

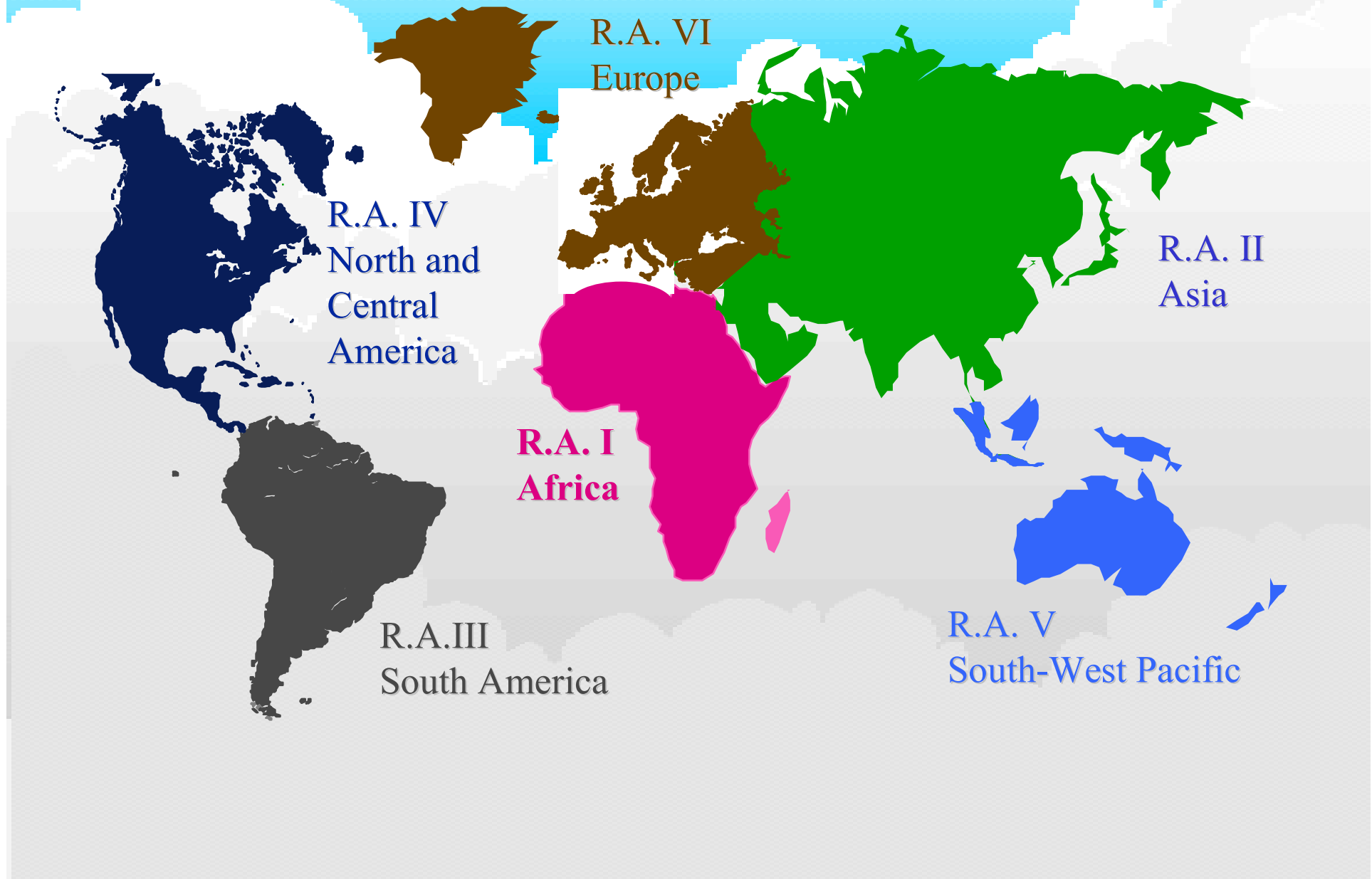


***World Meteorological Organization
Weather . Climate . Water***

World Meteorological Organization (WMO)

- ▶▶ Co-ordinates global scientific activities to allow increasingly prompt and accurate weather and water resources information for national, regional and international users.
- ▶▶ Successful policy of free and unrestricted exchange of meteorological data.
- ▶▶ Stressing the need for freely sharing hydrological information.

Regional Associations



WMO Programme Structure

World Weather Watch Programme

*World
Climate
Programme*

*Atmospheric
Research
and
Environment
Programme*




*Applications
of
Meteorology
Programme*

*Hydrology
and
Water
Resources
Programme*

Education and Training Programme

Regional Development and Co-operation

HYDROLOGY AND WATER RESOURCES PROGRAMME

-  **Concentrates on promoting world-wide cooperation in evaluation of water resources and development of hydrological networks and services**
-  **Concerned with the assessment of quantity and quality of water resources**
-  **Standardization of all aspects of hydrological observations and organized transfer of hydrological techniques**



Programme structure

The Programme is implemented through five mutually supporting components:

- **Programme on Basic Systems in Hydrology (including HOMS and WHYCOS)**
- **Programme on Forecasting and Applications in Hydrology**
- **Programme on Sustainable Development of Water Resources**
- **Programme on Capacity Building in Hydrology and Water Resources**
- **Programme on Water-related Issues**

Programme on Basic Systems in Hydrology



Aim: supports NHSs in the collection, transmission and storage of data, the implementation of the Hydrological Operational Multipurpose System (HOMS), and the development of the World Hydrological Cycle Observing System (WHYCOS).

