



Session 2

GEOSTAT WP2: Geostatistics

***European Forum for Geostatistics
Conference 2010
5-7 October 2010
Tallinn, Estonia
Session 2:
GEOSTAT WP2: Geostatistics***

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Session 2

- To introduce different approaches to compile grid data
- To assess opportunities to compile grid data and integrate grid data by different approaches
- *1 x 10 min + 8 x 20 min*
- GEOSTAT project: Status report of WP2
- Examples of NSIs of Estonia, Norway, France
- More examples of construction of gridded data by a scope of researchers:
 - **Alex de Sherbinin**, NASA Socioeconomic Data and Applications Center, CIESIN – The Earth Institute at Columbia University, USA
 - **Klaus Steinnocher et al.** AIT Austrian Institute of Technology,
 - **Pavol Hurbanek et al.** University of Southampton...
 - **Francisco Goerlich**, University of Valencia,



The GEOSTAT project

Work Package 2: Geostatistics Status Report

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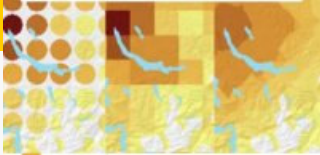
WP2 - Geostatistics

- Objectives - partners
- State of Art
- Conclusions and future plans



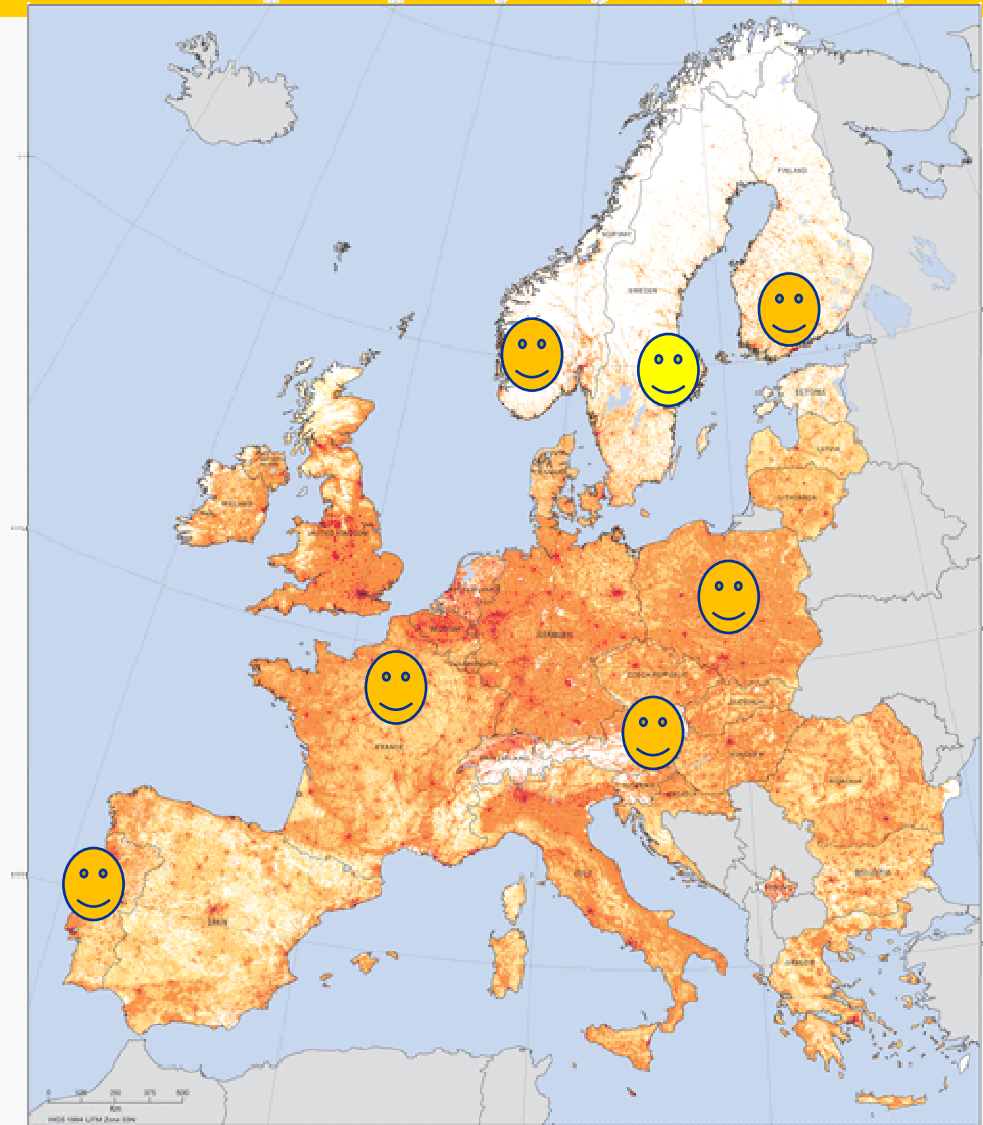
WP2 Objectives

- To improve the GEOSTAT Population Map 2010
- To promote production, (improved) quality and content of grid based datasets in the member states
- **To make guidelines for compiling gridded population statistics**
- To demonstrate building of harmonised European population grid data
- To propose common terms of dissemination of grid based data



WP2 Partners

- Statistics Finland (WP leader)
- Statistics Austria
- Statistics France
- Statistics Norway
- Statistics Poland
- Statistics Portugal
- MD Mapping, Lars Backer



National grid based data

Data source: National Statistics of institutes
 Population data based on aggregation of population at geocoded buildings, addresses or real estate to 1 km grid.
 Population based data are used for Austria, Denmark, Estonia, Finland, the Netherlands, Norway, Slovenia, Sweden and Switzerland and
 population data for Ireland's and Northern Ireland's.

The population data are provided by the following institutes: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Spain and United Kingdom (and Northern Ireland).

Country	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Austria	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Belgium	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Bulgaria	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Czech Republic	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Denmark	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Estonia	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Finland	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
