



## DEWA/GRID-Europe Quarterly Bulletin No. 4 - 2005

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UNEP/Global Resource Information Database

### GRID-Europe Partnership Agreement Renewed

by Ron Witt

UNEP, the Swiss Federal Office for the Environment (FOEN) and the University of Geneva have now renewed the previous four-year "Partnership Agreement" under which the DEWA/GRID-Europe office operates and receives core funding and in-kind support from the three partners. This is now the third four-year Partnership phase, with previous agreements having been implemented from 1998-2001 and 2002-2005. The current agreement, under which all three partners have guaranteed increased core funding and/or in-kind support to the office, will run until 31 December 2009.

The DEWA/GRID-Europe Partnership is unique in that it is a rare, perhaps the only example, of a formal arrangement

between a UN agency or programme (UNEP), a federal government and member of the UN (the Swiss Confederation) AND a local institution, the University of Geneva that is run by the Canton and Republic of the Geneva state. Thus, the agreement was approved and signed by the Rector of the University of Geneva Dr. Andre Hurst, the new head of the Swiss Federal Office of Environment Dr. Bruno Oberle, and UNEP's Executive Director. It is also formally approved by the Swiss Federal Council in a certificate signed by the President of the Swiss Confederation, Dr. Samuel Schmid.

Over the last eight years, the Partnership Agreement has not only guaranteed a situation of stable core funding and personnel for DEWA/GRID-Europe,

but has brought strategic advice and direction to the office through an Advisory Board consisting of two members from each of the three partners UNEP, FOEN and the University of Geneva. The Advisory Board chairmanship rotates among the three partners' locales and meetings are held twice annually, with each partner hosting in turn. Its six members provide advice and guidance in all areas of DEWA/GRID-Europe programme of work, as well as scientific support and oversight of expenditure, office staffing etc.

DEWA/GRID-Europe, the Regional Coordinator and all of the staff express their thanks once again to all three of the partners for their continued confidence and support, as evidenced by the signing of the 3rd Partnership Agreement! ■

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Editors: Diana Rizzolio, Ron Witt

### Completion of IMOS Second Phase

by Jean-Michel Jaquet & Karine Allenbach

GRID-Europe concluded the execution of the second phase of the Iraq Marshlands Observation System (IMOS). IMOS is coordinated by UNEP's Post Conflict Branch, as part of UNEP's "Support for Environmental Management of Iraqi Marshlands" project.

During the three-year period under study (January 2003 - December 2005), significant and rapid environmental change has been taking place in the Iraqi Mesopotamian Marshlands. After over a decade of precipitous decline, during which the marshlands had dwindled by early 2003 to less than 7% of their former extent in 1973, a new phase of active and widespread inundation started in Spring 2003.

Accordingly UNEP, in consultation with the Iraqi Ministries of Water Resources and Environment, designed a satellite-based monitoring approach - IMOS - to survey the extent and distribution of marshland re-flooding, and assess the development of wetland vegetation cover.

By the end of the second phase project, the monitoring work revealed a remarkable and steady recovery process underway. In less than one year since the



re-flooding began (May 2003-March 2004), more than 20% of the 1973 marshland area had been inundated. By May 2005, almost 50% of the former marshes had been flooded, but this level gradually declined with the high evapo-transpiration rates of the hot summer months, stabilizing at approximately 40% by November 2005. Another major finding is the rapid establishment of emergent wetland vegetation, which has been increasing at the rapid rate of over 800-900 km<sup>2</sup> per annum since May 2003.

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## GRID-Europe Takes Part in New EU METAFUNCTIONS Project

by Andrea de Bono & Gregory Giuliani

The European Union METAFUNCTIONS project, pooling expertise in bioinformatics, computer science, geographical information systems and marine sciences, was launched in Bremen, Germany, in October 2005. This innovative tool will enable scientists to infer functions and activities for sequenced hypothetical genes, thus providing a wealth of information about niche adaptations, as well as new enzymes and proteins for medical and industrial use.

The METAFUNCTIONS approach integrates a diverse range of expertise from four European institutions in Germany, Poland and Switzerland, including GRID-Europe.

