



Updated Delivery Report European Mosaic

EEA-FTSP-Sealing-Enhancement_DeliveryReport-EuropeanMosaic

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Prepared by:

Miroslav Kopecky, GISAT
Dr. Hanjo Kahabka, Infoterra GmbH



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Author:	Miroslav Kopecky, GISAT s.r.o.	 Sign _____ Date: 10.12.2009
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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This document presents the updated delivery report of EEA's Fast Track Service Precursor Sealing Product "European Mosaic" which has been generated based on the 38 enhanced country products. Content of the initial delivery report has been complemented by the specification of the enhanced product, enhancement methodology and quality control results.

1.2 APPLICABLE DOCUMENTS

ITD.2009-0643-0-1	Proposal responding to EEA's Invitation for Tender, Technical Offer including Management Part –Issue 1
EEA-FTSP-Sealing_DeliveryReport-EuropeanMosaic_F1v0	Delivery Report of the initial project

1.3 REFERENCE DOCUMENTS

EEA/SES/09/003	Tender Specifications "GMES Fast Track Service on Land Monitoring – high-resolution core land cover data built-up areas, including degree of soil sealing, 2006 – Data enhancement in support of Member States requirements", EEA, 2009
ISO9001	ISO 9001: 2000 Standard
ITD-QMS-POL-0001_Infoterra_Quality_Policy	Quality Policy Statement
QMS-ITD-MA-0011_QMSManual_I3.1	Quality Management System (QMS) Manual
ITD-UMS-POL-0001_Infoterra_Environmental_Policy	Declaration of Enterprise Environmental Policy
ITD-QMS-STD-0001-ControlOfDocumentation	Control of Documentation and Data
QMS-ITD-ST-0001_CSM	Customer Satisfaction Measurement
QMS-ITD-PR-0003_PM_ProductDevelopment_I4	Project Management, Product (Prototype) Development and Production

2 DATA SPECIFICATIONS

2.1 TECHNICAL PRODUCT SPECIFICATION

<p>Content</p> <p><i>Seamless European mosaic of:</i></p> <ol style="list-style-type: none"> 1. Updated raster dataset containing the degree of imperviousness ranging from 0 - 100% in full spatial resolution (20 x 20 m) with the associated metadata. 2. Updated raster dataset containing the degree of imperviousness ranging from 0 - 100% in aggregated spatial resolution (100 x 100 m) with the associated metadata - see averaging methodology below. 3. Updated raster dataset of 100 x 100 m cells; cell values represent the number of valid "sealed" 20 x 20 m cells within one 100 x 100 m cell with the associated metadata. 4. Raster dataset with the identification of updated areas (20mx20m) 5. Raster dataset with the removed pixels belonging to class 1.3.x (20mx20m)
<p>Geographic coverage</p> <p><i>EU27 and neighbouring countries, in total 38 countries (area covered ~5,8 km²): Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France (without French overseas departments and territories), Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Albania, Bosnia-Herzegovina, Croatia, Former Yugoslavian Republic of Macedonia, Montenegro and Serbia</i></p>
<p>Input data sources</p> <ul style="list-style-type: none"> ▪ Country products (deliverable 2): 38 files with enhanced raster datasets on core land cover data for built-up areas including continuous degree of soil sealing (or imperviousness) ranging from 0 - 100% in full spatial resolution (20 x 20 m) with the associated metadata. ▪ Description of national coordinate reference systems (CRS_v8.xls)
<p>Methodology</p> <p><i>Product 1: Re-projection of country products into European CRS; mosaicing and tiling.</i></p> <p><i>Product 2: Aggregation of product 1 by using the following decision tree:</i></p> <ol style="list-style-type: none"> 1. ≥ 13 pixels with valid sealing value? <ul style="list-style-type: none"> → Yes: average sealing degrees (taking into account the sealed pixels only) → No: 2. No data (255) pixels \geq unclassifiable (254) pixels? <ul style="list-style-type: none"> → Yes: assign "no data" to the cell → No: assign "unclassifiable" to the cell <p><i>In this case, 255 would be preferred when it comes to equality.</i></p>

