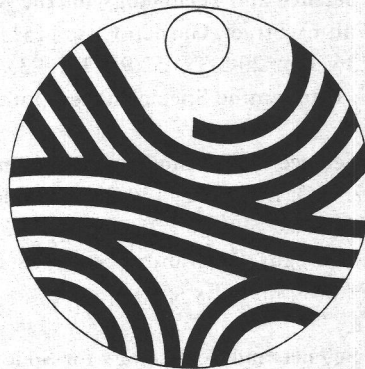


IHP INFORMATION

N° 35

July/September 1993



International Hydrological Programme

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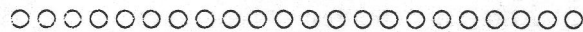
*This issue reports on the period
July - September 1993*

IHP GENERAL

Implementation of IHP Projects



The IHP Secretariat thanks the German IHP/OHP Secretariat for their donation of a micro-computer and a printer. This equipment will certainly be well used for the implementation of IHP Projects H-5-1 (Hydrological research and water resources management strategies in the humid tropics and other warm humid regions) and H-5-5 (Application of methods of hydrological analysis using regional data sets (Flow Regimes from International Experimental and Network Data Sets/FRIENDS).



Project H-3-2: Hydrological, chemical and micro-biological processes of contaminant transport in river, reservoir and lake systems

HYDROCHEMISTRY '93

An international symposium on *Hydrological, chemical and biological processes of transformation and transport of contaminants in aquatic environments (HYDROCHEMISTRY '93)* was held in Rostov-on-Don, Russia from 24 to 29 May 1993. It was organized by the State Hydrochemical Institute in Rostov, supported by UNESCO and IAHS, and co-sponsored by WHO, UNEP, the US Environmental Protection Agency, the US National Committee on Scientific Hydrology, and the Canadian Water Research Institute.

The symposium was well attended and some forty reports including keynote papers were presented. A poster session was also held and a

scientific and cultural excursion to the lower Don region organized for the participants.

The proceedings will be published by the IAHS.

In view of the great success of the symposium and the high level of the scientific presentations, the participants recommended that a symposium on the same subject be held every five years.

Project H-5-1: Hydrological research and water resources management strategies in the humid tropics and other warm humid regions



Despite the financial stringencies within the Organization for the year 1993, developments in the Humid Tropics Programme are proceeding satisfactorily. Several activities have continued through the Regional Offices, some of which are reported elsewhere.

One of the emerging issues is the management of "cloud forests" and UNESCO was able to provide some support for a meeting reviewing the state-of-the-art on cloud forest research held in Puerto Rico, 31 May-5 June 1993, co-sponsored by the East-West Center (Hawaii), the International Institute of Tropical Forestry USFS as well as UNESCO IHP, and also in collaboration with IUCN Mountain Program (CNPPA and COE), International Society and Association for Tropical Biology. A preliminary report of the meeting has been published and more detailed proceedings will be published in

1994 edited by Lawrence S. Hamilton (East-West Center), James Juvik (University of Hawaii) and Fred Scatena (International Institute of Tropical Forestry). Specifically emanating from the meeting were recommendations for future cloud forest activities within the IHP-V from 1996.

Throughout the year there have been several informal meetings within the framework of the close collaborative agreement between IHP and IGBP/BAHC (International Geosphere-Biosphere Programme/ Biospheric Aspects of Hydrological Cycles) concerning a possible contribution towards the planned Large Scale Field Experiment in 1997/8 in the Amazon basin, known as LAMBADA (Large Scale Atmospheric Moisture Balance of Amazonia using Data Assimilation). UNESCO supported some delegates to the first planning meeting of LAMBADA held in Sao Jose dos Campos, Brazil, from 7-11 September 1993. Closer co-operation between the water programmes of UNEP and IHP will hopefully lead to new activities both within the Amazon basin and Africa towards the end of the current fourth phase of IHP.

The joint meeting of the Sixth Scientific Assembly of the International Association of Meteorology and Atmospheric Physics (IAMAP) and the Fourth Scientific Assembly of the International Association of Hydrological Sciences (IAHS) held in Yokohama included a symposium devoted to the *Hydrology of Warm Humid Regions* which was convened by J. S. Gladwell. Part of the symposium objectives was to provide a "course-correction" in the overall policy of the IHP Humid Tropics Programme originating out of the 1989 Colloquium in Townsville, Australia. The conclusions of this symposium are as follows:

Of the many possible themes for future action which arose in the discussion, the following may be points for IHP attention:

- Assessment of impact of land rehabilitation on dry-weather flows.
- Hydrology of cloud forests and the impact of their clearance.
- Highland/lowland interactions.
- Scaling-up of land-use change impacts on hydrology.
- Use of "nested" catchment studies to evaluate TOPOG/TOPMODEL type models.
- Hydrology of alluvial and riverine (flooded) forests.
- Integrated management of water in urban areas.

- Evaluation of best land and water management practices in tropical cities.
- Water budget studies of low income, informal (squatter) settlements.
- Studies of groundwater recharge in the tropics.
- Assessment of any special problems of groundwater protection and pollution prevention in the tropics.
- Evaluation of best techniques of groundwater management for low-lying tropical islands.
- Design of appropriate methods and techniques for aquifer management on tropical islands.
- Evaluation on impact of climatic change on coastal groundwater bodies and on river flows.
- Improvement of hydrological awareness of decision-makers
- Improvement of involvement of local people in water projects and hydrological aspects of land use management.
- Better use of existing knowledge through data exchange and production of hydrological guidelines.

Also of interest were symposia on *Macroscale Modeling of the Hydrosphere and Exchange Processes at the Land Surface for a Range of Space and Time Scales: Contribution of the Hydrological and Atmospheric Sciences* devoted to themes associated with IHP Project H-1-1 (Water transport through the atmosphere-vegetation-soil system) where there are some important linkages with aspects of the Humid Tropics Programme.

The Japanese IHP National Committee hosted a one-day meeting of the Regional Steering Committee for project H-5-1 for Southeast Asia. A strategy for producing a *Catalogue of Rivers in Southeast Asia and the Pacific* was developed at the meeting. It is intended that each country will prepare information and data according to a specific format for 2 or 3 rivers in humid tropical parts of each country. Japan will take the leading role in this initiative. Also discussed was a regional data base of hydrological information. On this topic a representative from the Global Runoff Data Centre (GRDC) in Koblenz, Germany, was invited to present details of the global data base. Other options such as a data base with integrated facilities for data analysis and other packages in the *HOMS* manual of WMO were also discussed.

It was agreed that data should be provided voluntarily by each country, that this could be forwarded to the GRDC and that further information on data base/analysis packages would be distributed.

Publications

The book entitled "*Hydrology and Water Management in the Humid Tropics - Hydrological research issues and strategies for water management*", by M. Bonell, M.M. Hufschmidt and J.S. Gladwell, the first volume in the UNESCO / Cambridge University Press International Hydrology Series was officially launched at the Yokohama Symposium *Hydrology of Warm Humid Regions*. (This publication has been reviewed in the previous issue of IHP Information).



Following a short speech by Mr Ian Douglas, University of Manchester, at the official launch of this publication, members of the Round Table panel joined two of the editors for a group photograph on 15 July 1993. Left to right: T. Falkland (ACT Electricity and Water, Canberra, Australia), R. Volker (James Cook University, Townsville, Australia), M. Bonell (Division of Water Sciences, UNESCO), J. Gladwell (formerly UNESCO), Y. Takahashi (Shibaura Institute of Technology, Tokyo, Japan), I. Douglas, L.A. Bruijnzeel (Faculty of Earth Sciences, Free University, Amsterdam, The Netherlands) and L. Oyebande (Hydrology Laboratory, University of Lagos, Nigeria).

The latest popularised document which has gone to press concerns the subject *Tropical Cities - Managing Their Water*. Three other popularised documents should be submitted for publication by the end of the year.

* * *

The United States of America continues its highly active participation in the IHP. A recent example is the allocation for 1993 of US\$20,000 from the US National Committee on Scientific Hydrology - US Department of the Interior towards the IHP Humid Tropics Programme within the Latin America and Caribbean region.

* * *

IHP Mission to French Guyana

Mr Mike Bonell was invited by Mr Thierry Bariac of the Laboratoire de Biogéochimie Isotopique, Paris, along with Mr Jerry Balek (previous member of the Organizational Committee of the Townsville Colloquium on Humid Tropics), to participate in a 3-week experimental hydrology programme to monitor the pathways of storm runoff in the ORSTOM-operated ECEREX drainage basins in French Guyana.

Project M-2-1: Development of national water-related information and documentation systems, with emphasis on non-numerical information

Invitation to participate in training activities and courses organized in the framework of this project during the 4-month period 2 February - 28 May 1994 in Brussels, Belgium

2nd International training course on the MANAGEMENT OF INFORMATION IN SCIENCE AND TECHNOLOGY (MIST 2) with emphasis on information related to water and the environment

Approved by the Flemish Interuniversity Council. Sponsored by the Belgian Administration for Development Cooperation (BADC) and UNESCO's International Hydrological Programme.

Costs

Free of charge for 12 participants from developing countries to be selected by the BADC and the organizers. They will also receive a grant to cover the costs of accommodation and a return air ticket. Others will have to pay a fee to participate during the whole period (US\$2,000) including all social activities or in particular items selected from the programme. Participants are expected to pay for their own travel, meals and accommodation.

Contact

Phone: +32-2-641-2429. Fax: +32-2-641-2609 (or 2282). Tlx: 61051 vubco-b. E-mail (Internet): PVOUPLING@VUB.AC.BE or PNIEUWEN@VUB.AC.BE. Mail: Paul Nieuwenhuysen or Patrick Vanouplines, MIST 2, University Library, Free University Brussels, Pleinlaan 2, B-1050 Brussels, Belgium.

Preliminary Programme

- Orientation tour of the University Library and of the Laboratory of Hydrology.
- Introduction to microcomputer systems: hardware / software.
- Microcomputer operating systems.
- The flow of scientific information.
- Bibliographic descriptions: ISBD.
- National libraries and national bibliographies.
- Subject classification schemes and thesaurus systems.
- Telematics, data communication, computer networks.
- Electronic mail.
- Online information retrieval.
- Bibliographic data bases related to water and the environment.
- Search strategies.
- Software packages for local storage and retrieval of bibliographic information.
- Introduction to CDS/ISIS software package for information storage and retrieval.
- The application of CDS/ISIS: searching / editing data in a data base / output of selected data to file or printer / developing a data base structure / indexing data for fast retrieval.
- Downloading of information and record format conversion: principles / application of Fangom with CDS/ISIS.
- Statistics for information science.
- Queuing theory.
- Citation analysis.

- The bibliometric laws.
- Scientometrics.
- Library automation.
- Online Public Access Catalogues (OPACs).
- Interlibrary lending and cooperation.
- Document collection development.
- Introduction to the IDAMS microcomputer software package for data analysis.
- Text editing / Word processing.
- Information technology for developing countries.
- The information society.
- Copyright.
- Transborder data flow.
- CD-ROM 0 Compact Disk - Read Only Memory.
- Presentation of data, using a microcomputer.
- Marketing of information and documentation.
- CD-interactive.
- Audio visual media.
- Computer-based multimedia.
- Relational data base management systems.
- Public relations.
- Archives.
- Image data bases.
- Geographic Information Systems (GIS).
- Artificial intelligence for information systems.

Study Visits

- Library of the University of Antwerp (UIA) + Inter-university Postgraduate School for Information and Library Science at the University of Antwerp.
- The Royal (National) Library (Brussels).
- Documentation centre of the national association for the prevention of accidents (in Brussels).
- Information service of the Geology Department of the Royal Museum on Africa (in Tervuren near Brussels).
- Institute for Marine Scientific Research IZWO (at the sea coast near Ostend).
- International Reference Centre (IRC) for Water Supply and Sanitation (The Hague, The Netherlands).
- Documentation Department of the KIT (in Amsterdam).
- National Online Information Meeting 1994 (in Rotterdam).

General Information

- **Personal project** Related to the trainee's personal interest, based on the newly acquired knowledge.
- **Location** The training is mainly organized at the University Library of the Vrije Universiteit Brussel (VUB), close to the rich cultural city of Brussels, Belgium.

- *Language used:* English.
- *Course Director:* Mr Paul Nieuwenhuysen, Lecturer at the Vrije Universiteit Brussel and at the Universitaire Instelling Antwerpen.
- *Certificate:* Trainees will obtain a certificate after active participation.
- *Grants:* Candidates for a grant should apply before 30 November 1993.

