



European Topic Center
Terrestrial Environment

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European Environment Agency



Training on CLC2000 change mapping in Serbia and Montenegro

Mission Report

**Belgrade, Serbia
(EvroGeomatica)**

**Podgorica, Montenegro
(Geological Survey of Montenegro)**

6-13 March 2006

Ref.: Training Mission Report 1/2006

20th March 2006

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1. Activities linked to the preparation of the mission

In Serbia and Montenegro CLC2000 is implemented under the CARDS programme. As 3.2 point of the Technical Annex of the project states: 'as the national team of Serbia and Montenegro has no previous experience in the development of a CORINE land cover database, a more intensive training compared to other countries will be necessary to ensure the correct execution of the project.' In compliance with this plan, the 3rd pair of training missions by the CLC2000 Technical Team (TT) were undertaken between 6-10 March 2006.

Previously a general training on CLC2000 and the specific photointerpreters' training on using software InterView (developed by FÖMI) were held by TT in Serbia and Montenegro. The aim of the recent training was to get acquainted with principles of change mapping and gaining practice in the use of InterChange software (also developed by FÖMI). Similarly to earlier missions, separate courses were held in Serbia and in Montenegro.

Dragutin Protic technical project manager (Beograd) and George Büttner project coordinator have agreed on the agenda of the course. IMAGE90 has been prepared by Dragutin Protic for both parts of the team (Serbian and Montenegrin).

2/A. Mission Agenda (Serbia)

Place of the verification mission: an office long-term rent by EvroGeomatica in Beograd, Pijaca Kalenic, Serbia

6th March 2006

09.00 – 13.00

Presentation of lectures (GB):

- Theoretical basis of change mapping
- Practical examples of changes from all over Europe
- Overview of the InterChange software

14:00-18:00

Using InterChange (BK)

- Systematic introduction to the InterChange programme
- Setting up a project file (different areas for each interpreter) and starting to get acquainted with change mapping and the software tool.

7th January 2006

09.30 – 16.00

Practical work on change mapping with consultation with TT members.

3/A. Participants (Serbia)

The following experts participated the meeting:

From the Serbian national team:

- Dragutin Protic, technical manager
- Slaven Tomic, photointerpreter
- Aleksandar Maric, photointerpreter
- Stasa Majstorovic, photointerpreter
- Mladen Simic, photointerpreter
- Slobodanka Delic, photointerpreter

From the CLC2000 Technical Team:

- Barbara Kosztra (BK)
- George Büttner (GB)

4/A. Summary conclusions of the training (Serbia)

