



EO2HEAVEN

Earth Observation and ENVironmental modelling for the mitigation of HEAlth risks

EO2HEAVEN Overview

OGC Health DWG Adhoc

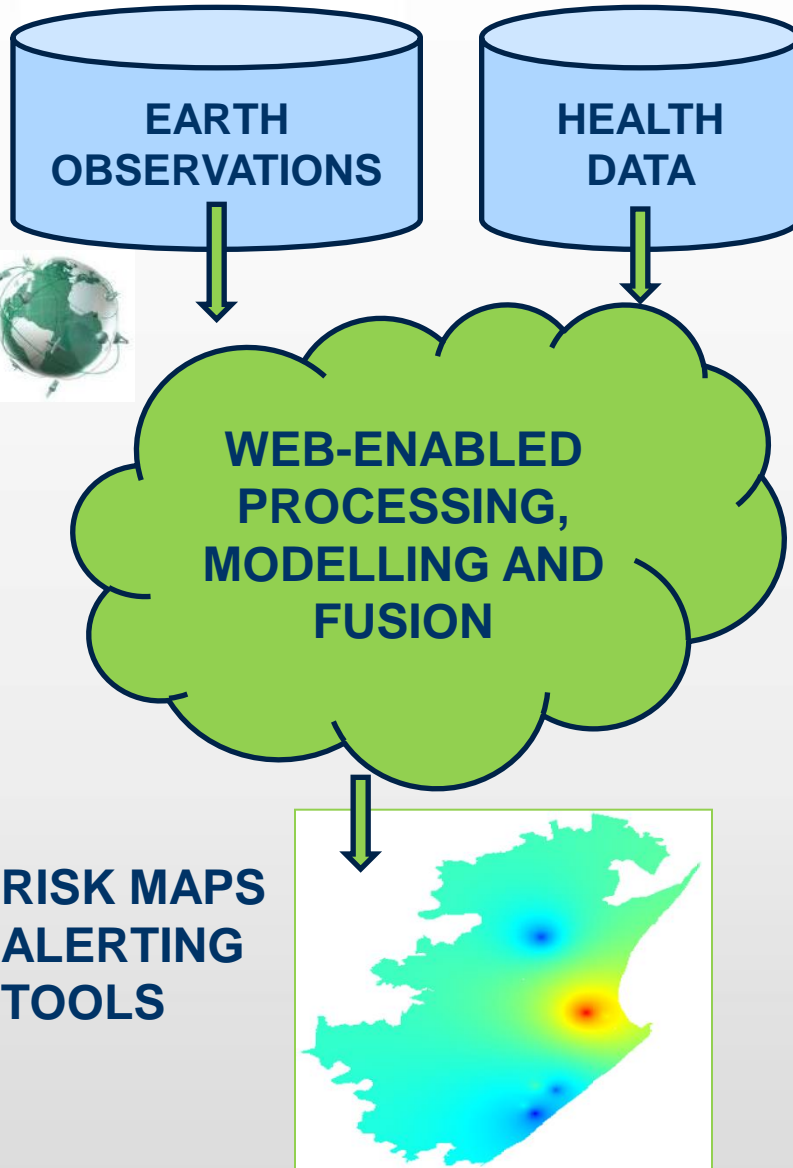
31st May 2013

Kym Watson, Coordinator EO2HEAVEN, Fraunhofer IOSB

Ingo Simonis, Technical Manager EO2HEAVEN, OGCE

Project Facts and Figures

- FP7 Theme 6 Environment (including Climate Change)
- Grant Agreement 244100, Large-scale Integrating Project
- Duration: 02/2010 – 05/2013
- 13 Partners (3 from Africa)
- Budget ~8.7 M€, EU-funding ~6.3M€



Air Quality and/or Aeroallergens

Image: UKZN



Durban,
Saxony

Water borne disease cholera

Image: S. Woodborne, CSIR



Uganda



Multi-Disciplinary Approach



- Health
- Epidemiology
- Microbiology
- Geo-informatics, ICT
- Modelling and Statistics