Programme on Forecasting and Applications in Hydrology



Aim: promotes hydrological modelling and forecasting and the application of hydrology in studies of global change.

The programme mounts activities in support of water resources development and management, hazard mitigation, studies of climate change and environmental protection

Programme on Sustainable Development of Water Resources



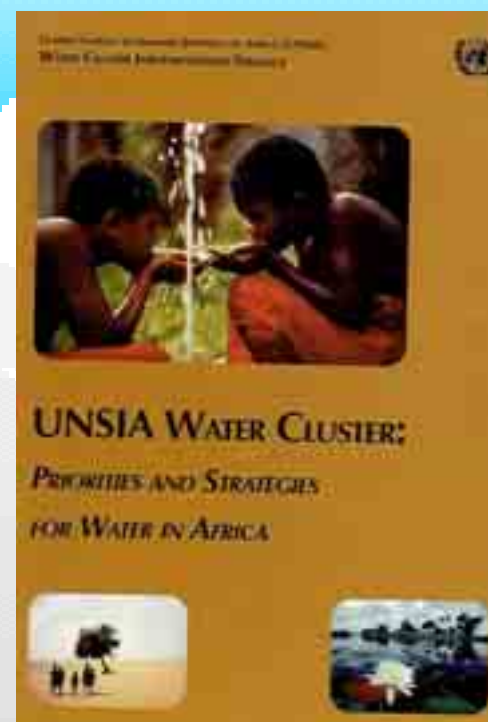
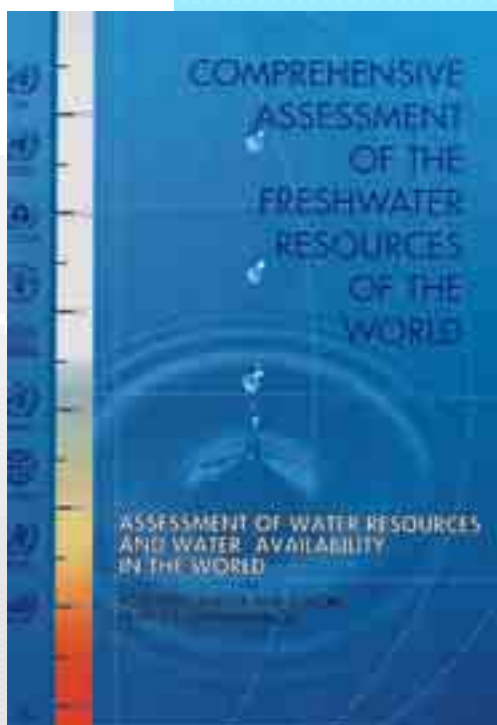
Aim: encourages the full participation of Hydrological Services in the national planning and implementation of actions consequent to the relevant recommendations of UNCED and the Special Session of the UN General Assembly (1997).

Programme on Capacity Building in Hydrology and Water Resources



Aim: provides a framework by which NHSs can seek advice and assistance and provide support to efforts to build their capacities to serve their nations.

Programme on Water Related Issues



Aim: maintains WMO's important role in international activities relating to water-resource assessment and hydrological forecasting and the Organization's collaboration with other agencies within the UN system.

Fresh Water a finite resource

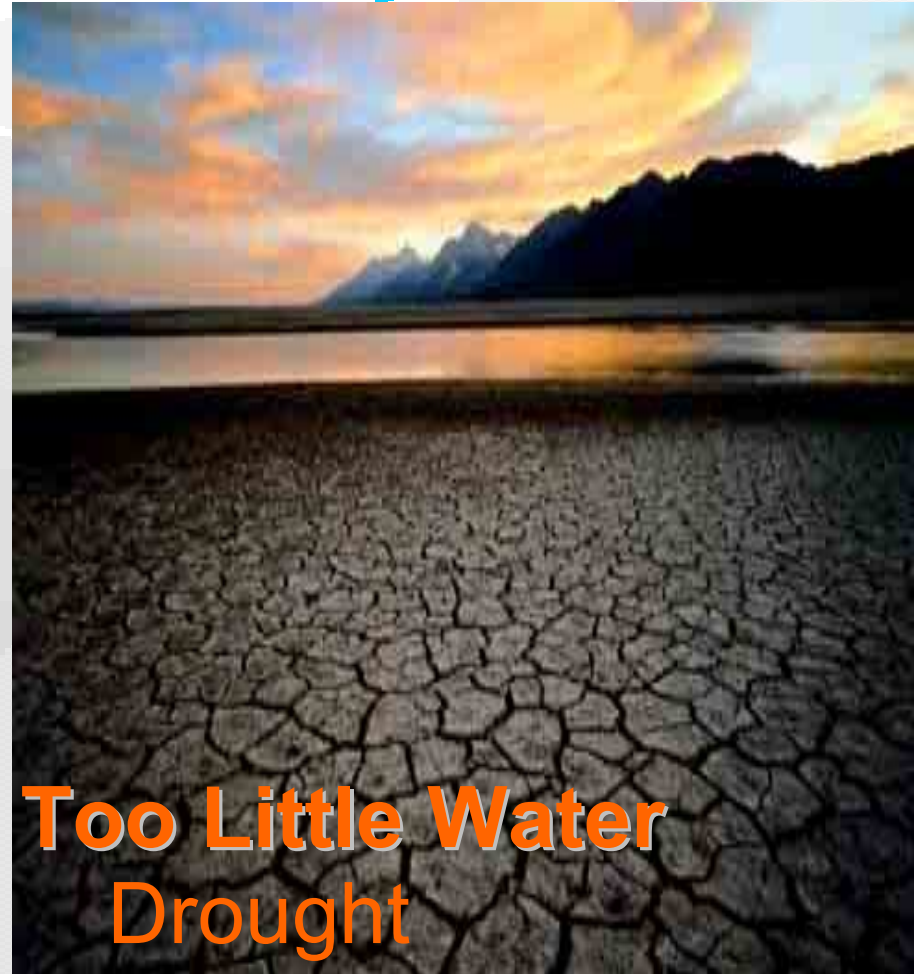
Major Issues in Water Resources Management