International Coordinating Committee on Reservoir Sedimentation (ICCORES)

An agreement to set up ICCORES was ratified by IAHR, IAHS, ICOLP and IRTCES in May 1993. The objectives of ICCORES are to coordinate efforts to improve water resources management with specific reference to reservoir sedimentation: to design, operate and maintain facilities for long-term economic and environmental sustainability and to eliminate unnecessary duplication of efforts.

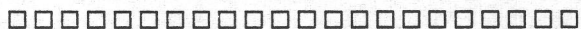
The ICCORES committee met during the ICHE '93 in Washington, DC, USA, from 9 to 11 June 1993. The next activity of ICCORES is the St. Petersburg Conference in 1994. Seven topical papers will be presented to the workshop, namely: (1) Scope and consequences of sedimentation; (2) Uncertainty; (3) Watershed processes and control; (4) River processes; (5) Reservoir sedimentation processes and measurement; (6) Reservoir design and management to control sediment; (7) Impacts of sediment management. IRTCES is responsible for Topics (6) and (7). The ICCORES Symposium on Reservoir and Sedimentation in 1995 will be held on 22-26 March in conjunction with ICHE '95 in Beijing, China.

Analysis on Changes in Runoff and Sediment Load in the Yellow River Research Project

This large-scale research project was sponsored by the Foundation for Changes in Runoff and Sediment Load in the Yellow River, Ministry of Water Resources of China. Since the 1970's an evident reduction in runoff and sediment load in the Yellow River has taken place. Taking into account that such changes have significant consequences on the development of the whole Yellow River, a special foundation to study the future trend of changes in runoff and sediment load was set up by the Ministry of Water Resources. About 150 scientists and engineers from 20 research institutes, river administrative agencies and universities participated in the study. The main achievements can be summarized as follows: (1) Systematic study on runoff and sediment load for each of the 24 tributaries and also the upper and lower reaches with emphasis on source areas of sediment yield in the middle Yellow River; (2) Overall study of runoff and sediment load of the Yellow River including its tributaries; (3) Assessment of effects of various measures on reduction of sediment

Project E-2-1: Model curricula for water-related courses in university programmes

The German IHP/OHP National Committee organized a brainstorming meeting in Koblenz from 6 to 8 September 1993 in order to launch an extension of this project. The aim of the new project is the production of CAL (computer-assisted learning) materials in hydrology. As a first step, a national workshop will be convened in March 1994 in order to make a survey of existing CAL programmes and to determine the work necessary for the compilation of materials suitable for use by universities.



News from the International Research & Training Centre on Erosion & Sedimentation (IRTCES) Beijing, China



Latest Activities of IRTCES

Regional Training Programme on Erosion and Sedimentation for Asia (RTPESA)

The Colloquium for High-Level Decision-Makers on the Problems of Erosion and Sedimentation Management, the last activity of RTPESA, will be held from 11-18 October 1993 in Beijing. The purpose of the colloquium is to evaluate the project.

load; (4) Establishment / improvement of computational methods for the analysis of changes in runoff and sediment load applicable to tributary basins.

International Visits

A 10-member Japanese delegation headed by the Chairman of the Board of Presidents, Japan-China Technical Friendship Association visited IRTCES. A round-table discussion on the development of coastal areas and a visit to the coastal region around the city of Tianjin were organized and possible future cooperation was discussed.

One Thai delegation composed of 13 members was also invited by IRTCES to visit points of watershed management in small river basin in Beijing and some of its provinces. A Chinese delegation organized by IRTCES will visit Thailand at the end of this year or early next year.

- **International Journal of Sediment Research (Vol.8, N°2, 1993)**

This issue contains the following articles:

- Study on sedimentation problems of

Lianyun Harbour, by Jin Liu.

- Strategy of reservoir sedimentation control in China, by Xu Mingquan.
- Numerical simulation of turbidity current in reservoir, by Yu Wei-Sheng and Lee Hong-Yuan.
- Experimental study on scouring of cohesive deposits in salt water, by Huang Jianwei.
- Relationship between velocity profile and distribution of sediment concentration, by Ni Jinren and Hui Yujia.

The issue also contains news on two research projects:

- "Environmental evolution of the Yellow River Catchment and its runoff and sediment load" completed for the National Natural Science Foundation Commission of China;
- "Analysis on changes in runoff and sediment load in the Yellow River" completed for the Ministry of Water Resources.

This Journal is published by IRTCES in one volume (3 issues) a year. The subscription rate is US\$60 for 3 issues, surface mail postage included, and US\$69 if sent by air mail. Mail orders and enquiries to: *IRTCES P.O. Box 366, Beijing, China. Phone: 841 33 72. Fax: 86 1 841 11 74. Telex: 22786 ITCES CN.*

REGIONAL AND IHP NATIONAL COMMITTEES

EUROPE

Information Meeting between IHP (UNESCO) / OHP (WMO) /CEC (Brussels, 10 June 1993)

An Information Meeting between representatives of UNESCO's International Hydrological Programme (IHP) and WMO's Operational Hydrology Programme (OHP) and the Commission of European Communities (CEC) took place in Brussels, Belgium on 10 June 1993. The purpose of the meeting was to explore ways of mutual cooperation, as a follow-up of the International Conference on Water and the Environment, Dublin, January 1992.

The IHP activities were introduced by A. Szöllösi-Nagy, Director of the Division of Water Sciences, UNESCO. The OHP activities were introduced by J. Rodda, Director of the Hydrology and Water Resources Department of WMO. Several IHP and/or OHP country representatives took the floor and briefly presented activities funded by CEC or of general interest to CEC.

It was suggested that a formal review of the respective programmes of the CEC and UN-organizations working in the water field be carried out by a committee established by the CEC. The Global Runoff Data Centre was presented. It was pointed out that 60% of the world freshwater resources are located in 200 international river basins. The Himalayan network was mentioned as an example of

network development. The activities in the Danube River Basin were reported. Four projects on Decision Support Systems for the Environment were presented, as well as the AMHY-project, an extension of the FRIEND-project in the Mediterranean countries. The relationship with international scientific associations such as IAH (International Association of Hydrogeologists) and IAHS was highlighted. Several EC-funded projects were mentioned in Greece, Norway, Finland (Water and Environment Research Institute / WERI), The Netherlands (TEMPUS-Joint European Project / JEP on Environment, Water and Agricultural soils /EWA-Ring), Belgium (ERASMUS Interuniversity Cooperation / ICP, *Hydrology and Water Management*, COMETT University Enterprise Training Partnership / UETP, *TECHnology for WATER REsources / TECHWARE*, and the WEEL-project within HUMAN CAPITAL and MOBILITY). The basic principles of EC-RTD (European Community-Research and Technological Development) activities and the link between several programmes such as ERASMUS, COMETT, SPRINT and the RTD Framework Programmes and their relationship with the EUREKA Initiative were discussed. The MONITOR-SAST Project N° 6 on RTD for freshwater resources management was briefly introduced as well as the four action lines of the Fourth Framework Programme (1994-1998). The EUREKA and COST projects were also developed. Finally, the Environmental Programme for the Danube River Basin and its Programme Coordination Unit were presented.

In conclusion, a holistic approach in matters of RTD+D (RTD and Demonstration) for water resources was advocated, linking international programmes such as IHP, OHP, WRCP (World Climate Research Programme) and IGBP. It was pointed out that a multi-sectoral approach to water-related RTD proposals and a permanent assessment were needed. It was suggested that the international bodies present at the meeting and the national representatives should try to identify likely areas of cooperation which could be covered by a COST-action. All participants agreed that a follow-up meeting should take place in about one year.

Environmental Programme for the DANUBE river basin

The overall aim of the Danube Programme is to initiate a process whereby the countries of the Danube begin to work together to examine and develop solutions to environmental problems in the region. It has been set up for a three year period at the meeting of the Riparian Countries and the international and non-governmental organizations and certain G-24 countries involved in providing assistance to the region at the meeting in Sofia in September 1991 where it was decided to create the Danube Task Force.

The main lines of action of the Programme are to:

1. identify and implement short-term, high priority actions;
2. provide the basis for a longer term programme of environmental investment;
3. strengthen local, national and regional capacities to manage the environment of the Danube River Basin.

A Programme Coordination Unit (PUC) has been set up in Brussels to support the Task Force, provide daily coordination, project initiation and follow-up, and the identification of longer term, strategic environmental issues in the Danube River Basin. The Team Leader is Mr David W. Rodda.

Two Expert Sub-Groups of the Task Force have been created to assist in the identification of appropriate, cost-efficient strategies for strengthening monitoring, laboratory and information management, and an approach for setting-up an international accident, emergency warning system. This latter activity is one of the identified short-term priority actions. Once the appropriate strategies have been agreed upon in both these areas then a major effort will be made to implement the recommendations.

To prepare the environmental investment programme, a series of diagnostic missions were carried out in 16 tributary catchments of the main river which were selected because of severe problems related to industrial, municipal and agricultural pollution. Pre-feasibility studies on identified *hot spots* are being carried out which will produce a series of high priority, potentially "*bankable*" projects for environmental investment in the region.

A wide variety of actions, which are no less important, are also in progress or being planned by the Coordination Unit to strengthen the regional capacity in environmental management.

These actions range from regional studies, e.g. on diffuse pollution sources, work to protect biological resources, environmental information management, and applied research projects, to institutional development activities including legal and administrative systems, training, awareness-raising and work with non-governmental organizations.

Activities in the Danube River Basin under the auspices of IHP

By F. Nobilis (Austria), representative of the IHP National Committee, and Deputy of the Hydrological Advisor (OHP).

In addition to the Danube Commission at governmental level, which has been located in Budapest for decades, nearly forty years ago the Conference on Hydrological Forecasting of the Danube Countries was set up. This conference takes place every two years in a different Danube country. The title was now been enlarged to include water resources management.

More than a decade ago, an expert group of IHP National Committees (IHP-NCs) started projects partly sponsored by the IHP-NCs. One output was the monograph of the river Danube. At the moment projects concerning the water balance, precipitation and trends, the coincidence of floods and river bed changes are partly finished or will be tackled e.g. Austria will be coordinating the projects from 1993 until 1996. Germany as a an EC member country is involved and more EC member countries will be involved in the future. This river basin, as an international river case study should be of interest for EC activities.

Activities of the Greek IHP National Committee

By A. Mimikou (Greece)

An IHP-NC has recently been established in Greece. The synthesis of the group includes representatives from ministries, governmental agencies, research institutes and universities. The NC is coordinated by the Ministry for Industry, Energy and Natural Resources, Division of Water Potential, within the framework of activities of the UNESCO National Committee. Regular meetings take place every two months and several water related problems are discussed. The strong interest of the IHP-NC in research activities has been expressed by the preparation of two research proposals dealing with state-of-the-art topics, such

as the assessment of regional hydrological effects of climatic change and groundwater contamination. The proposals (seeking for partners) were distributed to the participants of the UNESCO/WMO/ICSU International Conference on Hydrology held in Paris (March '93). Until now, several researchers and organizations have expressed their interest in collaborating. Among them, the International Commission of Hydrology for the Rhine River (KHR) will participate in an on-going research project on climate change, which has been proposed by the UK Institute of Hydrology and the National Technical University of Athens (participating in the IHP-NC). This project has been funded by the EC-DG-XII (Environment) for three years.

Comments from the Institute of Hydrology

A stated objective of the CEC's Draft Fourth Framework Programme is the closer integration of CEC-RTD with that of international organizations. This is a worthwhile objective, reducing duplication and achieving by cooperative efforts what may not be possible by independent actions.

In order to achieve greater integration of CEC-RTD activities with IHP-UNESCO, OHP-WMO WCRP, IDNDR (International Decade for Natural Disaster Reduction), etc., the following is required:

1. *A formal review should be commissioned by the CEC of the respective programmes of the CEC and UN organizations working in the water field. Initially this could start with CEC/IHP/OHP/WCRP (World Climate Research Programme). This might be organized along the lines of one of the SAST reports.*
2. *This review should seek to define existing areas of complementarity. This should cover RTD:*
 - *Within, or as affecting the European geographical sphere.*
 - *External RTD programmes such as Life Sciences for the Developing Countries and International Scientific Cooperation.*
3. *This review should not be purely restricted to areas of RTD common interest, but should also identify areas of common interest affecting non-RTD CEC activities, such as:*
 - *Inter-regional programmes where transboundary water problems may exist, i.e. Danube;*

- *Environmental management within the EC, i.e. FRIEND network and EEA (European Environment Agency);*
- *External affairs and EC aid programmes, i.e. PHARE and TACIS Indicative Programmes.*

The hydrology and water resources programmes of UNESCO and WMO have developed over many years through broad international consensus as to what are the important transnational water problems. In areas where the EC is seeking to very rapidly develop new policies and technical assistance programmes (i.e. Central and Eastern Europe, and the former Soviet Union) the existing UN water programmes, e.g. UNESCO and WMO, can provide useful guidelines and organizational structures.