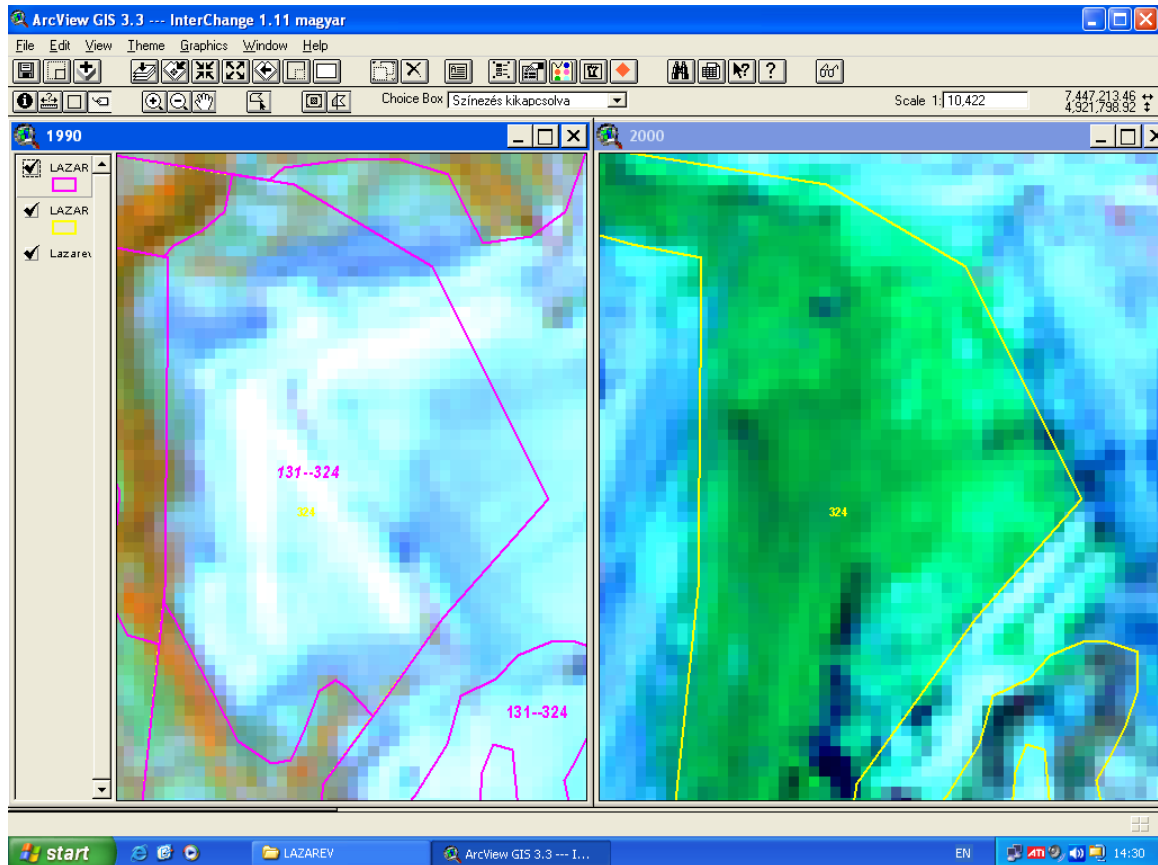


Figure 1: Example of a CLC-change in Serbia: recultivation of a mineral extraction site (131-324)

Left: IMAGE90 with the change area outlined in magenta (area is 90 ha), right: IMAGE2000 with CLC2000 in yellow.

The Serbian team is going to map changes by back-dating. This means that after completing CLC2000, changes will be derived backward in time using IMAGE90. Four interpreters worked on four different mapshets (Lazarevac, Kragujevac, Zrenjanin, Pozarevac) during the training. The following conclusions were made:

- The team learnt very easily the use of InterChange because of the similarity to InterView, used already for mapping CLC2000.
- There are several land cover changes in Serbia, some of them having very large area: urbanisation, forest clear-cutting and growth, mining activities, etc. (Figure 1)
- Although CLC2000 is of good quality, several inconsistencies were found by just looking at IMAGE90. Interpreters appreciated InterChange's feature of allowing correction (revision) of CLC2000 any time during the backdating process.
- Interpreting 'changes' coming from seasonal differences in land cover (e.g. differences in forest canopy density) or from differences of image enhancement has to be avoided. The exact date of satellite images must be known by the interpreters and they should be aware of seasonal effects.

2/B. Mission Agenda (Montenegro)

Place of the verification mission: Geological Survey of Montenegro: Cetinski put bb 81000 Podgorica.

8th March 2006

09.00 - 17.00

Presentation of lectures (GB):

- Theoretical basis of change mapping
- Practical examples of changes from all over Europe
- Overview of the InterChange software

Using InterChange (BK)

- Systematic introduction to the InterChange programme
- Setting up a project file (different areas for each interpreter) and starting to get acquainted with change mapping and the software tool

9th March 2006

08.30 – 13.00

Practical work on change mapping with consultation with TT members

13.00 – 21.00 Field trip

10th March 2006

08.30 – 13.00

Practical work on change mapping with consultation with TT members

3/B. Participants (Montenegro)

The following experts participated the meeting:

From the Montenegrin national team:

- Slobodan Radusinovic, technical manager
- Neda Devic, photointerpreter
- Bozica Jovanovic, photointerpreter
- Tijana Danilovic, photointerpreter

From the CLC2000 Technical Team:

- Barbara Kosztra (BK)
- George Büttner (GB)
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4/B. Summary conclusions of the training (Montenegro)

Like the Serbian team, the Montenegrin team is also going to map changes by back-dating. This means that after finishing CLC2000, changes will be derived backward in time by using IMAGE90. Three interpreters have worked on different mapshets during the training (Change mapping: Niksic, Gacko, Danilovgrad, discussion on difficulties of CLC2000: Podgoriva, Ivanograd, Ulcinj). The following has been concluded:

- The team learnt very easily the use of InterChange software because of the similarity to InterView, used already for mapping CLC2000.
- Based on the map sheets examined during the mission, there are only limited number of changes in Montenegro, covering not too large areas.
- Although CLC2000 is of good quality, several inconsistencies were found by just looking at IMAGE90. Interpreters appreciated InterChange's feature of allowing correction (revision) of CLC2000 any time during the backdating process.

- The use (or not use) of some of the classes have been discussed, e.g.:
 - 244 (agroforestry) is not likely to be relevant in the country.
 - The existence of class 241 in Montenegro must be checked on the field.
 - 322 (moors and heathland) is not likely to be relevant in Montenegro (check with botanists)
 - Burnt natural areas (334) should be dark on the image, meaning a recent burnt.
 - The geobotanical map of Montenegro (found in a standard Atlas) could be used for orientation in defining in which areas should interpreters consider the application of Sclerophyllous vegetation class (323).
- Interpreting 'changes' coming from seasonal differences in land cover (e.g. differences in forest canopy density) or from differences of image enhancement has to be avoided. The exact date of satellite images (1990 and 2000 as well) must be known by the interpreters and they should be aware of seasonal effects..

4B.1 Field trip

The half day field trip, aimed at checking the interpretation of some of the problematic classes had the following itinerary: Podgorica – Virpazar – Petrovac – Bar – Ulcinj – Bojana – Podgorica. The following classes have been studied on the field:

- Wetlands close to the Skadar lake
- Separation of 112 and 242 classes
- Olive groves (223) along the coast (see images on next page)
- Sclerophyllous vegetation (323) on slopes near the coast

5. Difficulties encountered during the mission and proposed solutions

No difficulties were encountered.

6. Materials collected

A few examples of typical changes were collected. Field photos were taken.