- 
- ✦ Increase in demand
 - ✦ Increasing pollution
 - ✦ The uncertain threat of climate change
 - ✦ Dwindling hydrological networks and databases
 - ✦ Potential conflicts between countries that share river basins or aquifers
 - ✦ Lack of resources for capacity building in developing countries
 - ✦ The need for integrating the scientific, management and political aspects.

**The problem with water resources management
is the unpredictability of water**



Too Much Water
Floods



Too Little Water
Drought

WHYCOS

World

Hydrological

Cycle

Observing

System

WHAT IS WHYCOS

- ▶▶ A system for building the capacity of water resources management at the national, river basin, regional and global levels
- ▶▶ A system that aims at promoting cooperation in the collection, transmission, processing, archiving and use of hydrological data and information

WHYCOS – Background

- ▶▶ In 1993, in response to the recommendation of Agenda 21 chapter 18 and the recommendations of UNDP/WB project on Hydrological Assessment for SubSaharan countries, WMO developed the WHYCOS concept.
- ▶▶ In 1995 the first project was developed with financial support from the WB (Med-HYCOS).
- ▶▶ In 2004 more than twenty projects at various stages of development.

Objectives

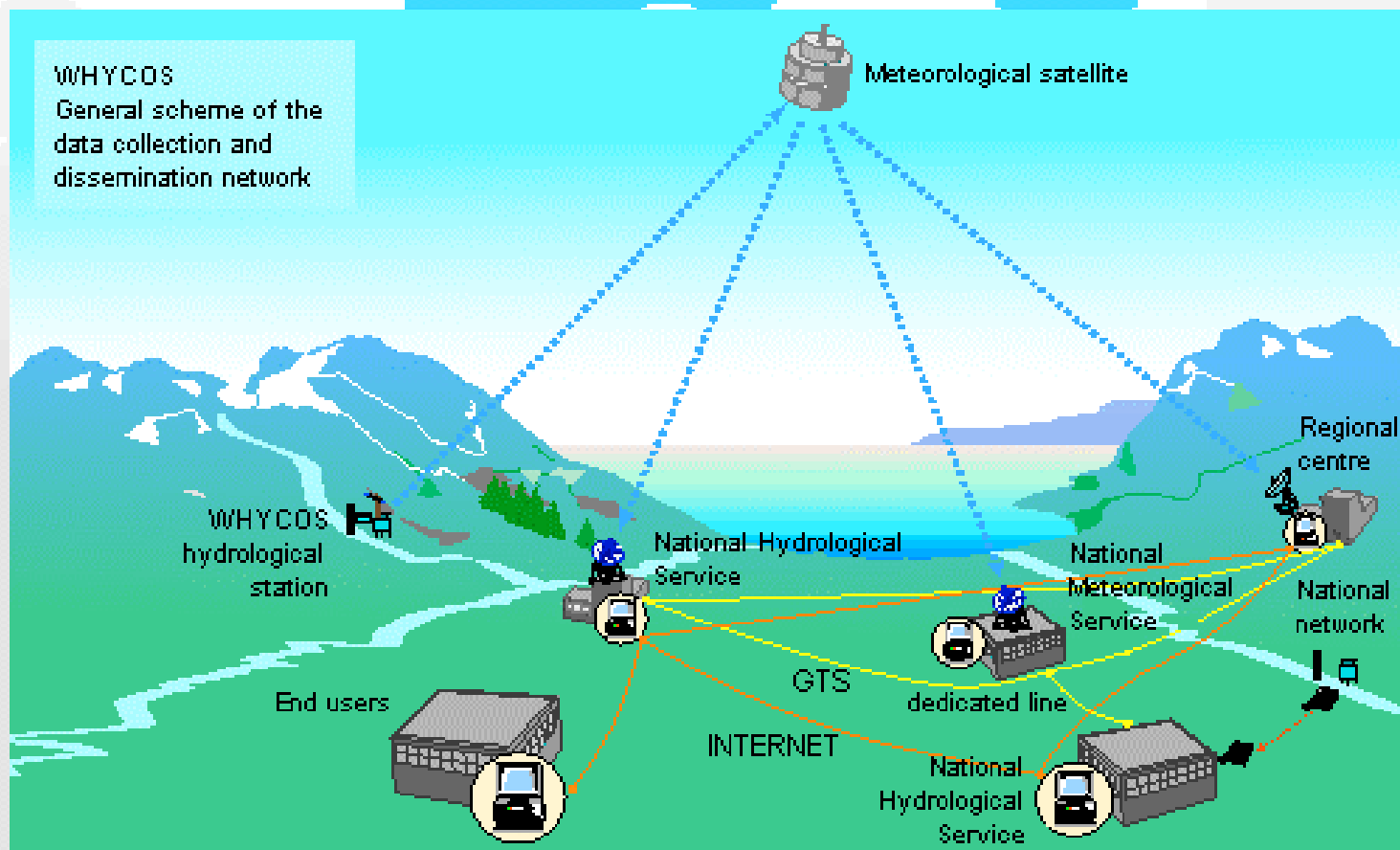
- ▶▶ Strengthen technical and institutional capabilities of Hydrological Services. (Short Term)
- ▶▶ Promote and facilitate dissemination and use of water-related information. (Short Term)
- ▶▶ Strengthen Regional and International cooperation. (Long Term)
- ▶▶ Establish a global network of key National stations. (Long Term)

WHYCOS – The Structure

- ★ WHYCOS consists of a number of regional components, each independently implemented and response to National and Regional needs.

