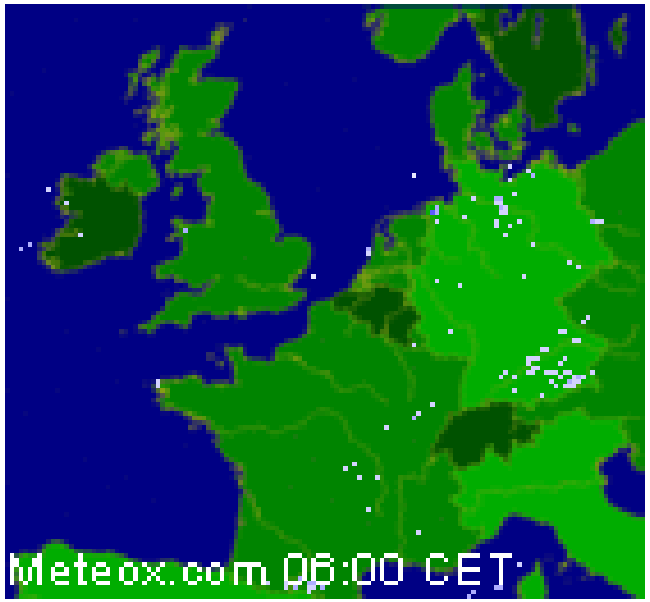
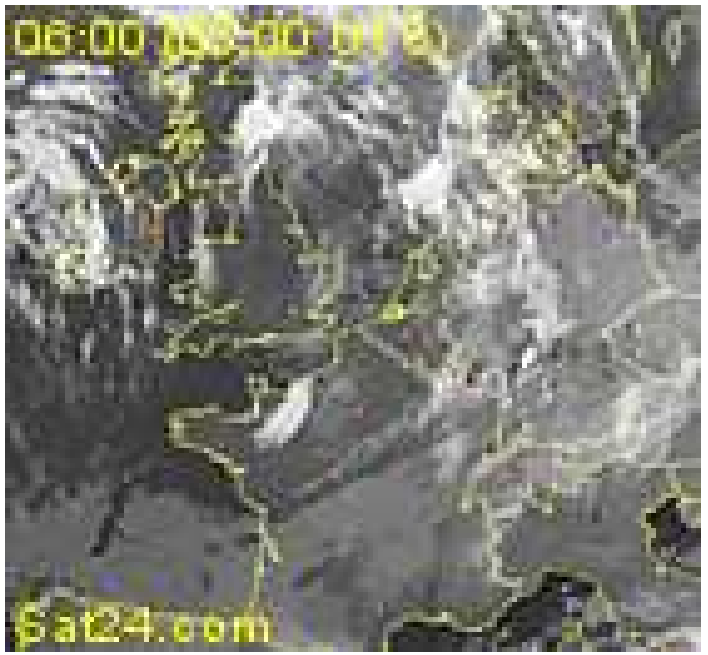
Open Access to sensors

RGI

TNO | Kennis voor zaken

Jan Jellema, geowetenschappelijk informatie specialist


Meteox.com 06:00 CET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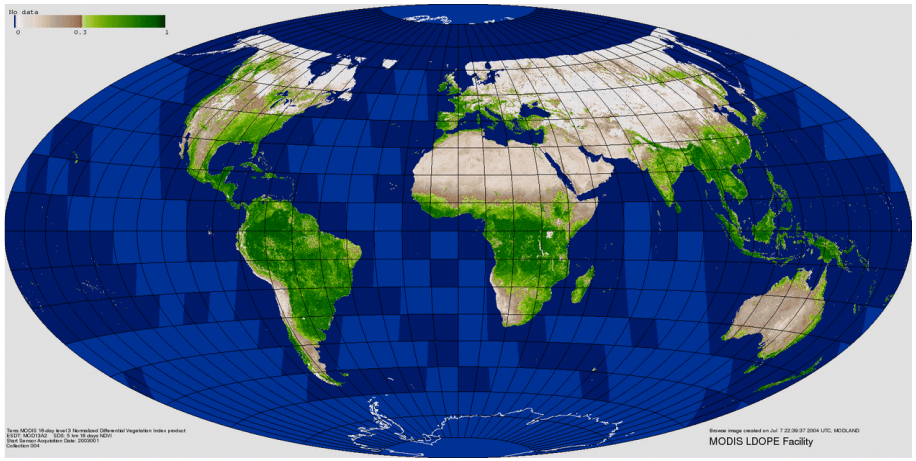
Sat24.com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1
MODIS LDOPE Facility


Groningen
Leeuwarden
Assen
Hoogeveen
Meppel
Alkmaar
Hoorn
Lelystad
Almere
Zwolle
Haarlem
Harderwijk
Almelo
Amsterdam
Apeldoorn
Deventer
Enschede
Utrecht
Arnhem
Gouda
Ede
Wageningen
Zwolle
Enschede
Nijmegen
Tiel
Oss
Den Bosch
Venray
Middelburg
Vlissingen
Roosendaal

Goals National Sensor project

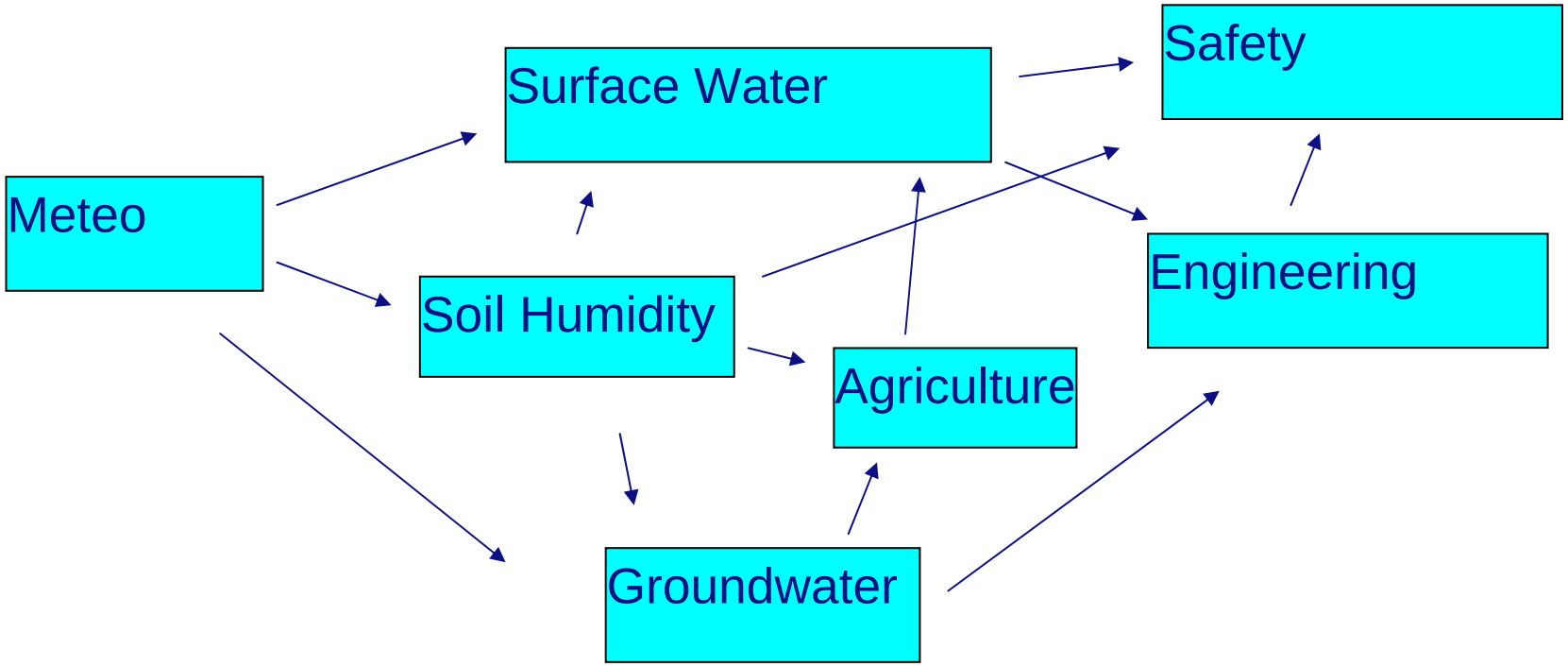
- Integrate Sensornetworks in the National GIS infrastructure
- Improve exchange between institutes
- Use SWE as input for models and applications

Why Standardisation?