4. *A committee should be established by the CEC to:*
 - *Establish a frame of reference as outlined in 1-3 above.*
 - *Identify the particular contribution that the CEC can make to the global environmental issues by working with the International Programmes.*
 - *Monitor longer term changes in the hydrology and water programmes of IHP-UNESCO, OHP-WMO, etc. as they affect the CEC.*

This committee should draw upon specialist staff from CEC, IHP-UNESCO, OHP-WMO, etc. and CEC Member States who are active in UN water programmes. The committee should be chaired by the CEC.

The committee should prepare annual statements of policy and practical measures undertaken by the CEC to increase the integration of its RTD with these organizations.

An appropriate reporting line should be established within the CEC to allow communication of recommendations, etc. from the committee to relevant CEC directorates, i.e. DG-XII (Science, Research and Development) as well as DG-I (External Relations), DG-VI (Agriculture), DG-XI (Environment, Nuclear Safety), DG-XVI (Regional Policy).

* * *

France / Romania

Since 1991, the French and Romanian IHP National Committees, under the auspices of IAHS and with the support of the French and Romanian Ministries of the Environment, have held biennial meetings to develop collaboration between specialists from the two countries in order to jointly study priority issues as well as to combine their action in the framework of international programmes such as the IHP.

A meeting took place in Tulcea, Romania, 6-9 September 1993 which considered three main issues:

1. The computing, gathering and processing of basic hydrological data to be used for hydrological research and water resources management.
2. The modelling of pollutant propagation in the hydrosphere for pollution control.
3. Case studies at basin level.

The meeting was concluded by a round-table which highlighted a common concern as regards the following future needs:

1. To monitor flows (liquid as well as dissolved solids) in a changing environment.
2. To monitor, in particular the diffusion of pollutants in rivers, with special attention to the role of soil.
3. To study, in particular, hydrological droughts, i.e. the deficits of which would become apparent if the demands for water exceed available resources.
4. To continue hydrological forecasting.
5. To avoid "research for research" and encourage users to orient their work.
6. To optimize research in the Danube basin by creating environmental research networks associating hydrology, biology, ecology, etc. (biosphere reserve networks should be consolidated in the Danube basin by identifying common research themes).

Finally, a need to conduct integrated studies from a multidisciplinary base appeared and lead to certain considerations of interest to UNESCO.

UNITED STATES OF AMERICA

The United States Geological Survey (USGS) will organize and conduct a training course on *Techniques of Hydrologic Investigations for International Participants*. The course, which was originally scheduled from 7 June to 30 July 1993, is now postponed until *June 1994*.

The purpose of the training course is to provide hydrologists from around the world with the opportunity to learn the techniques and methods of data collection, analysis and interpretation used by the USGS to evaluate the water resources of an area or region. Data collection techniques include hands-on field methods of collecting and storing data. Interpretative techniques include graphical, analytical, and computer methods of analyzing data to determine hydrological relationships. The course includes multidisciplinary studies with 3 weeks of specialization in either ground or surface water.

The training locations include Reston, Virginia, Colorado Springs and Denver, Colorado. Instruction is in English. The cost is US\$7.500 per participant.

Requests for additional information should be directed to: *USGS, Water Resources Division, 436 National Center, Reston, Virginia 222092, U.S.A. (Phone: +1 703 648 5053 / Fax: +1 703 648 5070 / Tlx: 49614145).*

LATIN AMERICA AND THE CARIBBEAN

Regional Activities

- *XXVII Ordinary Meeting of the Regional Committee of Hydraulic Resources (CRRH) and XXVIII Meeting of Directors of Meteorological Services of the Central American Isthmus, 26-28 July 1993*

The meeting was held in Tegucigalpa, Honduras, with the main objective of following-up on activities executed in the Central American Isthmus with the cooperation of UNESCO/IHP, WMO, PRIMSCEN (Project for the Rehabilitation and Improvement of the Meteorological and Hydrological Services in the Central American Isthmus) and other subregional projects and activities. The following subjects were discussed by the meeting:

1. Surface water balance of the Central American Isthmus: A report was made of

the project's progress at national level as well as the difficulties encountered and the solutions found. It was recommended that a subregional coordination workshop be organized.

2. Hydrogeological map of the Central American Isthmus: The project's progress at national level was reported and details of scales and national publication were discussed. It was recommended that a subregional coordination workshop be organized.
3. Preparation of data bases on hydrology and water resources. All the countries of the subregion received the MicroISIS and IDAMS software packages with the corresponding operating manuals, as a first step in the launching of the LACHYCOS project. The countries requested the assistance of a UNESCO expert for the implementation of the computer programmes.
4. Latin American and Caribbean hydrological cycle and water resources activities observation and information system (LACHYCOS): at the request of the countries of the subregion it was suggested to organize a meeting with UNESCO, WMO and CRRH with the aim of defining a work strategy for the project's development.
5. Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC). The meeting participants expressed the wish that CRRH participate in some of CATHALAC's projects or activities.
6. CRICA Courses: The successful development of the 10th CRICA roving course held in the Dominican Republic, Honduras, Panama and Nicaragua in 1992 was reported. The courses benefitted 102 professionals from the subregion, at an individual cost of US\$192,93. CRICA courses for 1993 were programmed in Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama from 11 October to 6 November 1993. The subjects of the 1994 courses were also defined.
7. ERIS Course: It was reported that the short course on *Irrigation and drainage in small tropical plots* was delivered at the Regional School of Sanitary Engineering of the San Carlos University of Guatemala (ERIS/USAC). The subject of the next short course was defined as *Integrated basin*

development, and will be held from 28 September to 2 October 1993.

The CRRH adopted a recommendation requesting the continuation of UNESCO's support to the different projects and activities in the subregion. The Committee decided unanimously to maintain its venue in Costa Rica for the period 1 January 1994 - 31 December 1997 and extended the appointment of Mr Eladio Zarate as Executive Secretary for the period 1 January 1993 - 31 December 1995.

- *Manual for data base on LACHYCOS project components*

The design and implementation of the MicroISIS/CD data base has been concluded for the following LACHYCOS project components:

1. Data base on hydraulics and hydrology research centres of Latin America and the Caribbean;
2. Data base on hydrology, water resources and hydrogeology specialists of Latin America and the Caribbean.

- *Special seminar on hydrology and meteorology and their influence on hydropower generation*

The seminar took place in Florianopolis (Brazil) from 22 to 25 August 1993 and was organized by the Central Committee of the Commission for Regional Electricity Integration of Latin America (CIER). The participants were specialists from the region.

- *Workshop on large-scale biosphere-atmosphere field experiment in the Amazon basin*

The workshop was held in Sao Jose dos Campos (State of Sao Paulo, Brazil) from 8 to 11 September 1993 under the coordination of Mr Carlos Nobre of INPE. The agenda included the following themes:

1. Presentation of the LAMBADA and BATERISTA (Biosphere-Atmosphere Transfers and Ecological Research in Situ Studies in Amazonia) projects;
2. Review of existing projects in the basin;
3. Research on themes of interest to the Amazon basin countries;
4. Hydrology and hydrobiochemistry of the Amazon basin;
5. Carbon cycle in the Amazon basin;

6. Organization and implementation of working groups.

- *Preparation of a data base on research projects and training activities in hydrology of the humid tropics of Latin America and the Caribbean*

The project to be executed by the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC) will start in October 1993 with funding from the US Committee on Scientific Hydrology (US Geological Survey) and technical assistance from UNESCO/IHP.

- *Meeting of experts on possible impacts of climate global changes on the use of water resources in Latin America and the Caribbean*

The meeting, organized by ECLAC in Santiago de Chile from 23-25 November 1993, will receive contributions and be attended by participants from the IHP National Committees of the region and other institutions and international organizations.

National Activities

Argentina

IHP coordination meeting with the new director of water resources

On 26 August 1993 the ROSTLAC Regional Hydrologist met with the new Director of Water Resources, Mr Victor Pochat, to review the different on-going projects and activities and establish new mechanisms for the identification, preparation and execution of development projects in Argentina.

Postgraduate course in environmental engineering

A one-year postgraduate course is taking place at the Faculty of Engineering of the National University of Cuyo in Mendoza. On 26-27 August 1993 the UNESCO Regional Hydrologist lectured on the subject of the new challenges faced by the water sciences and the environment in Latin America on the eve of the 21st century.

Bolivia*Programme for the study of tropical glaciers*

The first report on the project executed by the Bolivian Electricity Company (COBRE), ORSTOM (France) and the Institute of Hydraulics and Hydrology (IHH) has been concluded in the framework of the IHP-IV Project H-4-2, which includes the following: timetable of initiatives, results of first observations of performance of the new equipment and control methods, detail of glaciers selected, other peripheric studies and ways to continue the programme. Participants: P. Ribstein, J. Bourges, J. Hoorelbeke, E. Contreras, R. Vargas and F. Camacho.

Cuba*Analysis and treatment of waste water*

The Cuban IHP National Committee and the Faculty of Chemical Engineering of the Polytechnical Institute *Jose A. Echeverria* are co-sponsoring a series of activities such as postgraduate short courses, training sessions, M.Sc. programmes and teaching advisory services at postgraduate level. For further information please contact: *Ms. Lourdes Zumalacarregui de Cordero, Facultad de Quimica, ISPJAE, Casilla Postal 19390, La Habana, Cuba. Tel. 207220; Fax 332429.*

Ecuador*Project on engineering aspects to be considered in the environmental diagnosis of irrigation projects in Ecuador*

A case study was undertaken at the Salinas project in the province of Imbabura. The general objective of the project is to formulate guidelines on engineering aspects to facilitate the study of the environmental diagnosis. The specific objective is to apply these guidelines to the environmental diagnosis of the Salinas irrigation project (2091 ha. and 1700 a.s.l.). The project was executed by Alejandra Figueroa Garcia and Raul Vega Calderon under the supervision of Cesar Narvaez of the Faculty of Civil Engineering of the National Polytechnical School, with financial support from UNESCO/IHP.

Honduras*Hydrogeological map of Southern Honduras*

The first phase of the project has been executed under the auspices of the National Autonomous Service of Drainage and Sewage (SAANA), the British Geological Survey (BGS) and the National Geographic Institute of Honduras (IGN). The members of the project team were Messrs. Derek Ball, A. McKenzie, R. Ochoa, L. Duran and M. Sagastume. The explanatory note and map at scale 1:250.000 can be obtained from the Publications Department of the IGN, Apartado Postal 3177, Tegucigalpa, Honduras, att. Daisy Fonseca. Cost: US\$ 85.

Uruguay*Hydrological modelling and geographic information systems*

Between 16 and 27 August 1993 a short course was held at the Institute of Fluid Mechanics and Environmental Engineering (IMFIA) of the Faculty of Engineering-National University of Uruguay. The course was delivered by lecturers from the Swedish Royal Institute of Technology and IMFIA.

First Uruguayan symposium on wind energy

This symposium was organized on 6 August 1993 by the National Electricity Company (UTE) and the Faculty of Engineering of the National University of Uruguay.

Dissemination of the groundwater availability insurance

During the annual cattle and agricultural show Expo-Prado '93 (19 to 27 August 1993) a series of talks on the above project were sponsored by the National Insurance Bank and UNESCO/IHP.

SOUTH & CENTRAL ASIA

A Regional Training Course on Tracer Hydrology, was held in Kathmandu, Nepal, from 20 September to 1 October 1993, jointly organized by UNESCO/ROSTSCA, the Swiss Development Cooperation, Department of

Hydrology and Meteorology, Nepal, ICIMOD (International Centre for Integrated Mountain Development), WMO and GTZ (German Technical Cooperation Agency). The course introduced the use of tracer techniques in hydrology with special emphasis on discharge measurements in turbulent rivers. The course was held at the Department of Hydrology and Meteorology, Kathmandu, Nepal.

Global Forum on Environmental Education for Sustainable Development

The Indian Environmental Society under the sponsorship of UNESCO (IHP and MAB) and in association with a number of national and international agencies organized a Global Forum on Environmental Education for Sustainable Development, in New Delhi from 24-28 September 1993, as a follow-up of the Rio Earth Summit.