GRID-Europe will be contributing to this new project through its work on this novel data-mining system. For this purpose, a 'Genomes MapServer' is under development by GRID-Europe, soon allowing scientists around the world to access integrated genomic and ecological data, and clearly visualise the results of their analyses.

An innovative aspect of this project is the use of geographic information systems (GIS), which allow simulation and analysis of events from a geographical or spatial perspective. Novel patterns - for example, the physical clustering of genes within a genome - will be correlated to the contextual habitat data. For instance, a particular cluster of genes may be found in a number of genomes and metagenomes all taken from high-temperature environments. It would be reasonable to infer that the gene

must play some role in enabling survival in extreme heat. GRID-Europe will be processing selected environmental GIS data sets.

In the last years, more than 260 microbial genomes have been successfully sequenced, while over 600 are currently in progress. So far, researchers have largely focused on bacteria that are medically important; 'environmentally important' organisms (e.g. those involved in methane production and consumption) have not received the same attention.

As it is difficult to culture ecologically relevant bacteria for genomic sequencing under laboratory conditions, scientists often take DNA samples directly from the environment instead. Sequences of these samples are known as metagenomes - not the genome of an organism, but the genetic make-up of a particular environment. A wealth of metagenome information is

emerging- but the tools to analyse it are seriously lacking. Consequently, METAFUNCTIONS will develop a novel data-mining system that can identify relationships between sequenced genes and their environmental and ecological context. The ultimate aim is to determine the function of as yet unknown genes, known as hypothetical genes.

In particular, the METAFUNCTIONS project will help to break through the current backlog in assigning function to the vast number of conserved hypothetical genes that high through-put genomic sequencing has produced. Marine ecology, biotechnology, medicine and many industrial sectors could all benefit from the mapping that METAFUNCTIONS will give to ecological genomics.

The first results of this three-years project are expected in 2006. ■



The 14 scientists from several European countries met for the first time at the Max-Planck-Institute for Marine Microbiology in Bremen during the METAFUNCTIONS kick-off meeting, from 19-21 October 2005.

## International Platform on Sustainable Urban Development

by Diana Rizzolio

The International Platform on Sustainable Urban Development S-DEV 05 was held at GENEVA PALEXPO, from 11 - 13 October 2005. This first Forum's theme was "Innovating cities around the world", and included presentation of projects, offers of products or services, sources of finance, partnerships, North-South cooperation, and broadening of networks.

Over 2,500 participants attended this event, including mayors, directors from the public and private sectors, international and local organisations, business people, inventors, researchers, experts, students and others interested in sustainable urban development. In all, 70 nationalities were represented. The conference ended with the "Geneva Declaration for a viable future in cities", which has been submitted

to mayors and other representatives of local authorities who attended S-DEV 05. The goal is to create a world network for solidarity which supports the ongoing exchange of innovative experiences and solutions for urban areas.

GRID-Europe staff attended S-DEV 2005 to present DEWA products and activities on the UNEP stand. The "Cities from Space" posters prepared for the 2005 World Environment Day were re-used for this event, as well as other DEWA products, such as the GEO-Cities publications, the GEO Yearbook, the "One Planet - Many People" Atlas and other GEO Assessments.

A presentation of the Atlas "One Planet Many People" was made during a side event organised by the Earth Focus Foundation and the Geneva Environment Network.

The next edition of S-DEV is expected in 2007 in Geneva. ■



UNEP stand at S-DEV 05

## Completion of IMOS Second Phase

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Despite these positive developments, caution should be exercised not to equate marshland re-flooding with ecosystem restoration. In this connection, it is also important to examine whether the direction of change is consistent with desirable states of ecosystem recovery and with the provision of the goods and services on which local populations depend for their livelihoods. Such an assessment will require long-term inter-disciplinary research and collaboration.

A combined approach relying on satellite sensors collecting data at various scales and multi-temporal analysis was adopted to observe the evolution of marshland re-flooding. A novel methodology applying an object-oriented approach, based on initial image segmentation followed by a multi-criteria classification, was therefore developed and applied to the Moderate Resolution Imaging Spectroradiometer (MODIS), Indian Remote Sensing Satellite Linear Imaging Self Scanning Sensor (IRS P6 LISS-III) and Landsat Enhanced Thematic Mapper (ETM) imagery. Although a certain amount of residual noise remains, the methodology created is considered to be globally satisfactory. Nevertheless, a continual effort was made to address the anomalies and revise the classification procedures accordingly.