Makerere University College of Health Sciences



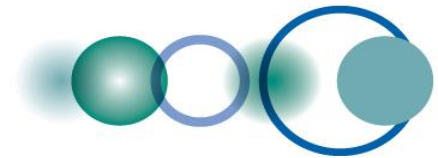
Royal Tropical Institute



GEO and GEOSS



<http://www.earthobservations.org>



EO²HEAVEN is
in SBA Health,

also relevant:
Water
Climate

EO2HEAVEN Contributions to GEO Workplan 2012-2015

- IN 05 GEOS Design and Interoperability: AIP 3, AIP 4, led the AIP 5 SBA Health threads,
- HE 01 Tools and Information for Health Decision Making
 - Coordinator: Rifat Hossain / WHO
 - C1 Air-borne Diseases, Air Quality and Aeroallergens
 - C2 Water-borne Diseases, Water Quality and Risk
- ID-02 Developing Institutional and Individual Capacity: Stakeholder and training workshops
- Participation in Health & Environment Community of Practice

Spatial Information Infrastructure



Making the results sustainable

- Capacity building with stakeholders
- Open specifications and best practices
 - Spatial Information Infrastructure for health & environment data
 - Candidate OGC Best Practices to facilitate usage of SOS service (voting in OGC ends 22/06/13)
 - Microbiological sampling
- Software Components as open source
- Collaboration with organizations in GEO Health & Environment CoP
- Targeted: OGC Health DWG

Cholera case study in Uganda

An illustrative example of some issues in health surveillance

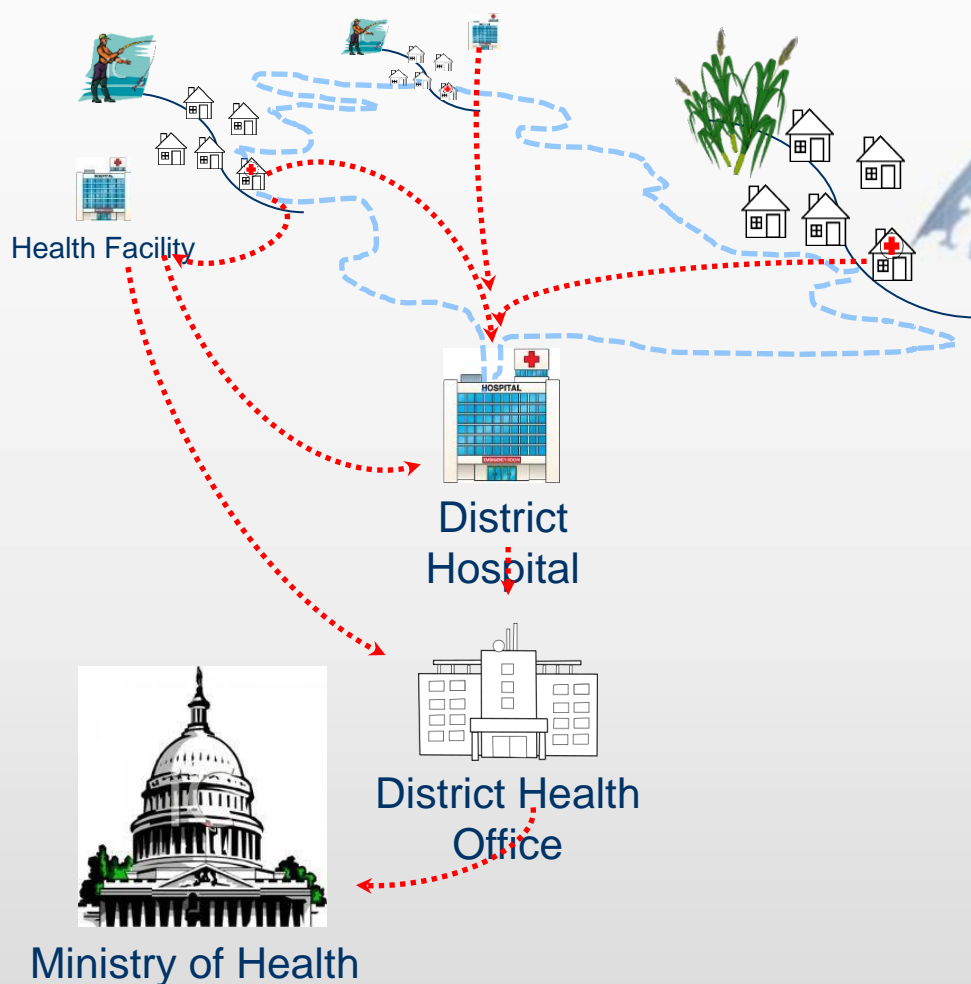
Cholera rapid response

Tasks of a response system:

1. Rapid detection of cases
2. Prompt detection of outbreaks
3. Monitoring of epidemic
4. Monitoring program interventions



Uganda National cholera reporting and information system



1. New cases directly reported to DHO

2. Confirmed cases are directly reported to the MoH

3. Weekly cholera reports are sent to the DHO (33b)

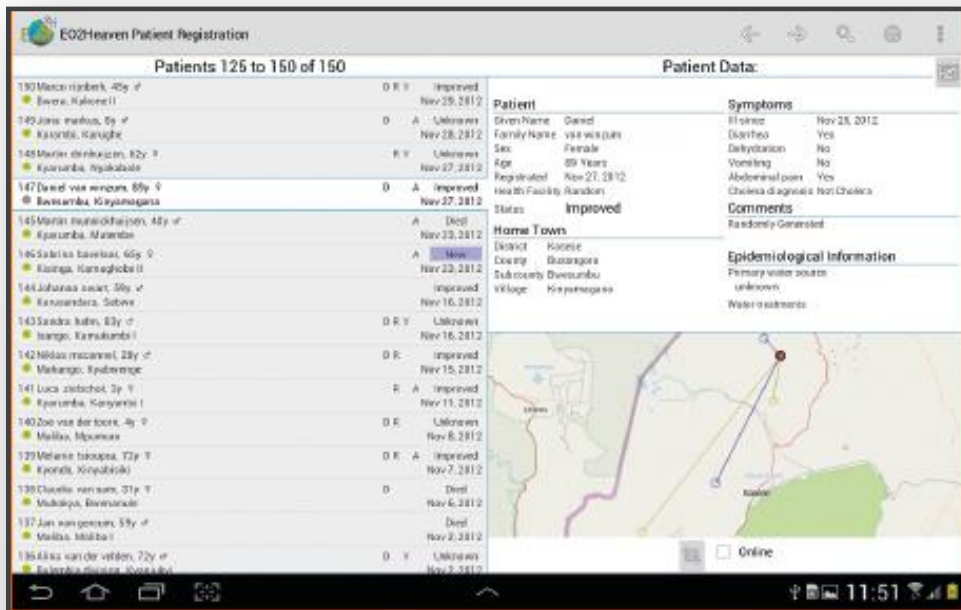
4. Monthly modifiable disease reports sent to the ministry

5. Ministry reports to international community

Dira Disease incidence reporting application as mobile app in field

Case registration application

1. Standardized data entry
2. Complementary to mTRAC
3. Transparent data processing
4. Meets various end user requirements
5. Access control




The screenshot shows the E2Heaven Patient Registration application interface. It features a list of patients on the left, a detailed patient data form in the center, and a map on the right. The patient list includes names, ages, and dates. The patient data form includes fields for patient information, symptoms, home town, and epidemiological information. The map shows the location of the patient's home town.



District Health
Office

Ministry of Health

Dira patient data

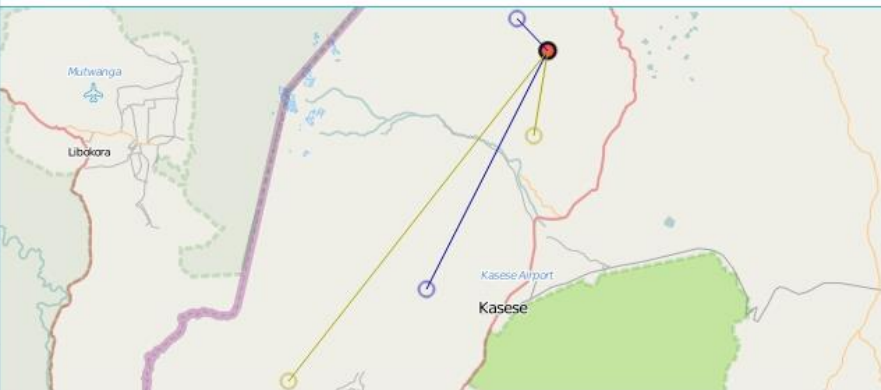

EO2Heaven Patient Registration

← → 🔍 ⊕ ⋮

Patients 125 to 150 of 150

Patient Data:

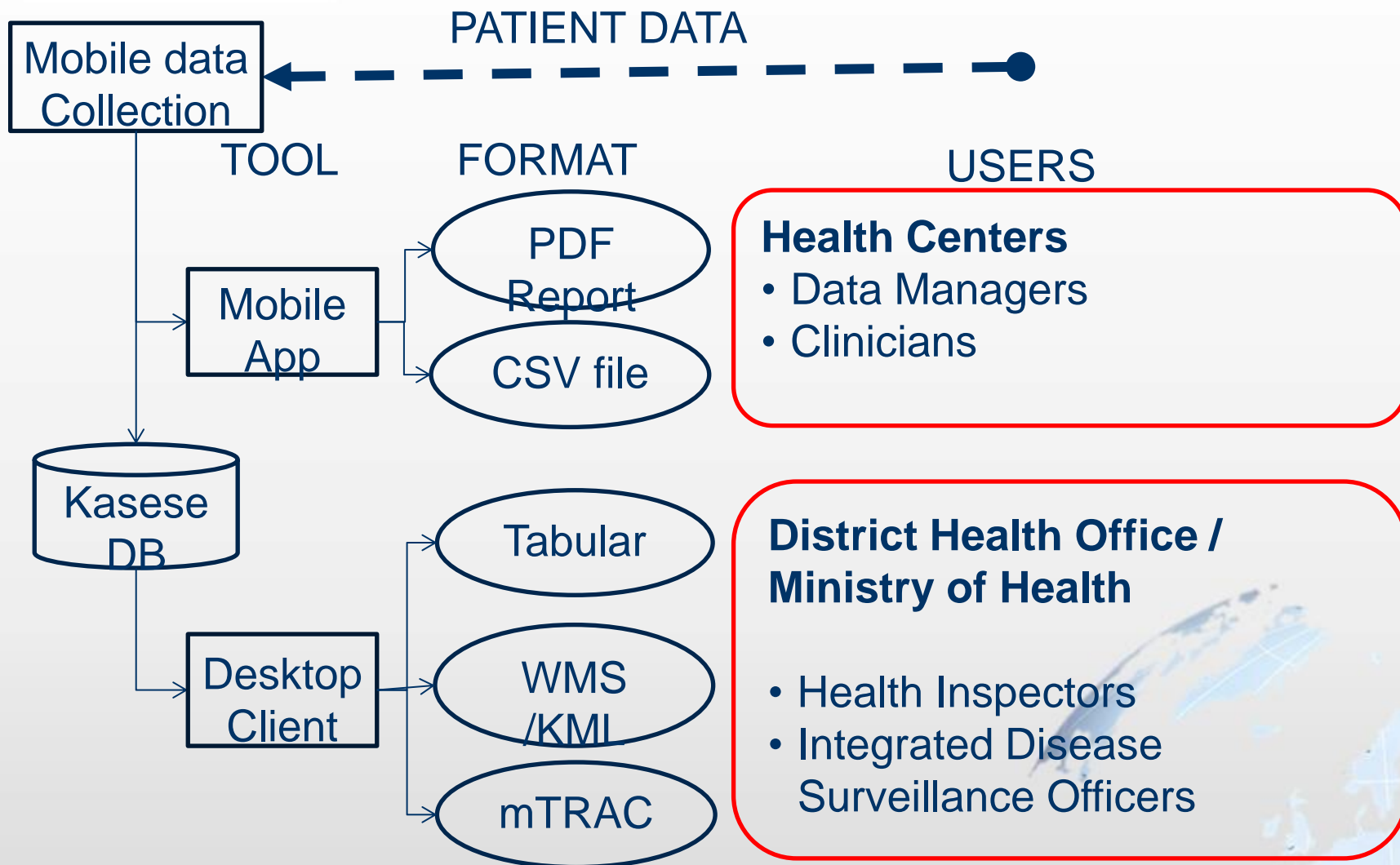
150 Marco rijnberk, 45y ♂ ● Bwera, Kakone II	D R V Improved Nov 29, 2012	Patient Given Name Daniel Family Name van winzum Sex Female Age 89 Years Registrated Nov 27, 2012 Health Facility Random Status Improved Home Town District Kasese County Busongora Subcounty Bwesumbu Village Kinyamagana Symptoms Ill since Nov 25, 2012 Diarrhea Yes Dehydration No Vomiting No Abdominal pain Yes Cholera diagnosis Not Cholera Comments Randomly Generated Epidemiological Information Primary water source unknown Water treatments
149 Jona markus, 8y ♂ ● Karambi, Karughe	D A Unknown Nov 28, 2012	
148 Martin drinhuijzen, 62y ♀ ● Kyarumba, Nyakabale	R V Unknown Nov 27, 2012	
147 Daniel van winzum, 89y ♀ ● Bwesumbu, Kinyamagana	D A Improved Nov 27, 2012	
145 Martin munnickhuijsen, 40y ♂ ● Kyarumba, Matembe	A Died Nov 23, 2012	
146 Sabrina bavelaar, 65y ♀ ● Kisinga, Kamughobe II	A New Nov 23, 2012	
144 Johanna swart, 59y ♂ ● Karusandara, Sebwe	Improved Nov 16, 2012	
143 Sandra hahn, 83y ♂ ● Isango, Kamukumbi I	D R V Unknown Nov 16, 2012	
142 Niklas mcconnel, 28y ♂ ● Mahango, Kyabwenge	D R Improved Nov 15, 2012	
141 Luca zielschot, 3y ♀ ● Kyarumba, Kanyantsi I	R A Improved Nov 11, 2012	
140 Zoe van der toorn, 4y ♀ ● Maliba, Mpumuro	D R Unknown Nov 8, 2012	
139 Melanie tsioupra, 72y ♀ ● Kyondo, Kinyabisiki	D R A Improved Nov 7, 2012	
138 Claudia van sam, 31y ♀ ● Muhokya, Bwenanule	D Died Nov 6, 2012	
137 Jan van gorcum, 59y ♂ ● Maliba, Maliba I	Died Nov 2, 2012	
136 Alina van der velden, 72y ♂ ● Bulembia division, Kyaniukvi	D V Unknown Nov 2, 2012	


