



Project no.: 033811

Project acronym: INTAMAP

Project title: Interoperability and Automated Mapping

Instrument: Sixth framework programme; STREP

Thematic Priority: IST-2005-2.5.12
ICT for Environmental Risk Management

D4.2 - R codes for heterogeneous monitoring networks

Due date of deliverable: September 1, 2007

Actual submission date: August XX, 2007

Start date of project: 01-09-2006

Duration: 31-8-2009

Organisation name of lead contractor for this deliverable: Wageningen University

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)	
Dissemination Level	
PU	Public
PP	Restricted to other programme participants (including the Commission Services)
RE	Restricted to a group specified by the consortium (including the Commission Services)
CO	Confidential, only for members of the consortium (including the Commission Services)

COVER LETTER

As specified in the Description of Work, D4.2 consist of a 'report (D4.1) and Implementation of technology (R code) for dealing with inequalities and heterogeneity due to differences between national monitoring networks for subsequent mapping procedures at the European scale'. The report and implementation are provided in this document in five parts:

1. D4.1 report on inequalities and heterogeneity due to differences between national monitoring networks;
2. R code for automatic filtering of systematic and random measurement errors in mapping: general linear case;
3. Draft scientific journal article explaining and illustrating the methodology behind the R code presented in part 2;
4. R code for automatic filtering of systematic and random measurement errors in mapping: tailored solution to EURDEP data;
5. Draft scientific journal article explaining and illustrating the methodology behind the R code presented in part 4.

Part 1 is a thorough analysis of the existing radiological monitoring network in terms of spatial and temporal resolution, sensor placement, measurement support, devices, and comparability. Available earth observation data and full coverage maps are evaluated with respect to their relevance to incorporation in the spatial interpolation procedures, and previous surveys (e.g. AIRDOS) is addressed.

Parts 2 and 3 consider the general spatial interpolation case in which a map of a spatially distributed variable is to be created from point observations of the target variable and from spatially exhaustive covariates. The implemented methodology removes estimated systematic errors in measurements and filters random measurement errors. The limitation is that the method assumes that the underlying geostatistical models are linear and that the stochastic terms are normally distributed.

Parts 4 and 5 extend the methodology and implementation presented in parts 2 and 3 to the specific case of mapping gamma dose rates (i.e. EURDEP data). In particular it concentrates on intelligent removal of discontinuities in data observed at the borders between countries.

It should be noted that although the R code contained in parts 2 and 4 have undergone extensive internal testing, they need further rigorous and external testing before the code can be disclosed to a wider audience. Also, further integration of the two products is desired, whereby the general spatial interpolation code of part 2 can benefit from the advanced bias estimation method of part 4 and the EURDEP interpolation is embedded in the general linear prediction framework.

Note also that the draft journal articles contained in parts 3 and 5 provide much detail about the methods developed but are not yet ready for submission to peer-review scientific journals. Apart from editorial improvements they also require further interpretation of results and drawing of conclusions.

Dr Gerard B.M. Heuvelink (WP4 Leader)

PART 1

REPORT ON INEQUALITIES AND HETEROGENEITY DUE TO DIFFERENCES
BETWEEN NATIONAL MONITORING NETWORKS

http://www.intamap.org/deliverables/NP/D4_1_Heterogeneity_report.pdf

PART 2

R CODE FOR AUTOMATIC FILTERING OF SYSTEMATIC AND RANDOM
MEASUREMENT ERRORS IN MAPPING: GENERAL LINEAR CASE

<http://www.intamap.org/documents/Appendix/script2.R>

PART 3

DRAFT OF THE SCIENTIFIC JOURNAL ARTICLE EXPLAINING AND
ILLUSTRATING THE METHODOLOGY BEHIND THE R CODE OF PART 2

PART 4

R CODE FOR AUTOMATIC FILTERING OF SYSTEMATIC AND RANDOM
MEASUREMENT ERRORS IN MAPPING: TAILORED SOLUTION TO EURDEP
DATA

<http://www.intamap.org/documents/Appendix/bound.R>

<http://www.intamap.org/documents/Appendix/stratify.R>

<http://www.intamap.org/documents/Appendix/heterogeneity.R>

PART 5

DRAFT OF SCIENTIFIC JOURNAL ARTICLE EXPLAINING AND
ILLUSTRATING THE METHODOLOGY BEHIND THE R CODE OF PART 4