The Great Eurasian Transition - Changing Social and Economic Policies and their Implications for the World's Largest Continent



Volker C. Radeloff, University of Wisconsin-Madison

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Kirsten de Beurs, G. Henebry, G. Ioffe, T. Nefedova

Mutlu Ozdogan, D. Aksenov, M. Baumann, A. Jaroshenko, K. Wendland

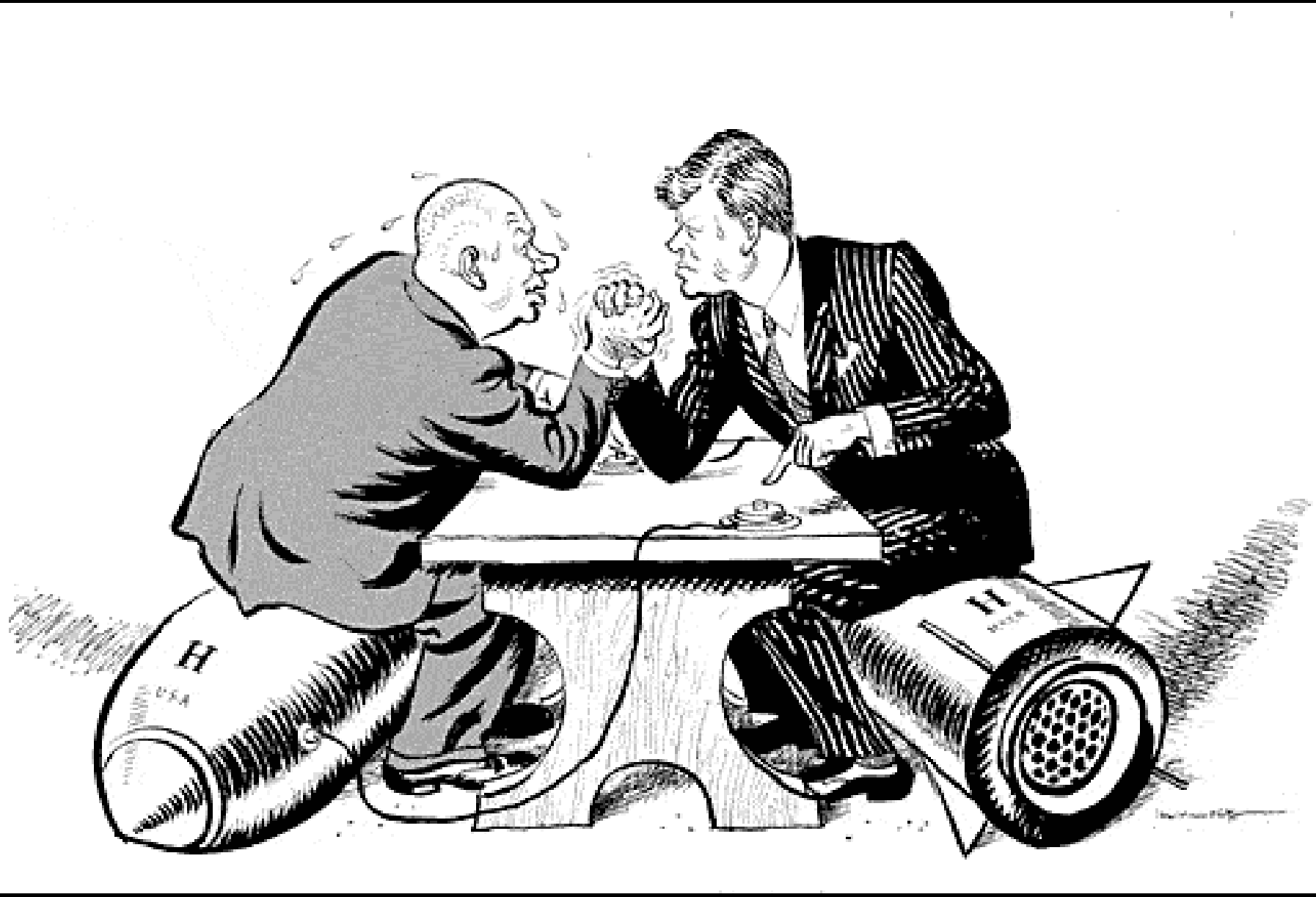
Peter Potapov, M. Hansen, S. Turubanova

Curtis Woodcock, P. Olofsson, A. Baccini, V. Gancz, R. Houghton, P. Torchinava

NASA Land-Cover and Land-Use Change Program LCLUC

October 4th 2011

COLD WAR 1946-1991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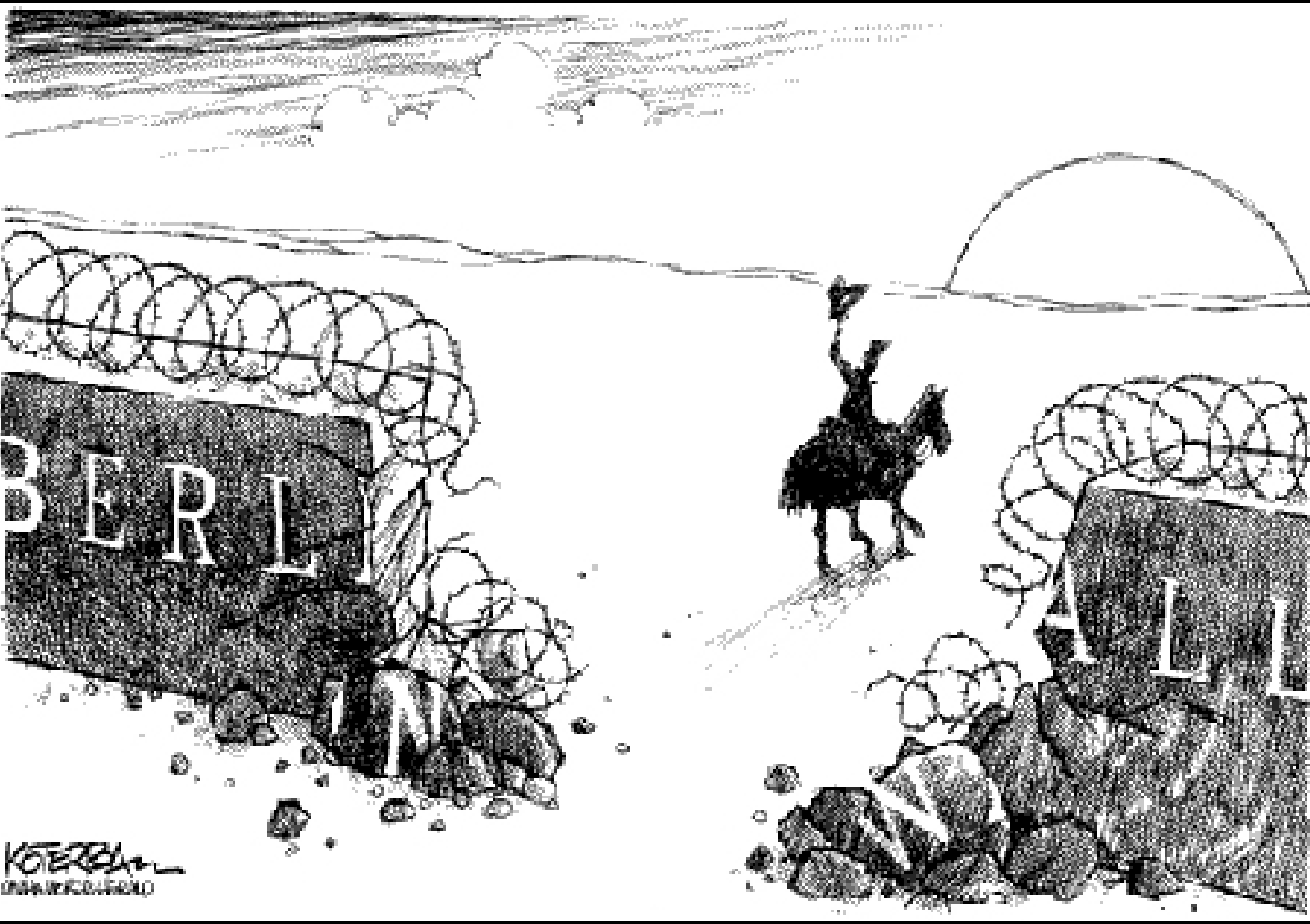
BERLIN
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Test
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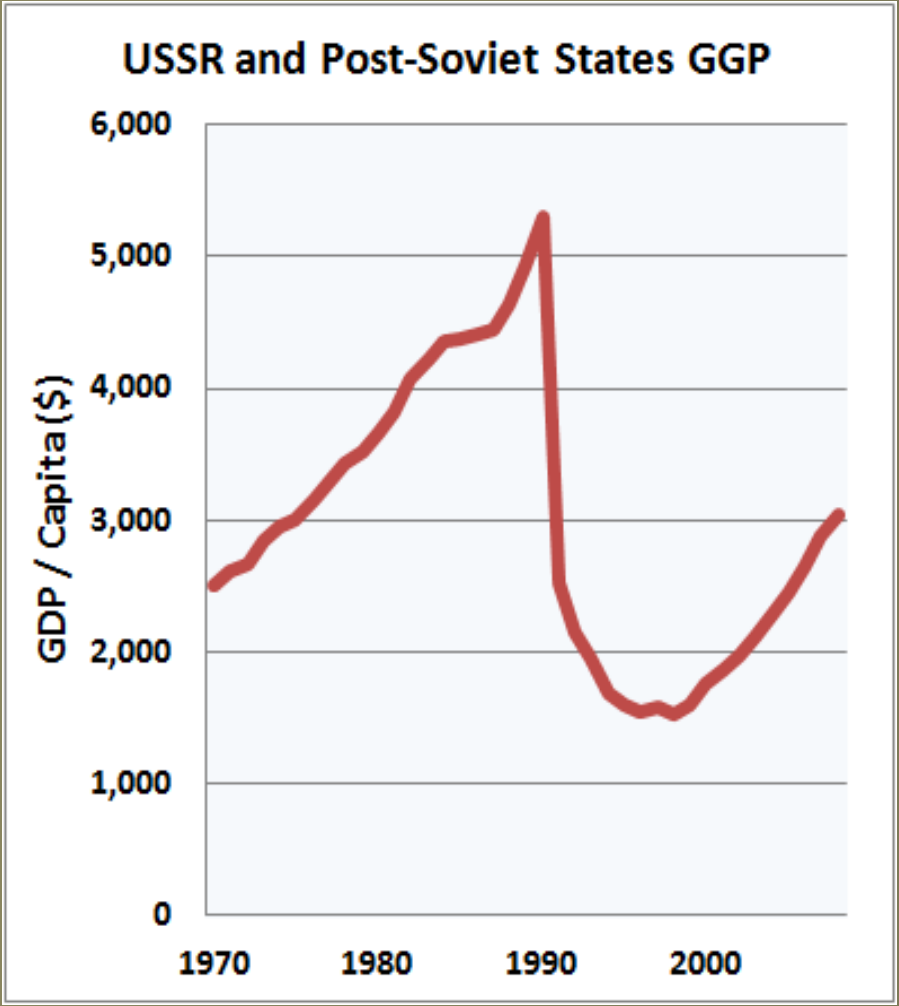
LIFE

Institutional changes

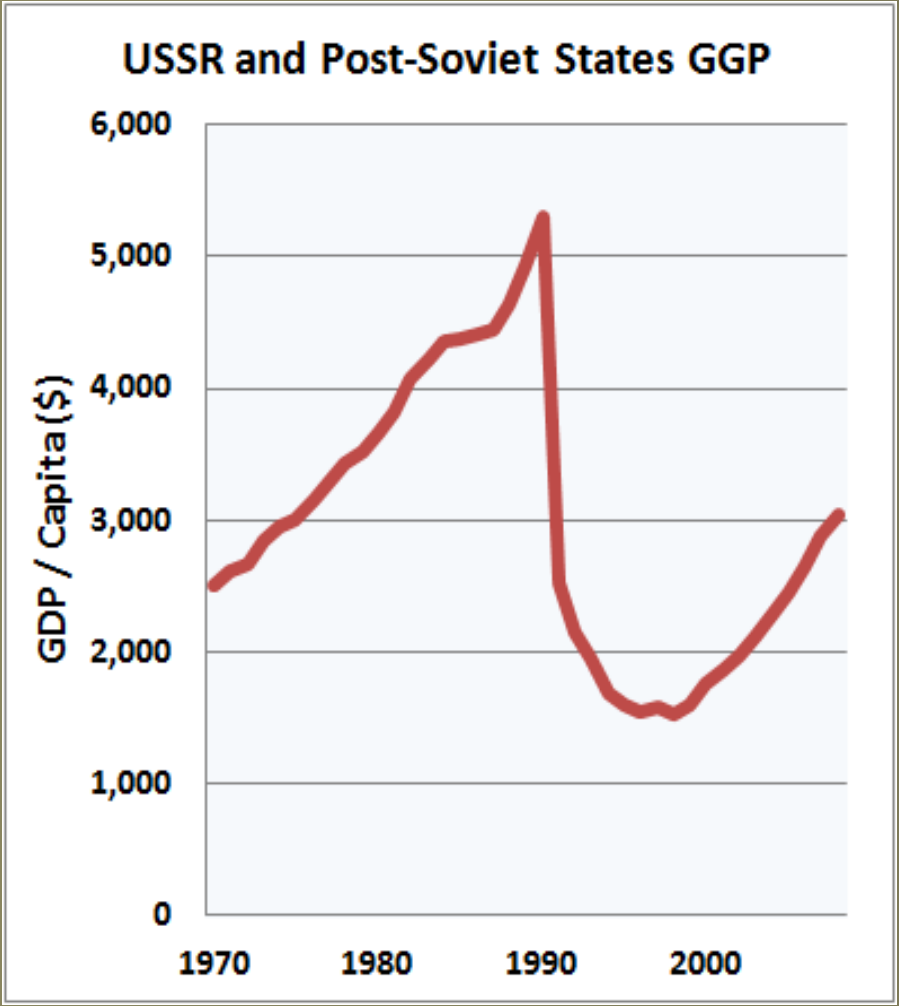
Shock therapy:

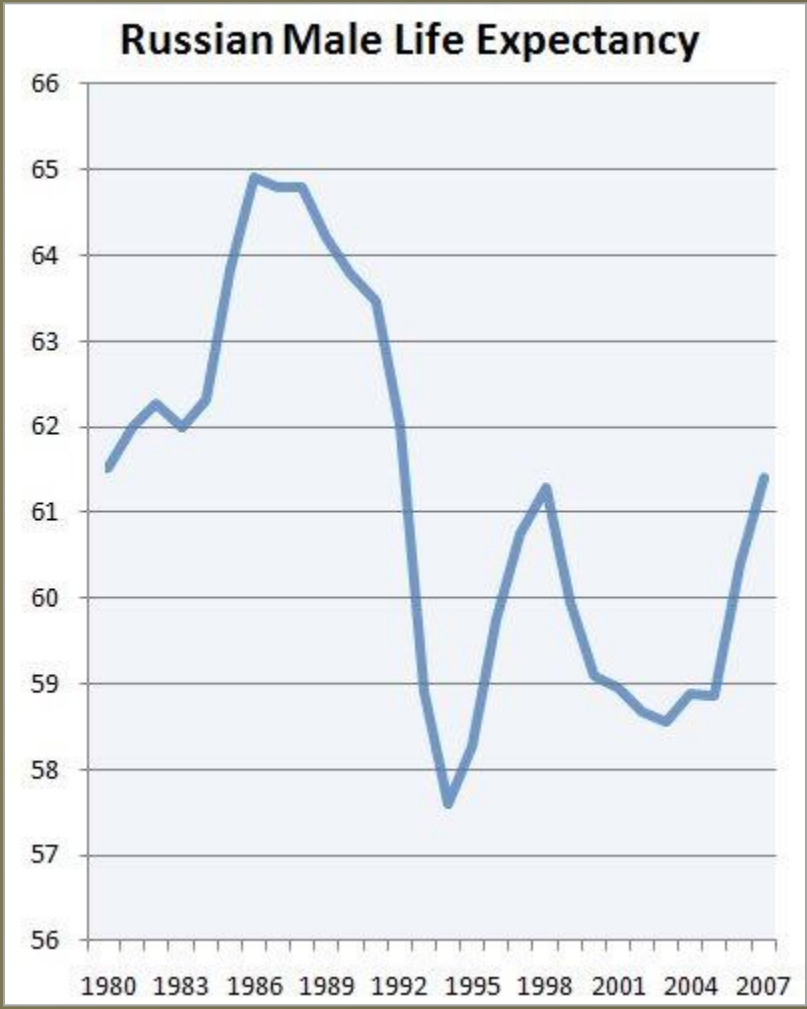
- ***Open markets***
- ***Subsidy cuts***
- ***Privatization***

Introduction

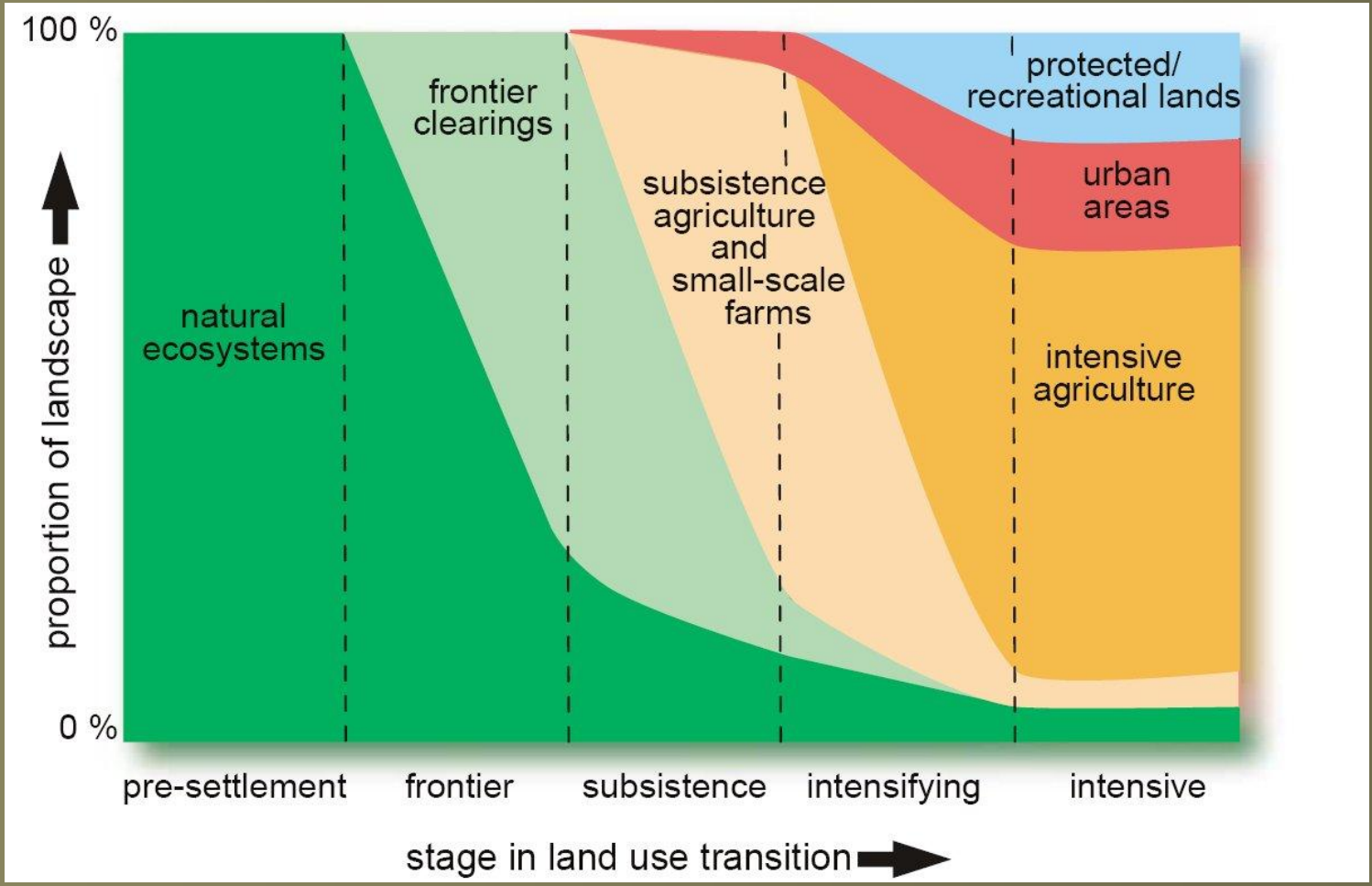


Introduction



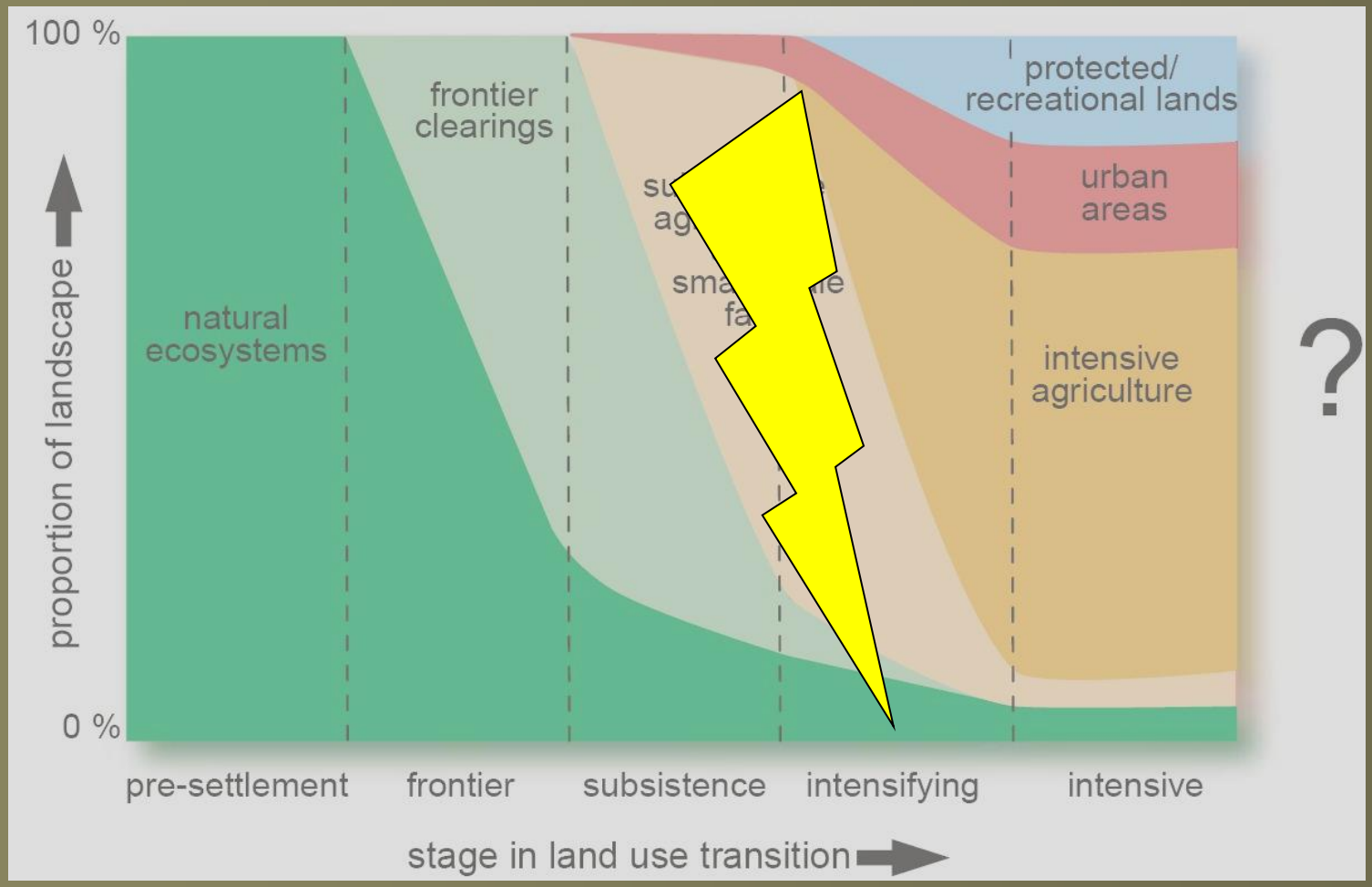


Introduction



Foley et al., 2005, Science

Introduction

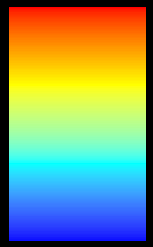


Research Questions

Effects of:

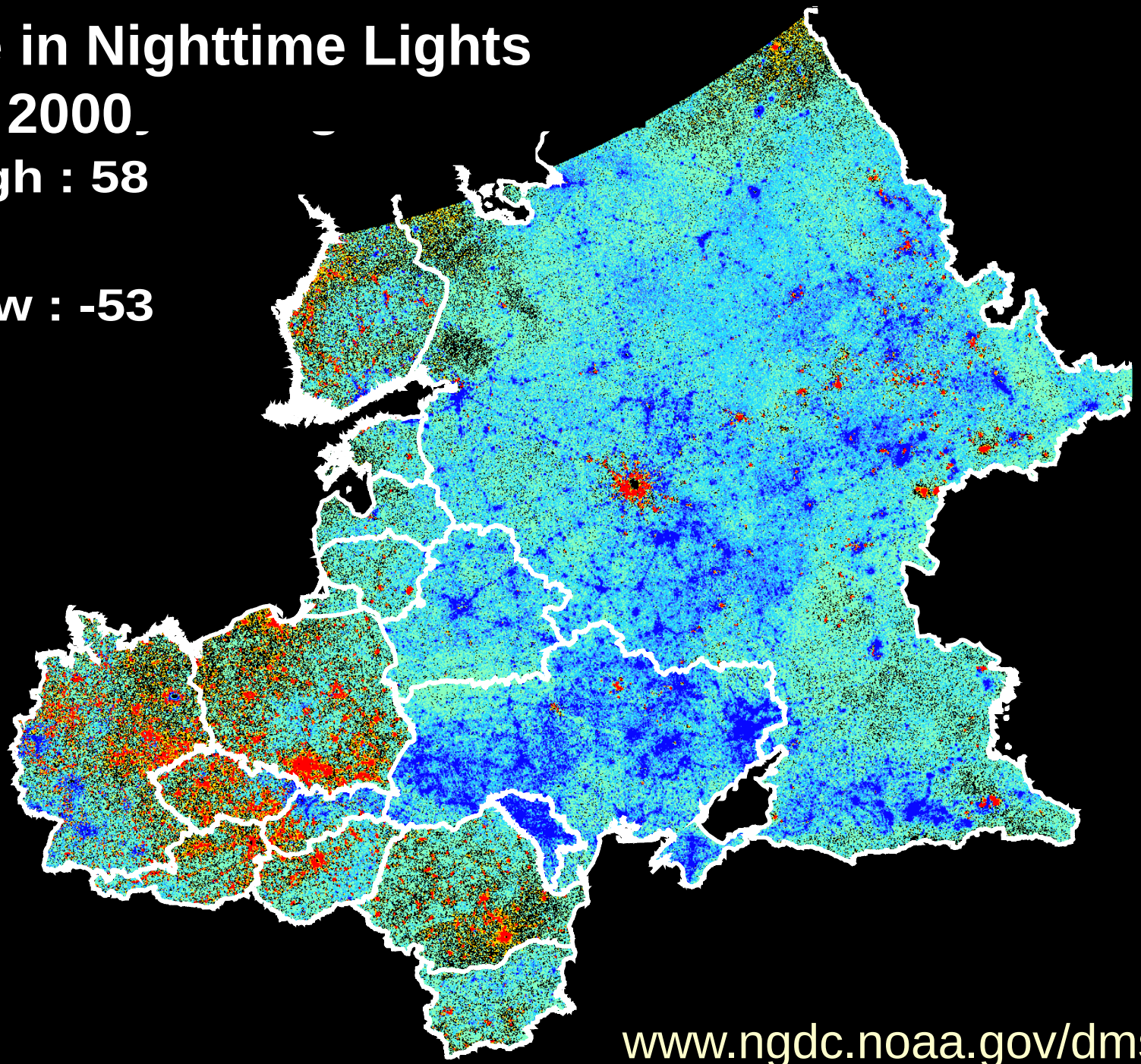
1. socioeconomic shocks

Change in Nighttime Lights
1992 to 2000



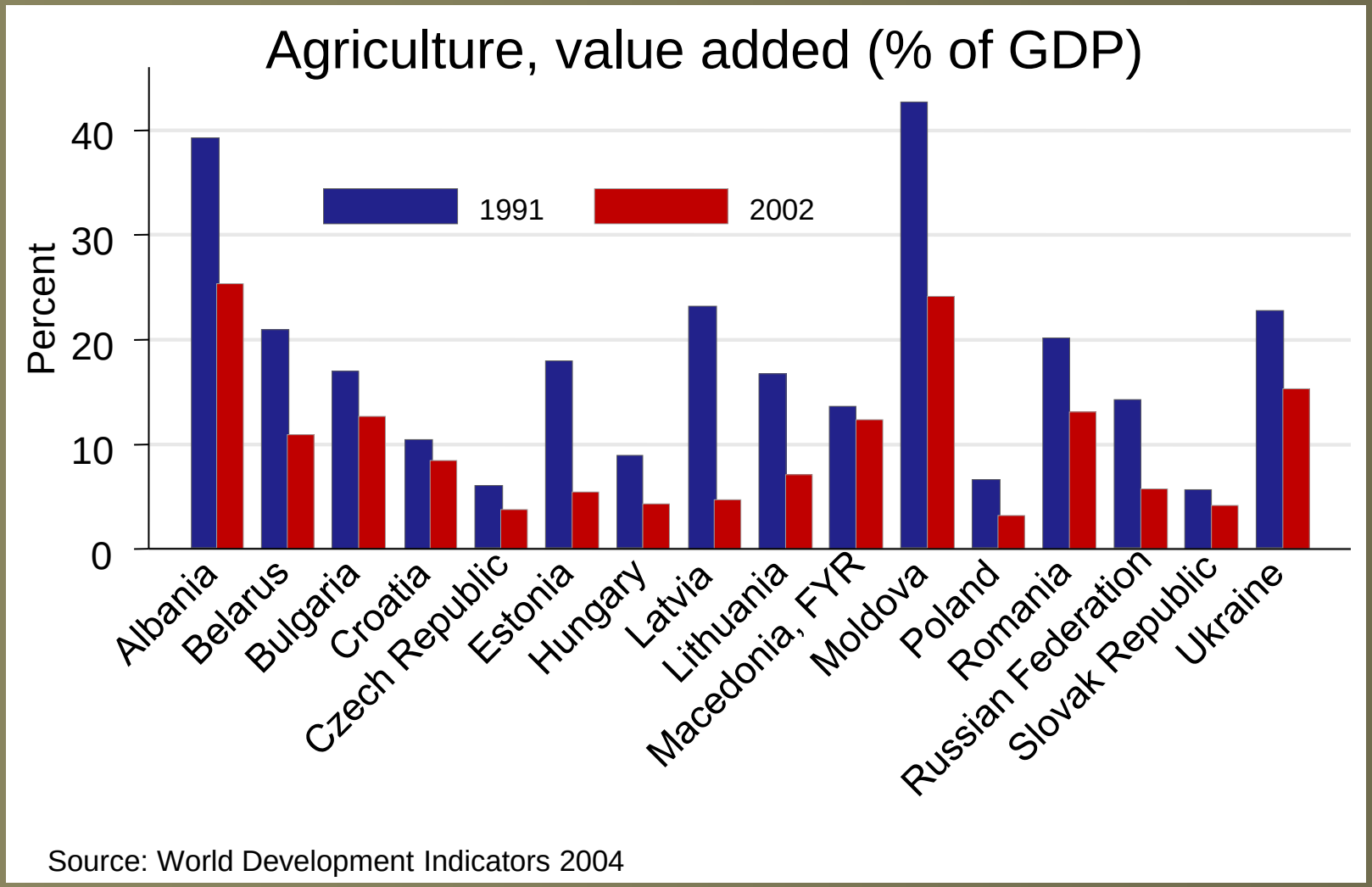
High : 58

Low : -53



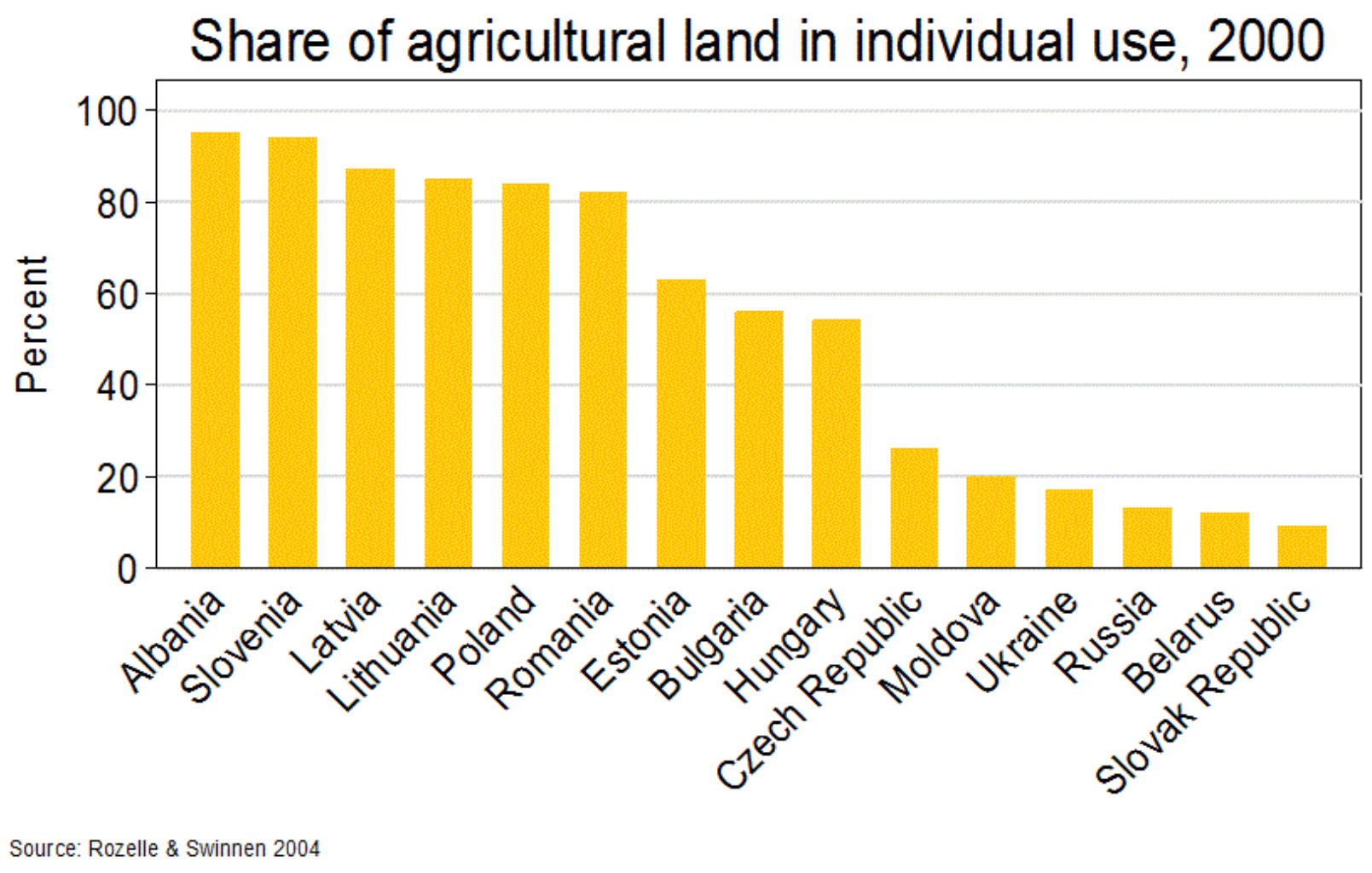
www.ngdc.noaa.gov/dmsp/

Institutional changes

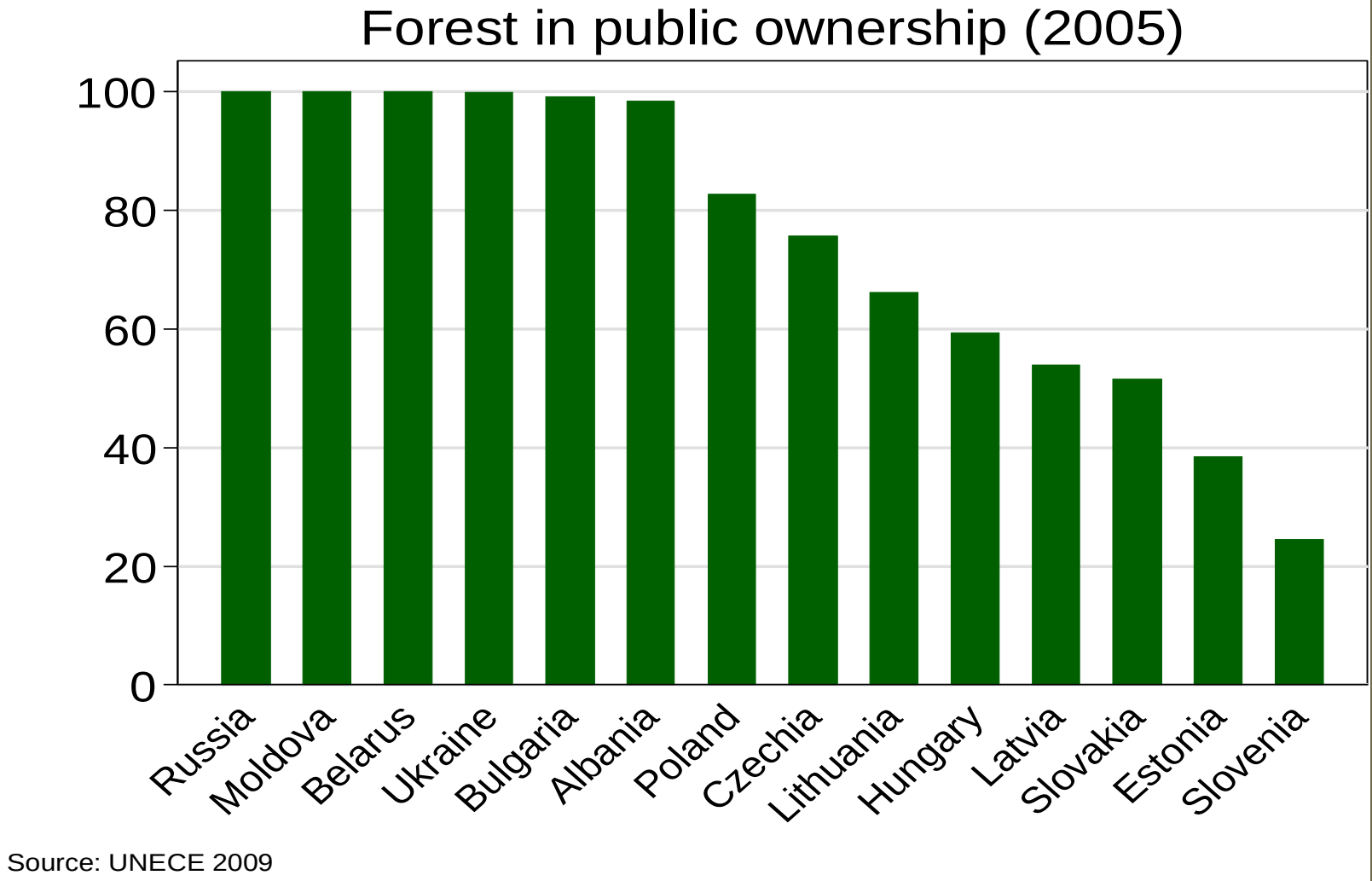


Source: World Development Indicators 2004

Institutional changes



Institutional changes



Introduction

Introduction

Introduction

Research Questions

Effects of:

1. socioeconomic shocks

2. and broad-scale drivers

Research Questions

Effects of:

1. socioeconomic shocks

2. and broad-scale drivers

on agriculture, forests, and biodiversity


ПЕРЕДОВАЯ ЛИНИЯ БОРЬБЫ ЗА УСКОРЕНИЕ
НАУЧНО-ТЕХНИЧЕСКОГО ПРОГРЕССА
ПРОЛЕГАЕТ ЧЕРЕЗ НАУКУ.
НАУКОЙ
ОПЫТ УМНОЖАЯ,
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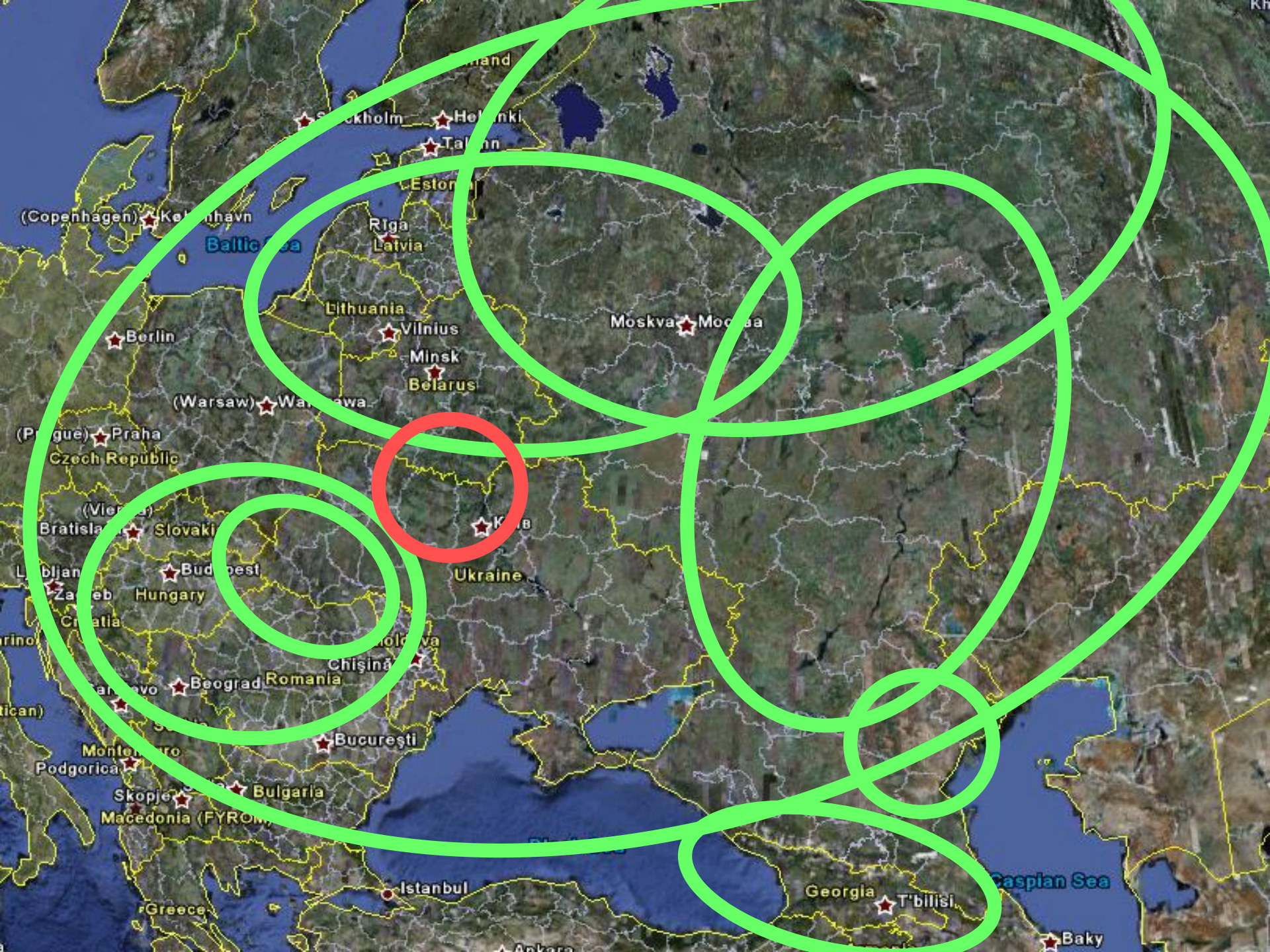
ГРОМАДУ УРОЖАЯ!
ОСНОВЫ ЗЕМЛЕДЕЛИЯ
ДАЗНО.РУ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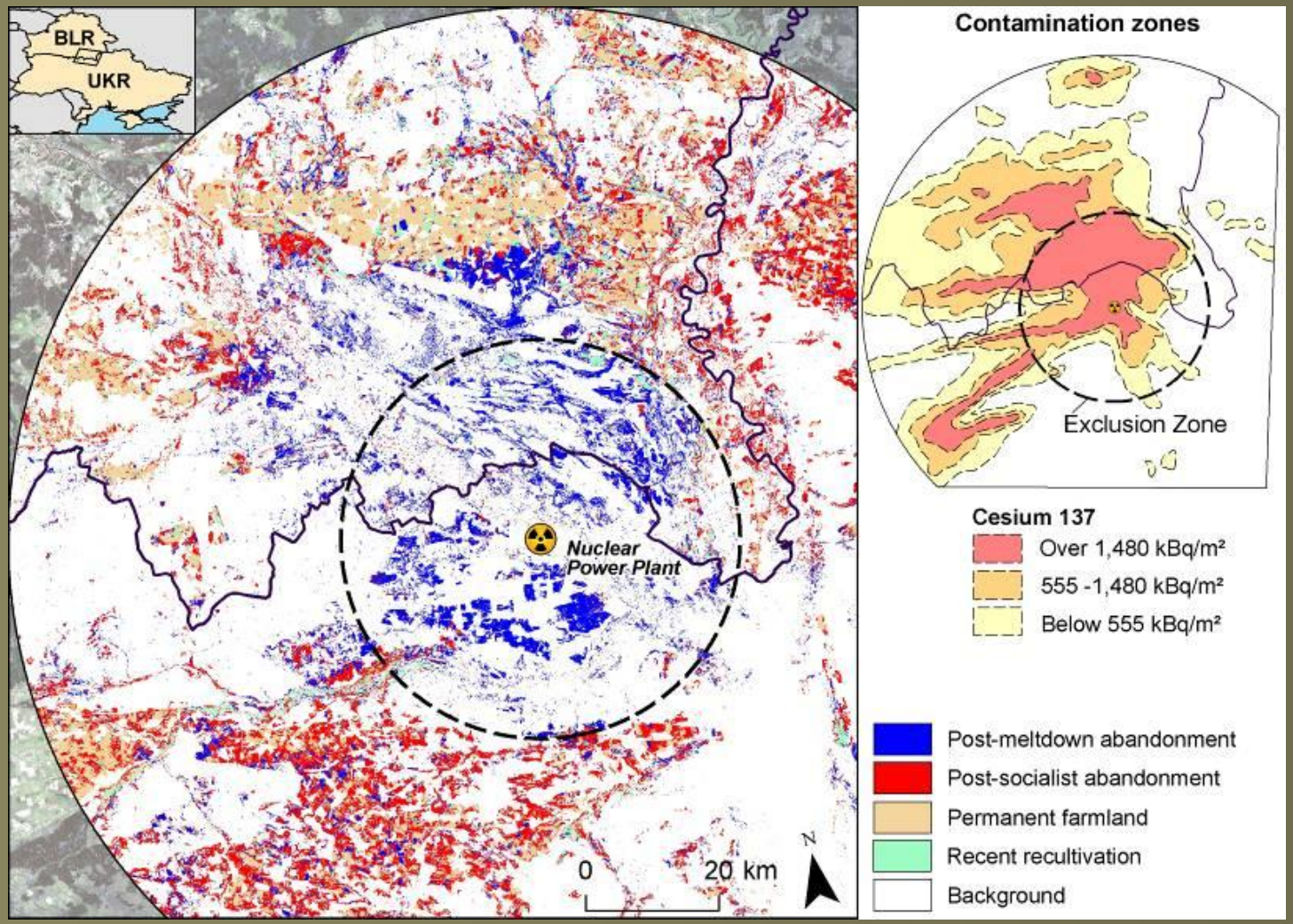
Baky