☐ Online

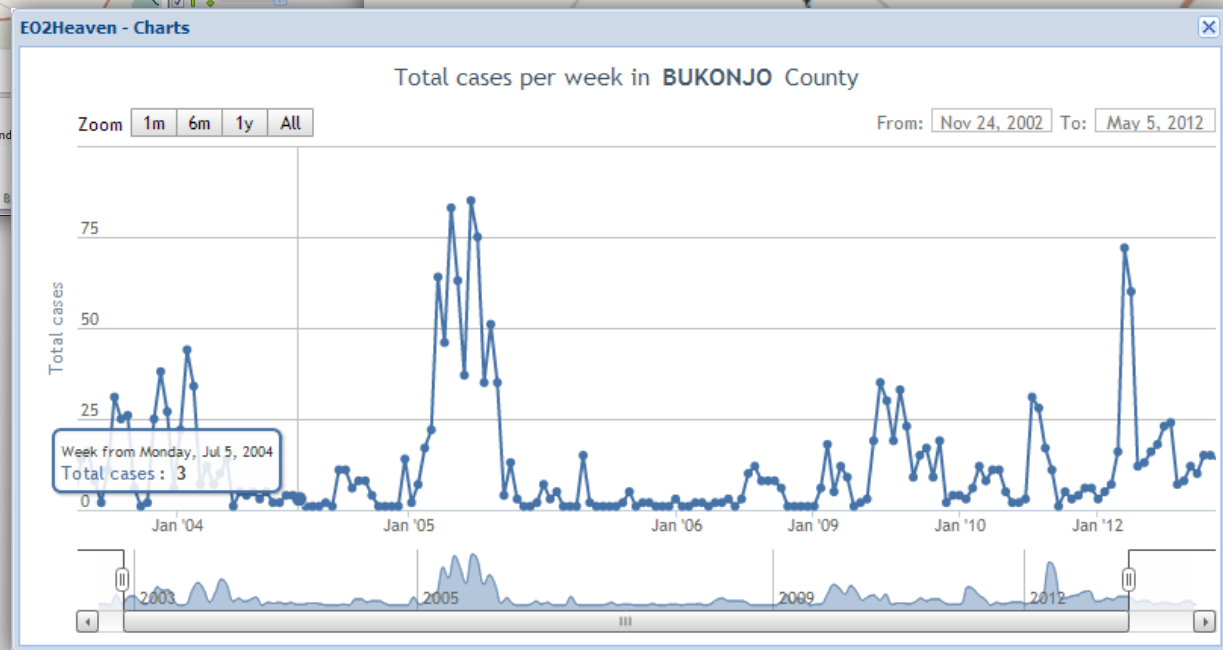
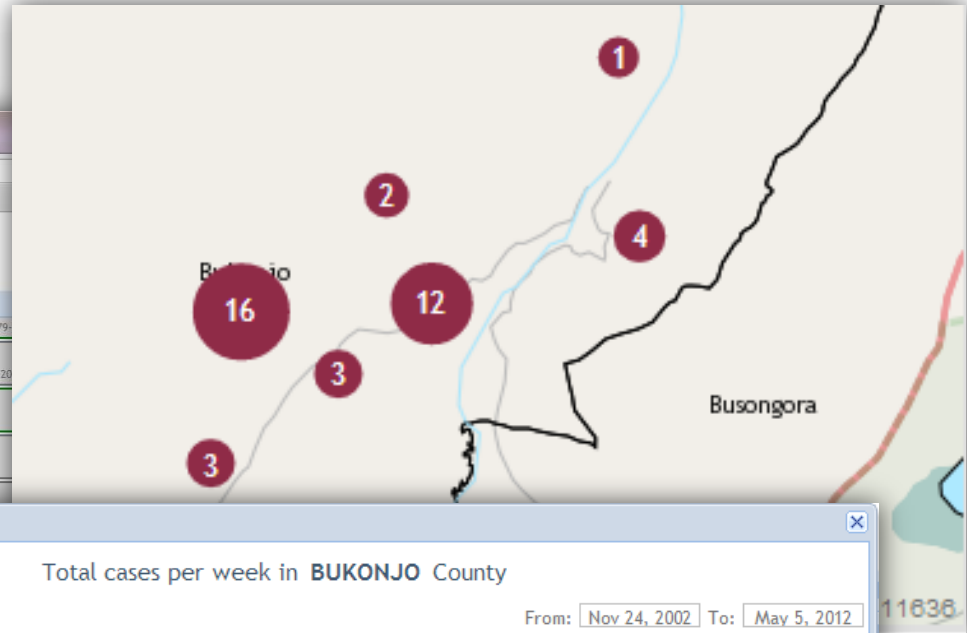
