LAND USE/LAND COVER RESEARCH IN THE CZECH REPUBLIC

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Czech Republic

- Area: 78,866 Km²
- Population (2004): 10.2 million
- Capital: Prague (1.2 million)
- Density of population: 130/km²
- GDP per capita: 70.1 (EU=100)

Highest point: 1,602 m asl
Lowest point: 115 m asl
Middle altitude: 413 m asl
Average temperature (Prague): 8.6 °C
Total precipitation: 491 mm

High variability as in social as natural conditions
Czech Landscape
Czech history, dear students, is basically history of the means redistribution
Land Use Changes in Czechia 1845–2000 and some of their Societal Driving Forces
IC = average annual index of change in %

source: Bičík, Jeleček, Štěpánek, (2001): Land use changes and their social driving forces in Czechia in the 19th and 20th centuries. Land use policy 18, Elsevier Science Ltd. pp. 65-73,
LULC data in the Czech Republic

Cadastral map 1 : 2 880 - year 1845

Aerial photograph archive since begining of 20th century

Statistical data archive since 1845

<table>
<thead>
<tr>
<th>general categories</th>
<th>basic categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>I) agriculture land (AGL)</td>
<td>1) arable land (AL)</td>
</tr>
<tr>
<td></td>
<td>2) permanent cultures (PC)</td>
</tr>
<tr>
<td></td>
<td>3) permanent grasslands (PGL)</td>
</tr>
<tr>
<td>II) forest areas (FA)</td>
<td>4) forest areas (FA)</td>
</tr>
</tbody>
</table>

Satellite data

CORINE land cover 1990, 2000, 2006
1. Land use/Land cover research has been a traditional field of interest e.g. Atlas of Czech Landscape (Founded by Ministry of Environment)

2. There have been several LULC projects, however only few have been using satellite data

3. Earth Observation in the Czech Republic has not been widely supported by government, only several universities, research institutions and private companies have disseminated EO

4. The Czech Space Office has tried to manage EO activities, e.g. coordination of the Czech Republic accession into ESA in 2008

The Czech Space Office is private institution
Charles University in Prague was founded in 1348 and is one of the world’s oldest universities.

17 faculties, 7,500 employees and over 51,000 students

LULC research has been traditional discipline in the Faculty of Science
CHARLES UNIVERSITY IN PRAGUE

**LUCC Czechia database 1845-1948-1990-2000**

**Case studies**

**CORINE database 1990, 2000 and 2006**

Land cover changes

**Agricultural extensification**

<table>
<thead>
<tr>
<th>change between 1990 and 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>no change</td>
</tr>
<tr>
<td>less than country average (0.02 %)</td>
</tr>
<tr>
<td>more than country average</td>
</tr>
</tbody>
</table>

+ 2,931,6 km²

Land cover changes

**Afforestation**

<table>
<thead>
<tr>
<th>change between 1990 and 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>no change</td>
</tr>
<tr>
<td>less than country average (4.67 %)</td>
</tr>
<tr>
<td>more than country average</td>
</tr>
</tbody>
</table>
The satellite data receiving station modul, data:
METEOSAT
NOAA - AVHRR
ENVISAT - MERIS and AATSR

LCLU object based classification

Evaluation of suburban processes
IKONOS, Quick Bird

Land Cover in the Czech Republic
year 2009
Bark Beetle Calamity Assessment from Remotely Sensed Data in the Sumava Mts.

Forest cover classification - Landsat 5 TM, 1998

Forest cover in 1985

Forest cover changes in the Modrava region in 1998

Grassland
Border
Healthy and moderate damaged coniferous
Highly damaged and dead spruce
Clear cuts and forest plantations
Mixed and broad-leaved forest
CzechCarbo - Land use change and carbon sequestration

Grassland change between 1991 - 2003
Biomass carbon storage [t.ha\(^{-1}\)] in 2003
Biomass carbon storage \([\text{t.ha}^{-1}]\) change in 1990 - 2003

<table>
<thead>
<tr>
<th>LULC category</th>
<th>Date</th>
<th>1991 [km²]</th>
<th>2003 [km²]</th>
<th>change</th>
</tr>
</thead>
<tbody>
<tr>
<td>built-up area</td>
<td></td>
<td>3649</td>
<td>3649</td>
<td>0</td>
</tr>
<tr>
<td>forest</td>
<td></td>
<td>23292</td>
<td>23647</td>
<td>355</td>
</tr>
<tr>
<td>clearing</td>
<td></td>
<td>1504</td>
<td>1290</td>
<td>-215</td>
</tr>
<tr>
<td>arable land</td>
<td></td>
<td>32702</td>
<td>29920</td>
<td>-2781</td>
</tr>
<tr>
<td>water</td>
<td></td>
<td>582</td>
<td>676</td>
<td>94</td>
</tr>
<tr>
<td>grassland</td>
<td></td>
<td>8567</td>
<td>10003</td>
<td>1436</td>
</tr>
<tr>
<td>scattered greenery</td>
<td></td>
<td>1145</td>
<td>2279</td>
<td>1134</td>
</tr>
<tr>
<td>celkem</td>
<td></td>
<td>71440</td>
<td>71440</td>
<td></td>
</tr>
</tbody>
</table>
FOREST DISTURBANCES IN ŠUMAVA NATIONAL PARK

Martin Hais, Department of Ecosystem Biology, Faculty of Sciences, University of South Bohemia, Czech Republic, e-mail: martin.hais@seznam.cz
Changes of surface temperature due to bark beetle outbreak

The assessment of multitemporal changes of Surface temperature

GISAT Company

- Type of organisation: SME
- Specialised in: Land monitoring and satellite mapping, Remote Sensing, Geoinformation services, GIS development and modelling
- Thematic areas: environment, agriculture, forestry, urban studies, Earth exploration

- 15 permanent employees and external experts

GSE Land
Thematic Strategy on Soil Protection

Urban Land Use
Land use change assessment: spatial insight into changes (KU Chodov)
GISAT Company

- **Land Use / Land Cover Monitoring**
  - CORINE Land Cover activities (EEA)
  - GSE Land (ESA)
  - DAIFOR – land use and change for agro-envi indicators development (CZ – BE cooperation)
  - Landscape small features extraction
  - Crop classification in CZ (CULS, CHMI)
  - GlobCORINE (ESA-EEA)

- **Soil Sealing**
  - GMES Fast Track Services, 2006, 2009 update (EEA)

- **Urban Greenery Monitoring**
  - GSE Land, GMES Urban Services (GUS)

- **Brownfields Monitoring**

- **Abandoned Land Monitoring**
  - REAL - identification and monitoring of abandoned land

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How can we contribute?

• **IGU LUCC workgroup - join research and conference activities**
  
  Prof. Ivan Bicik – the chief of IGU LUCC workgroup
  Financial support by Czech Grant Agency (2008-2012)

• **Training and workshop activities**
  
  EU project GeoNetCab „Capacity Building“ (2009-2012)

• **Sharing our data, experiences, capacities…**
  
  join publications, join research grants…

• **Sharing our connections (ESA, IALE, GEO Group on Earth Observations …)**

• **CzechGlobe infrastructure – HS, LIDAR, TIR airborne data**
  
  (e.g. satellite data calibration) – ISBE ASCR Brno
Thank you for your attention

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