Four-Week Training Programme on Geographic Information Systems for Natural Resources Management

The Centre of Studies in Resources Engineering, Indian Institute of Technology, Powai, Bombay, will organize with the Department of Science and Technology, New Delhi, a UNESCO sponsored Training Programme on Geographic Information Systems (GIS) for Natural Resources Management, from 18 October to 12 November 1993.

Any activity which involves the use of spatial data like the planning and monitoring of environmental issues, location of amenities and services becomes cumbersome when the conventional methods of data handling are resorted to. Over the years, coalescence of application software like CAD, AM/FM etc., have resulted in a versatile spatial data management tool, the GIS. As a process, GIS takes the decision maker/planner from a set of data, to its analysis on the basis of resolved criteria, to the generation of scenarios which reflect the outcome of a set of interventions.

The concept of spatial data management is emerging in the context of increasing emphasis given to issues like land use, wastelands development, water management, infrastructure planning etc. GIS is only beginning to be appreciated by the users. In India, it is very much in the research domain as yet and very few organizations have promoted research and development in GIS and have made efforts to

introduce GIS into their operational activities.

This training programme was planned with a view to popularizing the GIS concept. This course drew inputs from the experiences gained by the Department of Science and Technology (DST), IIT, Bombay, the Central Ground Water Board, the Department of Space, the Town and Country Planning Organizations, Survey of India, National Sample Survey Organization, Census Department and international experts. The programme for the school consisted of lectures on fundamental concepts: Geographic Information Systems (GIS), Spatial Data Structures, Query Methods, DBMS, digital cartography, data sources, digital terrain modelling, geo statistics, spatial decision support system, visual and digital processing of remotely sensed images, integration of remote sensing and GIS. The course also familiarized the participants with application studies using GIS. The areas covered were forestry, soils/agriculture, watershed management, urban planning, mineral exploration etc.

International Workshop on Groundwater Monitoring and Recharge in Semi-Arid Areas

This international workshop, sponsored by UNESCO and the International Association of Hydrologists (IAH), will take place in Hyderabad, India from 18 to 20 January 1994. It will be organized by the National Geophysical Research Institute, Hyderabad.

The Workshop aims to address selected aspects of groundwater monitoring and recharge estimation in semi-arid areas and will be a contribution to IHP projects H-5-2 (Hydrological research and water management strategies in arid and semi-arid zones), and M-1.1b (Integration and coordination of soil water monitoring systems to support groundwater resources assessment).

The themes of the Workshop will be:

1. Background monitoring of groundwater systems (before significant development); specific monitoring requirements (for exploited groundwater systems).
2. Groundwater monitoring tools and observation density; groundwater data bases.
3. Hydrogeological parameter estimation.
4. Recharge of phreatic aquifers due to: (a) precipitation, including distributed irrigation; (b) ephemeral flow conditions, including man-induced recharge; (c) perennial flow conditions, including lakes, canals and drains.

The workshop will contribute to two publications:

1. Recharge of phreatic aquifers in (semi-) arid areas (to be published by IAH/UNESCO).
2. Monitoring for groundwater assessment and management in (semi-) arid regions (to be published by UNESCO).

* * *

Technical Support Service for Hydrology

UNESCO is to provide overall technical support to an on-going five-year hydrology project at the National Institute of Hydrology (NIH), Roorkee, India. The project, entitled *Developing Capabilities for Hydrological Studies*, aims at stepping up facilities at the NIH for this purpose. The thrust of the studies is to see how optimal use of water resources can be made in order to meet the demands of the growing population. Water balance studies are also being undertaken in catchment areas with different water balance characteristics in three different geographic regions.

Launched in November 1990, the Project is being executed by the NIH with a \$3 million financial assistance from UNDP.

To ensure efficient and economic planning of water resources a number of problems such as siltation of and seepage from reservoirs, backwater effects from the flow of rivers, coastal pollution, geomorphology of rivers, interaction of surface with ground water etc. have been identified. Five new divisions - Hydrological Instrumentation with Laboratory, Deltaic Hydrology, Nuclear Hydrology with Laboratory, Hydrometeorology and Lake Hydrology - have been established to give immediate attention to the above-mentioned problems.

Other divisions (remote sensing, Man's Influence and Mountain and Snow Hydrology) are also being strengthened.

The Institute hopes that at the completion of the project, it will possess trained scientists and the capability for technology transfer in certain defined areas.

The technical support service supplied by the UNESCO team, comprising hydrology specialists from ROSTSCA and UNESCO's International Hydrological Programme will cover:

- Technical monitoring of the progress of the project;
- Regular evaluation of the project performance;

- Evaluation of the technical work-breakdown-structure of the project;
- Impact assessment of the project;
- Any other technical service as may be requested by the project authorities.

SOUTHEAST ASIA

Activities

From 11 to 23 July 1993 a joint international meeting of IAMAP, the International Association of Meteorology and Atmospheric Physics, and IAHS, International Association of Hydrological Sciences, was held in Yokohama, Japan. Details are given in the Section of this Newsletter relative to IHP Project H-5-1.

A *Training Course on Observation Technology related to Global Climatic Change* was given at the Water Resources Institute of the University of Nagoya, Japan, 16 August-3 September 1993. Two Chinese and one Filipino junior scientists were given the opportunity to attend the course, which was supported by a Japanese fund-in-trust grant to UNESCO. Issues addressed were precipitation and water resources in Asia, the water cycle and water quality in the hydrosphere and hydrological observations and models of discharge. Another important part of the course consisted of field trips and practical work on meteorological observations and measurements in a hilly catchment, hydrological facilities for water quality conservation, short-range precipitation forecasting and laboratory work on bare soil evaporation.

China

National activity

In the framework of IHP Project H-5-2 (Flash Floods) the Chinese IHP National Committee and the Institute of Water Resources and Hydropower are organizing with the support of UNESCO an **International Symposium on Flash Floods in Arid and Semi-Arid Zones**. The symposium will be held in Xi'an, China, from 26 to 29 September 1994.

Rainstorms characteristic of arid and semi-arid regions are of short duration but high intensity

and often result in torrential flash floods which are difficult to predict or forecast and, therefore, cause enormous damage. For this reason, the study of flash floods is attracting increasing attention throughout the world. As inadequate and insufficient hydrological data exist concerning arid and semi-arid areas it is essential to undertake studies on flash floods and the relationship between rainstorms and flash floods. The forthcoming symposium will highlight factors affecting the formation and development of flash floods, including climatic and topographic conditions, man-made and environmental impacts and the mitigation of calamities.

Main subjects of the symposium

1. Rainstorm characteristics, formation of flash floods and their temporal and spatial distribution in arid and semi-arid areas;
2. Flash flood modelling;
3. Investigation and computation of flash floods;
4. Countermeasures against flash floods:
 - Flood warning;
 - Structural and non-structural measures

for mitigating flash floods;

- Soil and water conservation.

For further information, please write to: *Mr Liang Zhixin, Deputy Secretary-General, The Chinese National for the IHP, 1 Xikang Road, Nanjing 210024, China. Phone: 86-25-6632106. Tlx: 34101 ectuw cn. Fax: 86-25-3315375.*

UNESCO Office for the Pacific States in Apia, Western Samoa

The UNESCO Office for the Pacific States in Apia, Western Samoa, has a Science Adviser. Mr Trevor Sankey whose task is to promote all aspects of UNESCO's science programmes in the Pacific, including the IHP, in liaison with water science specialists at Headquarters and at ROSTSEA, Jakarta. Water specialists working in the region are invited to contact him for an exchange of information at the following address: *Mr Trevor Sankey, Science Adviser, UNESCO Office for the Pacific States, P.O. Box 5766, Matauta uta P.O., Apia, Western Samoa. Phone: + 685 24276. Fax: + 685 22253. Telex: 209 UNESCO SX.*

COOPERATION WITH

NON GOVERNMENTAL ORGANIZATIONS

International Association for Hydraulic Research



Jubilee Seminar XXV IAHR Biennial Congress World Water Convention

Jubilee Seminar

On 28 August 1993, a Memorial Seminar for the Silver Jubilee on the occasion of the XXV IAHR Biennial Congress, was held in Tokyo, Japan under the theme *IAHR moving towards the 21st century*. In recent years, there has been

increasing concern about the crisis of our global environment as a problem which must be solved immediately for the future of mankind. It is necessary to deal with these problems on a global scale recognizing that the three basic elements which make up the earth: air, water and soil, are the life conservation system of mankind and living beings. These problems have political and economic elements which require international consideration to take proper countermeasures. IAHR considered it necessary to elucidate various hydraulic phenomena implied in these problems and to accumulate scientific information in this area. With this in mind, the Local Organizing Committee, chaired by Mr Yoshiaki Iwasa, decided to hold this Seminar. The objective of the seminar was to stimulate initiatives for the future perspective of IAHR in the 21st century

derived from the historical role of IAHR in the development of hydraulic engineering, the economic development of society, the prevention and mitigation of disasters, the preservation of the environment and the like. The programme included the following presentations:

- *Global warming and environmental changes on the surface of the earth*, by J.S. Theon, NASA.
- *Sustainable water resources development*, by E. Plate, Karlsruhe University.
- *Sustainable coastal development*, by R.E. Waterman, member government Province of South Holland.
- *Hydraulics in the Global Age*, by Y. Iwasa, Kyoto University.
- *Prefixed Hydro Technologies*, by T. Carstens, President of IAHR.

The outcome and proposals of the Seminar were introduced during the Opening Ceremony of the Congress for further discussion and expansion during the week. The final *Jubilee Statement* was presented at the Closing Ceremony.

XXV IAHR Biennial Congress

The XXV IAHR Biennial Congress was held in Tokyo from 30 August to 3 September 1993. The congress provided an excellent opportunity for scientists, researchers and engineers to present and discuss the results of research and experiments on various kinds of disasters and their prevention. The main theme *Achievement of a less hazardous world through hydraulic research* was linked to the International Decade for Natural Disaster Reduction (IDNDR) with the objective to further develop the hydraulic community's contribution to the creation of a safe society. A lively exchange about recent topics such as impacts of human activities on the global environment and water environment, the progress of visualization technology and its application to hydraulic engineering, urban water fronts, etc. took place. A total number of 785 delegates participated in the congress.

Opening Ceremony

The Congress was graced by the attendance of Their Imperial Highnesses, the Crown Prince and Crown Princess at the Opening Ceremony. IAHR was greatly honoured by this recognition of its professional international activities.

Special lectures were presented on:

- *Flood control methodology in Japan - Retrospect over the modern flood control projects and prospects for the future improvement*, by S. Yamamoto, President of the Japan River Association.
- *Water science issues at the dawn of the 21st Century: Where should the hydraulic community help?*, by A. Szöllösi-Nagy, Director Division of Water Sciences, UNESCO.
- *Water supply, demand and pollution*, by J. Kondo, President Science Council of Japan.

During the Opening Session, the Ippen, Shoemaker and Honorary Membership Awards were presented by the IAHR President.

Congress Themes and Seminars

In total, 195 papers were presented under the following main themes:

- A. Flood and Drought
- B. Debris Flow and Landslides
- C. Stormsurge, Tsunami and Storm Waves
- D. Man-caused Environmental Disasters.

Thirty-three papers in all were presented in the Seminars:

- Advances in Flow Measurements, Visualization and Display Techniques.
- Expert Systems in Hydraulics.
- Waterfront Development in Urban Areas.
- Remote Sensing and Global Environment.
- Management of Hydraulic Research.
- Continuing Education for Capacity Building in Hydraulics and Water Resources Engineering.

In addition, special seminars presented up-to-date information on:

- Tsunami caused by the Hokkaido earthquake.
- The Mississippi floods; and
- Case study on Bangladesh floods.

A choice of technical visits was offered to the participants.

Closing Ceremony

At the Closing Ceremony the Ippen Award Winner, Mr Yeou-Koung Tung, presented his lecture *Probabilistic Hydraulic Design: A next step to experimental hydraulics*. The ceremony was concluded by a short presentation by the chairman of the LOC, Mr Rodney White, on the

26th IAHR Congress, which will be held from 11 to 15 September 1995 in London.

Attention should be drawn to a very important event which took place during the Closing Ceremony - this is the presentation by the Secretary General of the IAHR of the WORLD WATER CONVENTION which is the result of discussions held during the XXV Congress on the outcome of the findings of the Jubilee Seminar.