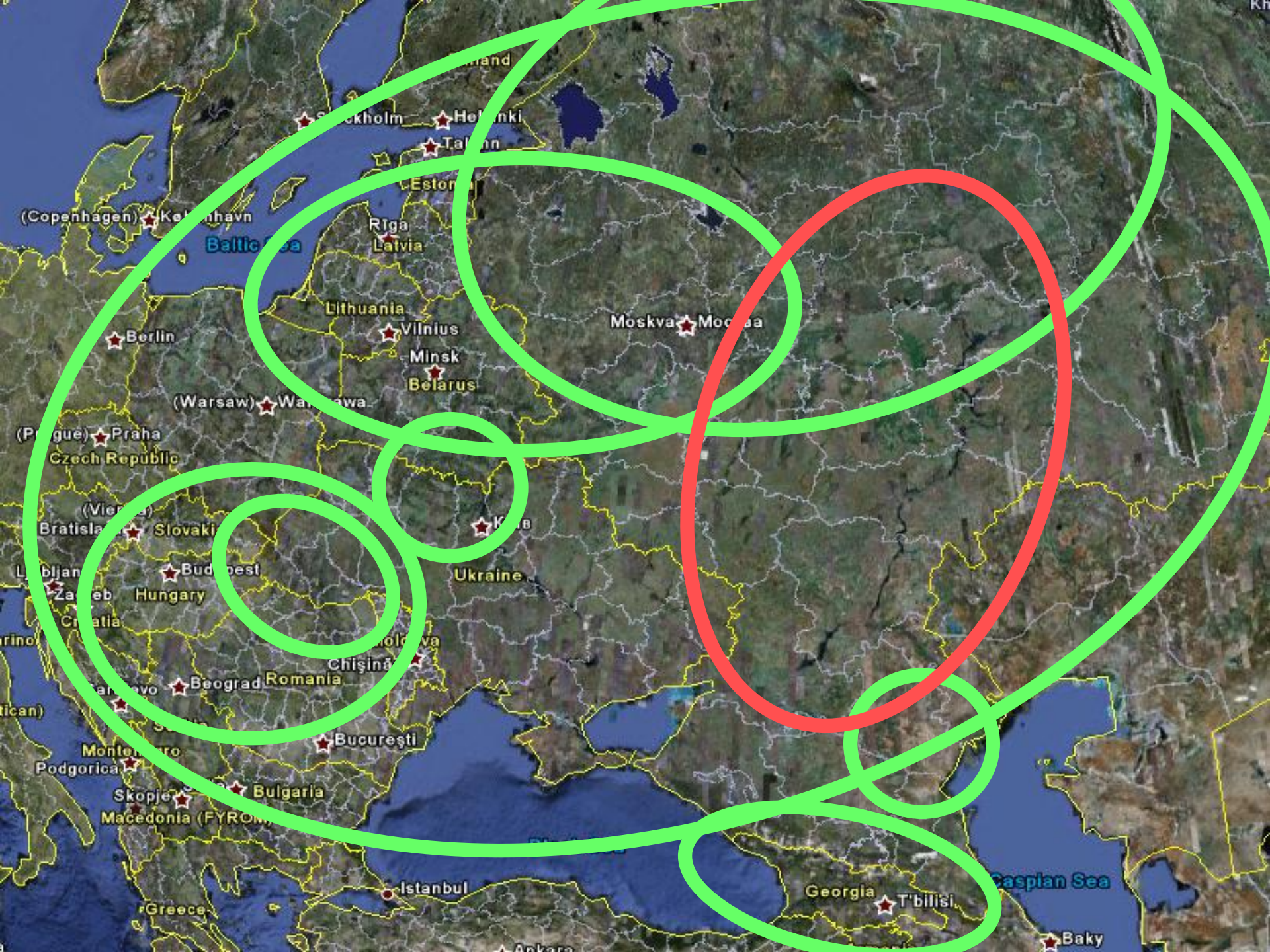
Agriculture

IAEA 2006

Agriculture



Hostert et al., ERL, *in press*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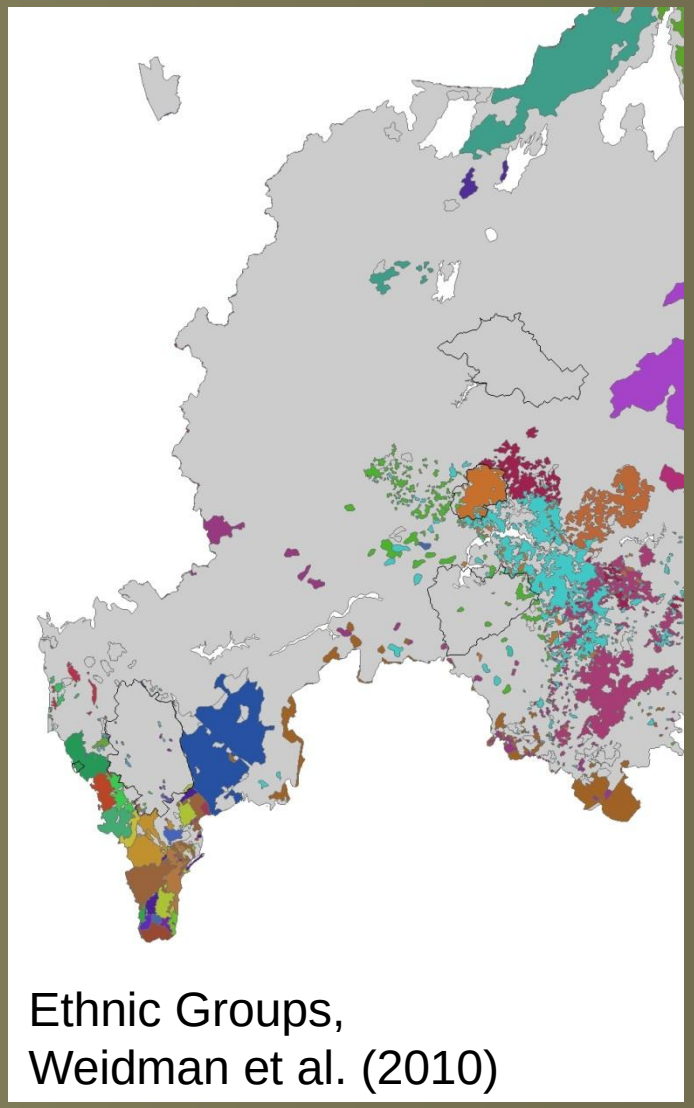
Agriculture

de Beurs, et al., ERL, *in rev.*

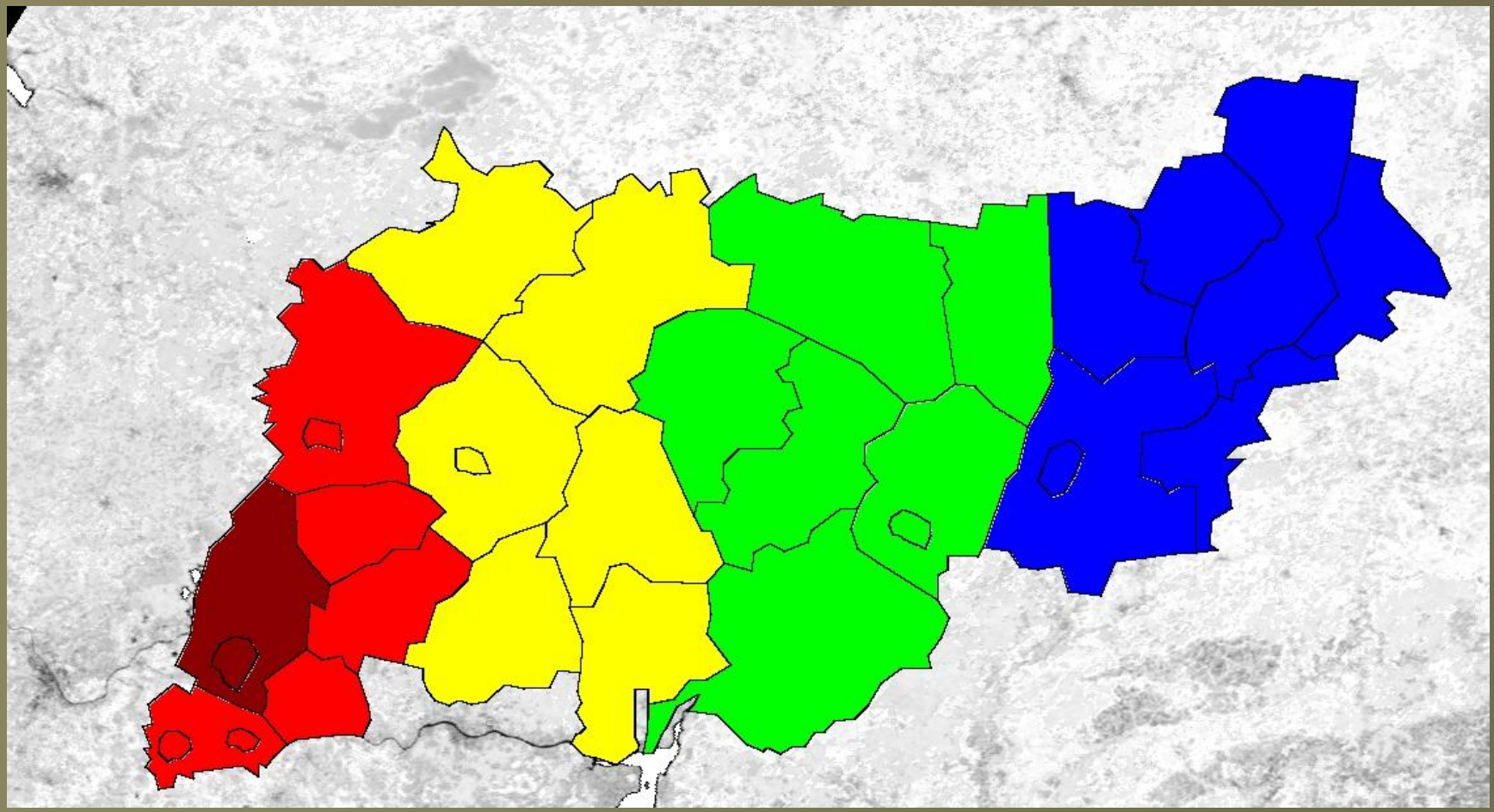
Agriculture



Ethnic Groups,
Weidman et al. (2010)

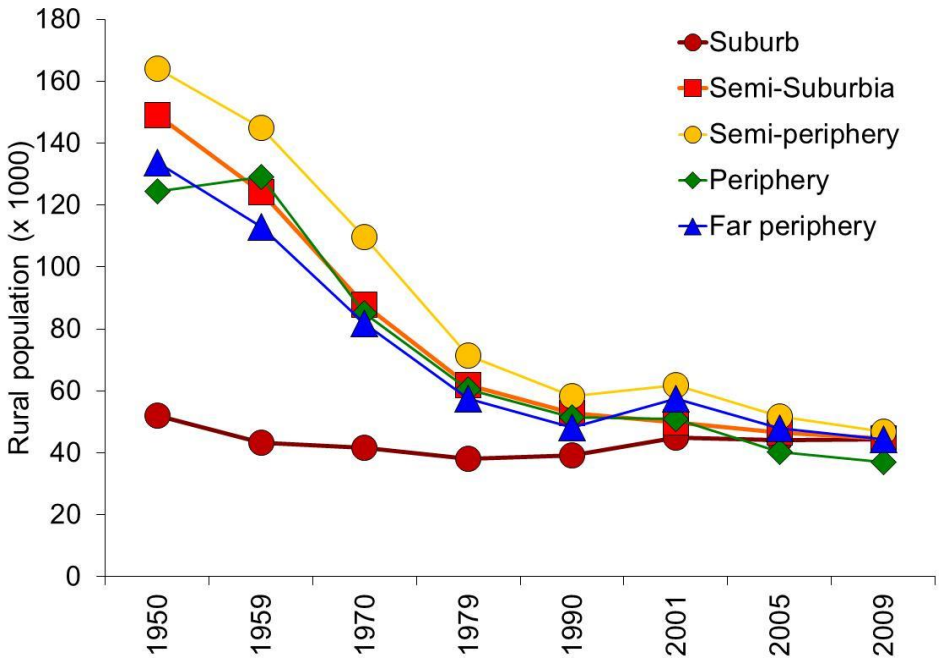
de Beurs, et al., ERL, *in review*

Agriculture

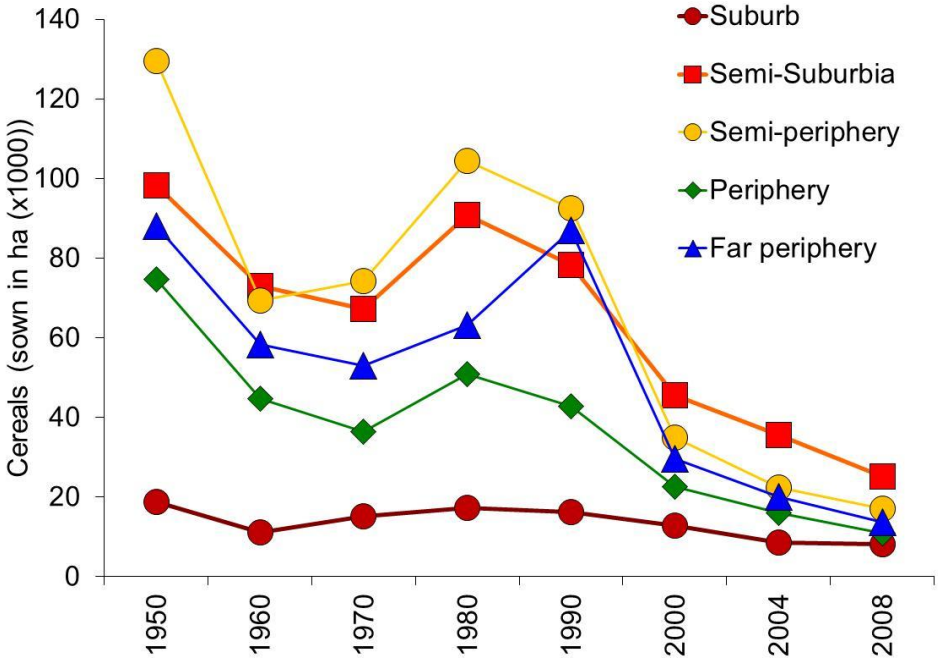


de Beurs, et al., ERL, *in rev.*

Agriculture

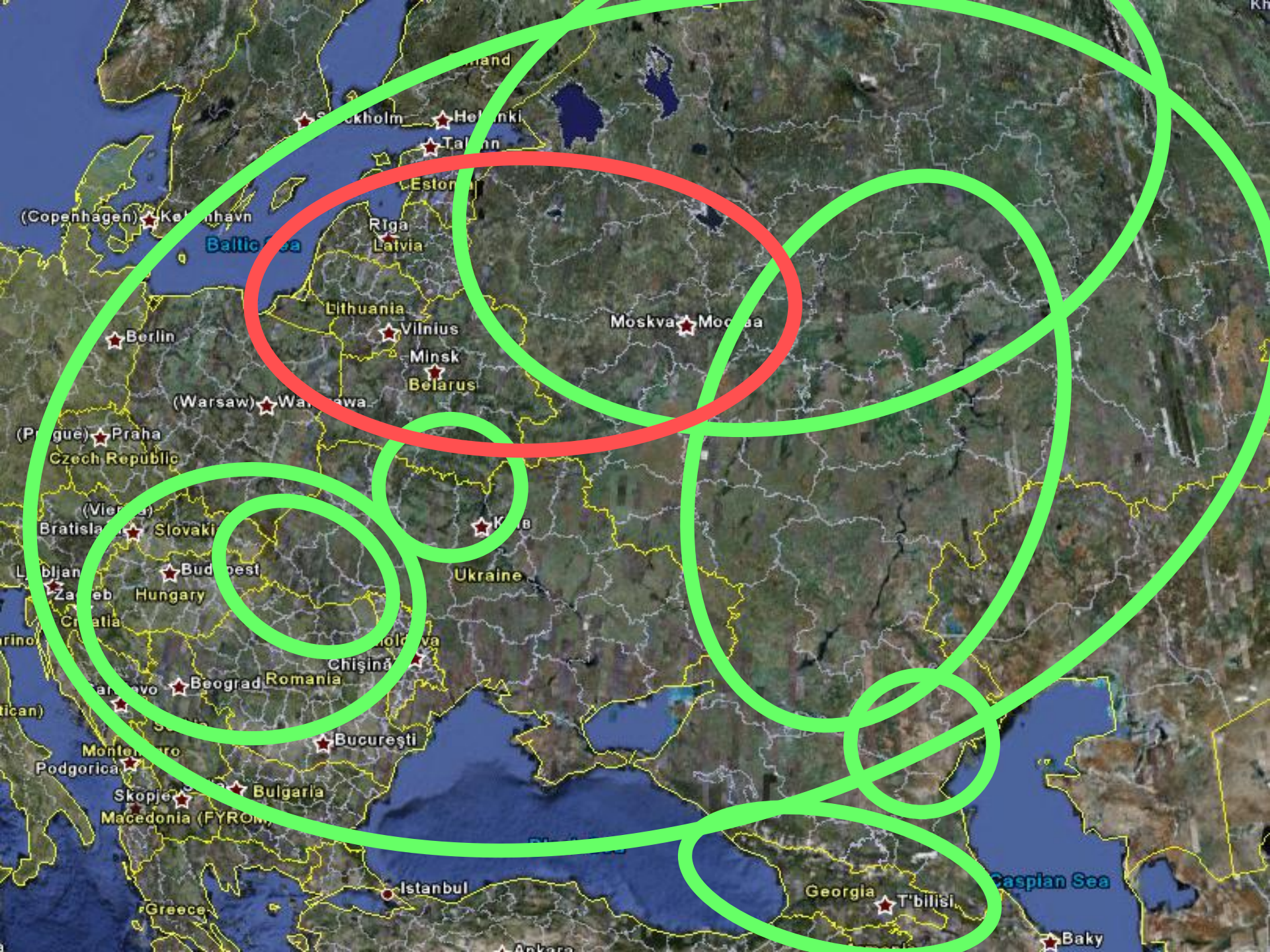


Rural Population



Cereals

de Beurs, et al., ERL, *in review*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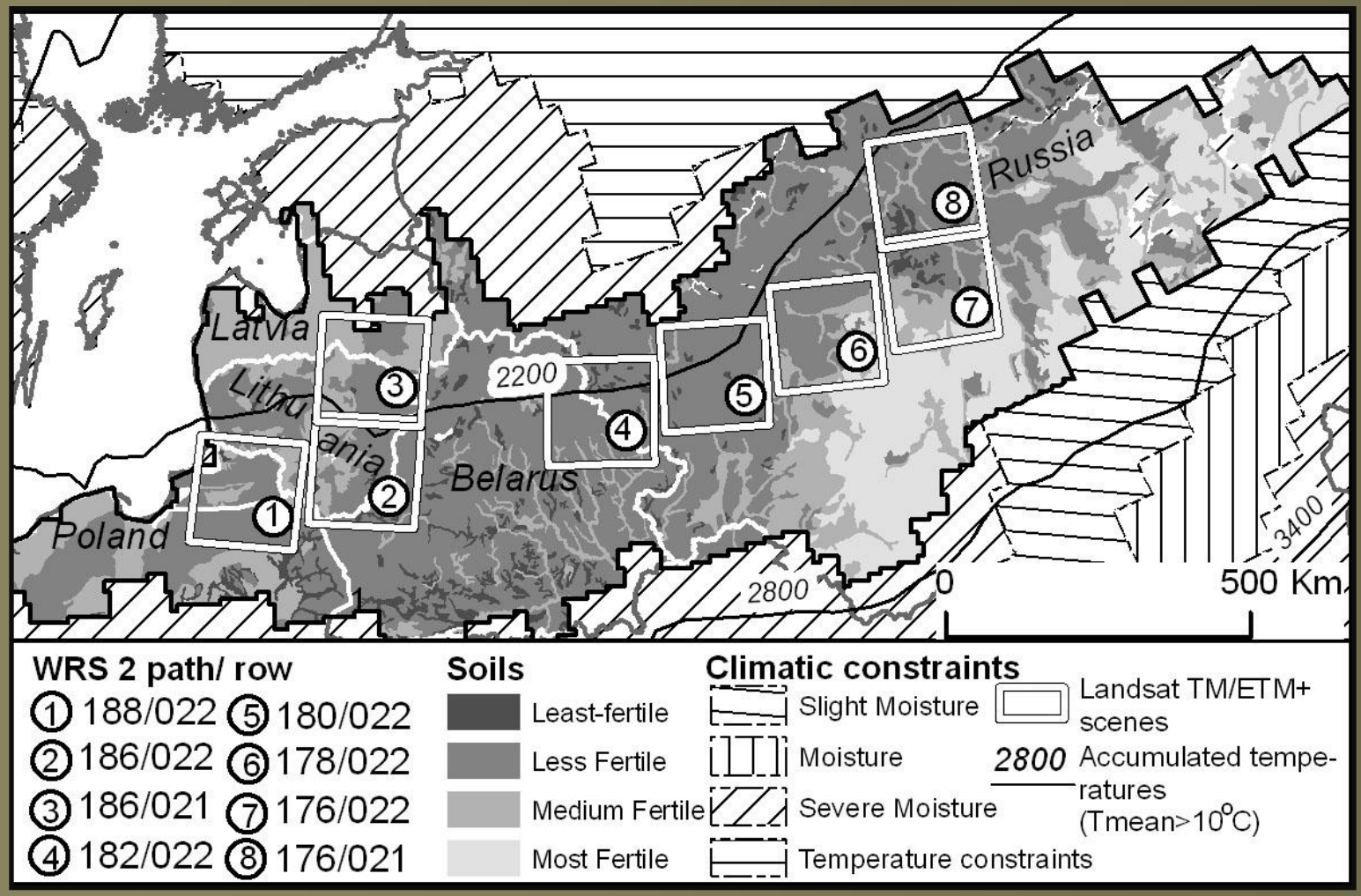
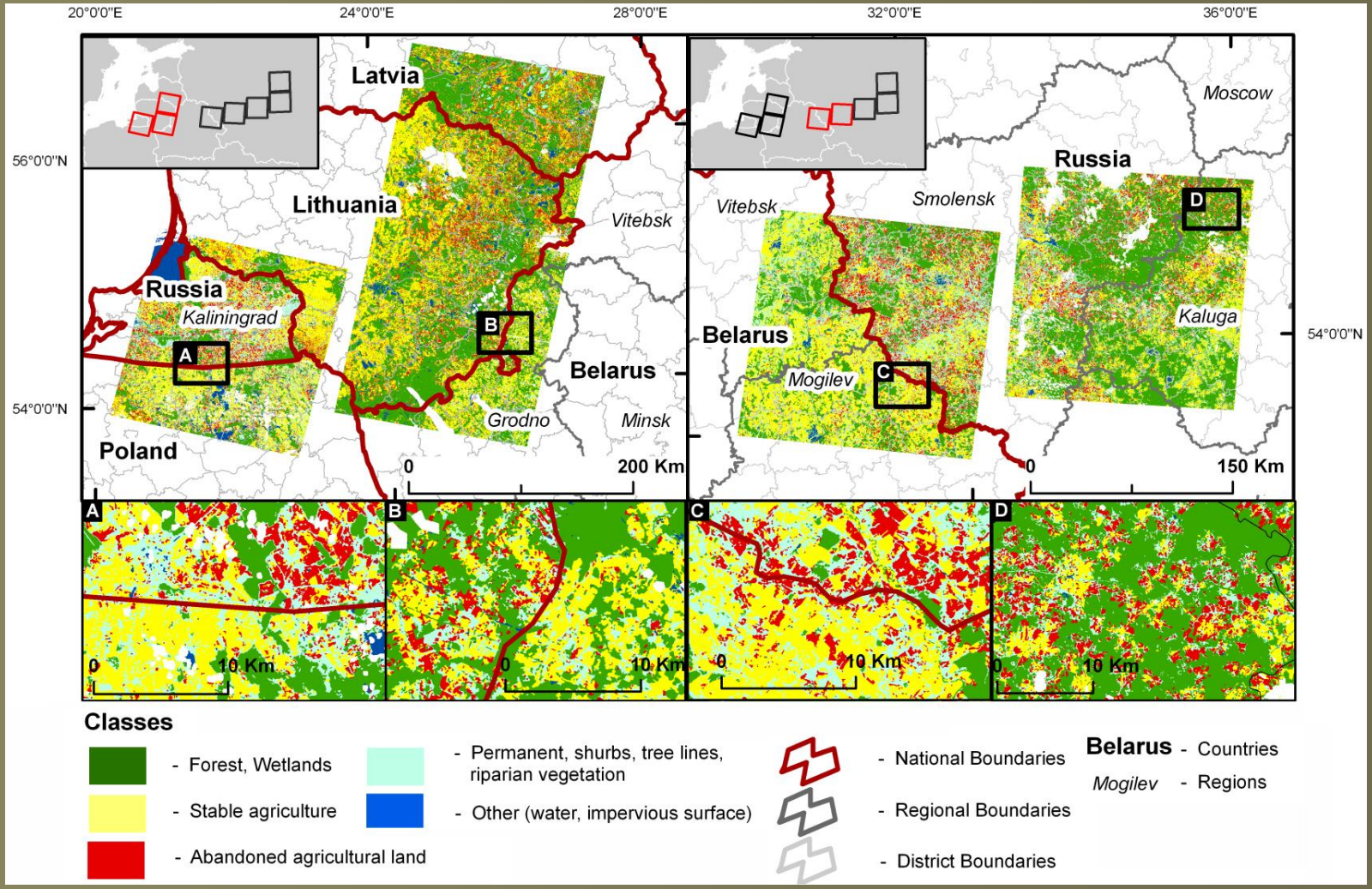
Agriculture



