Key findings - land cover changes

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BIOPRESS final workshop, Brussels

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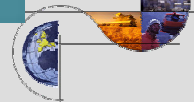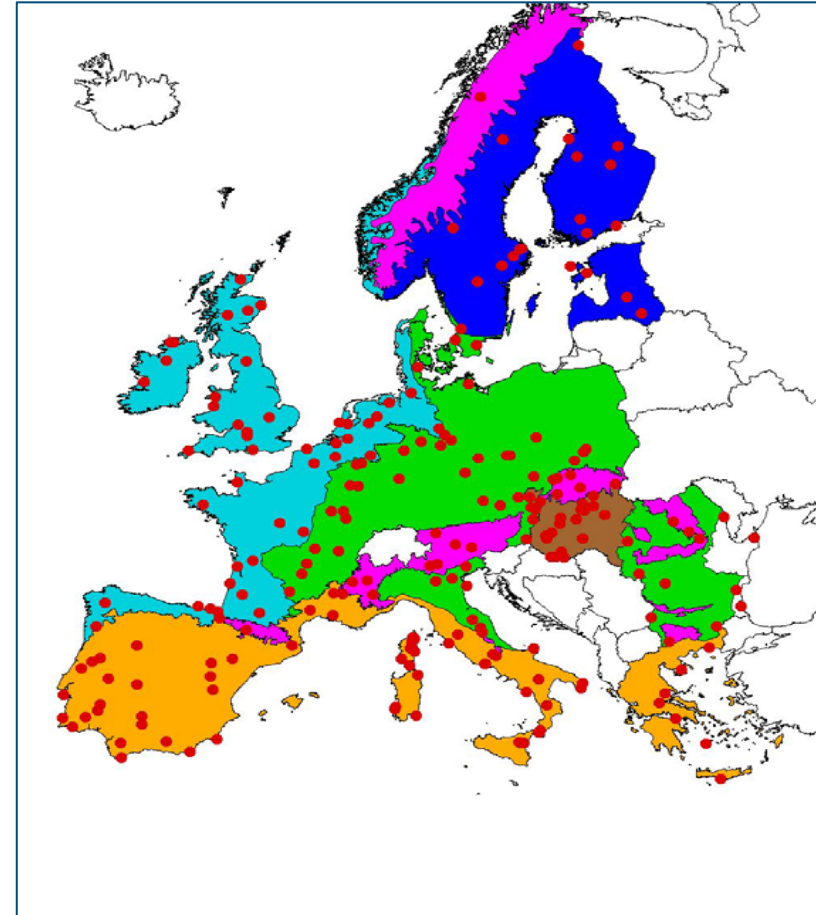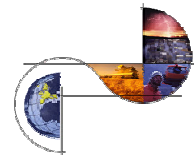
Sample selection

- Focus on Natura 2000 sites with Annex 1 habitats
- Expert pre-selection of 227 samples
- Stratification to BRME
- Deduction of umbrella habitats (Forest, Grasslands, Mire, running water)
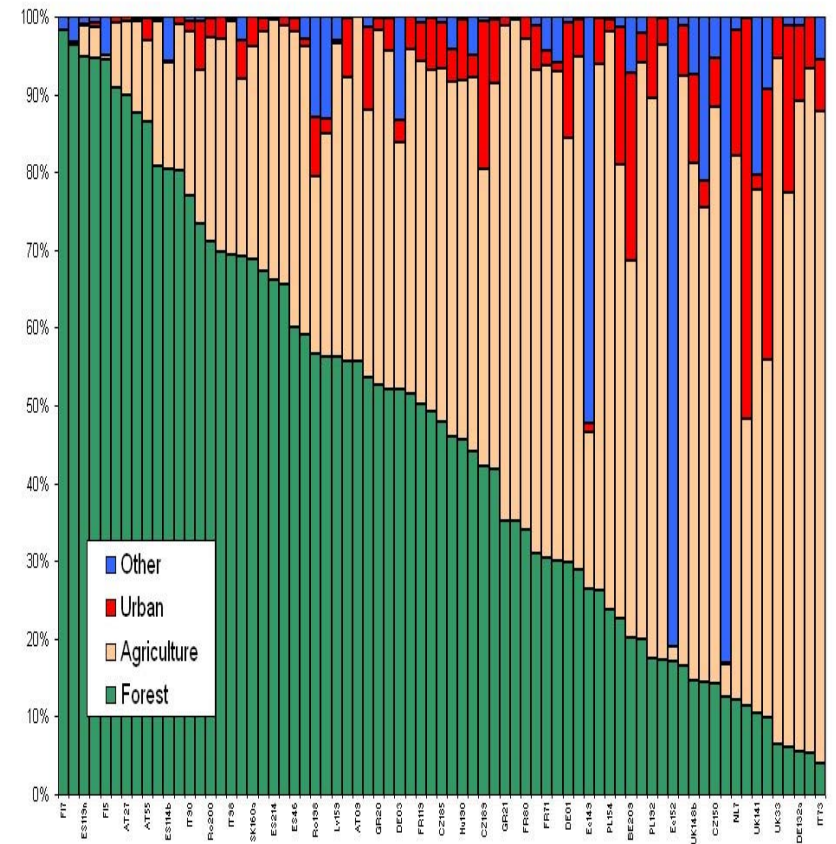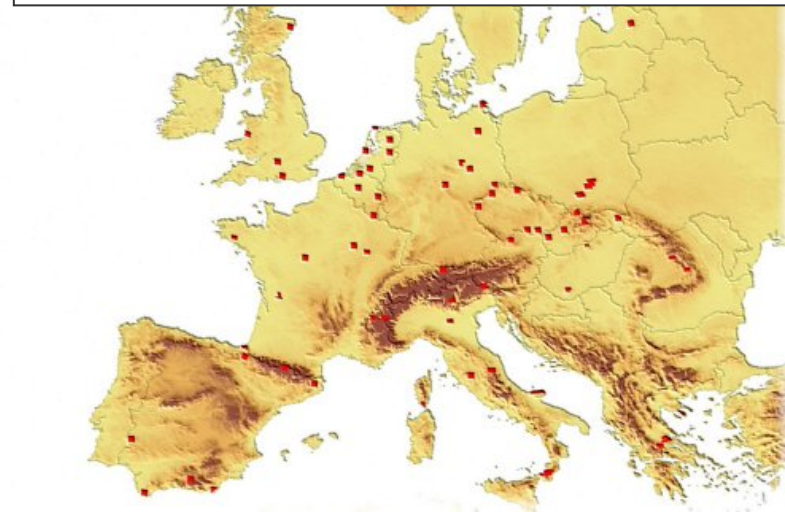- Sub selection due to data availability and resources
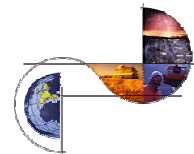
Distribution of 73 Windows

