Participation of Slovenia in WGE LRTAP

Slovenian Forestry Institute (GIS) & Slovenian Forestry Service (ZG)
University of Ljubljana, Biotechnical Faculty (BF)
Institute Jožef Stefan, Ljubljana (IJS)
Slovenian Environmental Agency (ARSO)
Participation in WGE programmes

• **ICP Forest, Level I**- from the beginning;
  Level II- from 2002?
(Slovenian Forestry Institute & Slovenian Forestry Service, UL BF, IJS, ARSO)

**Level I** : agreed activities (4 x 4 km grid, 16 x 16 km grid; additional activities: several bioindication methods (epiphytic lichen mapping); **forest die-back inventory in slowly converting to forestry inventory**


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ICP-Forest-Level I- 44 plots observed each year

OSUTOST KROŠENJ PO DREVESNIH VRSTAH, 2013
CROWN DEFOLIATION BY TREE-SPECIES, 2013

- skupaj / total
- listavci / broadleaves
- bukev / beech
- iglavci / conifers
- smreka / Norway spruce
- bori / Pinus sp.

0 - 10%
11 - 25%
26 - 60%
61 - 99%
sušice / dead
ICP-Forest-Level I- some data: Average crown defoliation in the period 1991-2013
Epiphytic lichen cover, compiled for all tree species; forest inventory 2007
ICP-Forest-Level II (12 plots): each year activities

- Deposition (bulk + throughfall)
- Phenology
- Meteorology
- Soil solution
- Growth
- Defoliation and damages
- Ozone injuries
- Ambient air quality (passive samplers for ozone)
- Foliar nutrition status – foliar analysis (every 2 years)
- Ground vegetation (every 5 years)
- Soil (every 10 years)
ICP – Vegetation; participation since 1996
UL BF, Ljubljana, IJS, Ljubljana, ERICo, Velenje)

- Monitoring tropospheric ozone impact: use of standardised bioindicators (tobacco, white clover, brown napweed,..) within the ICP – Vegetation protocols; few physiological measurement, observation of injuries in natural, crop and ornamental plants in collaboration with GIS
LJUBLJANA 2006
Daily & Cummulative AOT40 with Critical Level for Crops & Natural Vegetation and Clover Biomass
ICP – Vegetation: monitoring deposition of air pollutants in mosses:
(IJS, GIS, UL BF)

• Deposition of metals in mosses (lichens)
• Deposition of N-pollutants ($\text{NO}_3^-$, $\text{NH}_4^+$) in mosses
• Evaluation of sampling method
• Deposition of PAH in mosses
Temporal trends 1995-2010 of Cr, national level

Change 1995-2010 63.8%
Temporal trends 1995-2010 of Cd, national level

Change 1995-2010
62.5 %
Comparison: concentrations in mosses/estimated model deposition*

Reductions (1990/2010)

Deposition
2.3 times

Conc. in mosses
2.1 times


Deposition
1.4 times

Conc. in mosses
2.7 times

*Deposition was calculated by EMEP (European Monitoring and Evaluation Programme), MSC-E; 64 sampling sites for Cd (Pb) + emission data → modelling deposition

Web-site: WWW.msceast.org
N (%) content in mosses (*Hypnum cupressiforme*), sampled in 2010
ICP- Mapping & Modelling

- Participation in two calls
- N, S load assessment in forests
- Data from EMEP and ICP-Forest Level II
Perspectives in future

• **Problems:**
  • Cutting fonds for environmental monitoring,
  • WGE activities are not compulsory
  • Priority conflicts in environmental monitoring at the European scale regarding activities of CLRTAP and collision in funding with other conventions at the European and national level

• **Promises:**
  • At least ICP-Forest activities are implemented in forestry legislation
  • Originaly forest die-back inventory has become/remained the only national forest inventory (multipurpose inventory) in Slovenia and the only methologically grounded monitoring of terrestrial ecosystems
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