



OGC Standards and Interoperability addressing Environmental Challenges

**II Eurasian Forum
Innovation and Internationalization
Verona, ITALY – 17.-18. October 2013**

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The presentation is about ...

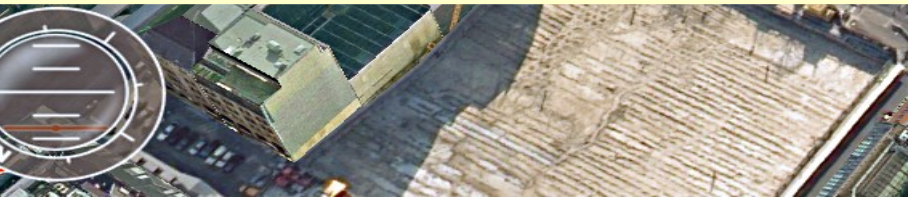
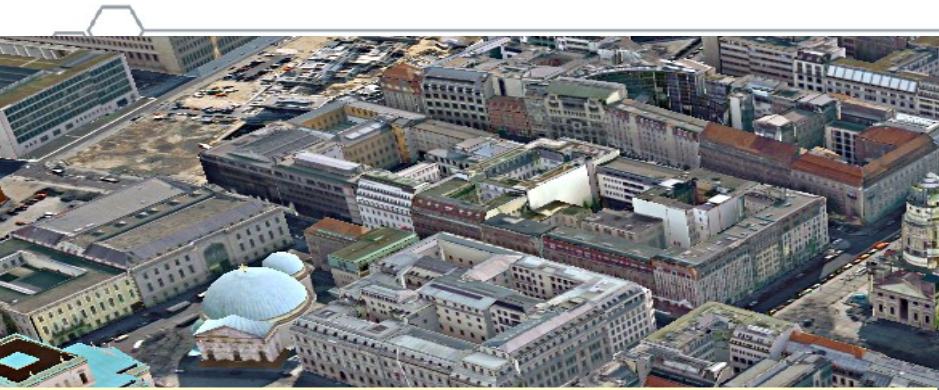


- ... standards and interoperability
- ... the Open Geospatial Consortium
- ... shows examples of OGC standards



What is it all about?

Urban Sustainability



Pandemic Disease Events



Source: de.dreamstime.com



<http://www.popsci.com/sites/popsci.com/files/images/2008/07/sars.jpg>



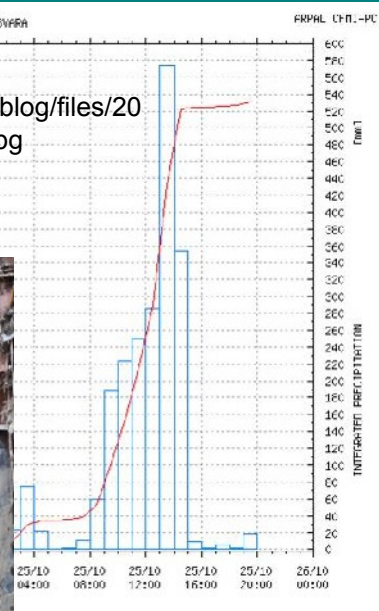
FreeFoto.com

Extreme Weather / Climate Change

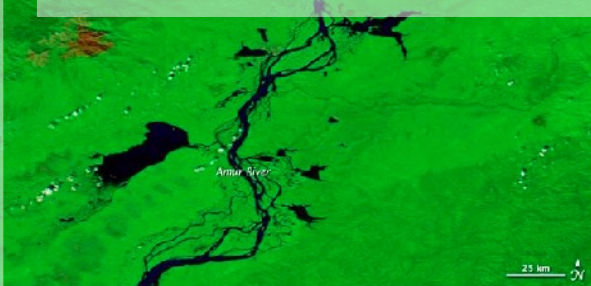


Source: <http://www.itar-tass.com/en/c680/864095.html>

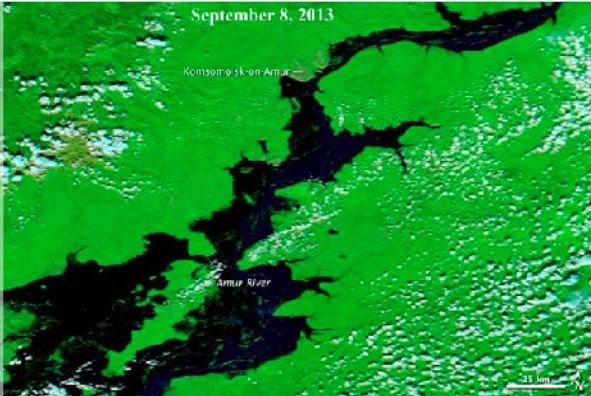
Photo: ITAR-TASS/ Dmitry Morgulis



Source: National Geographic, photo and caption by Andrea Barletta



September 8, 2013



Oxfam East Africa at <http://www.flickr.com/photos/46434833@N05/5933226731>



Cross-Boundary Information Sharing...



... continues to be one of our biggest challenges!



Source: David Rydevik, Thailand Tsunami, 2004



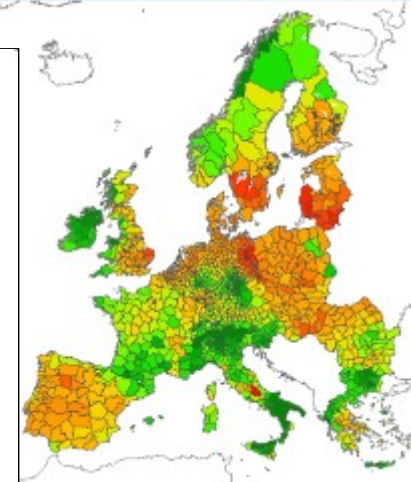
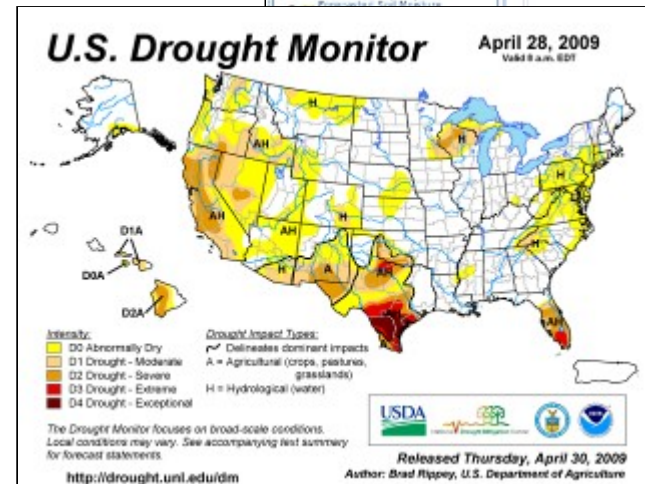
The ability to access, fuse and apply diverse data sources is critical to situational awareness.

Improving Knowledge Sharing and Transfer...

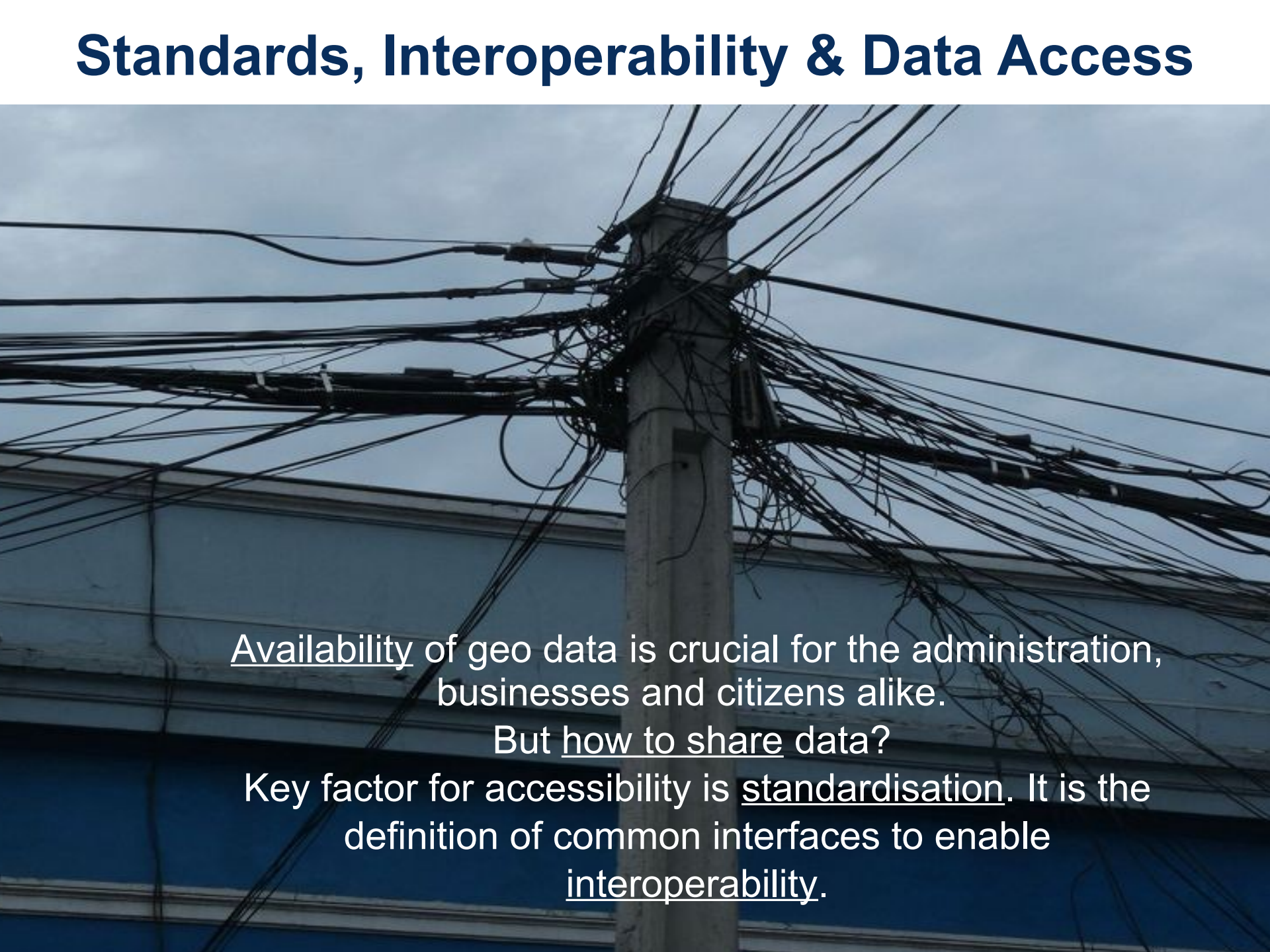


... by addressing critical issues, that need cooperation
... across domain and multi-disciplinary

- Growth in urban centers and coastal areas
- Climate Change, Environmental Monitoring
- Water Resource availability and quality
- Emergency planning, preparedness & response
- Aviation Safety
...and many more



Standards, Interoperability & Data Access



Availability of geo data is crucial for the administration, businesses and citizens alike.