<p><i>Product 3: Calculation of number of valid "sealing" cells (20 x 20 m) within one 100 x 100 m cell –done for all 100 x 100 m cells.</i></p> <p><i>Product 4&5: Mosaicing of country products</i></p>
<p>Spatial resolution</p>
<p><i>Product 1, 4 & 5: pixel resolution 20m x 20 m</i></p> <p><i>Product 2 & 3: pixel resolution 100m x 100 m</i></p>
<p>Tiling</p>
<p><i>100 km x 100 km tiles both for 20 m as well as 100 m products (with exactly same corner coordinates);</i></p> <p><i>Same corner coordinates as CLC2000 product</i></p> <p><i>Naming according to CLC products using the location of the left corner (example: 100KME15N10) – see also Corine download viewer http://www.eea.europa.eu/themes/landuse/clc-download.</i></p>
<p>Coordinate Reference System</p>
<p><i>according to ETRS_1989 LAEA 52N 10E.prj provided by EEA</i></p> <p><i>Map Projection Name: Lambert Azimuthal Equal Area</i></p> <p><i>Longitude of Projection Center: 10.000000</i></p> <p><i>Latitude of Projection Center: 52.000000</i></p> <p><i>False Easting: 4321000.000000</i></p> <p><i>False Northing: 3210000.000000</i></p> <p><i>Geodetic Model</i></p> <p><i>Horizontal Datum Name: D_ETRS_1989</i></p> <p><i>Ellipsoid Name: Geodetic Reference System 80</i></p> <p><i>Semi-major Axis: 6378137.000000</i></p> <p><i>Denominator of Flattening Ratio: 298.257222</i></p>
<p>Geometric accuracy (positioning scale)</p>
<p><i>According to orthorectified satellite image base delivered by ESA</i></p>
<p>Thematic accuracy (in %)</p>
<p><i>Classification accuracy of built-up non built-up areas is > 85% (see Delivery Reports of country products - CDR)</i></p>
<p>Delivery format</p>
<p><i>IMAGINE Image (IMG)</i></p>
<p>Data type</p>
<p><i>Raster</i></p>

Raster coding

Thematic pixel values product 1 & 2:

0: Non-built up areas, water bodies inland

1-100: sealing values for built-up areas

254: "unclassifiable" (no thematic information could be extracted due to e.g. cloud coverage – see PMP Annex II)

255: "no data" (No EO image information available)

Thematic pixel values product 3:

0-25: Number of valid sealing cells (20 m) within the 100 m cell

Thematic pixel values product 4:

The change indication layer contains information about changed pixels according to the coding as follows:

Code	Description		Output layer
0	Background	Input	FTSP2006_enhanced
1	Sealed in FTS 2006	Input	FTSP2006_enhanced
2	Non-sealed in FTS 2006	Input	FTSP2006_enhanced
3	Removed CLC13*	edit	Layer removed 13*
4	removed	edit	Layer updated areas
5	added	edit	Layer updated areas

Metadata

According to EEA metadata standards (EEA MSGI specification)

Metadata will also contain a lookup table (LUT) allowing the aggregation of the continuous values of degree of soil sealing into the following 5 degree of soil sealing classes:

- 0 - 29%
- 30 - 49% (30% threshold compatible to lower limit of CLC class 1.1.2, 49% threshold a median of CLC class 1.1.2)
- 50 - 79% (79% threshold compatible to ceiling of CLC class 1.1.2)
- 80 - 99% (80% threshold compatibility to CLC class 1.1.1)
- 100%

2.2 ALGORITHMS USED

Processing steps
<ul style="list-style-type: none"> • <i>Re-projection of individual country products into European CRS (see 2.1 – Coordinate reference System) preserving the spatial resolution of 20m x 20m</i> • <i>Mosaicing of re-projected country products into tiles with full spatial resolution (20m x 20m)– mosaicing lines set inside the overlapping buffer of neighbouring country products (no blending applied)</i> • <i>Aggregation of tiles with reduced spatial resolution of 100m x 100m (see Fehler! Verweisquelle konnte nicht gefunden werden. – Methodology)</i> • <i>Calculation of number of valid “sealing” cells (20 x 20 m) within one 100 x 100 m cell (see Fehler! Verweisquelle konnte nicht gefunden werden. – Methodology)</i>
Transformation Method
<ul style="list-style-type: none"> • <i>Application of 7 parameter Bursa-Wolf transformation using the parameters listed in the CRS description table (CRS_v8.xls provided by EEA)</i> • <i>Applied resampling method: “Nearest Neighbour”</i>