- data availibility
- same location as transects
- forest and natural grasslands and agricultural area dominate

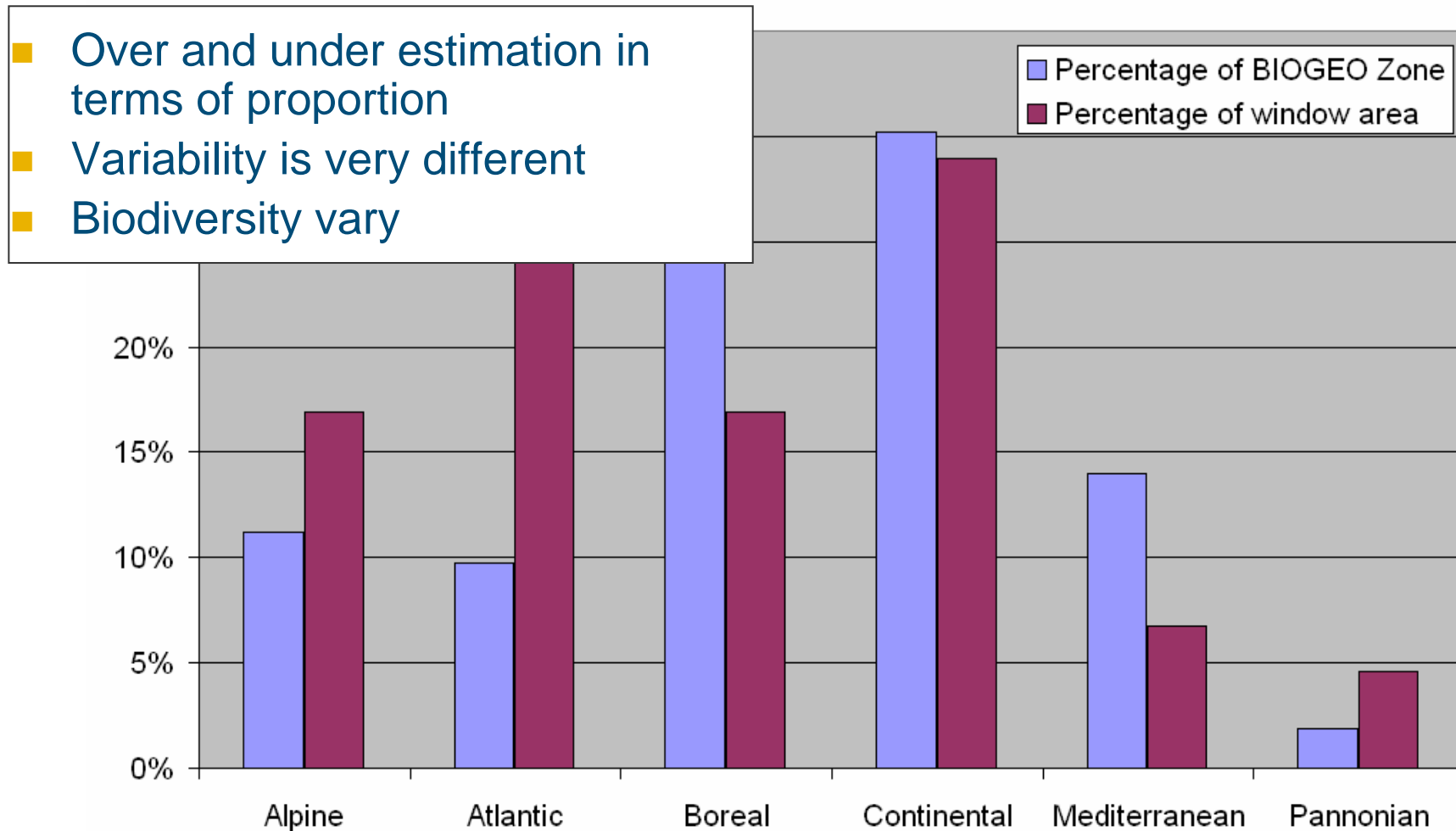Landcover characteristics for all windows

