

**7th Framework Programme  
ENV.2010.4.1.2-2  
Integrating new data visualisation approaches of  
earth Systems into GEOSS development**



Project Nr: 265178

**QUALity aware VISualisation for the Global Earth Observation system of  
systems**

**Deliverable D1.3  
Web site of the project:  
[www.geoviqua.org](http://www.geoviqua.org)**

Version 0.2.2

Due date of deliverable: 01/04/2011  
Actual submission date: 13/05/2011

<b>Document control page</b>		
<b>Title</b>	D1.3 Web site of the project: <a href="http://www.geoviqua.org">www.geoviqua.org</a>	
<b>Creator</b>	IS_CREAF	
<b>Editor</b>	IS_CREAF and JM_CREAF	
<b>Description</b>	Web site of the project: <a href="http://www.geoviqua.org">www.geoviqua.org</a>	
<b>Publisher</b>	GeoViQua Consortium	
<b>Contributors</b>	GeoViQua Partners	
<b>Type</b>	Text	
<b>Format</b>	MS-Word	
<b>Language</b>	EN-GB	
<b>Creation date</b>	28/04/2011	
<b>Version number</b>	0.2.2	
<b>Version date</b>	13/05/2011	
<b>Last modified by</b>		
<b>Rights</b>	Copyright © 2011, GeoViQua Consortium	
<b>Dissemination level</b>	<input type="checkbox"/> CO (confidential, only for members of the consortium)	
	<input checked="" type="checkbox"/> PU (public)	
	<input type="checkbox"/> PP (restricted to other programme participants)	
	<input type="checkbox"/> RE (restricted to a group specified by the consortium)	
	When restricted, access granted to:	
<b>Nature</b>	<input type="checkbox"/> R (report)	
	<input type="checkbox"/> P (prototype)	
	<input type="checkbox"/> D (demonstrator)	
	<input checked="" type="checkbox"/> O (other)	
<b>Review status</b>	<input checked="" type="checkbox"/> Draft	<i>Where applicable:</i>
	<input type="checkbox"/> WP leader accepted	Accepted by the PTB
	<input type="checkbox"/> PMB quality controlled	Accepted by the PTB as public document
	<input type="checkbox"/> Coordinator accepted	
<b>Action requested</b>	<input type="checkbox"/> to be revised by all GeoViQua partners	
	<input checked="" type="checkbox"/> for approval of the WP leader	
	<input type="checkbox"/> for approval of the PMB	
	<input checked="" type="checkbox"/> for approval of the Project Coordinator	
<b>Requested deadline</b>	for approval of the PTB	

<b>Revision history</b>			
Version	Date	Modified by	Comments
0.1	28-04-2011	IS_CREAF	Created the basic content of the deliverable
0.2	29-04-2011	JM_CREAF	Structuring the content.
0.2.1	29-04-2011	IS_CREAF	Adding and deepening contents
0.2.2	10-05-2011	JM_CREAF	Minor edits

Copyright © 2011, GeoViQua Consortium

The GeoViQua Consortium grants third parties the right to use and distribute all or parts of this document, provided that the GeoViQua project and the document are properly referenced.

*THIS DOCUMENT IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS DOCUMENT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.*

## Table of Contents

<b>1. The portal.....</b>	<b>1</b>
1.1 <i>Maintenance and backup copies .....</i>	<i>2</i>
<b>2. The sections .....</b>	<b>2</b>
2.1 <i>Main sections.....</i>	<i>2</i>
2.2 <i>Thematic sections.....</i>	<i>3</i>
2.3 <i>Related information.....</i>	<i>3</i>
2.4 <i>Participants sections.....</i>	<i>4</i>
<b>3. Complementary resources to the main portal .....</b>	<b>5</b>
3.1 <i>The twiki .....</i>	<i>5</i>
3.1.1 <i>GeoViQuaExtranet .....</i>	<i>6</i>
3.1.2 <i>GeoViQua.....</i>	<i>6</i>
3.1.3 <i>GeoViQualIntranet.....</i>	<i>7</i>
3.2 <i>Social Network.....</i>	<i>7</i>
3.2.1 <i>LinkedIn.....</i>	<i>7</i>
<b>4. Annexes .....</b>	<b>7</b>
4.1 <i>Current text in the portal .....</i>	<i>7</i>
4.2 <i>Example of GeoViQua twiki: GeoViQua Workshop.....</i>	<i>19</i>

## 1. The portal

The portal is the single entry point to access all the relevant information concerning GeoViQua project.

It can be accessed by the following URLs:

[www.geoviqua.org](http://www.geoviqua.org)  
[www.geoviqua.net](http://www.geoviqua.net)  
[www.geoviqua.com](http://www.geoviqua.com)  
[www.geoviqua.cat](http://www.geoviqua.cat)  
[geoviqua.org](http://geoviqua.org)  
[geoviqua.net](http://geoviqua.net)  
[geoviqua.com](http://geoviqua.com)  
[geoviqua.cat](http://geoviqua.cat)

Only the first one will be promoted in flyers and other dissemination materials. The others have been acquired to avoid others to use the same name for a different activity.

The portal is hosted at CREAM, the coordinator partner of the project at Bellaterra (Barcelona), which is connected to the UAB facilities. UAB owns network wires and routers including the ones inside the CREAM building. UAB facilities are connected to the *science ring* that is maintained by the Catalan supercomputer centre (CESCA) that provides connection to RedIris (Spanish node) and guarantees a good quality of service.

The portal resides in an Internet Information Service in a Windows Server 2003 Enterprise operating system on a dual Intel Xeon server. It is composed by web pages written in HTML code with a CSS style sheet. It has been tested and properly working with the following browsers and versions: Internet Explorer 8, Version 8.0.6001.18702; Google Chrome Version 11.0.696.60; Mozilla FireFox 3.6.17; Opera 11.10; and Safari 5.0.5.

At the moment, the portal is only available in English.



Figure 1: Main page of the GeoVIQua portal

## 1.1 Maintenance and backup copies

The CREAM Information Technology personal is responsible for the backup copies.

The content will be updated by the Coordinator fortnightly or whenever there is new relevant information to offer. Ivette Serral is the current responsible for the maintenance of this vital infrastructure.

Connection stability is ensured by CAS (Support and Assistance Centre) a hotline service provided by the UAB (24/7 service). Stability of the connection to the power grid is also provided and maintained by the UAB services even though it's inside CREAM building.

## 2. The sections

### 2.1 Main sections

- News. Updated list of events where GeoVIQua participates.

- Overview. A brief summary of the project.
- Objectives. A list and description of the main objectives to be accomplished by GeoViQua.
- Topics covered. The topics covered by the project, specially concerning GEOSS.
- Structure & work plan. The organization and plan of the project during the following next 3 years.
- Acronyms. A list of the most common acronyms used in the project vocabulary.
- Documents. Downloadable documents from dissemination (leaflets, papers, etc) to official information (public deliverables and reports).