2.3 FORMAT DESCRIPTION

Delivery format
<p><i>ERDAS IMAGINE Image (IMG)</i></p> <p><i>Data Type: unsigned 8-bit</i></p> <p><i>Compression: Run-length encoding (ESRI)</i></p> <p><i>Number of bands: 1</i></p> <p><i>Pixel size: Product 1: 20 m</i> <i>Product 2&3: 100m</i></p>
Data type
<i>Thematic Raster</i>
Metadata
<i>According to EEA metadata standards (EEA MSGI specification)</i>

2.4 METADATA

See European Environment Agency – Metadata Standard for Geographic Information (EEA-MSGI), Version 1.1a (18 August 2004).

The metadata is provided as XML-file and as PDF-document according to EEA Metadata Standard for Geographic Information (EEA-MSGI).

3 SUMMARY OF PRODUCTION

3.1 TIMETABLE, PRODUCTION MILESTONES – INITIAL PRODUCT

Delivery by prime	Data Reception	Production	
		Start	End
Subsequently after approval of country deliverables by EEA; (except: FR delivered after submission to EEA)	Subsequently First country: DK Last country: FR	01.05.2008	23.10.2008

3.2 TIMETABLE, PRODUCTION MILESTONES – ENHANCED PRODUCT

Production Enhanced	
Start	End
25.11.2009	18.12.2009

3.3 TECHNICAL PROBLEMS ENCOUNTERED, MITIGATION MEASURES

None

4 QUALITY CONTROL

Quality control aspects
<ul style="list-style-type: none"> • Check of compliance to technical specifications • Check of format and projection • Sample plot plausibility check of product 2 versus 1 • Sample plot plausibility check of product 3 versus 2 • Check of metadata

5 DETAILED LIST OF PROVIDED DATA

- Raster dataset of built-up and non built-up areas including degree of soil sealing, 2006, in full spatial resolution (20 m x 20 m). European Mosaic in 905 tiles with spatial extent of 100x100km (Naming according to CLC products using the location of the left corner)
- Raster dataset representing ancillary change layer, in full spatial resolution (20 m x 20 m). European Mosaic in 905 tiles with spatial extent of 100x100km (Naming according to CLC products using the location of the left corner)
- Raster dataset of built-up and non built-up areas including degree of soil sealing, 2006, in aggregated spatial resolution (100 m x 100 m). European Mosaic in 905 tiles with spatial extent of 100x100km (Naming according to CLC products using the location of the left corner)
- Raster dataset in aggregated spatial resolution (100 m x 100 m) representing the number of valid 20m-cells in one 100m-cell. European Mosaic in 905 tiles with spatial extent of 100x100km (Naming according to CLC products using the location of the left corner)
- ArcMap Legend File for raster data set for plotting a degree of soil sealing, aggregated to thematic classes
- ArcMap Legend File for raster data set for plotting a degree of soil sealing in a range from 1-100 %
- Vector dataset defining all areas which deviate from the ITT's EO data specifications
- Vector dataset representing the footprints of the raster tiles
- Vector dataset containing the national country borders in EEA CRS
- XML-Metadata of raster and vector data according to EEA specifications
- EEA Metadata Stylesheet
- Report including description of raster and vector data and production methodology

ANNEX 1: LIST OF COUNTRY PRODUCTS USED

The following list provides information about the country products which were used to create the enhanced European Mosaic.

Table 1: List of country products for the production of the enhanced European Mosaic