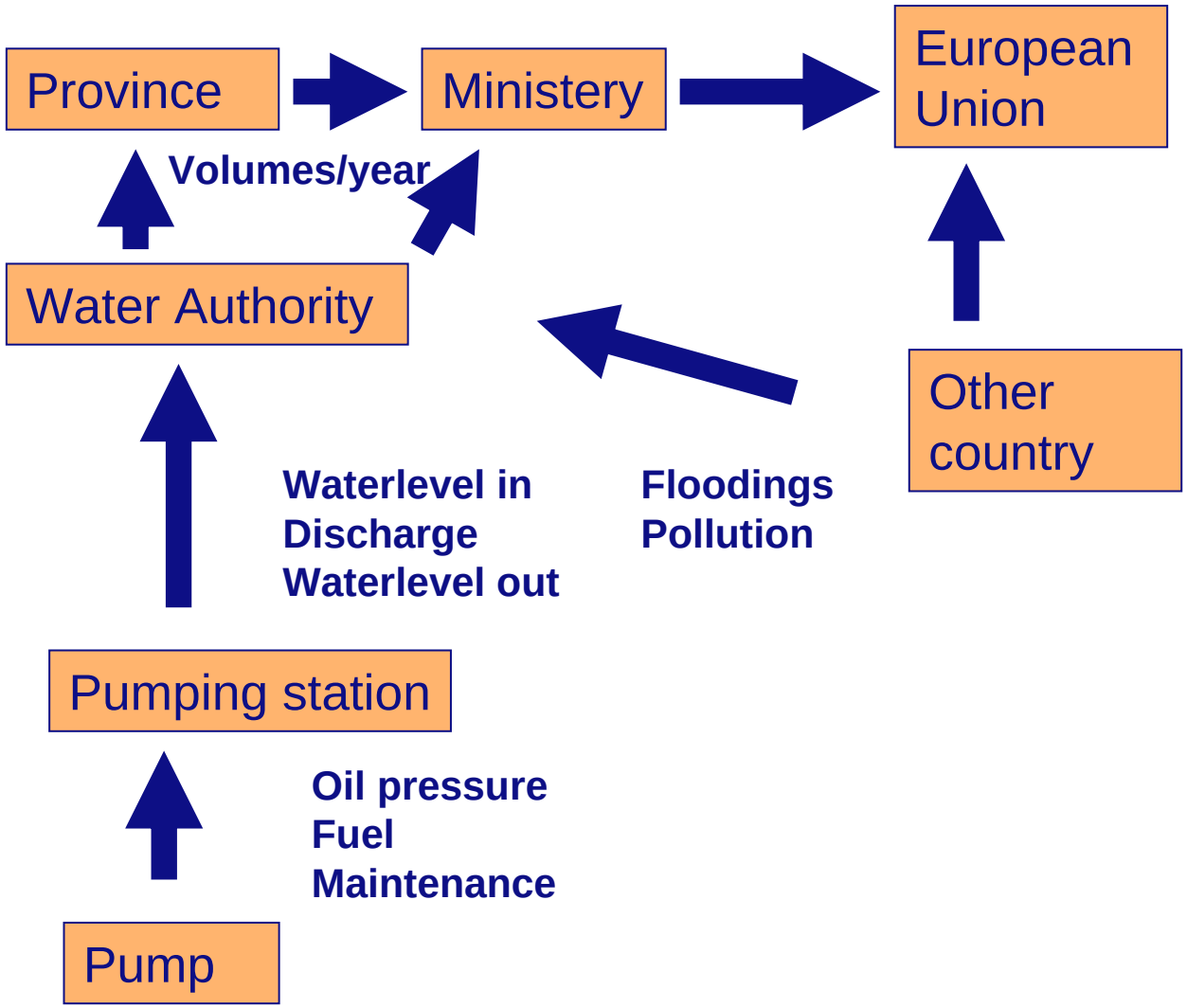
Trend:

- Cooperation between domains
- Cooperation between organisations
- Cooperation between scale of monitoring
- Cooperation between old-actual-prediction data