But how to share data?

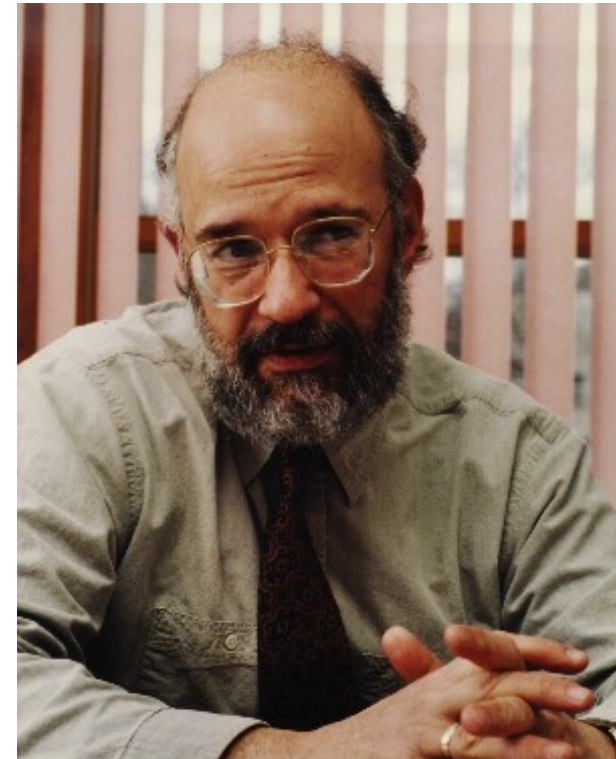
Key factor for accessibility is standardisation. It is the definition of common interfaces to enable interoperability.

Interoperability allows a Common Reality



“What the Open Geospatial Consortium is doing is facilitating a common picture of reality for different organisations which have different views of the reality, the disaster, the catastrophe, that they all have to deal with collectively.”

David Schell,
Chairman Emeritus OGC Board
and Chief Strategist





Some facts about the OGC



<http://www.youtube.com/ogcvideo>

→ more videos on OGC's Youtube Channel:
<http://www.youtube.com/user/ogcvideo/videos>

OGC at a glance (1)



- Founded in 1994, not for profit, consensus based and voluntary
- 470+ member organisations (industry, government, academia)
(Oktober 2013) <http://www.opengeospatial.org/ogc/members>



საქართველოს ეროვნული საზოგადოებრივი
საზღაპრო ინფორმაციის
სერვისების ეროვნული ცენტრი



القيادة العامة لشرطة أبوظبي
Abu Dhabi Police GHQ.



ORACLE®



INTERGRAPH



逢甲大學地理資訊系統研究中心
GIS RESEARCH CENTER, FENG CHIA UNIVERSITY

Interoperability Issues

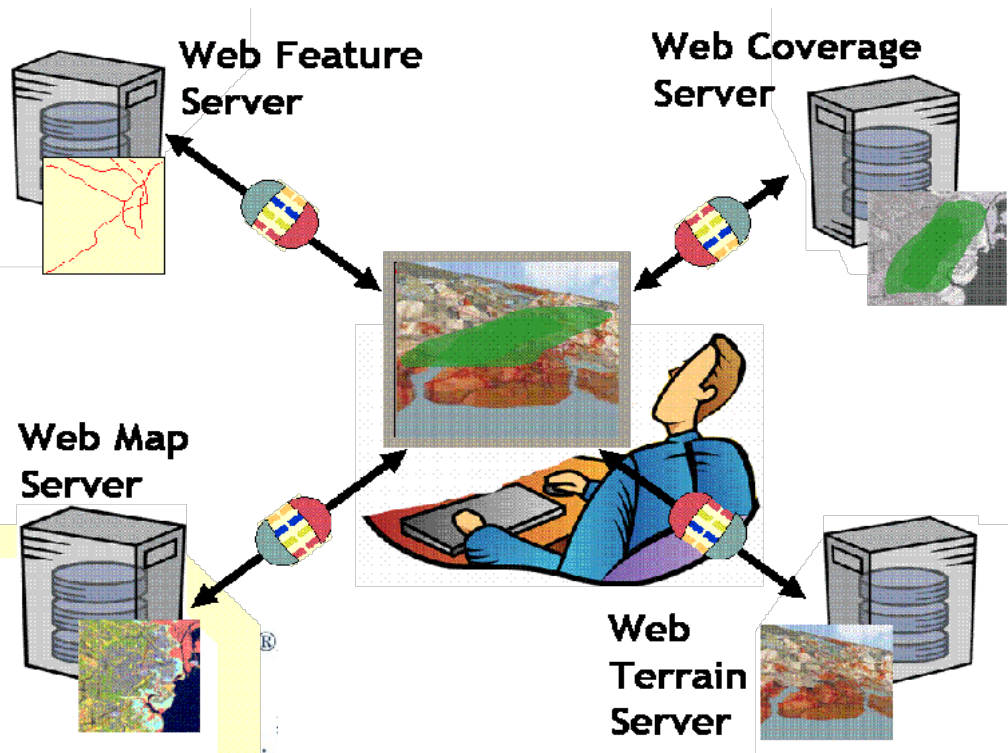


- „We **can't share** maps on the Web.“
- „We **can't deliver** data to different systems easily.“
- „We **don't have** a common language to speak about our geospatial data or our services.“
- „We **can't find** and pull together data from our automated sensors.“

OGC at a glance (2)



- 30+ adopted OGC Standards (some are ISO Standards)
<http://www.opengeospatial.org/standards>
- Several hundred software products, implementing OGC Standards
<http://www.opengeospatial.org/resource/products>



Just as `http://` is the dial tone of the World Wide Web, and `html / xml` are the standard encodings, the geospatial web is enabled by OGC standards.

OGC at a glance (3)

- Broad user community worldwide, many policy positions for National and International Spatial Data Infrastructures based on OGC standards



- Cooperation with other standards organisations and foundations, ISO/TC 211, OSGeo, W3C, OASIS and others
<http://www.opengeospatial.org/ogc/alliancepartners>



OGC Activities Driven by Community Needs



Education & Research



Sustainable Development



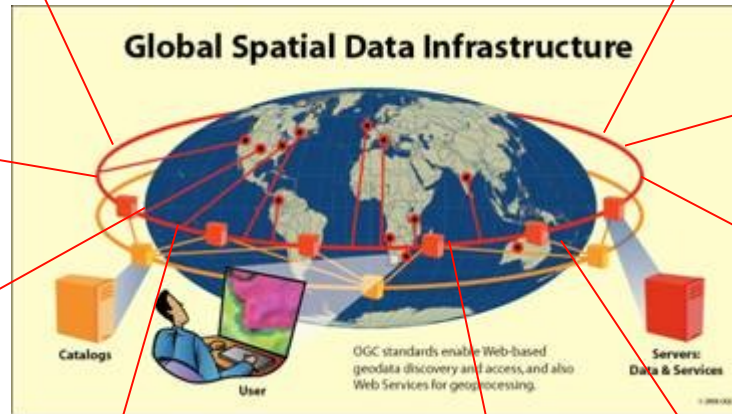
Defence



Health



Global Spatial Data Infrastructure



E -Government



Emergency Services,
Disaster Management



Energy



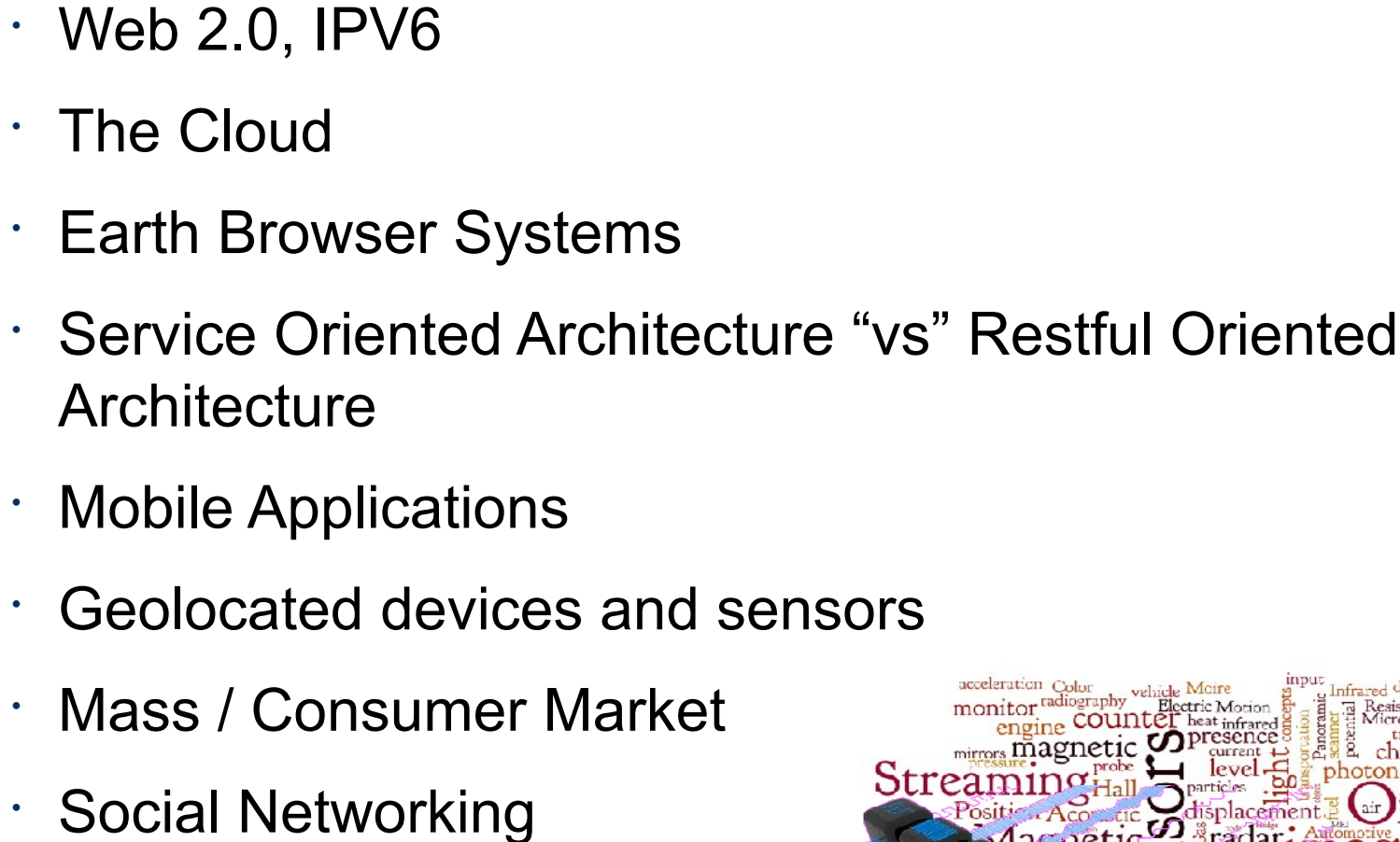
Consumer Services,
Real Time
Information



