



European Topic Center
Terrestrial Environment

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CLC2000 Training in Montenegro Mission Report

Podgorica, Montenegro

(Geological Survey of Montenegro)

11th – 16th October 2005

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Submitted by: J. Feranec and B. Kosztra

ETC-TE / Universitat Autònoma de Barcelona

Torre C5-S, 4a planta

Edifici C - Facultat de Ciències

Universitat Autònoma de Barcelona

08193 Bellaterra (Barcelona)

Spain

Tel. Secretariat: + 34 93 581 3518

Direct Tel.: + 34 93 581 3519

Fax.: +34 93 581 3545

<http://terrestrial.eionet.eu.int>

1. Activities linked to the preparation of the training

The mission in Montenegro (CG) was the 29th training mission undertaken by the ETC-TE CLC2000 Technical Team (TT). Two TT experts participated to the mission: Jan Feranec (JF) and Barbara Kosztra (BK).

Details of the contract and the training agenda have been discussed and agreed in June during a visit by Stefan Kleeschulte ETC-TE manager and George Büttner (GB) CLC2000 TT coordinator to main contractor, EvroGeomatika, the Serbian company responsible for the realisation of the project. Training on CLC2000 was held for EvroGeomatika in Belgrade on 1-6 July 2005. Representative of Geological Survey of Montenegro participated that training as well.

Due to different natural conditions in the two parts of the country, a separate training course was organised in Montenegro.

2. Context of the CLC2000 project in Serbia and Montenegro

CLC2000 in Serbia and Montenegro (SCG) is implemented under the CARDS programme. The project is fully funded by EEA (i.e. without financial contribution from SCG). The country has been previously asked to contribute to the project by providing easy access to the necessary support materials, like topographic maps, Digital Terrain Model (DTM) and aerial photographs. National team includes a part in Serbia (Beograd, EvroGeomatika) and a part in Montenegro (Geological Survey of Montenegro, Podgorica). A previous preparatory mission (September 2004) revealed, that there is no significant satellite photointerpretation expertise exist in the country, therefore a longer, non-standard training session was to be organized. Interpretation training has been carried out for the Belgrade team on 28th August – 2nd September 2005.

The ETC-TE and its CLC Technical Team leads and ensures the project implementation. EvroGeomatika is responsible for the formation of a national team and the correct execution of the national activities. EvroGeomatika should establish a subcontract with the Geological Survey of Montenegro for the realisation of the work in Montenegro. In addition to produce seamless databases (CLC2000, CLC90 and CLC-change) for Montenegro, merging of the Serbian and Montenegrin parts (to yield seamless databases for Serbia and Montenegro) also constitutes the work of the Montenegrin partner.

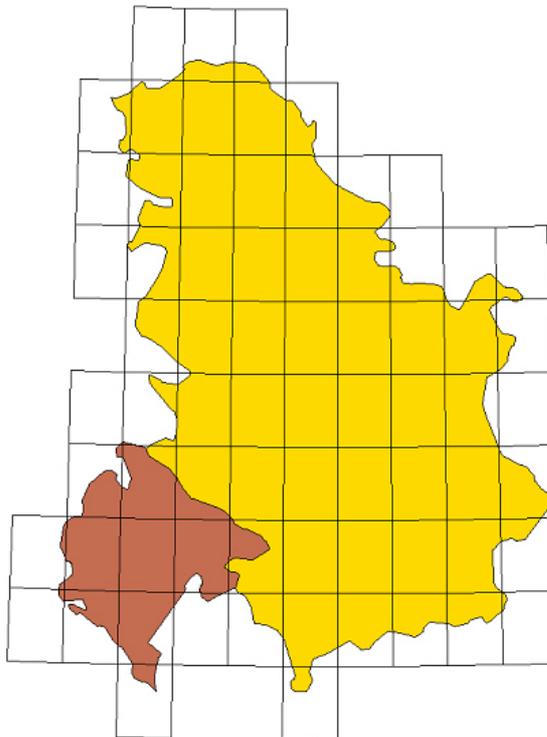


Fig. 1. Working units at scale 1:100.000 in Serbia (yellow) and Montenegro (brown)

