EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

INTAMAP

INTeroperability and Automated MAPping

Jorge Samuel Mendes de Jesus
Joint Research Centre, EC

STREP with the EC, FP6, IST (Call 5: IST-2005-2.5.12, ICT for Environmental Risk Management).

Project funding: 1.856 M€
Timeline: 1st of September 2006 – 31 August 2009

Information Society Technologies

Universities of Utrecht & Münster, The Netherlands & Germany (Coordinator)
University of Aston, United Kingdom
REM, IES, DG-JRC
University of Wagening, The Netherlands.
Technical University of Crete, Greece.
University of Klagenfurt, Austria.
Federal Office for Radiation Protection (BfS), Germany.
KEYNETIX Ltd, United Kingdom.

Joint Research Centre

Institute for Environment and Sustainability

The real-time mapping issue

Many critical environmental variables are monitored **in situ** (e.g. atmospheric pollutants, background radiation levels, rainfall fields, temperature, seismic activity).

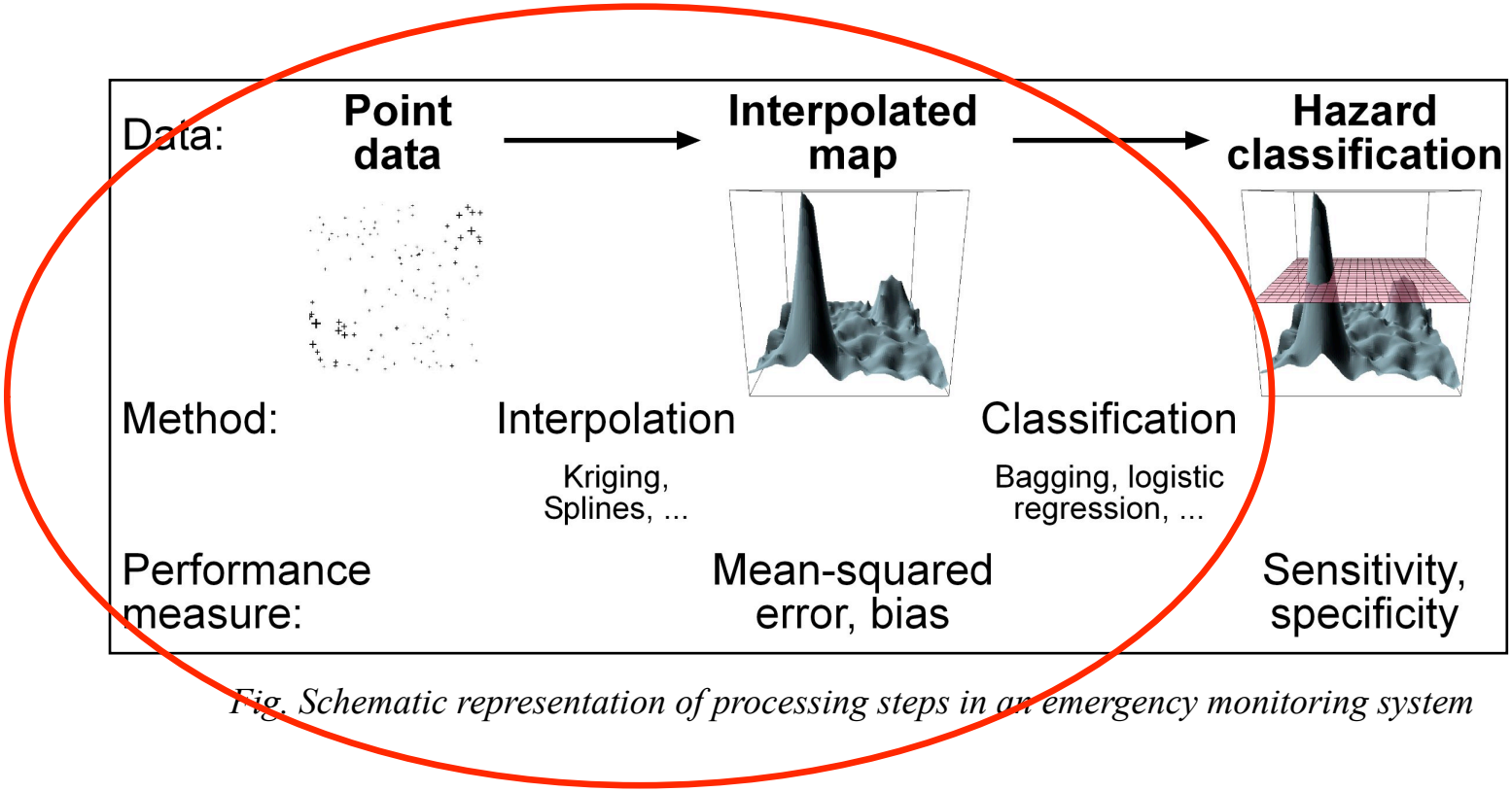


Fig. Schematic representation of processing steps in an emergency monitoring system