Geosciences:
land, sea, air information

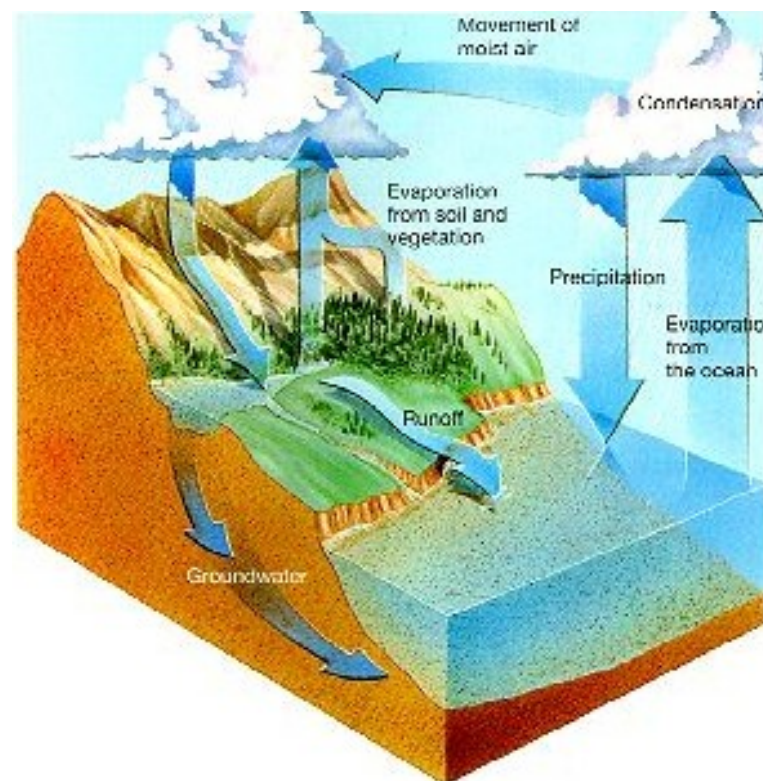


... and many more





Use case Hydrology: Complex Observing Systems



Building Experience with Water Resources



Hydrology DWG



OGC®

The **Hydrology Domain Working Group** is a **Joint Working Group** of the World Meteorological Organisation (WMO) and the OGC

The purpose of the Hydrology DWG is to provide a venue and mechanism for seeking technical and institutional solutions to the challenge of describing and exchanging data describing the state and location of water resources, both above and below the ground surface. The path to adoption will be through OGC papers and standards, advanced to ISO where appropriate, and also through the World Meteorological Organization's (WMO) and its Commission for Hydrology (CHy) and Information Systems (WIS) activities.

While CHy has the recognized mandate to publish and promote standards in this area, OGC contributes to the process with its resources and experience in guiding collaborative development among disparate participants in a rapidly evolving technological environment. The OGC Hydrology DWG will provide a means of developing candidate standards for adoption by CHy as appropriate.

The Hydro DWG is open to both member and non member participation and is intended to be a public forum for communication, and both the [email list](#) and the wiki are open to interested parties.

Co:Chairs: David Lemon (CSIRO), Ilya Zaslavsky (SDSC) and Ulrich Looser (GRDC)

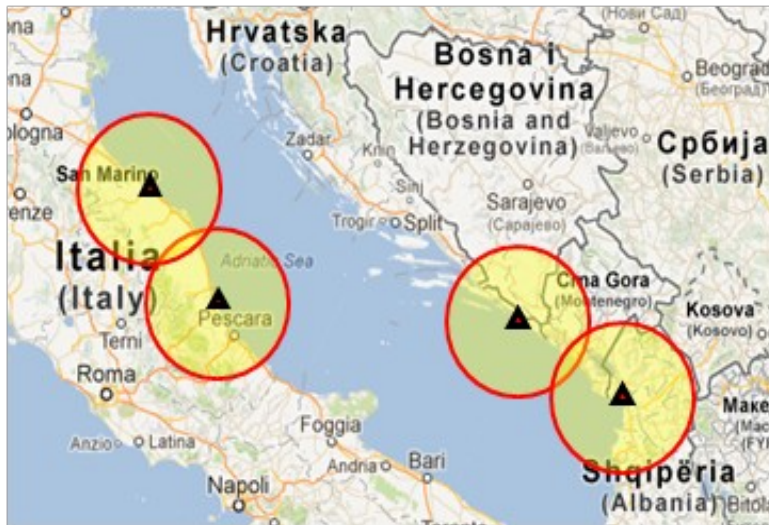
→ <http://www.opengeospatial.org/projects/groups/hydrologydwg>

Example ADRIARadNet (2)

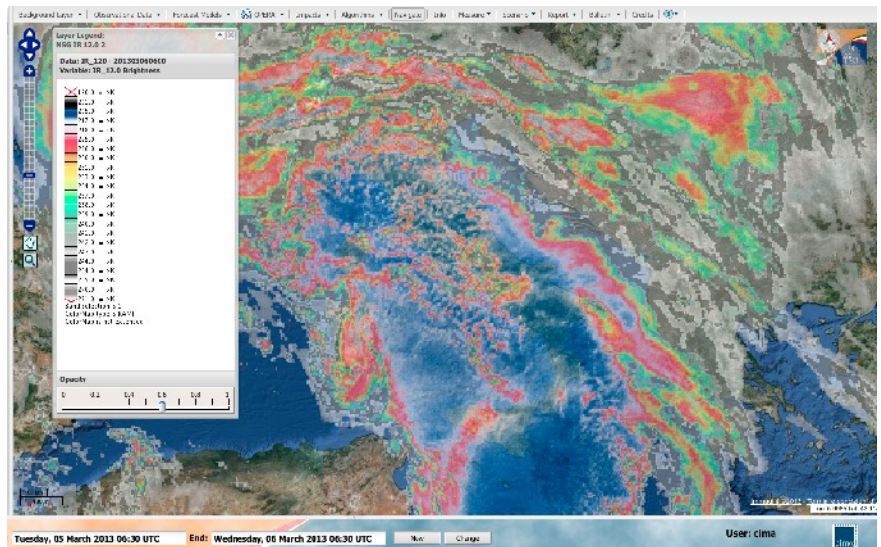


„ADRIatic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision“

Radar-based products



Satellite products

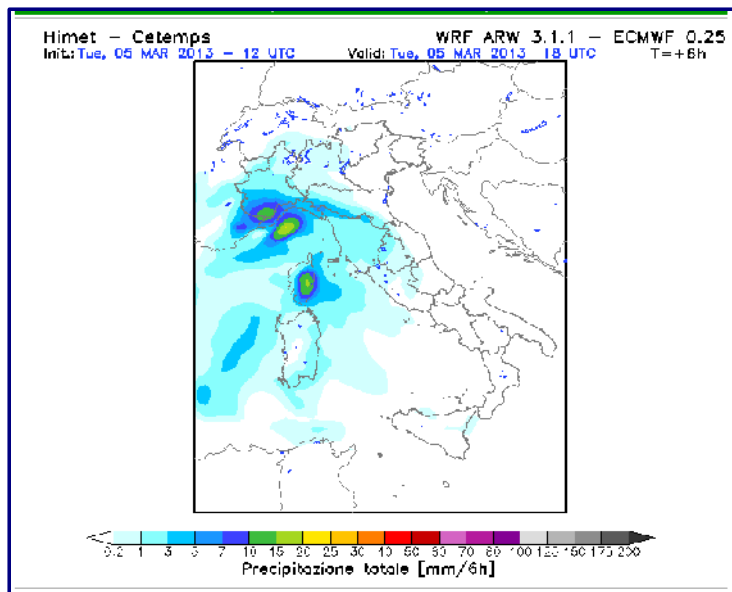


Example ADRIARadNet (2)

