



## *DEWA/GRID-Europe* *Quarterly Bulletin No. 3 - 2004*

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**UNEP/Global Resource Information Database**

### Carthians Environment Outlook Report goes forward with Tisza River Basin Case Study

By Ron Witt

Further progress has been made towards the initiation of the Carpathians Environment Outlook (KEO) report. The newly-constituted KEO Steering Group met at UNEP/GRID-Warsaw for the first time on 17-18 September, to fully discuss and plan all practical requirements of the KEO reporting process over the next two-year period, including the development of a complete plan or "road map" for the KEO report. This KEO steering group meeting follows up on the successful "kick-off" meeting held with representatives of six of the seven Carpathians countries held at the Hungarian Ministry of Environment and Water (MoEW) in Budapest, in March 2004.

The first Steering Group meeting was convened by UNEP's Division of Early Warning and Assessment (European office), UNEP/ROE and GRID-Warsaw.

The KEO Steering Group is composed of key persons from the Carpathians countries and UNEP, including governments and significant regional NGOs, who will guide, support and underpin the reporting process. Led by DEWA-Europe's Regional Coordinator, the meeting covered all of the following aspects/topics related to preparation of the KEO report: project activities, outputs to date and current status; related activities of UNEP (and other partners); content elements of the proposed report, including data requirements; process elements of the proposed report; funding needs; time schedule; and links with the Carpathian Framework Convention (CFC).

At the same time, a case study for a watershed that is representative of the overall Carpathians region is being undertaken for the Tisza River Basin (TRB). Commissioned by UNEP's Regional Office for Europe (ROE), the "rapid environmental assessment" of the TRB is being carried out by DEWA-Europe. In many ways, the TRB - partially within the Carpathians - is a microcosm of the broader region and experiencing many of the pressures and problems found there. Being done with the integrated environmental assessment methodology, the TRB assessment will be completed for and tabled at the next meeting of the International Commission for the Protection of the Danube River (ICPDR) being held in December 2004.



Potential accident risk spots in the Tisza River Basin, with zoom in the Maramures mining region.

The TRB "rapid environmental assessment" is a holistic view of human pressures and environmental problems in the Tisza Basin, and policy measures existing or required to mitigate these, in particular problems of unsafe mining practices and aging industrial facilities that are found throughout this area, the largest sub-basin of the Danube. The interplay between the natural environment and socio-economic systems is examined on a watershed basin scale, with conclusions and recommendations to be made on appropriate means to address the same.

The TRB "rapid environmental assessment" will be fully illustrated with graphics, maps and satellite imagery, and available through DEWA/GRID-Europe's website by mid-December. ■

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#### What's in a Name?

By Ron Witt

Many of you, our readers, will be asking themselves why the UNEP office that was until recently known as "DEWA-Europe" and/or simultaneously "GRID-Geneva" (the latter since the date we opened our doors in mid-1985!) has now changed overnight to "DEWA/GRID-Europe". The answer is, in a way, quite simple, but perhaps needs explaining all the same...

Firstly, the mission and roles of what was originally "GRID-Geneva" have

changed and grown significantly since we began operations as an environmental, GIS and remote sensing data service - and one of the two original GRID centres - nearly 20 years ago. Since the late 1990s, we have also functioned as the REGIONAL centre for UNEP's Division of Early Warning and Assessment (DEWA) in Europe, with related responsibilities for a broad part of DEWA's programme of work in these two major areas. This was not fully encapsulated in our former name.

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## Env&Sec Events and Ongoing Support Work

By Ron Witt

The calendar of events and activities for the joint UNEP-UNDP-OSCE "Environment and Security (Env&Sec)" project continued to be highly active during the middle of the year, with an ongoing series of meetings and missions, and support work for these being carried out at DEWA/GRID-Europe.