Sampling area of windows in respect to size of BMRE region

- Over and under estimation in terms of proportion
- Variability is very different
- Biodiversity vary

Legend:
- Percentage of BIOGEO Zone
- Percentage of window area

20%
15%
10%
5%
0%

Alpine   Atlantic   Boreal   Continental   Mediterranean   Pannonian
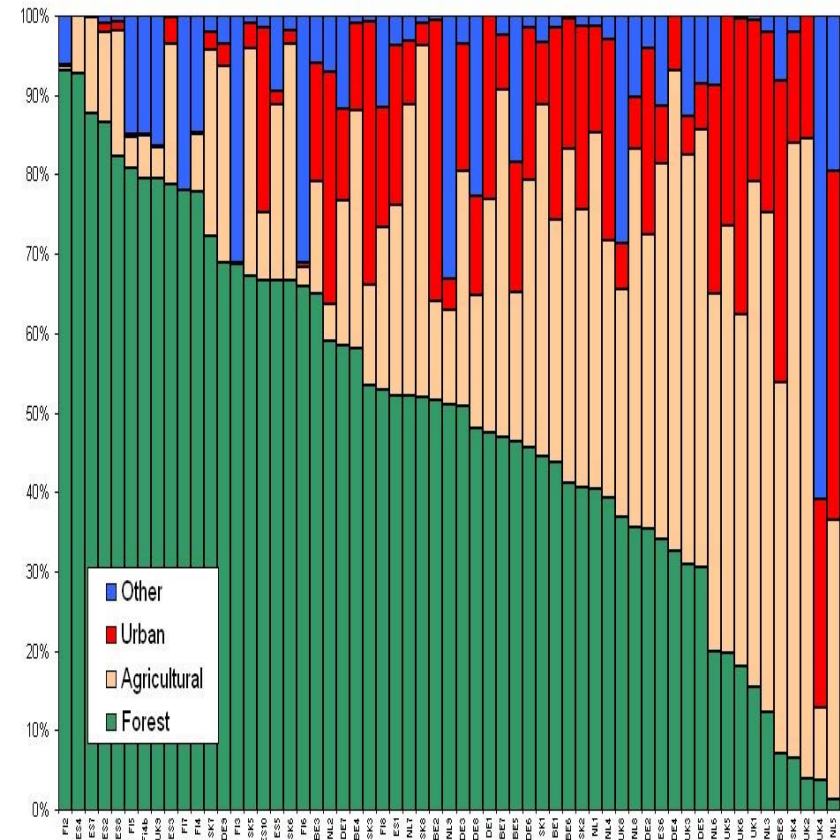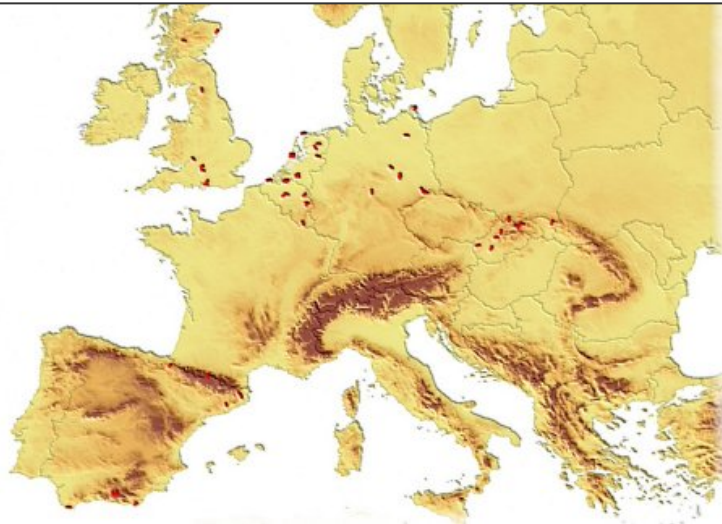
UH Universität Hamburg   World Forestry   biopress
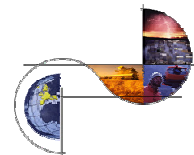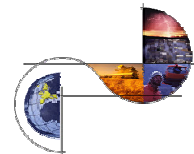
Distribution of 59 Transects

