EAGLE : concepts and implementation

Geoff Smith

Stephan Arnold and EAGLE Group
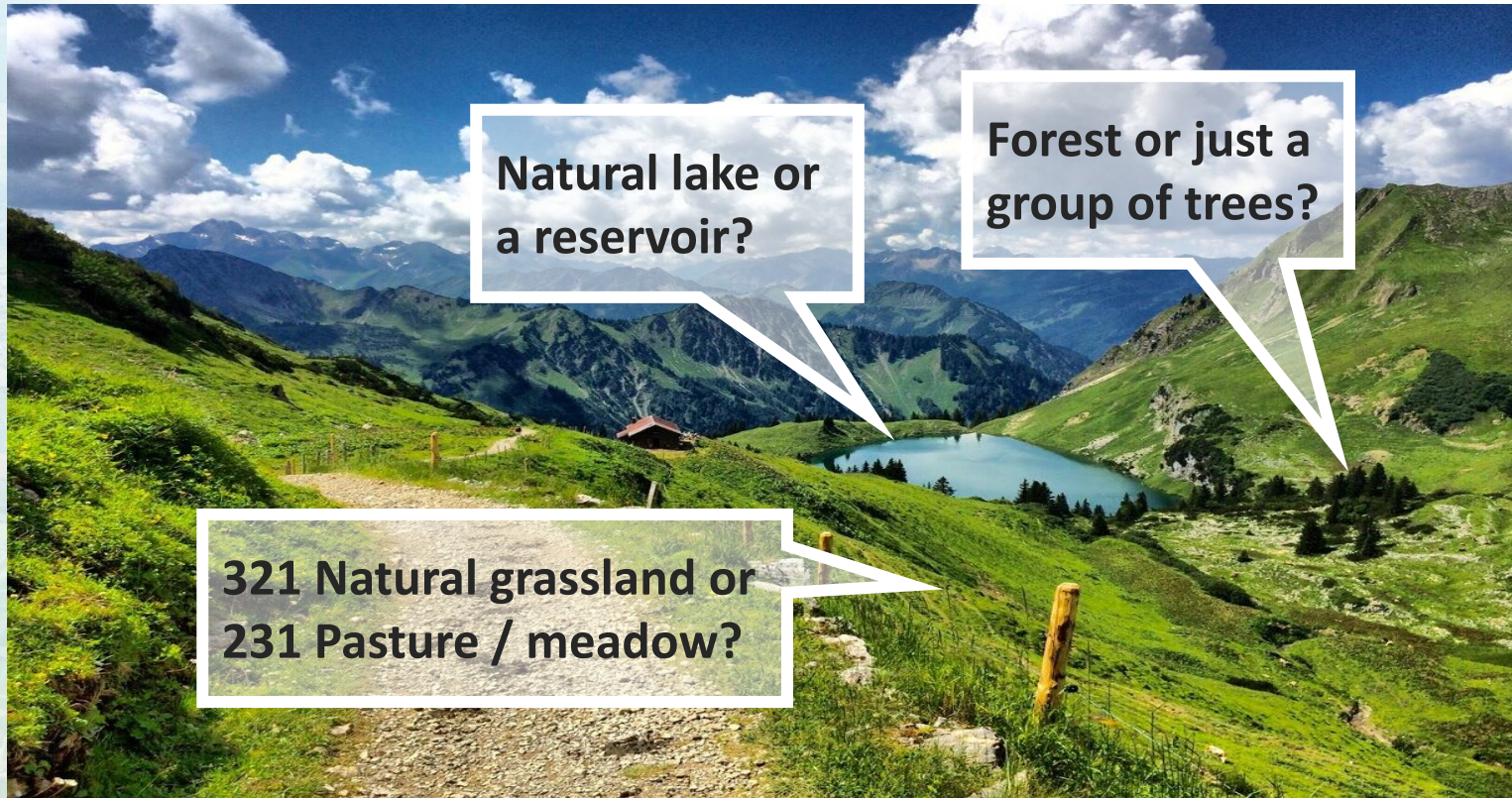
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112 Discontinuous urban area?