Country	Name of country deliverable (incl. version)
AL	EEA-FTSP-Sealing-Enhancement_AL_F1v0 EEA-FTSP-Sealing-Enhancement_AL_Change_F1v0
AT	EEA-FTSP-Sealing-Enhancement_AT_F1v0 EEA-FTSP-Sealing-Enhancement_AT_Change_F1v0
BA	EEA-FTSP-Sealing-Enhancement_BA_F1v0 EEA-FTSP-Sealing-Enhancement_BA_Change_F1v0
BE	EEA-FTSP-Sealing-Enhancement_BE_F1v0 EEA-FTSP-Sealing-Enhancement_BE_Change_F1v0
BG	EEA-FTSP-Sealing-Enhancement_BG_F1v0 EEA-FTSP-Sealing-Enhancement_BG_Change_F1v0
CY	EEA-FTSP-Sealing-Enhancement_CY_F1v0 EEA-FTSP-Sealing-Enhancement_CY_Change_F1v0
CZ	EEA-FTSP-Sealing-Enhancement_CZ_F1v0 EEA-FTSP-Sealing-Enhancement_CZ_Change_F1v0
DE	EEA-FTSP-Sealing-Enhancement_DE2_F1v0 EEA-FTSP-Sealing-Enhancement_DE2_Change_F1v0 EEA-FTSP-Sealing-Enhancement_DE3_F1v0 EEA-FTSP-Sealing-Enhancement_DE3_Change_F1v0 EEA-FTSP-Sealing-Enhancement_DE4_F1v0 EEA-FTSP-Sealing-Enhancement_DE4_Change_F1v0 EEA-FTSP-Sealing-Enhancement_DE5_F1v0 EEA-FTSP-Sealing-Enhancement_DE5_Change_F1v0
DK	EEA-FTSP-Sealing-Enhancement_DK_F1v0 EEA-FTSP-Sealing-Enhancement_DK_Change_F1v0
EE	EEA-FTSP-Sealing-Enhancement_EE_F1v0 EEA-FTSP-Sealing-Enhancement_EE_Change_F1v0
ES	EEA-FTSP-Sealing-Enhancement_ES28_F1v0 EEA-FTSP-Sealing-Enhancement_ES28_Change_F1v0 EEA-FTSP-Sealing-Enhancement_ES29_F1v0 EEA-FTSP-Sealing-Enhancement_ES29_Change_F1v0 EEA-FTSP-Sealing-Enhancement_ES30_F1v0 EEA-FTSP-Sealing-Enhancement_ES30_Change_F1v0 EEA-FTSP-Sealing-Enhancement_ES31_F1v0 EEA-FTSP-Sealing-Enhancement_ES31_Change_F1v0
FI	EEA-FTSP-Sealing-Enhancement_FI_F1v0 EEA-FTSP-Sealing-Enhancement_FI_Change_F1v0
FR	EEA-FTSP-Sealing-Enhancement_FR1_F1v0 EEA-FTSP-Sealing-Enhancement_FR1_Change_F1v0

Country	Name of country deliverable (incl. version)
	EEA-FTSP-Sealing-Enhancement_FR2_F1v0 EEA-FTSP-Sealing-Enhancement_FR2_Change_F1v0
GR	EEA-FTSP-Sealing-Enhancement_GR_F1v0 EEA-FTSP-Sealing-Enhancement_GR_Change_F1v0
HR	EEA-FTSP-Sealing-Enhancement_HR_F1v0 EEA-FTSP-Sealing-Enhancement_HR_Change_F1v0
HU	EEA-FTSP-Sealing-Enhancement_HU_F1v0r EEA-FTSP-Sealing-Enhancement_HU_Change_F1v0
CH	EEA-FTSP-Sealing-Enhancement_CH_F1v0 EEA-FTSP-Sealing-Enhancement_CH_Change_F1v0
IE	EEA-FTSP-Sealing-Enhancement_IE_F1v0 EEA-FTSP-Sealing-Enhancement_IE_Change_F1v0
IS	EEA-FTSP-Sealing-Enhancement_IS_F1v0 EEA-FTSP-Sealing-Enhancement_IS_Change_F1v0
IT	EEA-FTSP-Sealing-Enhancement_IT1_F1v0 EEA-FTSP-Sealing-Enhancement_IT1_Change_F1v0 EEA-FTSP-Sealing-Enhancement_IT2_F1v0 EEA-FTSP-Sealing-Enhancement_IT2_Change_F1v0
LI	EEA-FTSP-Sealing-Enhancement_LI_F1v0 EEA-FTSP-Sealing-Enhancement_LI_Change_F1v0
LT	EEA-FTSP-Sealing-Enhancement_LT_F1v0 EEA-FTSP-Sealing-Enhancement_LT_Change_F1v0
LU	EEA-FTSP-Sealing-Enhancement_LU_F1v0 EEA-FTSP-Sealing-Enhancement_LU_Change_F1v0
LV	EEA-FTSP-Sealing-Enhancement_LV_F1v0 EEA-FTSP-Sealing-Enhancement_LV_Change_F1v0
ME	EEA-FTSP-Sealing-Enhancement_ME_F1v0 EEA-FTSP-Sealing-Enhancement_ME_Change_F1v0
MK	EEA-FTSP-Sealing-Enhancement_MK_F1v1 EEA-FTSP-Sealing-Enhancement_MK_Change_F1v1
NL	EEA-FTSP-Sealing-Enhancement_NL_F1v0 EEA-FTSP-Sealing-Enhancement_NL_Change_F1v0
NO	EEA-FTSP-Sealing-Enhancement_NO31_F1v0 EEA-FTSP-Sealing-Enhancement_NO31_Change_F1v0 EEA-FTSP-Sealing-Enhancement_NO32_F1v0 EEA-FTSP-Sealing-Enhancement_NO32_Change_F1v0 EEA-FTSP-Sealing-Enhancement_NO33_F1v0 EEA-FTSP-Sealing-Enhancement_NO33_Change_F1v0 EEA-FTSP-Sealing-Enhancement_NO34_F1v0 EEA-FTSP-Sealing-Enhancement_NO34_Change_F1v0 EEA-FTSP-Sealing-Enhancement_NO35_F1v0 EEA-FTSP-Sealing-Enhancement_NO35_Change_F1v0 EEA-FTSP-Sealing-Enhancement_NO36_F1v0 EEA-FTSP-Sealing-Enhancement_NO36_Change_F1v0