- Clustering: partner countries
- four umbrella habitats
- Artifical area, forest and semi natural grassland area increases

Landcover characteristics for all transects

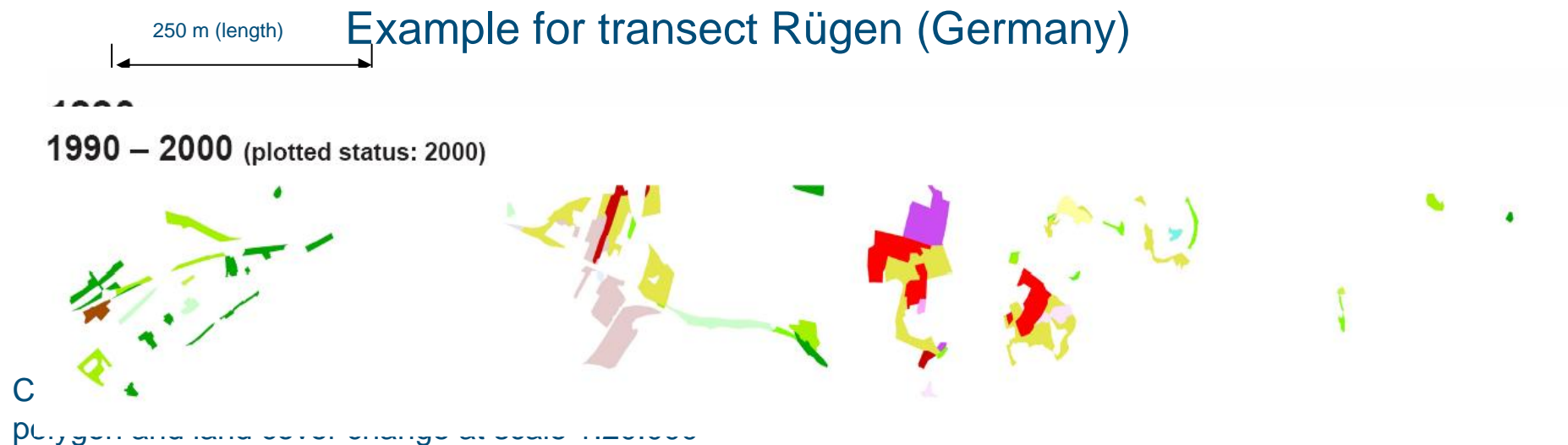# Interpretation Methodology

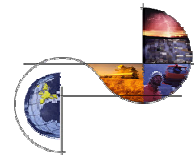- **Windows:** backdating from CLC 1990 to 1950
- **Transects:** Photo to Photo manual Interpretation for 2000, 1990 and 1950

250 m (length)

Example for transect Rügen (Germany)

1990 – 2000 (plotted status: 2000)

C
polygon and land cover change at scale 1:25.000

➔ Grouping of changes using Landcover to pressure conversion matrix

Storage of results in Internet database

- Characteristics / GIS
- Meta database with explanations
- Real time statistics
- Natura 2000 site information
- Maps showing land cover and pressures

Interpretation with description of status and changes:
For further information please click on picture

clc 1950   clc 1990   clc 2000

changes 1950-1990   changes 1990-2000

changes 1950-2000
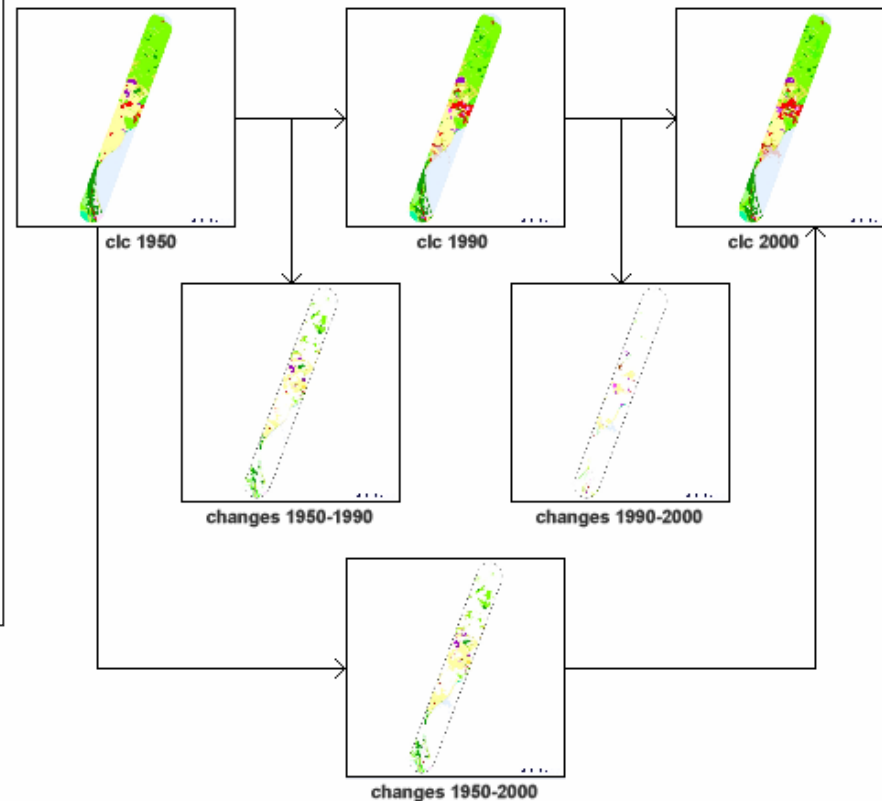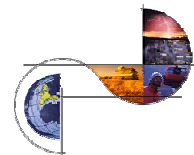
Examples from the Internet database for Rügen 1/2