France	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Germany	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Greece	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Hungary	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Ireland	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Italy	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Lithuania	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Luxembourg	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Poland	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Portugal	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Romania	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Slovakia	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Spain	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
United Kingdom	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Northern Ireland	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000

Estimated grid based data

Data source: European Commission / JRC
 Population data based on interpolation of population at 1 km level through Centre Land Cover 2000 data to regular km grids.

Estimated data are used in Belgium, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Spain and United Kingdom (and Northern Ireland).



Guidelines for producing statistics by grids

- Phase 1:
Different production models based on examples of 6 countries
- Phase 2:
Development of national datasets towards integrated datasets of several countries
- Phase 3:
Compilation and dissemination of best available European wide population grid data



Phase 1 : Status report

- State of the Art 8/2010 Country reports by 6 partners
- Summary report about the State of the Art
 - Data and methods used until now
 - Potential data and methods to be considered
 - Quality indicators used
 - Confidentiality rules
 - Implementation of Inspire specifications
 - Plans to improve/develop statistical grid data



Different approaches, Data and methods

Dissaggregation

Top down approach

- France
 - population of census output areas – auxiliary data of CLC, soil sealing, RGE...
 - pure disaggregation – hybrid disaggregation
- Poland
 - population by census 2011, -TERYT +?
 - method to be agreed later
- Portugal
 - population by 2001 census output areas
 - Random points, Region_Grid, Historic census

Aggregation

Bottom-up approach

- Austria, Finland, Norway
 - population of registers –georeferences of buildings or addresses
- France
 - population of registers – georeferences of cadastral register
- Poland
 - population by census 2011, - georeferences from TERYT/buildings
 - method to be agreed later
- Portugal
 - population by census 2001 of Alentejo – georeferences of buildings



Hybrid approach

- Grid data from different sources and by different methods to be integrated
- GEOSTAT Population Map 2010
GEOSTAT Population Map 2012
- **France:** a full hybrid disaggregation method – The Firenze method
- **Poland:** will test “an agreed” method by Census 2011 data
- for a purpose of full coverage, new variables, time series



The grid net

Country	Grid cell size	Projection	Coding
Austria	7: 125-10000	EPSG 31287, ETRS-LAEA	yes
Finland	3: 250-5000	GRID27E	yes
France	100	Lambert II	no
Norway	Open ended /quadratic	UTM33/WGS84 (EUREF89)	yes
Portugal	1000	PT-TM06/ETRS89	no
Poland	?	?	?