Fence

141 Green "urban" area, or 324 Shrubs?

311 Broadleaved forest or 411 / 412 Wetland type?

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Crown cover density [%]

Source: Comber et al. (2005)

Minimum tree height in [m]

From classification to object-oriented description

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Characterization

- **Growth form**
  - **Homogeneous**
  - **Heterogenous**
- **Growth density**
  - **Closed**
  - **Sparsely**
- **Soil condition**
  - **Wet**
  - **Dry**
  - **Acidic**
- **Use / Function**
  - **Pasture**
  - **Recreation**
  - **Sport**
  - **Air traffic**
- **Ecosystem type**
  - **Wetland, swamp**

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- Description of landscape unit is challenging

- Broad variety of applications of LC/LU data

  => various different classification systems
     (on national or European level)

- Effects:

  – Emphasises on specific feature type groups

  – Incomplete mixture of LC and LU classes

  => Lack of comparability between definitions hamper exchange of information between nomenclatures and datasets

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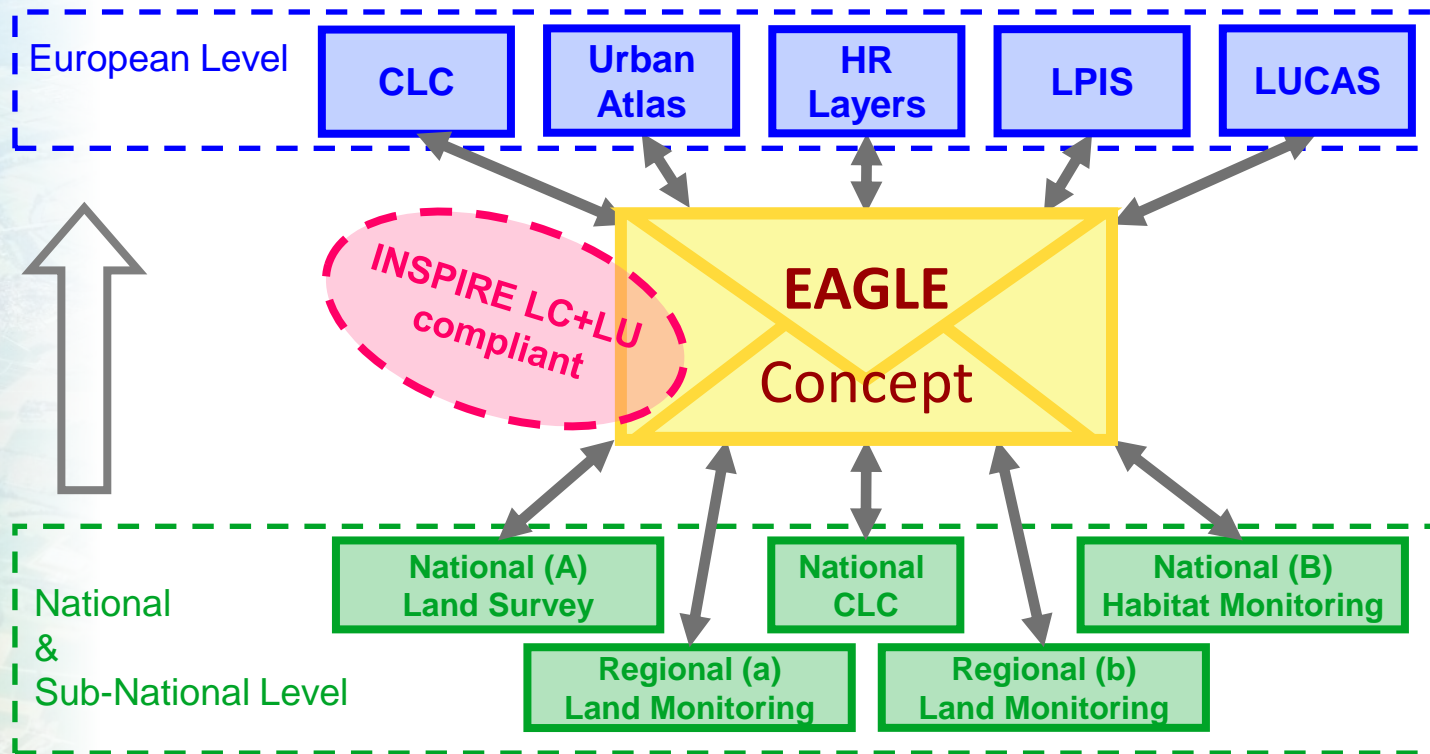Copernicus
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- Initiated by group of NRCs, LM experts & EEA