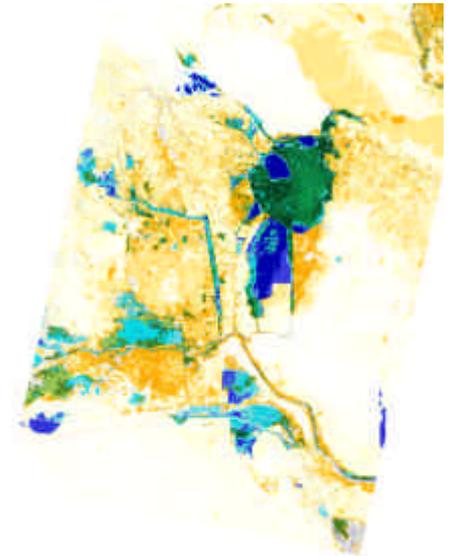
Using MODIS Terra satellite imagery, synoptic maps (see figure below) were

designed and produced, using a legend to illustrate the temporal distribution of marshland reflooding and wetland vegetation development, on a nominal weekly/bi-weekly basis since January 2005. In total, 92 map sets have been prepared for the three-year period from 2003-2005. Surface area statistics of wetland vegetation and water body themes (the two key land cover types comprising the marshes) have been calculated from the synoptic and seasonal vegetation maps.

Semi-detailed vegetation mapping of the marshlands was carried out using Landsat 7 ETM+ products and IRS satellite imagery; identified as the most suitable source of medium-resolution imagery currently available. Similar object-based methodologies as that used for MODIS have been developed and applied for both the Landsat 7 ETM+ and IRS satellite data sets (see right figure). In total, seven seasonal vegetation maps have been prepared for the Spring and Autumn, capturing the marshlands at their maximum and minimum extents respectively, on an annual basis for the period 2003-2005.

All results have been placed in the public domain and made available on the IMOS website (<http://imos.grid.unep.ch/>), which is regularly updated to help ensure timely access for the Iraqi authorities, as well as partner organisation and interested stakeholders.

In conclusion, at the end of the second phase of the project, three of the four major objectives were fully met:



The Marshlands seen by IRS on 15 June 2005

- Development and implementation of IMOS, consisting of an articulated ensemble of concepts, data, methodology, software and products, accessible through a website. Owing to the large size of the Iraqi marshlands and to the security situation, remote sensing was the only approach to observe their evolution. Daily MODIS imagery has been the main source of data, supplemented by a few IRS and Landsat images at a seasonal frequency. Thematic information was extracted from all the imagery by a unified, object-based approach followed by a fuzzy, multi-criteria classification. Because of the scarcity of field data, the role of the analyst's expertise was important in the process. The possibility to log and store the algorithms used assures full reproducibility of the results.

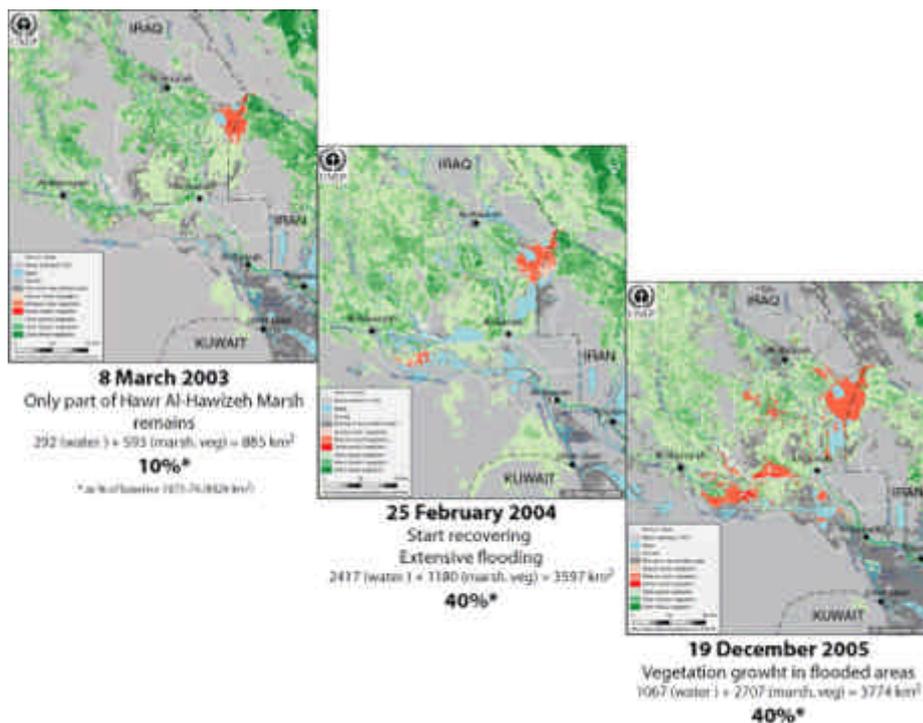
- Information products and services, of which the former consist of MODIS-based Simplified Land Cover and Inondation (SLCI) maps and statistics produced and included in weekly reports. Based on the higher-resolution imagery of IRS and Landsat, more detailed seasonal vegetation maps were also produced. All images, maps and reports are displayed in, and accessible from the IMOS website.