3. Training Agenda

Place of the meeting:

Geological Survey of Montenegro, Cetinjski put bb, 81000 Podgorica, Montenegro

12th October 9.00 – 18.00

- Welcome (Vladan Dubljevic, director)
- Overview of project and tasks (JF, BK)
- Basics of CORINE Land Cover (BK)
- CLC2000 nomenclature – Part I. (JF)
- Examples from European validation (BK)

13th October, 9.00 – 18.00

- CLC2000 nomenclature – Part II. (JF)
- Examples from European validation (BK)
- Practical exercise: interpretation of satellite image hardcopy with traditional method (JF, BK)

14th October, 9.00 – 18.00

- Project organisation (BK)
- Introduction to use of interpretation software InterView
- Field work (JF)
- Field trip to nearby mountain area West of Podgorica (Podgorica – Beri – Kruse – Drazevina – Brezine – Podgorica)

15th October, 9.00 – 18.00

- Field trip (Podgorica – Golubovci – Vranjina – Petrovac – Budva – Cetinje – Podgorica) to compare photointerpretation results with real land cover classes

16th October, 9.00 – 12.00

- Introduction of field trip results using Interview
- Discussion on project organisation and division of tasks within the team

4. Participants

The following experts participated the training:

- Neda Devic (Geological Survey of Montenegro)
- Bozica Jovanovic (Geological Survey of Montenegro)
- Dragan Radojević (Geological Survey of Montenegro)
- Slobodan Radusinovic (Geological Survey of Montenegro)
- Tijana Danilovic (Geoprojekt, d. o. o. Podgorica)
- Milan Radulovic (student, Faculty of Mining and Geology)

Welcome and overview of tasks meeting was hosted and led by Vladan Dubljevic, director of Geological Survey of Montenegro.

Participants on CLC2000 Technical Team side:

- Jan Feranec (IG SAS / IGN FI)
- Barbara Kosztra (FÖMI)

5. Practical exercises

5.1 Photointerpretation

As participants had no previous experience with photointerpretation it was considered important to get acquainted with the traditional way of producing the CORINE land cover database. An area near Podgorica has been selected and printed on hard copy for each participant at scale 1:100.000 (Fig. 2). They had to interpret the area by using topographic maps (1:25.000, see Fig. 3) and the assistance of the Technical Team.

The aim of photointerpretation was to detect and identify characteristic patterns of CORINE land cover classes on satellite image and to register them onto the transparency as land cover polygons.

5.2 Field trips

Two field trips have been organised to the area of photointerpretation exercise in order to see, explain and discuss identified characteristic patterns of land cover classes on the satellite image.

The itinerary of the first field trip was as follows: Podgorica – Beri – Kruse – Drazevina – Brezine – Podgorica). The following CLC classes were shown and explained on the route:

- The class 231 (pastures) represented extensively used grasslands with presence of farm structure – agricultural practices and abandoned arable land (probably after 3 years)
- Small parcels of arable land, orchards, vineyards and grasslands, smaller than 25 ha mixed with significant natural vegetation and somewhere also with very sparse houses (the class 243) at the wide bottom of karstic valley or small villages in mountain areas.
- Areas of natural developmental forest formation (the class 324) – young broad-leaved wood species in abandoned meadows and pastures.

The itinerary of the second field trip was as follows: Podgorica – Golubova – Vranjina – Petrovac – Budva – Cetinje – Podgorica. The following CLC classes were shown and explained on the route:

- The class 121 (industrial and commercial units) – the aluminium factory occurred at the periphery of Podgorica.
- Parcels (smaller than 25 ha) of arable land with annual crops (agricultural crops and vegetables) or permanent crops (mainly vineyards, fruit trees or grasslands) somewhere with scattered houses (the class 242).
- Low productivity natural grasslands in karstic area without agricultural exploitation (the class 321). Vegetation covers more than 50% of the surface.
- Bushy vegetation composed of sclerophyllous species such as *Juniperus oxycedrus* and *Ostrya carpinifolia* represents sclerophyllous vegetation (the class 323).
- Strongly eroded slopes of karstic areas with sparse vegetation (between 10-50 % vegetation cover) should be classified as the class 333 (sparsely vegetated areas).
- Bare rocks with very sparse vegetation – scattered trees, bushes or small spot of grasslands (less than 10% of the surfaces) should be classified as the class 332 (bare rocks).
- The CLC class 411 (inland marsh) was typical for the area around the Skadar Lake (along the N shore).