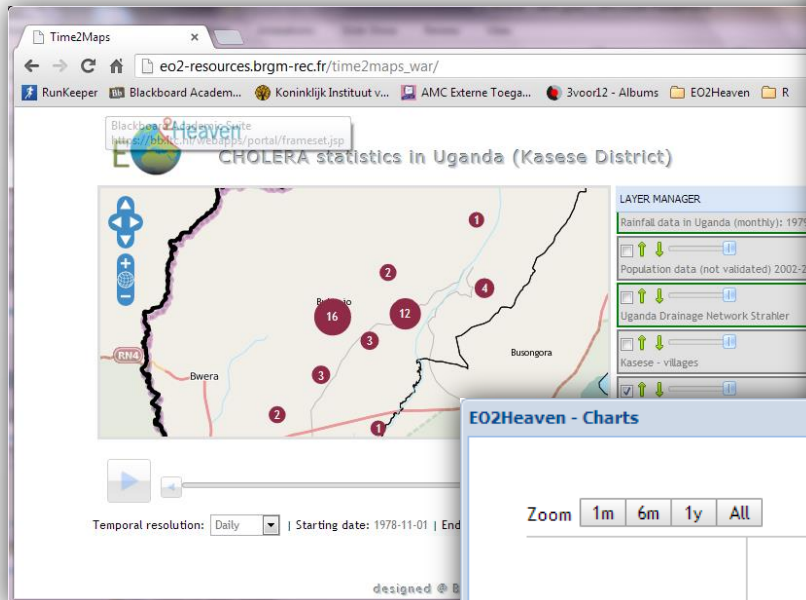
← → 📄 🖨️ ⌂