WORLD WATER CONVENTION PROPOSED BY IAHR

Resulting from the discussions in the Memorial Seminar for the Silver Jubilee on the occasion of the XXV IAHR Biennial Congress: "IAHR moving towards the 21st century" and the deliberations thereafter, the General Members Assembly at the XXI IAHR Biennial Congress in Tokyo, Japan, 30 August through 3 September 1993, expresses its concern that a World Water Convention, similar to the established Conventions on Biodiversity and Climate Change adopted at UNCED held in Rio de Janeiro is still lacking in spite of the pressing water problems of the world.

The World Water Convention should cover among other items, the monitoring and protection of the quantity and quality of the world's water resources in order to prevent global and regional water crises and to mitigate water-related disasters. The aim of the convention is to provide a common legal framework for joint actions and a code of conduct related to water resources and to help resolve potential conflicts on international river basins. The international hydraulic research community offers its assistance to the process that leads to such a Convention.

The XXV IAHR Biennial Congress, therefore, proposes that the United Nations and its relevant specialized agencies, as a follow-up of UNCED, take effective steps towards the establishment of a World Water Convention. Moreover, it urges the international non-governmental professional water-related associations to join in this request and furnish their expertise.

Tokyo, 3 September 1993

President of IAHR, Torkild Carstens
Secretary-General of IAHR, Henk Jan Overbeek

Meeting of IAHR/IHP Panel in Tokyo, 31 August 1993

The International Association of Hydraulic Research established a panel to coordinate joint

efforts of IHP and IAHR. The Panel is composed of IAHR Council members and the Executive Secretary, under the chairmanship of Mr O. Starosolszky. During the XXV IAHR Biennial Congress the Panel met with the Director of the Division of Water Sciences, and Secretary of the IHP (UNESCO) and discussed several matters of joint interest.

The fifth phase of the IHP (IHP-V / 1996-2001) offers a new opportunity to the non-governmental organizations, like IAHR, to contribute effectively.

The megaproject on reservoir sedimentation, a joint venture of IAHR, IAHS, IAWQ, (International Association on Water Quality) ICOLD (International Commission on Large Dams) and IRTCES through the International Coordinating Committee on Reservoir Sedimentation (ICORES) has also become part of IHP-V. IAHR has a special interest in the continuing education and training of hydraulic engineers. The newly formed IAHR Committee on Continuing Education and Training could thus be instrumental in making specific proposals for the Education and Training component of IHP-V.

A first draft of the joint UNESCO/IAHR publication on Education in Hydraulics and Hydraulic Engineering was presented during the XXV IAHR Biennial Congress and will be finalized in the coming months.

UNESCO will publish and disseminate the COWAR report "Water in Our Common Future". COWAR is a joint ICSU/UATI Committee on Water Research of which eleven water-related associations, including IAHR, are members.

There might be some possibilities for travel support to delegates from developing countries for participation in IAHR congresses and conferences. As many topics focussed upon these events are related to IHP activities, IAHR will submit specific requests for support to UNESCO.

UNESCO plans to expand its programme for UNESCO chairs in developing countries (UNITWIN) sponsored by industry and or non-governmental organizations. IAHR corporate members may also be interested in sponsoring such a chair and IAHR will further investigate possibilities.

IAHR continues awarding IAHR lectureships to institutes of higher education in developing countries (IAHR lecturer nominated by a specific IAHR section to lecture for at least 7 days on a specific topic related to hydraulics and its application).

IAHR may play a role in the planned UNESCO Conference on Water and Civilization in 1996 or 1997.

UNESCO is willing to promote the suggestion for a World Water Convention which is proposed by IAHR at its XXV Congress.

It is envisaged to hold a similar panel meeting at each congress, thus the next one will be held in September 1995 in London.

International Association of Hydrological Sciences



IAHS/IHP Corner



**IAHS Symposia and Workshops and Joint
IAHS/IAMAS Symposium and Workshops at the
IUGG XXI General Assembly
Boulder, Colorado, USA, 3-14 July 1995
*Call for Papers***

The XXI General Assembly of IUGG will be held on the campus of the University of Colorado in Boulder near Denver (USA) from 2 to 14 July 1995. During the Yokohama Assembly the scientific programme of IAHS at Boulder was discussed at great length. There will be six IAHS Symposia with pre-published Proceedings; four IAHS Workshops; one joint Symposium of IAHS/IAMAS (formerly IAMAP), WRCP/GEWEX and IGBP/BAHC; and three inter-association workshops held jointly with IAMAS. This Call for Papers is only for the six IAHS Symposia which will have pre-published Proceedings. The scientific programmes will be supported by UNESCO and WMO. The subjects proposed for the six IAHS Symposia are:

H1 Effects of scale on interpretation and management of sediment and water quality convened by ICCE and ICWQ

The objective of this Symposium is to evaluate the relationships between sediment, water quality, and temporal and spatial scale. Primary topics will include:

1. scale effects on processes (e.g. comparability of dominant processes across land scale units affected by different precipitation inputs);
2. monitoring;
3. modelling at different scales; and

4. management tools and practices and their effectiveness.

The corresponding convenor for this Symposium will be:

Waite Osterkamp
USGS, Denver Federal Center,
Box 25046,
MS 413, Lakewood,
Colorado 80225, USA.
fax: +1 303 236 5034

H2 Models for assessing and monitoring groundwater quality: convened by ICGW and ICASVR

This Symposium will explore the scientific issues associated with designing and developing programmes for monitoring and assessing groundwater quality. Proposed topics include:

1. development, validation and application of groundwater flow and contaminated transport models;
2. simulation, optimization and/or statistics-based techniques for designing data collection networks for groundwater quality assessment;
3. programmes for large-scale (regional and national) groundwater quality assessment;
4. interpretative techniques for evaluating water quality data and characterizing groundwater quality;
5. use of groundwater quality assessments for evaluating and formulating groundwater policy; and
6. retrospective analyses of past groundwater quality studies.

Theoretical and applied contributions aimed at assessing and monitoring groundwater quality are welcome. The corresponding convenor for this Symposium will be:

Brian J. Wagner
USGS, 345 Middlefield Road,
MS421, Menlo Park,
California 94056,
USA.

H3 Biogeochemistry of seasonally snow-covered catchments: convened by ICSI with ICWQ and ICT

This Symposium will cover the following topics:

1. snowpack transformations and atmospheric interactions, including mass energy and chemistry; physical and chemical snowpack processes; scaling snow properties;

2. snow hydrology and hydrochemistry; spatial distribution of snow and its chemistry; snowmelt models and chemical hydrographs; chemical elution from the snowpack;
3. snowmelt runoff and biogeochemical processes: snowpack-soil interactions; biotic interactions; influences on surface water quality; and
4. hydrological flowpaths in snow and glacial systems: identification and quantification of flow paths; natural and applied tracers; biogeochemical transformations and processes.

The corresponding convenor for this Symposium will be:

Kathy Tonnessen
 US National Park Service,
 Air Quality Division,
 P.O. Box 25287,
 Denver, Colorado 80225,
 USA.
fax: +1 309 969 2822

H4 Comparison of tracer technologies for hydrological systems: convened by ICT, with ICSW, ICSI, ICWQ, IAMAS, ICCE and ICGW.

Investigations of hydrological systems using tracer techniques are based on a standard methodology, but the investigation of each hydrological sub-system requires specific techniques for field procedures and the evaluation of the data. Special attention will be given to mathematical approaches to transport processes. Proposed topics include:

1. mathematical models in tracer hydrology; and
2. tracer technologies for surface water; the unsaturated zone and vegetation; groundwater; sediment transport; catchment processes.

The corresponding convenor will be:

Chris Leibundgut
 Department of Hydrology,
 LA University,
 Werderring 4,
 D-7800 Freiburg,
 Germany
fax: +49 761 2033531; tel. +49 761 2033575

H5 Man's influence on freshwater ecosystems and water use: convened by ICSW with ICGW and ICWQ

This Symposium will focus on the impact of Man on the hydrological and chemical regime of rivers and on the resulting effects on water use and ecology. It will include the following topics:

1. biological responses to changes in flow and chemistry;
2. groundwater-surface water interactions; effects on quantity and quality;
3. water allocation;
4. eutrophication and generation of runoff;
5. waste water management; and
6. reservoir operation.

The corresponding convenor will be:

Geoffrey E. Petts
 Director of Environment Research
 and Management
 University of Birmingham
 Birmingham
 UK
(address from 1 January 1994)

H6 Modelling and management of sustainable basin-scale water resource systems: convened by ICWRS

This Symposium will cover new ideas and modelling methods as well as application examples for considering sustainable water resource systems at a basin scale. Contributions are invited in order to define criteria, report on modelling water quality and quantity and to report on recent developments of management aids. Proposed main topics of the Symposium are:

1. sustainable water quantity and quality management issues and examples: water use; reservoirs; monitoring water quantity and quality; management strategies; and
2. modelling of water quantity and quality: risk and uncertainty; validation of models; modelling tools; use of Geographic Information Systems; use of expert systems; decision support systems; integration of different tools.

The corresponding convenor for this Symposium will be:

S.P. Simonovic
 Department of Civil Engineering,
 The University of Manitoba,
 Winnipeg, Manitoba, Canada R3T 2N2.
fax: +1 204 261 8534

Participants who wish to present a paper at one of the above Symposia, the Proceedings of which

will be pre-published, should send a 300-400 extended abstract in English or French to the corresponding convenor for the respective symposium by *28 February 1994*. Notification of acceptance will be sent to contributors, with instructions for preparation of full papers, by *31 May 1994*; full papers should be submitted by *30 September 1994*.

Inter-Association Meetings at IUGG

An Inter-Association Symposium (J1) is being organized by IAHS and the International Association of Meteorology and Atmospheric Sciences (IAMAS) with the title: *Clouds, Convection and Land Surface Processes*. This is a contribution to the international GEWEX activities. Improvement of links between modelling the atmosphere and hydrology are of interest to IAHS and IAMAS as well as WCRP/GEWEX and IGBP/BAHC. Land surface parameterization in atmospheric models as well as interaction between clouds, convection and land surface processes will therefore be important issues in the Symposium. The Symposium and related Workshops (see below) have been approved by the Bureaux of IAHS and IAMAS; precise topics and areas to be covered will be specified by the convenors. The Symposium will be co-ordinated with WCRP/GEWEX, IGBP/BAHC, WMO, UNESCO and UNEP, as well as the relevant IAHS and IAMAS Commissions. The corresponding convenor for IAHS will be:

John Schaake
National Weather Service,
Office of Hydrology, W/OH3
1325 East-West Highway,
Silver Spring,
Maryland 20910,
USA.
fax: +1 301 713 0963

Co-convenor (IAMAS): Anne Henderson-Sellers,
Australia

Related Inter-Association Workshops are:

JW1 Remote sensing algorithms in hydrology:

JW2 Large-scale modelling of the hydrological cycle in mountain regions

JW3 Dynamic monitoring and estimation of the water balance of the globe and its continents

The following IAHS workshops will be held:

HW1 Spatial information systems in hydrology

HW2 Predictability, uncertainty and prejudice in hydrology

HW3 Hydrology and water resources of developing countries in the light of global change

HW4 Quality assurance in hydrological measurements

For future information on the IAHS meetings please contact:

Dr R. Hadley
3784 S. Depew Street
Denver, Colorado 80235
USA
tel.: +1 303 986 750;
fax.: +1 303 871 40 00 (c/o Dept. of Geography)

NEW PUBLICATIONS

IHP Publications

✓ □ **Report of the UNESCO/WMO/ICSU International Conference on Hydrology: Towards the 21st century: Research and Operational Needs.** The publication contains the report of this international conference, jointly convened by UNESCO, WMO and ICSU, which was held in Paris from 22 to 26 March 1993. English and French. 18 pp. + xvii pp. Available free of charge from the Division of Water Sciences.

Approximately every six years, UNESCO and WMO jointly convene an international conference to coordinate their hydrology and water resources activities. In view of the increasingly important role being played by non-governmental scientific and technical organizations in this field, the two conference convenors were joined by the International Council of Scientific Unions (ICSU) for this, the fourth such conference in the series. This international conference was opened in UNESCO, Paris on Monday 22 March, the day when the *World Day for Water* was celebrated for the first time.