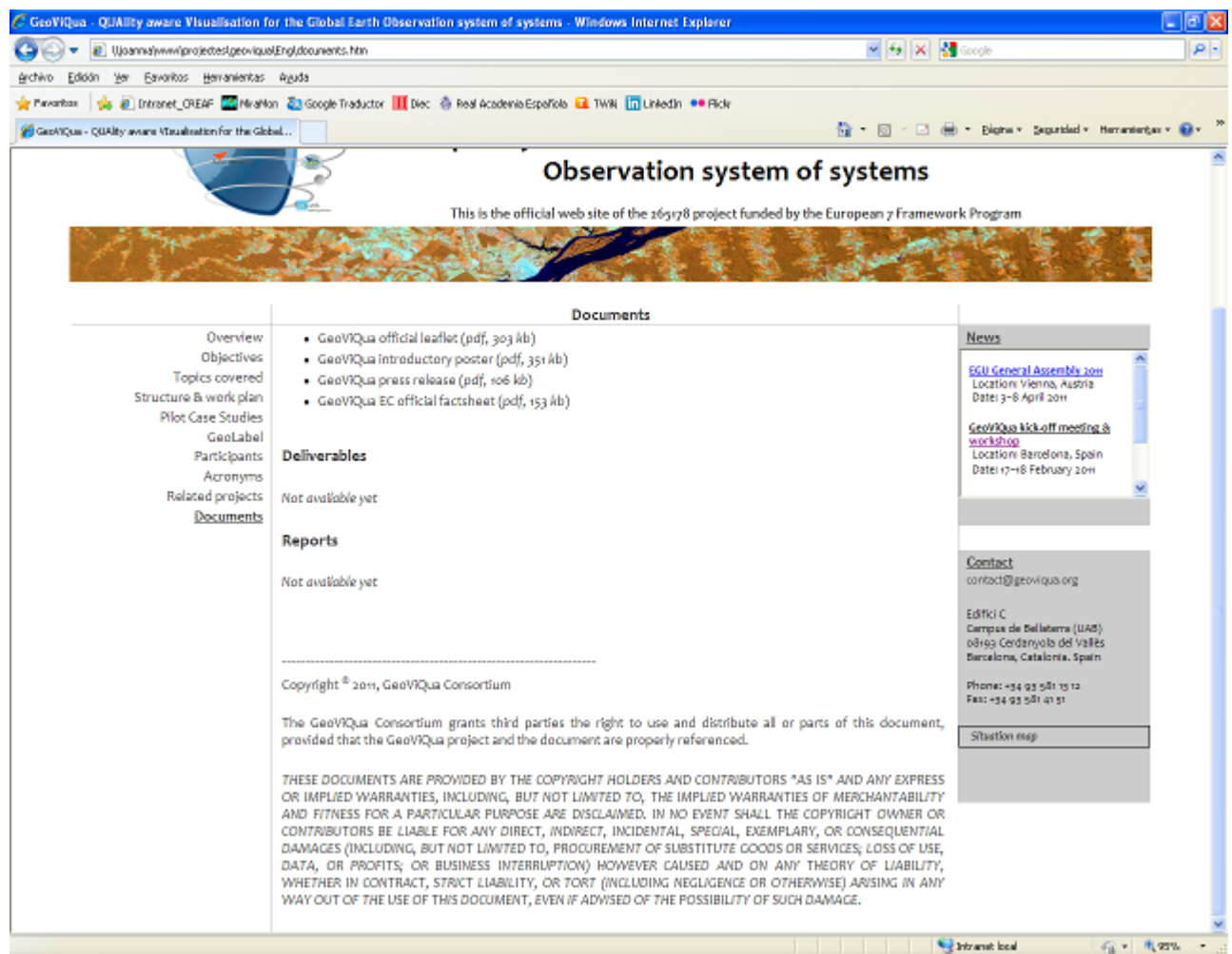


Figure 2: Main page of the GeoViQua portal

## 2.2 Thematic sections

- Pilot Case studies. A brief definition of the pilot cases defined to test project proposals and results.
- GEOLabel. The initial and further definitions of the GEOLabel concept to be performed during the project reflecting collaboration with EGIDA, ST-09-02 and GEO STC.

## 2.3 Related information

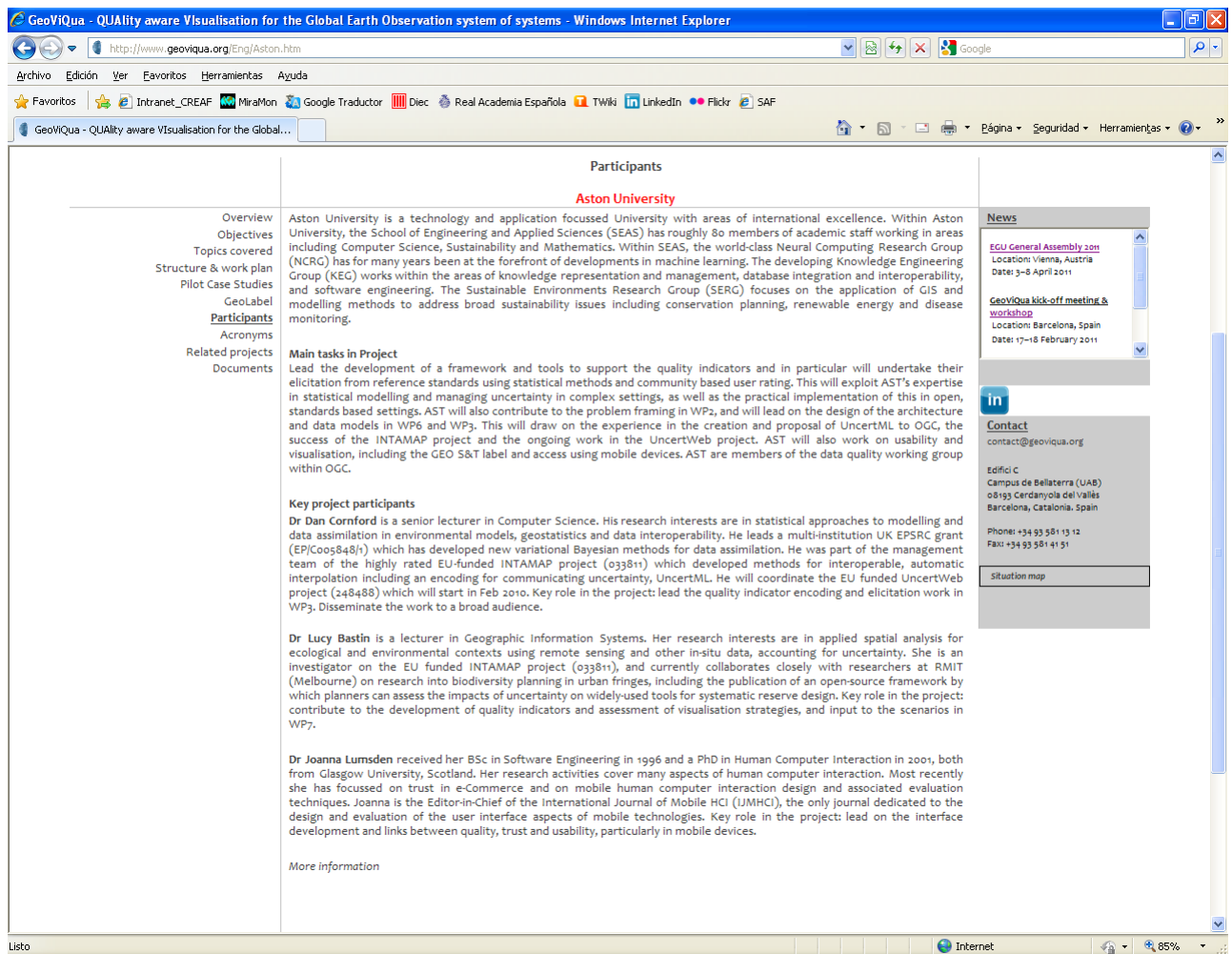
- Related projects. A description of other FP7 projects related to GeoViQua. Currently, only EGIDA and EUROGEOSS FP7 projects are in this section although it will be

updated as the project progresses. Other relevant are included as the ones referring to GEO/GEOSS, OGC and QA4EO. Again, new links will be included as the project goes forward.

## 2.4 Participants sections

- Participants. A description of every particular organization participating on GeoViQua:
- CREAM: Centre for Ecological Research and Forestry Applications (*Spain*)
- UAB: Universitat Autònoma de Barcelona (*Spain*)
- 52° North GmbH (*Germany*)
- Fraunhofer Institut Graphische Datenverarbeitung -IGD- (*Germany*)
- Consiglio Nazionale delle Ricerche (CNR). IMAA - Istituto di Metodologie per l'Analisi Ambientale (*Italy*)
- Aston University (*UK*)
- University of Reading (*UK*)
- Commissariat a l'Energie Atomique (CEA). LSCE -Laboratoire des Sciences du Climat et de l'Environnement (*France*)
- ESA: European Space Agency (*France*)
- S[&t Corporation (*The Netherlands*)





**Participants**

**Aston University**

Overview  
Objectives  
Topics covered  
Structure & work plan  
Pilot Case Studies  
GeoLabel  
**Participants**  
Acronyms  
Related projects  
Documents

Aston University is a technology and application focussed University with areas of international excellence. Within Aston University, the School of Engineering and Applied Sciences (SEAS) has roughly 80 members of academic staff working in areas including Computer Science, Sustainability and Mathematics. Within SEAS, the world-class Neural Computing Research Group (NCRG) has for many years been at the forefront of developments in machine learning. The developing Knowledge Engineering Group (KEG) works within the areas of knowledge representation and management, database integration and interoperability, and software engineering. The Sustainable Environments Research Group (SERG) focuses on the application of GIS and modelling methods to address broad sustainability issues including conservation planning, renewable energy and disease monitoring.

**Main tasks in Project**  
Lead the development of a framework and tools to support the quality indicators and in particular will undertake their elicitation from reference standards using statistical methods and community based user rating. This will exploit AST's expertise in statistical modelling and managing uncertainty in complex settings, as well as the practical implementation of this in open, standards based settings. AST will also contribute to the problem framing in WP2, and will lead on the design of the architecture and data models in WP6 and WP3. This will draw on the experience in the creation and proposal of UncertML to OGC, the success of the INTAMAP project and the ongoing work in the UncertWeb project. AST will also work on usability and visualisation, including the GEO S&T label and access using mobile devices. AST are members of the data quality working group within OGC.

**Key project participants**

**Dr Dan Cornford** is a senior lecturer in Computer Science. His research interests are in statistical approaches to modelling and data assimilation in environmental models, geostatistics and data interoperability. He leads a multi-institution UK EPSRC grant (EP/C005848/1) which has developed new variational Bayesian methods for data assimilation. He was part of the management team of the highly rated EU-funded INTAMAP project (033811) which developed methods for interoperable, automatic interpolation including an encoding for communicating uncertainty, UncertML. He will coordinate the EU funded UncertWeb project (248488) which will start in Feb 2010. Key role in the project: lead the quality indicator encoding and elicitation work in WP3. Disseminate the work to a broad audience.

**Dr Lucy Bastin** is a lecturer in Geographic Information Systems. Her research interests are in applied spatial analysis for ecological and environmental contexts using remote sensing and other in-situ data, accounting for uncertainty. She is an investigator on the EU funded INTAMAP project (033811), and currently collaborates closely with researchers at RMIT (Melbourne) on research into biodiversity planning in urban fringes, including the publication of an open-source framework by which planners can assess the impacts of uncertainty on widely-used tools for systematic reserve design. Key role in the project: contribute to the development of quality indicators and assessment of visualisation strategies, and input to the scenarios in WP7.