The results of photointerpretation exercise were corrected during the field trip, after the explanation of every recognized CLC class.

5.3 Photointerpretation software

The SCG team agreed in the use of the InterView100 photointerpretation software developed by FÖMI, running under ArcView 3.x. At the end of the training course the capabilities of the software have been demonstrated. Especially the following functions were shown: delineation of a CLC polygon, splitting a polygon, merging two polygons, giving a code, correcting a code, adding a comment to the polygon, searching for different features in the database, error checking and correction. Finally participants were requested to solve simple tasks with the software, partly based on experience gained during the field trip.

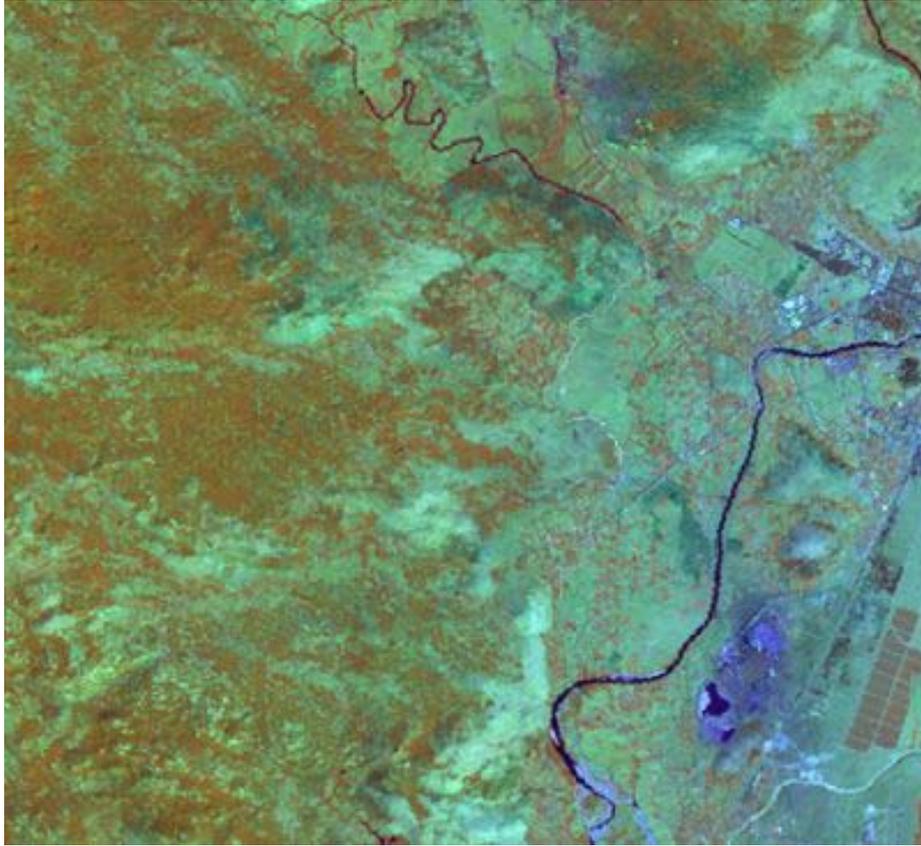


Fig. 2: Part of Landsat TM image of the training area

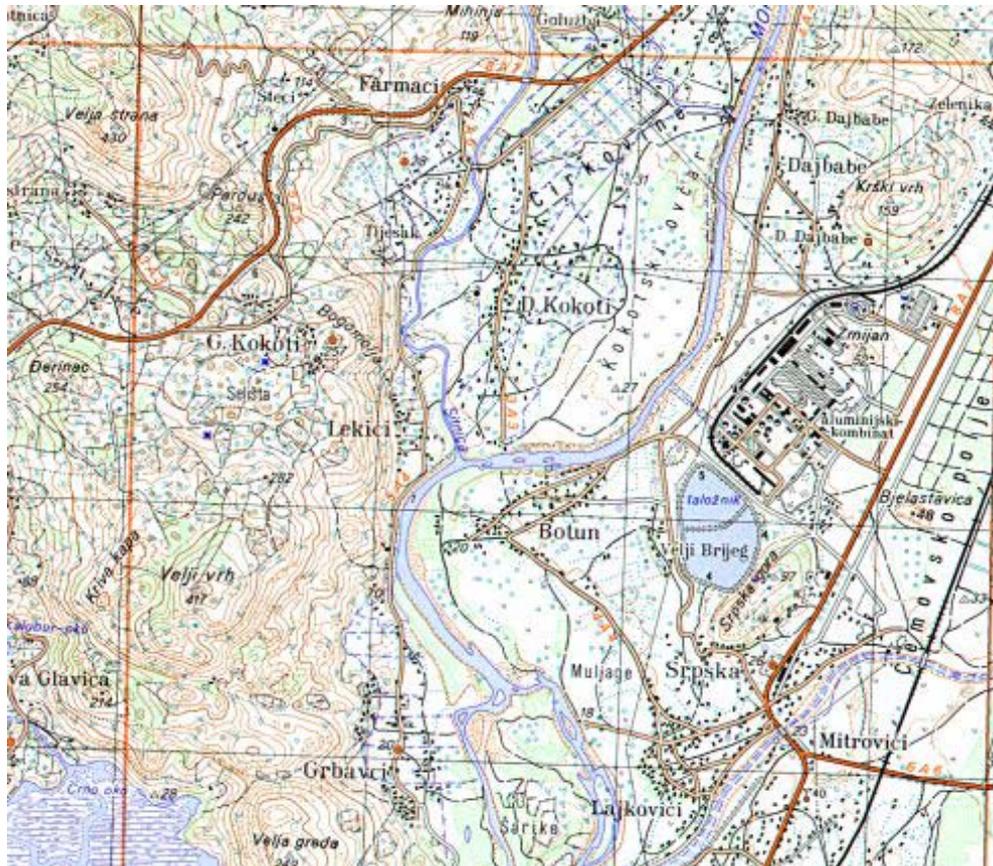


Figure 3: Example of a topographic map at scale 1:25.000 (region South of Podgorica)

6. Recommendations from CLC2000 Technical Team

- The recommended size of the photointerpretation team is no more than 2 members, in order to avoid heterogeneity in data processing.
- It is necessary to choose a single person as contact person between national team and CLC2000 technical team.
- Rural settlements (villages) where the density of houses is not too high (but with distance between houses shorter than 300 m) is difficult to identify only by satellite images. Therefore topographic maps have to be used also.
