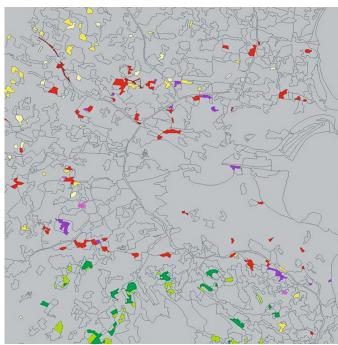


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CLC 2006 map of Dublin (IE) and the corresponding change map (meaning of colours on change map: red patches = urban sprawl, magenta = new industries, yellow = arable land - pasture rotation, green = forest management)















European Commission











Introduction

Following three previous surveys in 1990, 2000 and 2006, the 4th CORINE Land Cover (CLC) inventory in Europe (CLC 2012) took place under the auspices of the pan-European component of GIO land.

CLC was specified in the 1980s to standardise data collection on land in Europe, in order to support environmental policy development. CLC data provides information on the biophysical characteristics of the Earth's surface. Images acquired by Earth Observation satellites are used as the main source data to derive land cover and land use information. The implementation of CLC follows a bottom-up approach, meaning that national teams produce the database for their own country, and this data is integrated at European level. Project management is provided by the European Environment Agency (EEA) and 39 countries participated in CLC2012.

Despite limitations in spatial resolution, CLC has become the primary spatial data source on land for the EEA. It is widely used for indicator development, environmental modelling and land cover/land use change analysis in the European context. Other Commission Services (e.g. DG Environment, DG Agriculture) also rely on CLC. Page-view statistics show that CLC is one of the most popular EEA databases.

1. Technical specification

The basic parameters of CLC have not changed during its lifetime, thus maintaining comparability between consecutive inventories. $\frac{1}{2} \int_{-\infty}^{\infty} \frac{1}{2} \int_{-\infty$

These include:

- Minimum mapping unit (MMU): 25 ha (status layer), 5 ha (change layer)
- Minimum width of linear elements: 100 m
- Nomenclature: standard European level-3
- Positional accuracy: better than 100 m
- Thematic accuracy: > 85%
- Equivalent scale: 1:250,000 (status layer),1:100.000 (change layer)

2. Nomenclature

The CLC nomenclature is hierarchical, including three levels of thematic detail in five major groups:

- (1) artificial surfaces
- (2) agricultural areas
- (3) forests and semi-natural areas
- (4) wetlands
- (5) water bodies

In addition to pure land cover classes, the nomenclature includes land use classes, while some classes have a mixed land cover/land use character. Altogether there are 44 classes on level-3.

3. Methodology

Photo-interpretation was applied by the countries to derive the CLC status layer in the 1990s, as well as the first CLC change layer. In most countries, computer assisted photointerpretation was the main tool used to update CLC. The recommended methodology was to map the changes directly on screen using satellite images taken in the year of the old and new status layers and the CLC of the previous status layer. The new CLC status layer is derived by adding together the CLC change and the old CLC status layers.

The aim is to map the real land cover changes that:

- are larger than 5 ha and wider than 100 m;
- occurred between the old and new inventories;
- reflect real evolution processes (e.g. urban sprawl, new forest plantation, forest fire damage, etc.).

An interpreter gives two CLC codes to each change polygon: code_old and code_new. These codes must represent the land cover status of the given polygon in the two years for which mapping is done.

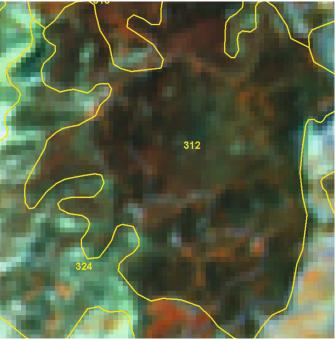
A change code pair thus shows the process that occurred in reality.

To reduce the human workload and increase reliability, new methodologies are under development to derive CLC in a semi-automatic way. These are based on the following data or technologies in certain countries:

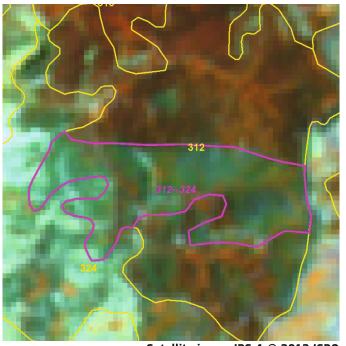
- Up-to-date land use information (FI, IS, NO, SE)
- LPIS and forestry service data (FI, IE, NO, SE)
- Forest classes, derived by regression estimation based on satellite imagery (FI)
- Automatic generalisation of high resolution national land monitoring data (DE, ES)

4. Change analysis

Users interested in CLC changes should always rely on the corresponding CLC change product and not on the difference (intersect) of the two status layers. The CLC change product includes the real land cover changes mapped at the higher resolution of 5 ha MMU, while the intersect includes the difference between two generalised, lower resolution datasets with 25 ha MMU.



Satellite image IRS-1 © 2006 ISRO



Satellite image IRS-1 © 2012 ISRO

CLC change mapping of forest loss (probably a non-recent fire, Samos island, GR). Upper image: IMAGE2006 overlaid by CLC2006.

Lower image: IMAGE2012 overlaid by CLC2006 and CLC-Changes(magenta).