Proportion of changed transect area between 1950 and 1990 for all levels

L1	L2	L3
9.5 %	16.16 %	21.15 %

## Cross table of changed transect area between 1950 and 1990 level 1

CLC Level1 Window DE08 1950	CLC Level1 Window DE08 1990				
	1	2	3	4	5
1	165,40	10,85	33,50		
2	159,26	577,15	52,48		
3	29,53	3,69	1476,43		4,70
4				0,00	
5	9,65		10,60		775,76
Area in Hectare					

Main changes observed in transect

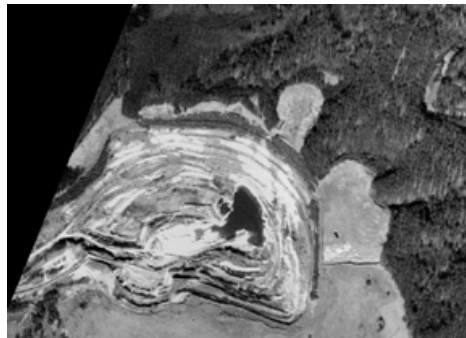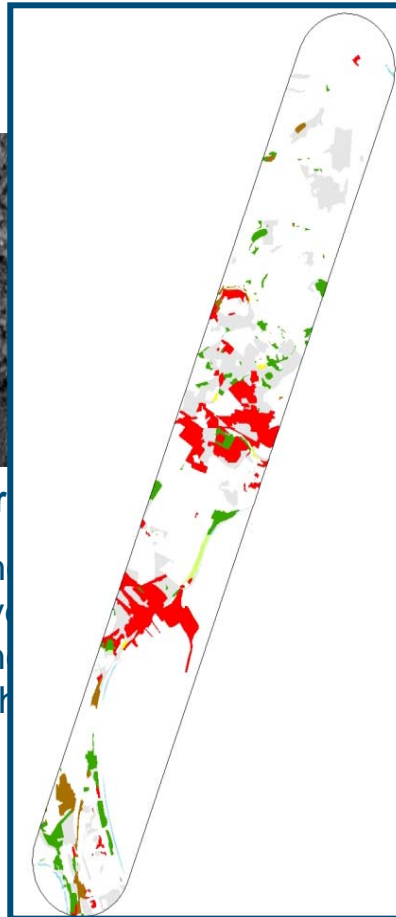| Direction	Area	Percent
211 - 231	92.13 ha	13.00 %
311 - 313	76.51 ha	11.00 %
211 - 112	54.75 ha	8.00 %
311 - 312	33.42 ha	5.00 %
211 - 242	26.34 ha	4.00 %

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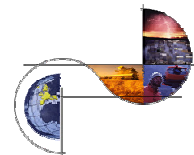
Examples from the Internet database for Rügen 2/2

METADATA with local expert input:
Calculated pressure map for changes1950 and 1990

Legend

- 🟥 Urbanisation
- 🟨 Intensification
- 🟩 Abandonment
- 🟫 Deforestation
- 🟩 Afforestation
- 🟦 Drainage
- ⬜ No relevant change
- No changes
- No data

Explanation for changes fr

These pictures of change sh...   ...lt of
changing management. Dev...   ...of land
from non-irrigated arable lan...   ...ges
and occurs in the centre of th...   ...f all
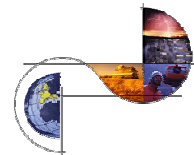changes within these areas.   ...nsect.