Quality indicators

- Coverage of georeferences of all data units
- Percentage of data suppressed
Percentage of grid cells suppressed
- A weakness indicator by NUTS3 – comparison of population figures

$$\frac{\sum |P - \hat{P}|}{\sum P}$$

- Dependent on source data!



Confidentiality rules

- Principles the same but implementations differ
- Data protection measures dependent on
 - delicacy of variables,
 - number of cases in different table/grid cells
 - size of target population
 - number of variables/classes to be released
 - size of the area/grid cell
 - agreed zoning
 - the declaration of data specific
 - dissemination format
- Other considerations:
the same data by different geographic areas – overlaying background information (roads, municipal borders)



Confidentiality rules

Country	No restrictions	Min cases/grid cell	Major disclosure control method
Austria	Total number of inhabitants, households, dwellings, buildings, local units, employed persons	31	Data suppressing
Finland	Similar to Austria + inhabitants by sex, age	10, 100	Data suppressing
France	(Total number of population Maps, agreed zoning)	(? – 2000)	Proposed data shuffling
Norway	Some variables (?)	3, 10	Data suppressing – to be agreed
Poland		3	
Portugal		3	Data suppressing



Implementation of Inspire specifications

- Work started (Austria, Finland, Norway, Portugal)
- No timetable – no high priority at the moment
- Metadata specifications - conversions from available national systems - to be agreed



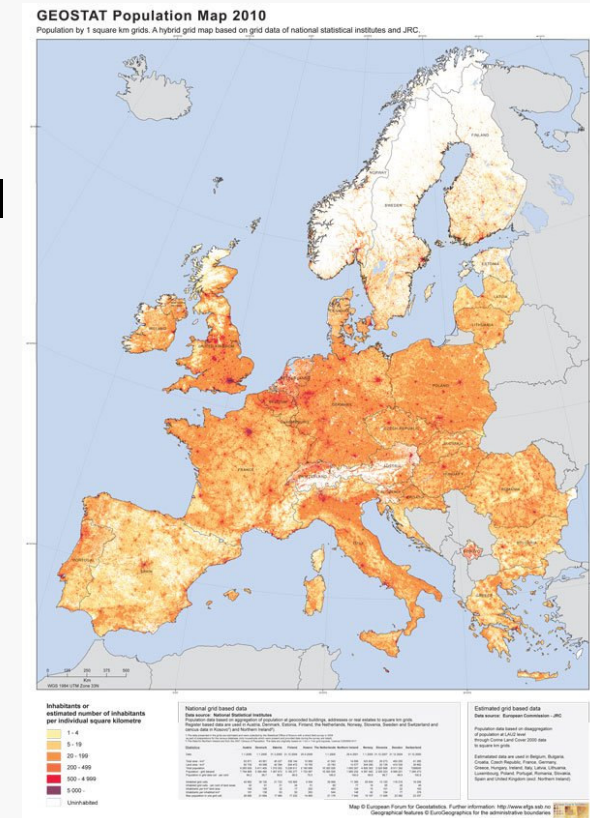
Plans to improve grid data during the Census

- **Austria**
a complete change to INSPIRE grid specs
the number of variables on grids reduce because of register-based census
- **Finland**
to revise confidentiality rules
new classifications based on grid data
- **France**
no official plans concerning grids
- **Norway**
a good method for making grid statistics anonymous
- **Poland**
preliminary, dissemination presumes a good method for making grid statistics anonymous
- **Portugal**
to georeference all the buildings, e.g. to satisfy needs for data by statistical grids



The current State of “Integreted/Hybrid” datasets of Europe

- The GEOSTAT population map updated every year since 2007
- Estimated population by JRC + available national population grids
- Last update 02/2010 – incl. national data from 11 countries
- WGS 1984 UTM zone 33N
- Available only by maps; TIFF image, PDF image and/or A1 paper map – *data by an agreement of NSIs*
- Already used to a new urban-rural typology by DG Regio, JRC and Eurostat





Conclusions and future plans

- The summary of country reports (Guidelines v1)
- To agree on proposals/recommendations for
 - *projection and coding of grids*
 - data and methods, especially disaggregation methods
 - quality measures/indicators
 - metadata specs
 - confidentiality rules
- To review the dissemination policy
- **Phase 2:**
 - to develop/produce national datasets (of 6 countries) into harmonised/integrated datasets of Europe by the end of January 2011