World Meteorological Organization

Working together in weather, climate and water

Weather • Climate • Water

Introduction to WMO Commission for Hydrology (CHy) activities to support DRR

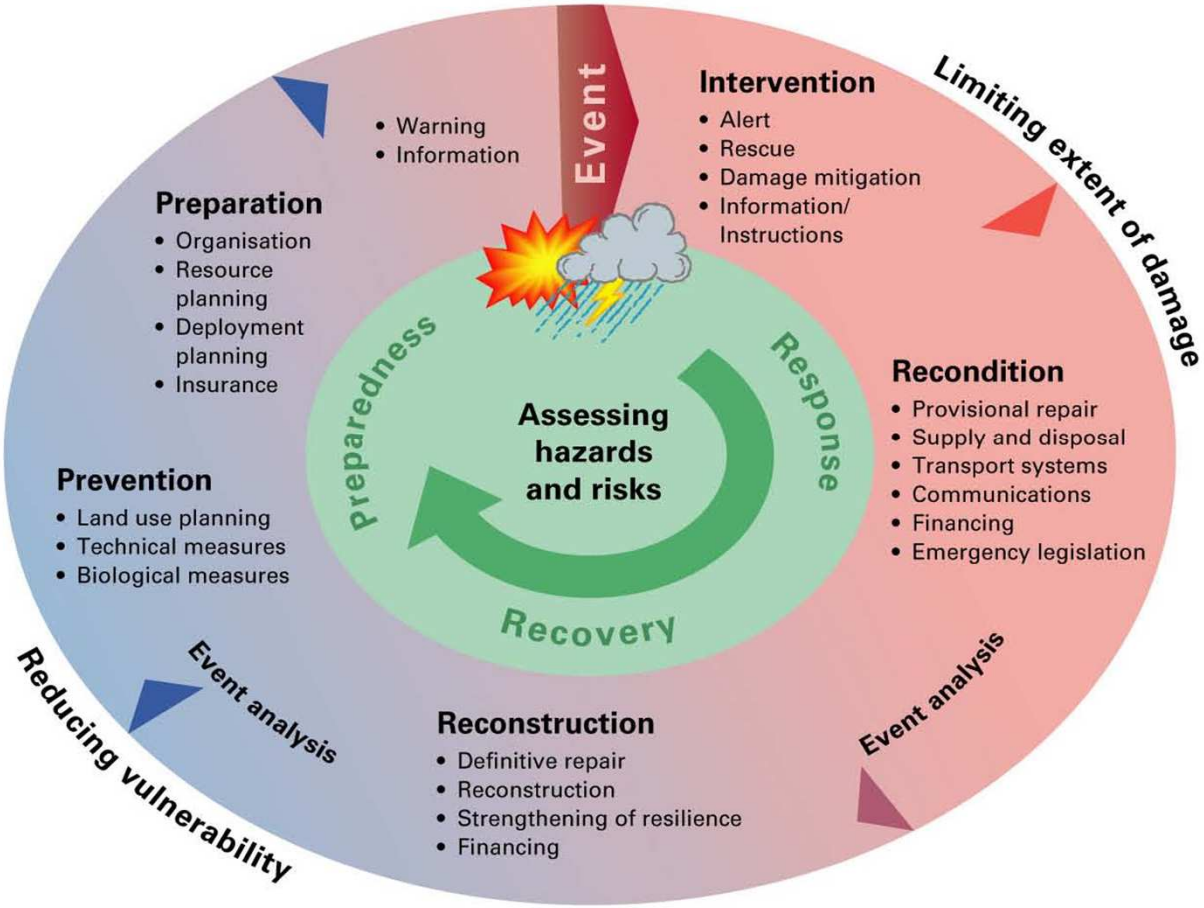
2015 Meeting of the Disaster Risk Reduction Focal Points of WMO Regional Associations, Technical Commissions and Programmes (DRR FP RA-TC-TP)

3-5 November 2015, Geneva

Dr Yury Simonov, Senior Researcher, Hydrological Forecasts Department Hydrometeorological Centre of Russia, DRR Focal Point of CHy

Mr Johnson Muturi Maina, Kenya Meteorological Department, DRR Focal Point of CHy

Hydrological hazards



source: Swiss Federal Office for Civil Protection
A. Calver (2013)