**Dr Joanna Lumsden** received her BSc in Software Engineering in 1996 and a PhD in Human Computer Interaction in 2001, both from Glasgow University, Scotland. Her research activities cover many aspects of human computer interaction. Most recently she has focussed on trust in e-Commerce and on mobile human computer interaction design and associated evaluation techniques. Joanna is the Editor-in-Chief of the International Journal of Mobile HCI (IJMHCI), the only journal dedicated to the design and evaluation of the user interface aspects of mobile technologies. Key role in the project: lead on the interface development and links between quality, trust and usability, particularly in mobile devices.

*More information*

**News**

**ECU General Assembly 2011**  
Location: Vienna, Austria  
Date: 3-8 April 2011

**GeoViQua kick-off meeting & workshop**  
Location: Barcelona, Spain  
Date: 17-18 February 2011

**Contact**  
contact@geoviqua.org

Edifici C  
Campus de Bellaterra (UAB)  
08193 Cerdanyola del Vallès  
Barcelona, Catalonia, Spain

Phone: +34 93 581 13 12  
Fax: +34 93 581 41 51

**Situation map**

Figure 3: Example of a participant page

More detailed information is going to be asked to each participant in order to enrich all pages.

### 3. Complementary resources to the main portal

The portal directly links to other GeoViQua communication resources: the twiki page, the LinkedIn group and the rss resource.

[Go to the GeoViQua twiki \(updated information\)](#) [Go to the GeoViQua internal web \(only registered members\)](#)



#### 3.1 The twiki

It allows any partner to submit to the community any relevant information, as well as to coordinate WP tasks by the WP leader, upload documents like deliverables, reports, etc.

The twiki is a Free Software under the GNU/GPL to be used as a Web-based collaboration platform where everyone can edit anything, anywhere on a page.

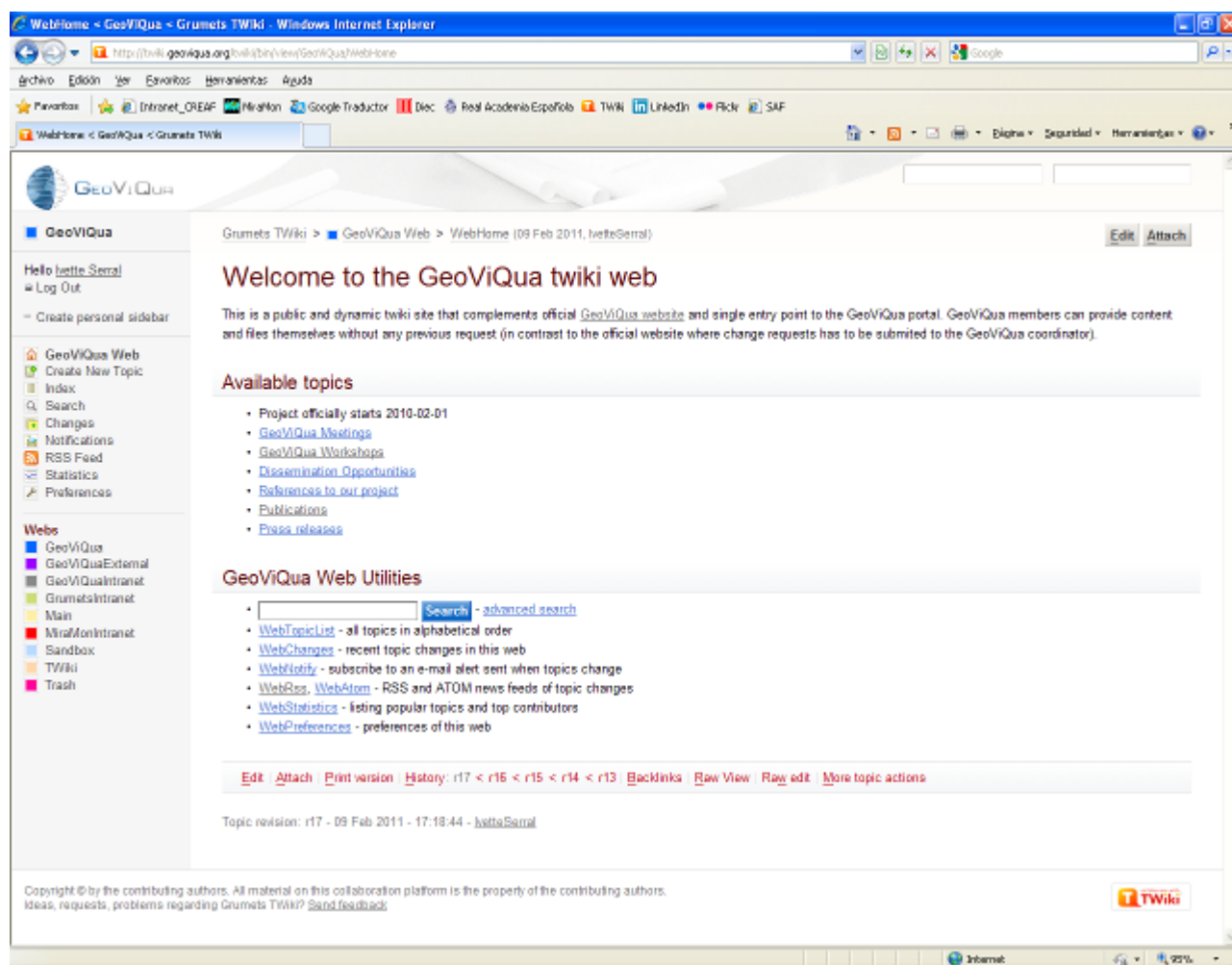


Figure 4: Twiki main page

It can be used as document repository though it is a slow to upload information, always saves a versions historic (occupying too much space), but it is good enough to download documentation and allows some metadata over the document. The attachments in topics/pages have a maximum size permitted of 50Mb per file.

GeoViQua uses twiki in its 4.2.0 version and it has 3 levels of permission:

### 3.1.1 GeoViQuaExtranet

Resource to communicate with other interested public. It is editable for any auto registered user and visible to everybody in or out of the consortium. Example: Discussing issues with other people in GEOSS.

<http://twiki.geoviqua.org/twiki/bin/view/GeoViQuaExternal/WebHome>

### 3.1.2 GeoViQua

It's a more dynamic web site. It is editable for any GeoViQuaGroup member and visible to everybody. Example: Fast exposure of ideas and contributions to everybody in or out of the consortium.

<http://twiki.geoviqua.org/twiki/bin/view/GeoViQua/WebHome>

### 3.1.3 GeoViQualIntranet

To be used for internal coordination. It is only visible and editable for the GeoViQuaGroup members. A username and password are required to use it. Example: To be used it as a coordination tool for Work Packages Task, Partners...). Every partner has a personal topic/page that can be used as they prefer. Some basic information has been added for the Coordinator team to each partner page as the list of milestones and deliverables, the description of all WP, tasks, etc.

<http://twiki.geoviqua.org/twiki/bin/view/GeoViQualIntranet/WebHome>

## 3.2 Social Network and web 2.0

We have setup our presents in the social network LinkedIn. We are also studying other possibilities as twitter and facebook.

### 3.2.1 LinkedIn

A LinkedIn Group (GeoViQua) has been created in order to share information and experience with people in this professional network. We do not recommend to use it as a discussion forum: for this purpose it is better to use the email list or even the twiki creating a Discussion topic page.

<http://www.linkedin.com/groups?gid=3775972>

It links GeoViQua to EGIDA project:

<http://www.linkedin.com/groups?mostPopular=&gid=3730770>.

### 3.2.2 RSS

News of the project are also provided in RSS feed formats available for RSS readers to be used and alerted. The subscription can be done at

<http://www.geoviqua.org/eng/geoviqua.rss>.

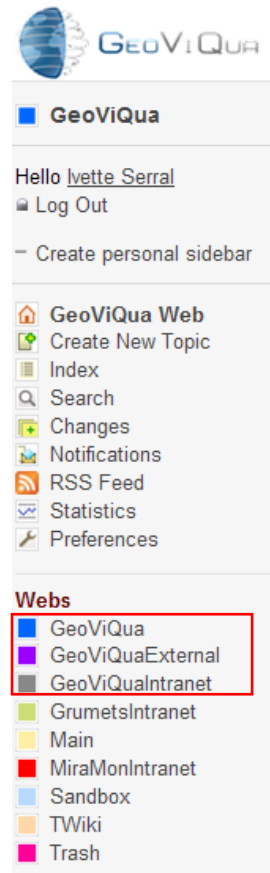
## 4. Annexes

### 4.1 Current text in the portal

#### 4.1.1 Overview

GeoViQua is a recently started FP7 project (ENV.2010.4.1.2-2; nr 265178) focused on adding rigorous quality specifications to the Global Earth Observation System of Systems (GEOSS) spatial data in order to improve reliability in scientific studies and policy decision making. Quality visualization and search tools will be integrated to the public GEOPortal to assist in the spatial data discrimination for scientific purposes; the project will also contribute to the definition of a GEOLabel concept reflecting scientific relevance, quality, acceptance and societal needs. To achieve all this, several pilot cases spread over the whole Earth Observation chain are performed, considering remote sensing acquisition and data processing, and its application to the main GEO (Group on Earth Observations) Societal Benefit Areas (SBA): Health, Disasters, Weather, Energy, Water, Climate, Agriculture, Ecology and Biodiversity.

