

Final

Verification of high resolution soil sealing layer- Serbia

- Qualitative assessment -

Prepared by:
Dragutin Protic

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1. Preparatory work

List the experts/expertise that are involved in the verification task:

Expert name	Field of expertise	Institution
Dragutin Protic	Remote sensing, GIS, cartography	Department for Geodesy and Geoinformatics, University of Belgrade
Milan Kilibarda	Remote sensing, GIS, cartography	Department for Geodesy and Geoinformatics, University of Belgrade

2. Reference data

Please list the reference data that is used for this verification:

1. Topographic maps

☐ No

☒ Yes

Year: 1970-1995

Area: Subset

If only a subset, then please specify the area(s):

Sabac-428-1234

Valjevo-478-1234

Kraljevo-530-1234

Cacak-529-1234

2. Aerial orthophotos

☒ No

☐ Yes

Year:

Area: Please, select:

If only a subset, then please specify the area(s):

3. Very High Resolution satellite data

☐ No

☒ Yes

Year: 2003 and later

Area: Subset

If only a subset, then please specify the area(s):

GoogleEarth very high resolution coverage (Digital Globe)

4. CLC2000

☒ No ☐ Yes

5. Other

Name: Year: Area: Please, select:

If only a subset, then please specify the area(s):

Comments concerning the reference data used (if any):

1. Google Earth VHR (very high resolution) imagery served as the main reference data used for the verification. The high resolution soil sealing data of 20x20m original resolution was first aggregated to blocks of 1 ha (100x100m). The pixels that are more than 80% sealed (considered “built-up) were transformed into point vector dataset where the points represent centres of the original pixels of interest. The coordinates of the points were finally transformed to latitude/longitude on WGS84 ellipsoid to be properly projected in Google Earth (Figure 1).
2. Topographic maps in scale 1:25.000 were used in the areas with significant numbers of 100x100m resolution built-up pixels for which no Google Earth VHR imagery existed. However, benefit of topographic maps was limited since they were outdated (most of them are from the year 1970, others from 1995-1998)