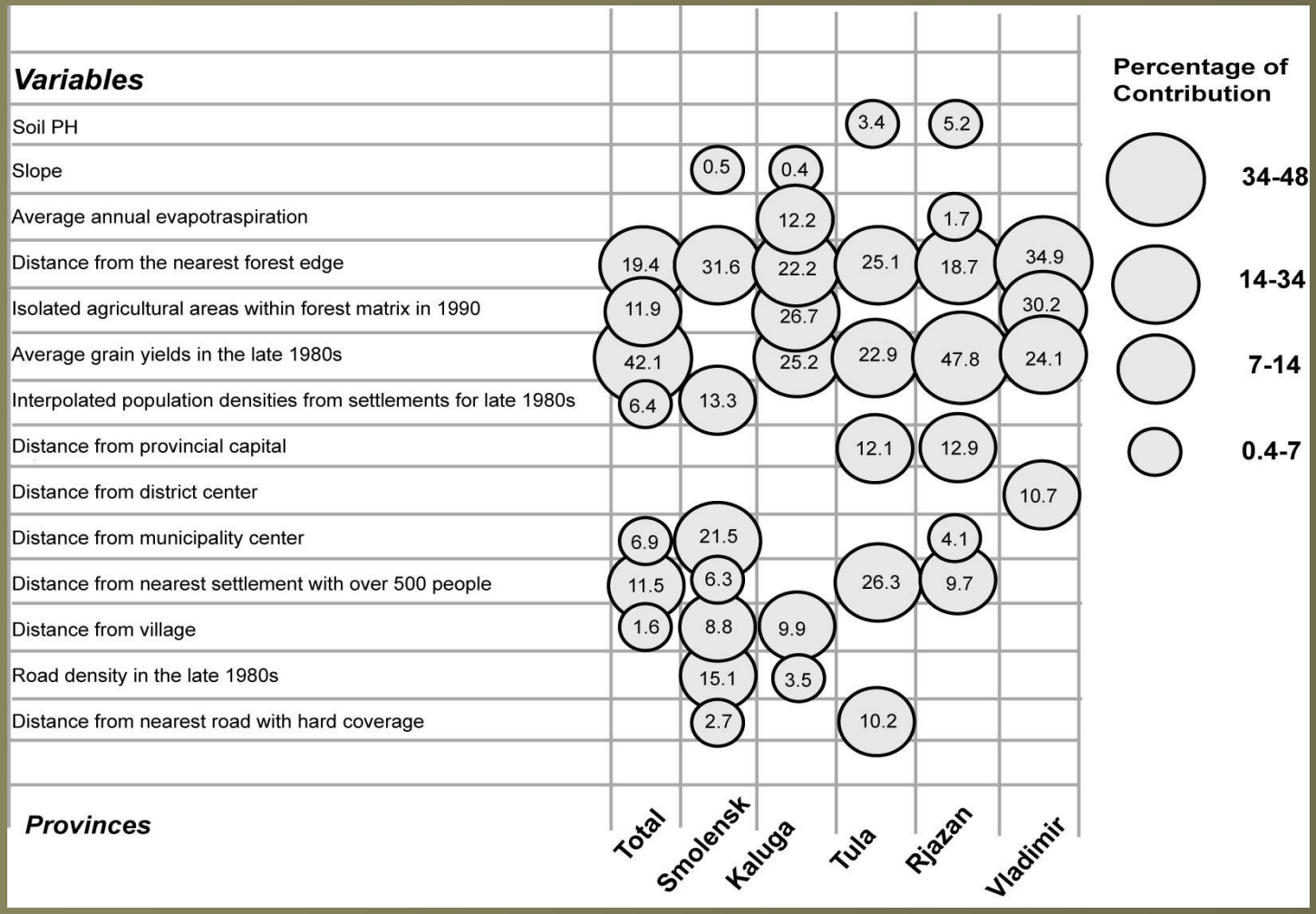
Prishchepov et al., *in review*

Agriculture



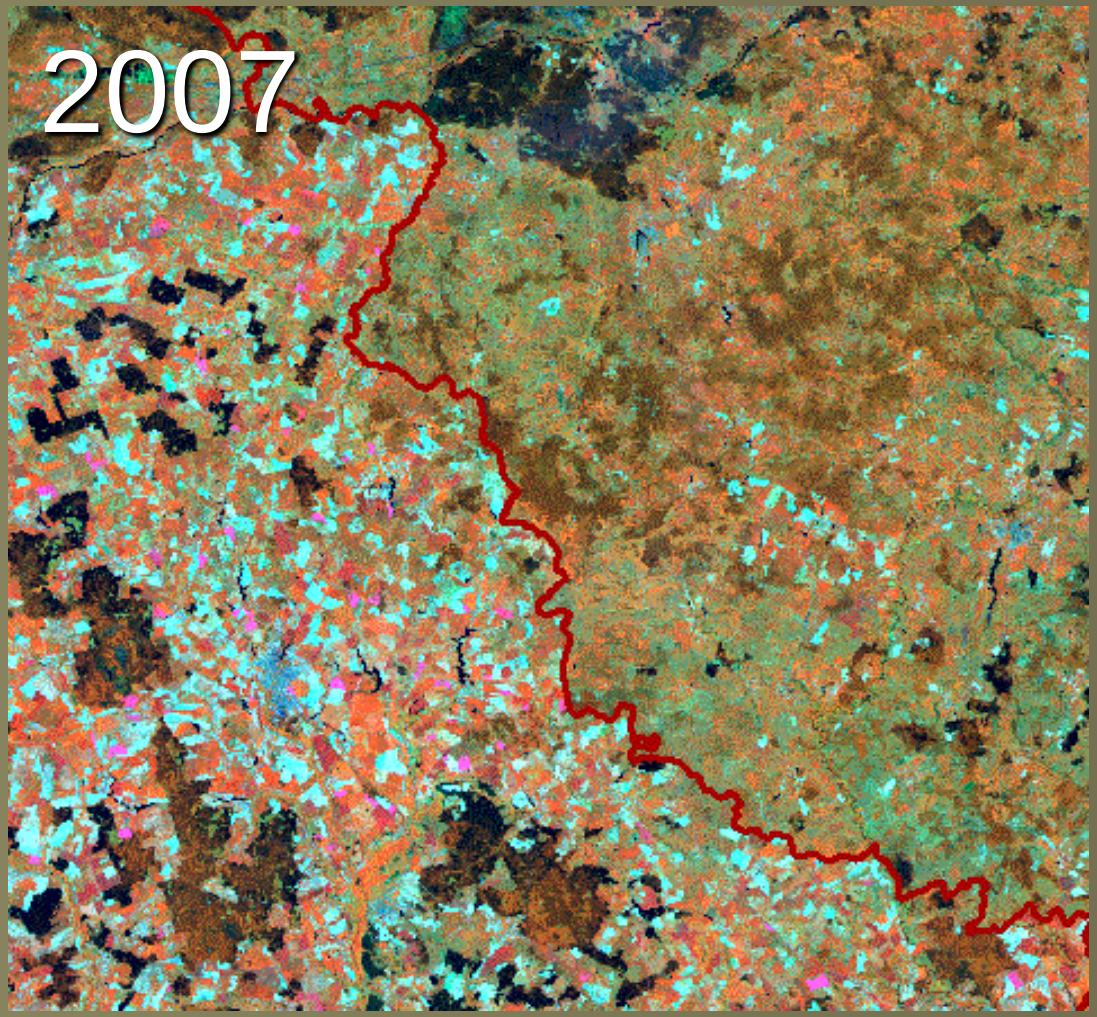
Prishchepov et al., *in review*

Agriculture



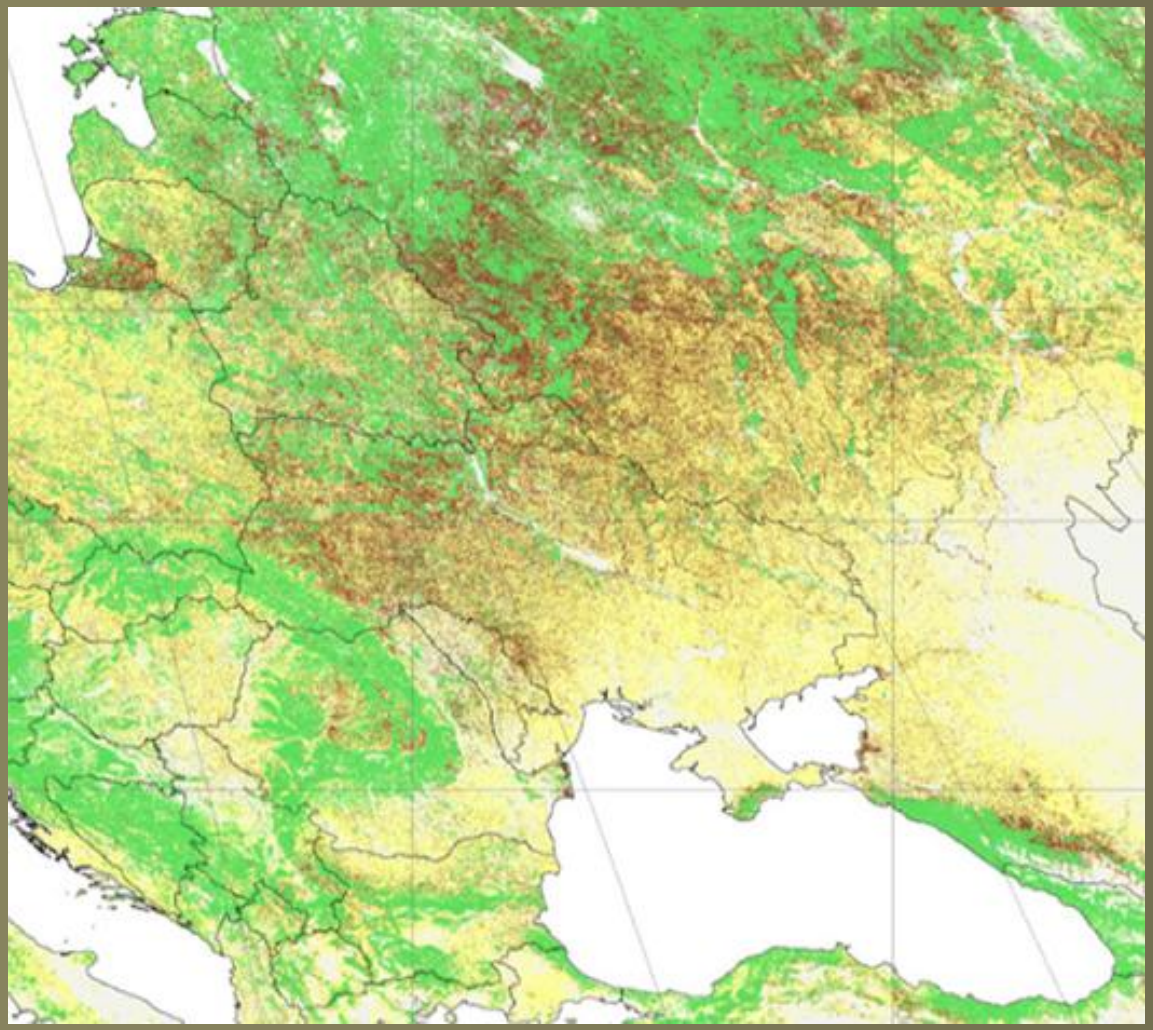
Prishchepov et al., *in review*

Agriculture



Prishchepov et al., *in review*

Agriculture



Alcantara, 2010, PhD Dissertation

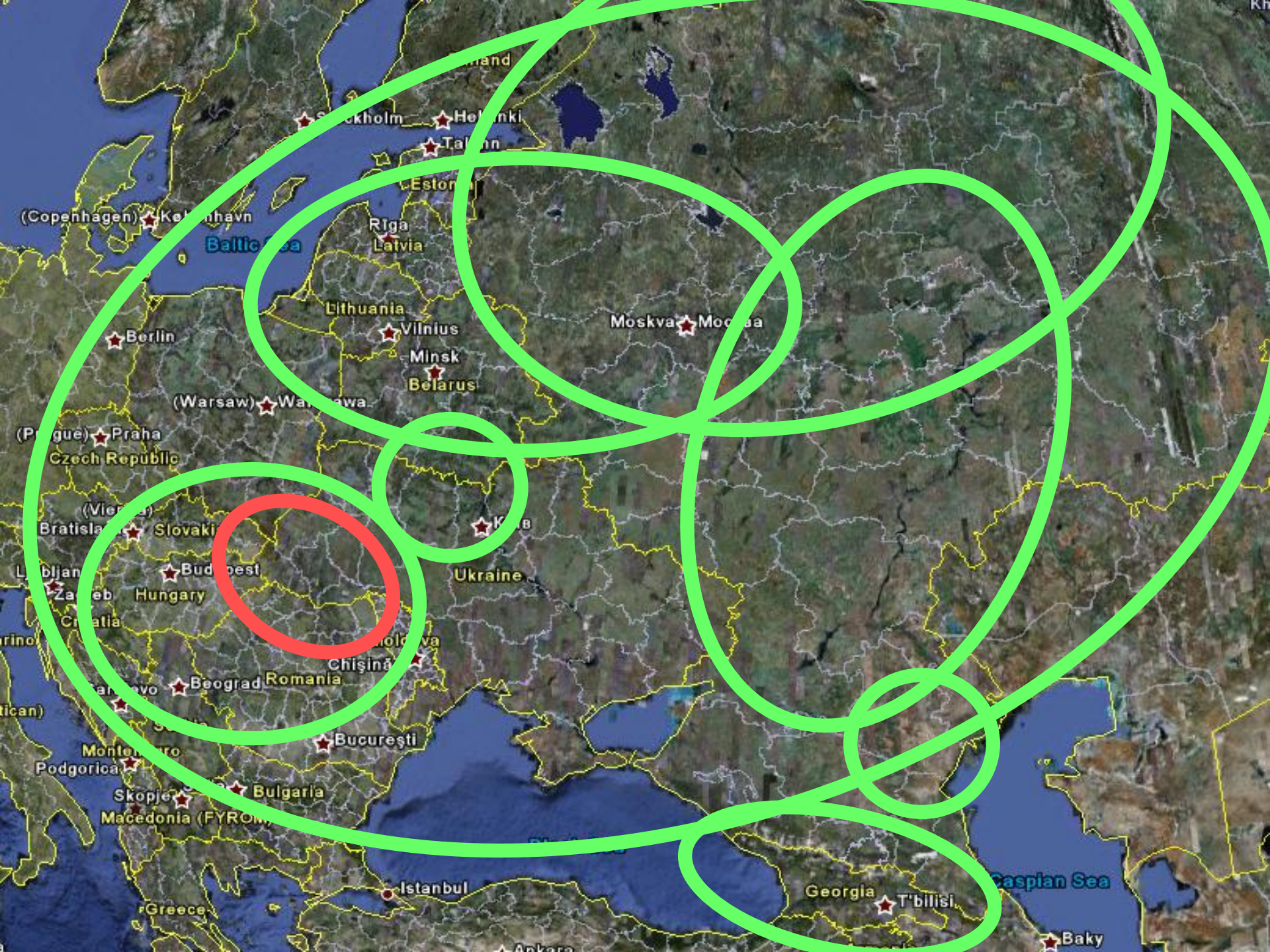
Agriculture

Northern Eurasia is rewilding

Abandonment rates differ strongly among countries

Strength of institutions matters most


ТОВАРИЩИ ЛЕСОРУБЫ!
СДЕРЖИМ СЛОВО, ДАННОЕ ТОВАРИЩУ СТАЛИНУ!
даём сверх плана!
А. Кокорекин
48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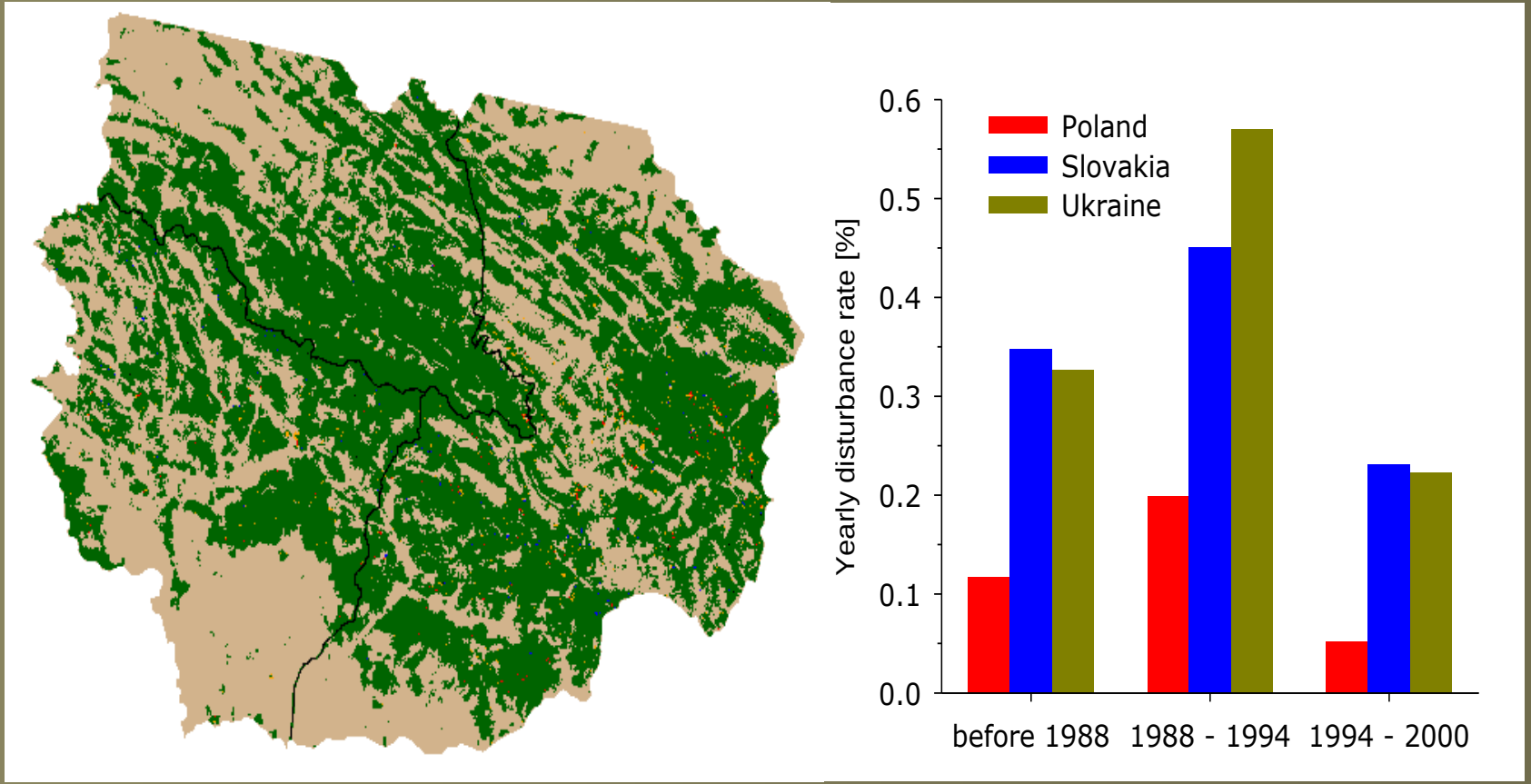
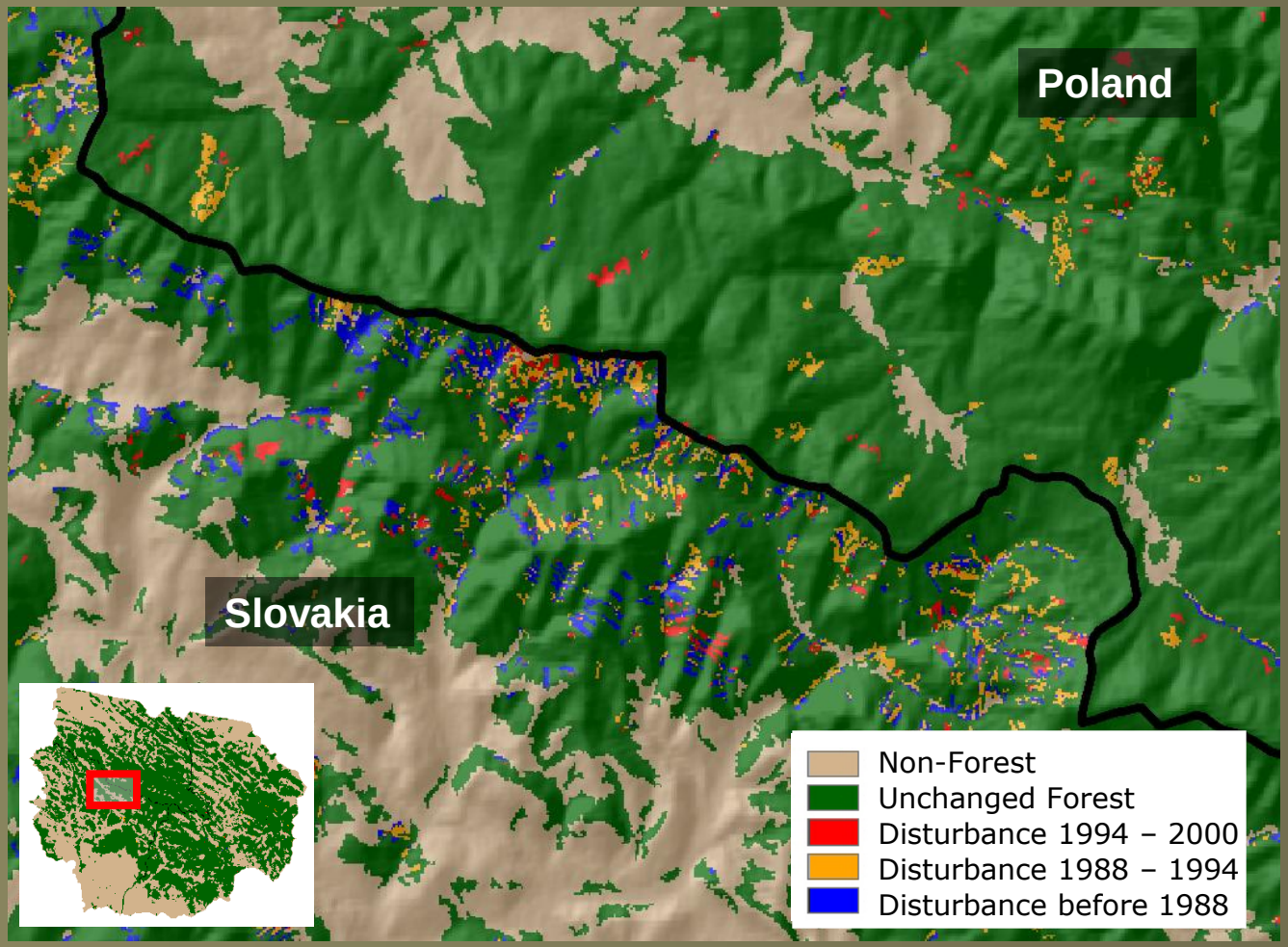
Forests



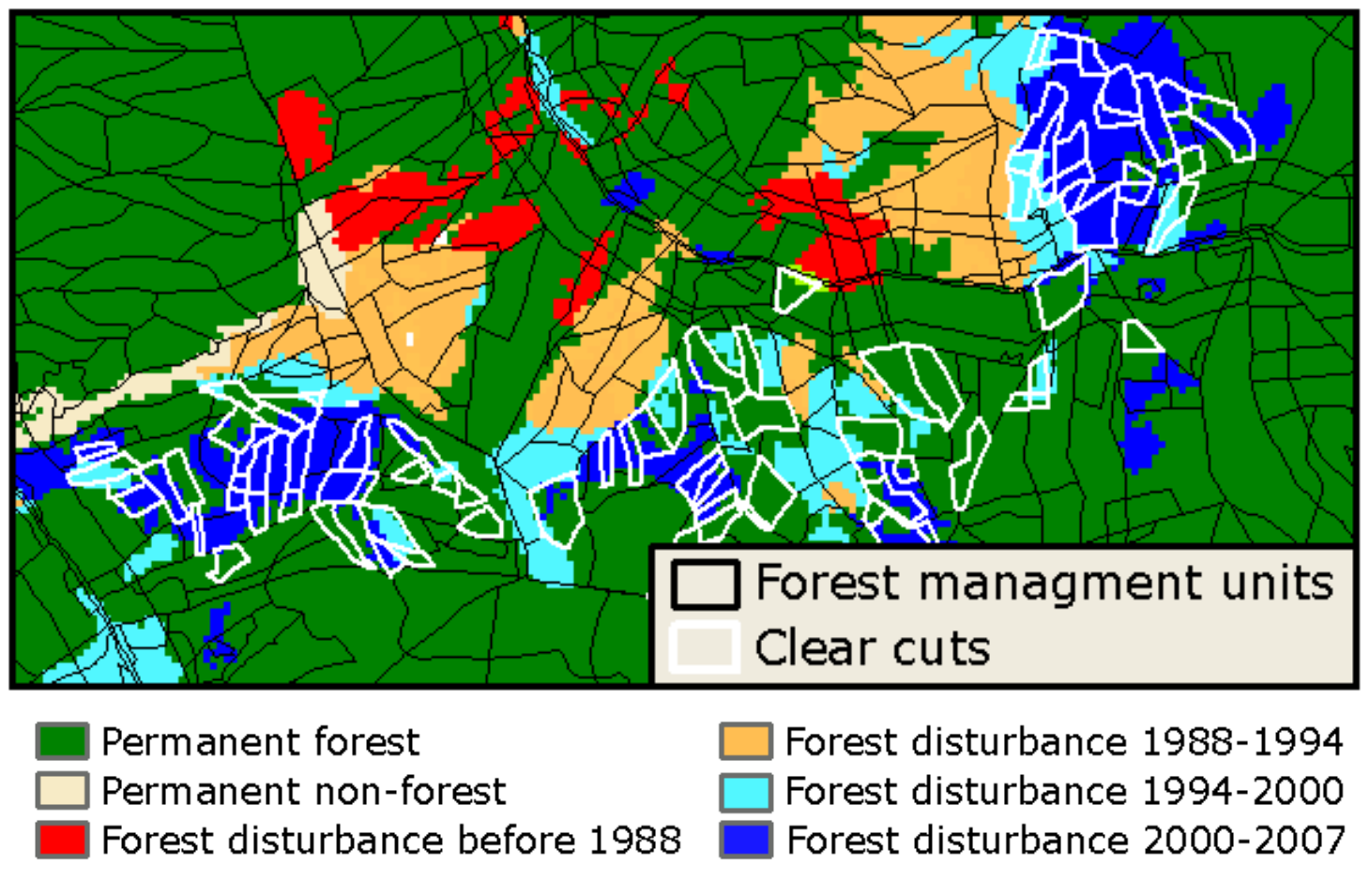
Kuemmerle et al., 2007, Eco. Apps.