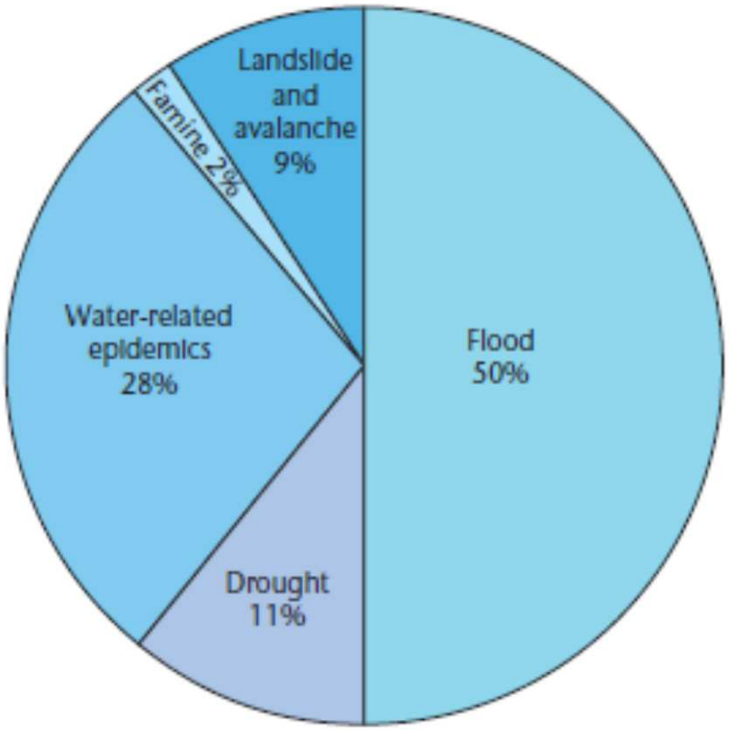
Hydrological setting

- Hydrological extremes are plainly crucial – floods and droughts; and overall hydrological characterisation is also important in terms of background to other hazards

- Risks are to health and safety, water and food supply, mobility, power and industrial functioning, environmental concerns

- Hydrological disasters have both fast and slow run-in times, and recovery times vary; sequences of events can be important

Flood related disasters - overview



Types of water-related natural disasters
(UNESCO World Water Assessment Program)

Facts:

- Floods threaten human life and property worldwide - floods account for 15% of all deaths related to natural disasters.
- Floods can occur anywhere after heavy rain – all flood plains are vulnerable and heavy storms cause flash flooding in any part of the world.
- Flooding is a chronic natural hazard with potentially devastating consequences, giving rise to a third of all losses due to natural events.
- The risks and cost of floods are likely to increase due to global social and environmental change.

Key flood risk activities

Key flood risk activities

Short-term flood forecasting

Longer term flood frequency estimation

Inundation extent

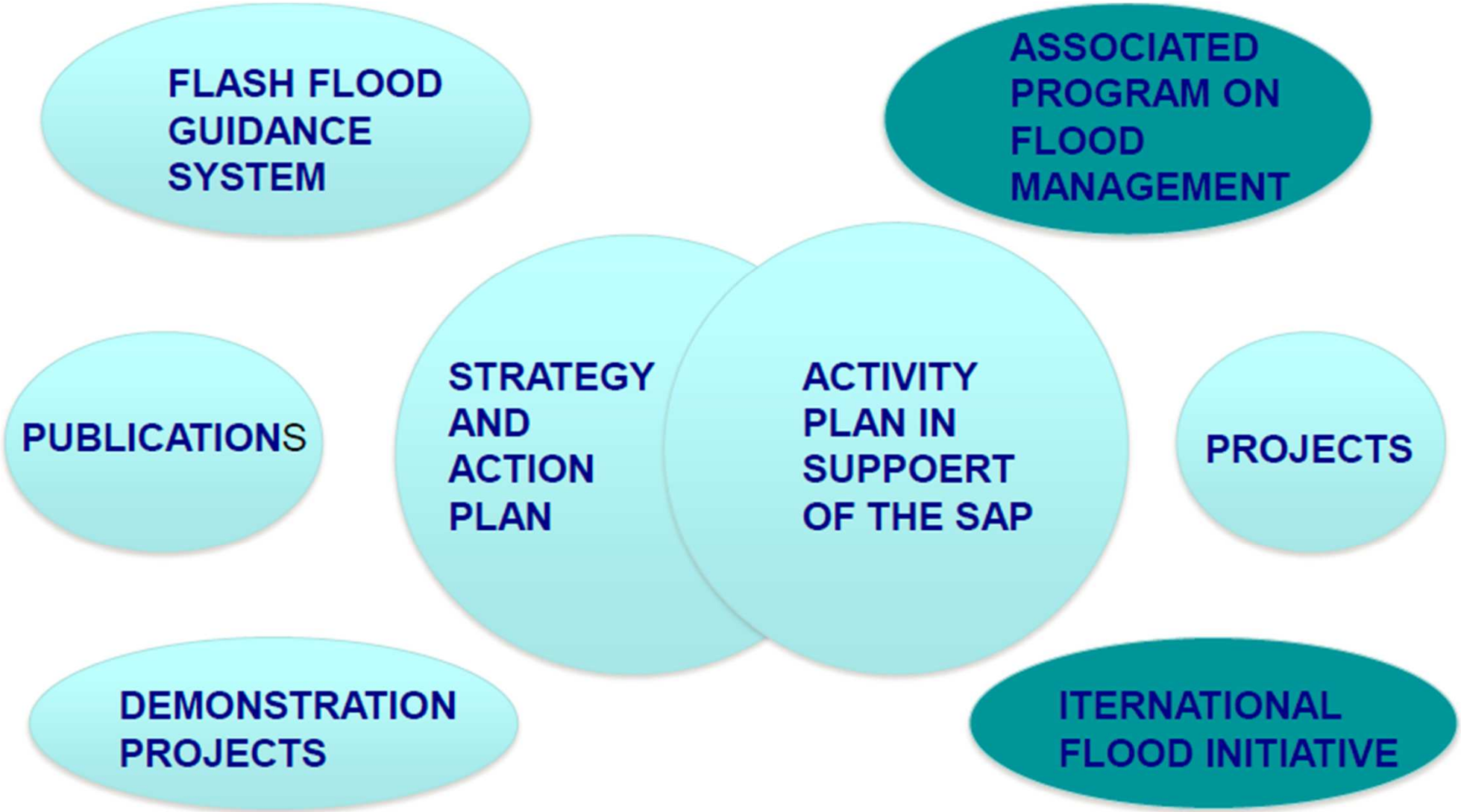
Specific aspects eg. urban flooding, groundwater floods