WHYCOS

Scheme of data collection and dissemination network



•*List of variables which could be provided by a DCP*

Environmental variables	Frequency of measurement per day
1. Water level	1 to 6 (depending on size of river)
2. Water pH	1
3. Water conductivity	1
4. Water temperature	1
5. Dissolved oxygen	1
6. Turbidity	1
7. Air temperature	8 (synoptic hours)
8. Rainfall	24, plus daily total
9. Relative humidity	8 (synoptic hours)
10. Wind speed	8 (synoptic hours)
11. Net radiation	8 (synoptic hours)
Housekeeping variables	Frequency of measurement per day
12. Battery voltage	1
13. Solar panel voltage	1
14. Memory status	1
15. Temperature inside instrument housing	1

Project status

- Implemented projects (external funding ended)
MED-HYCOS, SADC-HYCOS (ph. 1) AOC-HYCOS (pilot)
- Projects under implementation
Niger-HYCOS, Volta-HYCOS, SADC-HYCOS (ph. 2)
- Advanced development stage
Carib-HYCOS and IGAD-HYCOS
- Preparatory stage for implementation
HKH-HYCOS, Mekong-HYCOS, Aral-HYCOS, Baltic-HYCOS, Pacific-HYCOS
- Conceptual stage
Nile-HYCOS, Amazon-HYCOS, Arctic-HYCOS, Black Sea-HYCOS, Caspian-HYCOS, Danube-HYCOS, La Plata-HYCOS, Victoria-HYCOS
- Under consideration
Lake Chad-HYCOS, Senegal -HYCOS

Med-HYCOS (1997 - 2001)

(completed)

- 31 Data Collection Platform (DCPs)
- Establishment of Regional Data Base
- Creation of Regional web site
- Training of nationals
- Strengthened cooperation among NHSs



Map Table Graph

DCP Station

S.Samuele Di Cafiero

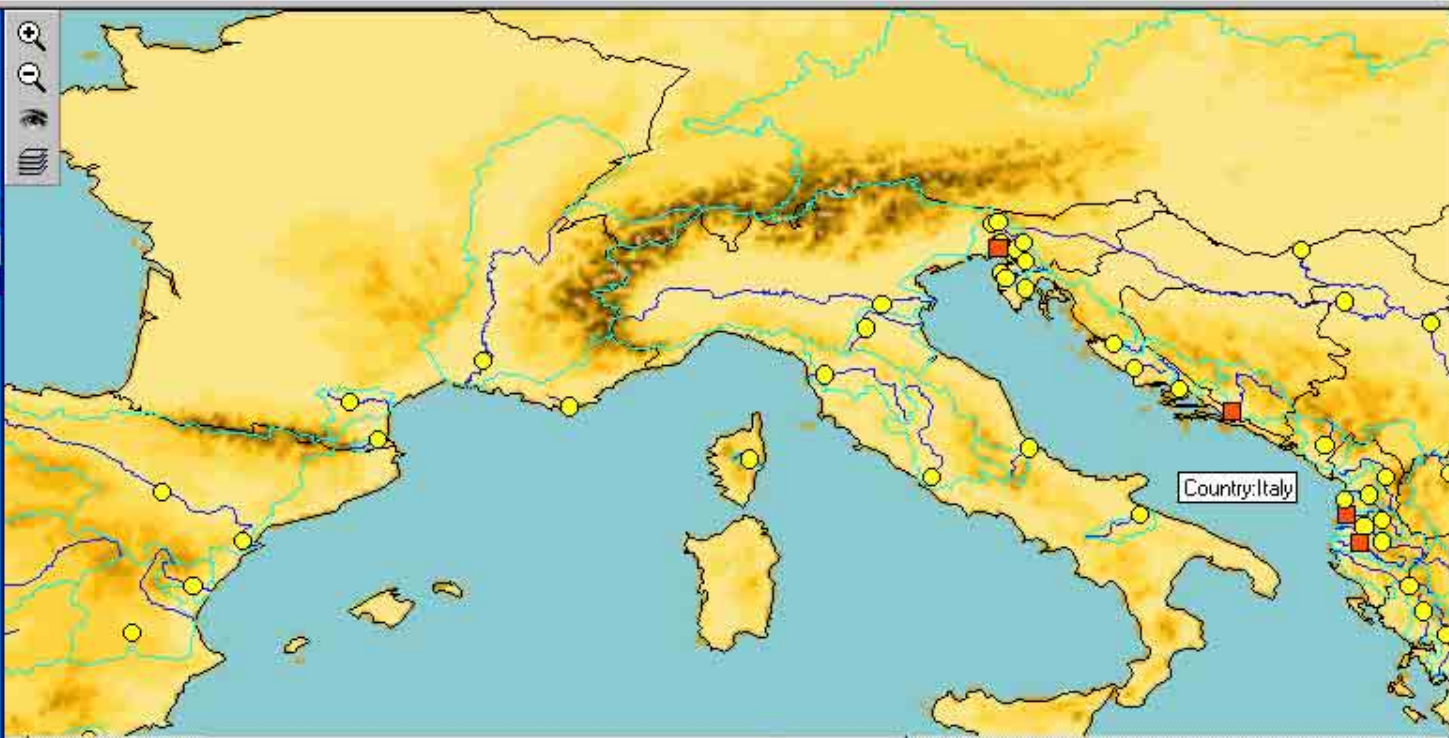
Geographical Info

Latitude	N 41°15'00"
Longitude	E 16°03'00"
Altitude [m]	31.73
River	Ofanto
Basin	Ofanto
Country	Italy