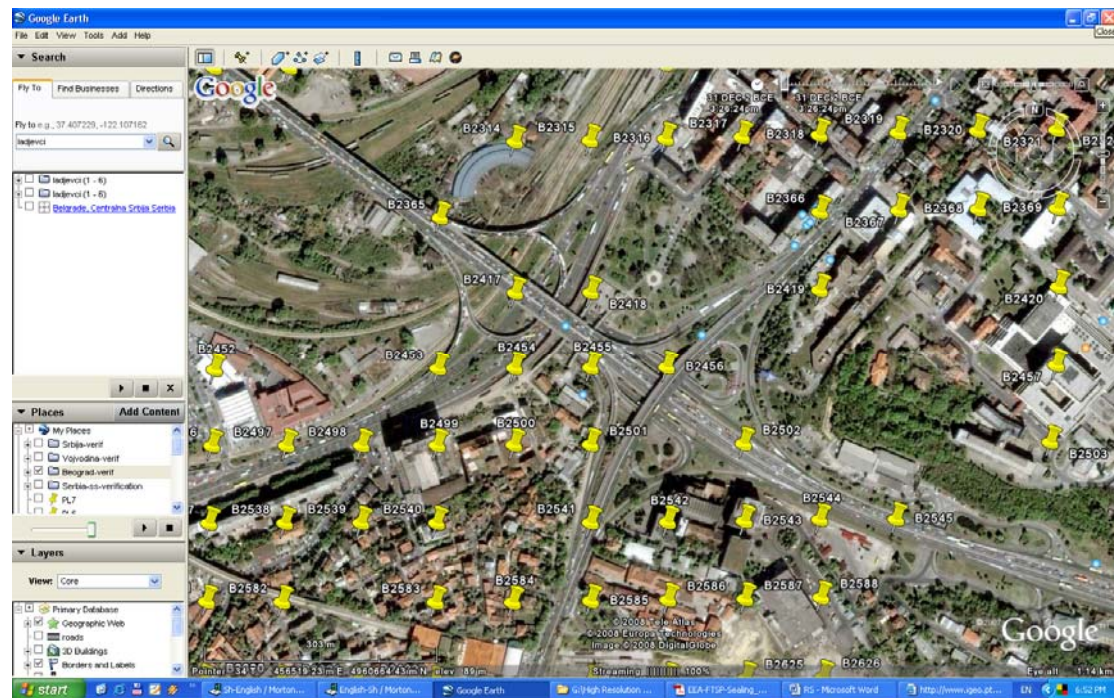


Figure 1. Verification using GoogleEarth VHR imagery: yellow dots represent centres of the 100x100m built-up pixels

B. Geometric quality

Please provide your qualitative assessment of the geometric quality of the data. The objective of this task is to perform a visual analysis of the soil sealing dataset concerning its co-registration when put in overlay with other reference datasets.

1. Check geometric accuracy:

Is there a visible shift? ☐ Yes ☒ No

If yes:

a. Is there a systematic shift? ☐ Yes ☐ No

b. Is there a local shift? ☐ Yes ☐ No

Where?

Please indicate the region, place name, coordinates or other description of location:

2. Is the used projection correct? ☒ Yes ☐ No

3. Comments concerning geometric issues (if any), or in case the geometric quality could not be checked, please provide a short explanation:

C. Thematic quality

Urban fabric:

- a. Did you check if built-up/non built-up areas are correctly mapped within urban fabric (e.g. houses, buildings, streets, etc.)?
- ☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality of the mapped built-up area within the urban fabric?
- ☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent
- a. Short description of errors found (if any): some sporadic omission errors

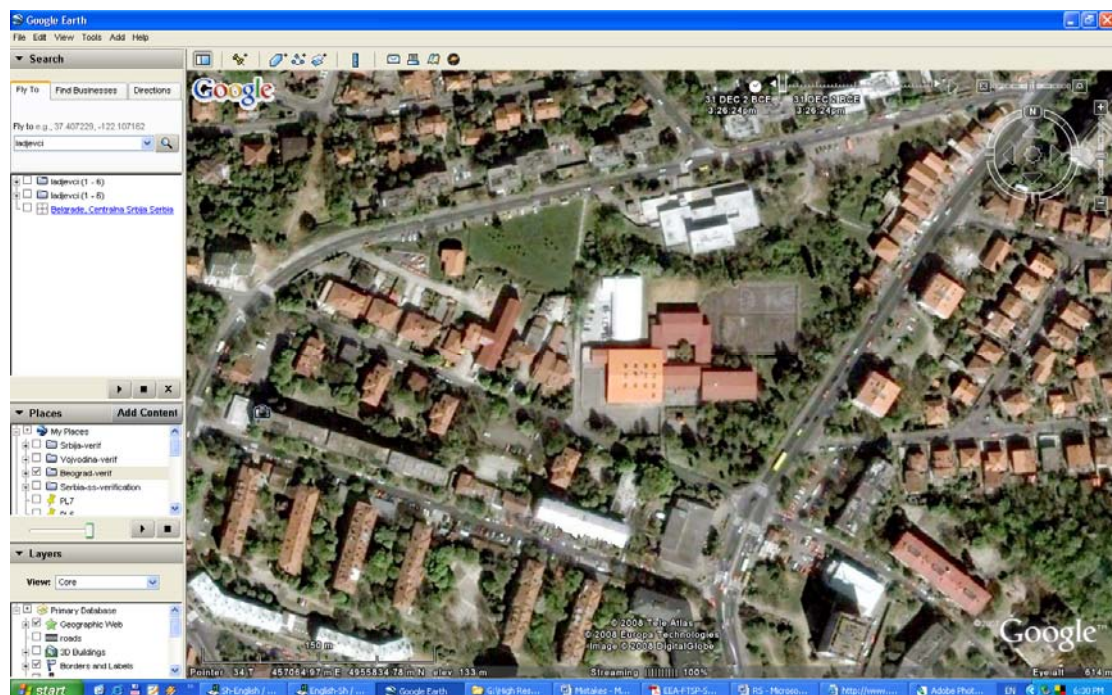


Figure 2. Example of omission error

Industrial or commercial units:

- a. Did you check if built-up/non built-up areas are correctly mapped within industrial or commercial units (e.g. parking lots, buildings, etc.)?
- ☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality?
- ☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent
- b. Short description of errors found (if any): some sporadic omission errors

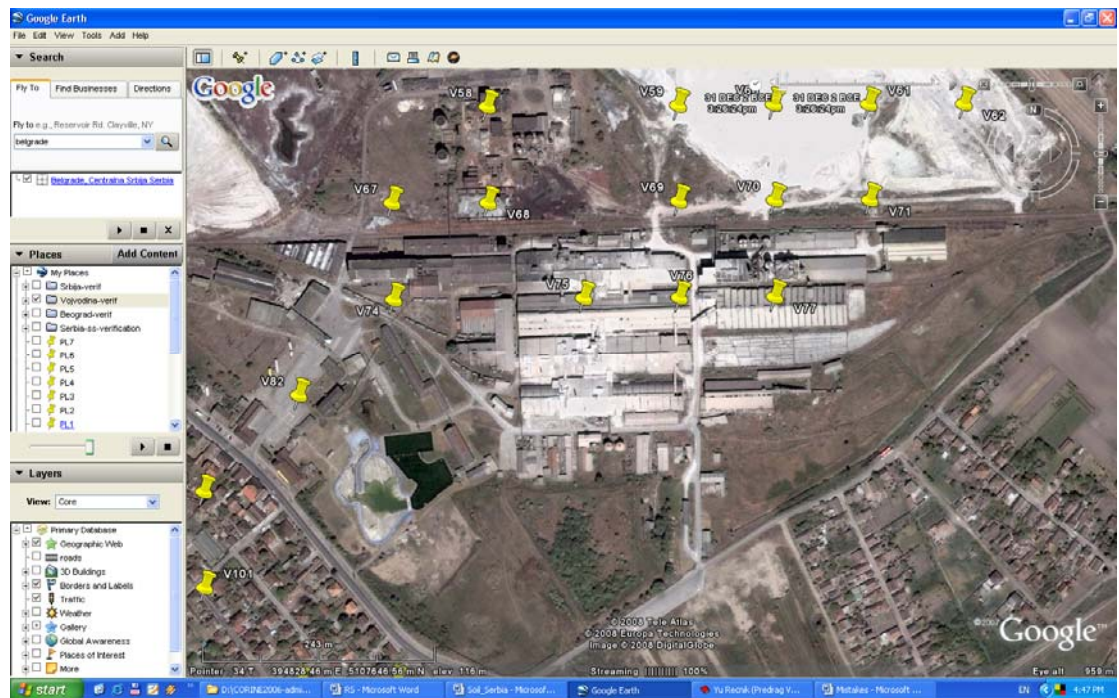


Figure 3. Example of omission error

Road and rail networks and associated land:

- a. Did you check if built-up/non built-up areas within road and rail networks and associated land are correctly mapped (e.g. railway stations, highways >20 m width, etc.)?
☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent
- c. Short description of errors found (if any): some sporadic omission errors

Port areas:

- a. Did you check if built-up/non built-up areas in port areas are correctly mapped (e.g. installations, dykes, etc.)?
☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☒ excellent
- d. Short description of errors found (if any):

Airports:

- c. Did you check if built-up/non built-up areas in airports are correctly mapped (e.g. runways, buildings, etc.)?