The purpose of the conference was:

- To follow-up on UNCED (United Nations Conference on Environment and Development, Rio de Janeiro, June 1992) and its AGENDA 21.
- To offer a forum for the free exchange of views on the current status and future direction of hydrological sciences, operational hydrology, interdisciplinary activities involving hydrology, and related education, training and capacity building activities.
- To encourage the development of innovative proposals for future activities under international programmes in hydrology.
- To review past activities and propose long-term priorities in order to help draw up the agenda for the hydrological programmes of UNESCO and WMO and related activities under ICSU, as an aid to the coordination of the relevant programmes of the three bodies.

The Conference treated four themes: Hydrological Research, Operational Hydrology, Interdisciplinary Activities, and Education, Training and Capacity Building.

The report contains the text of the Resolution adopted by the UN General Assembly at its 47th Session declaring "22 March" of each year as *World Day for Water*, the *Paris Statement on Hydrology* adopted by the Conference and the four keynote papers on the above themes.

The full Proceedings of the conference will be published later.

□ **Education systems for hydrology technicians**, by Michael Bruen. IHP Technical Document in Hydrology. IHP-IV Project E-1-1. 77 pp. UNESCO 1993. English. Single copies free of charge from the Division of Water Sciences.

Based on data collected from a large number of regional and national training courses for hydrology technicians, an analysis has been made on how to assess training needs and plan human resources at the level of hydrology technicians. Various training systems have been described ranging from on-the-job training to formal continuous courses. For potential course organizers a logistics has been elaborated covering all organizational aspects. Case studies demonstrate applications. Advice is given on how to prepare, organize and execute the various forms of technician training.

Keywords : technician training, human resource planning, training requirements, on-the-job training, ad hoc courses, field training, classroom training, course logistics, course organization, course budget.

IHP-Related Publications

□ **Schwebstoff- und Geschieberegime der Donau. (Suspended sediment and bed-load regime of the Danube)** Co-ordinator: L. Rákóczi. Regional co-operation of the Danube countries within the IHP. 84 pp. ISBN 963 511 109 6, 1993. German + Russian with summaries and titles also in English. Free copies can be obtained from: Ms. E. Ribényi, Hungarian IHP/OHP Secretariat, Pf. 27, H-1453 Budapest, Hungary. Or: Mr D. Gutknecht, Institut für

Hydraulik, Wasserwirtschaft und Gewässerkunde der TU Wien, Karlsplatz 13, A-1040 Wien, Austria.

This publication is the first of four follow-up volumes to the work *The River Danube and its Basin - A Hydrological Monograph* compiled within the framework of the hydrological co-operation of the Danube countries and published in 1986.

The measured data of the sediment variation cover the period 1956 to 1985. During this period a great number of far-reaching anthropogenic changes of various kinds took place in the basin. The main purpose of the publication is to show the anthropogenic impacts in terms of changes on the sediment regime.

The publication describes the suspended sediment regime in the Danube observed at 20 gauge stations and, based on a smaller number of data, the bed-load regime including changes in grain-size distribution.

Keywords : *Danube, hydrology, suspended sediment, bed-load regime, grain-size distribution, anthropogenic influences.*

□ **Researches on Integrated Water Management in Urban Areas in Japan, No. II.** Research related to UNESCO's International Hydrological Programme in Japan, 1993. 177 pp. English. Available from: *Mr Y. Takahashi Faculty of Engineering, Shibaura Institute of Technology, Shibaura, Minato-ku Tokyo, Japan.*

This volume contains the following reports from the Japanese hydrologists as their contribution to IHP-IV Project H-5-1 (Humid Tropics Project) as edited by Mr Yukata Takahashi:

- The significance of improving water-use systems in modernization of paddy field regions in East Asia, by H. Shimura.
 - Modification of hydrometeorological conditions due to urbanization, by T. Ohata and K. Higuchi.
 - On the recent trend of river runoffs in Japan, by K. Takeuchi.
 - Preliminary study on deforestation on runoff regime based on multi-layers mesh model, by S. Ikebuchi.
 - Effects of urban stormwater infiltration systems and their evaluation, by K. Musiaka, S. Herath and S. Hironaka.
 - The evolving history of an urban water system. The case of Sapporo on the Toyohira River, by N. Tambo.
 - Changes in groundwater due to urbanization in Tokyo, by I. Kayane.
 - The cooling effect of the river and the canal on the micro-climate in urban areas, by K. Kan and Y. Takahashi.
- **Nordic Hydrology. An International Journal, Vol. 24, No. 2/3, 1993.** Selected Papers from 9th Northern Research Basins Symposium/Workshop, Nordic Association for Hydrology.
- The working group on **Northern Research Basins (NRB)** is a special programme within UNESCO's IHP. NRB was established in 1975 and since then symposia/workshops have been held every second year. Since these meetings are the only regular international ones dealing with snow, ice and cold climate in Northern basins, they are a forum for exchange of knowledge and experience and also of new ideas, since much research in progress is presented. Hydrological processes and modelling now dominate the symposia.
- This report contains the following papers, presented at the ninth Northern Research Basins Symposium which was held in North-Western Canada, 11-15 August 1993:
- Snowmelt runoff and total solids production in a discontinuous permafrost basin (E. Cacho).
 - Estimating evaporation using stable isotopes: quantitative results and sensitivity analysis for two catchments in Northern Canada. (J. Gibson, T. Edwards, G. Bursey and T. Prowse).
 - Numerical modelling of phase change in freezing and thawing unsaturated soil (H. Engermark and U. Svensson).
 - Kinematic model of river ice motion during dynamic breakup (M. Ferrick, P. Weyrich and D. Nelson).
 - Analysing hydrometeorological time series for evidence of climatic change (G. Kite).
 - Relocation of major ions in snow along the Tundra-Taiga Ecotone (J. Pomeroy, P. Marsh and L. Lesack).
 - Strength variability of major river-ice types (T. Prowse and M. Demuth).
 - Temporal variation in snowcover area during melt in prairie and alpine environments (K. Shook, D. Gray and J. Pomeroy).
 - Short- and long-term variability of snow albedo (J. Winther).
 - Runoff generation in a high boreal wetland in Northern Canada. (J. Gibson, T. Edwards and T. Prowse).

☐ **Wetlands and Ecotones.** *Studies on Land-Water Interactions.* Edited by B. Gopal, Anna Hillbricht-Ilkowska, and Robert G. Wetzel. English. 300 pp. © National Institute, New Delhi, 1993. Price US\$40. Available from: *International Scientific Publications, 50-B Pocket C, Siddhartha Extension, New Delhi 110014, India.*

This publication is based on selected contributions to the subject of wetlands and ecotones, most of which were discussed at an international Conference on Land-Water Interactions, organized in New Delhi, December 1991 by the National Institute of Ecology, with support from UNESCO (under IHP and MAB Programmes), SIL, IUCN, WWF, Asian Wetland Bureau. Whereas the majority of the papers came from the tropics, the processes in temperate zones are also evaluated in depth by some of the leading scientists.

The volume will be of interest to all wetland scientists, aquatic ecologists and all those interested in land-water ecotones, throughout the world.

☐ **Exchange Processes at the Land Surface for a Range of Space and Time Scales.** Edited by H.-J. Bolle, R.A. Feddes and J.D. Kalma. IAHS Publication N° 212 (published July 1993). ISBN 0-947571-53-1; 626 + xii pp; price \$80 (US). For orders and enquiries, see below.

The papers of this volume were presented at Symposium J3 which was a contribution of the hydrological atmospheric sciences to the IGBP Core Project BAHC and to the IHP Project H-1-1. The Symposium was convened during the joint international meeting of IAMAP and the IAHS in Yokohama, Japan, July 1993. It was organized in the recognition that large Global Change Programmes, such as the Core Project of the International Geosphere-Biosphere Programme (IGBP) on "Biospheric Aspects of the Hydrological Cycle(BAHC)", and projects such as the joint H-1-1/IAHS International Committee on Soil-Atmosphere-Vegetation Relations "Review of the scientific aspects of the interface processes of water transport through the atmosphere-vegetation-soil system at elementary plot, catchment and large grid-size scales" in the International Hydrological Programme of UNESCO, need close interdisciplinary and broad international cooperation to lead to a better understanding of these processes and the syntheses of scientific investigations which are on-going in many parts of the world.

The contributions span a broad scientific field. It is evident that there will be a great need for convergence towards the essential issues of these

international programmes in the future. In order to provide guidelines about the present status of planning in this area, two introductory papers set out the goals and implementation plans of the BAHC and H-1-1 projects.

☐ **Macroscale Modelling of the Hydrosphere.** Edited by W.B. Wilkinson. IAHS Publication N° 214 (published July 1993). ISBN 0-947571; 193 + viii pp. Price \$50 (US). For orders and enquiries, see below.

A keynote paper "Linked atmosphere-hydrology models at the macroscale" by C.J. Vorosmarty *et al.* introduces this volume - the proceedings of an international symposium held at Yokohama, Japan, in July 1993 during the joint scientific meeting of IAMAP and IAHS. The meeting was organized jointly by IAHS, UNESCO and WMO. The papers are divided into three topics:

- hydrological models
- land surface representation and sensitivity in GCMs
- intergrating hydrology and meteorology: data and models.

This is a newly emerging area of science and there are many scientific and technical problems to be overcome before full integration of atmospheric and hydrological models can be achieved at a macroscale. The 18 papers presented in this book are stepping stones towards this goal.

☐ **Hydrology of Warm Humid Regions.** Edited by John Stuart Gladwell. IAHS publication N° 216 (published July 1993). ISBN 0-947571-73-6; 510 + x pp.. Price \$75 (US). For orders and enquiries, see below.

The warm humid regions of the world are regions of intense population. It has been forecast that by the year 2000 at least one-third of the world's population will inhabit these regions. It is therefore important that water resources managers have the hydrological understanding and appropriate methods to cope with the water-related activities that will accompany the inevitable socio-economic and technical changes in these regions. One problem that cannot be overlooked is the susceptibility of the world's climate to improper forest management in the humid tropics.

This book comprises 45 papers presented at IAHS symposium H3 held at Yokohama, Japan in July 1993. The symposium was held during the joint assemblies of IAHS and IAMAP. The aim of the symposium was to focus on the research and practice of hydrology in the humid tropics and other warm humid regions of the world.

The papers are arranged in four sections:

- Hydrology and man's influence
- Special problems of tropical islands
- Urban problems in the tropics
- Groundwater in the tropics.

Orders and enquiries for the 3 above IAHS Publications to: IAHS Press, Institute of Hydrology, Wallingford, Oxfordshire OX10 8 BB, UK. Phone: +44 491 38800. Fax: +44 491 32256. Telex: 849365 hydrol g. Or: Office of the Treasurer IAHS, 2000 Florida Avenue NW, Washington, DC 20009, USA. Phone: +1 202 4626900. Fax: +1 202 3280566. Telex: 7108229300.

□ **Rencontres Hydrologiques Franco-Roumaines (Franco-Romanian Hydrological Gathering)** Proceedings of the Second Meeting held in Tulcea, Romania, 6-9 September 1993. A contribution of the French and Romanian National Committees to the IHP and IAHS, with the support of the French and Romanian Ministries of the Environment, and "Apele Romane". 143 pp. French/English. Secretariat: *Mr J.P. Carbonnel, Laboratoire de géologie appliquée, Université Pierre et Marie Curie, Case 123, 4 place Jussieu, 75252 Paris Cedex 05, France.* Or: *Mr Petru Serban, Apele Romane, Str. Edgar Quinet, sectorul 1, Bucuresti 70106, Romania.*

This publication contains the Proceedings of the meeting mentioned in the Regional Section of this Newsletter.

□ **A methodology for the assessment of surface resistance and soil water storage variability at mesoscale based on remote sensing**

measurements. A case study with HAPEX-EFEDA data. By W.G.M. Bastiaanssen, D.H. Hoekman and R.A. Robeling. July 1993. Report 38. Wageningen Agricultural University. This publication is a contribution to the International Committee on Atmosphere, Soil and Vegetation Relations of IAHS and IHP Projects H-1-1 (Review of the scientific aspects of the interface processes of water transport through the atmosphere-vegetation-soil system at an elementary, catchment and grid size scale) and H-2-1 (Study of the relationship between climate change and hydrological regimes affecting water balance components).