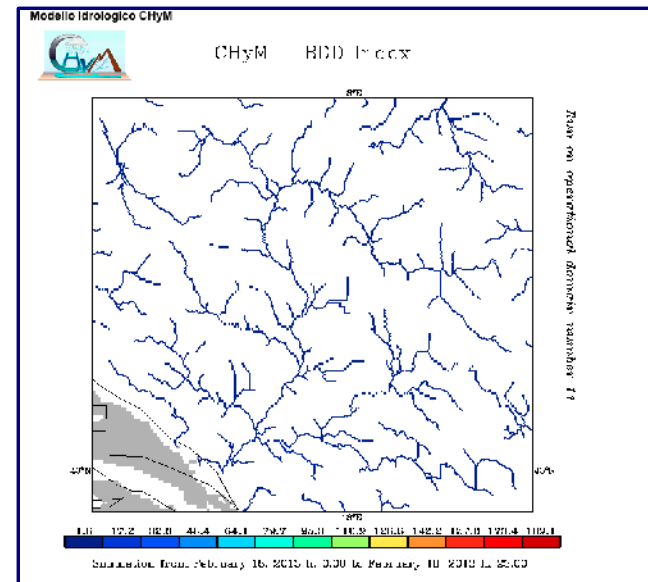


„ADRIatic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision“

Meteo-forecasting model



Hydro/Meteorological Model

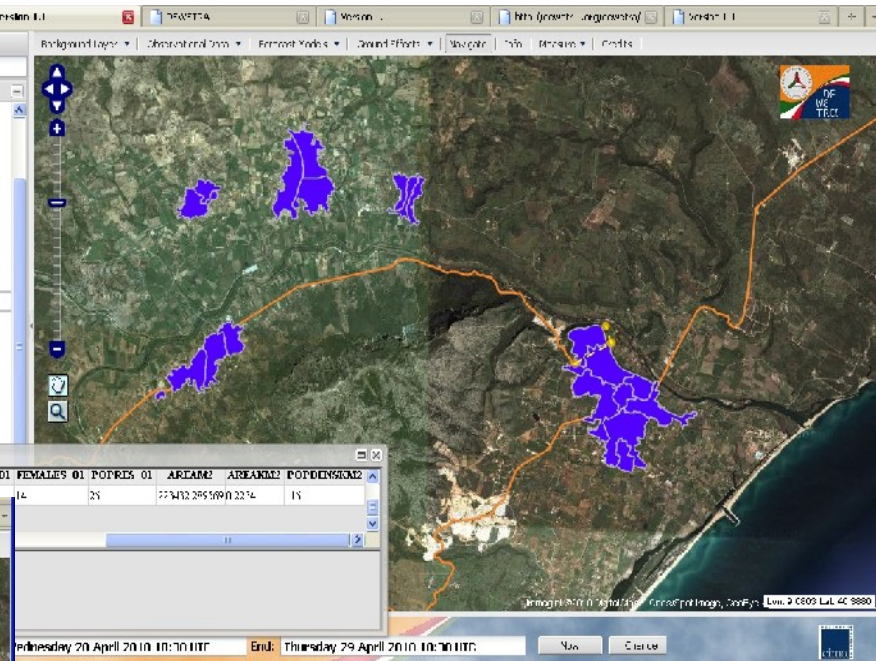
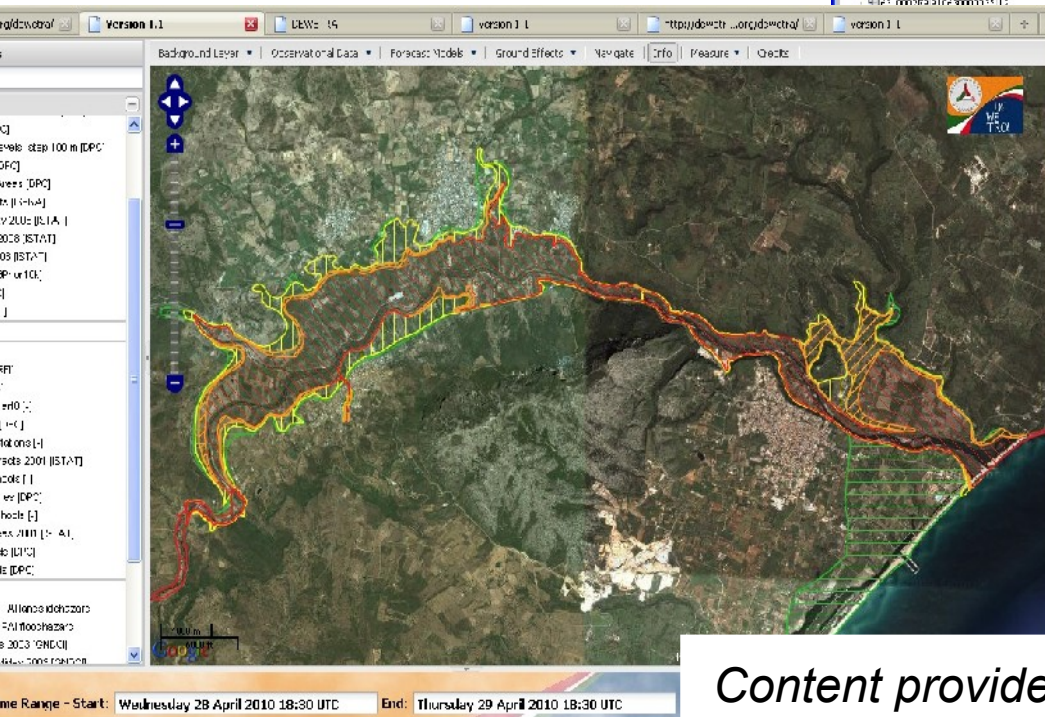


Example ADRIARadNet (3)



OGC Standard

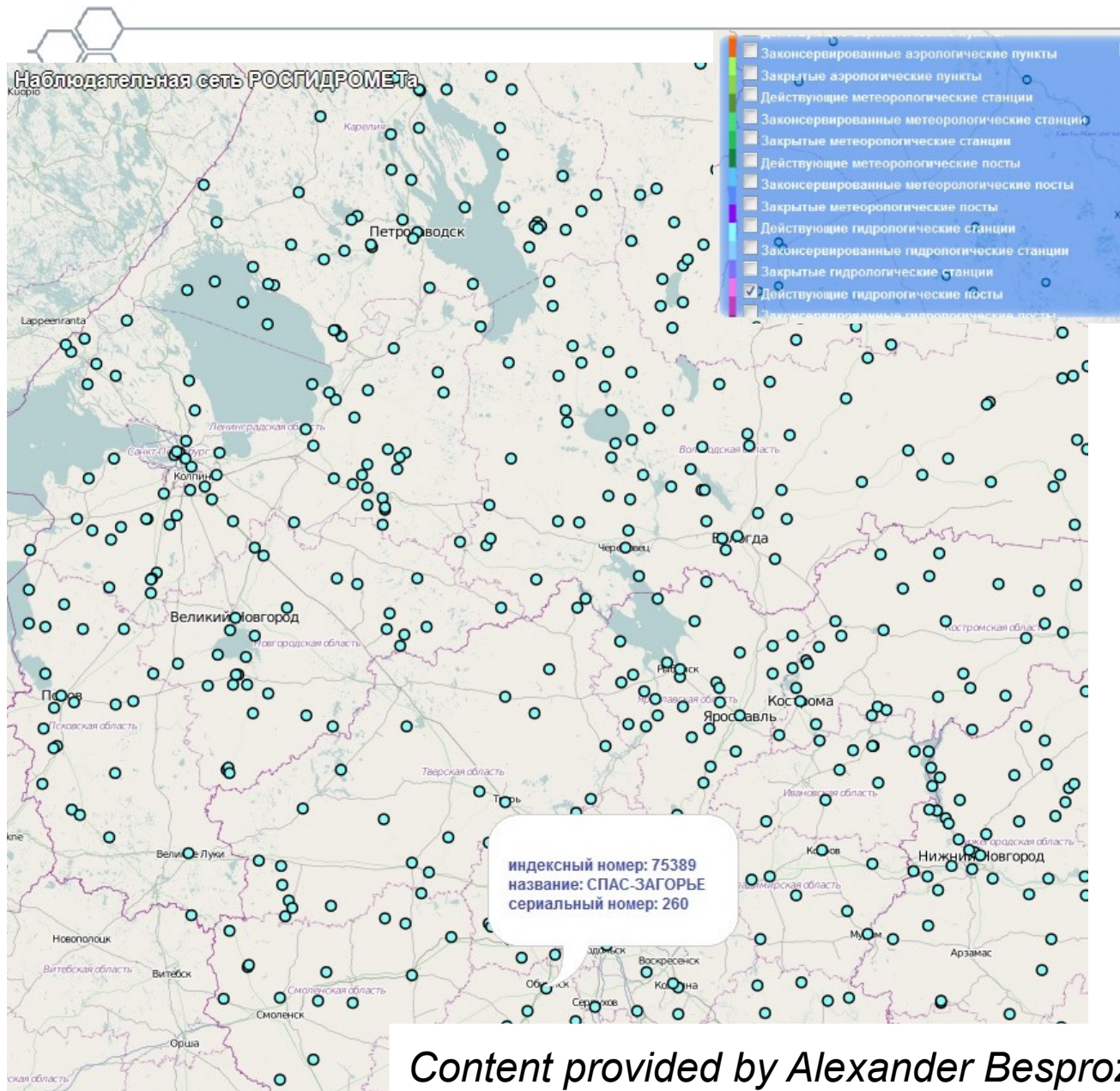
Hazard Maps



**Census information
- inhabitants**

Content provided by Marco Massabo Fondazione CIMA

Example – ROSHYDROMET (1)



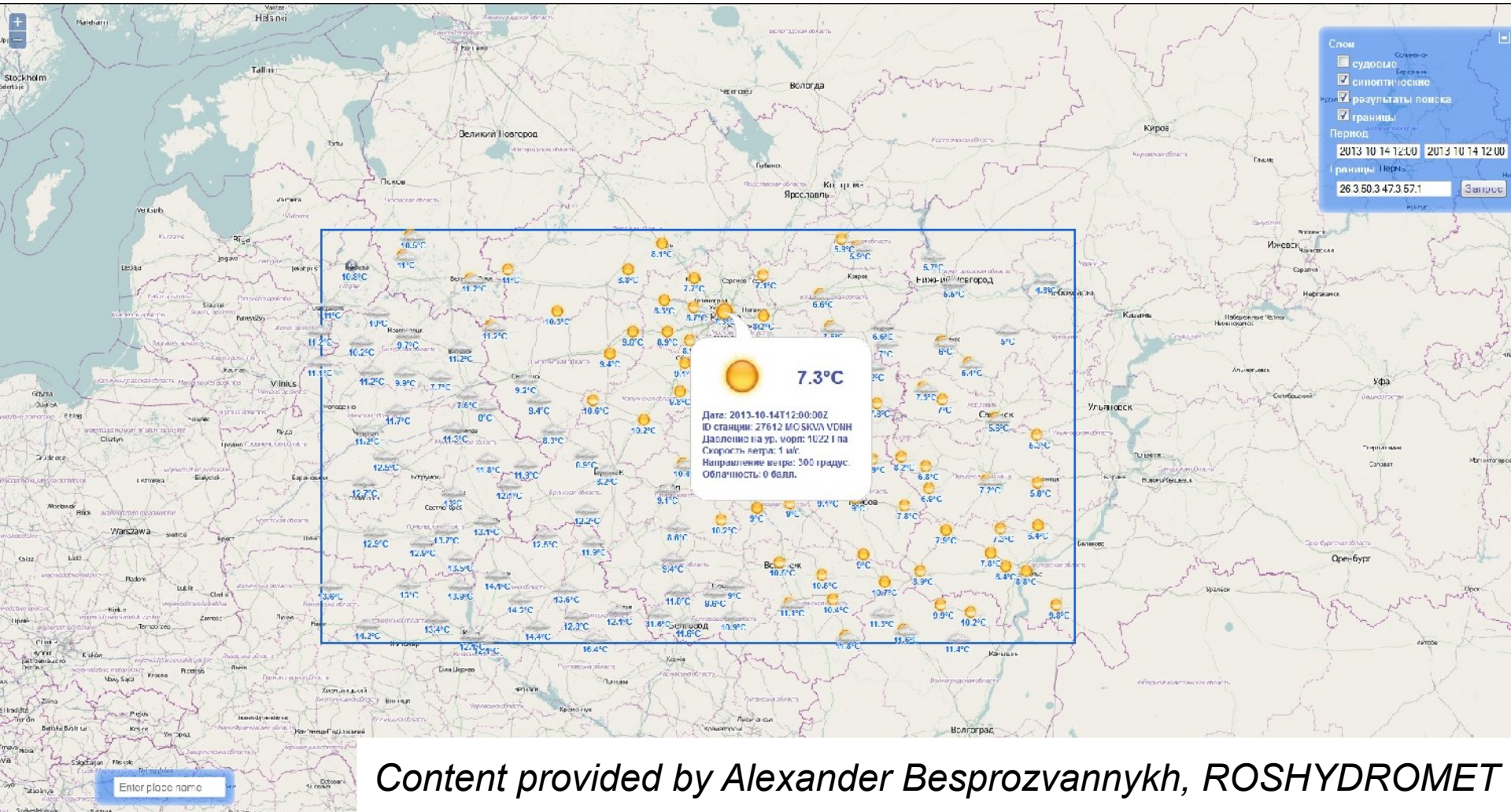
Presentation of observation platforms of ROSHYDROMET. This is a special application to control all observation platforms of ROSHYDROMET.