☒ Yes ☐ No ☐ Not possible

d. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☐ good ☒ excellent

e. Short description of errors found (if any):

Mine, dump and construction sites:

a. Did you check if built-up/non built-up areas in mine, dump and construction sites are correctly mapped (e.g. buildings, infrastructure, etc)?

☒ Yes ☐ No ☐ Not possible

b. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent

f. Short description of errors found (if any): some sporadic omission errors

Arable land:

a. Did you check if built-up/non built-up areas in arable land are correctly mapped (e.g. bare soil, large farm houses, roads>20m width, etc)?

☒ Yes ☐ No ☐ Not possible

b. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent

g. Short description of errors found (if any): some sporadic commission errors

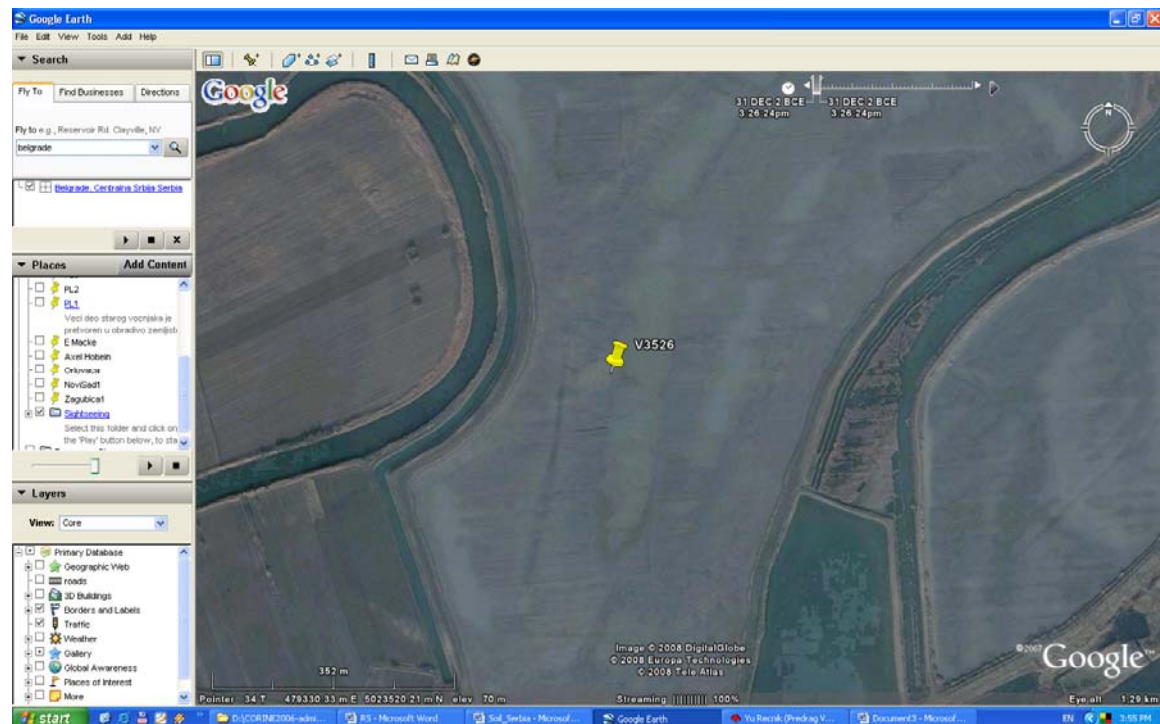


Figure 4. Example of arable land classified as built-up

Heterogeneous agricultural areas:

- a. Did you check if built-up/non built-up areas in heterogeneous agricultural areas are correctly mapped (e.g. buildings, roads >20m, etc)?
☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent
- h. Short description of errors found (if any): some sporadic commission errors