GeoViQua main objective is to improve the GCI providing the user community with innovative quality-aware visualisation and advanced geo-search capabilities making them available through the GEOPortal and other end-user implementations. To this end, GeoViQua will attach standard quality parameters to the current meta-data making it available to users and experts, producing more reliable studies about Earth systems and their dynamics, and tagging spatial information by means of a quality label: the GEOLabel.



To achieve all purposes, GeoViQua is supported by a group of 10 partners: Catalan, French, Italian and German research centres (CREAF, CEA-LSCE, CNR-IMAA, Fraunhofer-IGD, 52North); a Catalan and two English Universities (Universitat Autònoma de Barcelona -UAB-, Aston University and University of Reading); a Dutch company (S[&t]); and the European Space Agency (ESA).

#### **4.1.2 Objectives**

GeoViQua's primary goal is to augment GEOSS Common Infrastructure (GCI) with innovative quality-aware visualisation tools and geo-search capabilities, providing to the user community with enhanced and advanced tools available through the GEO Portal and other end-user tools.

GeoViQua has 3 major scientific and technical objectives:

1. The provision of innovative tools to enhance the current infrastructure capability. GeoViQua's major technical innovation is search and visualization tools for the community that communicate and exploit data quality information from GEOSS catalogues.
2. The development of the GEOLabel. Within GeoViQua, GEOLabel requirements are identified (Work Package 2), integrated with components (WP6), validated and applied into pilot cases (WP7), and disseminated to the community (WP8). This task will be completed in collaboration with the GEO task ST-09-02.
3. The harmonization, exploitation and dissemination of project outputs. A careful validation process is conducted in collaboration with a number of communities of practice and standards committees to ensure that the project contributes effectively to the GCI (GEOSS Common Infrastructure) architecture. Collaboration with AIPs (Architecture Implementation Pilot) will be continuous.

The role of quality

Quality information based on provenance information describing the processing and quality control applied to data: development of the GEOLabel.

Quality information also based on quantitative assessment of the uncertainty associated to data (QA4EO documentation).

Quality information based on user feedback related to user view of data utility in the form of subjective qualitative statements and reviewing mechanisms.

#### **4.1.3 Topics covered**

1. Information sharing
  - 1.1 2D and 3D data visualisation
  - 1.2 Data quality, trust and low-bandwidth access
  - 1.3 Web 2.0 and Volunteered Geographic
2. Quality assessment and quality metadata
  - 2.1 Relating data, metadata and quality
  - 2.2 Data quality indicators; quality elicitation methods
3. Standards
  - 3.1 Standards for metadata and quality
  - 3.2 Inclusion of data quality information into standards for data visualisation
4. Enhancing the GEOSS environment
  - 4.1 Data quality aware geo-search components
  - 4.2 Advancing in the use of GEOSS visualisation tools

#### **4.1.4 Structure & work plan**

- Consortium Management and assessment of progress and results (WP1).
- Collection of User Requirements and translation into Technical Requirements (output: Preliminary design, WP2).
- Research and Development (output: Developed components ready for integration, WP3, WP4, WP5).

- Components integration and validation (output: Integrated system, WP6).
- Validation through pilot use cases studies (output: Validated system, WP7).
- Outreach, sustainability, exploitation and contribution to standards (WP8).

#### 4.1.5 Pilot Case Studies

GeoViQua relies on needs and requirements coming from GEO Communities of Practice (CoPs), including those already identified by the established GEO committees. GeoViQua proposes solutions, including protocols, involving end-users and stakeholders. To this purpose, 7 pilot case studies are developed including scenarios on:

- Transversal satellite data producers and massive satellite data processors (RS\_PC: ESA and UAB),
- Global Carbon Project (CarbonPC: LSCE),
- meteorological reanalysis (ClimPC: University of Reading in collaboration with the UK Met Office and UAB),
- agricultural products (AgriPC: UAB in collaboration with JRC),
- air quality in-situ sensors (AirQuaPC: 52North),
- marine fisheries (FisheryPC: ESA),
- land cover changes (LandPC: CREAM).

This broad range of applications enables to access the much-needed contextual expertise on real-world challenges, and promotes constant dissemination of GeoViQua research and development activities.

#### 4.1.6 GeoLabel

Within GeoViQua a spatial quality indicator, GEOLabel, will be defined to en-sure at maximum users knowledge about quality when using spatial data, an issue particularly critical in scientific studies.

GEOLabel requirements will be firstly mined and determined, integrated into all GeoViQua components, validated and applied by the pilot cases, and finally dis-seminated to the community. This theoretical and methodological definition will be complemented in collaboration with the FP7 EGIDA project and the GEO task ST-09-02 committee, responsible of promoting GEOLabel in GEOSS.

#### 4.1.7 Participants

GeoviQua is supported by the participation of 10 partners – among which the Universitat Autònoma de Barcelona, two English Universities, French, Italian and German research centres, a Dutch company and the European Space Agency.

- CREAM: Centre for Ecological Research and Forestry Applications (Spain)

The Centre for Ecological Research and Forestry Applications (CREAF) is a public research institution that was created in 1987 by the Generalitat (Autonomous Government) of Catalonia, the Autonomous University of Barcelona (UAB) the Institute of Catalan Studies (IEC) and The University of Barcelona (UB), to promote basic and applied research in terrestrial ecology. CREAM has made important contributions in terrestrial ecology and towards a sustainable management of the environment and technology transfer. Some of these contributions are the publication of numerous scientific papers in international academic journals and the development of numerous scientific methodologies and technological tools such as the GIS&RS software MiraMon®.

#### Main tasks in Project

CREAF is the initiator and project coordinator and will work on; administrative and technical project management; the overall system architecture, user requirements and integration; will develop some of the quality elicitation and visualisation tools and provenance graphical visualisation, graphical catalogue. CREAM will participate in validation with technical support and in the dissemination and standardisation.

#### Key project participants

Mr. Joan Masó (MSc in Physics in 1994, and a MSc in Electronic Engineering) since 1995 he is a researcher at CREAM. Co-creator of the MiraMon compressed map and the MiraMon Map Reader idea in 1997; the first MiraMon technology for Internet distribution. He is a co-developer of the OGC WMS, WFS and WCS server and client MiraMon technology. He is co-developer of the MiraMon vector data model and metadata profile. He is an active member of the TC of the Open Geospatial Consortium (OGC) since 2003 and the editor OGC

07-057r7 WMTS recently approved and Spanish representative for the current ISO19115 revision process. Key role on the project: Technical coordination and management of the project.

Dr. Joan Pino (PhD in Biology, MSc in GIS) is researcher at CREAM and lecturer at the Ecology Dept. of the UAB. He accounts for more than 15 years of expertise in research, and more than 50 publications. He leads a landscape ecology group. Interests are geographical distribution interaction, ecology, and plant population dynamics with landscape structure and change. Led Spanish group in BIOPRESS EU FPV project (ref. no. EVK2-2002-00178) focused on landscape changes and biodiversity at pan-European level. He is leading the COCONUT EU FP6 project (ref. no. 044346), (impacts of grassland ecosystems habitat loss and fragmentation on biodiversity in the EU FP6 projects ALARM and DAISIE, (biology and impacts of invasions)). Key role on the project: Land use pilot case studies expert.

Ms. Núria Julià (Degrees in Biology and in Computer Sciences, MSc in Remote Sensing and GIS) is researcher at CREAM since 2002. The main objective of her research is the web services and the collaborative portals. She is a co-developer of the OGC WMS, WFS and WCS server and client. She is a co-editor of Web Map Tiling Service Standard recently approved. Núria has a large experience and knowledge in databases, C and JavaScript. She is a developer of the CaMM metadata catalogue and tools for automatically computation forest fire risk for a web portal on-fly. Key role on the project: Integration of components in the test web portal platform.

Ms. Ivette Serral (Degrees in Environmental Sciences, MSc in Remote Sensing and GIS) is researcher at CREAM since 2005. The main objective of her work is to develop and manage GIS for the public administration: the Catalan marine and coastal information system, the Catalan healthcare information system, the Andorran environmental information system, etc. She developed new methodological tools in reference systems integration and multicriteria studies. She has also been deployed several Web geodata portals (e.g., Thalassa, an interoperable portal gathering all MODIS SST and Chlor-a images from the Terra and Aqua series). She has been collaborating with secondary schools to disseminate GIS science and applications. Key role on the project: Technical management.

Ms. Paula Díaz (Degree in Geography, MSc in Territorial planning and environmental management, MSc in Remote Sensing and GIS) is a researcher at CREAM and was at Geography Department of the UAB since 2008. She is an expert in quality evaluation of the Metadata on standards like the ISO 19115, ISO 19139 standards and has elaborated studies quality metadata for INSPIRE SDI and Regional Spatial Data Infrastructures (IDEC, IDE - CLM and IDEG). She has collaborated in other European projects, in GEOPICTURES - (SPACE-2009-1-242390) GMES and Earth Observation combined with Position based Image and sensor Communications Technology for Universal Rescue, Emergency and Surveillance - developing technology research in case of Emergency Management, evaluating user usability and time response for several servers under WMS, WMTS and WMS-C services and in EGIDA - (ENV-2010-1-265124) Coordinating Earth and Environmental cross-disciplinary projects to promote GEOSS - realizing dissemination activities regarding GEOSS, to support the ST-09-01 and ST-09-02 GEO tasks. Key role on the project: support research activities in different GeoViQua Work Packages.