Anual rate of changes for forest (DE7)

Challenge of getting the correct monitoring point in time

% forest cover

Anual increase
1990-2000   0.49%

LC area of a class

Anual decrease
1950-1990   -0.15%

time

1950

1990

2000

37%
35%
33%
31%
29%
27%
25%

1940   1950   1960   1970   1980   1990   2000   2010

Year

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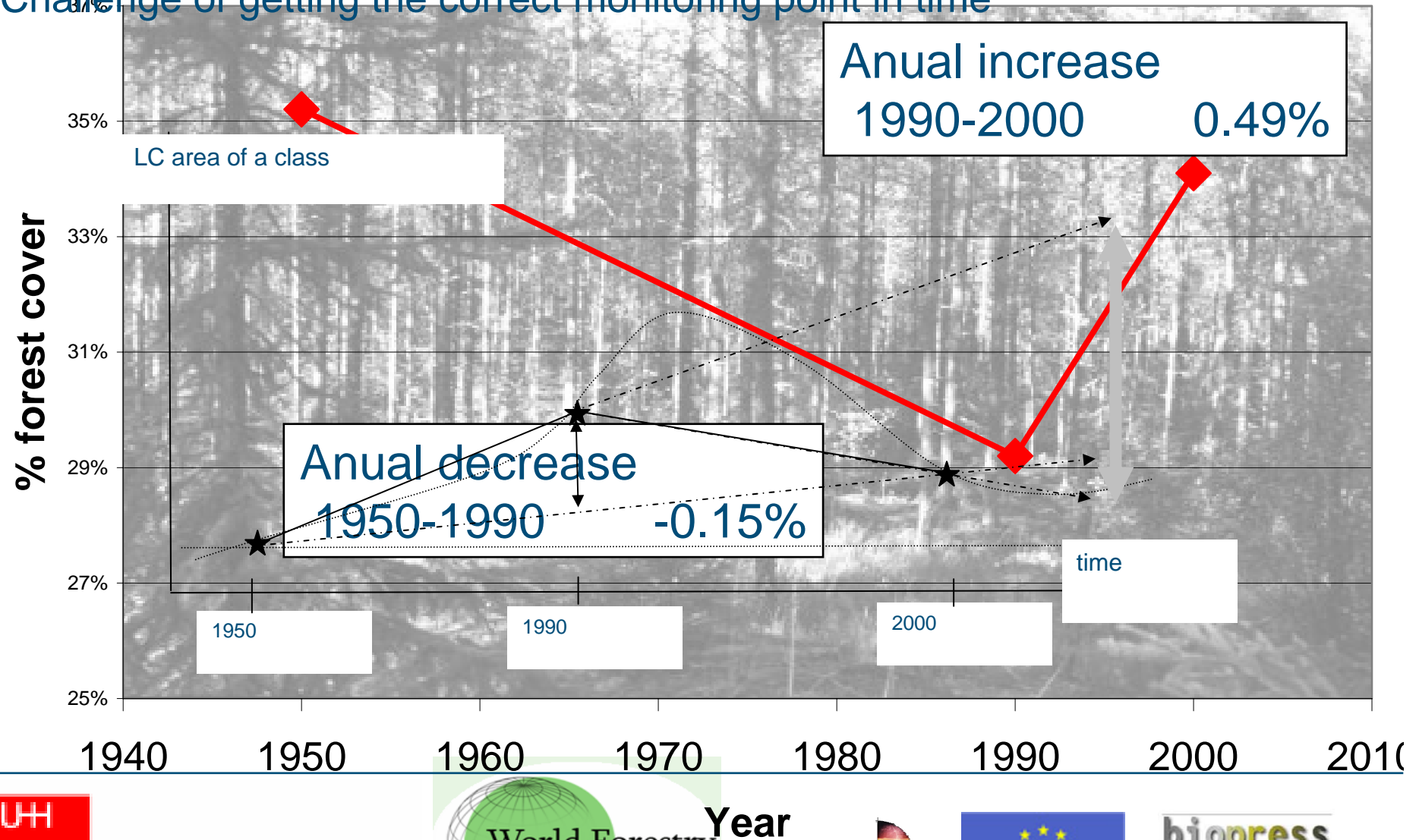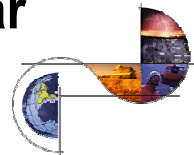
Results of window interpretation

- Most changes affect interpretation level 2
- Five time more changes were assessed in windows than in transects
- Urbanisation took mostly place in the Atlantic and Continental region and mostly on agricultural area
- Area inside of Natura 2000 sites stayed mostly unchanged

	No Change	Agriculture to Urban	Agriculture to Forest/Grassland	Forest/Grassland to Agriculture	Forest/Grassland to Urban
Alpine	96,68%	0,77%	0,98%	0,76%	0,11%
Atlantic	91,63%	**5,30%**	0,52%	0,68%	0,58%
Boreal	96,89%	0,28%	0,83%	**1,12%**	0,27%
Continental	94,92%	**2,09%**	1,29%	0,21%	0,24%
Mediteranean	96,57%	0,59%	1,92%	0,30%	0,10%