1. Cooperation between domains:



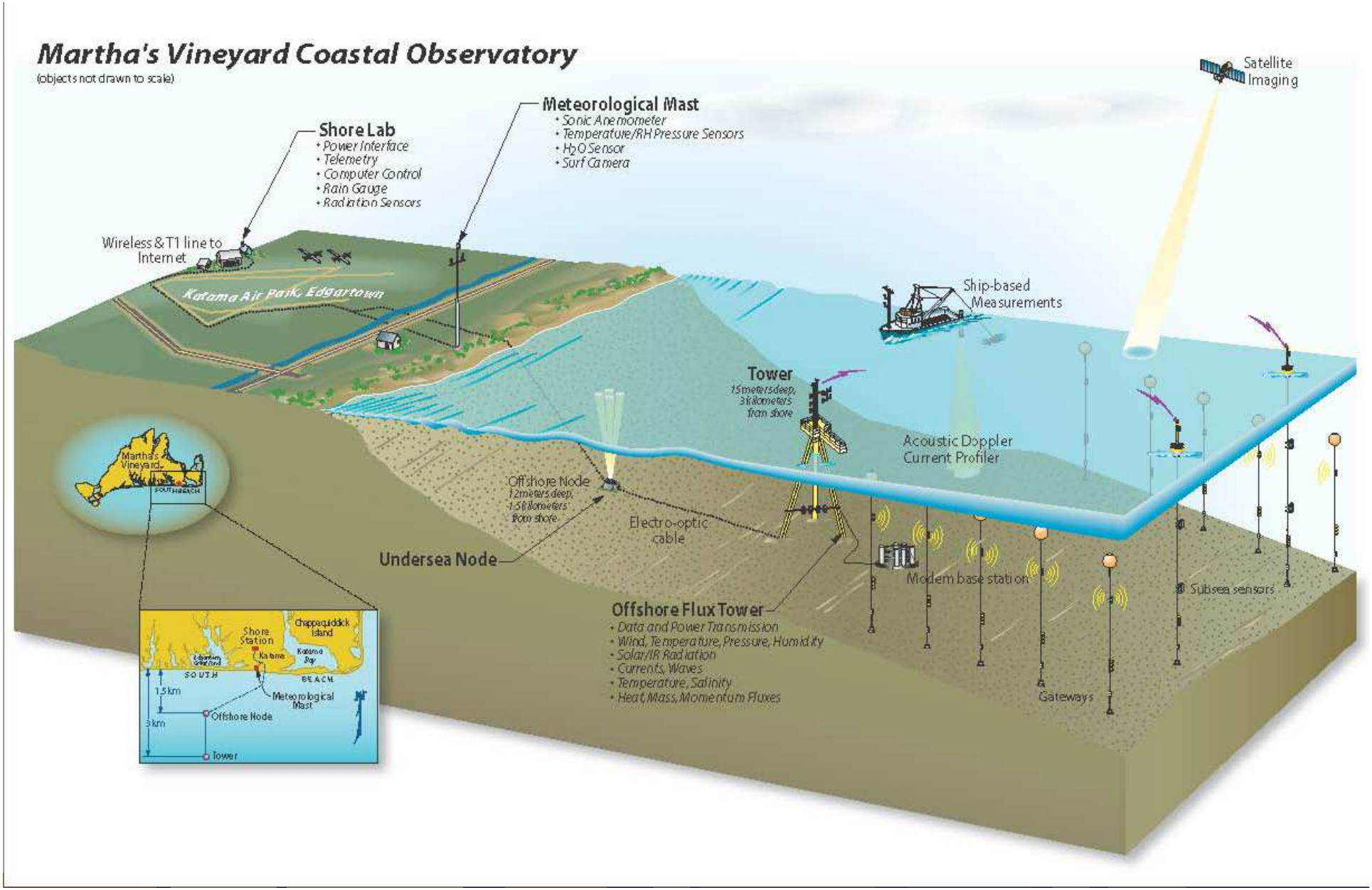
2. Cooperation between organisations

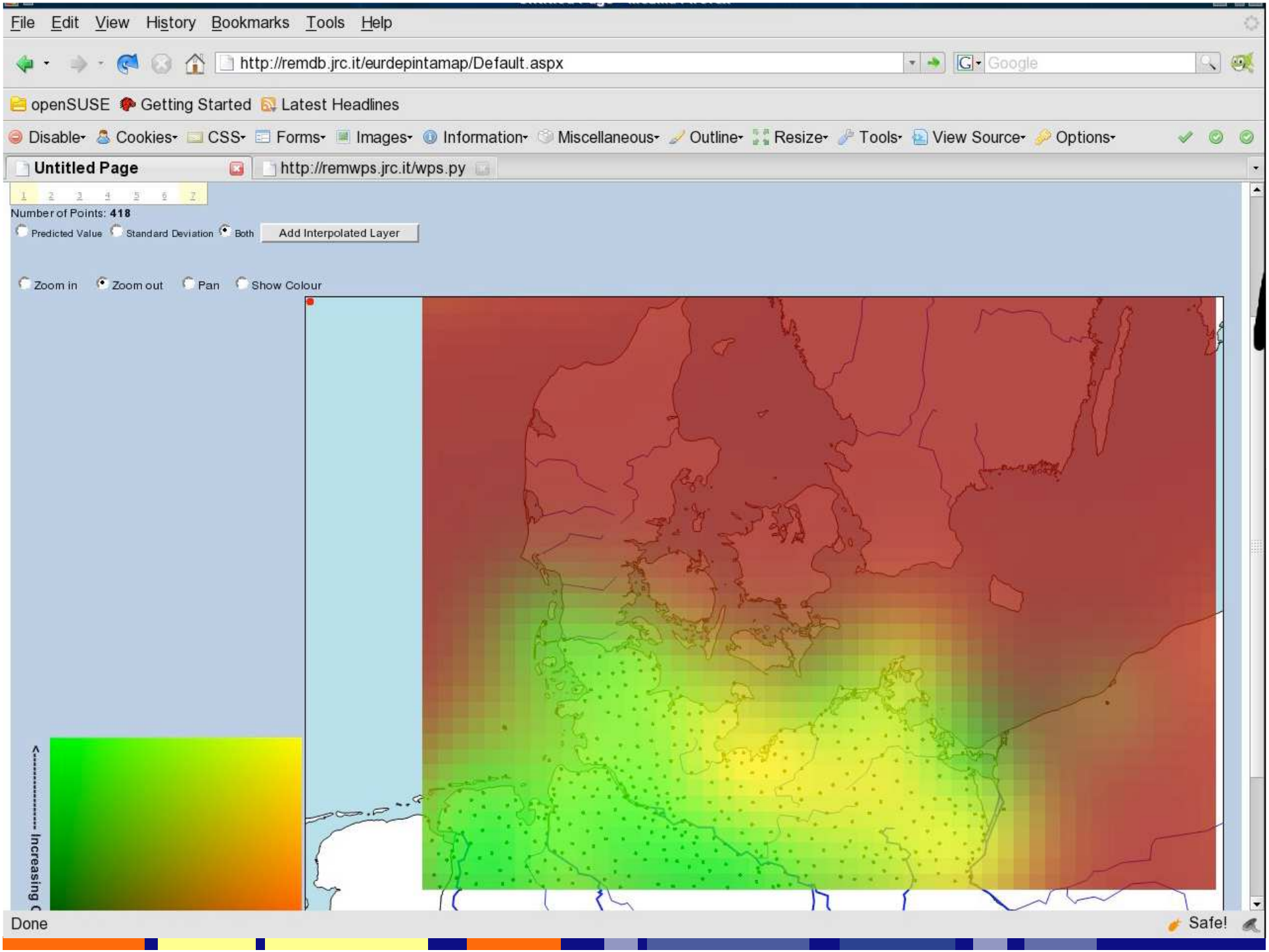


3. Spatial scale

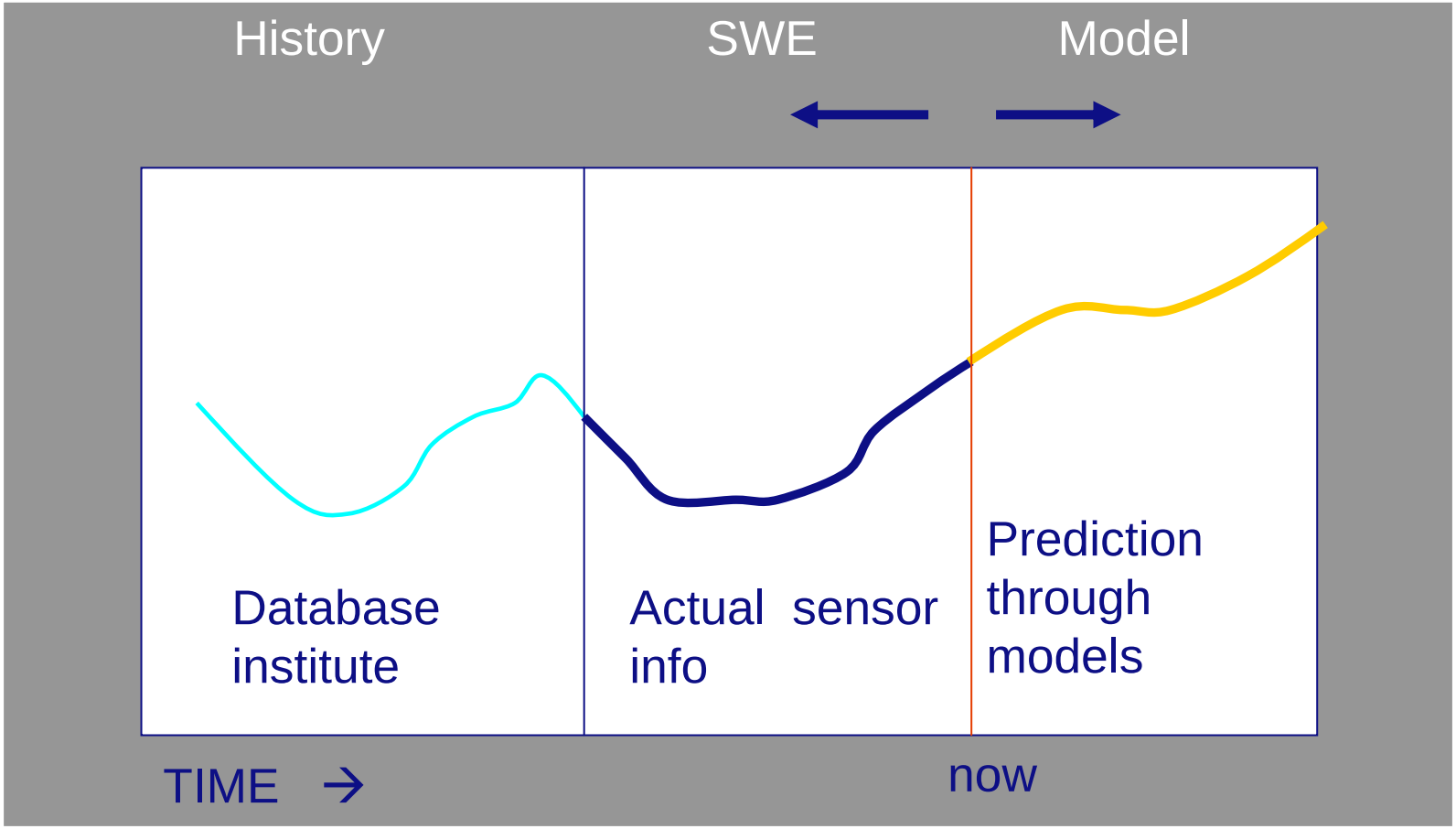
- Overview: Remote Sensing
  large volumes, periodical
- National Weather stations , LOFAR
  continue, ADSL, wired locations
- Regionaal: Field sensors
  many, wireless, periodical, small volumes
- Buildings
  Engines
  Laboratories
  Wired and powered sensors
  Continue, often no storage

Many domains




File Edit View History Bookmarks Tools Help
http://remdb.jrc.it/eurdepintamap/Default.aspx
Google
openSUSE Getting Started Latest Headlines
Disable Cookies CSS Forms Images Information Miscellaneous Outline Resize Tools View Source Options
Untitled Page
http://remwps.jrc.it/wps.py
Number of Points: 418
Predicted Value
Standard Deviation
Both
Add Interpolated Layer
Zoom in
Zoom out
Pan
Show Colour
Increasing
Done
Safe!

4. Relatie met Tijd, meerdere bronnen



Present public systems with SWE

- SensorBay, Canada
  http://www.sensorbay.ca/web/guest/find-view
- Sensors in de Oceanen rond de USA
  http://www.openioos.org/testbed/sos/gm_sos.html
- Zuid Afrika Beheer van bos- en veldbranden
  http://divenos.meraka.csir.co.za/afis/
- EU- project: Osiris, milieuverontreiniging en rampbestrijding
  http://www.osiris-fp7.eu
- GITEWS. Waarschuwingssysteem rampen (tsunami's)
  http://www.gitews.de
- SANY. EU-project ontwikkeling SWE en bijbehorende implementaties.
  http://www.sany-ip.eu

Conclusion 1:
Many organisational restrictions

• Privatisation restricts free access	Meteo Institute Groundwater Institute
• Contract dependencies	Hydraulic Institute
• Missing responsibility	Soil Humidity
• Lagging Public education	No understanding for statistics, valdidation

Statement: Free exchange between institutes and authorities

Conclusion 2:
Trend in field sensors contrary to SWE

Trend: smaller and wireless sensors

- Batteries limit energy consumption
- Wireless protocol requires compact messaging

Possible in 3-4 year??
- WIMAX protocol
- Alternative energy supply wind -- bio -- sun

Conclusion 3 SWE has to much freedom
Detailed profiles for each domain required

- Names of measurements, processes and definitions
- Unit of measurements
- Axes, positive-negative
- Symbols and colors

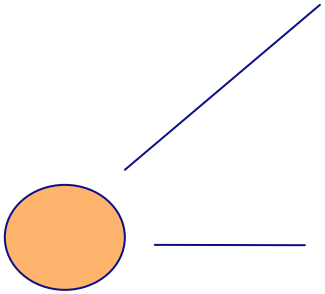
Conclusie 4 Applicaties

- Ready made applications needed for
  - Data input
  - Statistical processes
  - Data fusion and generalisation
  - Graphical and visualisation tools
- Loose relation with location and GML

Optional relation with GML

Electronic BUS

engines, factories cars, planes,



Timeseries on fixed locations

Laboratorium reports

Alarm systems

Fixed sample Location with ID

Suitable
for
suburbs?