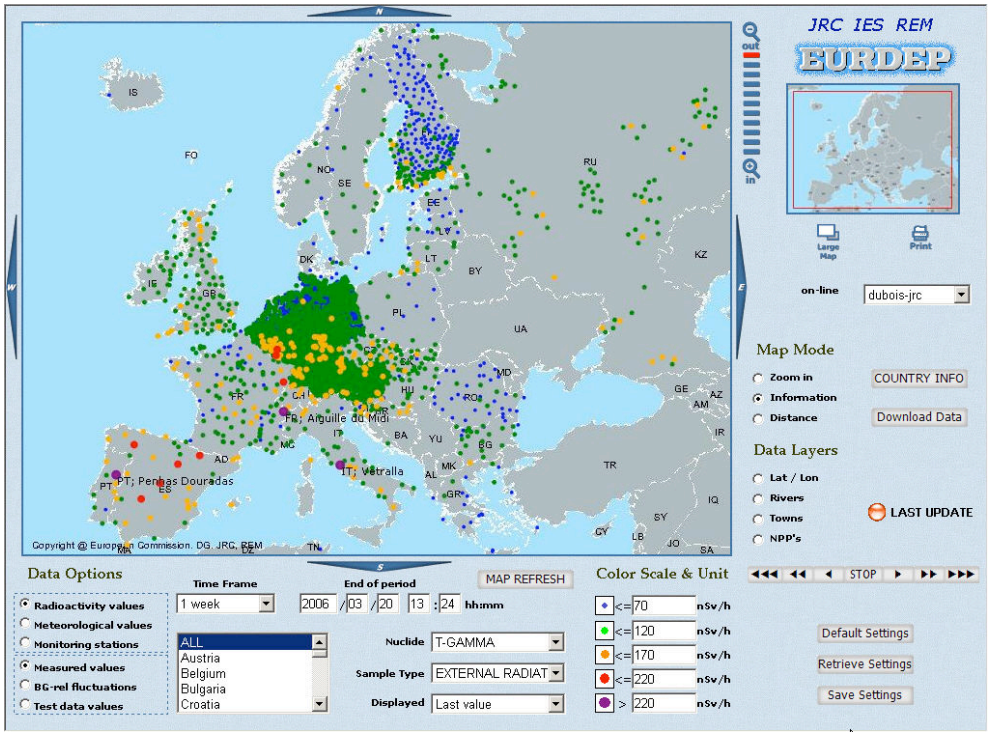
Maps from interpolated data are needed in **real time** (= automatic mapping) in case of environmental emergencies. Main challenge is statistics is dealing with unforeseen events **("hot spots" or extreme values**)

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

INTAMAP

Real-time mapping of environmental radioactivity

Main objective of INTAMAP: to develop an **interoperable framework** for real time interpolation of environmental variables by extending spatial statistical methods and employing **open**, **web-based**, **data exchange and visualisation tools**.



Test bed: EURDEP (EUropean Radiological Data Exchange Platform)

This project addresses key issues of **GMES** and integrates the results in an **INSPIRE** compliant framework, based on open standards and web (feature) services.