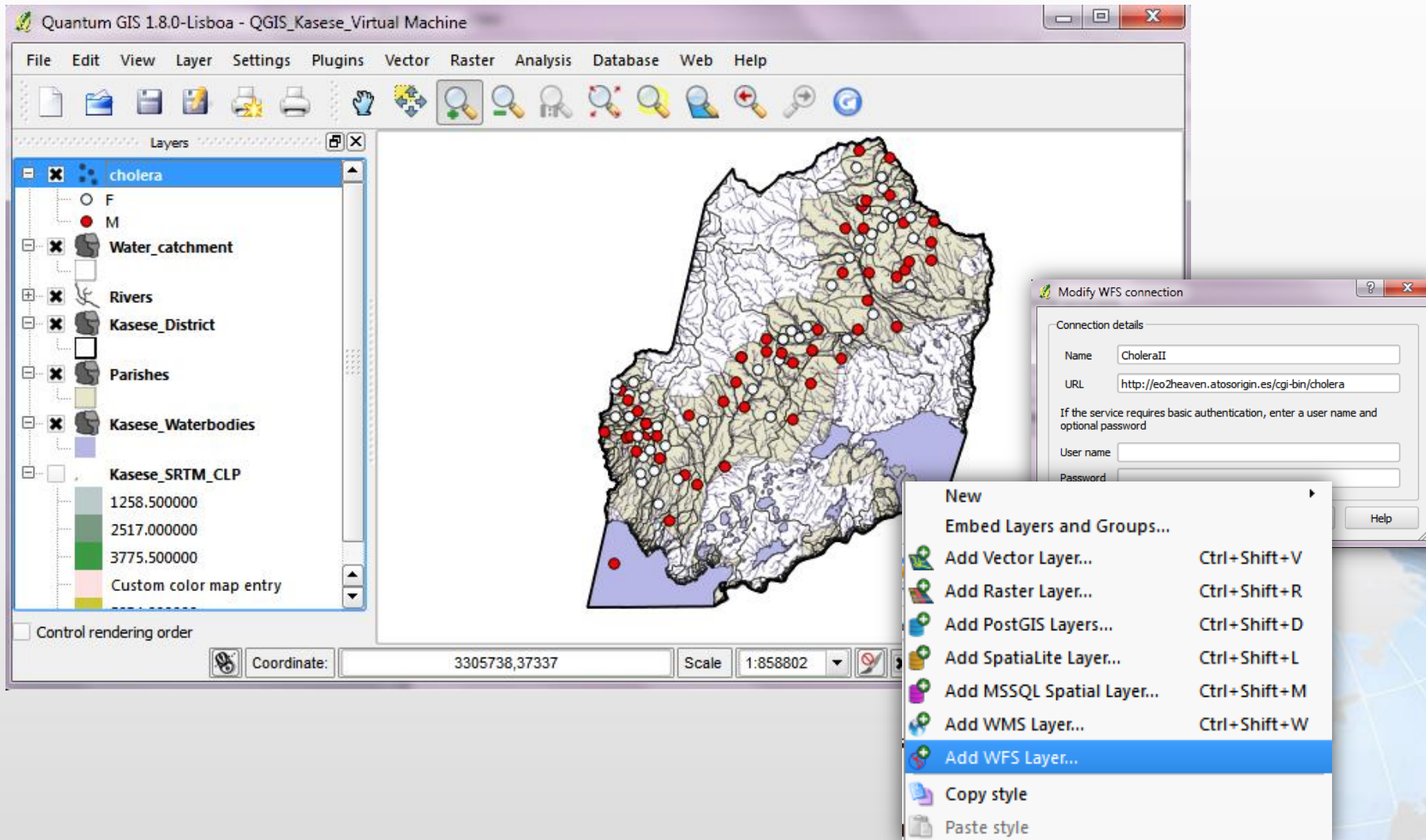
🔌 📶 📶 📶 11:51 📶 📶 📶

Data reporting options



Time2Maps for data exploration





The screenshot displays the Quantum GIS 1.8.0 interface running on a virtual machine named 'QGIS_Kasese_Virtual Machine'. The main map window shows a topographic map of Kasese District with numerous red and white dots representing cholera cases. The left sidebar lists several layers: 'cholera' (with sub-layers 'F' and 'M'), 'Water_catchment', 'Rivers', 'Kasese_District', 'Parishes', 'Kasese_Waterbodies', and 'Kasese_SRTM_CLP'. The 'cholera' layer is currently selected. The bottom status bar shows the coordinate '3305738,37337' and a scale of '1:858802'.

A 'Modify WFS connection' dialog box is open in the foreground, showing the following details:

- Name:** CholeraII
- URL:** <http://eo2heaven.atosorigin.es/cgi-bin/cholera>
- User name:** (empty field)
- Password:** (empty field)

A context menu is also visible, listing various actions for adding layers:

- New
- Embed Layers and Groups...
- Add Vector Layer... (Ctrl+Shift+V)
- Add Raster Layer... (Ctrl+Shift+R)
- Add PostGIS Layers... (Ctrl+Shift+D)
- Add Spatialite Layer... (Ctrl+Shift+L)
- Add MSSQL Spatial Layer... (Ctrl+Shift+M)
- Add WMS Layer... (Ctrl+Shift+W)
- Add WFS Layer... (highlighted)
- Copy style
- Paste style

Ideas for the OGC Health DWG

Topics to be considered

Issues to be considered

- Client applications must work with intermittent internet connectivity
 - Lightweight, robust data transfer protocols
 - Offline-caching of geodata
- Health surveillance applications must be integrated into national systems