B40D0314
B40D0223
Haalderen
B40D0135
B40D0068
B40D0068
Bemmelse Waard
B40D0323
B40D0242
B40D0244
B40D0318
B40D0040
B40D0241
B40D0243
B40D0066
B40D0067
B40D0254
B40D0240
B40D0324
B40D1359
B40D00290
B40D0224
B40D0298
B40D0064
B40D0225
B40D0262
B40D0066
B40D1285
B40D0070
B40D1300
Kwaliteit Zwemwater Walburgen
B40D0039
Zwemwater
B40D0071
B40D0071
B40D1289
B40D0286
B40D0333
B40D1296
Gendtse Waard
B40D0248
B40D0381
B40D0265
Ooij
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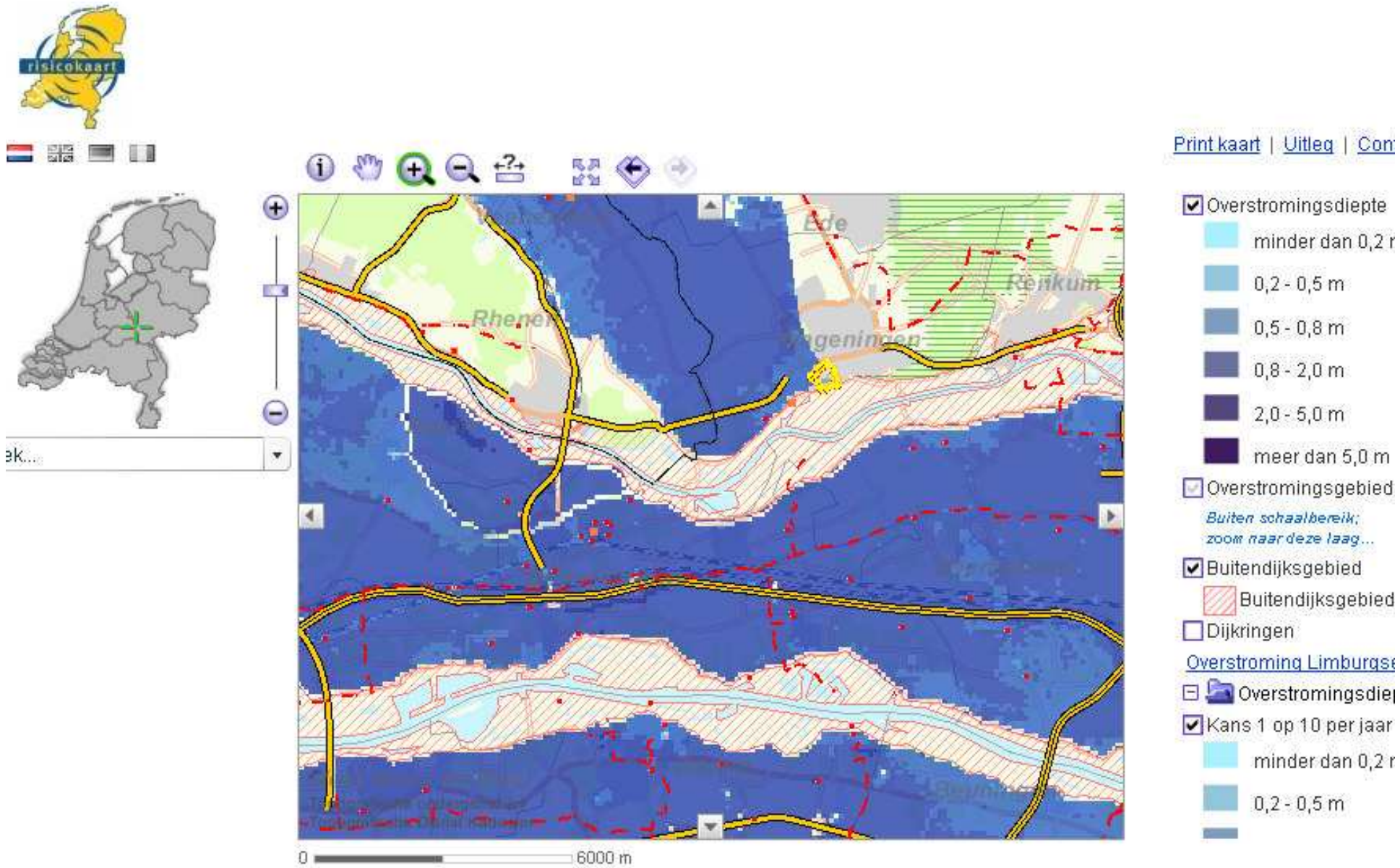
Image © 2008 Aerodata International Surveys
© 2008 Tele Atlas
Google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Print kaart | Uitleg | Con
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0,8 - 2,0 m
2,0 - 5,0 m
meer dan 5,0 m
Overstromingsgebied
Buiten schaalbereik;
zoom naar deze laag...
Buitendijksgebied
Buitendijksgebied
Dijkringen
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Kans 1 op 10 per jaar
minder dan 0,2 r
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Rhenen
Ede
Renkum
Wageningen
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6000 m
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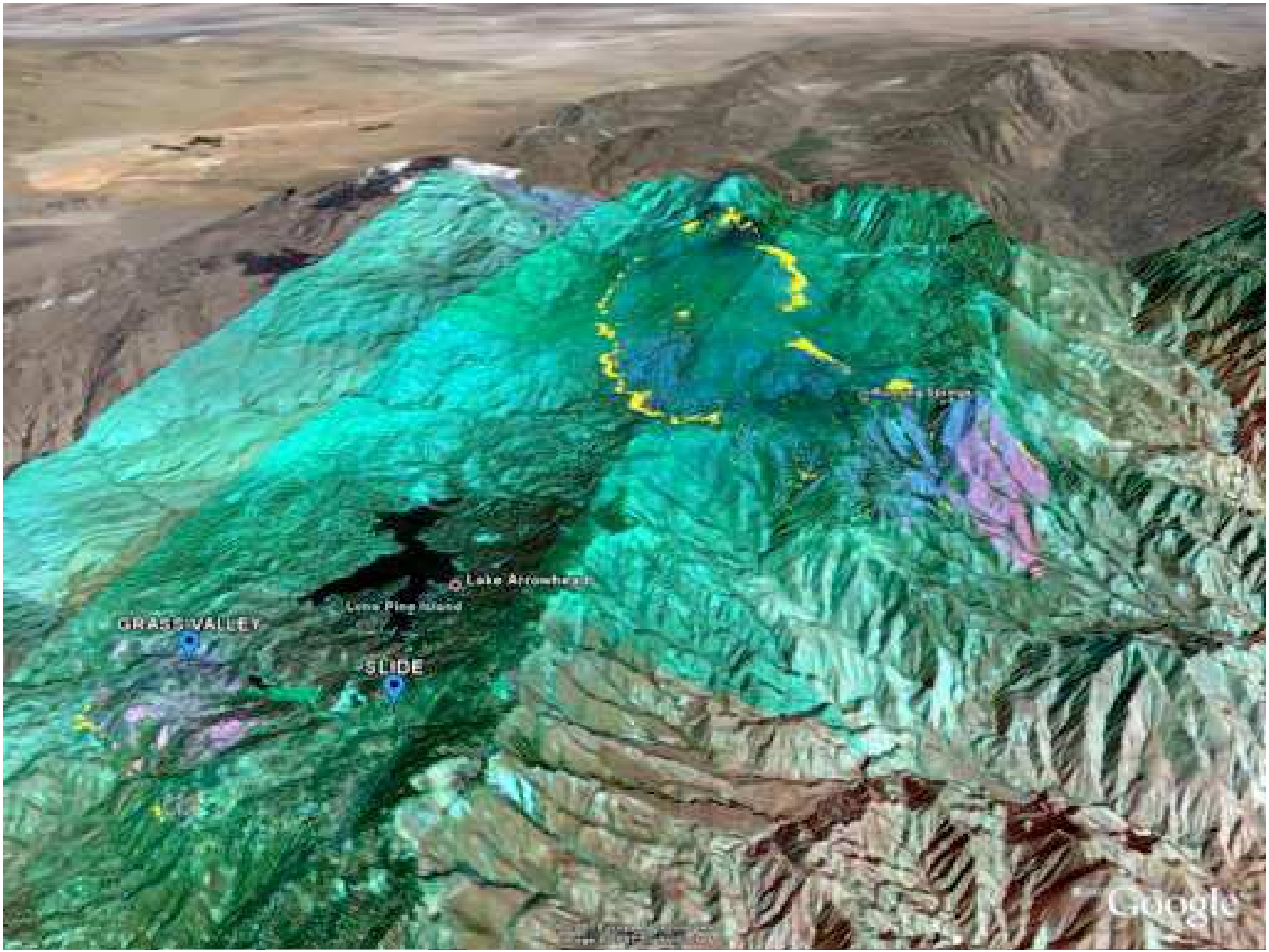
okaart; aan deze kaart kunnen geen rechten worden ontleend.