Content provided by Alexander Besprozvannykh, ROSHYDROMET

Example – ROSHYDROMET (2)



„CliWare“ application to collect and distribute hydrometeorological information. Distribution through OGC interface standards Web Map Service (WFS), Web Feature Service (WFS) and many more.



Content provided by Alexander Besprozvannykh, ROSHYDROMET



Disaster Prediction and Warning

Debris Flow Scenario - Feng Chia University

Pre-typhoon

2008/11



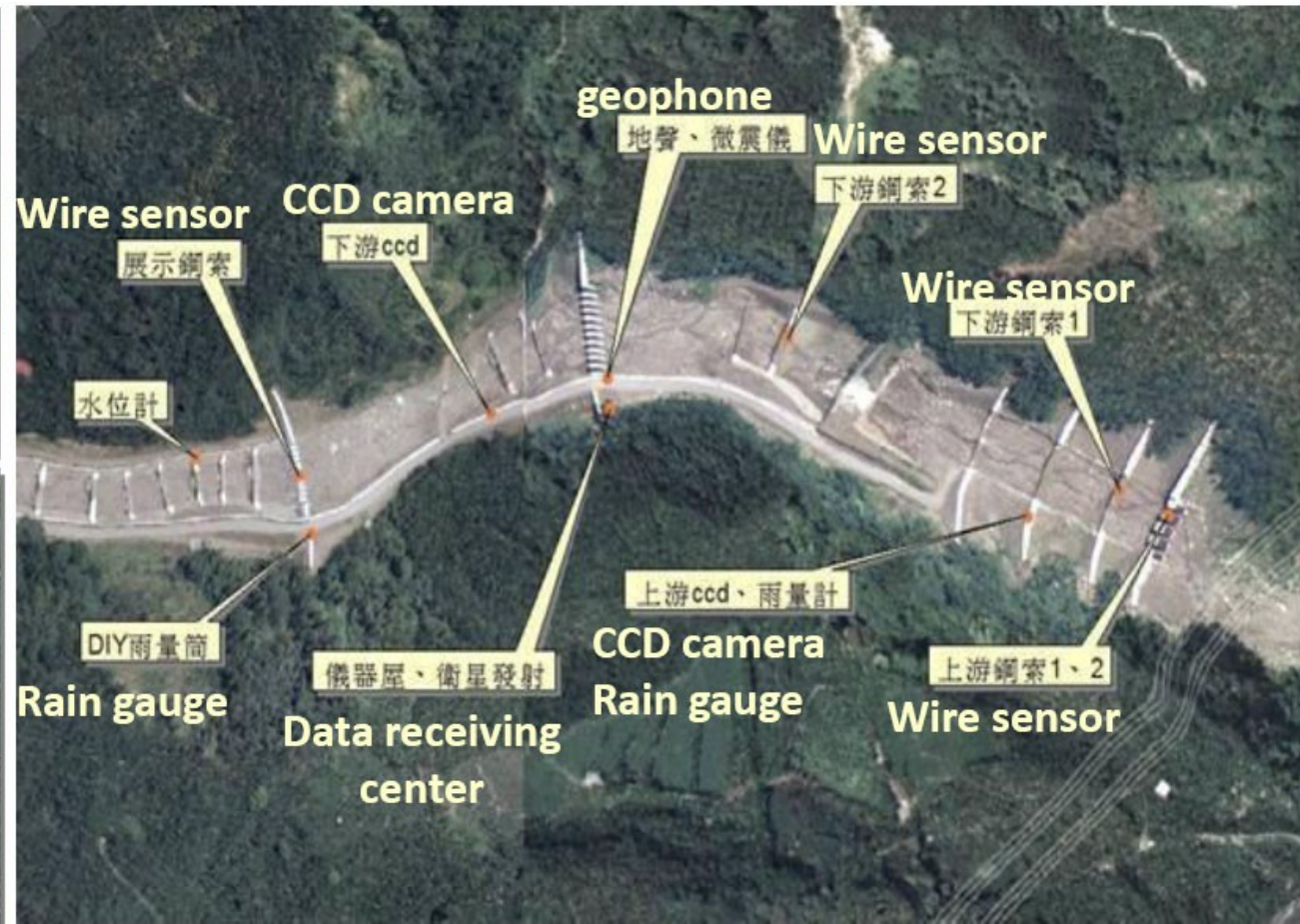
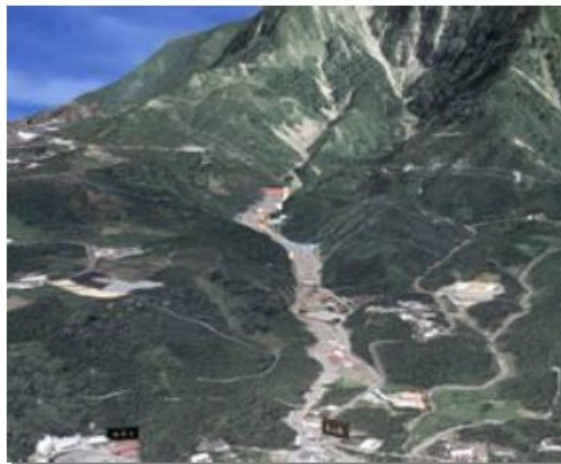
Post-Morakot