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Derived perssures from transects

1950-2000

BIOGEO region	Abandonment	Afforestation	Deforestation	Drainage	Intensification	NO Pressure	Urbanization
Alpine	1%	44%	10%	3%	5%	24%	13%
Atlantic	2%	21%	5%	10%	17%	13%	33%
Boreal	35%	16%	1%	43%	4%		1%
Continental	0%	24%	18%	4%	13%	17%	23%
Mediteran	0%	46%	5%	3%	16%	2%	28%

1950-1990

BIOGEO region	Abandonment	Afforestation	Deforestation	Drainage	Intensification	NO Pressure	Urbanization
Alpine	1%	37%	7%	2%	6%	34%	13%
Atlantic	2%	20%	5%	11%	19%	13%	31%
Boreal	36%	18%	1%	41%	4%		1%
Continental	1%	24%	20%	5%	15%	16%	21%
Mediteran	0%	45%	10%	4%	15%	1%	24%
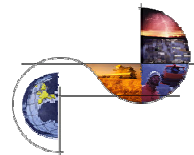
How does stratification work?

**Auxilliary variable for deforestation**: Area of forest clearcut in ha

AT09 **BE209** **ES79** **FI8** **FR206**

- Using BRME for stratification reduced varability in land cover
- Using umbrella habitats reduced variabllitiy in land cover
- Stratification of pressures to BMRE were less successfull
- For each variable of interest or pressure a specfic stratification rules is required