Project Partners Sensornetwerk

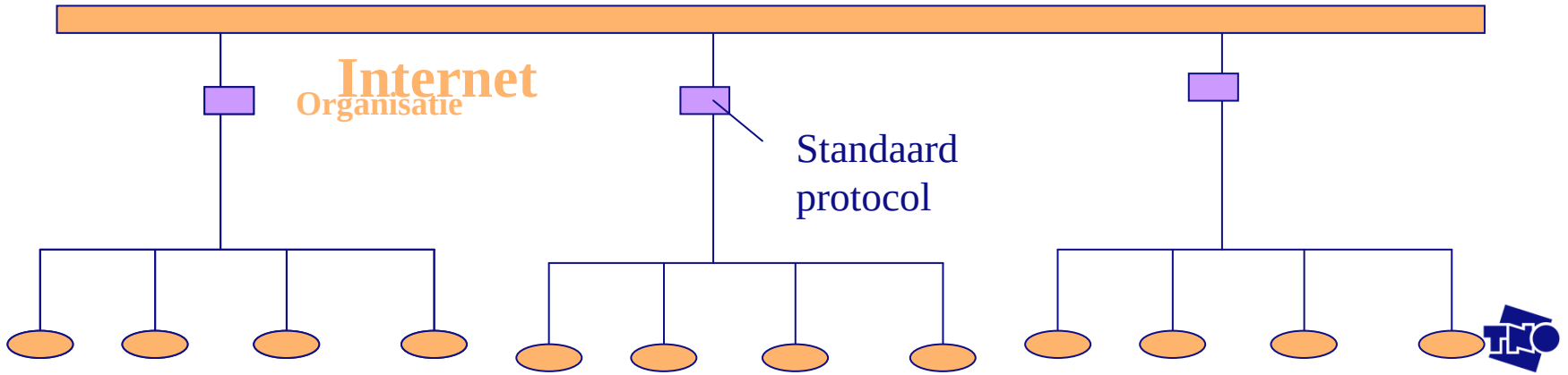
- KPN — National Telecommunications
- LOFAR — Super fast scientific fibre network
- KNMI — Royal Netherlands Meteorology Institute
- WUR — Wageningen Universiteit
- Alterra — Agricultural Scientific Institute
- Delft Hydr. — Delft Hydraulical laboratory
- GeoDelft — Centre for Geo-Engineering
- Eijkelkamp — Supplier of sensors for industry and environment.
- TNO B&O — Geological Survey of the Netherlands
- IFGI — Institute for Geo-Informatics (Germany)

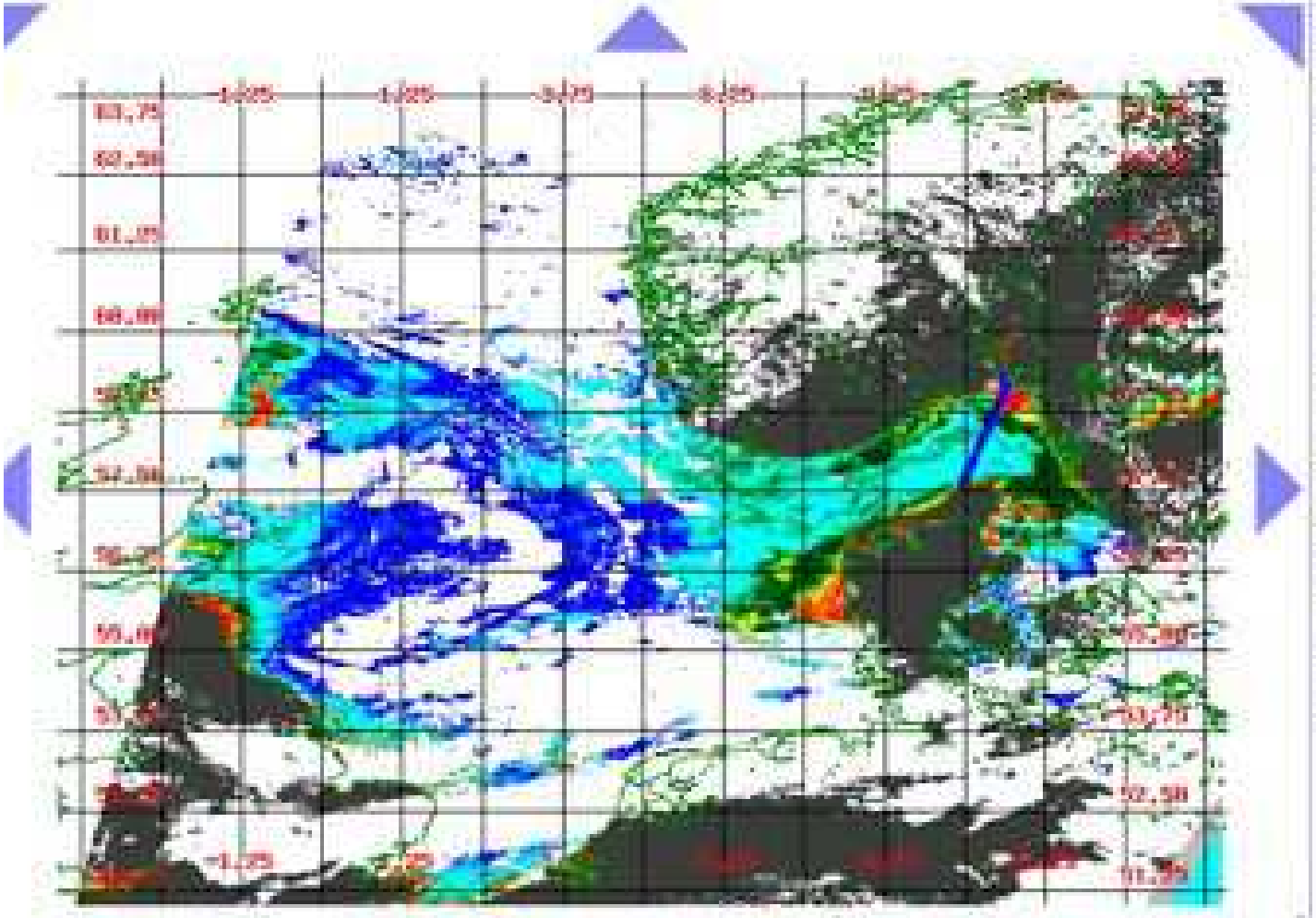
In consultation with the project “IJkdijk” in Groningen


Lake Arrowhead
Lone Pine Island
GRASS VALLEY
SLIDE
Google

Water Management

Samenwerking





Intro || Updates || News || Notes || Summary

Notes

Chlorophyll-20050610 (Source: NERSC) Chlorophyll-a concentration derived from MERIS data, 10 June 2005, 0:21z.