2009/8

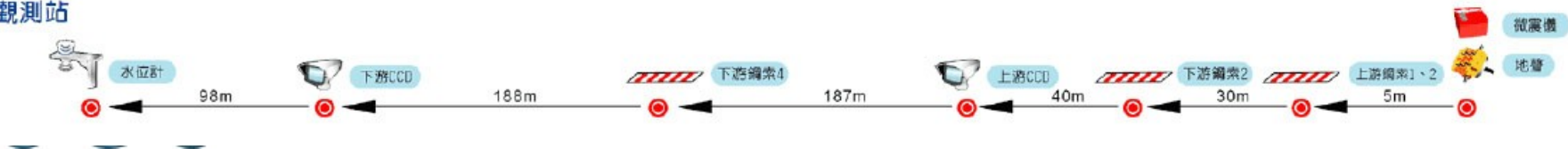


Disaster Prediction and Warning

Debris Flow Scenario - Feng Chia University



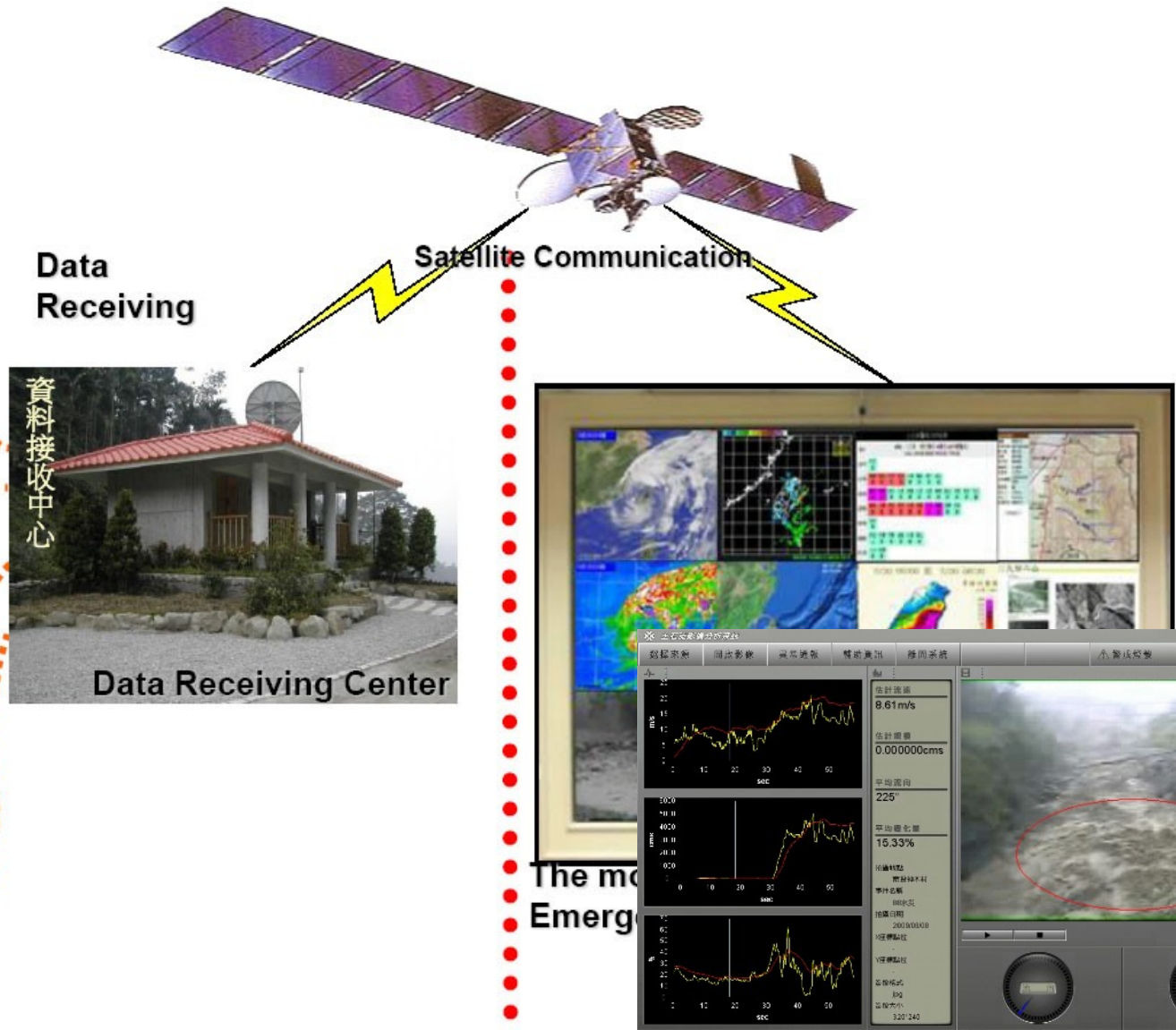
華山觀測站



Operational view of debris flow monitoring



On Site of Debris Flow



Disaster Prediction and Warning

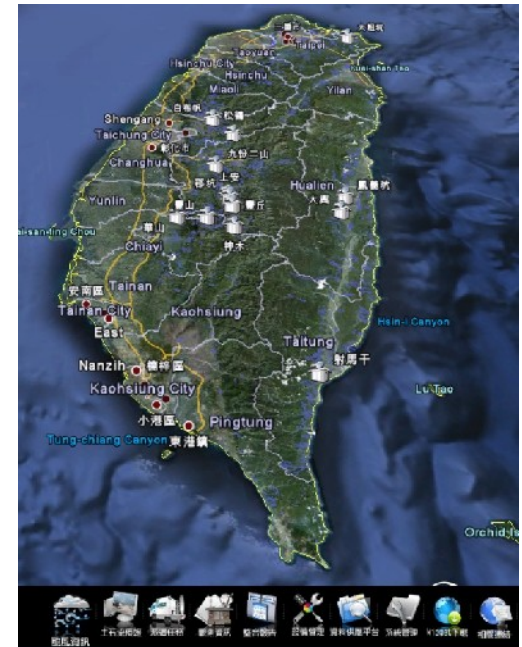
Feng Chia University



“The success of our programs to monitor, detect, warn and respond to emergencies and natural disasters in Taiwan depends heavily on OGC standards.

We use OGC Web Services and Sensor Web Enablement standards to rapidly mobilize monitoring, forecasting and warning networks, and to implement a diversity of sensor assets as part of these systems. This saves time, money and lives.”

Tien-Yin Chou, Director of the GIS Research Center
Feng Chia University



Summarizing



- avoid re-inventing the wheel, duplication of work and efforts
- interoperability & open standards help to sustain investments
- cooperation on international level is key to success



“Once you have understood how much open standards can underpin environmental policies, you keep trying to convince others. This is exactly what we at OIEau have been doing for years now in France and in other nations. I really enjoy taking part in this movement and will continue planting open standards seeds wherever I can.”

Sylvain Grellet (IOEau)

<http://www.opengeospatial.org/blog/1667>

Thank you for your attention!
Grazie!
спасибо



Athina Trakas

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OGC Standards and Interoperability addressing Environmental Challenges

**II Eurasian Forum
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**Dipl.-Geogr. Athina Trakas
Open Geospatial Consortium (OGC)
Director European Services
atrakas@opengeospatial.org
<http://www.opengeospatial.org>**

Dear ladies and gentlemen.

My name is Athina Trakas and I am OGC's Director for European Services. It is an honour to speak this afternoon about the work that is been undertaken by the Open Geospatial Consortium (in short OGC), an international standards developing organisation. I will use the next 15 minutes explaining what we are doing and more importantly why we are doing it.

The presentation is about ...



- ... standards and interoperability
- ... the Open Geospatial Consortium
- ... shows examples of OGC standards

The presentation is about the importance of standards and interoperability. I will give a very brief introduction to the work of the Open Geospatial Consortium. In closing, I will provide actual examples using OGC standards in the context of environmental aspects.



What is it all about?

Urban Sustainability



In a more and more interdependent world, we are facing many challenges which need to be addressed on the local level as well as the global level.

Urban sustainability, with aspects like urban planning, traffic and solar energy potential, access to fresh water.

Pandemic Disease Events



Source: de.dreamstime.com



<http://www.popsci.com/sites/popsci.com/files/images/2008/07/sars.jpg>

OGC[®]
Making location count.



FreeFoto.com

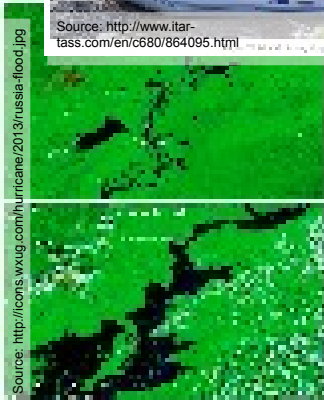
Extreme Weather / Climate Change



Source: <http://www.itar-tass.com/en/c680/864095.html>



Source: National Geographic, photo and caption by Andrea Barletta



Source: <http://icons.wxug.com/hurricane/2013/russia-flood.jpg>



Oxfam East Africa at <http://www.flickr.com/photos/46434833@N05/5933226731>

But also pandemic diseases and extreme weather and climate change events call for access to accurate and current geospatial data and information.

We need to manage data and information exchange and we need systems that enable different organisations, governments and industry to communicate with each other.

Cross-Boundary Information Sharing...



... continues to be one of our biggest challenges!



Source: David Rydevik, Thailand Tsunami, 2004



The ability to access, fuse and apply diverse data sources is critical to situational awareness.

OGC
Making location count.

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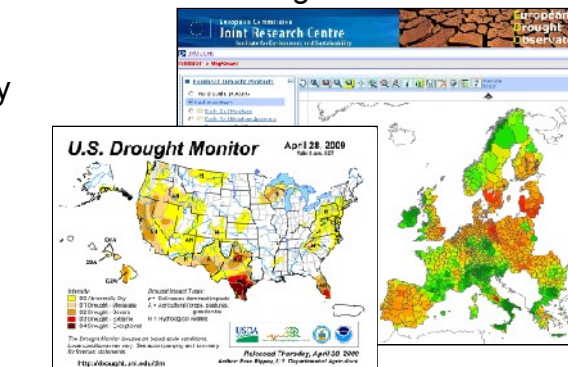
Especially cross border information sharing continues to be one of our biggest challenges. With cross border I don't mean only borders between countries, I mean also borders between different organisation within one country, or borders between different departments of one organisation and even borders between people, between you and me. We need to be able to have a shared awareness of environmental situations that arise.

Improving Knowledge Sharing and Transfer...



... by addressing critical issues, that need cooperation
... across domain and multi-disciplinary

- Growth in urban centers and coastal areas
- Climate Change, Environmental Monitoring
- Water Resource availability and quality
- Emergency planning, preparedness & response
- Aviation Safety
...and many more

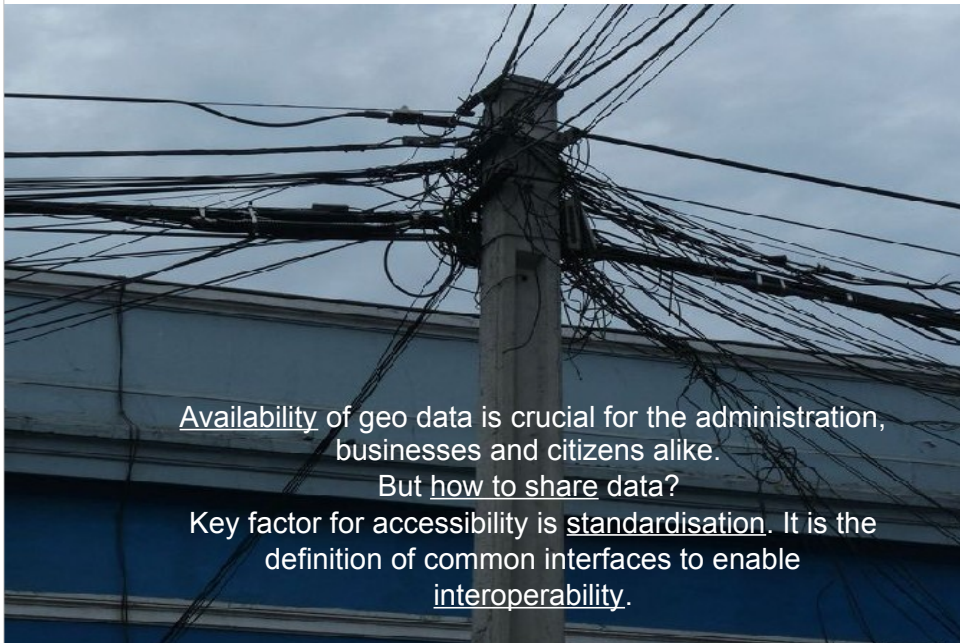


<http://www.ogcnetwork.net/pub/ogcnetwork/GEOSS/AIP3/index.html>

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The ability to access, fuse and apply diverse data sources is critical to situational awareness. And addressing critical interoperability issues that need cooperation across domains like weather forecasts, water management and also aviation safety and civil protection we are improving knowledge sharing and transfer. Arriving at technical interoperability through a consensus process -- That is the work of the OGC.

Standards, Interoperability & Data Access



Availability of geo data is crucial for the administration, businesses and citizens alike.

But how to share data?

Key factor for accessibility is standardisation. It is the definition of common interfaces to enable interoperability.

As I explained so far the availability and accessibility of geo data is crucial for administrations, businesses and citizens alike. But how to share data?

One key factor in making geospatial information and data accessible is standardization. It is the definition of common interfaces and terminology between heterogeneous systems to enable interoperability.

Interoperability allows a Common Reality



“What the Open Geospatial Consortium is doing is facilitating a common picture of reality for different organisations which have different views of the reality, the disaster, the catastrophe, that they all have to deal with collectively.”

David Schell,
*Chairman Emeritus OGC Board
and Chief Strategist*



Let me summarize this first part of my presentation with a quote from David Schell, OGC's co-founder and Chairman Emeritus of the OGC Board of Directors. He says: „What the Open Geospatial Consortium is doing is facilitating a common picture of reality for different organisations which have different views of the reality, the disaster, the catastrophe, that they all have to deal with collectively.”

OGC produces standards and best practices that allow different organizations, governments and communities of interest to access and apply diverse geoinformation sources with technologies that location enable decision making.



Some facts about the OGC



<http://www.youtube.com/ogcvideo>

06.11.13

→ more videos on OGC's Youtube Channel:
<http://www.youtube.com/user/ogcvideo/videos>

We learned in the first section, that interoperability and standardisation are crucial to help address a diversity of complex societal challenges.

This is valid not only when talking about environmental aspects, but also in areas like innovation, energy, food and agriculture or infrastructure – these are all areas that are being addressed during these two days at the 2nd Eurasia Forum here in Verona.