Forests



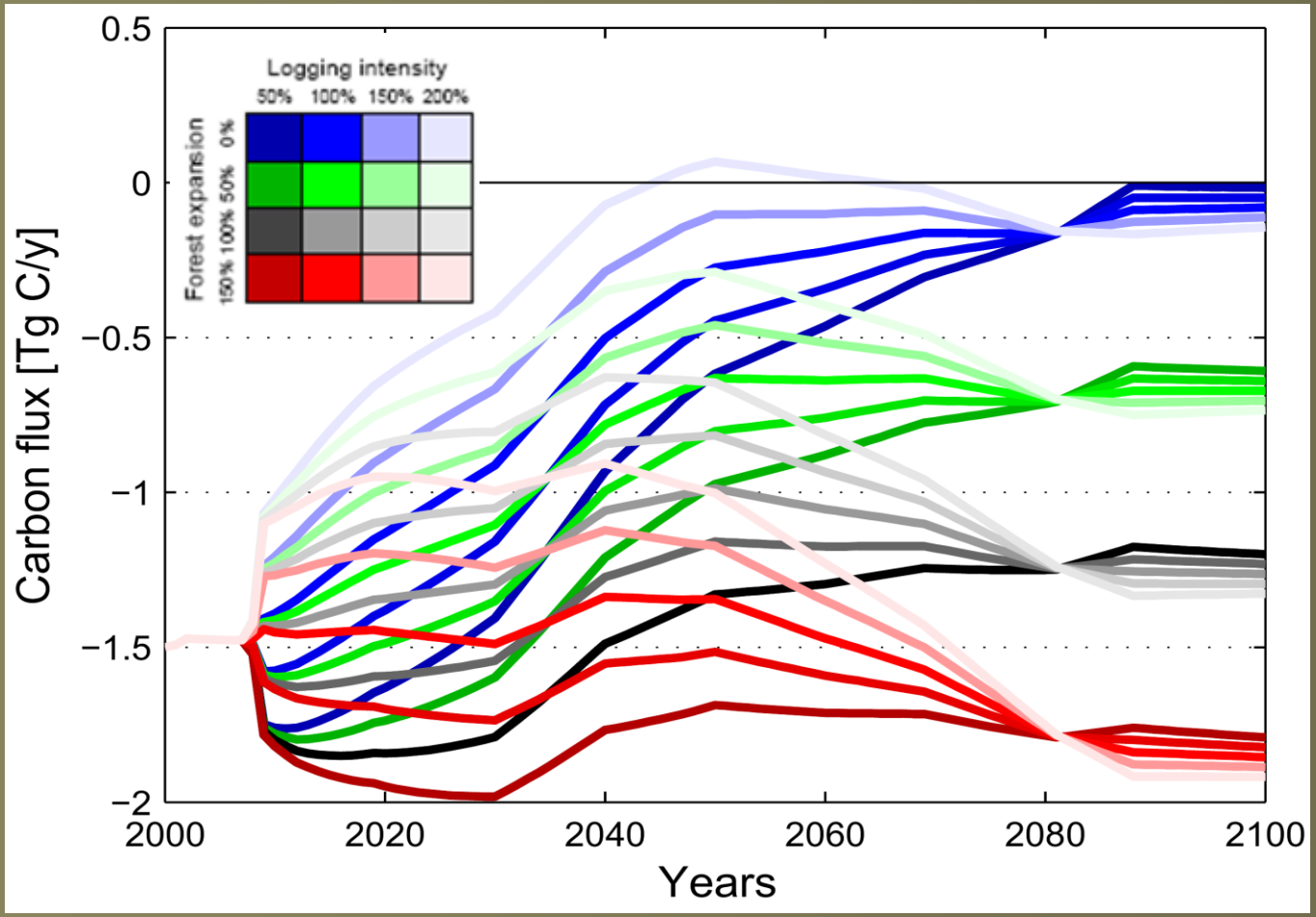
Kuemmerle et al., 2007, Eco. Apps.

Forests

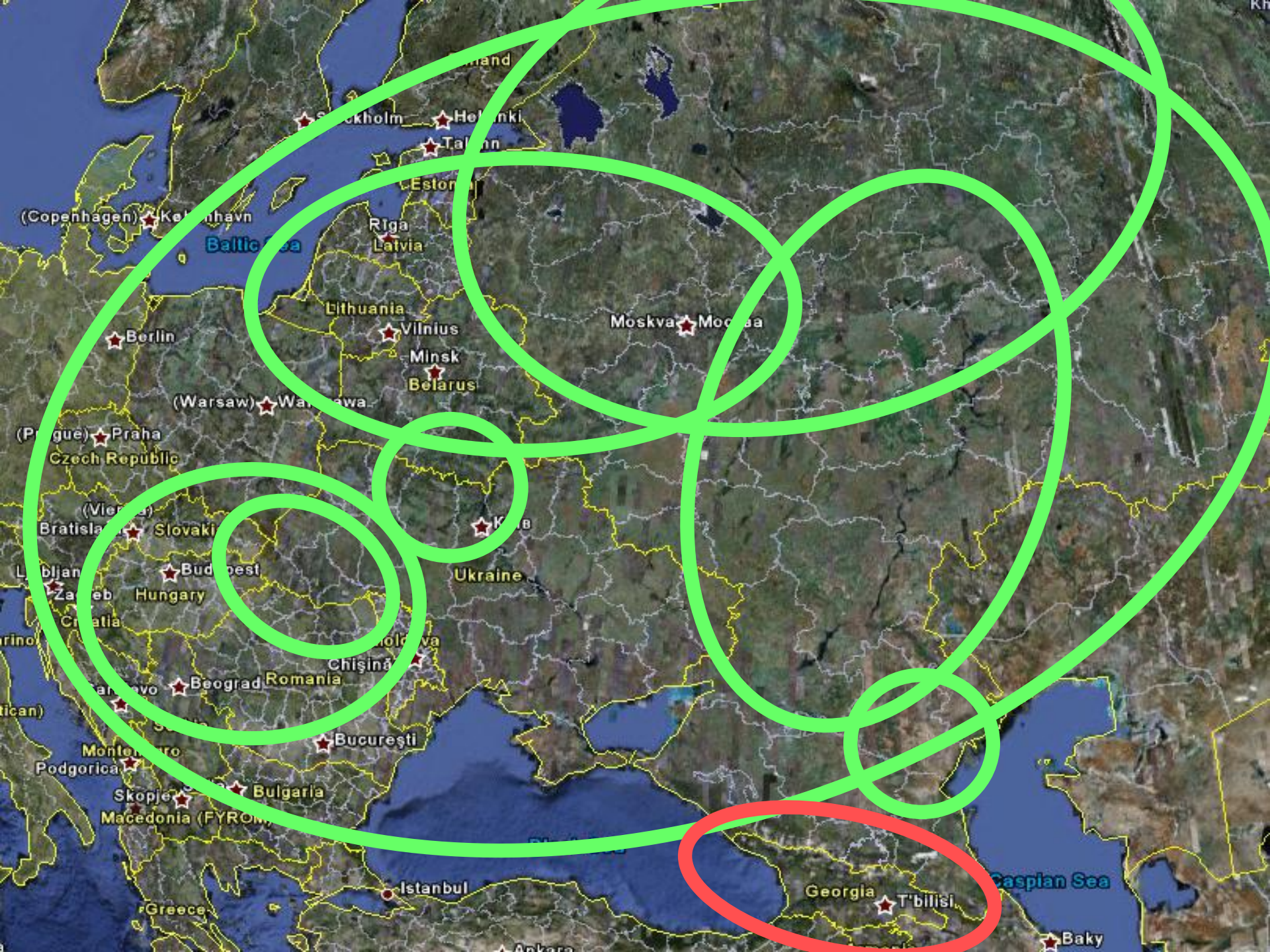


Kuemmerle et al., 2009, RSE

Forests



Kuemmerle et al., 2011, GCB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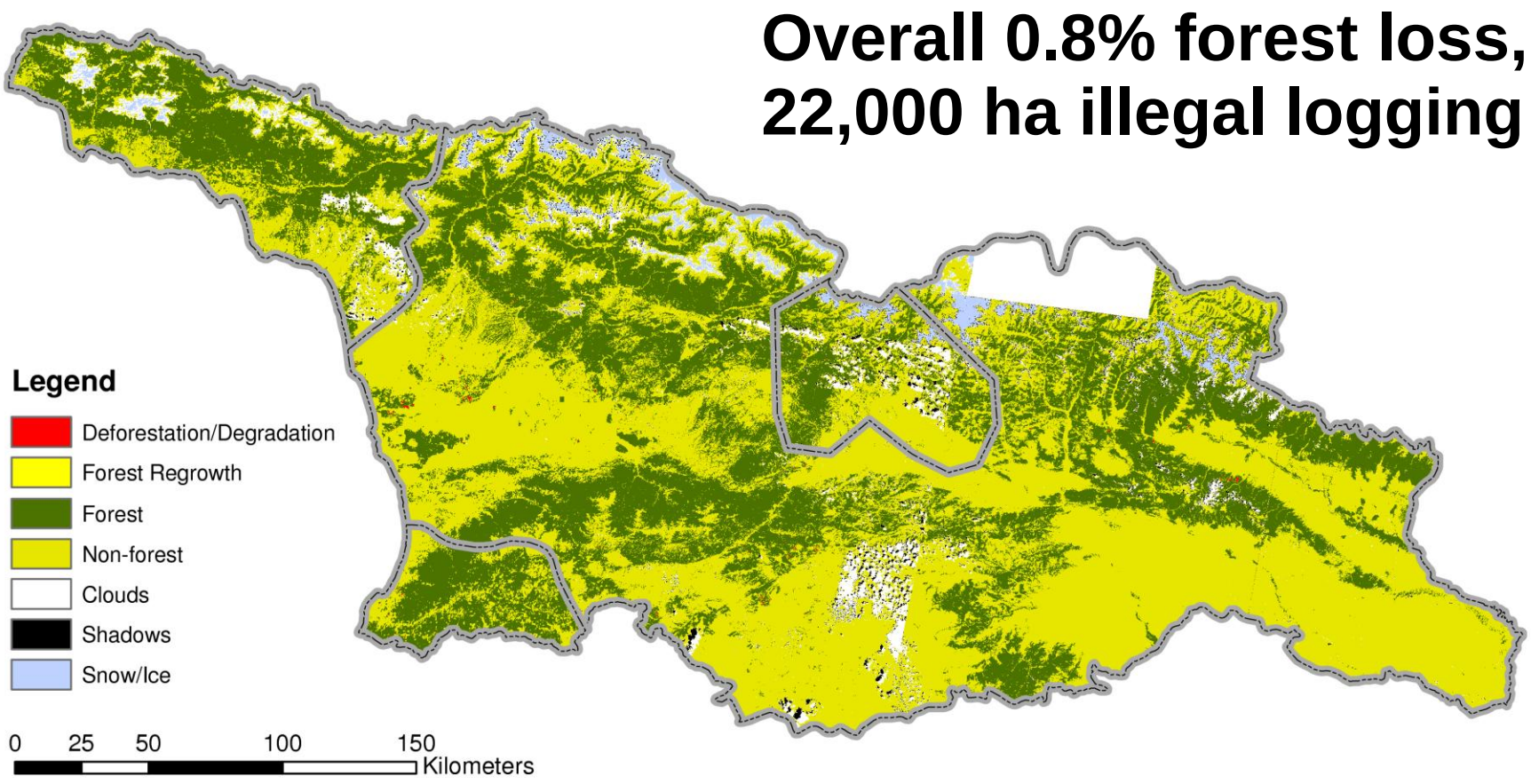
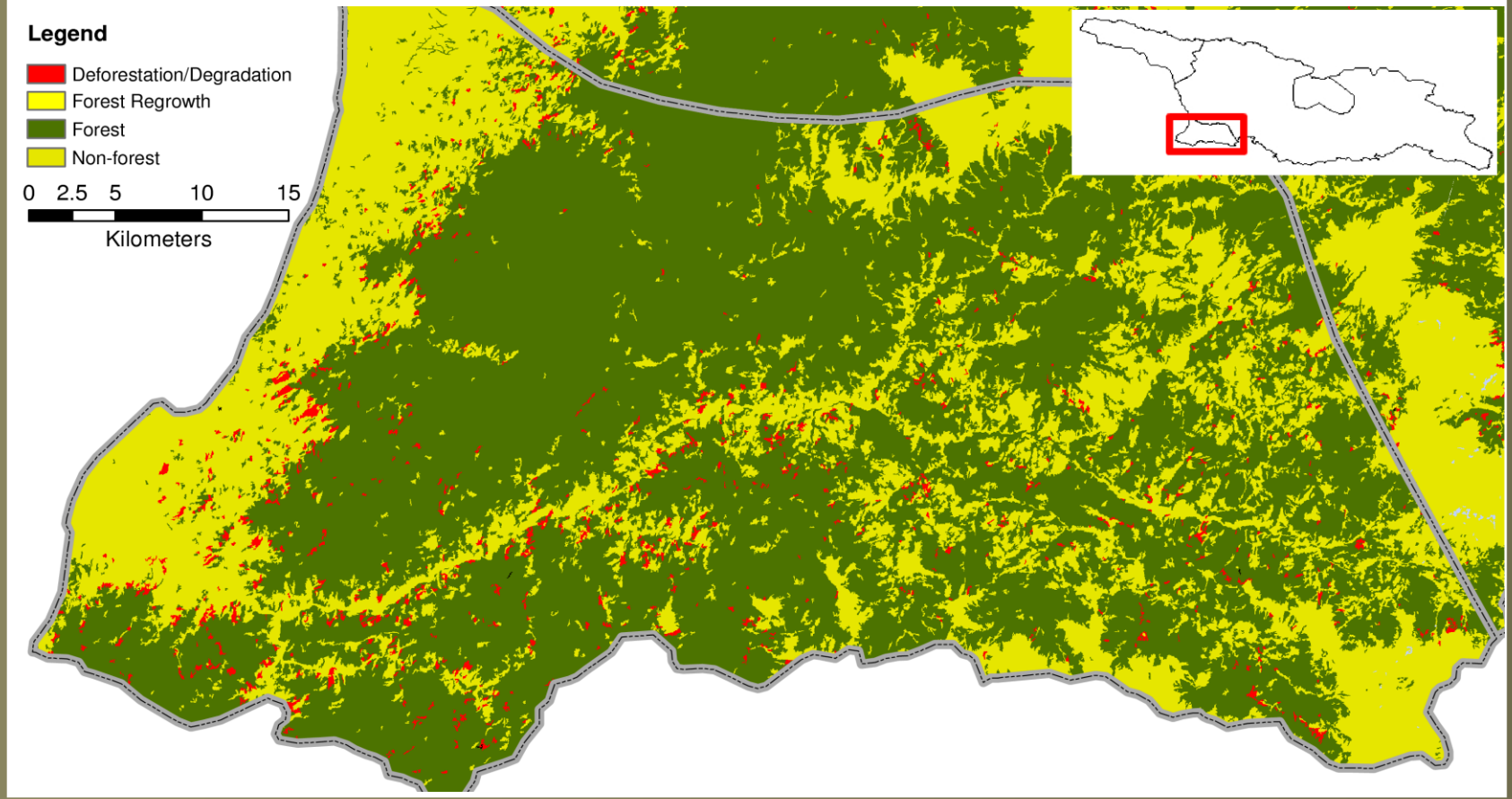


Woodcock, Olofsson et al.

Forests

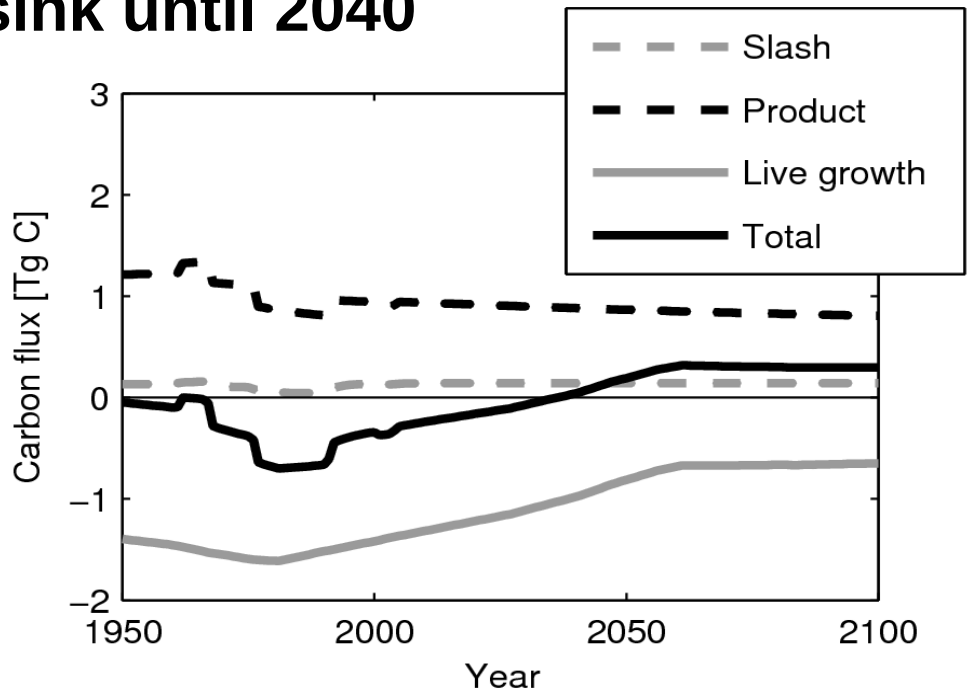
Autonomous Republic of Adjara, southwestern Georgia, 2.6% change



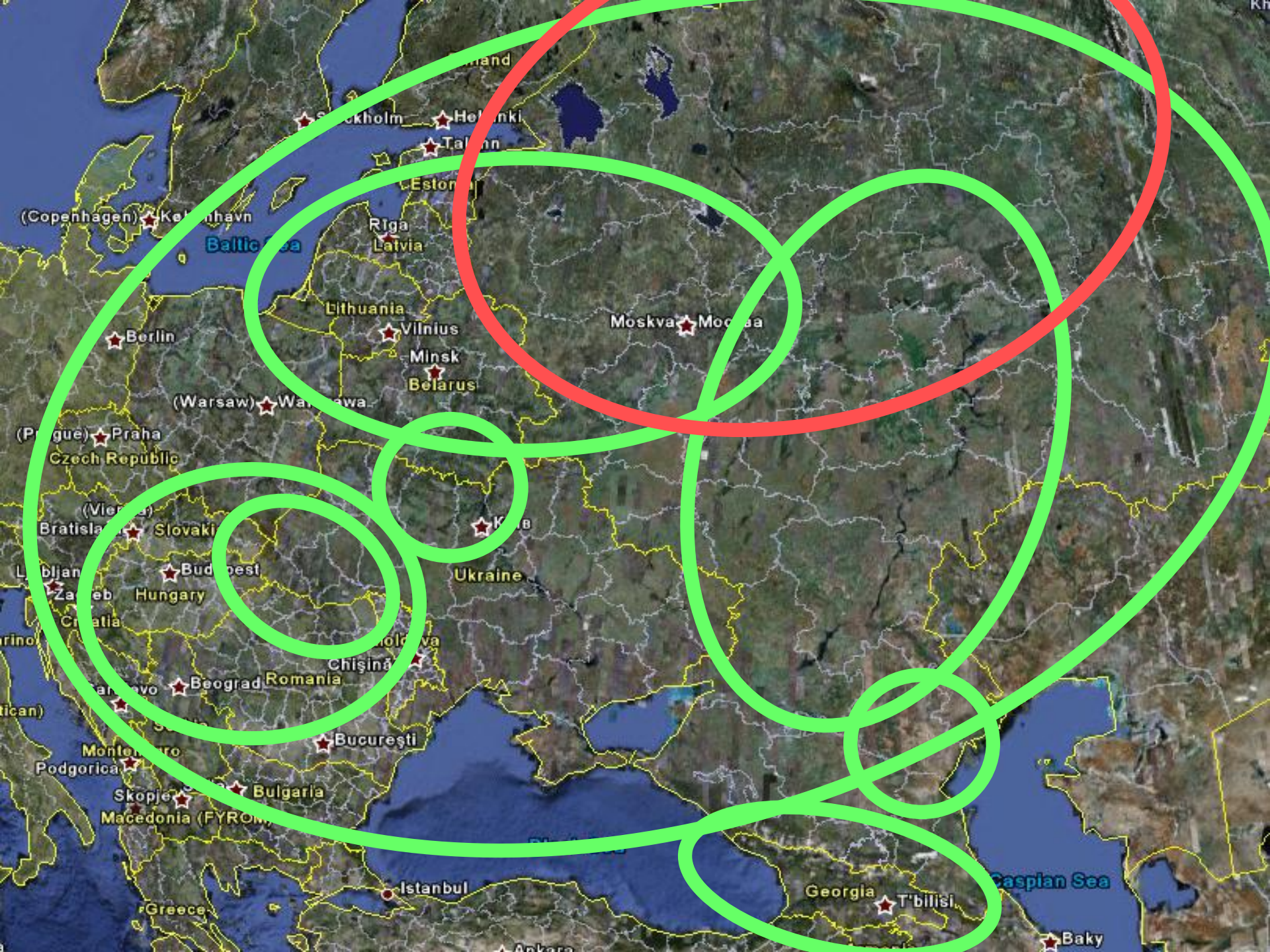
Woodcock, Olofsson et al.

Forests

- Georgian forests are a carbon sink (~0.3 Tg/yr.)
- Georgia will remain sink until 2040
- Sink strength ~30% of Georgia's carbon emissions