General Info

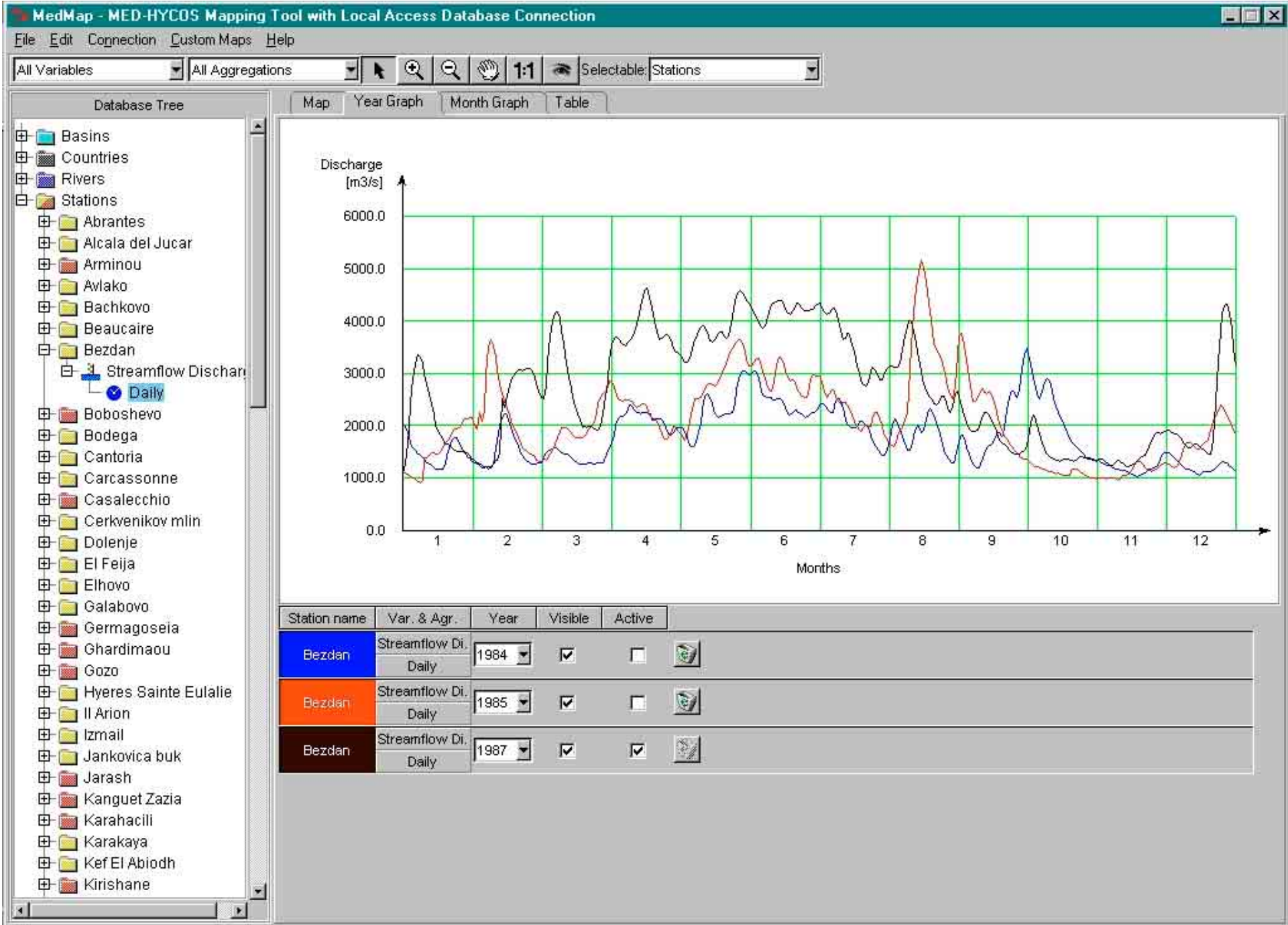
Station ID	000028
Eumetsat ID	16259.
River Outlet	Adriatic Sea
Station Owner	Ufficio Idrografico et Mareografico di parma
Basin Surface	2716
Start of working	1930
Hydrologic Conditions	Natural
Hydraulic Regime	Flash floods

Station Equipment
Foot bridge in metal structure projecting over the river with a hydrometrographic installation at its end; cable-way for discharge measurements and sampling of suspended sediment, sheltered in a brick cabin



Available Data

Variable	Aggregation Level	Start	End	Download	Table	Graph
Air Temperature	Hourly	11-MAY-00	28-MAY-00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rainfall	Hourly	11-MAY-00	28-MAY-00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Streamflow Discharge	Daily	01-JAN-30	31-DEC-94	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Streamflow Discharge	Monthly	01-JAN-30	01-DEC-88	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Water Level	Hourly	11-MAY-00	28-MAY-00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Water Temperature	Hourly	11-MAY-00	28-MAY-00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



SADC-HYCOS (1998 - 2001)

Ph.I (completed)

- 43 Data Collection Platform (DCPs)
- Establishment of Regional Data Base
- Establishment of HYDATA database in participating SADC countries
- Creation of Regional web site
- Establishment of e-mail links with countries
- Training of Nationals

Station attributes

STATION SAVE GORGE
COUNTRY ZIMBABWE
BASIN SAVE
RIVER SAVE
LONGITUDE 32.31
LATITUDE -21.22
ALTITUDE 22

Add to profile

Map access

Download

Photo

Description

Bibliography

Draw graph

Battery voltage

Pannel current

Available Data

Language

Previous page

MAIN MENU

Next page

Stations

water level

discharge

conductivity

water tem.

rainfall

air temp.