The next few slides provide some input on the OGC, our core business, the membership and the set-up of the organisation.

OGC at a glance (1)



Founded in 1994, not for profit, consensus based and voluntary

- 470+ member organisations (industry, government, academia)
(Oktober 2013) <http://www.opengeospatial.org/ogc/members>



At the time of OGC's founding in 1994 users of Geographical Information Systems were unable to easily share and exploit geospatial information between GIS software technologies from different vendors. This was when the OGC was founded as a not for profit international industry consortium. The purpose of the OGC is to develop publicly available interface standards. OGC Standards support interoperable solutions that "geo-enable" the Web, wireless and location-based services and mainstream IT. Membership and the work in the OGC is on a voluntary basis and the development of standards is based on a consensus process. Currently we have over 470 members from industry, public administration and agencies, the academic sector and research as well as non-governmental organisations of various kinds.

Here I provide some logos of our members, to give you an idea which organisations participate in the OGC. There are of course specialised organisations, but also many mainstream IT and .com companies that are involved in the Consortium.

Interoperability Issues



- „We **can't share** maps on the Web.“
- „We **can't deliver** data to different systems easily.“
- „We **don't have** a common language to speak about our geospatial data or our services.“
- „We **can't find** and pull together data from our automated sensors.“

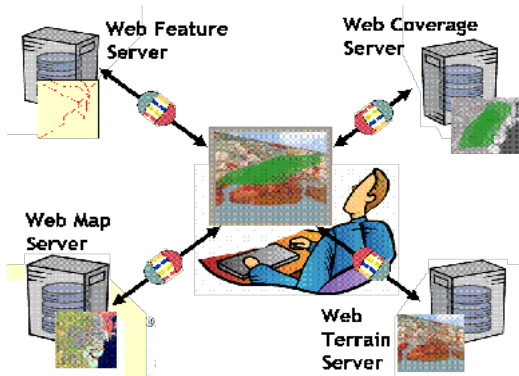
Many of our members face interoperability issues like not being able to share maps on the Web or not being able to find and pull together data from their automated sensors.

To address these issues they have joined the OGC to develop standards together with other organisations that face similar challenges.

OGC at a glance (2)



- 30+ adopted OGC Standards (some are ISO Standards)
<http://www.opengeospatial.org/standards>
- Several hundred software products, implementing OGC Standards
<http://www.opengeospatial.org/resource/products>



Just as `http://` is the dial tone of the World Wide Web, and `html / xml` are the standard encodings, the geospatial web is enabled by OGC standards.

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These open and freely available standards empower technology developers and the broader user community to make complex spatial information and services accessible and useful with all kinds of applications. Using services and standards allows anyone to fulfill their duties more efficiently and in a more sustainable manner. Several hundred software products are implementing the OGC standards.

Compared to the world wide web which we are all actively using and for which `http://` is the dial tone of it, the geospatial web is enabled by OGC standards. OGC standards and web services are helping users to better accomplish their work and to solve issues in a much more efficient and sustainable manner.

OGC at a glance (3)



- Broad user community worldwide, many policy positions for National and International Spatial Data Infrastructures based on OGC standards



- Cooperation with other standards organisations and foundations, ISO/TC 211, OSGeo, W3C, OASIS and others
<http://www.opengeospatial.org/ogc/alliancepartners>



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This is also the reason why we have a broad user community world wide and why many policy positions on geoinformation on local, national and international level are underpinned by OGC standards.

But we don't want to re-invent the wheel and therefore the OGC cooperates with other standards bodies. The OGC brings in 1) its expertise and leadership on location to help broader IT standards process any location information consistently, and 2) expertise in innovative standards processes for development, testing and certification of standards.

OGC Activities Driven by Community Needs



And all OGC activities, the decision to develop a particular standard is driven by community needs and brought into the process by our members.

Influenced by changing Technology

... and many more



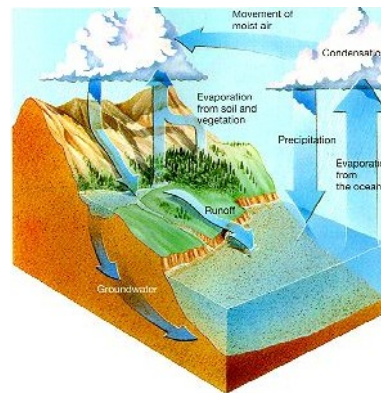
- Web 2.0, IPV6
- The Cloud
- Earth Browser Systems
- Service Oriented Architecture “vs” Restful Oriented Architecture
- Mobile Applications
- Geolocated devices and sensors
- Mass / Consumer Market
- Social Networking



Of course the standards development is also influenced by changing technologies. Take just sensors as an example: number of Internet-connected devices will reach between 50 and 60 billion by the end of the decade – many of them connected to the internet and all of them are sensing phenomena somewhere and somewhen....

Therefore the OGC has developed a suite of Sensor Web Enablement standards to access, process and integrate sensor data into web maps. The OGC also has various standardisation activities underway to exploit data as part of the Internet of Things.

Use case Hydrology: Complex Observing Systems



In the last part of my presentation I will provide some examples that show how the OGC, its standards and its members work together to address environmental and societal challenges. I explained why interoperability and standards are important in today's interdependent world and why participation in an international standards development organisations is important and beneficial for the participants and the community. Now let me please explain to you how these mentioned aspects are put into use.

Building Experience with Water Resources



Hydrology DWG



World Meteorological
Working together is weather, climate

The Hydrology Domain Working Group (DWG) is a joint effort of the Open Geospatial Consortium (OGC) and the World Meteorological Organization (WMO). The DWG is focused on developing and promoting the use of open standards for hydrology data and services. The DWG is active in various areas, including the development of the open standard WaterML, the promotion of the use of WaterML and complementary standards, and the integration of water data from observation stations worldwide. The DWG is also working on the development of a common, standardized, technical and institutional solutions to improve our knowledge of water resources above and below the surface of the earth.



→ <http://www.opengeospatial.org/projects/groups/hydrologydwg>

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The OGC together with the World Meteorological Organisation (WMO) jointly established a working group on Hydrology seeking common, standardized, technical and institutional solutions to improve our knowledge of water resources above and below the surface of the earth. This Hydrology Domain Working Group is active on various areas and is supporting the development of the open standard WaterML. Together with participants from Europe and the relevant INSPIRE community, Australia, North-America and Russia the community is promoting the use of WaterML and complementary standards to make it easier to access, integrate and use data from the myriad of observation stations in operation worldwide. I will not go into detail here, I want just to mention that the meteorological community and geosciences in general are actively supporting these efforts to reduce the cost, time and effort required to intergrate water data to better understand water resoruces at the local, regional and global levels.



Example ADRIARadNet (2)

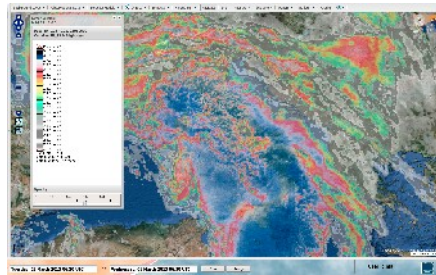


„ADRIATIC integrated RADAR-based and web-oriented information processing system NETWORK to support hydro-meteorological monitoring and civil protection decision“

Radar-based products



Satellite products



Content provided by Marco Massabo Fondazione CIMA

This is an example from Italy and the Adriatic Region – the EU funded project AdriaRADNet. The content is provided by Marco Massabo from OGC member Fondazione Cima. AdriaRadNet is an integrated RADAR-based and web-oriented information processing system NETWORK to support hydro-meteorological monitoring and civil protection decision“.

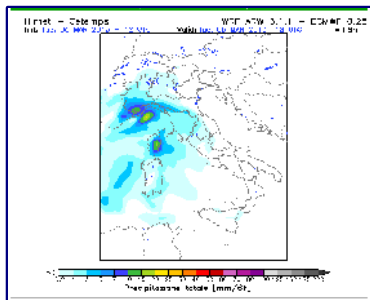


Example ADRIARadNet (2)

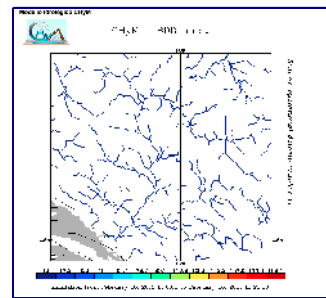


„ADRIatic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision“

Meteo-forecasting model



Hydro/Meteorological Model



Content provided by Marco Massabo Fondazione CIMA

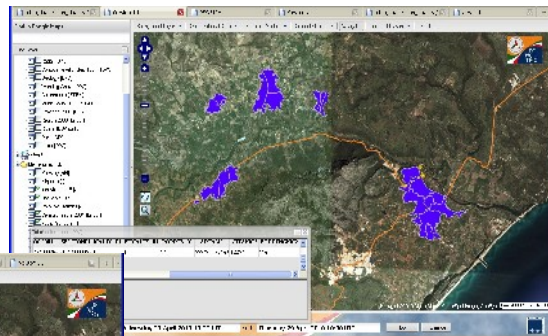
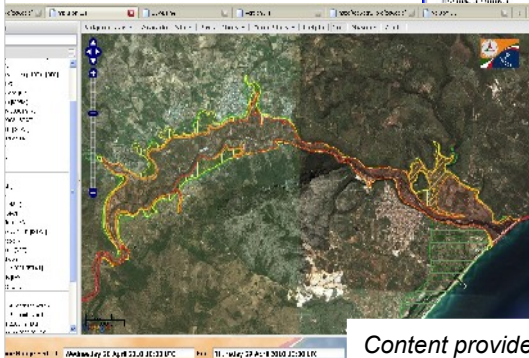
They overlay and use information from different sources like radar-based and satellite products, as well as meteo-forecasting and hydro-meteorological models.