- Privacy of health data according to national regulations
- Training and capacity building

Relevant data types

- Health data at various levels of spatiotemporal aggregation
- Environmental data
 - EO, in-situ, ex-situ
- Epidemiological data
- Socioeconomic data, e.g.
 - Population density
 - E.g. on WATSAN (water and sanitation)

OGC Standards & Health: required extensions

- Offering patient and health data in a SWE SOS
 - What are the features?
 - What are the sensors?
 - What are measurements? Quality?
 - Inclusion of epidemiological information
 - How to anonymize / aggregate the data?
- SDMX-HD data exchange (<http://sdmx-hd.org/>)
 - Statistical Data and Metadata eXchange - Health Domain
 - SDMX: ISO 17369:2013
 - Format used by WHO
 - Universal mapping SDMX-HD to O&M not possible
 - Map health indicators to O&M concepts?
 - No data access interface in SDMX-HD

Further Information

- Public deliverables on www.eo2heaven.org
 - Workshop and Event Presentations
 - EO2HEAVEN Book
 - Case study outcomes,
 - Environmental monitoring for health applications,
 - Spatial Information Infrastructure based on OGC standards
 - Description of software components

Thank you for your attention

Kym Watson

Coordinator EO2HEAVEN

Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB

Karlsruhe, Germany

kym.watson@iosb.fraunhofer.de

José Lorenzo

Research Coordinator EO2HEAVEN

Atos, Madrid, Spain

jose.lorenzo@atosresearch.eu

Ingo Simonis

Technical Manager EO2HEAVEN and leader GEO AIP 5 Thread SBA Health

Open Geospatial Consortium

isimonis@opengeospatial.org

www.eo2heaven.org