Layers

- Chlorophyll-20050608
- Chlorophyll-20050609
- Chlorophyll-20050610
- Chlorophyll-20050611
- Chlorophyll-20050612
- Chlorophyll-20050613
- Chlorophyll-20050614
- Chlorophyll-20050615
- Ferrybox chla-020604
- Ferrybox chla-fluoresc-140605
- hab-fish-tox-020604

Refresh Map

0 350 km

Controls

Zoom: Size 2 In Out

Pan

DISPRO Home

original extent

Automatische Water Kwaliteits metingen

WARMER project

Prototype miniaturized chemical sensors
Integrated in modular flow-cells

- **NO3-**
- **NH4+**
- **K+**
- **Na+**
- **Cl-**
- **Pb2+ , Cd2+, Cu2+**
- **Hg2+, Fe3+, Cr6+**

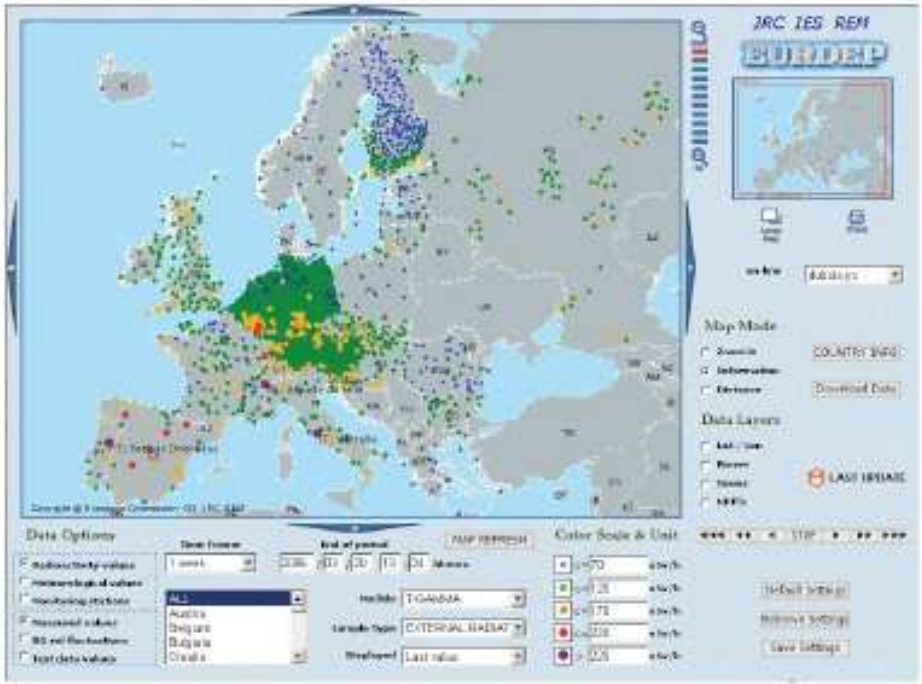
Chemical sensors

- **Potentiometric sensors**
- **Stripping voltammetry sensors**
- **Pb2+, Cd2+, Cu2+, Zn2+**
- **Miniaturized colorimetric flow-cell with fibre optics**
- **NH3, NO2 , PO4**

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

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

Voorgestelde Standaard: Sensor Web Enablement

OGC Sensor Web Enablement (SWE)

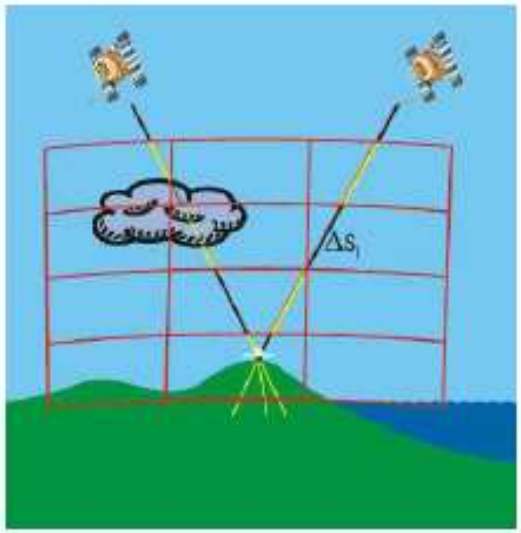
- Open Geospatial Consortium (OGC) initiative

- Web services
  - Sensor Observation service for data access
  - Sensor Planning Service for sensor tasking and feasibility studies,
  - Sensor Alert Service for registering atomic conditions and push based notification,
  - Web Notification Service as a data transport protocol transformer

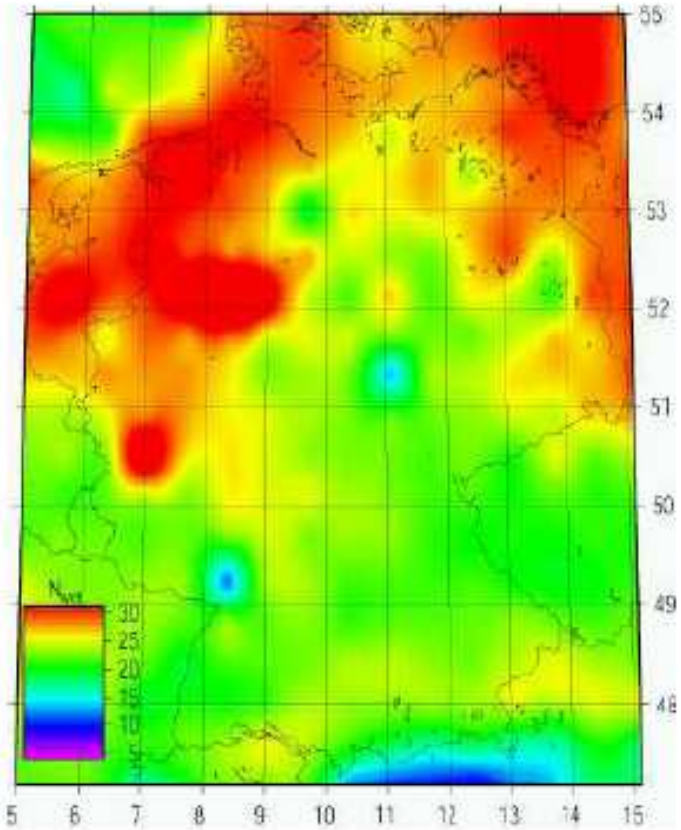
- Data models and encodings
  - Observation & Measurement (O&M)
  - Sensor Model Language (SensorML)

Atmospheric water vapor concentration based on GPS tomographie

Integrated water vapor (IWV) along the line of sight between ground pased GPS receiver and satellite is the base for 3D reconstructions



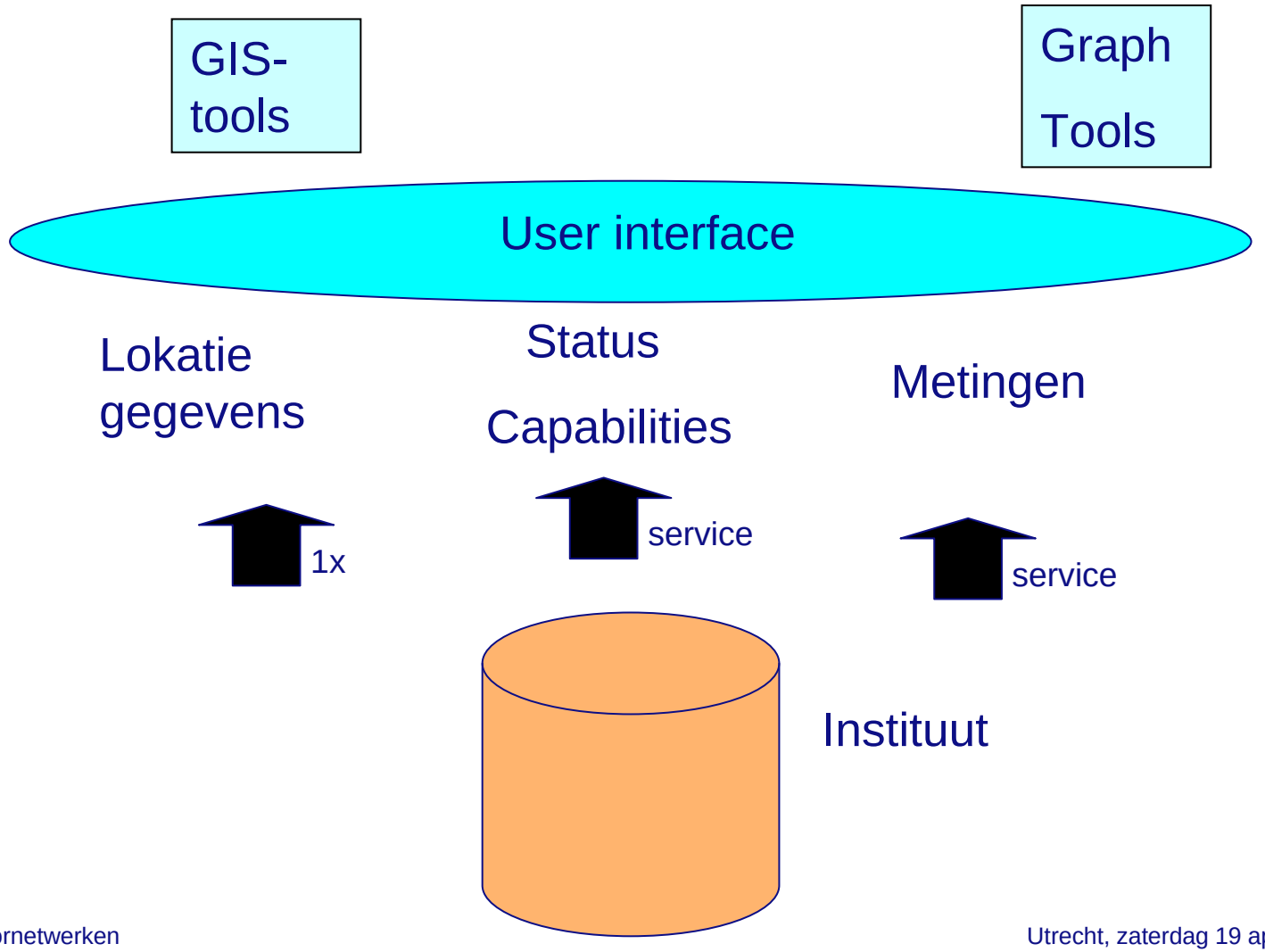
Slants and 3D water vapor (Figure from Troller, ETH)