Example ADRIARadNet (3)



OGC Standard

Hazard Maps

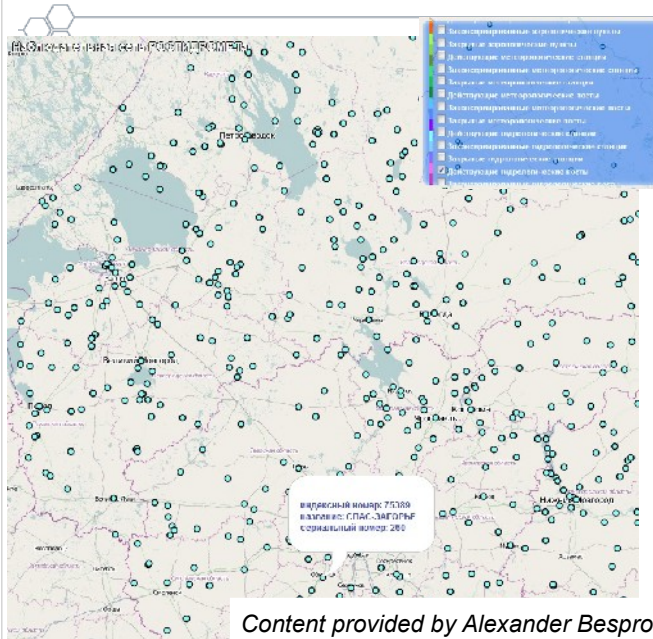


Census information
- inhabitants

Content provided by Marco Massabo Fondazione CIMA

By using OGC interface standards that allow interoperability, they overlay and combine these different information with statistical information e.g. on inhabitants. As a result they can provide hazard maps, that support decision makers in civil protection.

Example – ROSHYDROMET (1)



Presentation of observation platforms of ROSHYDROMET. This is a special application to control all observation platforms of ROSHYDROMET.

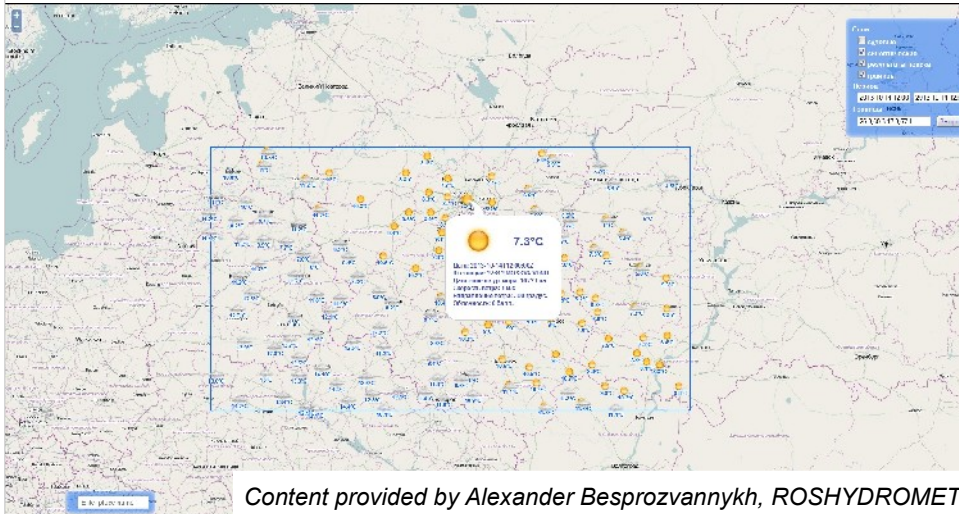
Content provided by Alexander Besprozvannykh, ROSHYDROMET

The next example is provided by Aleksander Besprozvannykh from Roshydromet the Russian Federal Service for Hydrometeorology and Environmental Monitoring. It shows a map of observation platforms of ROSHYDROMET. This is a special application to control all observation platforms of ROSHYDROMET.

Example – ROSHYDROMET (2)



„CliWare“ application to collect and distribute hydrometeorological information. Distribution through OGC interface standards Web Map Service (WFS), Web Feature Service (WFS) and many more.



Content provided by Alexander Besprozvannykh, ROSHYDROMET

The second example from ROSHYDROMET shows a special application called CliWare. The CliWare information system realizes basic functions of the Future WMO Information System project. It helps to and distribute hydro-meteorological information. As in the former example the data is distributed through OGC interface standards.

Disaster Prediction and Warning Debris Flow Scenario - Feng Chia University



Pre-typhoon

2008/11



Post-Morakot

2009/8



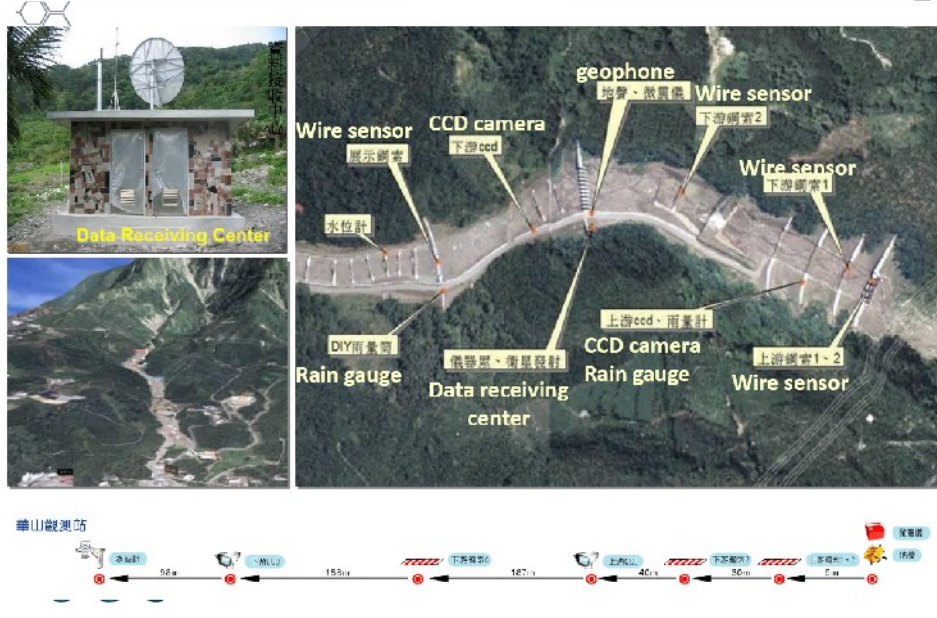
OGC
Making location count.

Source: Feng Chia University, GIS Research Center

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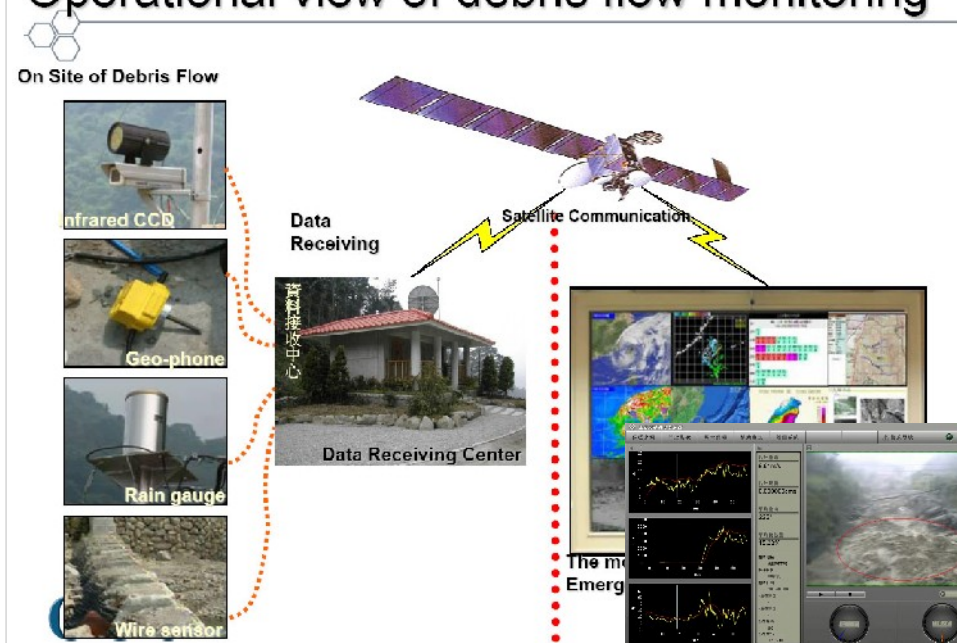
As last example I want to share with you an application from Taiwan where OGC standards are used in a disaster prediction and early warning system. Taiwan is struck very often by typhoons and earthquakes. Those trigger landslides and flooding on a frequent basis.

Disaster Prediction and Warning Debris Flow Scenario - Feng Chia University



OGC services are used with an array of spatial data and sensors (like geophones, CCD cameras, rain gauges) to provide situational awareness for forecasting, detecting, alerting and response to debris flow situations.

Operational view of debris flow monitoring



Through satellite communication the data can be rapidly analysed and processed. This is supporting the decision maker at the Debris Flow Emergency Operational Center.

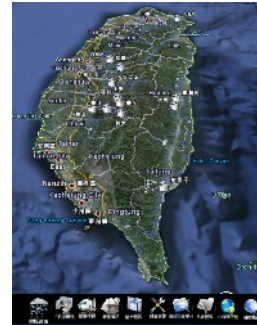
Disaster Prediction and Warning Feng Chia University



“The success of our programs to monitor, detect, warn and respond to emergencies and natural disasters in Taiwan depends heavily on OGC standards.

We use OGC Web Services and Sensor Web Enablement standards to rapidly mobilize monitoring, forecasting and warning networks, and to implement a diversity of sensor assets as part of these systems. This saves time, money and lives.”

Tien-Yin Chou, Director of the GIS Research Center
Feng Chia University



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Tien-Yin Chou, Director of the GIS Research Center who is involved in running this monitoring systems says: The success of our programs to monitor, detect, warn and respond to emergencies and natural disasters in Taiwan depends heavily on OGC standards. We use OGC Web Services and Sensor Web Enablement standards to rapidly mobilize monitoring, forecasting and warning networks, and to implement a diversity of sensor assets as part of these systems. This saves time, money and lives.

Summarizing



- avoid re-inventing the wheel, duplication of work and efforts
- interoperability & open standards help to sustain investments
- cooperation on international level is key to success

Now let me summarize my presentation:

I explained, that sharing data is important. And if you need to share data, why not also share your experiences and build on existing ones → avoid re-inventing the wheel and duplication of work, efforts and resources.

The technology evolution will continue at a fast, unpredictable and disruptive pace → interoperability and using open standards can help also to sustain investments.

And as I showed we live in important times for leveraging location information for improved decision making → cooperation on international level is key to success.



“Once you have understood how much open standards can underpin environmental policies, you keep trying to convince others. This is exactly what we at OIEau have been doing for years now in France and in other nations. I really enjoy taking part in this movement and will continue planting open standards seeds wherever I can.”

Sylvain Grellet (IOEau)

<http://www.opengeospatial.org/blog/1667>

Closing I want to share one more quote on the use of Open Standards, this time from Sylvain Grellet from the International Office for Water: “Once you have understood how much open standards can underpin environmental policies, you keep trying to convince others. This is exactly what we at OIEau have been doing for years now in France and in other nations. I really enjoy taking part in this movement and will continue planting open standards seeds wherever I can.”



Grazie, spasiba and Thank you very much for your attention.