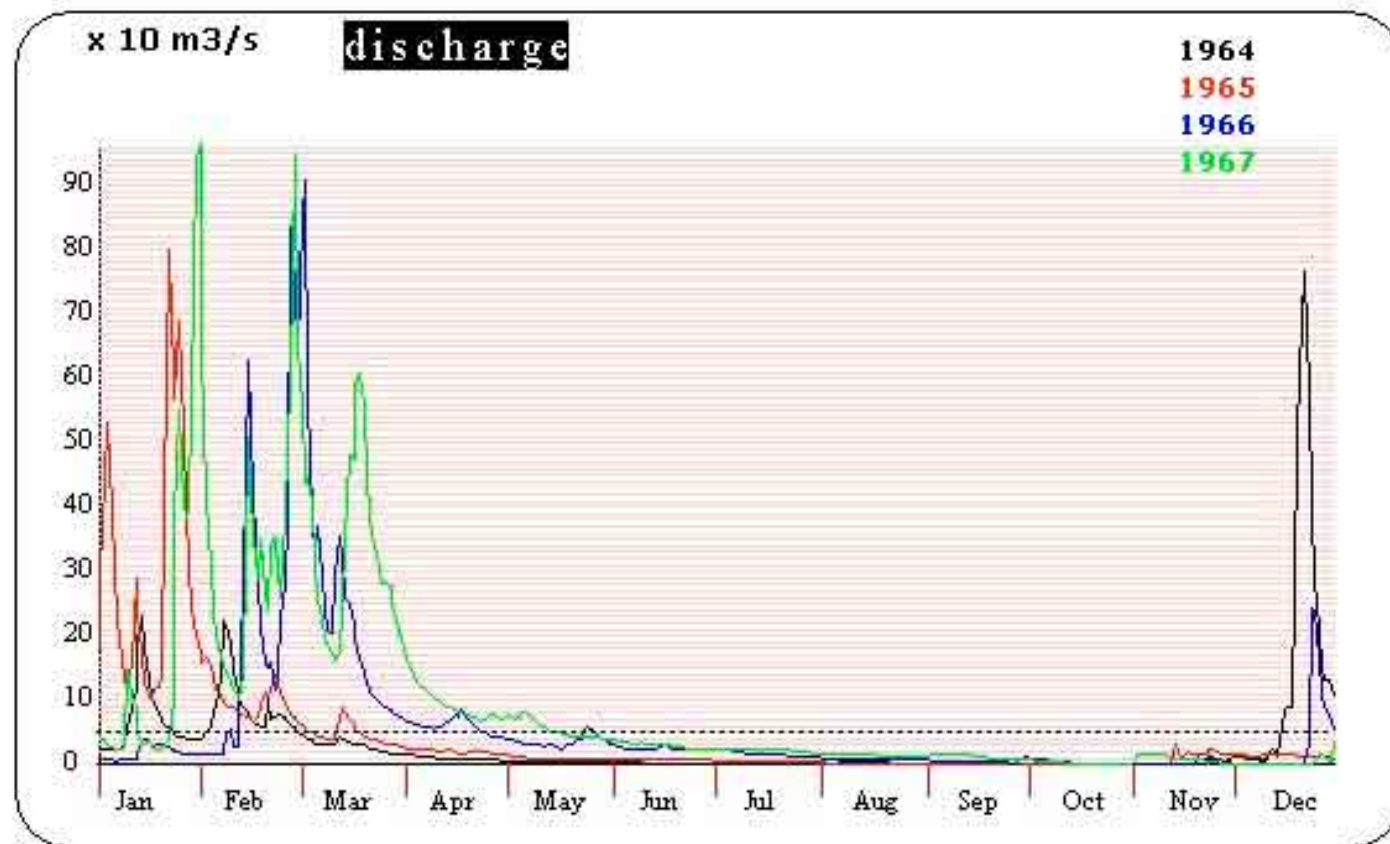
turbidity

wind

humidity

radiation

ETP



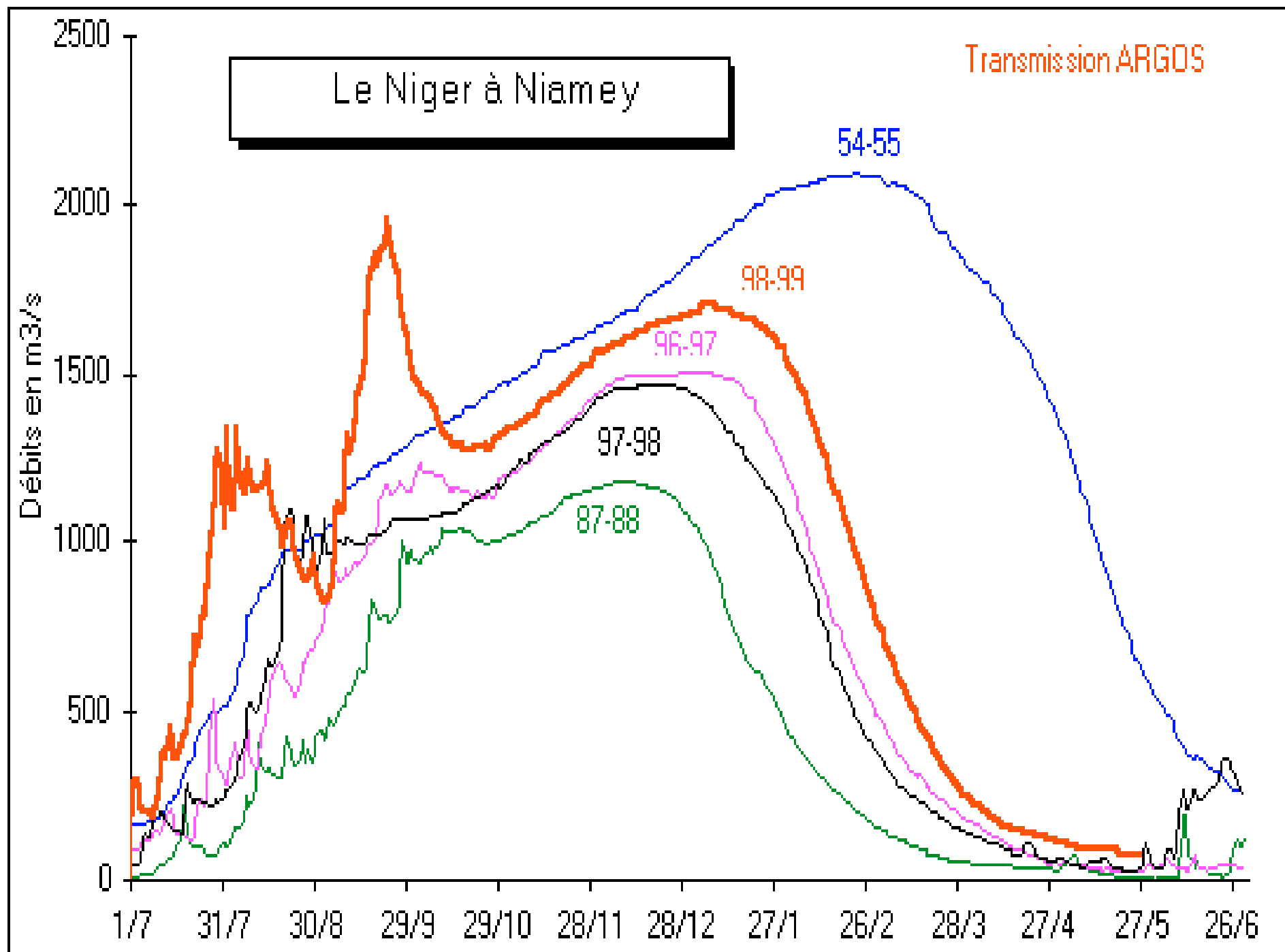
Maxi 964,50 m³/s 1/31/67

Initial month

No months

AOC-HYCOS (1999 - 2002) – Pilot Phase (completed)

- Establishment of Regional Data base
- Creation of Regional web site
- Establishment of e-mail links with countries
- Support of data collection activities in the participating countries
- Training of Nationals



SADC-HYCOS phase II

(under implementation)

- An "Implementation Document" for phase II has been prepared by the WMO Secretariat.
- The project's second phase, which would last four years will start soon.
- It will aim at Consolidation/redesign of the regional observation network
- Expanding the network to about a hundred hydrological stations, of which fifty should be Data Collection Platforms (DCPs) with telemetry capabilities.
- The cost of the project is US\$ 4.5 million.

SADC-HYCOS phase II (under implementation)

- Funding has been secured through the Netherlands Government (main project components) and the European Union (support to the Project Management Unit, located in DWAF).
- WMO's role will be to "oversee and facilitate the implementation of the project, and to provide technical assistance where required".
- WMO is member in the Regional Steering Committee (RSC).
- The first meeting of the RSC was held in May 2004 to discuss the recruitment of the project manager and the technical staff and to agree on the arrangements for signing the funding agreements for SADC, DWAF and WMO with The Netherlands.