- IMOS is suitable to follow marshland progress in terms of vegetation and water surfaces' evolution. The recovery is obvious. Since 2003, the total surface area of marshlands went from 15% to 40% of their maximal extent in the 1970s.

- Only the last objective, the transmission of IMOS as an operational tool to Iraqi partners was not yet achieved, but this is being conducted during the first half of 2006.

For more information visit:

<http://imos.grid.unep.ch> ■



Significant episodes of Marshlands recovery seen by MODIS

## Update of Geneva Canton Metadata and Upgrade of the SIEnG Website

by Jean-Philippe Richard

Two major projects, implemented by GRID-Europe for the Canton of Geneva, have been largely updated in 2005.

In early 1999, the Department of Interior, Agriculture, Environment and Energy of Geneva (DIAE) commissioned GRID-Europe to create a local meta-database, tailored along the lines of the European-designed Catalogue of Data Sources (CDS). Maintained with the support of GRID-Europe, a first report on cantonal meta-data was published in 2000 on the Internet. It was migrated in 2004 into the newly-structured Swiss Catalogue of Environmental Data Sources: ENVIROCAT, a Federal Office for the Environment project that GRID-Europe is also implementing. The meta-data for the Canton of Geneva had not been published earlier, and this was accomplished in 2005.

GRID-Europe provided valuable support through its partnership with DIAE to the various Geneva cantonal services and finished the work in collaboration with them in the last

quarter of 2005. Nearly 400 cantonal meta-data from approximately 30 services are now available at: <http://www.envirocat.ch>.

The web portal <http://www.sien.ch> (Geneva Environment Information System), which is hosted and supported since 2000 by GRID-Europe, allows various environmental Geneva stakeholders (approximately 30 services of various cantonal Departments, City of Geneva, Industrial Services of Geneva, some international institutions such as UNEP, CERN, UNITAR, eg.) interested in cantonal environmental projects to have access to this exchange platform.

The open-source application used (SQuAW, a PostgreSQL/PHP development) was upgraded in October 2005 in order to propose new features to users and a more friendly interface. This application allows collaborative work, secure and restricted access, document repository and self-management of html pages without knowledge of html language). GRID-Europe followed the upgrade development, developed the



Geneva Environment Information System (SIEnG)

new graphic style, and continues to support the users actively.

This application is greatly appreciated by the services using it. Although this website is essentially meant for Geneva administration's internal use, it was visited by 22,000 visitors in 2005. ■

## GEO-Cities in Europe: Pilot Case Study in Vitoria-Gasteiz

by Stephane Kluser

The city of Vitoria-Gasteiz, Basque region, Spain, is involved in several urban environment assessments having international status, such as UN-HABITAT "Best Practices" or Sustainable Cities/Aalborg +10 from the European Commission. Collaborations are ongoing with entities such as the International Clearinghouse on Sustainable Development and Environmental Protection (ICLEI), the European Environment Agency (EEA) and pioneer cities in urban environment thematics such as Munich (Germany) and Leicester (UK). Within the Basque region, the city is part of the Basque Network towards Sustainability (Udalsarea 21). At the local level, the city is also very active in terms of sustainability in regard to Agenda 21 and Strategic Planning 2010.