- UAB: Universitat Autònoma de Barcelona (Spain)

The Universitat Autònoma de Barcelona (UAB) was founded in 1968 and is 2nd in the national ranking of universities (2004-2005) and recently has been recognized as a campus of international excellence by the Ministries for Education (MEC) and for Science and Innovation (MICINN) of the Spanish Government. The Group of Methods and Applications in Remote Sensing and Geographical Information Systems (GRUMETS) in the Department of Geography aims to propose new algorithms, methodologies and tools for GIS, Remote Sensing, Cartography and land dynamics. The group has broad experience in image processing of remote sensors, having worked with images of low, medium and high spatial resolution from both satellite and airborne sensors. The members of the research group have published about 150 scientific papers and obtained a "Research, innovation and development" award from the Catalan Government.

Main tasks in Project

UAB will coordinate and work on the pilot case studies and metadata standards.

## Key project participants

Dr. Xavier Pons (PhD degree in Remote Sensing and GIS in 1992) is Full Professor at the Department of Geography of UAB focusing on Remote Sensing (satellite and airborne) and the development of GIS, both in terms of data structure and organization and in terms of software writing. He has participated, and led in many cases, more than 50 research projects. Recent works include descriptive climatology models, land use change analysis, study lossy images extracting information (JPEG2000, etc) and Remote Sensing studies about water usage in forest and crops. His publications in these fields have had an important impact and have been referenced by more than 800 papers. Key role in the project: Technical requirements definition and agriculture and remote sensing chain pilot case studies.

Dr. Miquel Ninyerola (PhD degree in GIS in 2001) is Full Professor at the Department of Animal Biology, Plant Biology and Ecology of UAB. His main interests are focused on plant-climate interactions through GIS and remote sensing: patterns on plant distribution under past and future climatic change scenarios, drought impacts on vegetation as well as the development of climate maps using spatial interpolation techniques. He has co-developed the Digital Climatic Atlas of the Iberian Peninsula and the Topo-climatic suitability Atlas of woody species. He has published more than 15 papers with a multidisciplinary point of view. Key role in the project: climate pilot case study, main coordinator of the pilot cases.

Dr. Pere Serra (PhD degree in Geography in 2002). His activity focus on RS imagery applied to landcover and land-use change analysis, landscape dynamics and monitoring water usage in Mediterranean crops. He participated in European and Spanish projects and he worked in the Joint Research Centre with Mr. Javier Gallego. He is actually Lecturer at the Department of Geography. Recent he assessed RS classifications from a per-pixel and per-polygon perspective, the flooding dynamics of rice fields and the comparison of water-saving strategies. Key role in the project: Agriculture pilot case study.

Dr. Jordi Cristóbal (PhD degree in Environmental Sciences in 2008). His activity focus on climate modelling using RS and geographical data, thermal atmospheric corrections of satellite imagery and energy fluxes modelling. He has recently worked in water usage and snow coverage from long series of satellite images and in landscape modelling. He is an associate professor at the Department of Geography at the UAB. In 2010 he will be a visiting professor at USDA. Key role in the project: Climate pilot case study.

Dr. Alaitz Zabala (MS degree in Geography in 2006 and MS degree in Remote Sensing and GIS). She is the main developer of the GeMM MiraMon metadata tool. She is a researcher and associate professor at the Department of Geography at UAB. Her main research interests are ISO standardised metadata, lossy images (JPEG2000) and developing standardised servers. She has participated in several competitive projects and has led contracts about conceptual metadata developments. In 2010 she will do a half year stage at the ESA Noordwijk Technology Center. Key role in the project: Contribute to the metadata and standardisation issues of the project.

Mr. Gerard Moré (MS degree in Remote Sensing and GIS in 2003, MSc 2008). His activity is focused on RS, in the usage of multitemporal series of images applied to the generation of categorical and quantitative cartography of forests and crops. Recent works include accuracy assessment in RS classification from per-pixel and per-polygon perspective, monitoring multitemporal flooding dynamics of rice fields, quantification of the effect of the number of images (dates) in detailed forestry classification, and LIDAR information to estimate ecological parameters on Mediterranean forest. Key role in the project: Agriculture and remote sensing chain pilot case studies and coordinate the WP7.

- 52° North GmbH (Germany)

52° North GmbH is an SME that forms the back office and service centre of an international research and development network aiming at fostering the process of innovation in the field of geoinformatics. This network is driven by leading research organizations and individuals of the international GIS community. Partners participate in the development of innovative technologies and their transformation into practical solutions. Principal participants and shareholders of the 52° North GmbH are: con terra - Gesellschaft für Angewandte Informationstechnologie mbH, Münster (Germany), International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (The Netherlands), Institute for Geoinformatics in University of Münster (Germany), and Environmental Systems Research Institute, ESRI Inc., Redlands (California,

USA). The participants have a long and outstanding record in the domain of geoinformatics, spatio-temporal modelling, spatial data infrastructures, software architectures, and standardisation processes. 52° North and its participants are actively involved and leading the OGC standardisation process for web based geoprocessing (Chair of the OGC WPS 2.0 Standards Working Group), sensor web enablement (Chair of the SOS 2.0 OGC Standards Working Group) and digital rights management (Chair of the OGC GeoRM 1.0 Standards Working Group) as well as in INSPIRE drafting teams. The 52° North GmbH is a company limited by shares, which acts as a non-profit organization manifested in its statutes. The company's annual surplus is invested in the promotion of science and research, education and training in the field of geoinformatics, the promotion of mutual transfer of knowledge between research and practical application, and the improvement of the availability of geoinformation technology and technology competence in developing and transformation countries. Currently, 52N has 9 employees. Being a small enterprise itself, 52N makes use of (personnel) resources provided by its participant organizations in order to form an optimal team of highly specialized experts for any given project.

#### Main tasks in Project

52° North will work on design of integrated quality enable systems for GEOSS and on smart search and quality visualisation.

#### Key project participants

Simon Jirka works as community leader for the sensor web group of 52° North. He is employed as a research associate at the Institute for Geoinformatics (IfGI) of the University of Muenster and holds a master degree in geoinformatics. He is currently working on his Ph.D. His research activities focus on discovery mechanisms for sensor networks and on the simulation of autonomous sensor behaviour. At IfGI Simon Jirka is the internal project manager of the EU-funded project GENESIS, in which IfGI deals with the development of an interoperable architecture for sensor networks; he is the work package leader for the technology research activities. He was the internal project manager at IfGI of the FP6 project OSIRIS. In addition, he is also involved in the Sensor Web Enablement (SWE) initiative in OGC.

Prof. Dr. Edzer Pebesma is professor at the institute for geoinformatics (IfGI) at the University of Muenster, one of the principal participants of 52° North, and is in that role part of the steering and advisory board of 52° North. He is leading the geostatistics community, an emerging community in 52° North that focuses on the modelling and statistical analysis of spatio-temporal data, and quantitative expression and visualisation of data accuracy, control of data quality, error propagation, and integration of in situ sensing data from fixed or mobile sensors with earth observation (remote sensing) data.

Daniel Nüst is a student assistant and software developer at 52°North. Daniel is actively participating in the development of SWE standards. He designed and implemented client and server components for the Sensor Web and participated in the EC projects OSIRIS and GENESIS. His research interests include sensor networks, sensor catalogues and geographic visualization.

#### - Fraunhofer Institut Graphische Datenverarbeitung -IGD- (Germany)

The Fraunhofer Gesellschaft (FhG) is the leading organization of applied research in Germany, undertaking contract research on behalf of industry, the service sector and the government. Commissioned by customers in industry, it provides rapid, economical and immediately applicable solutions to technical and organizational problems. At present, the organization maintains 80 research establishments at 40 locations throughout Germany with around 13,000 employees. The Fraunhofer Gesellschaft will contribute to the GIGAS Project through Fraunhofer Institute for Computer Graphics Research (IGD). FhG focuses on the development of product prototypes (hard- and software) and the realisation of concepts, models, and solutions for computer graphics and its adoption to specific application requirements. The work is rounded off by object-oriented basic research projects and the realization of single devices and computer graphics systems with pilot character (e.g. virtual and augmented reality, mobile computing, and security technologies). Three of the major subjects FhG is dealing are; with industrial applications, animation and image communication as well as with graphical information systems, with the focus on spatial and geographic information systems. The tasks of the Graphic Information Systems (GIS) department at FhG are research, development and services in the field of Graphic Information Systems, especially on 3D GIS, locationbased services and spatial data infrastructure technologies. The activities cover research as well as enduser and producer-relevant services.



### Main tasks in Project

We will lead the requirements assessment and definition for the project, especially defining user and systems requirements.

### Key project participants

M. Sc. Thorsten Reitz is deputy department head for the GIS department at Fraunhofer IGD. He has been developer, technical project manager or project manager for a variety of industry development projects (Agilent IBO Intranet 2001, tasman CRM software 2003, Tourenplaner3D 2005) and studies (Galileo Anwenderzentrum 2005, GDI-WSV 2006, GDI-DE Testsuite). His current activities include being a member of the Executive Board in the HUMBOLDT IP (7.9M€ EU contribution, 10/2006 to 09/2010) and work package leader or contributor in several other on-going public or industry-funded research projects (eSDI-NET+, NatureSDI). His research agenda concentrates on methods to identify and mitigate semantic and structural mismatches in the harmonisation of geodata. Key role in the project will include moderation in analysis and specification workshops, internal lead at Fraunhofer for the project, handling of administrative and financial issues.