Volta-HYCOS

(under implementation)

- A project document for Volta-HYCOS has been prepared and made available in September 2002 to the NHSs of the major stakeholders of the river basin (Burkina Faso and Ghana) for first comments.
- Heads and experts of the two NHSs have met in Accra in October 2002 and suggested amendments to the draft project document to be incorporated in the proposal.
- The amended draft proposal was made available in English and French and circulated to all countries of the river basin.

Volta-HYCOS

(under implementation)

- The Fonds Français pour l'Environnement Mondial (FFEM, the French GEF) will fund the project with € 1,000,000.00
- An agreement with the FFEM for funding the project and entrusting to WMO the supervision of the project implementation will be signed in early November 2004
- A further agreement shall be signed between WMO and EIER (L'Ecole Inter-Etats d'Ingénieurs de l'Equipement Rural, Bukina Faso) for hosting the PRC

Niger-HYCOS

(under implementation)

- The WMO Secretariat with support of a consultant from IRD has prepared the first draft of Niger-HYCOS.
- A first draft was discussed during the meeting of the HYDRONIGER Technical Committee, held in Niamey in May 2002.
- The Project Document has been updated accordingly (end of November 2002).
- The French Development Agency (AFD) has committed an amount of 3.00 million Euros for the Niger-HYCOS.