- Shift from classification to descriptive characterisation

- Agree on voluntary common specifications

- Put into practise bottom up / top down approach

- Respond to advancing requirements on LC / LU data for smart and sustainable decision making in Europe

- Develop a future-oriented, flexible and multi-purpose concept for harmonised Land Monitoring Framework

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- Clear separation between LC and LU

- Complete coverage of themes LC and LU

- Object-oriented description instead of classification

- Modelling of temporal phenomena

- Scale independent

- Applicable on national & European levels

- Backwards compatibility

Information on landscape described with three separate blocks:

I.) LAND COVER Components – LCC
Abiotic (Artificial + Natural), Vegetation, Water Surfaces

II.) LAND USE Attributes – LUA
Agriculture, Forestry, Mining, Residential, Transportation etc.

III.) CHARACTERISTICS – CH
spatial pattern, bio-physical parameters, cultivation measures, land management practices, status/condition etc.
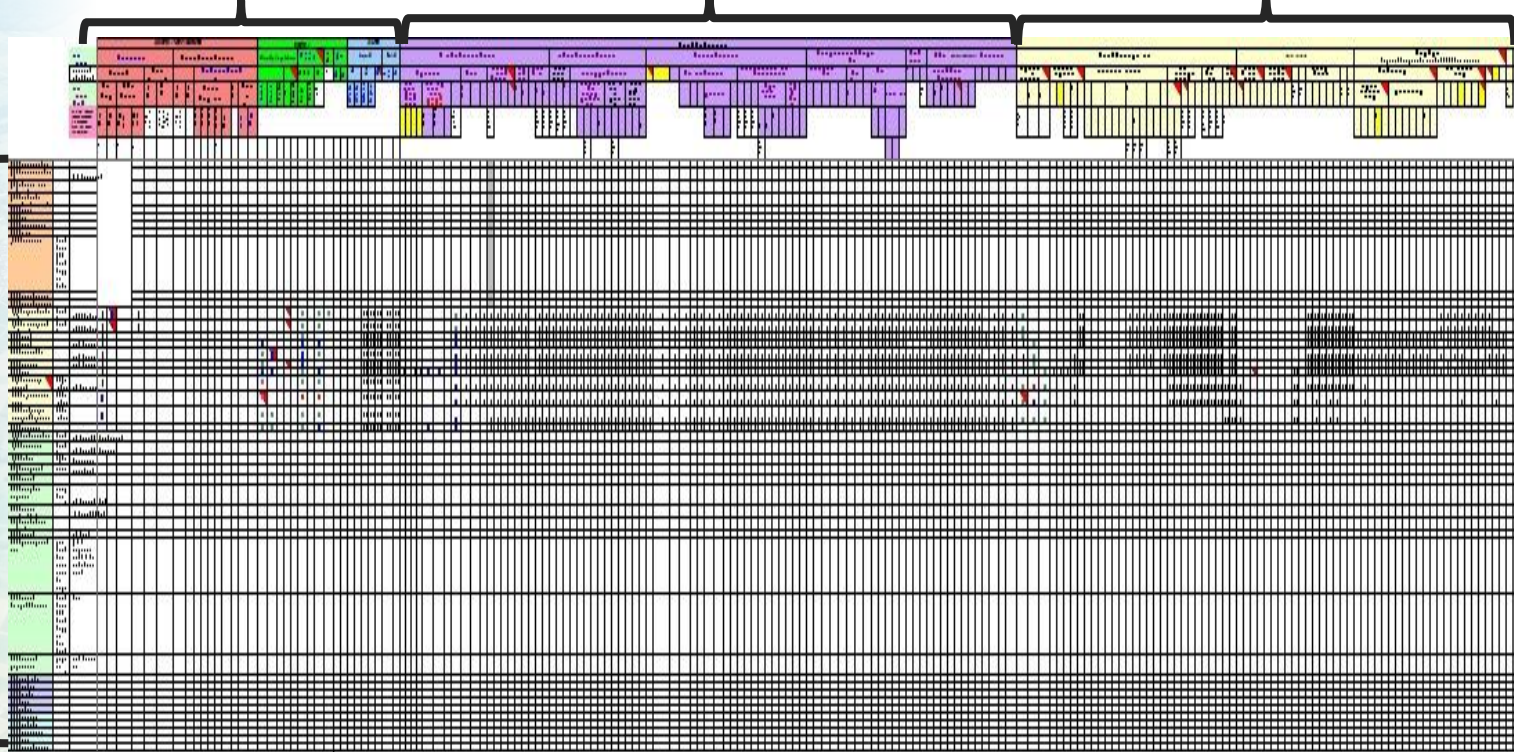
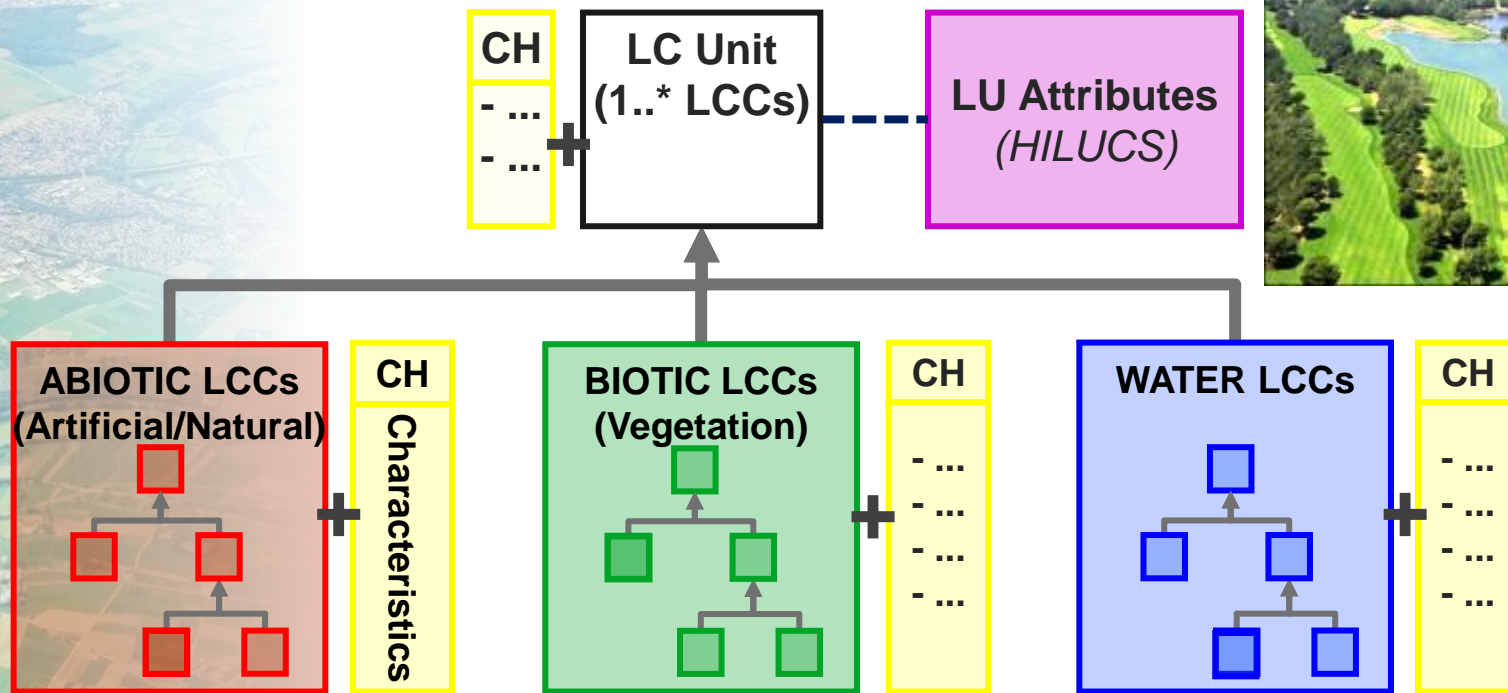Land
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I. LCC block