Moses Gone is a Research Associate at Fraunhofer IGD, Graphic Information Systems Department since 2007. Moses has a Msc. in Geoinformatics and Photogrammetry and is currently involved in various EU projects, including HUMBOLDT, GIGAS and NatureSDI+. His main competences includes: GIS project management and training, GIS analysis and modelling, developing geospatial systems design and development, ontology engineering and programming. His current research interests are in application of semantics in data quality assurance, data quality propagation as a result of transformations on data during spatial data processing, geoprocessing provenance and new approaches for data quality visualisation especially for non-expert geospatial data uses. Key role in the project will include leading the requirements definition work package, specification for provenance, and implementation of the quality visualisation component.

Michel Krämer, M. Sc. is a scientific staff member at Fraunhofer IGD, Graphic Information Systems Department. He has expertise in General software engineering, Software architecture of GIS, Visualisation, processing and storing of 3D geodata (particularly 3D city models) and Quality-driven integration of geodata. Key roles in the project will include specification and implementation of optimum quality visualisation strategies for 3D environments, implementation of quality visualisation tools for 3D visualisation tools.

Simon Templer studied computer science at the Technische Universität Darmstadt (Darmstadt University of Technology). In 2005 he joined the Fraunhofer IGD as a student research assistant. Since June 2009 he is a member of the research staff at the department for graphic information systems. His interests include general software engineering and design, generic data management and processing and visualization of geodata. Key roles in the project will focus on the implementation and evaluation of quality visualisation methods for 3D visualisation tools.

- Consiglio Nazionale delle Ricerche (CNR). IMAA - Istituto di Metodologie per l'Analisi Ambientale (Italy)  
The CNR-IMAA (Institute of Methodology for Environmental Analysis) of the National Research Council of Italy (CNR) is a research Institute whose research concerns the study of the atmosphere and of the Earth's surface, and of human impacts on these, using remote sensing and environmental and geophysical monitoring. It is a centre of competence of the Italian Civil Protection Department of the Prime Minister's cabinet. The Earth and Space Science Informatics Laboratory (ESSI-Lab) of CNR-IMAA was established to facilitate the effective and seamless provision of Earth and Space resources to Information Society applications. ESSI-Lab research focuses on the application of information and communications technologies to manage, share and harmonize Earth and Space Science data, information, services and knowledge in the framework of Geospatial Information technologies and infrastructures. A major research activity concerns crosswalks between the Earth and Space Science and Geospatial Information communities, investigating interoperability solutions. CNR-IMAA is a member of the OGC (Open Geospatial Consortium). CNR-IMAA has specific knowledge and experience on international framework and standard related to Earth Science Systems resources access and interoperability. Project/Initiatives: FP7 EUROGEOSS (a European approach to GEOSS); FP7 UncertWeb (The Uncertainty Enabled Model Web); FP7 GIGAS (GEOSS, INSPIRE and GMES an Action in Support), FP7 G-MOSAIC (GMES Services for Management of Operations, Situation

Awareness and Intelligence for regional Crises), FP7 SAFER (Services and applications for emergency response); FP6 CYCLOPS (Cyber-Infrastructure for Civil Protection Operative Procedure); ESA HMA-T Phase 2 (Heterogeneous Mission Accessibility - Testbed); CNR GIIDA (Gestione Integrata e Interoperativa dei Dati Ambientali); GEOSS AIP-2 (Architecture and Interoperability Project – phase 2); GEOSS “Model Web development” task. Participation in standardisation/specification WGs on metadata and network services (INSPIRE Metadata Drafting Team, OGC, DGIWG, UNIDATA THREDDS, ncML and ncML-GML).

#### Main tasks in Project

Coordinate R&D in Quality geo-search components.

#### Key project participants

Stefano Nativi: is co-chair of the GEO Science & Technology Committee (representing Italy). He has been co-chair of the GEOSS Interoperability Process Pilot Project (IP3). He is member of the GEOSS SIF (Standards and Interoperability Forum) core Team and Head of the SIF European Team. He was cochair of GEO AIP-2 for Climate Change & Biodiversity. He is member of GEO ADC and of the GEO Best Practices editorial Team. He is in charge of the Multidisciplinary Interoperability WP of the FP7 EuroGEOSS project. He is chair of the ESSI (Earth and Space Science Informatics) division of EGU (European Geosciences Union). He is member of the “Metadata Core Drafting Team” for the Implementing Rules of the INSPIRE initiative. He is the coordinator of the CNR Inter-departmental project GIIDA (Integrated and Interoperable management of CNR environmental data). He teaches “Systems for land management” for the University of Padova (specialization degree in Informatics). He is in charge of the Earth and Space Science Informatics Laboratory of CNR-IMAA and coordinator of the CNIT (Italian Interuniversity Consortium for Telecommunications) section for CNR-IMAA. He is Co-PI of the OGC GALEON II interoperability experiment. Key role in the project: Coordinate the development of the smart geo-search.

Paolo Mazzetti: is researcher at CNR-IMAA. He has ten years experience in design and development of infrastructures and services for geo-spatial data sharing. He teaches “Telematics” at the University of Florence at Prato for the degree in Information Engineering. He is member of the Italian Interuniversity Consortium for Telecommunications (CNIT). He is a member of the Earth Observation Extension Package of ebRIM profile and of the CIM (Cataloguing of ISO Metadata) Extension Package of ebRIM profile of CS-W Standards Working Group Charter, of the OGC. Key role in the project: develop the smart geo-search.

#### - Aston University (UK)

Aston University is a technology and application focussed University with areas of international excellence. Within Aston University, the School of Engineering and Applied Sciences (SEAS) has roughly 80 members of academic staff working in areas including Computer Science, Sustainability and Mathematics. Within SEAS, the world-class Neural Computing Research Group (NCRG) has for many years been at the forefront of developments in machine learning. The developing Knowledge Engineering Group (KEG) works within the areas of knowledge representation and management, database integration and interoperability, and software engineering. The Sustainable Environments Research Group (SERG) focuses on the application of GIS and modelling methods to address broad sustainability issues including conservation planning, renewable energy and disease monitoring.

#### Main tasks in Project

Lead the development of a framework and tools to support the quality indicators and in particular will undertake their elicitation from reference standards using statistical methods and community based user rating. This will exploit AST’s expertise in statistical modelling and managing uncertainty in complex settings, as well as the practical implementation of this in open, standards based settings. AST will also contribute to the problem framing in WP2, and will lead on the design of the architecture and data models in WP6 and WP3. This will draw on the experience in the creation and proposal of UncertML to OGC, the success of the INTAMAP project and the ongoing work in the UncertWeb project. AST will also work on usability and visualisation, including the GEO S&T label and access using mobile devices. AST are members of the data quality working group within OGC.

#### Key project participants

Dr Dan Cornford is a senior lecturer in Computer Science. His research interests are in statistical approaches to modelling and data assimilation in environmental models, geostatistics and data

interoperability. He leads a multi-institution UK EPSRC grant (EP/C005848/1) which has developed new variational Bayesian methods for data assimilation. He was part of the management team of the highly rated EU-funded INTAMAP project (033811) which developed methods for interoperable, automatic interpolation including an encoding for communicating uncertainty, UncertML. He will coordinate the EU funded UncertWeb project (248488) which will start in Feb 2010. Key role in the project: lead the quality indicator encoding and elicitation work in WP3. Disseminate the work to a broad audience.

Dr Lucy Bastin is a lecturer in Geographic Information Systems. Her research interests are in applied spatial analysis for ecological and environmental contexts using remote sensing and other in-situ data, accounting for uncertainty. She is an investigator on the EU funded INTAMAP project (033811), and currently collaborates closely with researchers at RMIT (Melbourne) on research into biodiversity planning in urban fringes, including the publication of an open-source framework by which planners can assess the impacts of uncertainty on widely-used tools for systematic reserve design. Key role in the project: contribute to the development of quality indicators and assessment of visualisation strategies, and input to the scenarios in WP7.

Dr Joanna Lumsden received her BSc in Software Engineering in 1996 and a PhD in Human Computer Interaction in 2001, both from Glasgow University, Scotland. Her research activities cover many aspects of human computer interaction. Most recently she has focussed on trust in e-Commerce and on mobile human computer interaction design and associated evaluation techniques. Joanna is the Editor-in-Chief of the International Journal of Mobile HCI (IJMHCI), the only journal dedicated to the design and evaluation of the user interface aspects of mobile technologies. Key role in the project: lead on the interface development and links between quality, trust and usability, particularly in mobile devices.

#### - University of Reading (UK)

The University of Reading is ranked as one of the UK's 10 most researchintensive universities and one of the top 200 universities in the world, with a world-class reputation for teaching, research and enterprise. The University's research in environmental science is rated among the very highest in the UK, and in 2006 the University received the Queen's Anniversary Prize for Higher Education for exceptional contributions to Meteorology. The University enjoys very strong scientific and technical links with the UK Met Office and the European Centre for Medium-Range Weather Forecasting. The UK National Centre for Earth Observation (NCEO) is a collaboration of 26 universities and other research institutes and is coordinated from the University of Reading. The Reading e-Science Centre, formed in 2003, is an interdisciplinary group of scientists and technologists at the University that aims to apply modern computing techniques to environmental science. The ReSC is known internationally for its work in applying OGC-based techniques to problems of environmental data sharing and visualisation. Its open-source ncWMS software (an implementation of the Web Map Service protocol for multidimensional gridded data) is used by research groups, government agencies and private industry around the world.