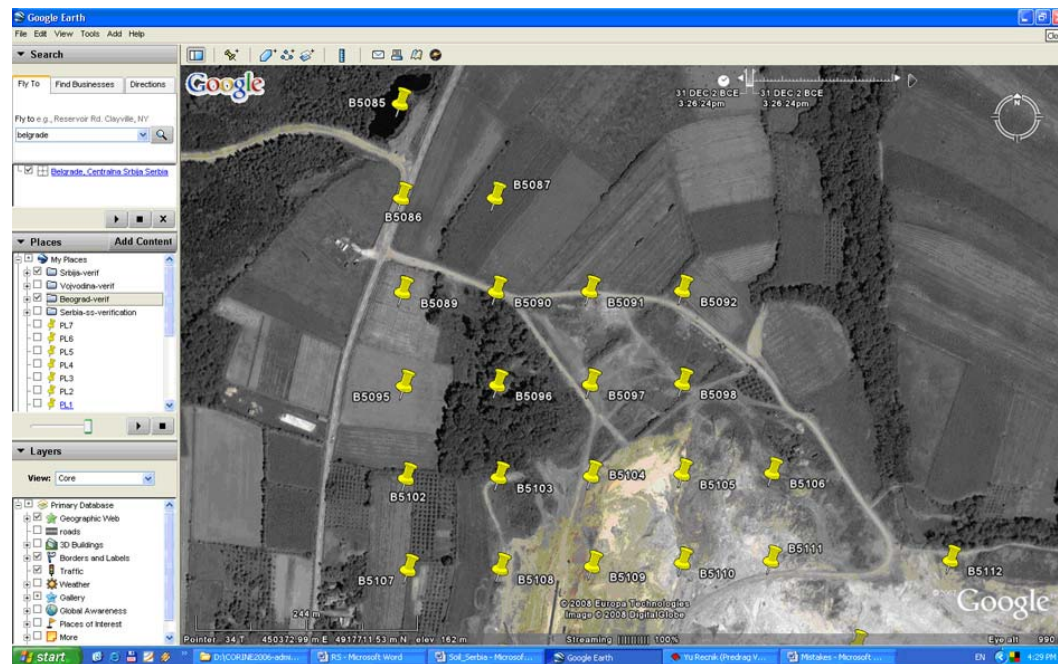


Figure 5. Example of several commission errors: forest, water and agricultural land classified as built-up

Forest:

- a. Did you check built-up/non built-up areas in forests are correctly mapped (e.g. clear-cuts, roads, etc.)?

☒ Yes
 ☐ No
 ☐ Not possible
- b. How would you assess the quality?

☐ very poor
 ☐ insufficient
 ☐ acceptable
 ☒ good
 ☐ excellent
- i. Short description of errors found (if any): very rare commission errors

Scrub and/or herbaceous vegetation associations:

- a. Did you check if built-up/non built-up areas in scrub and/or herbaceous vegetation areas are correctly mapped (e.g. dry vegetation, rock outcrop, etc.)?

☒ Yes
 ☐ No
 ☐ Not possible
- b. How would you assess the quality?

☐ very poor
 ☐ insufficient
 ☐ acceptable
 ☒ good
 ☐ excellent
- j. Short description of errors found (if any): very rare commission errors