The environmental and sustainability assessment for the city of Vitoria-Gasteiz "GEO Vitoria-Gasteiz" will be implemented by GEA 21 (a consulting company contracted by the municipality) and coordinated by the "Centro de Estudios Ambientales" (CEA) of the city of Vitoria. The first objective of GEA 21 is to adjust existing methodologies based on European sectorial policies (environment, urban, territorial planning) to the GEO-Cities methodology. As such, the "GEO

Vitoria-Gasteiz" will serve as a pilot project for the GEO-Cities process in European cities.

A workshop "Possible Futures for Vitoria-Gasteiz" took place in the Palacio de Congresos Europa, in Vitoria-Gasteiz,



Possible Futures for Vitoria-Gasteiz Workshop, 24-26 November.

from 24-26 November 2005. Various activity sectors were represented by the 60 participants: policy and administration representatives, scientists and technicians, industry, NGO and civil society activists. GEA 21 and the CEA Centre were in charge of the organisation.

GRID-Europe and DEWA Latin America and Caribbean (LAC) staff gave an overview of the GEO processes, the GEO-Cities experience in LAC and how the GEO Vitoria-Gasteiz would relate to these and be the first link of GEO-Cities within the European region. Coordinating the GEO Vitoria-Gasteiz for GEA 21, Isabel Velásquez led the workshop events following the European Awareness Scenario Workshop (EASW) methodology based on dialog between participants about future developments of the city, in small working groups divided according to different subjects of interest.

Participants had the chance to share their ideas and present them in a three-fold plan: desired future for Vitoria, future to avoid for Vitoria and ideas for the action plan -synthesis scenario. At the end of the workshop, the mayor of Vitoria-Gasteiz and representative from DEWA-LAC thanked participants and the organising committee for their valuable ideas and suggestions. ■

## GRID Network Re-inforced After Internal Review

by Ron Witt

Dating back to the mid-1980s, UNEP's network of Global Resource Information Database (GRID) centres and its origins were linked with the then "new" technologies of geographic information systems (GIS) and satellite remote sensing, and the aspiration of UNEP and its supporters to provide related services, database technologies and analytical skills relating to the environment, and monitoring of environmental change for the UN system as a whole, as well as member states of the United Nations community.

In the twenty years since the GRID network was founded, the UN world and information technologies have changed in significant ways. While GRID as a concept also evolved over the past 20 years, and the network itself expanded from the two original centres in Geneva and Nairobi to some 15 offices at different levels (national, regional and even thematic) around the world, it was considered for some time that the network needed re-thinking, in terms of its fundamental mission, and how it could more directly serve UNEP and its parent Division of Early Warning and Assessment (DEWA).

DEWA thus conceived and undertook an evaluation of the entire GRID network of centres through an external consultant, who studied the history of the network and visited several prominent GRID centres (particularly in Europe and at UNEP Headquarters). The results of the study and recommendations for the future of the GRID network were discussed at a meeting convened at UNEP's International Environment House (MIE-II) in early October 2005. The GRID Network Evaluation Meeting was chaired by the acting Director of DEWA, Ms. Marion Cheatele, along with the consultant Mr. Robert Starling of the Open GIS Consortium (OGC-Australia), and attend-

ed by other representatives from DEWA at Headquarters, along with GRIDs-Europe, Arendal, Nairobi, Sioux Falls (USA) and Warsaw.

Some of the major issues covered during the meeting were an updated institutional "model" for the GRID network (how structured; types of centres; what roles and who reports to whom); governance framework documents (statement of capabilities; mandate, mission and vision statements; core functions/services; centre benefits/duties; directory of participating centres; and data and information management "quality assurance/quality control" etc.); and in general how the revised GRID network would operate to directly assure delivery of DEWA's and more broadly, UNEP's programme of work (PoW).

Overall, the discussions confirmed that the demands for GRID network services within DEWA, UNEP and member states are both strong and constantly increasing (it was said that "if GRID didn't already exist, we would need to invent it"). Major recommendations were that: a) existing/ongoing innovations within the network be consolidated and made available as data services, offering greater benefits to the entire Division that is DEWA, UNEP and member states; and b) the overall network be re-vitalised and supported by re-establishing GRID coordination (a person as "Coordinator") at UNEP Headquarters.