#### Main tasks in Project

UREAD will lead WP5 (Quality Visualisation Components), providing particular experience with the Web Map Service protocol and the use of Google Earth for visualising multidimensional data. It will make significant contributions to WP3 (Quality elicitation), in which it will collaborate with AST in developing tools for eliciting quality information through data intercomparison. It will lead the application of the new technologies in the Climate pilot test case (ClimPC, WP7) and ensure that the outputs of the project are applied in NCEO.

#### Key project participants

Jon Blower is the Technical Director of the Reading e-Science Centre and a Senior Research Fellow at the University. He holds a degree (Cambridge) and PhD (Bristol) in Geological Sciences and worked in industry as a professional software engineer before joining Reading. He is the lead designer and developer of the ncWMS software and is very active in international efforts to apply OGC techniques to meteorological, oceanographic and climate data, particularly through the recently-formed OGC Met- Ocean Domain Working Group. He has significant experience of international collaboration through EU framework projects, having contributed to the MERSEA, ECOOP, MyOcean and GENESI-DR projects, and is the Principal Investigator on a number of UK projects connected with environmental informatics. Key role in the project: Manage UREAD's contributions and provide expert knowledge on WMS, multidimensional data and Google Earth. Supervise a post-doctoral research assistant.

Xiaoyu Yang (Kevin X. Yang) is a Research Fellow at Reading e-Science Centre. He completed post-doctoral research in Earth Sciences Department, University of Cambridge, UK in 2008. He then joined School of Electronics and Computer Sciences, University of Southampton, UK and worked on several EU framework projects. His research interests include geoinformatics, e-Science/e-Research, distributed computing, data visualisation, etc. He earned MSc degree in IT (2001) and PhD degree in Systems Engineering (2006) at De Montfort University, UK.

- Commissariat à l'Energie Atomique (CEA). LSCE -Laboratoire des Sciences du Climat et de l'Environnement (France)

The institute LSCE (Laboratoire des Sciences du Climat et de l'Environnement) is a joint research unit of the Centre National de la Recherche Scientifique (CNRS-INSU), the Commissariat à l'Energie Atomique (CEA), (two major funding agencies in France) and the university of Versailles-Saint Quentin. For this project, CNRS will not participate and CEA alone will carry out and be responsible for the work on this project through LSCE personal. The LSCE is part of the Institut Pierre Simon Laplace (IPSL) in Paris and covers numerous fields of research related to climate and environment. The experience and qualification of LSCE researchers for the Global Carbon Project comprise a unique expertise in atmospheric composition monitoring, development of process-based models over land and ocean, and inversion methods to quantify sources and sinks of greenhouse gases using atmospheric, space-borne, and in-situ observations. The LSCE researchers also played a leading role in the development of Earth System modelling in France. The organizational experience of the LSCE in the European research area is reflected through its active participation in several EU funded projects, GEMS-IP, CARBOEUROPE-IP, QUANTIFY, CARBOOCEAN, CARBOAFRICA and NITROEUROPE-IP. The LSCE coordinates GEOMON-IP dealing with groundbased atmospheric observation complementary to satellite, and IMECC and ICOS dealing with infrastructure carbon cycle measurements. The LSCE is strongly involved in the GMES core services for land, atmosphere and ocean.

#### Main tasks in Project

The LSCE (CEA) will contribute directly in the pilot case studies (WP7) and dissemination activities (WP8). Through its leading expertise in the carbon cycle and its direct implication on the Global Carbon Project (GCP), it will conceive, develop, and interface with the whole project the pilot case study on the carbon cycle. Namely, it will contribute to the definition of user requirements (WP2) for carbon tracking model simulations and develop the demonstrator of a user interface and visualisation system for the results of carbon tracking models.

#### Key project participants

Dr. Pep Canadell is research scientist on terrestrial ecology, currently executive director of the Global Carbon Project (GCP), the first joint project of the Earth System Partnership (ESSP). Key role in the project: Conception of the pilot case study on the carbon cycle.

Dr. Philippe Ciais is research scientist, currently Assistant Director at the LSCE (Staff 300). He has over 15 years research in the field of Carbon Cycle studies and of environmental isotope studies, and has contributed to 100 publications in peer reviewed journals, including 10 in Science and Nature. Key role in the project: Conception of the pilot case study on the carbon cycle.

Dr. Philippe Peylin is a research scientist working on the Carbon Cycle with a strong expertise in the development of inverse atmospheric tracer models and in the optimization of biogeochemical models. Key role in the project: Construction of the pilot case study on the carbon cycle.

Dr. Zegbeu Poussi holds a Ph.D. in applied physics and an engineering degree in mechanics and energy systems. He has a strong experience in the development of operational software and data visualising tools. He is involved in the ICOS project for the post-processing of carbon fluxes estimated by various atmospheric inversion systems. Key role in the project: Construction of the pilot case study on the carbon cycle.

- ESA: European Space Agency (Italy)

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA's purpose is to provide for, and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems.

ESRIN, known as the ESA Centre for Earth Observation, is one of the five ESA specialised centres situated in Europe and is responsible for Earth Observation ground segment and data exploitation management.

#### More information

##### - S&T Corporation (The Netherlands)

S&T Corporation (S&T stands for Science & Technology) is an SME conducting high-tech projects and consultancy related to technical software engineering and analysis. S&T started in 2000 and has grown to a diverse group of 30 scientists and engineers. Typical customers and participants are the European Space Agency (ESA), TNO, EADS, ASTRIUM, VEGA, Siemens, SNECMA, Logica and others. S&T has a broad experience in building data quality monitoring, control and visualisation systems for various EO-missions, such as ENVISAT, GOCE, and Radar Altimetry. Typically these systems involve extraction of data from both instrument raw data and processed product flows, processing the data into quality data, conditional handling of EO data based on data quality analysis results, and visualisation and reporting data quality to users. The systems also allow quality engineers to analyse these data interactively in order to perform in-depth investigation. Although the various EO missions and instruments are very heterogeneous in terms of the operations concept, data flows, data product format, data processing and visualisation, S&T is continuously trying to find generic concepts for these topics. Therefore, in addition to its quality monitoring software development activities, S&T is currently involved in various standardisation projects for data quality, including investigating application of QA4EO to its software. S&T aims will contribute the lessons learnt from the implementation of industrial data quality monitoring systems and from its current quality information standardisation activities to the GeoViQua project.

#### Main tasks in Project

Contribute to WP3 with respect to the data quality metadata design, data quality metadata extraction design, and user contributed quality tools. Contribute to WP7 for implementation of WP3 results, and a more minor consultancy role in WP5 on data quality visualisation concepts. In particular S&T will bring experience of the design of the Generic Cal/Val Analysis Environment (GECA) which will form a starting point for many of the developments within GeoViQua.

#### Key project participants

MSc Joost Smeets: graduated in 1995 in Applied Physics at the Eindhoven University of Technology. He started his career as systems and control engineer, and has worked at S&T since 2002 in the areas of systems engineering, calibration analysis, software engineering, and project management. As a software engineer, he has been responsible for realizing software and hardware systems that automatically and interactively assess data quality from EO satellites such as ENVISAT (GOMOS, MIPAS, RA-2, SCIAMACHY), and is currently working on calibration and data quality monitoring facilities for future missions such as ADM/AEOLUS and SWARM. Key role in the project: coordinate the S&T contributions to data quality interface and extraction, application of quality meta-results to pilot cases, and consultancy on visualisation concepts of quality data.

MSc Sander Niemeijer: graduated in 2000 in Mathematical Engineering at TU Delft, The Netherlands. After working as a Software Engineer on GSM/UMTS telecommunication services at Lucent Technologies, he joined S&T in 2001 as Project Manager and Lead Architect for several software projects in the domain of Earth Observation Systems and Atmospheric Science. Currently he is working on several projects related to ingestion, quality control, and visualisation of EO data. He has worked on quality control facilities for ENVISAT, ADM-AEOLUS, Cryosat-2, and SWARM, and has also been involved in analysing the application of the QA4EO-standards to EO missions. Currently he works on the Generic Environment for CAL/VAL Analysis (GECA) project where he is lead architect on developing a Quality Information and Action Protocol for communicating a-posteriori quality information on EO data to users, and is also involved in the definition and implementation of a Correlative Meta Data format. Key role in the project: Support the design of quality information metadata concepts and interfaces, and implementation of these items into pilot cases.