STDV: 1704 ha

STDV: 161 ha

STDV: 25 ha

STDV: 455 ha

Stratification by proportion of forest
Stratification by umbrella habitat
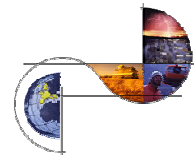
Representativity analysis
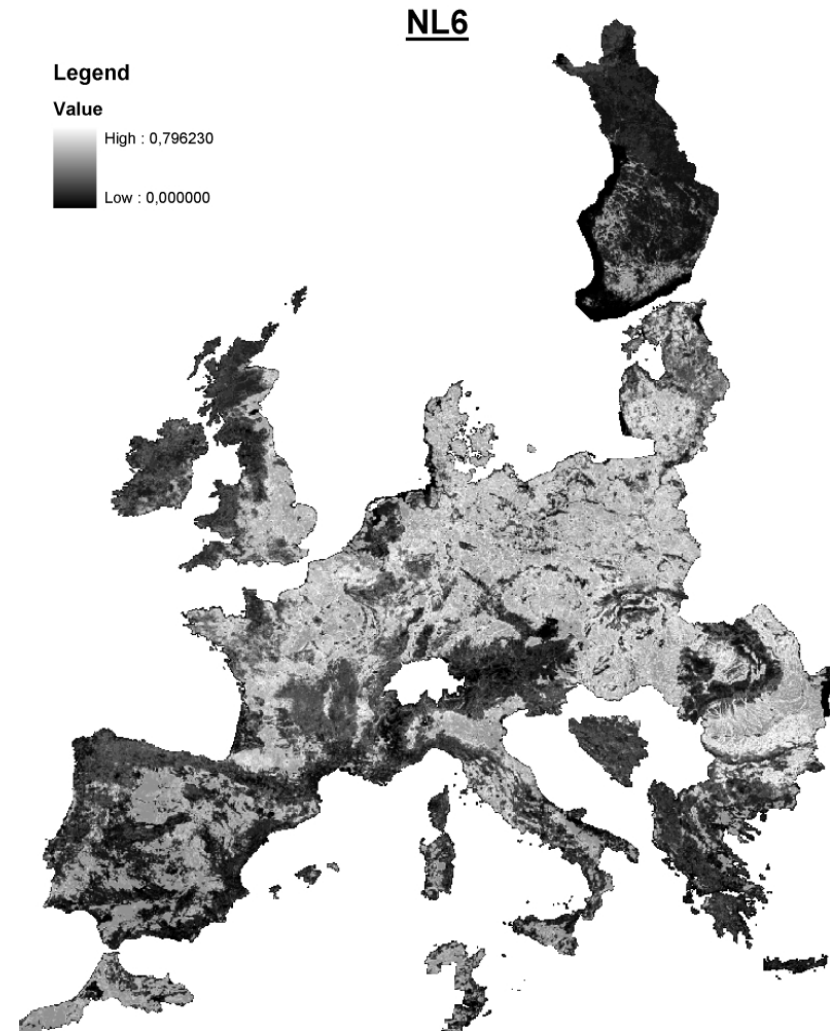
Quality assurance
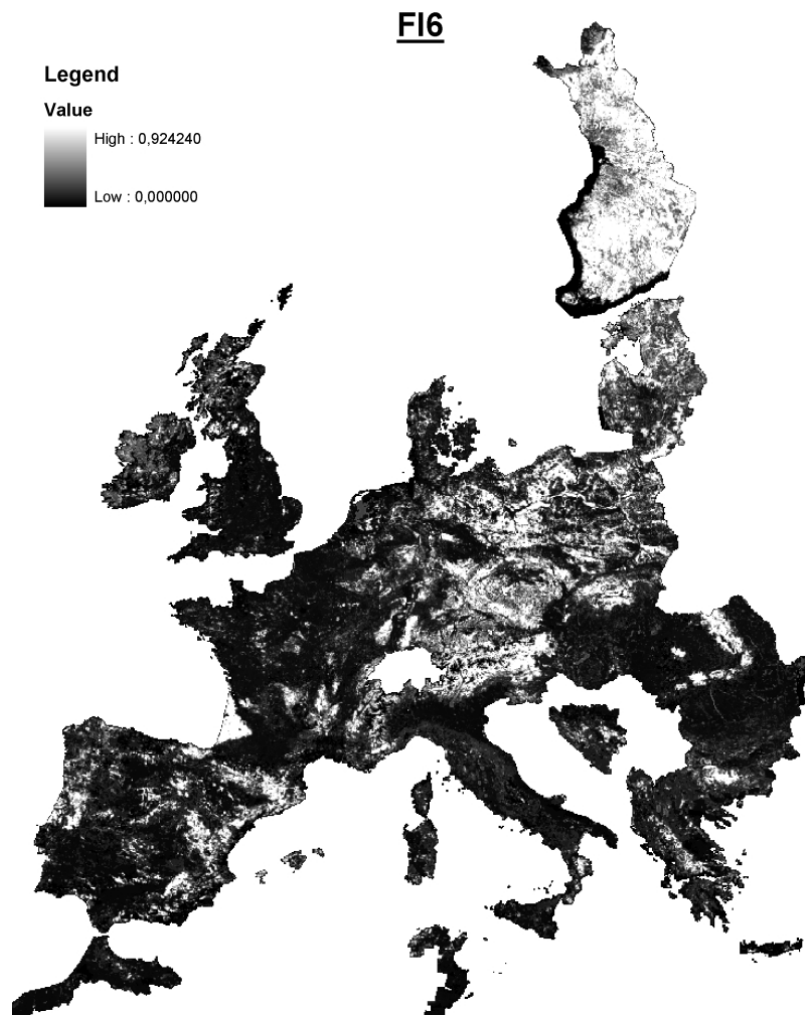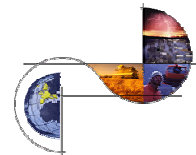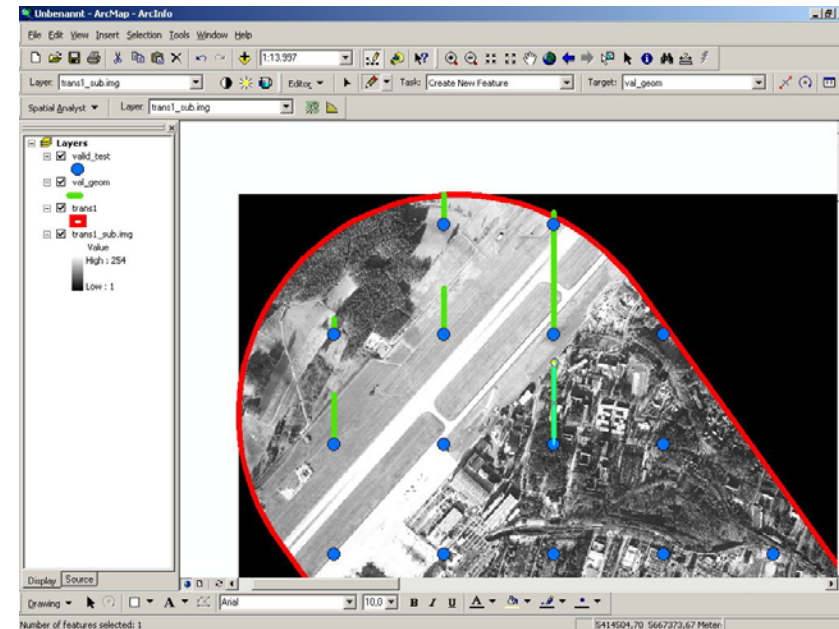
- Missing of verification source for 1950 ies
- 18 transects: sample validation
- 6 transects: full cover reinterpretation
- Windows partly reinterpretated
- Feedback from local experts

Consistency % ▉ good (>= 90%)   ▉ Bad (< 50%)

	LC 50			LC 90			LC 00		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
Continental	89%	80%	52%	92%	82%	57%	90%	79%	50%
Atlantic	89%	74%	54%	88%	76%	55%	89%	78%	56%
Mediterran	92%	83%	39%	93%	87%	37%	93%	88%	37%
Alpine	94%	75%	50%	95%	81%	53%	94%	82%	55%
Boreal	94%	91%	59%	94%	87%	57%	95%	88%	56%

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