The recommended structuring and responsibilities given to the GRID centres, particularly at the regional level, will have the effect of empowering DEWA's regional coordinators to expand and improve their regional networks. The meeting participants recognised that the European GRID network is the most advanced/developed among all UNEP regions, and the coming biennium (2006-07) should see further targeted implementation. ■

## GRID-Europe Staff News

by Diana Rizzolio

There have been a number of changes in GRID-Europe office staff since the end of 2005.

Two members have left the GRID-Europe team. Karine Bachmann, a former intern and consultant who was working on the Geneva Canton SIEnG since August 2004, left GRID-Europe at the end of 2005, and is now a teacher at a Geneva Secondary School. Bruno Chatenoux, also a former intern who joined our Early Warning team at the beginning of 2005, also finished his contract at the end of the year and is now involved with the "Small Arms Survey", an independent research project located at the Graduate Institute of International Studies in Geneva, as Information Management Coordinator of the Human Security Baseline Assessment (HSBA) team in Sudan. We heartily wish Karine and Bruno success in their new jobs!

Diaowye Konte continues to replace another staff member in the preparation of data for the GEO Data Portal since November 2005. Benedicte Boudol, who has been assisting our Secretariat since December 2004, was officially named to GRID-Europe's half time secretarial post in December 2005. Finally, Ana Priceputu, a former intern, joined GRID-Europe as a half-time consultant for the Carpathians Environment Outlook (KEO) project in October 2005.

We receive news on a regular basis from our former interns and staff members, while some of them join us periodically for short-term mandates. We occasionally join efforts in common projects with their new organisations and we are always very happy to share our mutual experiences! ■

## Core European GRID Centres Meeting

by Ron Witt

A corollary of the GRID Network Review was a one-day follow-up meeting organised by GRID-Europe and including GRIDs-Arendal, Budapest and Warsaw, with a precise and singular goal of discussing and developing a series of short proposals as to how the Euro-GRID network of centres, working together, could support DEWA's PoW in 2006-07.

Meeting on 12 December 2005, the four Euro-GRID centres' representatives prepared three proposals focusing on capacity building/the Bali Strategic Plan, Euro-networking and development of prototype national data portals for GEO assessment support.

GRID-Europe and GRID-Warsaw are already working very closely together on the Carpathians Environment Outlook (KEO) reporting process, where the latter

has been named as the "lead data centre" to develop the underlying trans-national database.

The three proposals have been forwarded to DEWA management at UNEP Headquarters for consideration by the relevant persons there. ■

## Calendar of Events

(January - June 2006)

18-20 January

Inter-Agency Meeting on Outer Space Activities  
Unesco, Paris

19 January

Planning meeting for 2006 cooperation activities, UNEP-  
World Glacier Monitoring Service  
Zurich

31 January - 6 February

ProVenton Forum 2006  
Bangkok

2 February

World Wetlands Day

7 - 9 February

9th Special Session of the Governing Council /  
Global Ministerial Environment Forum  
Dubai, UAE

8-11 February

GEOLAND Forum Open Day

15-19 February

GEO LAC Consultation, launch, presentation and training  
workshop of the GEO Global & LAC Data Portals  
Port of Spain, Trinidad and Tobago

6-10 March

GEO-4 2nd Production and Authors' Meeting (PAM)  
UNEP/DEWA, Nairobi

21 March

World Forestry Day

22 March

World Water Day

23 March

World Meteorological Day

22 April

International Earth Day

22 May

World Biodiversity Day

5 June

World Environment Day

## GRID-Europe's Latest Outputs

Sistan Basin Wetlands-2005. Map produced for the UNEP/Post-Conflict Branch.

Proposed Hawizeh Marshes Ramsar Site - Wetland of International Importance. Map produced for the UNEP/Post-Conflict Branch.

Iraqi Marshlands Observation System. Final Technical Report. Report produced for the UNEP/Post-Conflict Branch.



**Read GRID-Europe Early Warning "Briefs",  
available at  
[www.grid.unep.ch](http://www.grid.unep.ch)**