- In mountain areas, where agriculture exists only on terraces (strip cultivation), special attention should be paid to map this traditional cultivation method wherever it is possible. As these areas are often difficult to locate on satellite image, topographic maps should be used in order to help identification.
- These areas and villages where the distance between houses is more than 300 m should be included into the CLC class 242 or 243, depending on occurrence of natural areas.
- All detailed characteristics of CLC classes are available in the CORINE Land Cover Technical Guide – Addendum 2000.
- National topographic maps proved to be of high quality, although the survey date always has to be considered by the interpreter, and it should not be forgotten that the base of interpretation must be the satellite image.

7. Difficulties encountered during the mission

No special difficulties were encountered.

8. Materials collected

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9. Summary of actions to be undertaken

- Signing of contract between EvroGeomatika and Geological Survey of Montenegro covering all tasks of CLC2000 in Montenegro.
- Setting up the photointerpretation team (provisionally three interpreters were suggested for the job).
- Production of the orthorectified IMAGE2000 and IMAGE90 imagery (by EvroGeomatika) and sending it to Geological Survey of Montenegro in a format, fully suitable for use under InterView.
- Familiarisation with InterView100 programme in order to assure an effective spending of forthcoming practical interpretation training to be held on 1-5 November.

10. Next foreseen mission in the country

- Practical interpretation training in Montenegro is scheduled for 1-5 November 2005.

11. Annexes

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