7. Summary of actions to be undertaken

- Send the “minimum” specification requirement with regard to ESRI tools to Ivan Nestorov (**GB**)
- Provide this “minimum” set of ESRI GIS tools at both locations (Beograd, Podgorica) (**Nestorov**)
- Provide the exact date of satellite images (IMAGE90, IMAGE2000) to the photointerpreters (**Protic**)
- Assist Montenegrin team to produce a georeferenced “boundary line” for Sclerophyllous vegetation by using the small scale geobotanical map found in the national Atlas (**Protic**)

8. Next foreseen missions in the country

According to 3.2 point of the Technical Annex of the project: ‘As the national team only has limited GIS experience with ESRI products it will be necessary to give training on GIS and ESRI tools.’ It was agreed with Ivan Nestorov local project manager that EvroGeomatika will provide the necessary ESRI tools (specified by the Technical Team) in order to organise such a training in Beograd (with participant(s) from Montenegro) as soon as possible. Main issues that should be covered are as follows:

- Checking of database topology on map sheet level;
- Merging adjacent map sheets into a seamless database;
- Production of CLC90 using CLC2000 and CLC-Change;
- Production of deliverables according to specification.

Other activities foreseen are the 2nd verification missions, when 100% of CLC2000 and 50% of CLC-changes will be completed.

Both missions are expected during spring 2006.

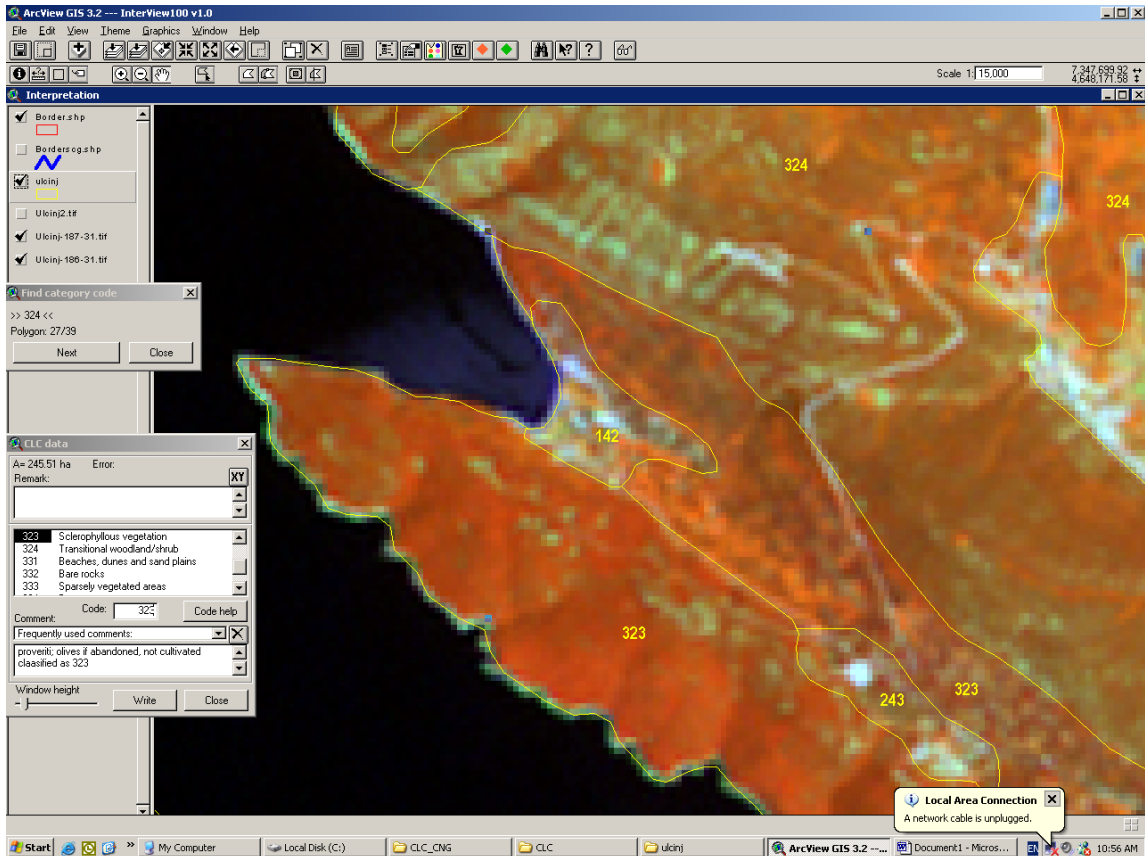


Figure 2. IMAGE2000 overlaid by preliminary CLC2000. For explanation see caption for *Figure 3*.



Figure 3. Former army holiday resort, recently opened to the public near Ulcinj. On the opposite hillside sclerophyllous vegetation (323), while on the nearby slope a big olive plantation (223) can be seen. The olive plantation is mostly cultivated, although some wild parts (to be mapped as 323) are also found on higher altitudes. Interpreter should ask local farmers which parts were cultivated in 2000, as this is impossible to tell based only on the satellite images. The same location is seen on IMAGE2000 satellite image on *Figure 2*.