Woodcock, Olofsson et al.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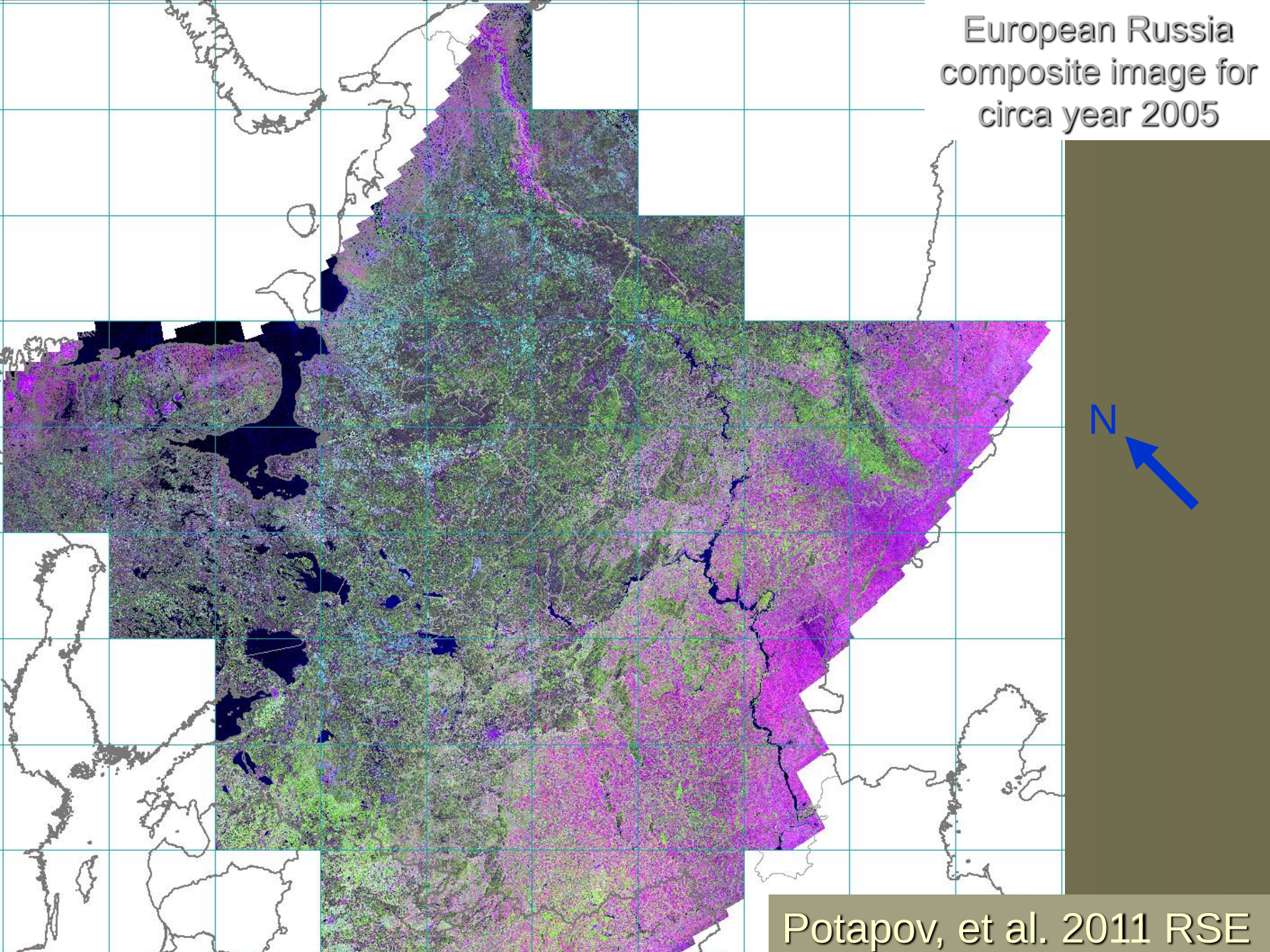
European Russia
composite image for
circa year 2005
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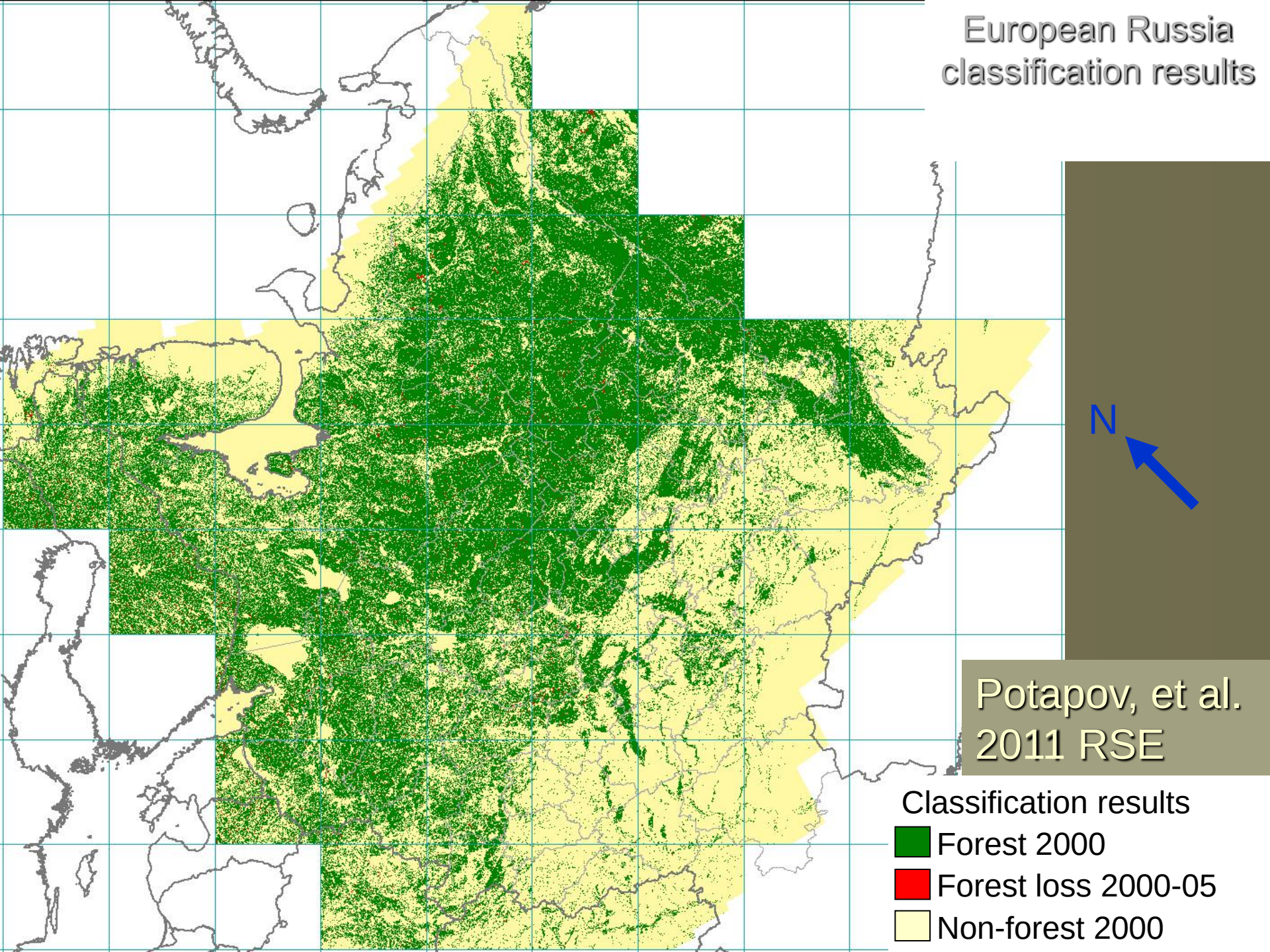
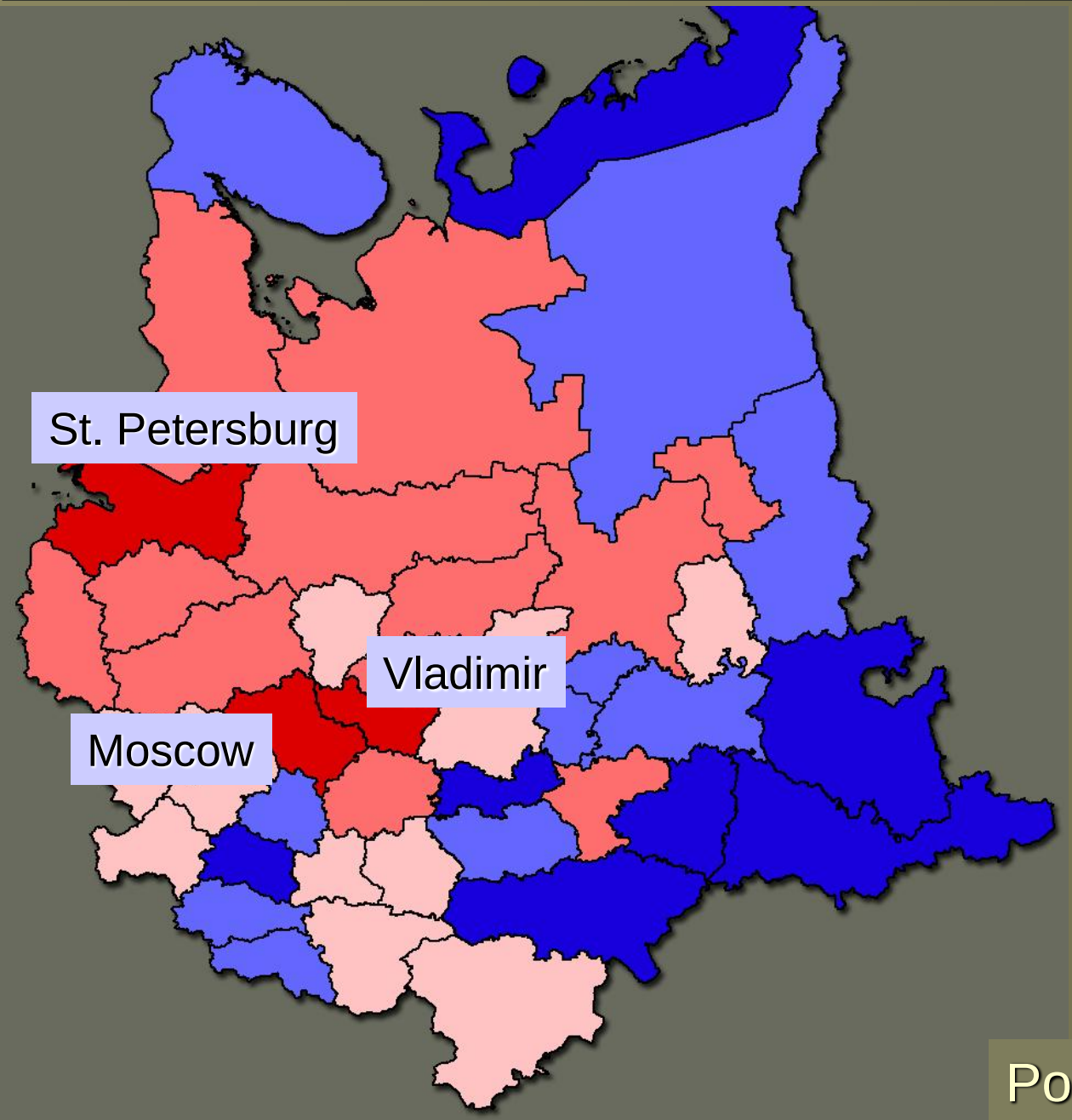
Potapov, et al. 2011 RSE

European Russia classification results



European Russia



Forest cover loss 2000-2005 relative to 2000 forest cover

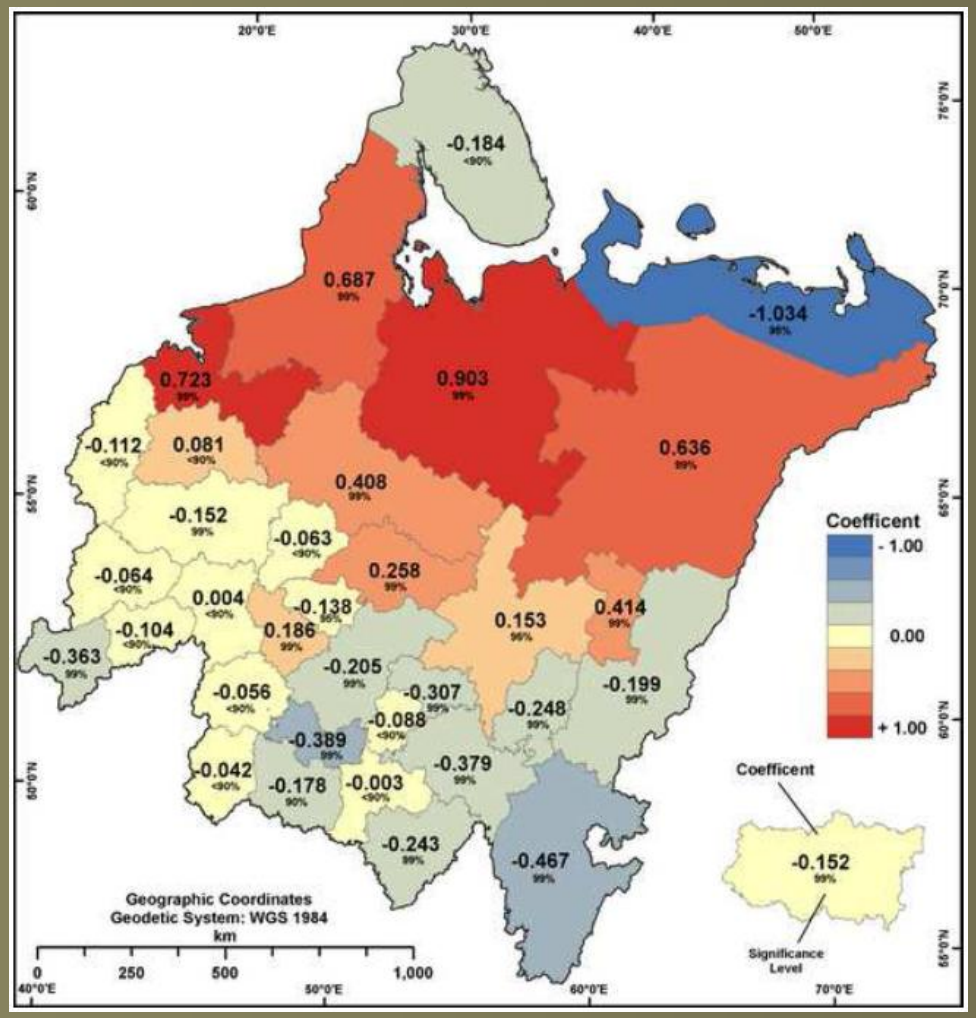
- **<0.5%**
- **0.5-1%**
- **1-1.5%**
- **1.5-2.5%**
- **>2.5%**

Regions with the highest forest cover loss:

Vladimir (3.7%)
St. Petersburg (3.5%)
Moscow (3.1%)

Potapov, et al. 2011 RSE

Forests



Wendland et al., 2011, GEC

Forests

A few logging hotspots, but generally less logging

Access to markets and regional governance are key factors


"Русский цирк Москвы"
RUSSISCH STAATSCIRCUS MOSKOU
СОВЕТСКИЙ ЦИРК
AMSTERDAM
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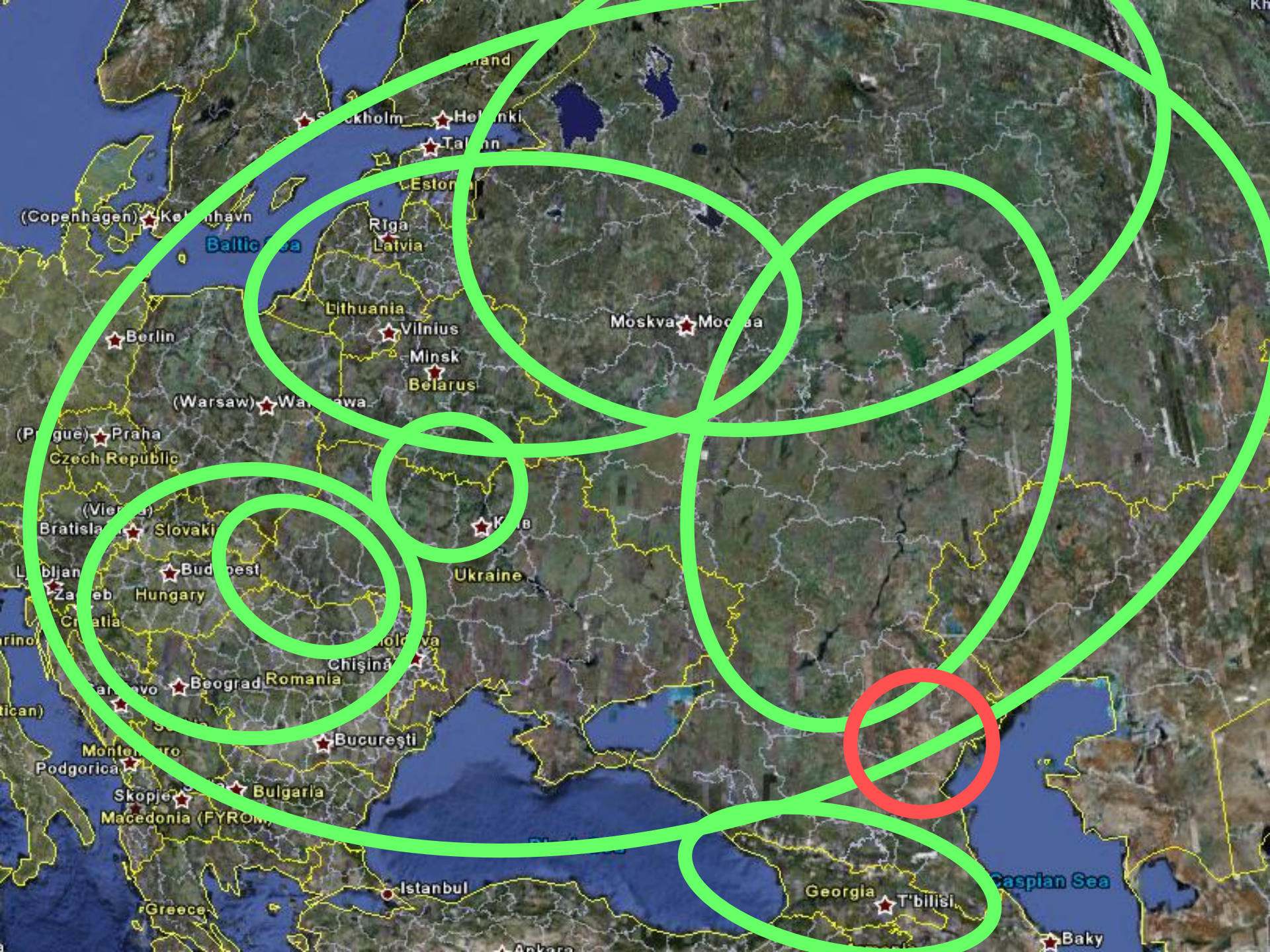
van 28 oktober t/m 13 november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Georgia
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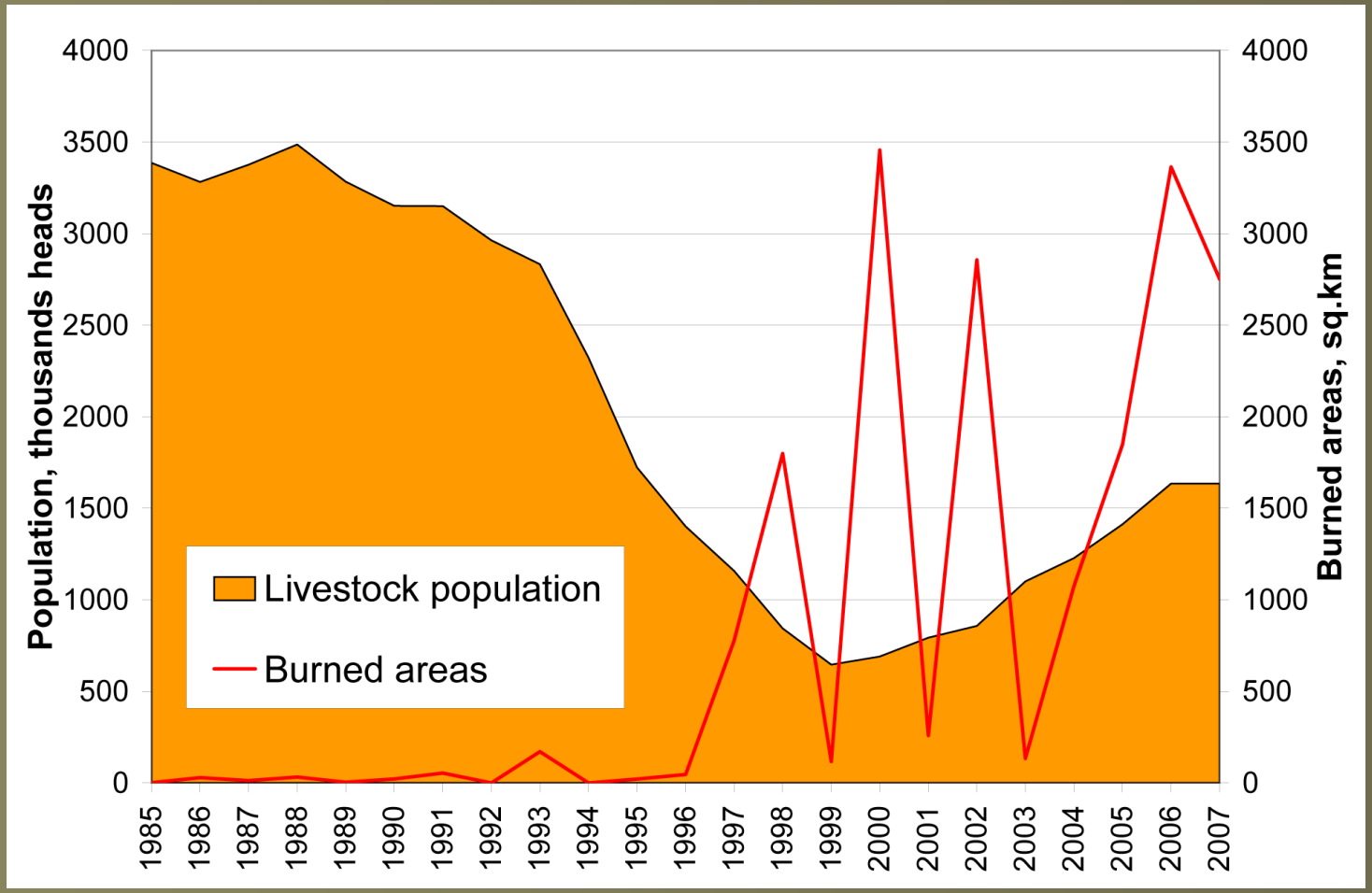
Caspian Sea
Baky