II. LUA block

III. CH block
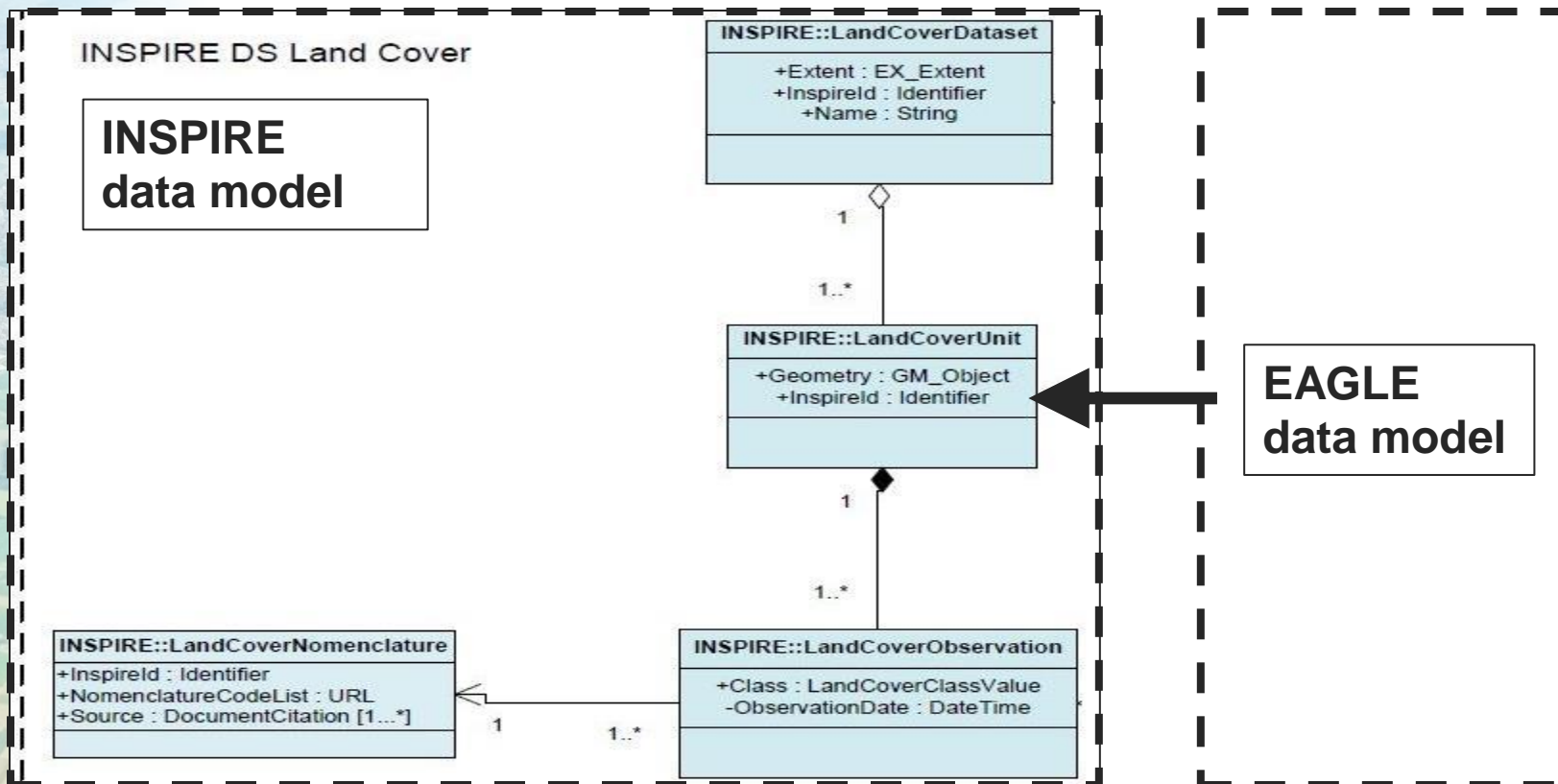
CLC classes

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CH
- ...
- ...

**LC Unit
(1..* LCCs)**

**LU Attributes
*(HILUCS)***

**ABIOTIC LCCs
(Artificial/Natural)**

CH

Characteristics

**BIOTIC LCCs
(Vegetation)**

CH
- ...
- ...
- ...
- ...

WATER LCCs

CH
- ...
- ...
- ...
- ...

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INSPIRE DS Land Cover

INSPIRE data model

EAGLE data model

INSPIRE::LandCoverDataset
+Extent : EX_Extent
+InspireId : Identifier
+Name : String

1

1..*

INSPIRE::LandCoverUnit
+Geometry : GM_Object
+InspireId : Identifier

1

1..*

INSPIRE::LandCoverNomenclature
+InspireId : Identifier
+NomenclatureCodeList : URL
+Source : DocumentCitation [1...*]

1

1..*

INSPIRE::LandCoverObservation
+Class : LandCoverClassValue
-ObservationDate : DateTime

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INSPIRE
data model

EAGLE Matrix population & comparison tool

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Nomenclature	Land Use / Cover Area Frame Survey	Urban Atlas	
Code	A10	11100	
Class	Roofed Built-up Area	Continuous Urban Fabric (S.L. > 80%	

Mandatory	**Buildings** Primary Production Sector Industries (Secondary Sector) Services (Tertiary Sector) Transport Networks, Logistics, Utilities	**Conventional Buildings** Permanent Residential Other Residential AND **Open Sealed Surfaces** Road Network (Incl. Parking Lots)	
Optional		**Specific Buildings** Residential Transport Networks, Logistics, Utilities **Inland Water** Urban Greenery And Parks	**Woody** Urban Greenery And Parks **Herbaceous** Urban Greenery And Parks **Succulent and Others** Urban Greenery And Parks **Mosses Lichens** Urban Greenery And Parks
Excluded	**Other Constructions** Biotic / Vegetation		

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- Hungarian bottom-up CLC generation: Creation of CLC-classes out of national data sources through EAGLE concept

- German DLR: Extension of EAGLE model´s artificial surfaces for hyperspectral urban surface recognition

- German land surveying authorities: Semantic Analysis of the Feature Type Catalogue "Recent Land Use", preparations for separate "land cover" module

- Rhineland-Palatinate [DE]: "NatFlo", Ministry of Environment: Remote sensing based landscape objects for nature protection and habitat database

- North-Rhine-Westfalia Environmental Agency: "NUMO NRW", Nature and Environmental Monitoring for multi-purpose reporting

- IIASA: Comparison of OpenStreetMap land use types with EAGLE

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Technical specifications for the implementation of a new land-monitoring concept based on EAGLE.

- EEA & DG GROW funded.

- Information engine at the core built on the EAGLE data model.

Thank you very much for your attention!

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