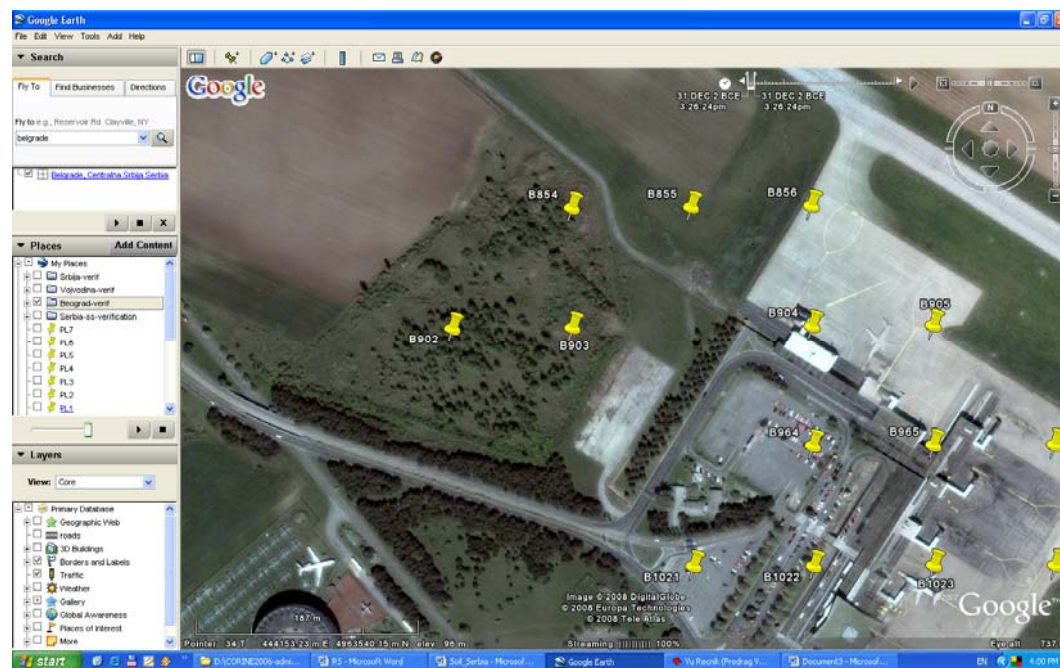


Figure 6. Example of scrub classified as built-up

Beaches, dunes and sands:

- a. Did you check if built-up/non built-up areas in beaches, dunes and sand areas are correctly mapped?
☒ Yes ☐ No ☐ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☒ excellent
- k. Short description of errors found (if any):

Bare rocks:

- a. Did you check if built-up/non built-up areas in bare rock areas are correctly mapped?
☐ Yes ☐ No ☒ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☐ excellent
- l. Short description of errors found (if any):

Sparsely vegetated areas:

- a. Did you check if built-up/non built-up areas in sparsely vegetated areas are correctly mapped?
☒ Yes ☐ No ☐ Not possible
- c. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent