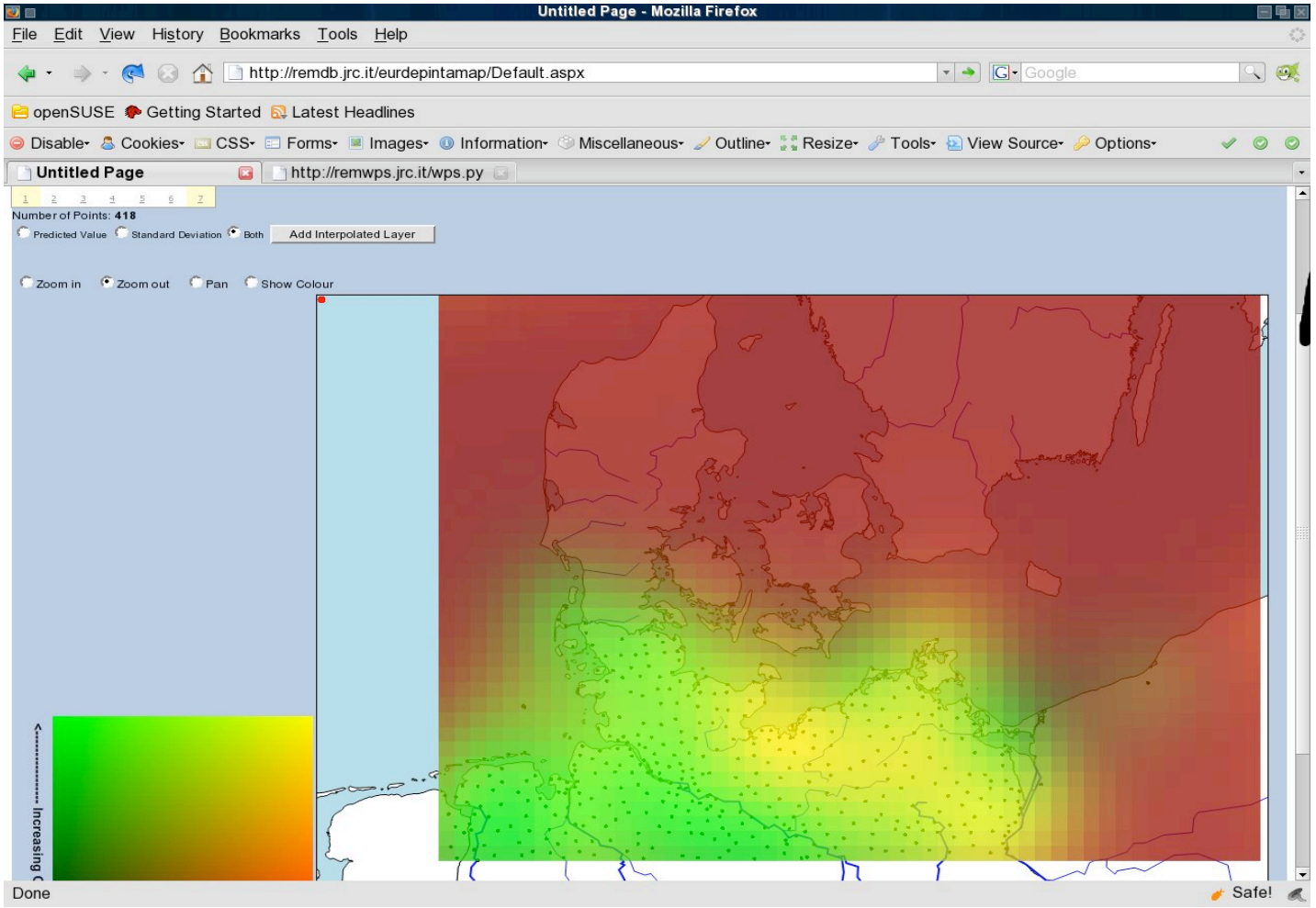
Joint Research Centre

Institute for Environment and Sustainability

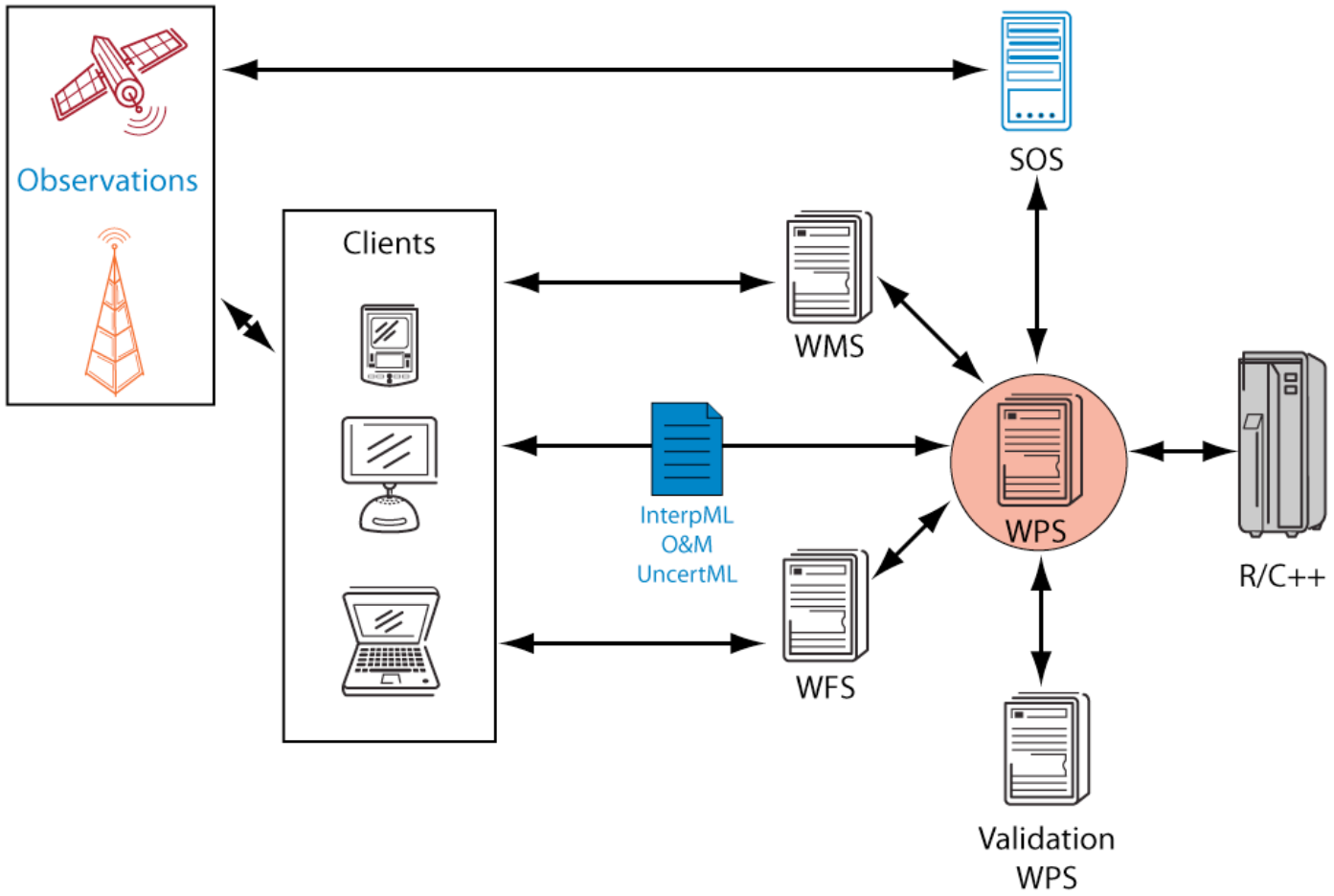
RAISIN Prototype

- Automatic interpolation service at:
  http://remwps.jrc.it/wps.py
- Data input as XML/GML and output as XML/GML or GeoTiff
- Eurdep prototype client:
  http://remdb.jrc.it/eurdepintamap

Eurdep Interpolation Prototype



INTAMAP's Architecture



INTAMAP's Current Developments

- Main interpolation server at:
  http://intamap.aston.ac.uk:8080/wps/

- Java technology based on 52North running on Tomcat server

- UncertML and InterpolationML as Input/Output

UncertML within INTAMAP (Aston Uni.)

UncertML

UncertML: An extensible XML language
for characterising uncertainty in a range of applications

UncertML: Description of uncertainty
associated with measurements

UncertML: Propagation of uncertainty
in processing chains

UncertML within INTAMAP (Aston Uni.)

UncertML

- Prediction result encoded as an UncertML distribution (or other uncertainty type if requested)

- Characterising uncertainty allows informed decision making (Especially useful for risk management systems).

Relation to OGC standards

UncertML

- Web Processing Service (WPS)
  - Interpolation is a modelling operation:
    - -Input (GML/UncertML)
    - -Output (InterpML/UncertML)

Relation to OGC standards

UncertML

- Sensor Observation Service
  - O&M Observation types returned by SOS
- Sensor Web Enablement Common
  - "Quality" property could be extended to allow distributions
  - Allow integration into other SWE languages, e.g. SensorML

Relation to OGC standards

UncertML

- Observations & Measurements (O&M)
  - 'Result' property can contain the observed value and any Uncertainty type to describe observation errors
  - Separate 'quality' property introduces ambiguity

Summary

•INTAMAP is developing new algorithms for automatic interpolation, using and developing interoperable standards.

•UncertML: An extensible XML language for characterising uncertainty in a range of applications .

•Moves toward automating processing in chains (e.g. as part of the SensorWeb) and in our view this makes uncertainty propagation essential.