A pair of Env&Sec meetings were held at UNEP's International Environment House in Geneva on 13-14 September. The three project partners, plus observers from NATO and the Canadian CIDA, met to discuss progress on all issues relevant to the Initiative and the individual projects. Each of the three Env&Sec regions where projects are ongoing (the Caucasus, Central Asia and SouthEastern Europe) was discussed, as well as a series of cross-cutting issues. For example, NATO should come into the project more formally as soon as their role is clarified in a letter to all three of the current partners.

For the Caucasus, the major subject was the completion and release of the first-phase assessment report to take place during a "side event" at the so-

called Kiev+1 meeting of environment ministers in Tbilisi, Georgia as part of the Environment for Europe process and ongoing discussions on implementation of the EECCA strategy, on 22 October.

For Central Asia, the major subject was follow-up to the joint Ferghana Valley mission that took place from 30 September to 8 August. DEWA/GRID-Europe supported this in-depth field assessment through data and information collection and analysis, maps showing a series of environmental problems and security issues "hot spots" and website updating. The Management Board also expressed its wish that a number of GEO-style scenarios of human migration and related impacts within the region be developed, to complement the assessment of hot spots and how to address the highest-priority ones in future actions.

For SouthEastern Europe (SEE), the major subject was the upcoming Users' Consultation held in Skopje, Macedonia, on 23-24 September. The problems caused by numerous mining operations (abandoned and ongoing), was discussed along with the current mining study under the Env&Sec umbrella, that DEWA/GRID-

Europe is providing research, mapping and website development support for. The relation of this latter activity with the ongoing Tisza River Basin "rapid environmental assessment" DEWA/GRID-Europe was commissioned by the UNEP Regional Office for Europe was also mentioned.

The idea of beginning Env&Sec project activities in a new, fourth sub-region that would be Eastern Europe (Belarus-Moldova-Ukraine) was also discussed, but actual start of any substantive work will not take place in the very near future.

The Advisory Group meeting for Env&Sec took place on the following day, with a full briefing on the Env&Sec initiative and projects thereof provided for up to 40 government representatives, NGOs and other interested participants. Overwhelmingly, these persons expressed their interest in and support for the Env&Sec initiative and that it was relevant for their countries and the rapidly changing European environmental and political scene. Such briefings on Env&Sec activities will continue to be held regularly.

The next Env&Sec Management Board meeting will take place in Vienna on 16-17 December 2004. ■

## Environmental Indicators Activities

By Jaap van Woerden

In order to support the global assessment and early warning work of DEWA, GRID-Europe is actively involved in a number of data and indicator initiatives. Realizing that sound indicators are needed to translate detailed, complex scientific data into useful information for easy communication to policy-makers and the general public, there is presently a renewed interest in the development of core sets of indicators and composite indices.

### Assessment of Sustainability Indicators

In cooperation with (the Scientific Committee on Problems of the Environment (SCOPE), UNEP has initiated a broad review process of indicator work (i.e. 'Assessment of Sustainability Indicators'), with the aim to produce a clear overview of most relevant initiatives and identify strengths and weaknesses. The partners of this activity met in May in Prague, aiming at the review, synthesis and assessment of indicators of sustainable development. It involved not only scientific experts, but also users, practitioners and other stakeholders at different levels. As part of this process, the core set of GEO Indicators were also reviewed. This list is a first attempt by DEWA

to formalize such a core set, having used data and indicators extensively through the GEO assessment by means of the GEO Data Portal or otherwise. The core set is part of the GEO Yearbook series.

### Working Group on Environmental Statistics

In an attempt to improve basic collection of environmental data, an Inter-secretariat Working Group for Environmental Statistics (IWG-Env) was initiated in 2003 by the UN Statistical Division (UNSD) in cooperation with OECD, Eurostat, UN-ECE and UNEP. This group focuses on practical data issues and identifies opportunities for collaboration to address major data gaps. The second IWG-Env meeting was held at Eurostat, Luxembourg, in October, which mainly focused on water statistics as a major data gap, and for which FAO and UNESCO were invited to participate. A special sub-group on water data was formed, which needs to develop methodological manuals and prepare for a seminar on freshwater statistics in 2005. The group also discussed general progress of the partners in environmental data-related activities, incl. the UNSD/UNEP Environmental Statistics Questionnaire 2004, as well as means to improve coordination, training and capacity building in environment statistics.