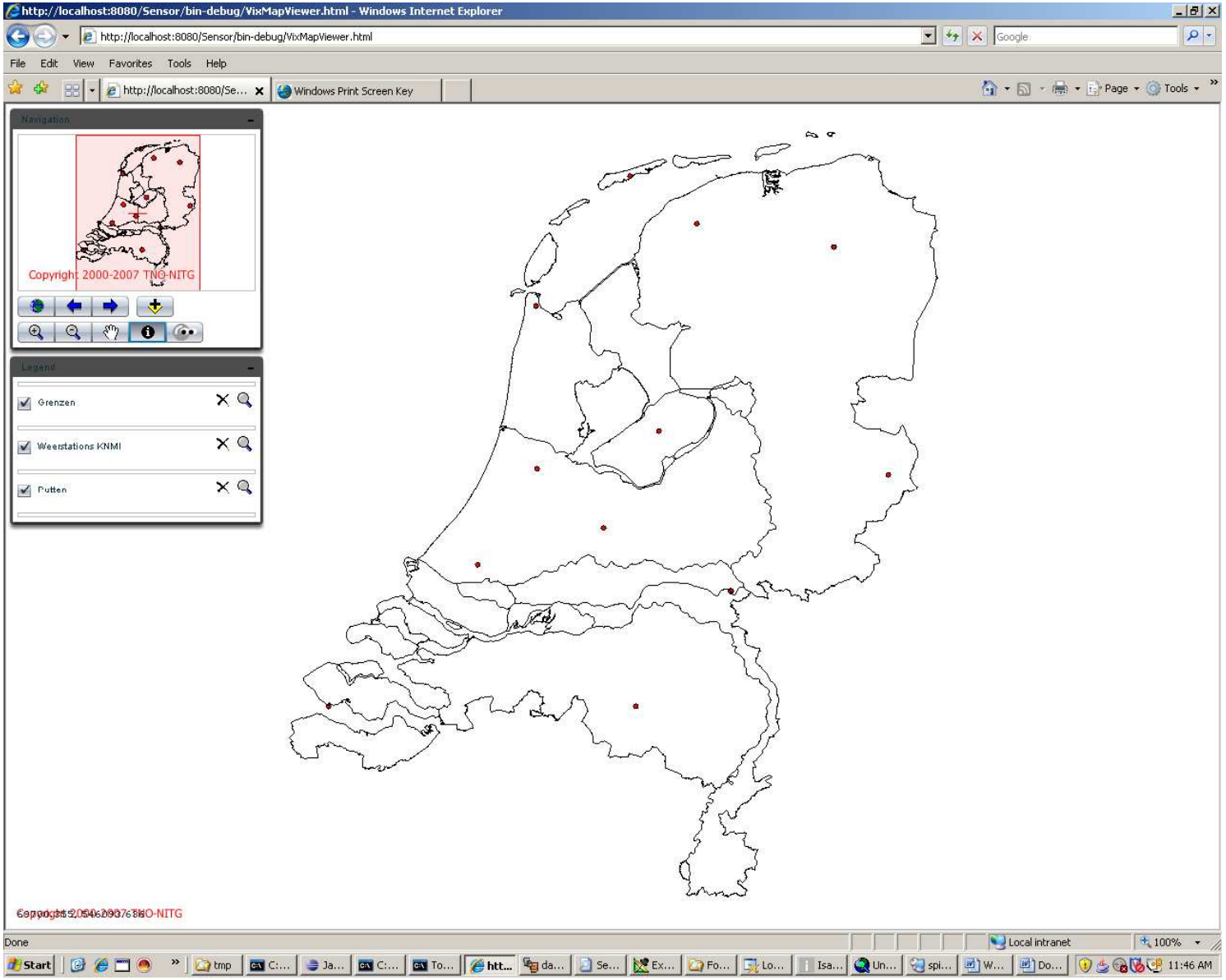
3D IWV at 500m from a 3D reconstruction based on the German ground network (139 stations used) (figures from Wickert, GFZ)

Bundesamt für Strahlenschutz

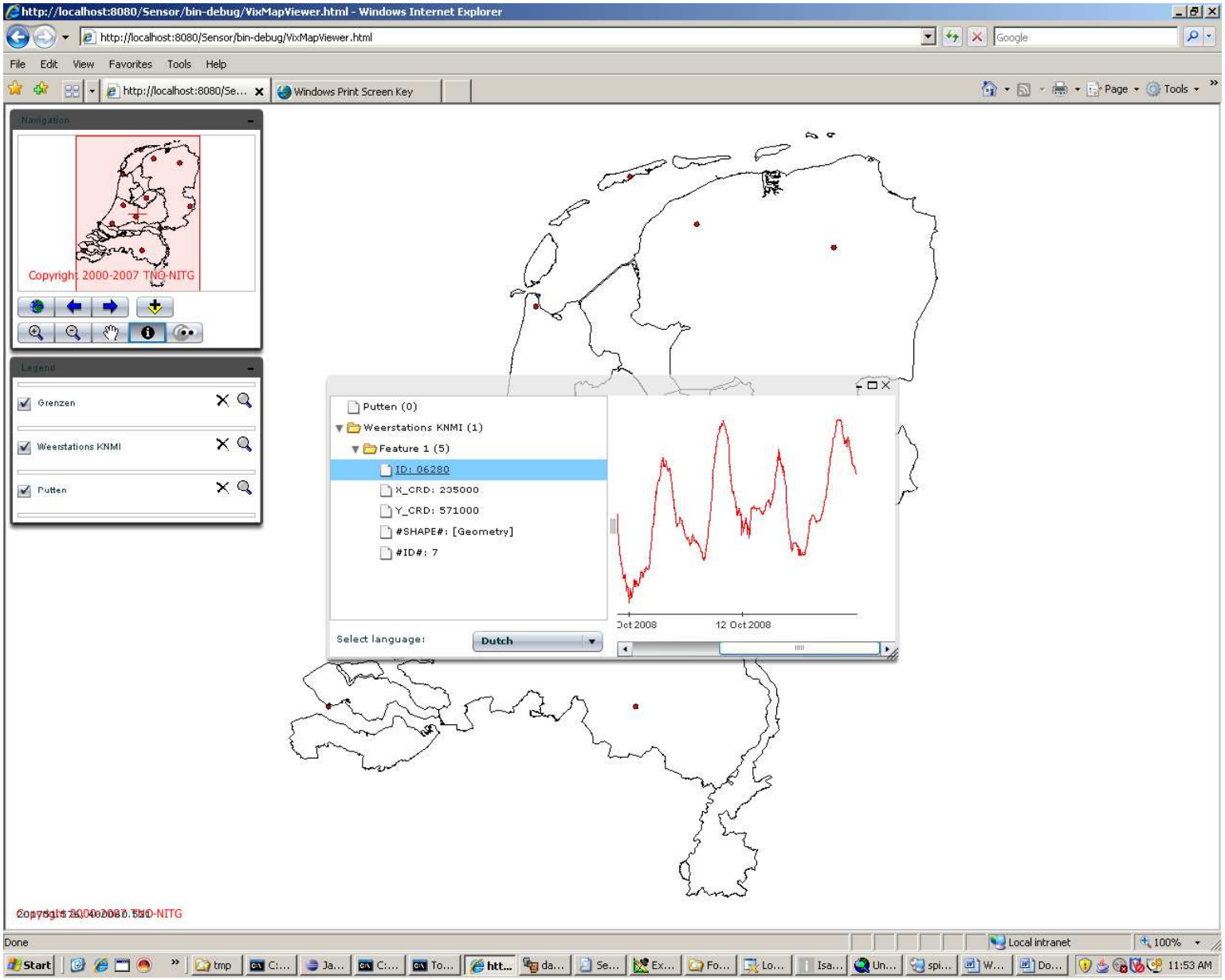
Publishing sensor information per institute