A new remote sensing algorithm has been tested with Normalized Difference Vegetation Index, surface albedo and surface temperature data obtained during the Thematic Mapper Simulator flight in the HAPEX-EFEDA field experiment (Hydrological and Atmospheric Pilot Experiment-Echival Field Experiment in a Desertification threatened Area). Its high spatial resolution allowed for a comparison of its results with soil moisture obtained from the moisture monitoring network. The microwave backscatter coefficient derived from AIRSAR data provided a possibility to compare the evaporation and topsoil moisture content. Having the surface energy balance instantaneously quantified in a distributed manner, it was finally possible (i) to inversely derive the surface resistance to evaporation from the latent heat flux and (ii) to study the (non-linear) relationship between surface resistance and soil water content at mesoscale for the Mediterranean climate in Spain. The monograph is available directly from: *Mr R. A. Feddes, Department of Water Resources, Wageningen Agricultural University, Nieuwe Kanall 11 / 6709 PA Wageningen, The Netherlands.*



FUTURE MEETINGS

International Symposium on Remote Sensing and GIS for Site Characterization - Applications and Standards

(San Francisco, USA,
27-28 January 1994)

The purpose of this symposium, convened by the US Geological Survey (USGS), with co-sponsorship by UNESCO, IAHS, IAH, among other organizations, is to bring together an inter-disciplinary and international group of engineers and scientists to:

1. Provide a forum for many professional disciplines to exchange experiences and findings related to the needs and methods for remote sensing, GIS, and maps, and the potential for standardization of some elements of each;
2. Learn from both successful and unsuccessful case histories;
3. Promote technology transfer between the various disciplines and countries represented; and
4. Provide an educational resource for those attendees who may be using, for the first time, the three elements (remote sensing, GIS and maps) that make up an overall land information system.

Topics will include engineering, geological and environmental applications of remote sensing and GIS technology, especially in relation to general state-of-the-art methods, applications, and standards. Plenary and poster sessions are being organized by an international programme committee to address the following topics:

- **Remote Sensing:** Applications to civil and geotechnical engineering, geological mapping and exploration, geological hazards, hydrology, environmental assessment, and monitoring. Papers related to data integration, new sensors, and emerging technologies will be desirable.
- **GIS:** Applications of GIS and related spatial information technologies. The use of desktop computer systems, the use of hardware and software, new applications, successes and problems, and the need for standardization.
- **Mapping:** Geological, hydrogeologic, soils, environmental engineering and waste management, quality standards and other

potential standards needs.

For more information, please contact:
*Symposium Chairman, Mr Vern Singhroy, Canada
Centre for Remote Sensing, 588 Booth Street,
Ottawa, Ontario K1A 0Y7, Canada. Phone: +1
613/947 1215. Fax: +1 613/947 1385.*

Northern Research Basins Tenth International Symposium & Workshop

(Spitsbergen, Norway,
28 August - 3 September 1994)

Purpose of Symposium and Workshop

In 1975, the IHP National Committees for Canada, Denmark, Finland, Norway, Sweden, the USA and the ex-USSR established a Working Group on Northern Research Basins (NRB) to encourage research on the hydrology of basins in northern latitudes where snow, ice and frozen ground play a dominant role. In 1992, Iceland joined the group. Nine so far highly successful symposia have been held in the various circumpolar countries: Edefors, Sweden (1975); Fairbanks, USA (1977); Quebec City, Canada (1979); Ullensvang, Norway (1982); Vierumaki, Finland (1984); Houghton, USA (1986); Ilulissat, Greenland (1988); Abisko, Sweden (1990) and Whitehorse-Dawson-Inuvik, Canada (1982).

Themes of the Symposium

Three general themes were identified for the 10th NRB at a meeting of the Chief Delegates held during the 9th Symposium and Workshop in Canada. They are:

- A. Basin hydrological processes with emphasis on:
 - The hydrological basis of water supply in permafrost areas;
 - Erosion and sediment transport in permafrost areas;
 - Transport of pollutants in Arctic hydrological systems.
- B. Hydrological and biological consequences of climate change in Northern catchments.
- C. Infiltration in frozen soils and subsequent runoff.

Reports from the 1992-94 Task Forces will also be presented. These have been:

- Review of methods and experiences with hydrometric measurements in Northern basins.
- Assessment of methods to link hydrological models with GCM output for Northern areas.

Call for Papers

Prospective participants should forward an abstract (approximately 200 words) by **15 January 1994**. Papers within the 3 general themes will be given priority. Authors of approved abstracts will be notified by **1 March 1994** and provided with an authors' set of instructions. Final papers are due **no later than 1 June 1994**. The papers will be published in a preprint, which will be available at the beginning of the symposium. Authors are also invited to submit their papers to a special issue of *Nordic Hydrology* on the 10th NRB.

Location

The participants will meet in Tromsø, Northern Norway, and go by plane to Longyearbyen, Spitsbergen. The Symposium and Workshop will be held in Spitsbergen in Ny-Alesund and Longyearbyen. Scientific excursions will be arranged at several locations.

Chief Delegates

- **Canada:** Mr Terry D. Prowse, National Hydrology Research Institute.
- **Denmark/Greenland:** Mr Thorkild Thomsen, Greenland Power Company.
- **Finland:** Mr Esko Kuusisto, National Boards of Waters and Environment.
- **Iceland:** Mr Jonas Eliasson, University of Iceland.
- **Norway:** Mr Knut Sand, SINTEF Norwegian Hydrotechnical Laboratory.
- **Russia:** To be appointed.
- **Sweden:** Mr Lars Bengtsson, Lund Technical University.
- **USA:** Mr Charles W. Slaughter, Institute of Northern Forestry.

Further Information

Participation is limited due to transport capacity. Priority is given to official delegates appointed by the Chief Delegates for the respective countries,

and to authors of approved papers.

Instructions for authors and second circular including preliminary programme, will be distributed on **1 March 1994**.

Please send abstract and preliminary registration scheme to: *Mr Knut Sand, SINTEF, Norwegian Hydrotechnical Laboratory, N-7034 Trondheim, Norway. Phone: +47 7 592300. Fax: +47 7 592376.*

XVIIth Conference of the Danube Countries on Hydrological Forecasting and Hydrological Bases of Water Management

**Budapest, Hungary,
5-9 September 1994**

This conference is convened by the Hungarian National Committee for IHP/UNESCO and OHP/WMO in cooperation with the Hungarian Ministry for Transport, Communication and Water, the Water Resources Research Centre Plc. (VITUKI), Budapest, the Office of the Mayor, Municipality of Budapest, UNESCO and WMO.

The Conference themes are the following:

- Methods of collecting, processing and disseminating hydrological data including aspects of hydrometry, standardization and regionalization.
- Methods of short-and long-range forecasting of water stages and discharges.
- Methodological and empirical experiences gained with the compilation of water balances; related aspects of climatic changes and fluctuations and of anthropogenic impacts.
- New solutions of sediment transport problems: analysis of the heat and ice regime.
- Basic aspects of water quality and the state of water bodies: aspects of environment protection and utilization of the biotopes of the Danube.

The working languages will be English and German. Simultaneous translation will be provided.

Experts from the Danube countries (Germany, Austria, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bosnia-Herzegovina, Yugoslavia, Romania, Bulgaria, Moldova, Ukraine) as well as of the countries with minor shares in the Danube Basin (Italy, Switzerland,

Poland, Albania) and all other interested countries and international organizations are invited to prepare original conference papers dealing with problems identified above as conference themes.

No registration fee will be charged for the XVIIth Danube Conference.

Central/East European Support Award

This Support Award will include modest accommodation and allowance, but will not include any international travel expenses. The number of Support Awards will depend on the success of the Organizer's efforts to obtain financial support from possible sponsors and is not yet known. Priority will be given to those members of the Scientific Board and first authors of Conference papers accepted for oral presentation who are citizens of the Central/East European Danube countries.

Conference participants are also encouraged to apply for travel and/or living expenses from national and international agencies and to inform the Organizer in the event of a successful outcome.

Any correspondence and communication related to the XVIIth Danube Conference should be directed to the Organizer: *Mr M. Domokos, Secretary, Hungarian IHP/OHP National Committee in VITUKI, H-1453, Budapest, Pf. 27. Phone: +361 215-6140/8160. Fax: +361 216 1514. E-mail: h6749BAL@ELLA.H.*

HYDROINFORMATICS

**Delft, The Netherlands
(19-23 September 1994)**

About the Conference

The Conference will provide a meeting point for users and developers of software for the support of consultancy, research and education in the areas of hydraulics, hydrology and environmental engineering. This bringing together of people and new ideas will be facilitated by moving away from the traditional system of concentrating on paper presentation and by focusing more on exhibitions, special demonstrations and round-table discussions. The discussions, in particular, will focus on immediately relevant topics and will explore the common ground between software users and developers. Greater attention will be given to practical experience obtained with informatics systems used as study-support tools.

Background information

The HYDROINFORMATICS Conference is a continuation of the earlier series of the HYDROCOMP Conferences. With the growing importance of the processing of information to and from modelling studies, the development of new simulation technologies and intelligent software support, the optimization of environmental systems through on-line control and the rapid development of information collection, processing and storage facilities, it was felt that the emphasis on computations had to be reduced so that it could be properly supplemented by an exchange of ideas on the full range of informatics developments. HYDROINFORMATICS was born and shaped through such developments and this first Conference will serve as a guide for those who are or will be exploring the full potential of the professional use of personal computers and work stations in water resources management and engineering generally.

Conference topics

The main conference topics are:

- Experiences with standard application-software products;
- Experiences with standard software-design products;
- Practical experience with expert systems and knowledge bases;
- Hydraulic and hydrological data bases;
- Developments in man-computer interfaces;
- Informatics support to field and laboratory data acquisition;
- New developments in simulation techniques, including neural networks and genetic algorithms;
- More general knowledge encapsulation technologies, including their foundation in semantics and semiotics;
- Real-time control and alarm systems;
- Education and training software tools.

Support

The Conference has been endorsed by the International Association for Hydraulic Research (IAHR), the Institution of Water and Environmental Management (IWEM), the Institution of Civil Engineers (U.K.) and UNESCO.

Exhibition

Particular attention will be given to the exhibition and demonstration of products supporting consultancy, research and education. These will include standard simulation packages for modelling 1-, 2- and 3-dimensional hydraulic and environmental systems. Generic real-time control and other decision-supporting tools will also be exhibited and demonstrated. The exhibition will further include the presentation of support software, such as data bases, GIS, expert systems, neural networks and software-development tool kits. In addition, informatics support to hydraulic experimentation, instrumentation and field data collection will be displayed. Many of the tools will be made available for hands-on working by conference delegates.

Conference Venue

The Conference will be held at the International Institute for Infrastructural, Hydraulic and Environmental Engineering at Delft, The Netherlands.

Call for Papers

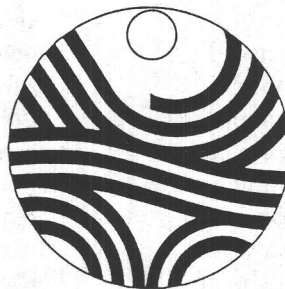
Authors are invited to submit papers in the English language of 6 or 8 pages of text, including figures, to the Conference Organizers

before **31 January 1994**. Instructions concerning the manuscripts will be faxed or mailed upon request. Each paper will be refereed by at least two members of the Advisory Committee. A selection of the papers will be collected in a bound volume of the Proceedings, distributed by an internationally-established Publisher. Other papers of good quality and abstracts will be reproduced in a special Conference Volume. All contributors will be given the opportunity to present their work personally. An early submission of an abstract of the paper will facilitate the selection process.

Important Dates and Deadlines

- 31 January 1994: Submission of papers
- 30 June 1994: End of period of registration at a reduced rate.
- 31 August 1994: Deadline for full inclusion in the list of participants.
- 18 September 1994: Welcoming of delegates.