### Environment & Health indicators

At the forefront of indicator development, as part of the 'ECOinformatics' initiative for cooperation on environmental and health information, a meeting was held in September in Brussels to exchange information on what has been learnt so far from international scientific and technical activities on environment and health indicators and assessments. In general, the role of indicators in the broader task of assessing and reporting on the environment was discussed, in particular practical experiences using the most up-to-date science and research in the USA and Europe.

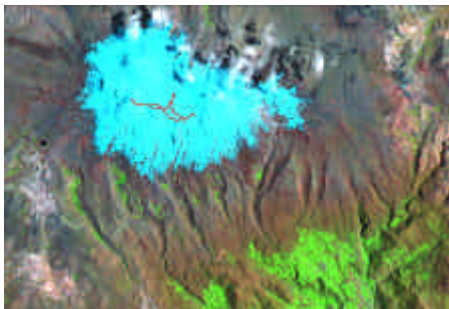
Led by EEA and US-EPA, and with participation of various other agencies including WHO/Europe, and JRC, current progress and the scope for future work to improve environment and health indicators were explored. Areas for new work and research were identified, as well as items which need to be further addressed; e.g., how to select core indicator sets for environment and health issues, develop composite indices, improve monitoring and surveillance, and link work and results in Europe and US with the rest of the world (for example, through UNEP's Global Environment Outlook (GEO-4)). ■

## Impact Assessment of Climate Change on the Coropuna Glacier

By Pascal Peduzzi

In Peru, the last decades have been characterized by both significant population growth and diminution of the hydrologic reserves. During the decade of the 1980s, glaciers have undergone an acute retreat, a phenomenon that continued during the 1990s, implying the loss of important water resources. During the same period, water demand for human consumption, irrigation, hydroelectric power stations, etc., has largely increased, inducing tensions between the users.

The recent disputes between the regions of Arequipa and Moquegua on the Great Inn dam reserves, are tangible signs of the increasing tension over this vital resource. Thus, there is a need to inventory the resources available and planning its management in the long term, within the framework of the concept of Sustainable Development. Long-term planning requires evaluation of trends on both population and resources, taking into account potential climate change patterns.



In cyan, the extent of the glacier as in 1988, in red the field work conducted by the UNEP team in August 2004, with estimation of ice depth.

Significant populations are living in the nearby valleys. Since precipitation occurs during part of the year, the surrounding villages are dependent on melting water from the Coropuna. There is a critical need to estimate remaining mass and retreating speed as an early warning for water supplies, allowing planners to take appropriate adaptation measures.

The water reserves are concentrated in the high mountain zones in the form of glaciers and lagoons. Due to the altitude and to rough topography, access to these zones is difficult, hence resulting in strenuous (and costly) missions for direct measurements. In such conditions, remote sensing technology is a cost-effective way of monitoring the evolution of the hydrologic resources. However, if these techniques limit the number of mission, *in situ* measurement are still needed for actual depth evaluation (impossible via remote sensors).

The German Cooperation Program (GTZ) has mandated a team from the University of Geneva and DEWA/GRID-Europe to assess the effects of global warming on the Coropuna glacier (alt. 6425m) in Peru. The team, composed of Walter Silverio, Christian Herold and Pascal Peduzzi, has been performing satellite image analysis, *in situ* measures, GIS modelling of remaining ice and statistical analysis for evaluation of trends.