Biodiversity

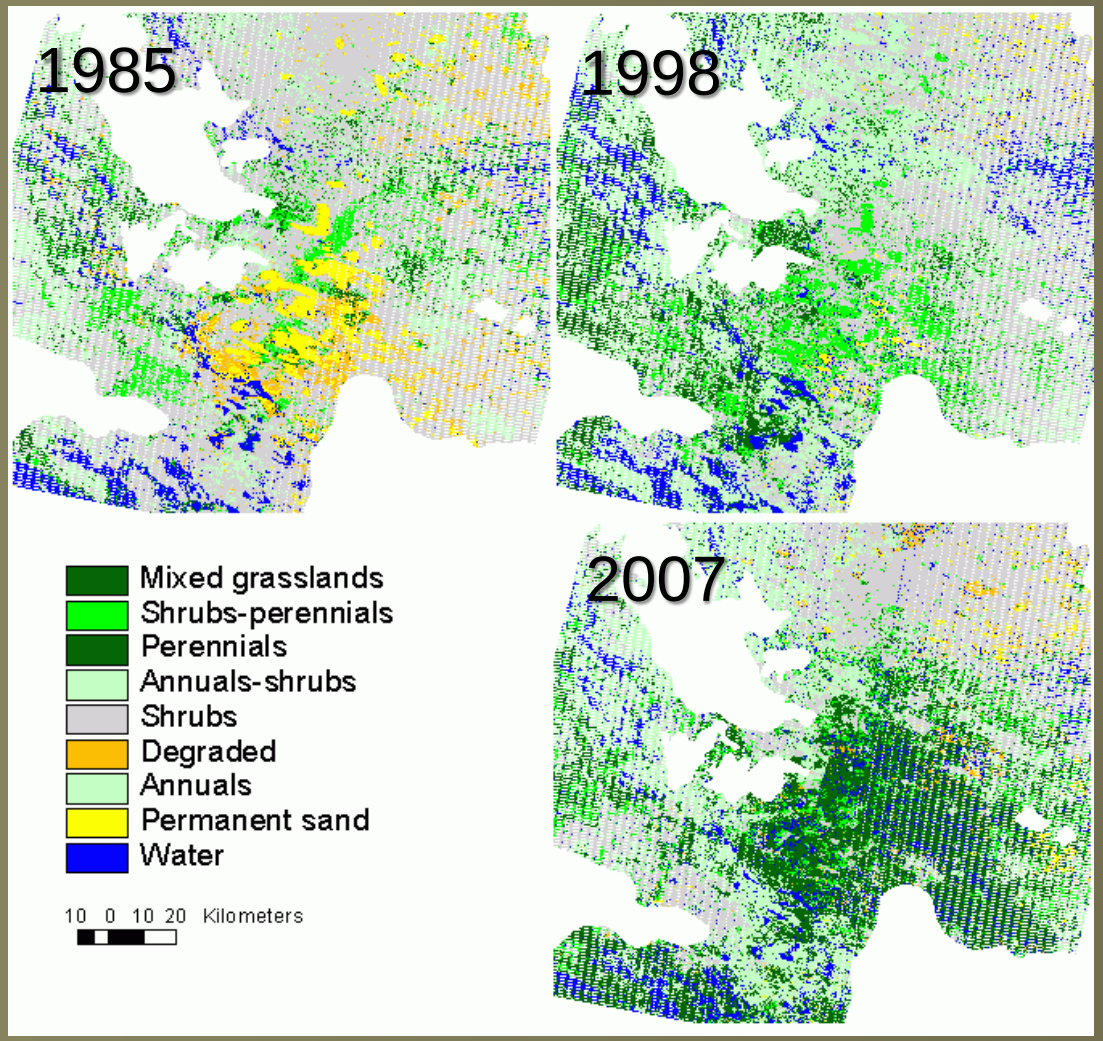
Lushchekina, A. 2009

Biodiversity



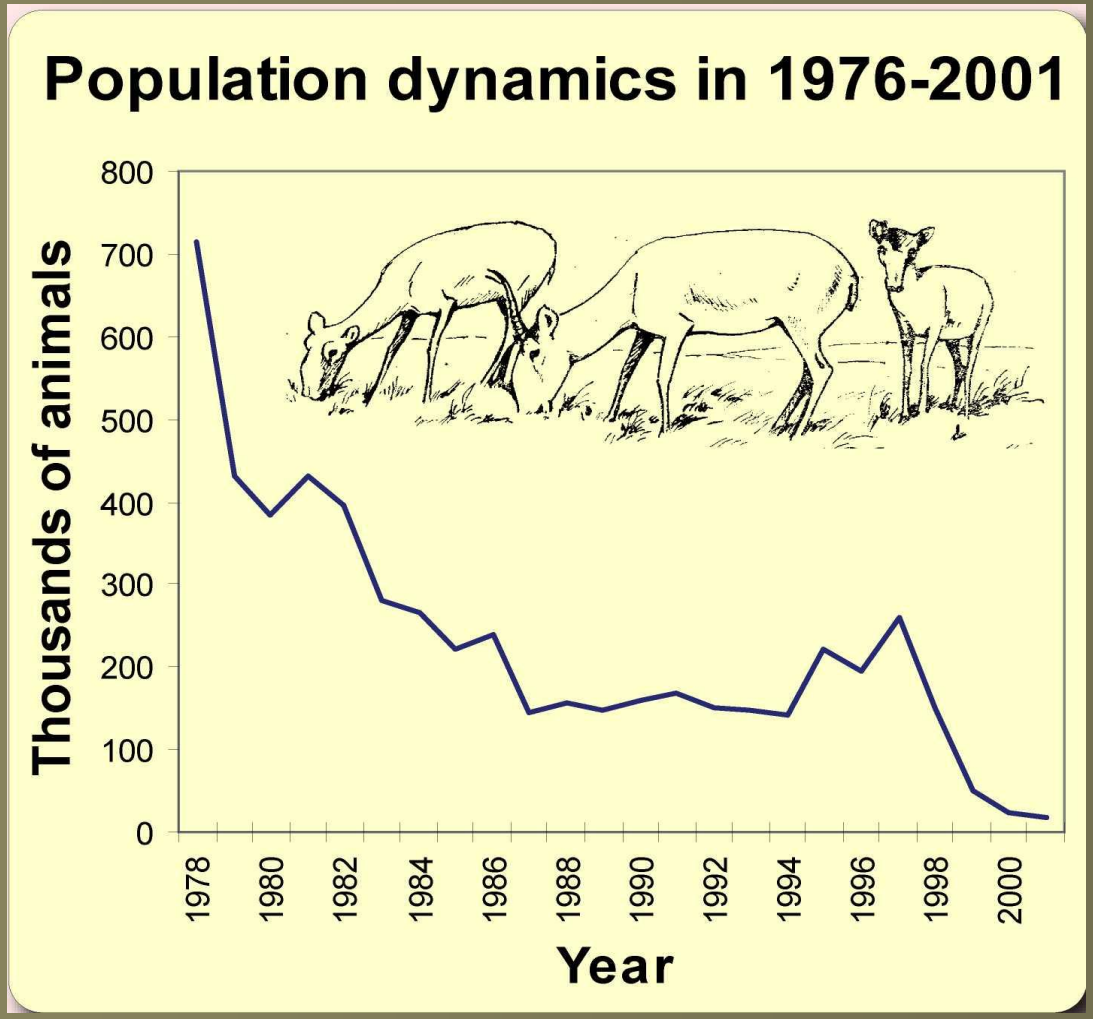
Dubinin et al., 2010, RSE

Biodiversity

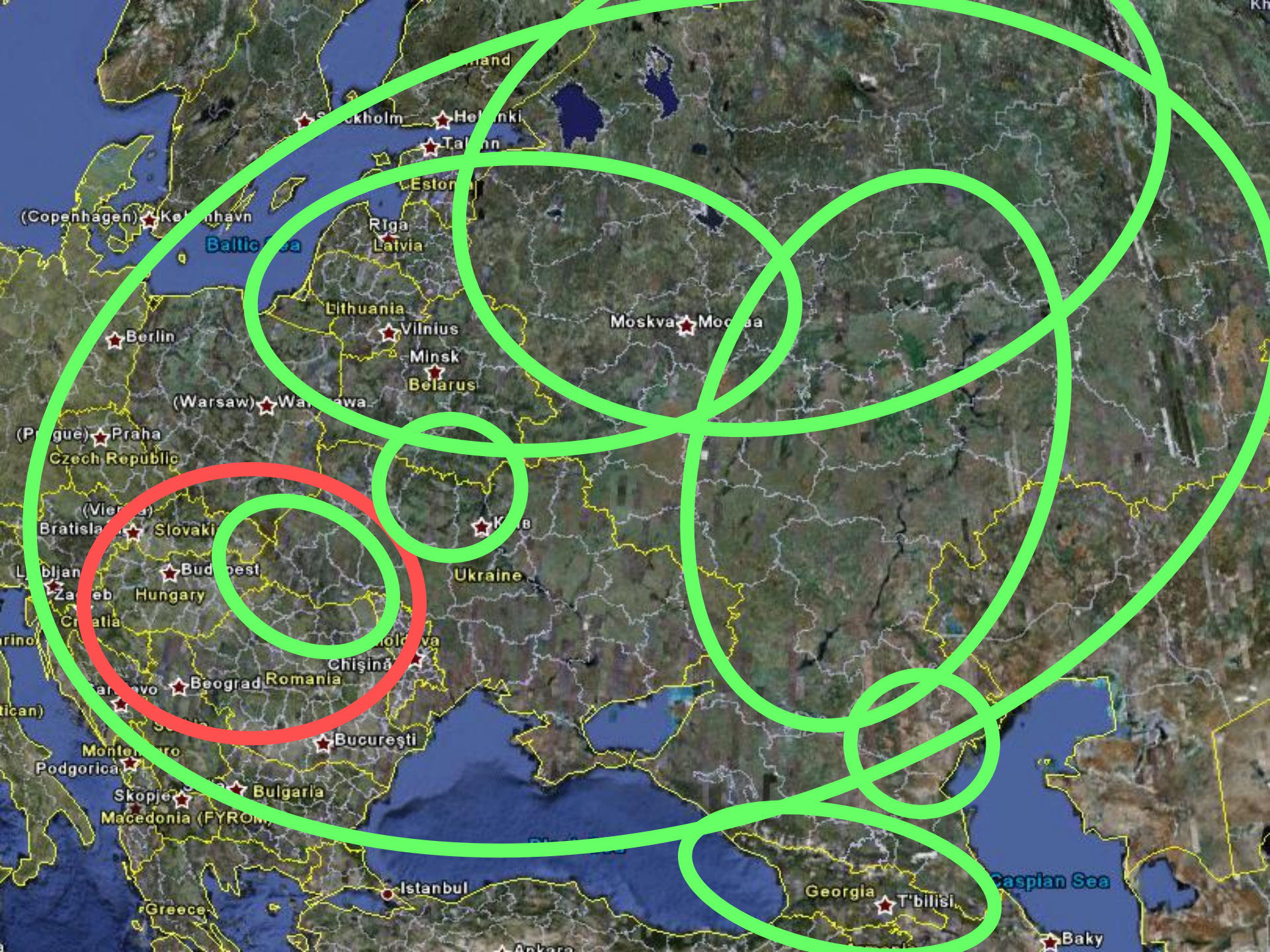


Dubinin, 2010, PhD Dissertation

Biodiversity



Lushchekina, A. 2009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Caspian Sea
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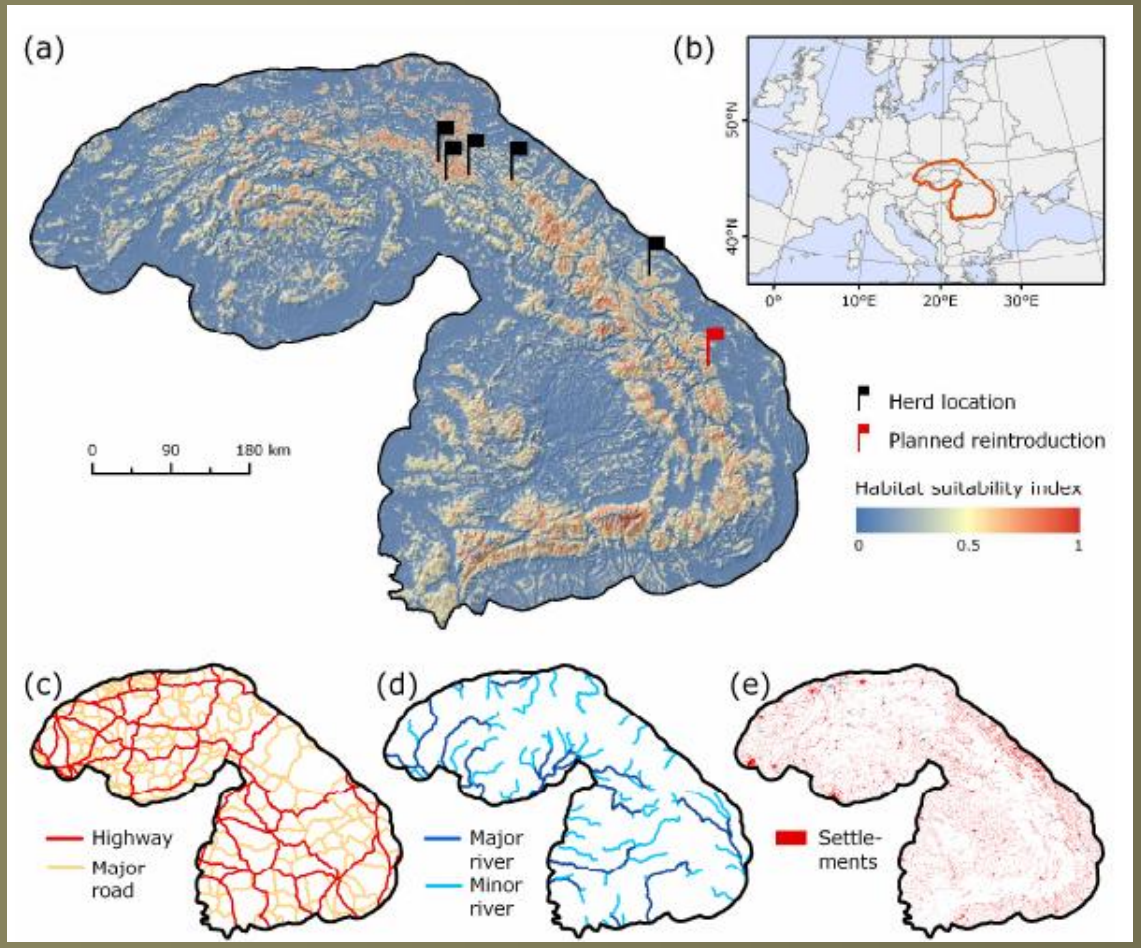
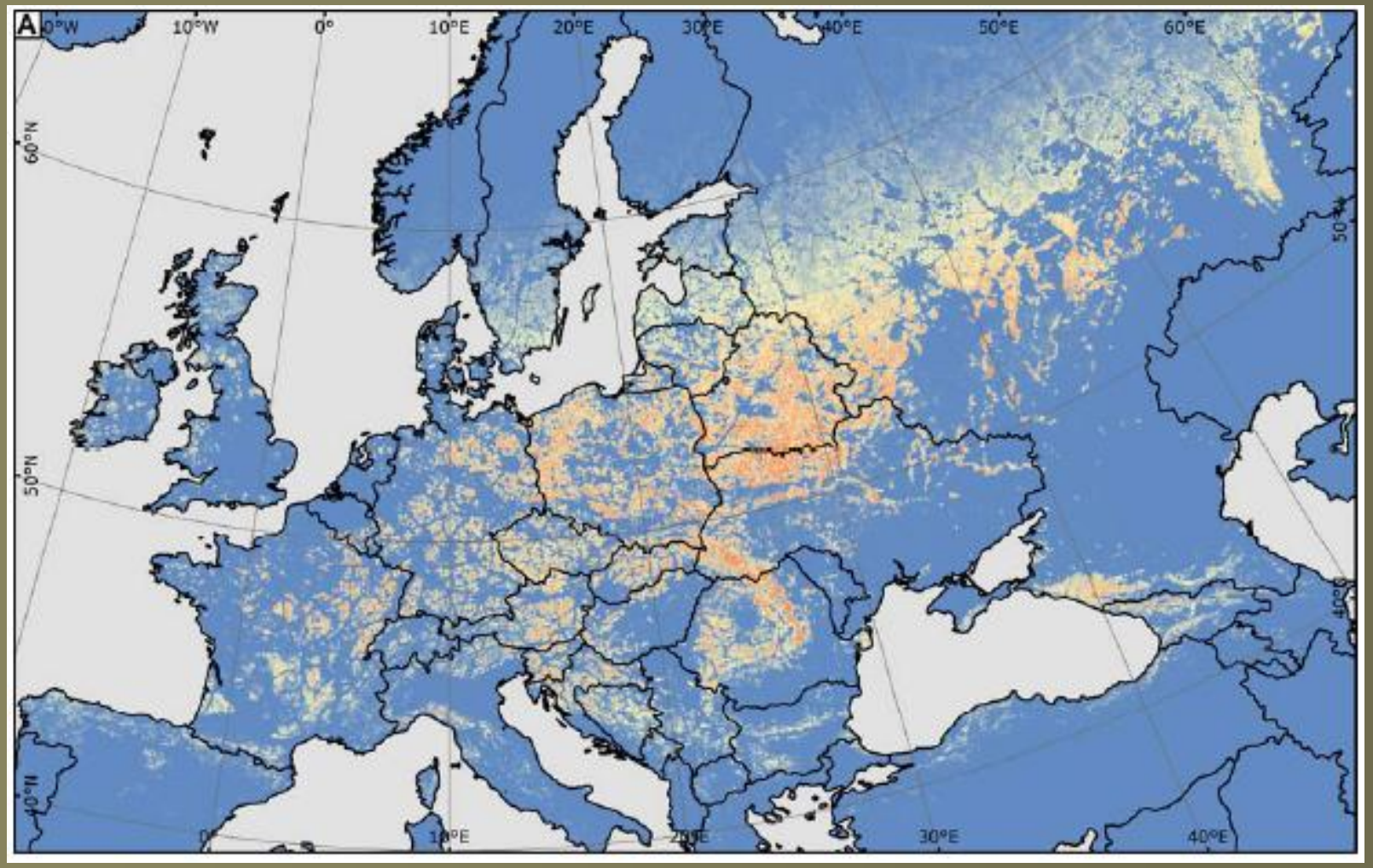
Biodiversity

Biodiversity



Kuemmerle et al., 2010, Biol. Cons.

Biodiversity



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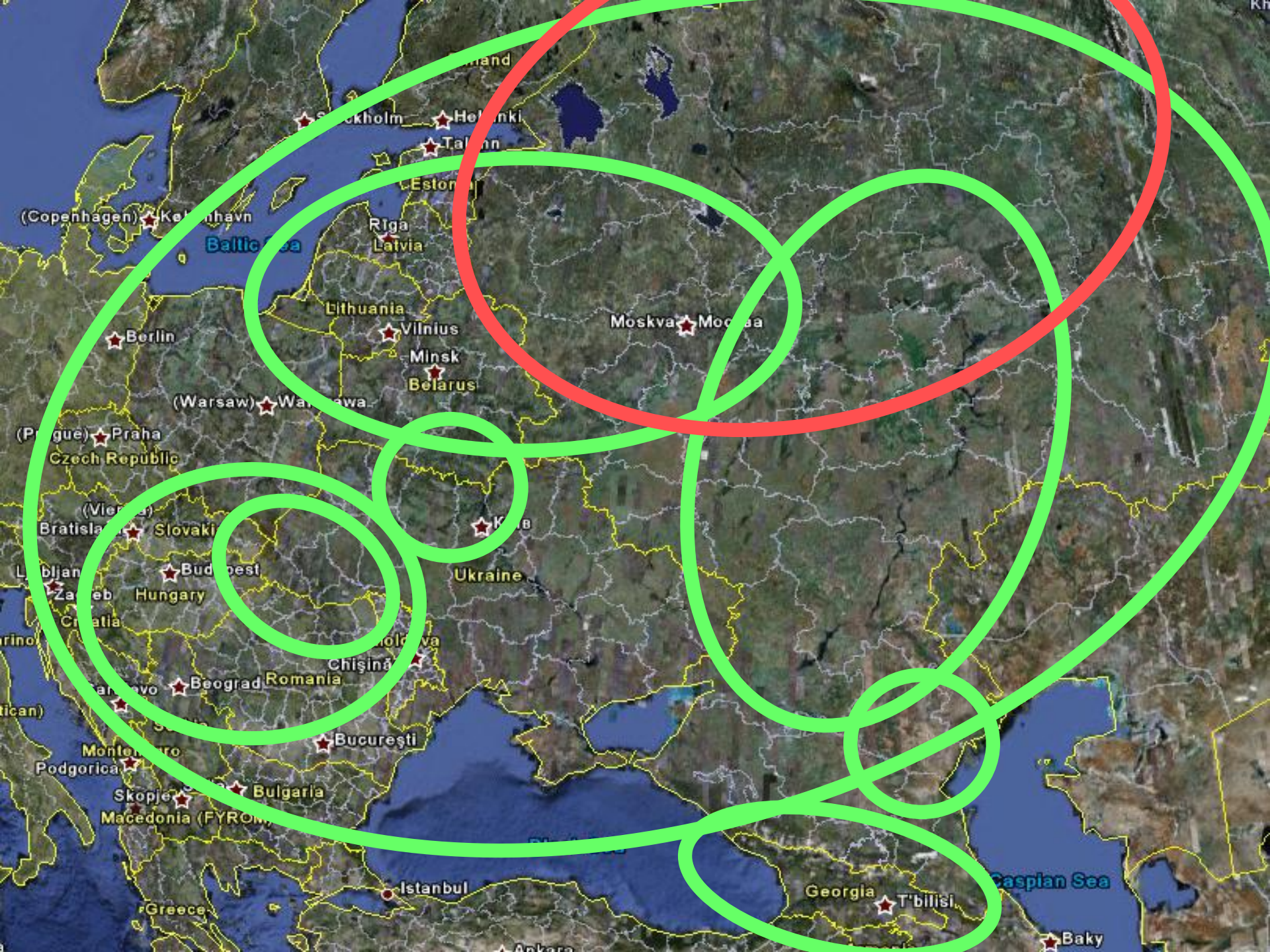
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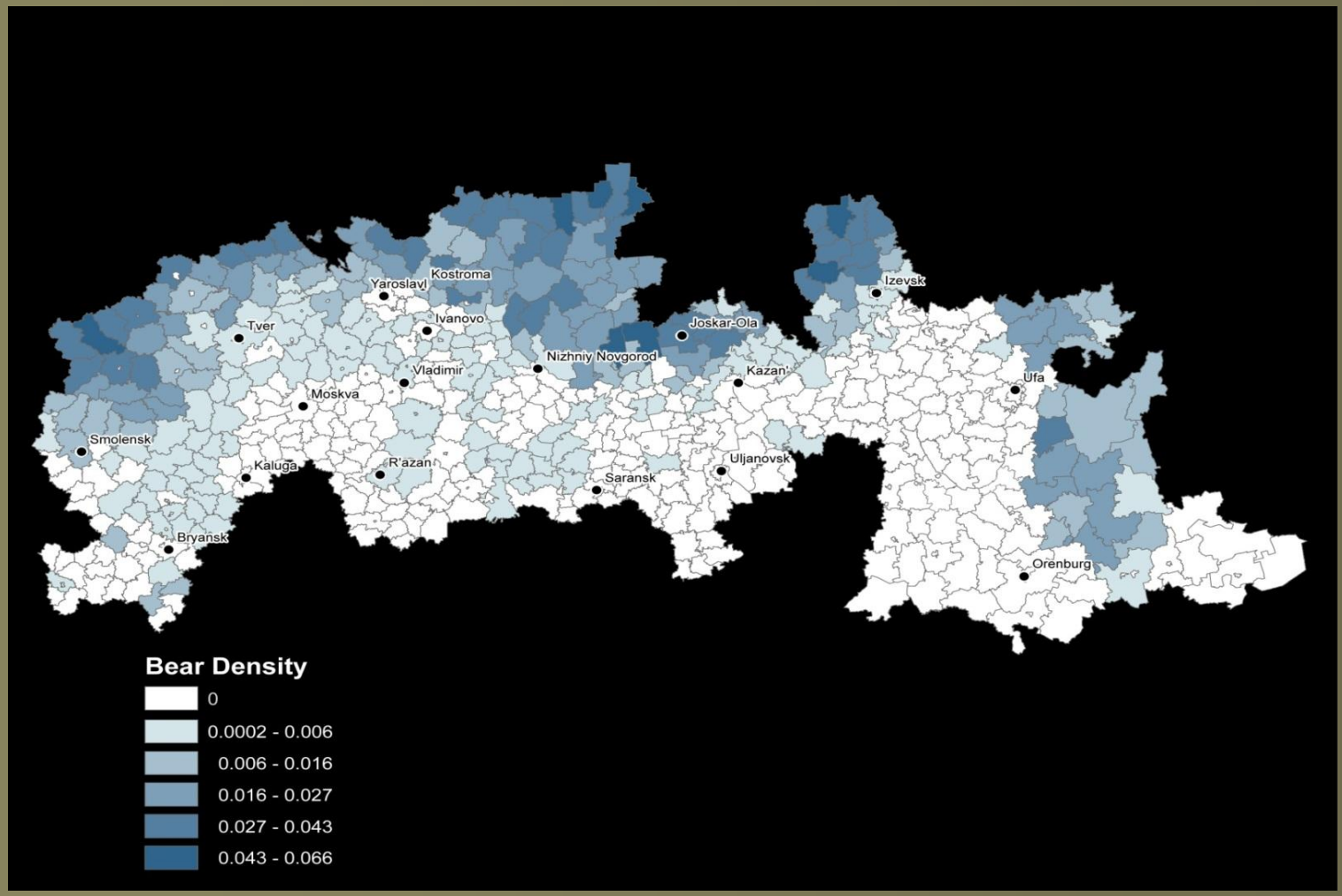
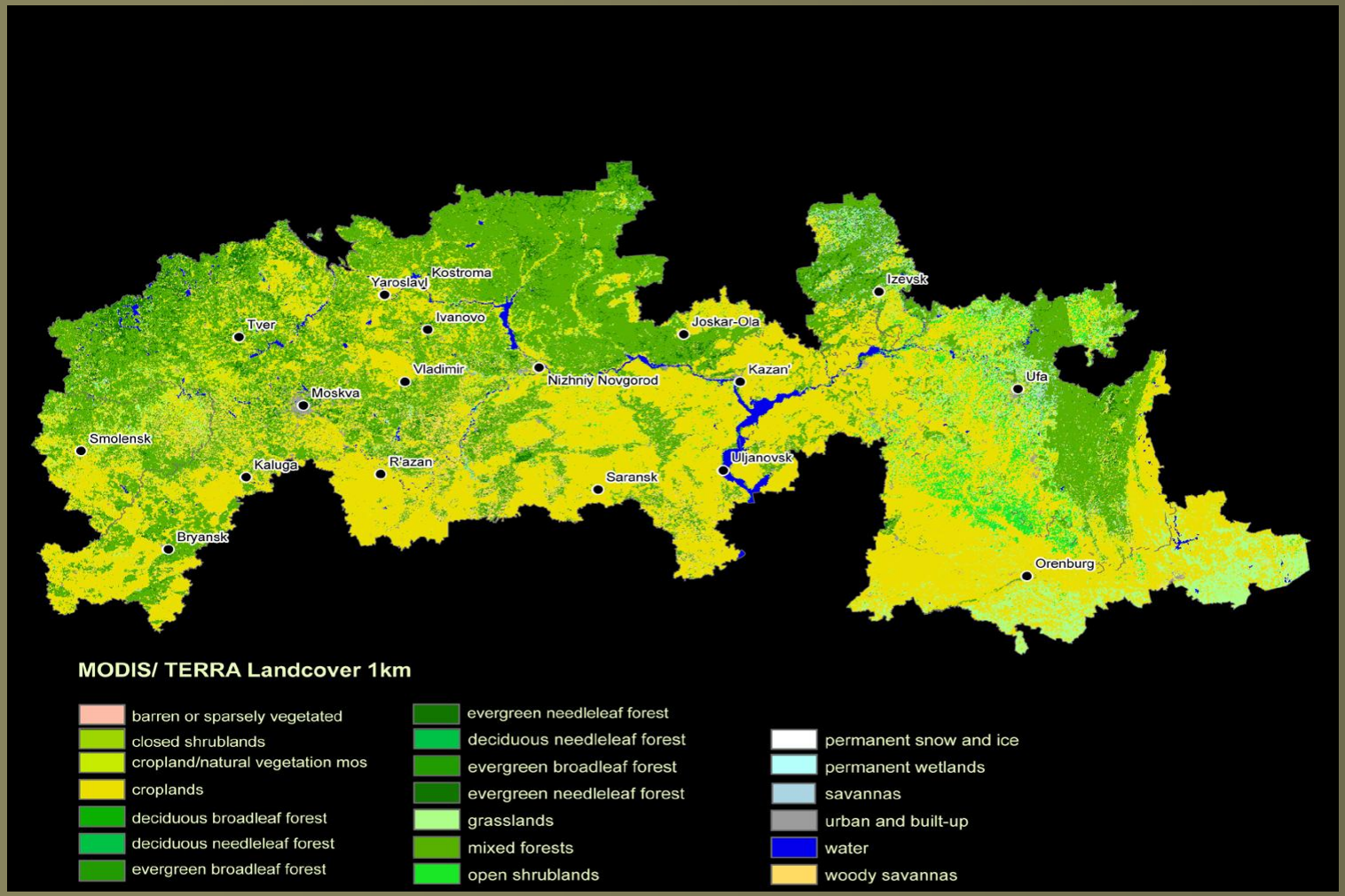


Alcantara, 2010, PhD Dissertation

Biodiversity



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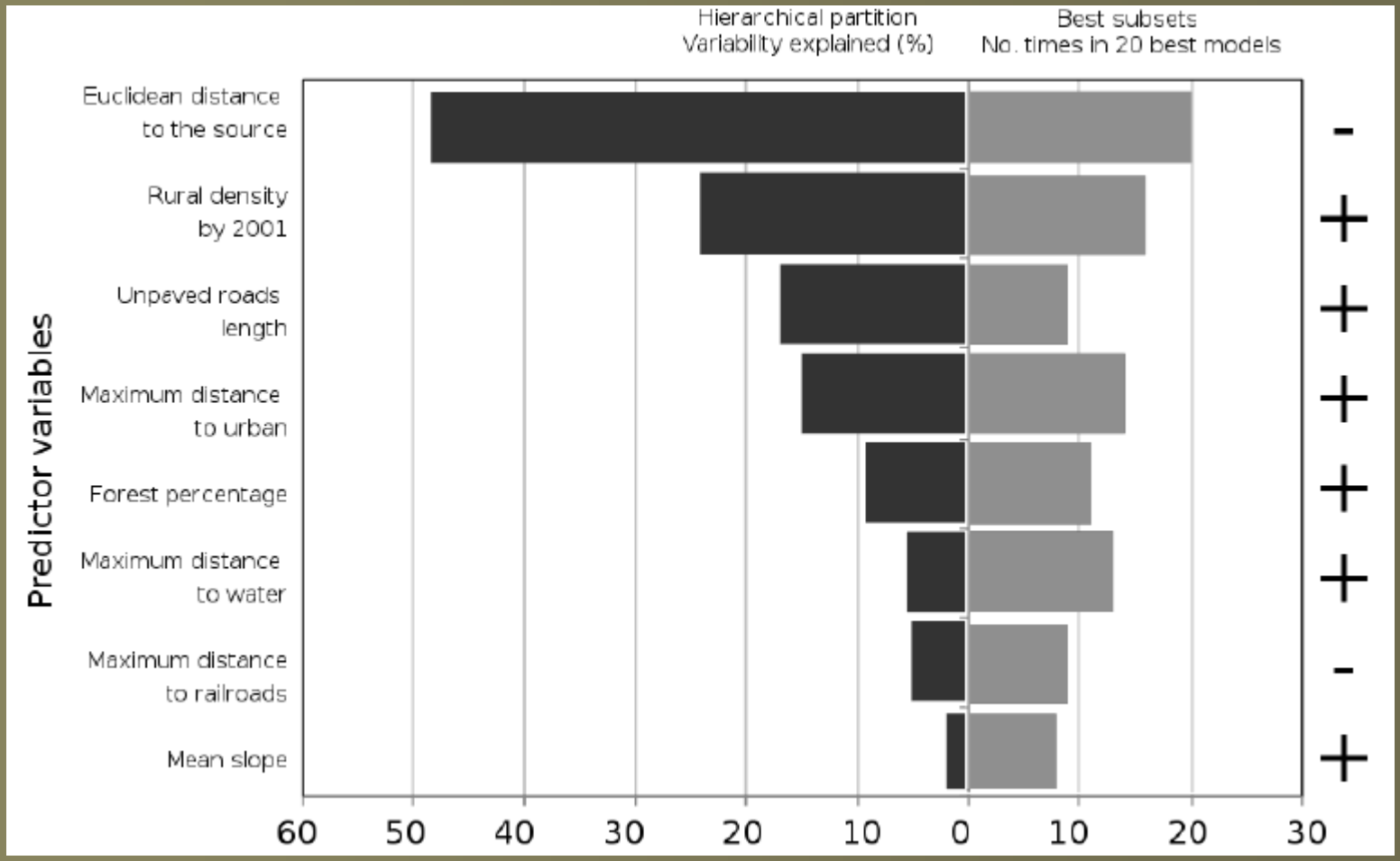