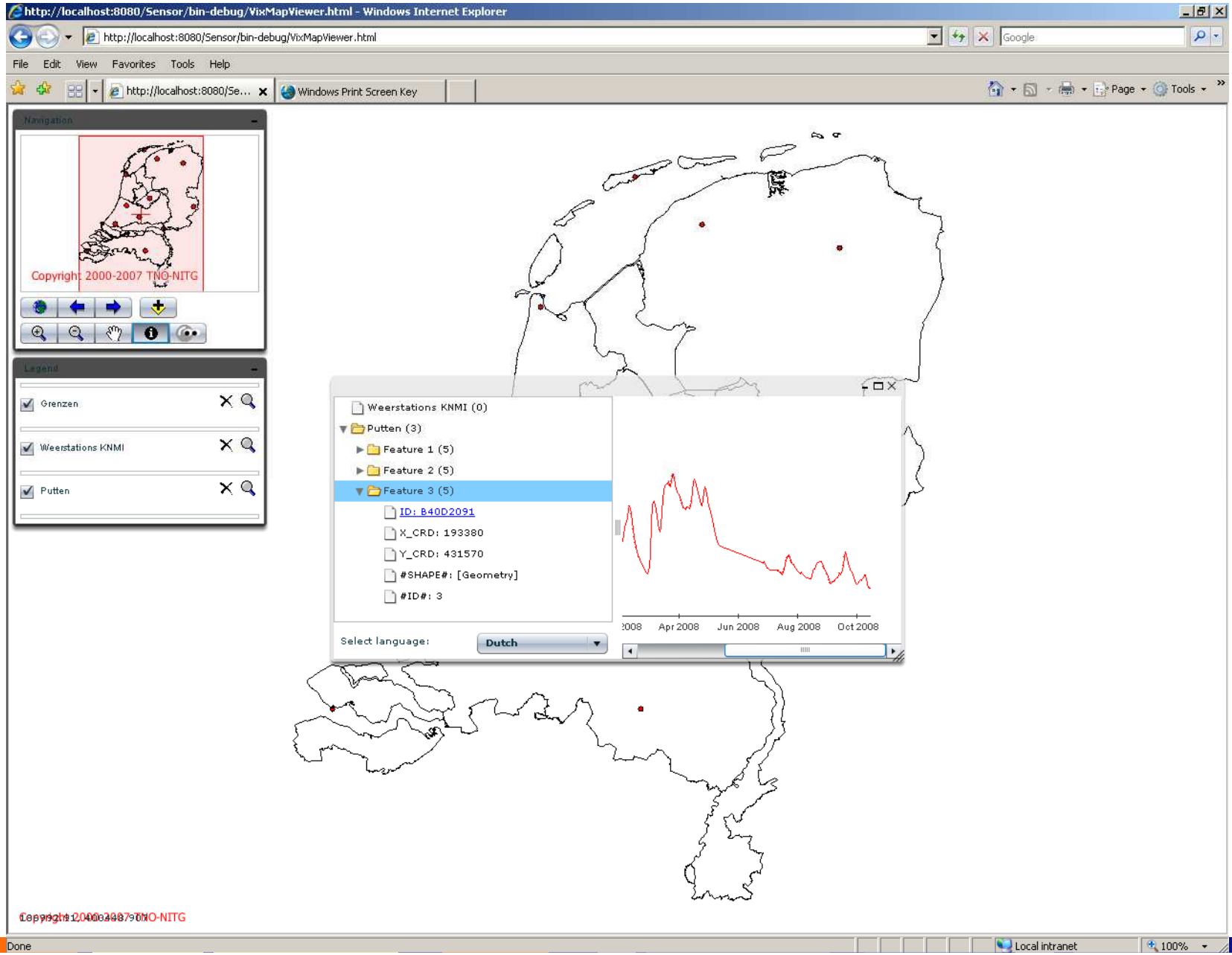
Meetnet Meteo (mapservice bij TNO)



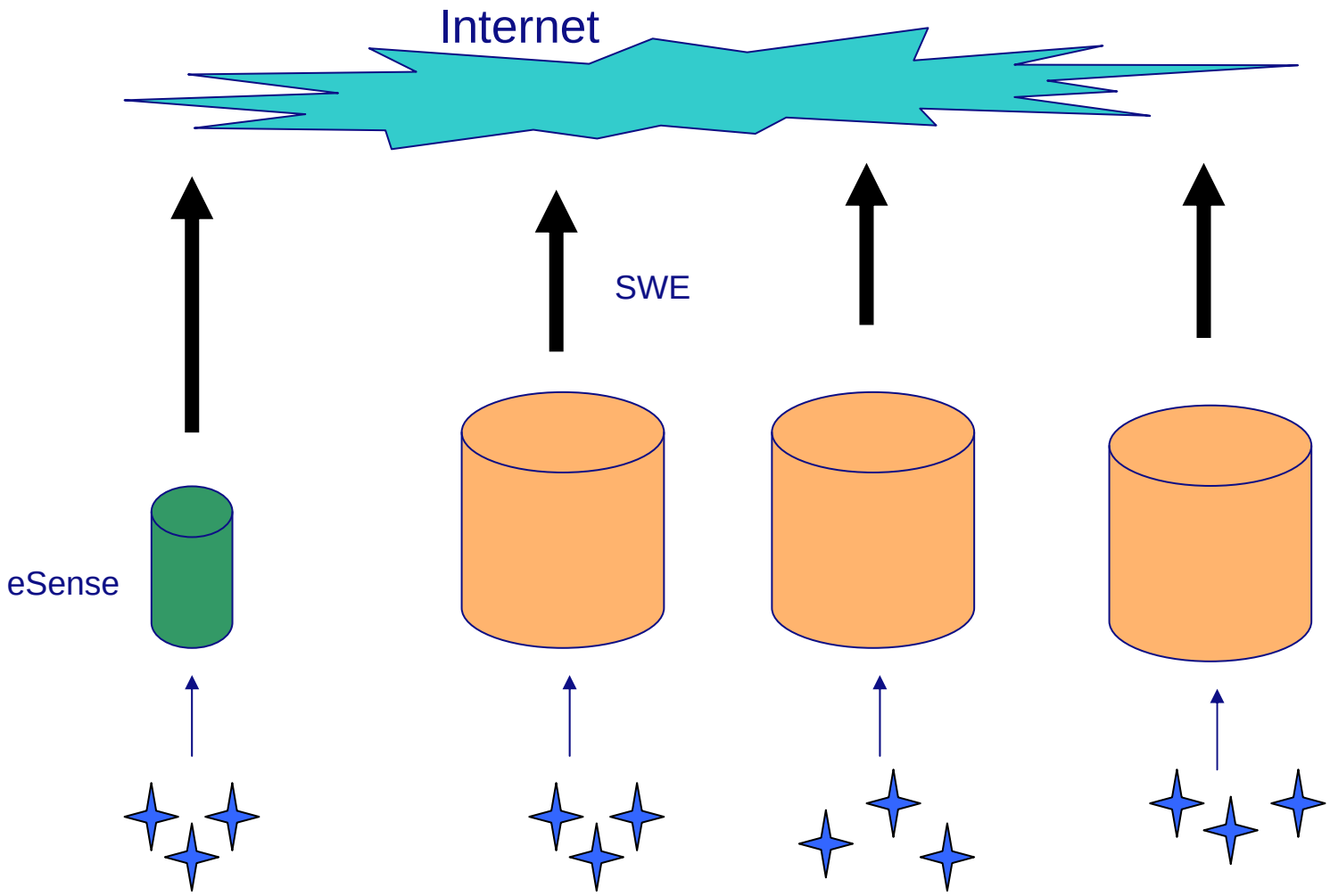
Meetnet Meteo Presentatie



Meetnet Grondwater Webservice



Flow sensor information



Middag programma

Lunch

13.20 – 13.40	Ontwikkelingen draadloze communicatie met sensoren Hans van Rheenen, Eijkelkamp
13.40 – 14.00	Perspectief Datacommunicatie KPN Joost Fleuren, KPN
14.20 – 14.40	Positieve en negatieve ervaringen tijdens toepassing van SWE Jan Jellema, TNO
15.00 – 16.00	Discussie
16.00	Sluiting

Voorstellen / Ideen

- Kleine samenwerkingsprojecten Instituut – Waterschap
- Europees project Framework Water
- Testproject Democratisch Netwerk (Web 3.0)
- Vrije gegegevens-uitwisseling tussen instituten.
- Vrije uitwisseling tussen RWS en Waterschappen
- Presentatie Voorspellingen