority of upland areas not covered by primary forest anymore
- Complex patch work of shifting cultivation (<2 ha patches)
- Seasonal variations in monsoon systems
- Persistent cloud cover and high aerosols

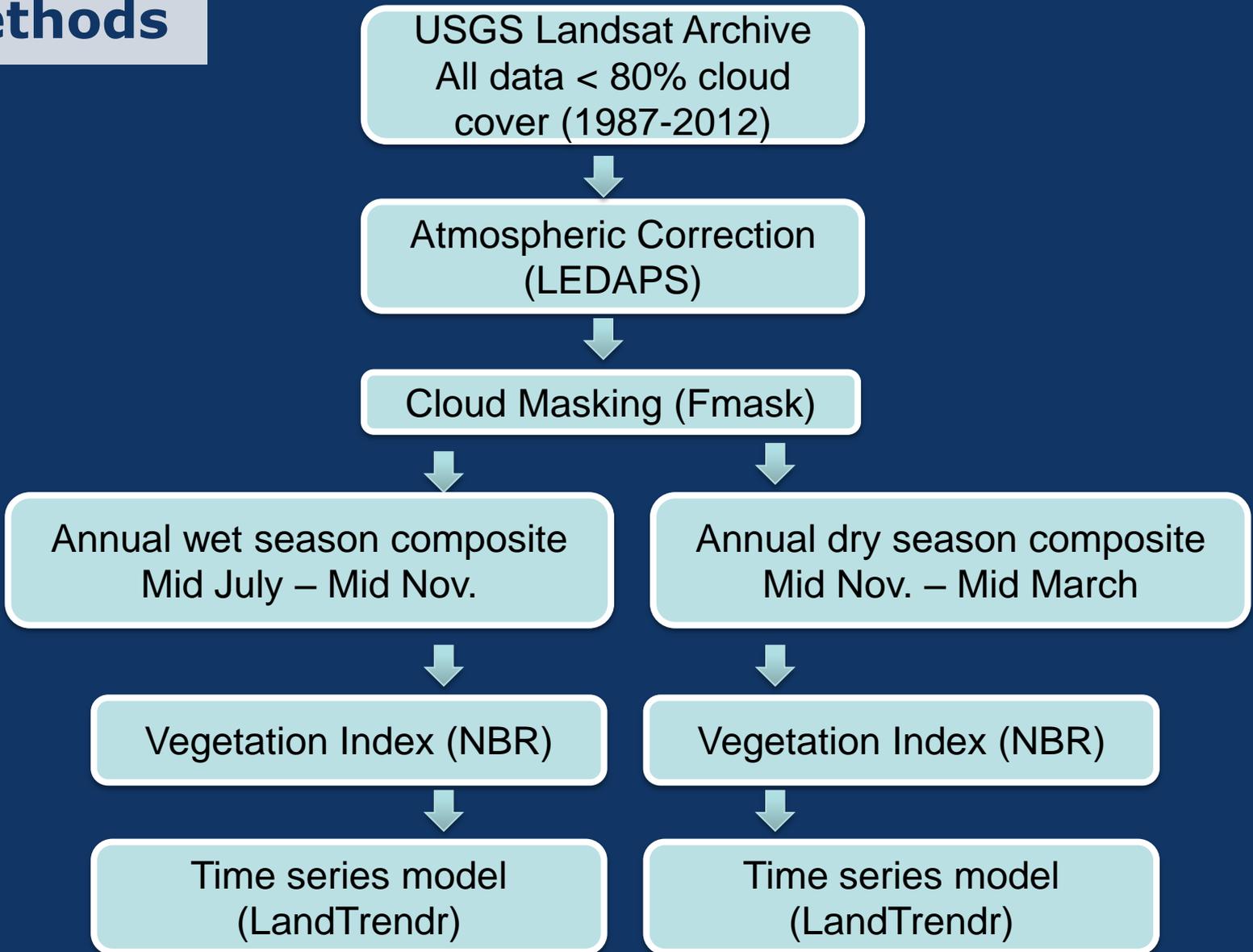


- Objective: Test the utility of Landsat time series to monitor forest changes in mosaic landscapes of Southeast Asia