Niger-HYCOS

(under implementation)

- An agreement between NBA and AFD has been signed on 9th April 2004.
- NBA would be the Implementing Agency for the Niger-HYCOS and WMO would be the Supervising Agency.
- The preparatory phase is due to start soon

IGAD-HYCOS

(advanced development)

- Preparatory phase completed with financial support from EC.
- Detailed project document prepared and circulated for possible funding for the implementation phase.
- EC expressed interest on funding the implementation phase.
- IGAD is negotiating with EC project funding under the 9th DF contribution agreement.

HKH-HYCOS

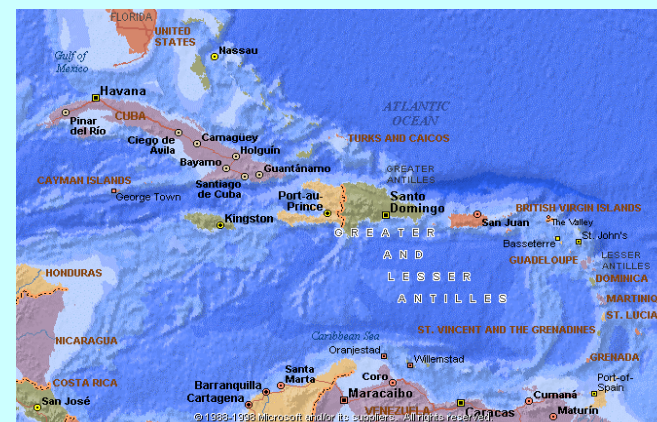
(advanced development)

- High-level consultative meeting has been held in 2001
- A consultative panel meeting in 2002.
- A second high level meeting held in Kathmandu in March 2003 endorsed the project proposal.
- Country consultations are being undertaken jointly by WMO and ICIMOD.
- In parallel a data transmission and information dissemination strategy will be developed in cooperation with the donors.
- A third high level meeting is planned to be held in late 2004 to endorse the final project document.

Carib-HYCOS (advanced development)



Carib-HYCOS



- ❖ In consideration of the different hydrological conditions and national priorities, CARIB-HYCOS is being developed in the form of two components;
- ❖ One covering the continental countries and the other the Islands States.
- ❖ The proposals were presented to and endorsed by the tenth session of the Caribbean Meteorological Council in December 2000.

Current status

Preparatory Stage for Implementation

- A joint mission from WMO and Institut de Recherche pour le Développement (IRD) has been carried out in March 2002 to promote the project in the region.
- On the basis of the outcome of this mission, WMO prepared a project document.
- Recently WMO prepared project document in collaboration with IRD in a format inline with donor demand.
- A workshop to discuss this new document among representative of all concerned countries is tentatively planned in Martinique towards end 2004.
- The Regional Government of Martinique is cooperating with IRD and WMO to organize the workshop and the project implementation.

Projects in preparatory stage for implementation

Project proposal available,

- Mekong-HYCOS
- Baltic-HYCOS (not retained by EC - 5FP)
- Pacific-HYCOS

Project in conceptual stage

Countries committed towards project development, project brief developed in cooperation with WMO

- Nile-HYCOS,
- Amazon-HYCOS,
- Aral-HYCOS,
- Arctic-HYCOS,
- Black Sea-HYCOS,
- Caspian-HYCOS,
- Danube-HYCOS,
- La Plata-HYCOS,
- Victoria-HYCOS

Projects under consideration

Request received from countries or regional bodies to support project formulation

- Lake Chad-HYCOS
- Senegal -HYCOS

Comprehensive Report on the Status of HYCOS Projects - Conclusions

General

- WMO: ownership of the WHYCOS programme
- Countries: ownership of the HYCOS components

Project development and implementation

- Demand driven
- Clear data exchange policy from project beginning
- Ensure countries' commitment through MoU
- Choose appropriate technology
- Identify products to be developed from project beginning
- More emphasis on capacity building

Development of a HYCOS project

- ✓ Request stage (Countries, Regional bodies)
- ✓ Concept stage (Countries, Regional bodies, WMO)
- ✓ Proposal stage (Countries, Regional bodies, WMO, (Donors))
- ✓ Project Implementation stage
 - ✓ Preparatory stage (Countries, Regional bodies, WMO, Donors)
 - ✓ Field implementation (Countries, Regional bodies, WMO, Donors)
- ✓ Maintenance and operation (Countries)

Sustainability

- Commitment by the participating countries
 - MoU with PRC
 - Benefits for the countries
- Robustness
 - Choice of the appropriate technology
- Capacity Building
 - On all project elements (station, databases, web, products)
 - Proper timing during project implementation

Governance and Management

- Steering Committee
- National Implementation Agencies (NHSs)
- Project Implementation Agency (PRC, PMU)
- Executing Agency (regional body)
- Supervising Agency (WMO)

Policy issues

- Data and Information Exchange
 - Implementation of Res. 40 (Cg-XII) and Res. 25 (Cg-XIII)
 - Data on the project web site
- Collaborating Centres
 - Support project development and formulation, technical support during implementation

HYCOS Projects - Future Plan 2005

- Follow up the implementation
Niger-HYCOS, Volta-HYCOS, SADC-HYCOS (ph. 2)
- Further work to ensure financial support
Carib-HYCOS and IGAD-HYCOS
- Work towards advanced stage
HKH-HYCOS, Mekong-HYCOS, Aral-HYCOS and Pacific-HYCOS
- Work towards conceptual stage
Lake Chad-HYCOS, Senegal -HYCOS

THANK YOU