#### 4.1.8 Acronyms

Acronym	Full name
---------	-----------

Acronym	Full name
AIP	Architecture Implementation Pilot
BNSC	British National Space Centre
CAL/VAL	Calibration and validation
CEOS	Committee on Earth Observation Satellites
CoP	Community of Practice
CSW	Catalogue Services for the Web
CZCP	Coastal Zone Community of Practice
DWG	Domain Working Group
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EMODNET	European Marine Observation and Data Network
EO	Earth Observation
ESSP	Earth System Science Partnership
FAO	Food and Agriculture Organisation
FCT	Forest Carbon Tracking
FES	Fluid Earth Sciences
GCI	GEOSS Common Infrastructure
GEO	Group on Earth Observations
GEOBON	GEO Biodiversity Observation Network
GEOSS	Global Earth Observations System of Systems
GIS	Geographical Information System
GMES	Global Monitoring for Environment and Security
GML	Geospatial Mask-up Language
KML	Keyhole Mark-up Language

Acronym	Full name
ICEDS	Integrated CEOS European Data Server
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
ISO	International Organization for Standardization
IOC	Initial Operations Capability
IPR	Intellectual Property Right
IVOS	Infrared and Visible Optical Sensors
MRV	Monitoring, Reporting, and Verification
OGC	Open Geospatial Consortium
Pol	Point of Interest
QA4EO	Quality Assurance Framework for Earth Observation data
RS	Remote Sensing
SBA	Societal Benefit Areas
SDI	Spatial Data Infrastructure
SME	Small and Medium Enterprise
STC	Science and Technology Committee
SIF	Standards Interoperability Forum
SoS	System of Systems
UIC	User Interface Committee
VGI	Volunteered Geographic Information
WADC	WGISS Architecture and Data Contributions
WGCV	Working Group on Calibration and Validation
WGISS	Working Group on Information

Acronym	Full name
	Systems and Services
WMS	Web Map Service

Acronym	Full name
WMTS	Web Map Tile Service
WP	Work Package

#### 4.1.9 Related Projects

GeoViQua is related to other FpP7 projects:

- EGIDA (Coordinating Earth and Environmental cross-disciplinary projects to promote GEOSS), Nr. 265124.
- EUROGEOSS, Nr. 226487.

Other useful links:

- GEO / GEOSS
- OGC
- QA4EO

#### 4.1.10 Documents

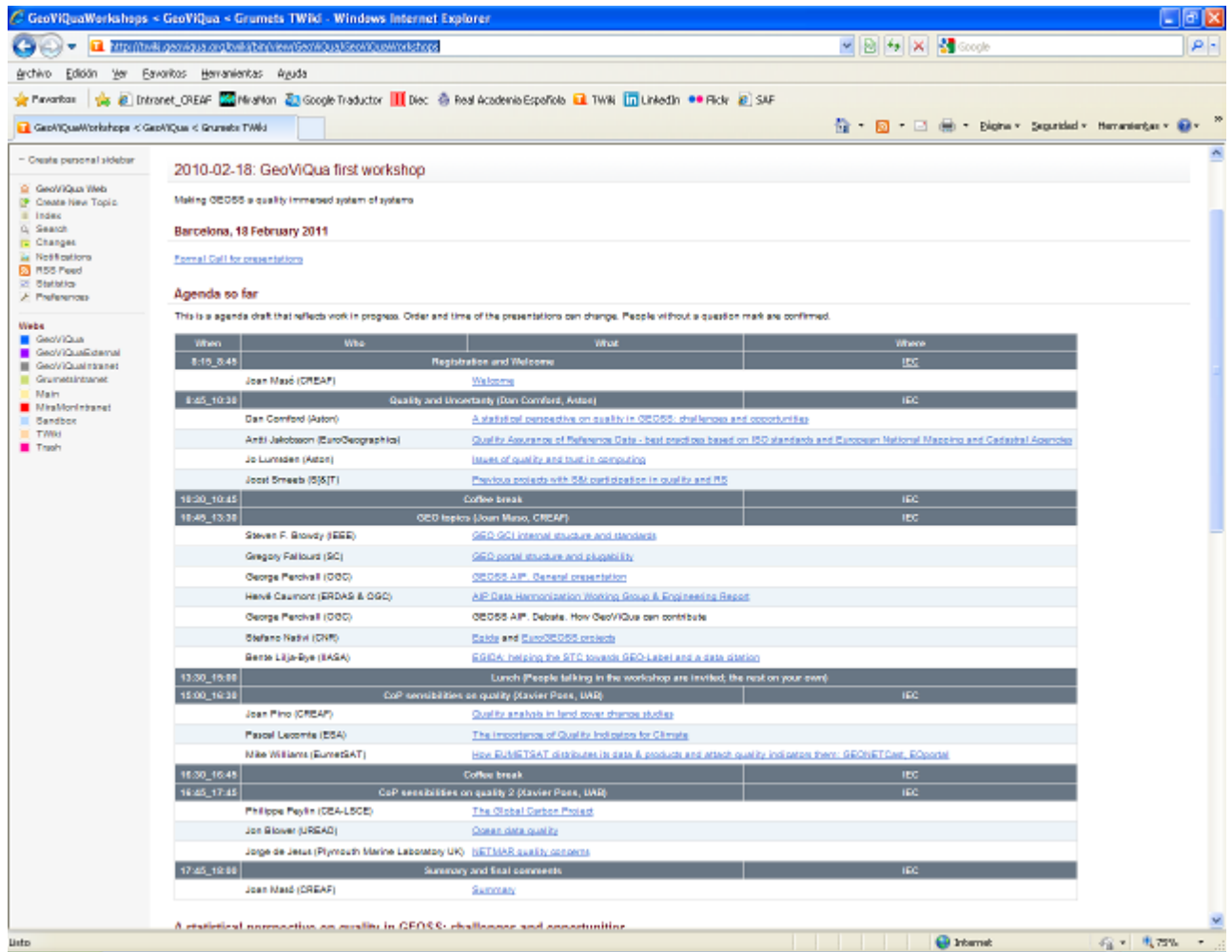
GeoViQua official leaflet (pdf, 303 kb)  
 GeoViQua introductory poster (pdf, 351 kb)  
 GeoViQua press release (pdf, 106 kb)  
 GeoViQua EC official fact sheet (pdf, 153 kb)

Deliverables: Not available yet

Reports: Not available yet

## 4.2 Example of GeoViQua twiki: GeoViQua Workshop

This example illustrates how the twiki complements the main website. Information about the workshop held in Barcelona on February 2011 is only available at the public twiki website as it may not be of general interest but very useful in the GeoViQua context. Other information like this will be posted as well in the twiki domain.



The screenshot shows a web browser window displaying the agenda for the '2010-02-18: GeoVIQUA first workshop'. The page title is '2010-02-18: GeoVIQUA first workshop' and the subtitle is 'Making GEOSS a quality immersed system of systems'. The location is 'Barcelona, 18 February 2011'. There is a link for 'Formal Call for presentations'.

**Agenda so far**  
 This is a agenda draft that reflects work in progress. Order and time of the presentations can change. People without a question mark are confirmed.

When	Who	What	Where
8:15_8:45		Registration and Welcome	IEC
	Joan Masó (CREAF)	<a href="#">Welcome</a>	
8:45_10:30		Quality and Uncertainty (Dan Cornford, Aston)	IEC
	Dan Cornford (Aston)	<a href="#">A statistical perspective on quality in GEOSS: challenges and opportunities</a>	
	Andri Jakobson (EuroGeographical)	<a href="#">Quality Assurance of Reference Data - best practices based on ISO standards and European National Mapping and Cadastre Agencies</a>	
	Jo Lumsden (Aston)	<a href="#">Issues of quality for INSPIRE in geospatial</a>	
	Joost Smeets (SNT)	<a href="#">Previous projects with INSPIRE participation in quality and IS</a>	
10:30_10:45		Coffee break	IEC
10:45_12:30		QED topics (Joan Masó, CREAF)	IEC
	Steven F. Blouvis (BEEB)	<a href="#">GEO GCI internal structure and Modellers</a>	
	Gregory Fallourd (IG)	<a href="#">GEO portal structure and availability</a>	
	George Percevall (ODC)	<a href="#">GEOSS API - General presentation</a>	
	Hervé Caumont (IRDAS & OGC)	<a href="#">API Data Harmonization Working Group &amp; Engineering Report</a>	
	George Percevall (ODC)	<a href="#">GEOSS API - Debate: How GeoVIQUA can contribute</a>	
	Stefano Nativi (DNR)	<a href="#">Rada and EuroGEOSS projects</a>	
	Bente Lijak-Björk (IASA)	<a href="#">EGDA: helping the RTC towards GEO Label and a data gateway</a>	
12:30_12:50		Lunch (People talking in the workshop are invited, the rest on your own)	
13:00_14:30		CoP sensitization on quality (Xavier Paek, IAR)	IEC
	Joan Pino (CREAF)	<a href="#">Quality analysis in land cover change studies</a>	
	Pascal Lecomte (ESA)	<a href="#">The Importance of Quality Indicators for Climate</a>	
	Nile Williams (Eumetsat)	<a href="#">How EUMETSAT distributes its data &amp; products and attach quality indicators there - GEOINT Case Report</a>	
14:30_16:45		Coffee break	IEC
16:45_17:45		CoP sensitization on quality 2 (Xavier Paek, IAR)	IEC
	Philippe Peylin (CEA-LSCE)	<a href="#">The Global Carbon Project</a>	
	Jon Glover (URRAD)	<a href="#">Open data quality</a>	
	Jorge de Jesus (Plymouth Marine Laboratory UK)	<a href="#">NETMAR quality concepts</a>	
17:45_19:00		Summary and final comments	IEC
	Joan Masó (CREAF)	<a href="#">Summary</a>	

[A statistical perspective on quality in GEOSS: challenges and opportunities](#)