Spatial and temporal patterns of slash and burn agriculture

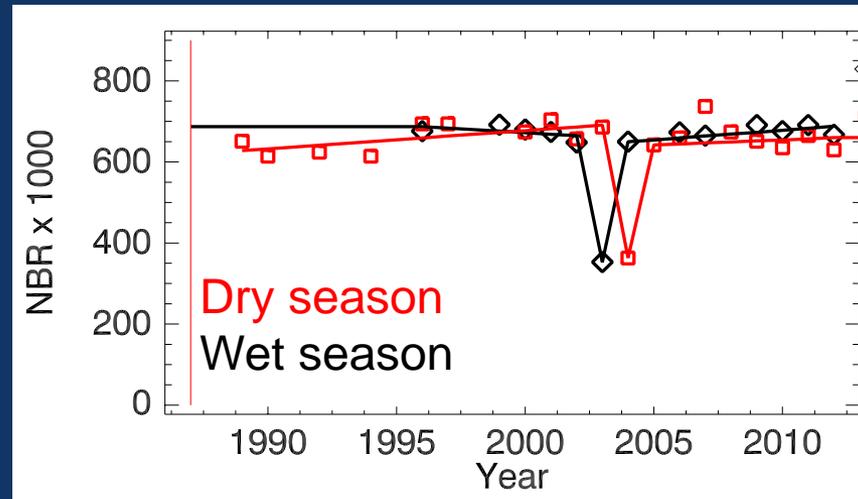
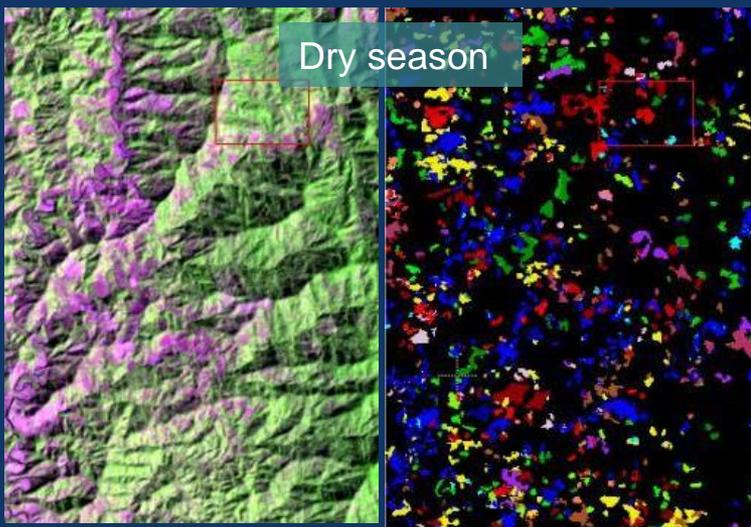
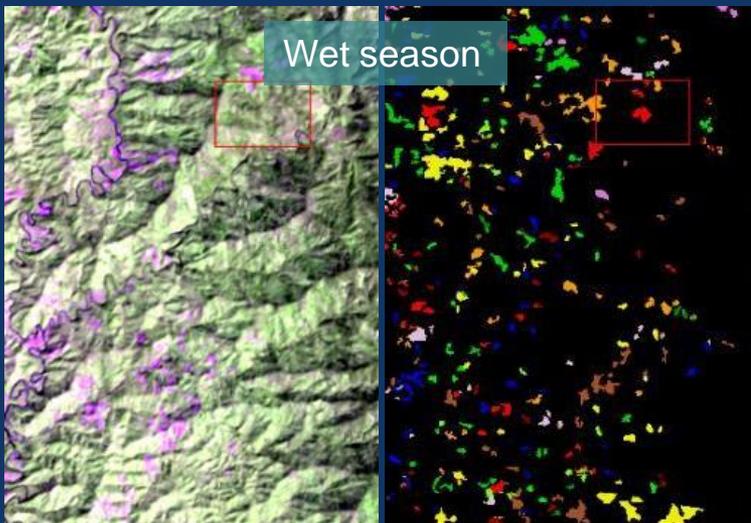


Methods



Disturbance detection using LandTrendr

Landsat composite Disturbance Year Map



- 90% of disturbed pixels recover spectrally within 1-2 years
- Including dry-season imagery improves time series density and thus detection accuracy

Summary

- Individual regions and processes have different prerequisites and need specifically optimized approaches
- Our approaches heavily rely on surface reflectance and reliable cloud/shadow masks
- Integrating seasonal information holds great potential and will benefit from improved spatial and temporal coverage
- Next challenges: L8 – Sentinel2 a/b