For further information on the Conference, please write to: *Organizing Committee, HYDROINFORMATICS Conference, IHE, P.O. Box 3015, 2601 DA Delft, The Netherlands. Phone: +31 15 151 814/811. Fax: +31 15 122 921.*



IHP CALENDAR

IHP PROJECT	TITLE	CONVENER/PLACE/DATE
H-5-2	IAH XXIVth Congress: Hydrogeology of hard rocks	Committee of Norwegian Hydrogeologists & NHK on behalf of IAH Oslo, Norway 28 June-2 July 1993
M-3-2	International workshop on groundwater / surface water ecotones: Biological & hydrological interactions & management options	UNESCO (MAB/IHP)/IAHS Lyon, France 5-9 July 1993
H-1-1,H-2-1 H-5-1 & others	Fourth scientific assembly of the IAHS and Sixth scientific assembly of the IAMAP	IAHS/IAMAP/UNESCO/WMO Yokohama, Japan 11-23 July 1993
--	15th International congress on irrigation and drainage	ICID The Hague, Netherlands 6-11 September 1993
--	Franco-Romanian hydrological gathering	IHP-NCs France/Romania Tulcea, Romania 6-9 September 1993
M-2-3	Workshop on GIS for hydrology and water resources management in a changing environment (<i>for invited speakers only</i>)	Univ. of Cagliari/IHP Cagliari, Italy September 1993
E-5	Global forum on environmental education for sustainable development	UNESCO/Indian Env. Society New Delhi, India 24-28 September 1993
H-5-5	2nd International conference on FRIEND	German IHP/OHP-NC/UNESCO/ WMO/IAHS Braunschweig, Germany 11-15 October 1993
H-5-2	International symposium on water resources in karst areas with special emphasis on arid and semi-arid zones	Iran Min. of Energy/ UNESCO Shiraz, Iran 23-29 October 1993

H-5-1	South & East Asia regional symposium on-tropical storm and related flooding	China IHP-NC/UNESCO/ESCAP Guangzhou, China 22-25 November 1993
H-5-2	International workshop on groundwater monitoring and recharge in semi-arid areas	UNESCO/IAH/NGRI Hyderabad, India 18-20 January 1994
M-	International conference on efficient utilization and management of water resources in Africa	IAHR/Sudan/UNESCO Khartoum, Sudan 1-4 February 1994
H-3-1	International symposium on suspended particulate matters in rivers, estuaries and coastal waters	GKSS/UNESCO Hamburg, Germany 21-25 March 1994
H-1-2	International symposium on the state of the art in river engineering methods and design philosophies	Russian IHP-NC/UNESCO/ IAHR/IAHS/UNEP St. Petersburg, Russia 16-20 May 1994
M-3-3	Workshop on integrated water resources management in urban and surrounding areas	German IHP/OHP-NC/UNESCO Gelsenkirchen, Germany 28 May-1 June 1994
M-4-3	Symposium on water resources planning in a changing world	UNESCO/German IHP/OHP-NC Karlsruhe, Germany 28-30 June 1994
E-3-1	Workshop on post-graduate education in hydrology	Czech IHP-NC/ UNESCO/WMO/IAHS Prague, Czech Republic 29 August-2 September 1994
H-5-2	International symposium on flash floods in arid and semi-arid zones	China IHP-NC/UNESCO Xi'an, China early Sept. 1994
--	XVIIth Conference of the Danube countries	Hungarian IHP-NC/ UNESCO/WMO Budapest, Hungary 5-9 September 1994

H-5-5 H-5-6	International conference on development in hydrology of mountainous areas	Slovak IHP-NC/UNESCO High Tatras, Slovakia 12-16 September 1994
M-1-4	International symposium on runoff computation for water projects	UNESCO/Russian IHP-NC St. Petersburg, Russia 18-22 October 1994
H-5-2	IAH XXVth Congress: Management to sustain shallow groundwater systems	IAH Adelaide, Australia 21-25 November 1994
H-5-4	Second symposium on regionalization in hydrology	German IHP/OHP-NC Germany 1995
M-4-1 M-4-2	International symposium on environment and socio-economic consequences of water resources development and management	Russian IHP-NC/CASPY/UNESCO Moscow, Russia 15-20 May 1995
M-	IAH XXVIth Congress: Managing the effects of man's activities on groundwater	IAH Edmonton, Canada 4-10 June 1995
H-3-1	Conference on time scales of human loading and quality response of large water bodies	Swedish National Science Research Council Linkoping, Sweden August 1995
H-5-2	International symposium on hydrological research and water resources management in arid and semi-arid zones	UNESCO/IHP-NC Uzbekistan Tashkent, Uzbekistan September 1995
H-2-2	International workshop on water-related problems in low-lying coastal areas (HYDROCOAST '95)	Dutch/German IHP/OHP-NCs/ UNESCO/WMO/ESCAP/IAHS/IAHR (South-East Asia) 12-17 November 1995

LIST OF UNESCO-SPONSORED POSTGRADUATE COURSES IN HYDROLOGY AND WATER RESOURCES

The list below contains the UNESCO-sponsored postgraduate hydrology courses. The Division of Water Sciences supports a number of these courses financially and candidates may apply directly to the course organizer to request a fellowship or travel support. There are no other funds at UNESCO for individual hydrology fellowships except within the framework of UNESCO's Participation Programme for which requests can only be submitted by the National Commission for UNESCO of the trainee's country.

All requests for admission and fellowships or enquiries should be addressed to the course organizer and not to UNESCO.

Place	Subject of course	Duration	Frequency	L *	Deadline	Address
ANKARA (Turkey)	Sediment technology	4 weeks	annually begins mid-June	E	10 April	Dr Ergun Demiroz DSI Teknik Arastirma ve Kalite Kontrol Daiseri Baskanligi 06100 ANKARA
ARGENTINE: Buenos Aires, Santa Fé, Mendoza, San Juan	General hydrology with emphasis on the environment	6 months	Inquire	S	Inquire	Director del Curso Comité Nacional para el Programa Hidrológico Internacional Av. 9 de Julio 1925 - 15° Piso 1332 BUENOS AIRES
BARCELONA (Spain)	Groundwater hydrology	6 months	annually, begins in January	S	30 Sept.	Curso Internacional de Hidrología Subterranea Calle Beethoven 15, 3° 08021 BARCELONA
BELGIUM	Hydrology and hydrogeology <i>- French language programme</i>	10 months	annually, begins in October	F	1 Sept.	Professeur Dr. ir. A. Monjoie Directeur des Laboratoires de Géologie de l'Ingénieur, d'Hydrogéologie et de Prospection géophysique - Bâtiment B19 Faculté des Sciences appliquées Université de Liège SART TILMAN B - 4000 LIEGE
	<i>- English language programme</i>	1 or 2 years	annually, begins in September	E	1 Febr.	Interuniversity Postgraduate Programme in Hydrology (IUPHY) Programme Director: Prof. A. Van der Beken Vrije Universiteit Brussel Laboratory of Hydrology Pleinlaan, 2 B-1050 BRUSSELS

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BIRMINGHAM (United Kingdom)	Water resources engineering in developing countries	9 months	special announcements	E	Inquire	The Graduate School Secretary School of Civil Engineering University of Birmingham P.O. Box 363 BIRMINGHAM B15 2TT
BUDAPEST (Hungary)	Hydrology	6 months	annually, from January	E	30 Sept.	Dr. G. Kienitz Research Centre for Water Resources Development (VITUKI) International Postgraduate Course in Hydrology, P.O. Box 27 H-1453 BUDAPEST 92
CAIRO (Egypt)	Environmental hydrology for arid and semi-arid zones	2 months	annually, May-June	E	Inquire	Prof. Dr. Mostafa M. Soliman Course Manager International Course on Hydrology for Arid and Semi-arid Regions P.O. Box 5218 Heliopolis-West, CAIRO
CRICA (Central America and the Caribbean)	Changing subjects (for subject and date inquire with organizer)	several courses per year in diff. countries. Inquire.	annually	S	Inquire	Ing. Juan Luis Guzmán Coordinador General del CRICA Esc. Regional de Ingen. Sanitaria Univ. de San Carlos de Guatemala Ciudad Universitaria, Zona 12 GUATEMALA
DAR-ES-SALAAM (Tanzania)	Water resources engineering	18 months	annually, begins in October	E	1 May	Mr. F.W. Mtalo Disciplinary Area Coordinator for Water Resources Engineering P.O. Box 35131 DAR-ES-SALAAM
DELFT (Netherlands)	Hydrology, with specialization in: - surface water - groundwater - water resources management	11 or 18 months	annually starting in October	E	30 June	IHE Westvest 7 P.O. Box 3015 2601 DA DELFT
GALWAY (Ireland)	Hydrology	1 year	annually, begins in October	E	No deadline Apply early	Dr. K.M. O'Connor Department of Engineering Hydrology University College Galway GALWAY
GRAZ (Austria)	Groundwater tracing techniques	5 weeks	1995, 1997, etc. begins in August	E	15 April	Dr. H. Zojer Postgraduate Training Course on Groundwater Tracing Techniques Institute for Geothermics and Hydrogeology Elisabethstrasse 16/II A-8010 GRAZ
GUATEMALA	Hydraulic resources	1 week	annually; begins end September	S	Inquire	Ing. Arturo Pazos S., Director Escuela Regional de Ingeniería Sanitaria y Recursos Hidráulicos Facultad de Ingeniería Ciudad Universitaria, Zona 12 GUATEMALA CITY

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KENSINGTON (Australia)	Hydrology, covering principles, practice and applications of surface and ground water hydrology	3 months	annually, begins in March	E	December	Course Director Graduate Course in Hydrology School of Civil Engineering The University of New South Wales P.O. Box 1 KENSINGTON New South Wales 2033
LAHORE (Pakistan)	Water resources management. Various options: - post-graduate - M. Sc. - M. Phil	12 mo. 16-1/2 mo. 2 years	annually, begins in Sept.	E	30 June	The Director Centre of Excellence in Water Resources Engineering University of Engineering and Technology LAHORE 31
LAUSANNE (Switzerland)	Hydrology	15 months	annually, begins end Sept.	F	1 May	Cycle postgrade inter-universitaire en hydrologie et hydrogéologie EPFL-IATE CH-1015 LAUSANNE
NEUCHATEL (Switzerland)	Hydrogeology	15 months	annually, begins in October	F	1 May	Cycle postgrade inter-universitaire en hydrologie et hydrogéologie CHYN 11, rue Emile-Argand CH-2007 NEUCHATEL
LISBON (Portugal)	Operational hydrology	2 months	annually, begins mid-October	P	1 Sept.	Curso Internacional de Hidrología Operativa Direcção-Geral dos Recursos Naturais Av. Almirante Gago Coutinho, 30 1000 LISBOA
MADRAS (India)	Hydrology and water resources engineering	1 year	annually, begins mid-August	E	15 May	Centre for Water Resources College of Engineering Anna University 600 025 MADRAS
MADRID (Spain)	General and applied hydrology	6 months	annually, begins in January	S	30 June	Centro de Estudios y Experimentación de Obras Públicas Alfonso XII, Num. 3 MADRID 28014
MONASH (Australia)	Hydrology and water sciences	1 year	annually	E	Selection takes place in December	Course Director Dept. of Civil Engineering Monash University Clayton 3168 VICTORIA
MONTPELLIER (France)	Hydrogeology of fissured rocks	2 weeks	September	F	Inquire	CREUFOP (J.C. Legars) 99, Avenue d'Occitanie 34096 MONTPELLIER Cedex 5
MOSCOW (Russia)	1994: Hydrochemistry of surface water and pollution control. 1995: Scientific and engineering limnology.	2 months	annually, begins mid-June	E R	28 Febr.	International Higher Hydrological Course Geography Department Moscow State University Lenin Hills MOSCOW 119899

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NAIROBI (Kenya)	Hydrology	9 months,	annually begins September	E	15 July	The Principal, Institute for Meteorological Training & Research Dagoretti Corner Ngong Road P.O. Box 30259 NAIROBI
NANJING (China)	Hydrology (advanced)	2 months	Special announcements	E	Inquire	International Activities Office East China Technical University of Water Resources 1, Xikang Road NANJING 210024
NEWCASTLE- UPON-TYNE (United Kingdom)	(a) Hydrology (b) Water resources	1 year	annually, begins in October	E	31 May	The Registrar Department of Civil Engineering University of Newcastle-upon-Tyne NEWCASTLE-UPON-TYNE
OUAGA- DOUGOU) (Burkina Faso)	Wide range of subjects	1 to 6 weeks	Inquire	F	Inquire	Mr. le Directeur de l'EIER Ecole Inter-Etats d'Ingénieurs de l'Equipement rural B.P. 7023 OUAGADOUGOU 03
PADOVA (Italy)	Hydrology	6 months	Inquire	E	Inquire	Centro Internazionale di Idrologia "Dino Tonini" Via Sette Chiese 35043 MONSELICE
PRAGUE (Czech Republic)	Hydrological data for water resource planning	6 months	1994, 1996, etc., begins in February	E	Autumn	International Postgraduate Course in Hydrology Department of Water Resources Prague Agricultural University 160 21 PRAHA 6 SUCHDOL
ROORKEE (India)	Hydrology (and several addi- tional options)	1 year	annually, begins mid-July	E	31 March	Head of Department of Hydrology University of Roorkee ROORKEE 247667, U. P.
U.S.A.	Techniques of hydrologic investigations for international participants	2 months	annually, begins early June	E	31 March	U.S. Geological Survey Water Resources Division 436, National Center RESTON, Va. 22092, USA

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