A multi-temporal image analysis of Coropuna glacier was carried out, allowing a general vision of the temporary and space distribution of the water reserves. Although the use of passive sensors provides useful information on the ice and lagoon area, one needs active sensor (radar) images to produce 3D Digital Elevation Model (DEM). The



Christian Herold prepares the ground penetration radar before undertaking measures at more than 6000 meters above sea level. The large white device with batteries and laptop weight together 35kg. Cold and windy conditions requested special protection measures for the electronic equipments.

variation through time of the DEM provides information on the ice mass losses/gains through time. However, these technologies are recent and only available since the 1990s, and do not provide information on remaining ice mass, for which ground measurements are still necessary.

The purpose of the mission on the Coropuna glacier was to use a ground penetrating radar for estimation of the remaining ice. The device sends electromagnetic waves, that echo on the bedrock, providing information on the depth of ice. The *in situ* measures were taken during a two-week mission in August 2004. Despite difficult climatic conditions, DEWA/GRID-Europe's team collected 10 km of profiles geo-referenced using a Ground Positioning System (GPS). These measures will be used for calibrating a model of mass estimation.

Once completed, the study will provide information on retreat speed, impacts from global warming and estimated remaining period with ice. Depending on the results, programs for adaptation will be implemented by local agencies with support from GTZ. ■

## Mapping Coastal Pollution in the Eastern Mediterranean Using Satellite Imagery

By Karine Allenbach & Jean-Michel Jaquet

Dramatic new evidence of coastal pollution from land-based sources in the Eastern Mediterranean appear on satellite images studied by GRID-Europe's Earth Observation section during the Coastal Zone Information System for Lebanon (CZISL) project.

Large, high chlorophyll plumes are visible on satellite imagery along the Middle-East coast, especially offshore the Nile delta, Tel Aviv, Haifa and Tyre. They contrast with the very clear, ultra-oligotrophic waters characteristic of the Levantine Basin.

In order to address the controversial question of these annatural features' ori-

gin, the team has followed their development through a time-series of SeaWiFS (Sea-viewing Wide Field-of-view sensor) satellite images.

From the beginning of June until the end of September 2001, scenes with sufficiently low cloud cover were processed by SEADAS software to retrieve the concentration of chlorophyll-a, as well as the Normalized Water-leaving radiance spectra (LWN) for eight visible and near-IR SeaWiFS channels. The spectra represent a kind of signature for the various water masses, and can be used to trace the origin of the nutrients inducing high planktonic concentrations.

The six transects studied are shown on the left figure (page 4), stretching from

the Western Nile delta in the southwest to the Litani river (Tyre) in the north. They were drawn following the main direction of each chlorophyll plume, from the coast to the open sea, on the 11 June 2001 image.

The LWN spectra computed at each coastal-most point on the transects have been classified in four types (right figure): A) coastal water influenced by land-derived pollution (Suez); B) deltaic waters (Rosetta); C) green-blue coastal waters (Gaza and Tel Aviv); D) blue-green coastal waters (Haifa and Litani). Type E spectrum represents the signature of typical Levantine oligotrophic water (out of the plumes).

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## Mapping Coastal Pollution in the Eastern Mediterranean Using Satellite Imagery

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The results show:

- An obvious and regular colour gradient exists between the A (yellowish) and E (blue) water types, following the distance from the Nile river mouth.

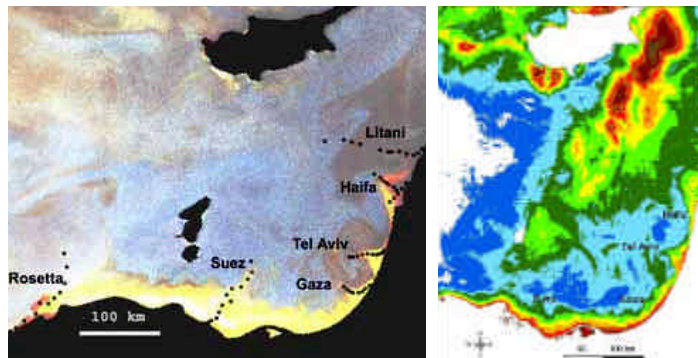
- Chlorophyll and sea surface temperature patterns and gradients are similar in the coastal area (fig.1), precluding an input of nutrients by cold upwellings and pointing instead towards land-derived sources.