Country	Name of country deliverable (incl. version)
PL	EEA-FTSP-Sealing-Enhancement_PL_F1v0 EEA-FTSP-Sealing-Enhancement_PL_Change_F1v0
PT	EEA-FTSP-Sealing-Enhancement_PT1_F1v0 EEA-FTSP-Sealing-Enhancement_PT1_Change_F1v0 EEA-FTSP-Sealing-Enhancement_PT2_F1v0 EEA-FTSP-Sealing-Enhancement_PT2_Change_F1v0 EEA-FTSP-Sealing-Enhancement_PT3_F1v0 EEA-FTSP-Sealing-Enhancement_PT3_Change_F1v0
RO	EEA-FTSP-Sealing-Enhancement_RO_F1v0 EEA-FTSP-Sealing-Enhancement_RO_Change_F1v0
RS	EEA-FTSP-Sealing-Enhancement_RS_F1v0 EEA-FTSP-Sealing-Enhancement_RS_Change_F1v0
SE	EEA-FTSP-Sealing-Enhancement_SE1_F1v0 EEA-FTSP-Sealing-Enhancement_SE1_Change_F1v0 EEA-FTSP-Sealing-Enhancement_SE2_F1v0 EEA-FTSP-Sealing-Enhancement_SE2_Change_F1v0
SI	EEA-FTSP-Sealing-Enhancement_SI_F1v1 EEA-FTSP-Sealing-Enhancement_SI_Change_F1v1
SK	EEA-FTSP-Sealing-Enhancement_SK_F1v0 EEA-FTSP-Sealing-Enhancement_SK_Change_F1v0
TR	EEA-FTSP-Sealing-Enhancement_TR1_F1v0 EEA-FTSP-Sealing-Enhancement_TR1_Change_F1v0 EEA-FTSP-Sealing-Enhancement_TR2_F1v0 EEA-FTSP-Sealing-Enhancement_TR2_Change_F1v0 EEA-FTSP-Sealing-Enhancement_TR3_F1v0 EEA-FTSP-Sealing-Enhancement_TR3_Change_F1v0 EEA-FTSP-Sealing-Enhancement_TR4_F1v0 EEA-FTSP-Sealing-Enhancement_TR4_Change_F1v0
UK	EEA-FTSP-Sealing-Enhancement_UK1_F1v0 EEA-FTSP-Sealing-Enhancement_UK1_Change_F1v0 EEA-FTSP-Sealing-Enhancement_UK2_F1v0 EEA-FTSP-Sealing-Enhancement_UK2_Change_F1v0 EEA-FTSP-Sealing-Enhancement_UK3_F1v0 EEA-FTSP-Sealing-Enhancement_UK3_Change_F1v0