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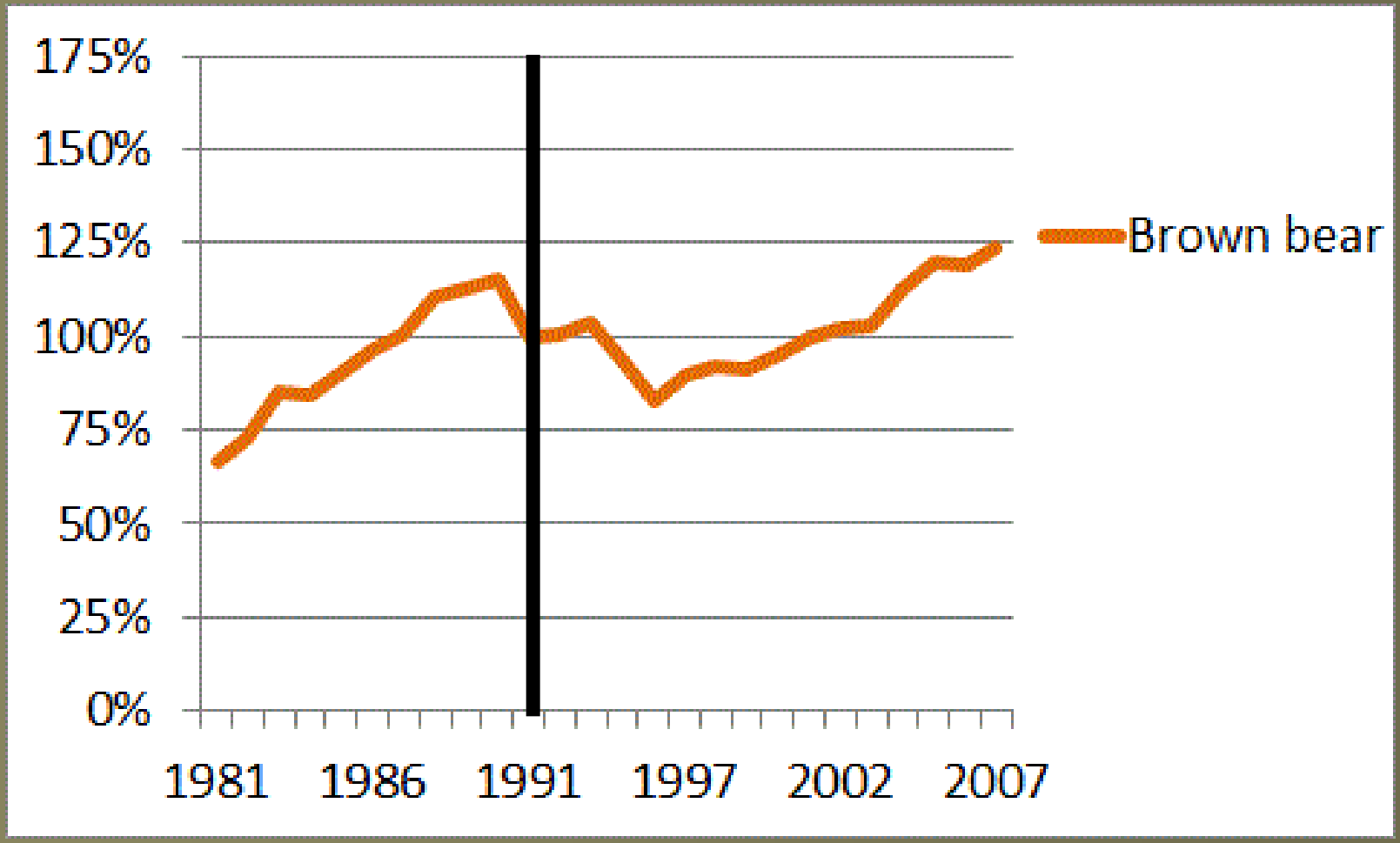
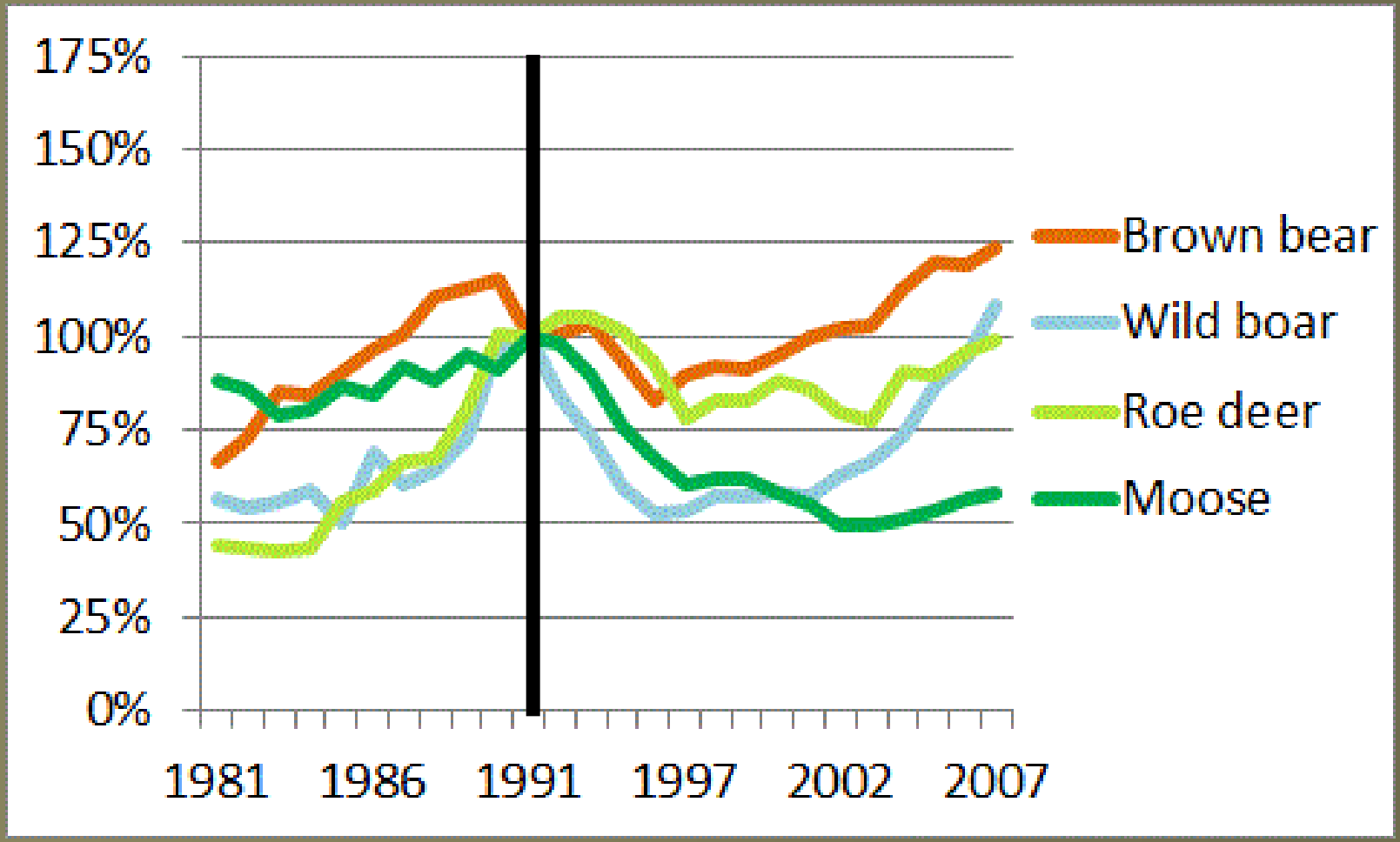


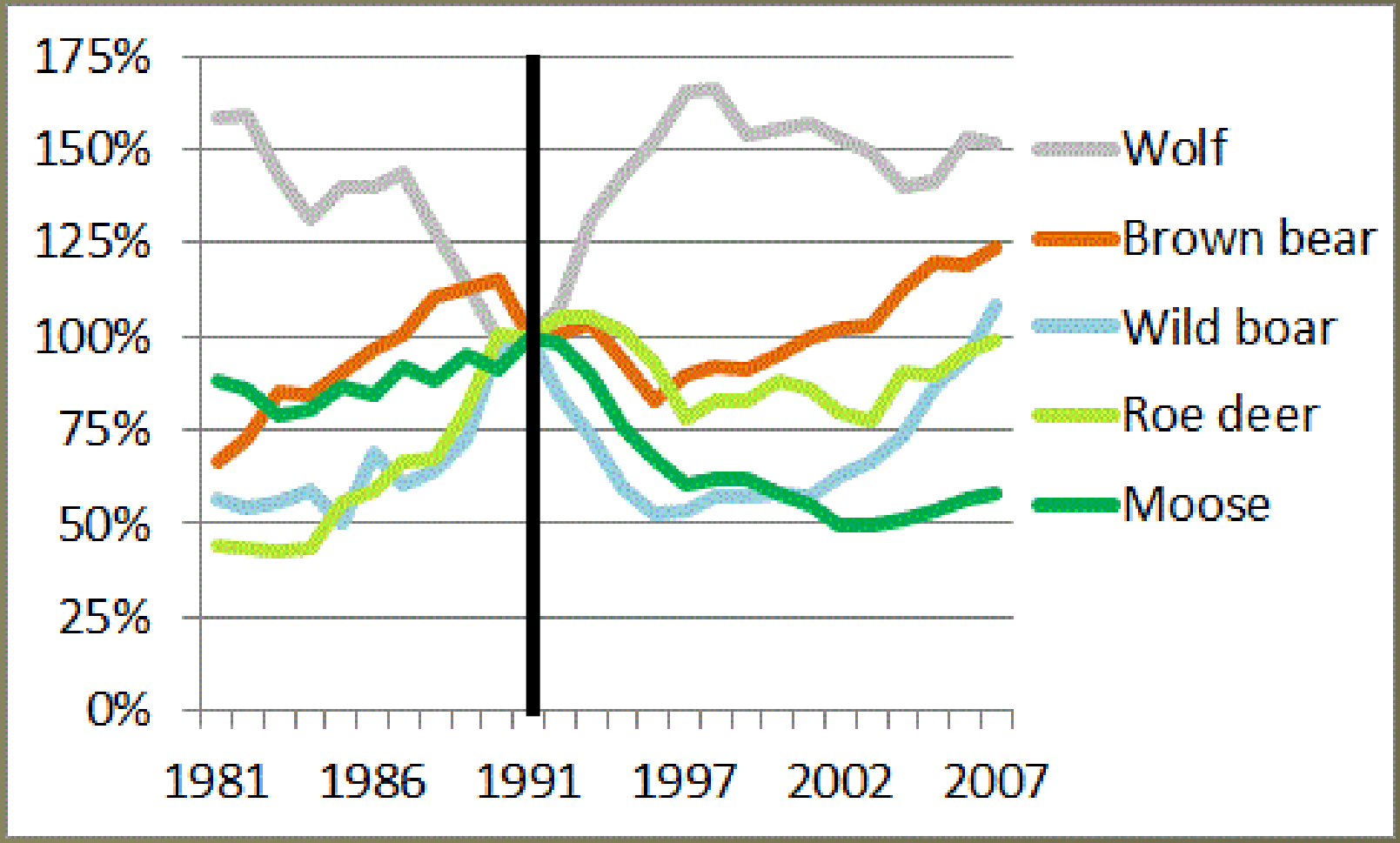
Bragina, E., et al. 2011

Biodiversity



Bragina, E., et al. 2011

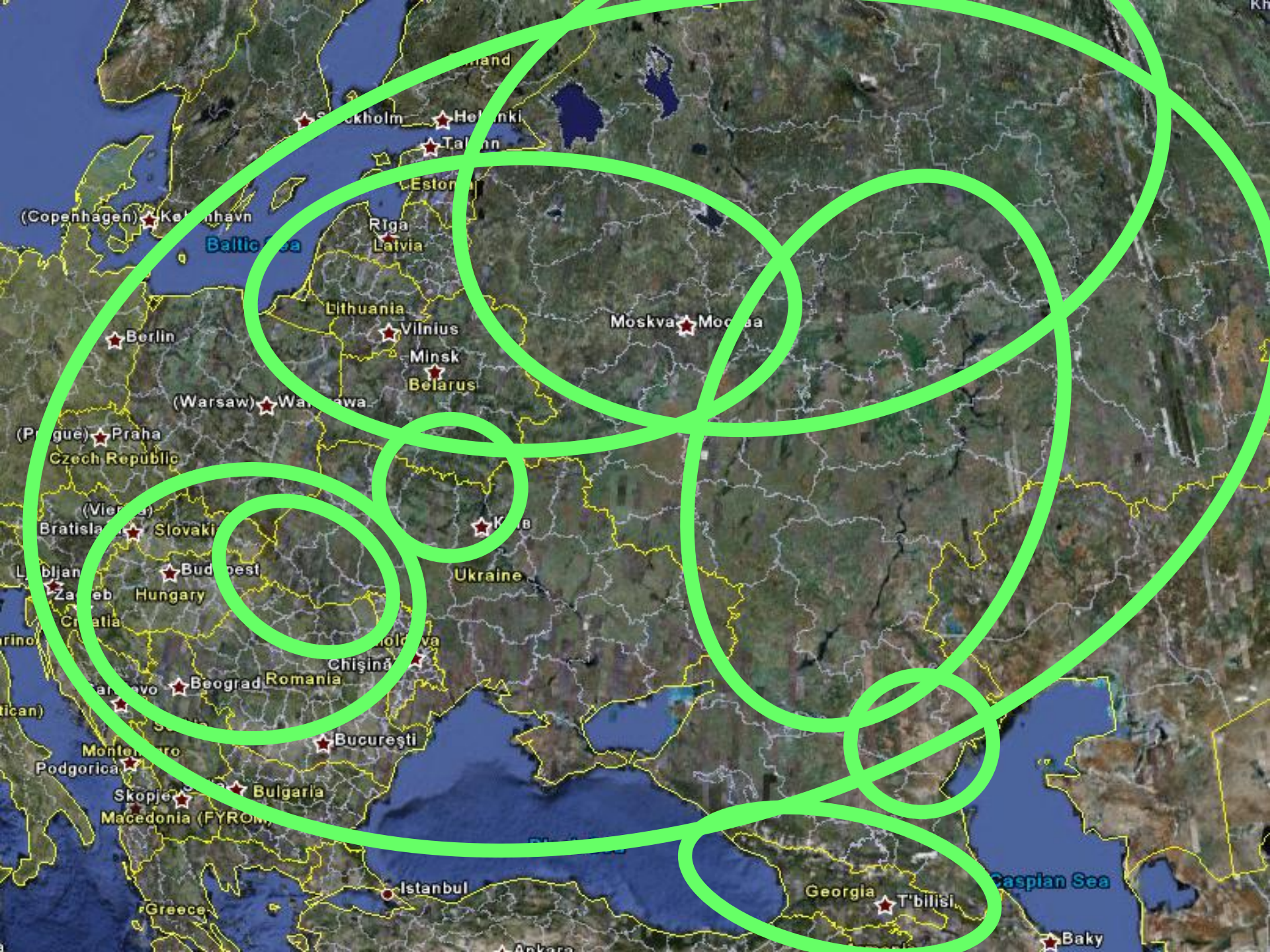
Biodiversity



Bragina, E., et al. 2011

Biodiversity

Mixed picture:
- rewilding provides habitat
- weak governance and lack of enforcement caused declines for most species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Research Questions

Effects of:

1. socioeconomic shocks

2. and broad-scale drivers

on agriculture, forests, and biodiversity

Conclusions

Institutional changes

- *The collapse of the USSR was a major socioeconomic shock*
- *Shock therapy*
  - *Open markets*
  - *Subsidies cut*
  - *Privatization*

Conclusions

Institutional changes

- *Countries diverged after the collapse*
- *Unique ‘natural experiment’*

Conclusions

Agriculture

- *Widespread abandonment of 1/3rd of all pre-collapse farmland*
- *Most abandonment where institutions are weak or changing*
- *Strong cross-border differences*

Conclusions

Forests

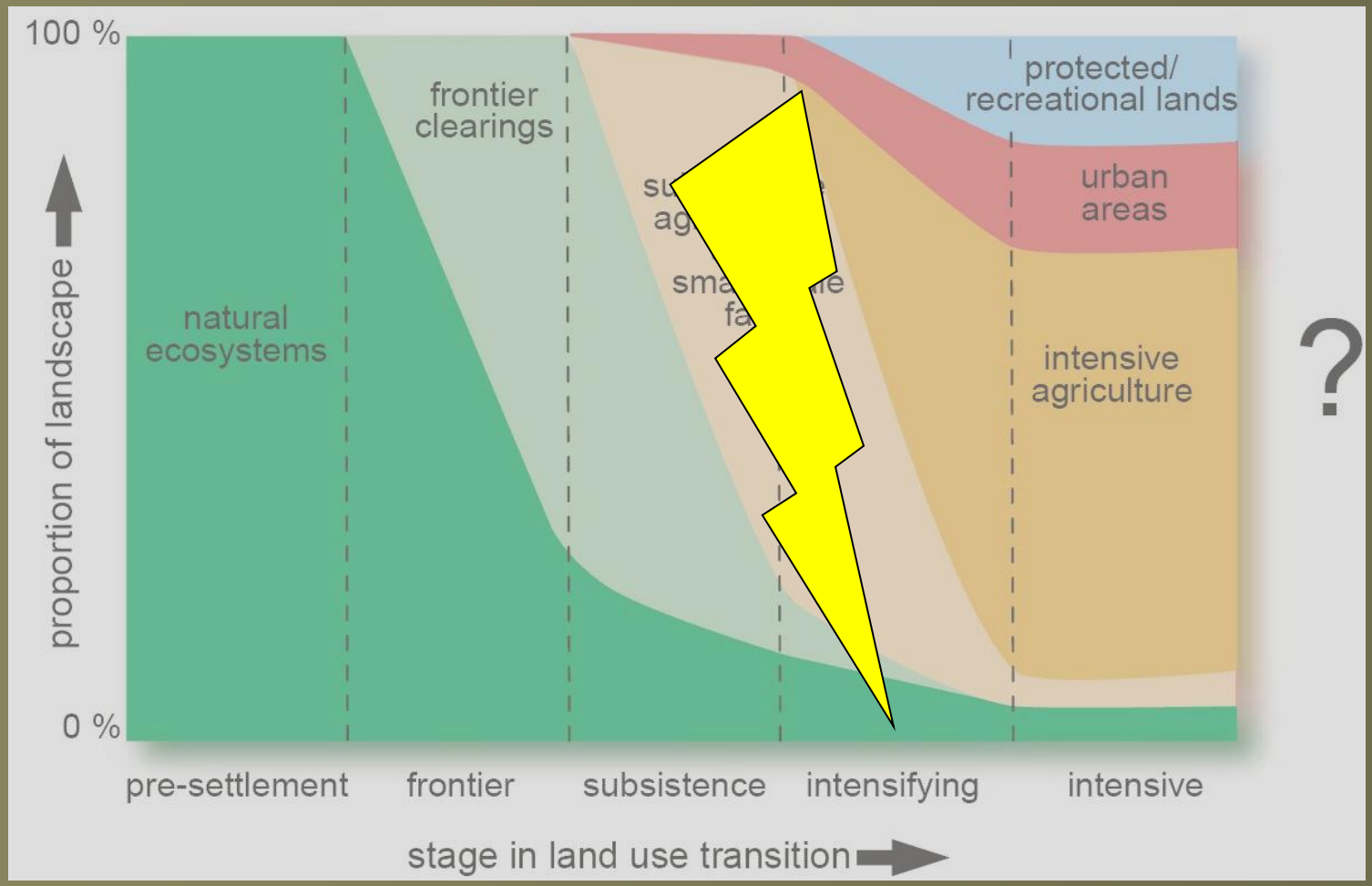
- *Logging rates changed rapidly after the collapse*
- *Generally logging declined*
- *Some logging hotspots, often due to illegal logging*
- *Governance effects non-linear*

Conclusions

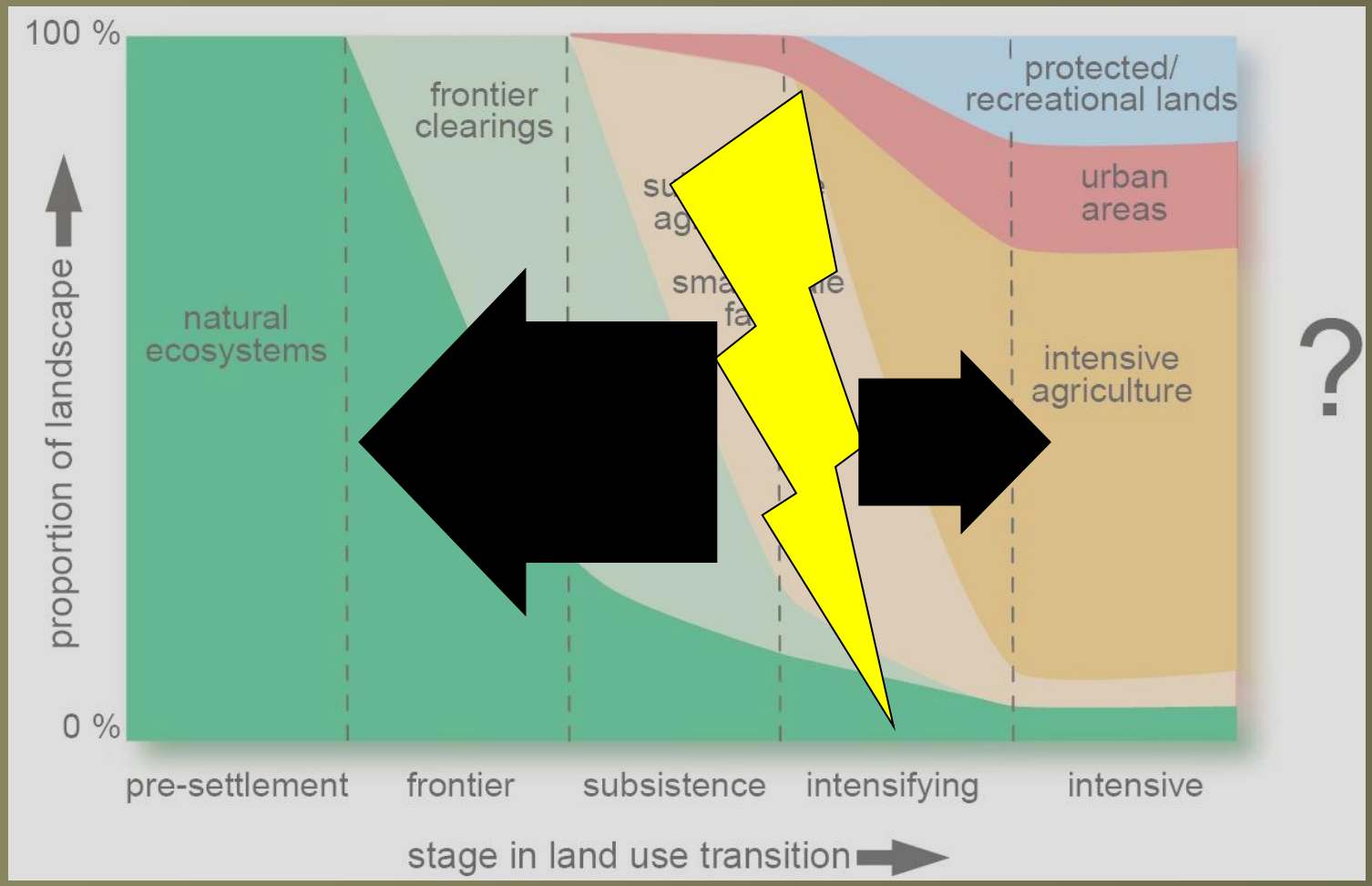
Wildlife

- *Northern Eurasia is rewilding, habitat availability is improving*
- *Initially, socioeconomic shock resulted in poaching of all species*
- *Now, some species rebounding while others continue to decline*

Conclusions



Conclusions



Conclusions

Socioeconomic shocks

- *Wars, revolutions, and recessions happen*
- *Majors effects on land use, generally decreasing land use intensity*
- *We need to account for socioeconomic shocks when modeling the future*

Conclusions

Conclusion

Conclusions

Broad-scale drivers

- *Most variability among countries and among regions*
- *The strength of institutions matters more than any institution by itself*
- *We need to understand institutions and governance when predicting the future*


Thanks to co-authors,
collaborators, and
graduate students!


Thank you!!!
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