- The largest chlorophyll plumes seem to be localised notably offshore from river mouths (Nile) and major cities such as Tel Aviv, Haifa and Beirut.

- According to the general circulation of the Mediterranean Sea, the nutrient-rich water from the Nile is known to be distributed northwards by the prevailing currents.

- After a drop following building of the Aswan dam in 1964, the anthropogenic nutrient exports from the Nile have increased again, due to fertilizer use and population growth in Cairo and Alexandria.

The Earth Observation team will proceed with this study, with the next major results expected in 2005. ■



Left: Histogram-equalized, false colour composite of SeaWiFS LWN channels 1 (red), 2 (green), 3 (blue) for the 11 June 2001 and localization of transects along the plumes (black dots). A Lwn spectral profile was computed at each point. Right: Sea Surface Temperature map for 11 June 2001. Temperature ranges from 24°C (dark blue) to 27°C (red) by steps of 0.5 °C. Note the similarity of colour and thermal patterns along the coast.

## What's in a Name?

Continued from page 1

At the same time, we value the name of our long-existing network the Global Resource Information Database (GRID) and have no desire to lose the name recognition value that one of UNEP's most performant networks affords us.

Finally, having both names "DEWA-Europe" and "GRID-Geneva", especially when they have been combined, has proven just a bit too cumbersome and perhaps confusing for some. Thus, for the sake of both brevity and clarity, we have undergone this slight change in our official

identity, even while behind the scenes all remains the same in terms of our mandate and roles on behalf of UNEP and DEWA.

We hope you will agree and get used to our new appellation! ■

## Calendar of Events

(November - December 2004)

**6 November**

International Day for Preventing the Exploitation of the Environment in war and Armed Conflict.

**10-16 November**

GEO-4 Design & Data Working Group Meetings, UNEP, Nairobi, Kenya.

**2 December**

GIS Day (UniMail), ESRI, Geneva, Switzerland.

**2-3 December**

European GEO-4 Partners' Meeting, Geneva, Switzerland.

**6-7 December**

EuroGRID-7 Meeting, Geneva, Switzerland.

**8-10 December**

2nd Geoland Forum, Meteo-France Conference Center, Toulouse, France.

**11 December**

International Mountain Day.

**16-17 December**

Env & Sec Management Board Meeting (OSCE-UNDP and UNEP), Vienna, Austria.

## Evaluation of ICPDR Information System

By Stefan Schwarzer

The UNDP/GEF Danube Regional Project, which is a partner of the International Commission for the Protection of the Danube River (ICPDR), contracted UNEP/GRID-Europe to review and evaluate the existing ICPDR information system called "Danubis", to define its strengths and weaknesses in order to give guidance and recommendations for its further development. The work carried out was based on research on their end users, contents and an understanding

of the project's strategic focus. The main emphasis of the evaluation was placed on the "Internal working area" of the IS, but includes also the public part.

The three weeks' project began with a visit to Vienna, a round table with the management and interviews with major staff at ICPDR-headquarters. It was followed by an in-depth study of the Information System and Architecture, analysing the user-interface, internal (web-)structure, navigation and labelling.

A final report was then sent to Vienna and approved by ICPDR. ■

## GRID-Europe's Latest Outputs

Ferghana Valley Region Hot Spots. Map produced for the Env&Sec Initiative.

Base Map of the Ferghana Valley Region. Map produced for the Env&Sec Initiative.

Overfishing, the greatest threat to Global Marine Ecology. Poster.

UNEP's Environment and Security Initiative for South-Eastern Europe. Poster.

Heatwave 2003 over Europe: a pre-taste of potential impacts from global warming. Poster.

Glacier retreat and related natural hazards in Cordillera Blanca, Peru. Poster.