m. Short description of errors found (if any): very rare commission errors

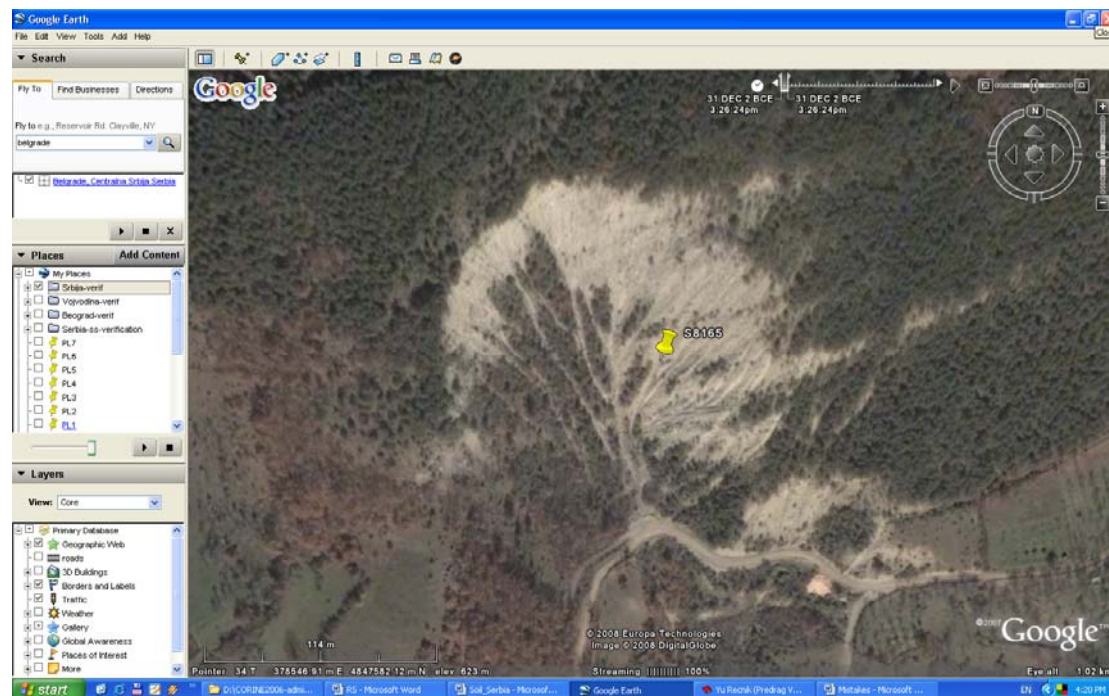


Figure 7. Example of sparsely vegetated area classified as built-up

Glaciers and perpetual snow:

a. Did you check if built-up/non built-up areas in glaciers and perpetual snow areas are correctly mapped?

☐ Yes ☐ No ☒ Not possible

b. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☐ good ☐ excellent

n. Short description of errors found (if any):

Inland wetlands:

a. Did you check if built-up/non built-up areas in inland wetlands are correctly mapped ?

☒ Yes ☐ No ☐ Not possible

b. How would you assess the quality?

☐ very poor ☐ insufficient ☐ acceptable ☐ good ☒ excellent

o. Short description of errors found (if any):

Salines:

- c. Did you check if built-up/non built-up areas in salines are correctly mapped?
☐ Yes ☐ No ☒ Not possible
- d. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☐ excellent
- p. Short description of errors found (if any):

Intertidal flats:

- a. Did you check if built-up/non built-up areas in intertidal flats are correctly mapped?
☐ Yes ☐ No ☒ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☐ excellent
- q. Short description of errors found (if any):

Coastal lagoons:

- a. Did you check if built-up/non built-up areas in coastal lagoons are correctly mapped?
☐ Yes ☐ No ☒ Not possible
- b. How would you assess the quality?
☐ very poor ☐ insufficient ☐ acceptable ☐ good ☐ excellent
- r. Short description of errors found (if any):

Comments concerning thematic content check (if any). Please indicate which part of the data was verified (full coverage or partial coverage, etc.):

Most of the 100x100m built-up pixels were compared with Google Earth VHR imagery (acquired after 2004). The basic impression on the data quality comes from that checking since topographic maps were outdated and hence uncertain for commission errors estimation.

D. Overall qualitative assessment of the dataset

The overall qualitative assessment is meant to support EEA in our contractual procedures with the service provider regarding the acceptance of the dataset. While the previous thematic quality assessment was looking at class by class, this section should provide your assessment of the quality for the whole territory.

How would you assess the overall quality of the mapped built-up/non built-up areas for the dataset provided?

☐ very poor ☐ insufficient ☐ acceptable ☒ good ☐ excellent

Please provide your final comments and additional remarks concerning overall qualitative assessment (e.g. difference in quality between regions e.g. mountains, agglomerations, coastal zones, etc), if any:

Discontinuous urban fabric areas should be checked using a quantitative validation method to avoid uncertain visual estimation of “>80% of soil sealing” criteria. However, the overall qualitative assessment shows that the accuracy of 85% is reached.

E. Quantitative validation

Are you planning to carry out a statistical validation (quantitative assessment) of the national dataset?

☒ Yes ☐ No

If yes, it would be helpful to provide us information about the timing, methodological approach or any other additional information which might be available:

Details on quantitative validation of HR soil sealing layer in Serbia are not available yet

Are you willing to contribute to the final validation of the European dataset (actions scheduled from the second half of 2008 onwards)?

☐ Yes ☐ No

Filled in by Dragutin Protic

Telephone number: +381-64-1733-256

Email address: protic@grf.bg.ac.yu

Date: 28.04.2008.

Thank you!