Source: A. Calver (2013)

WMO Flood Forecasting Initiative

Improve the capacity of meteorological and hydrological services to jointly deliver timely and more accurate products and services required in flood forecasting and warning and in collaborating with disaster managers, active in flood emergency preparedness and response.

Components of WMO - FFI



SAP action domains

1. Strengthening of Observing and Information Systems
2. Improvement of Meteorological Forecasting Practices and Products
3. Improvement of Hydrological Forecasting Practices and Products
4. Strengthening of Institutional Coordination, Cooperation and Integration between NMSs and NHSs
5. Strengthening of Cooperation and Coordination between Countries on issues related to Flood Forecasting
6. Formulation of Technical Documentation and Guidelines related to Flood Forecasting
7. **Supporting Disaster Management**
8. Addressing Climate Variability and Change in the Light of Extreme Events
9. Demonstrating the Value of Meteorological and Hydrological Data, Information and Products

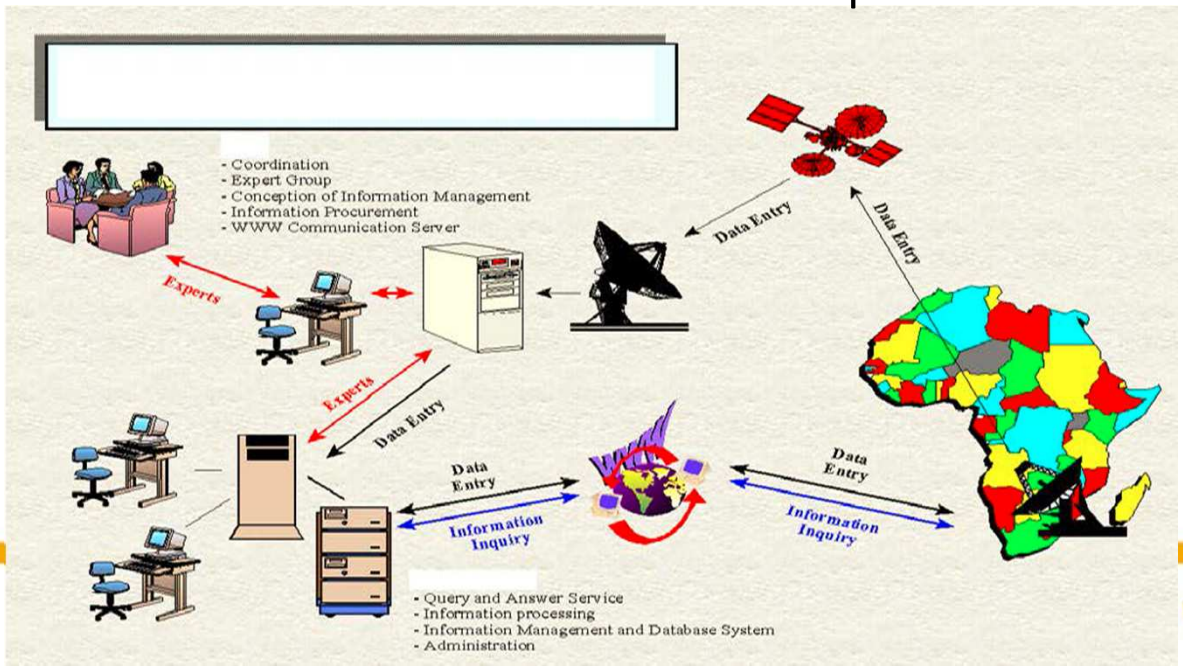
SAP actions to support disaster management

- Link forecasting services to socio-economic factors including the development of a standardized methodology for damage assessment.
- Promote the development of standardized methodologies for impact and damage assessment and information linked to hydrologic forecasting services.
- Consider strengthening the role of NHSs in disaster management by including other specific related functions, such as hazard identification, risk assessment, reviewing risk assessments, and communication of hazards through forecasting, in their functions.
- Chose and establish a multi-hazard approach in terms of observation systems, telecommunications and the development and communication of forecasting products, ensuring a close cooperation between NMSs and NHSs.
- Re-enforce links with national disaster managers, also ensuring close collaboration with other institutions, and possibly including the participation of the affected community.
- Promote public education and awareness with regard to flood management.
- Develop decision support systems to assist local authorities, civil protection, etc.

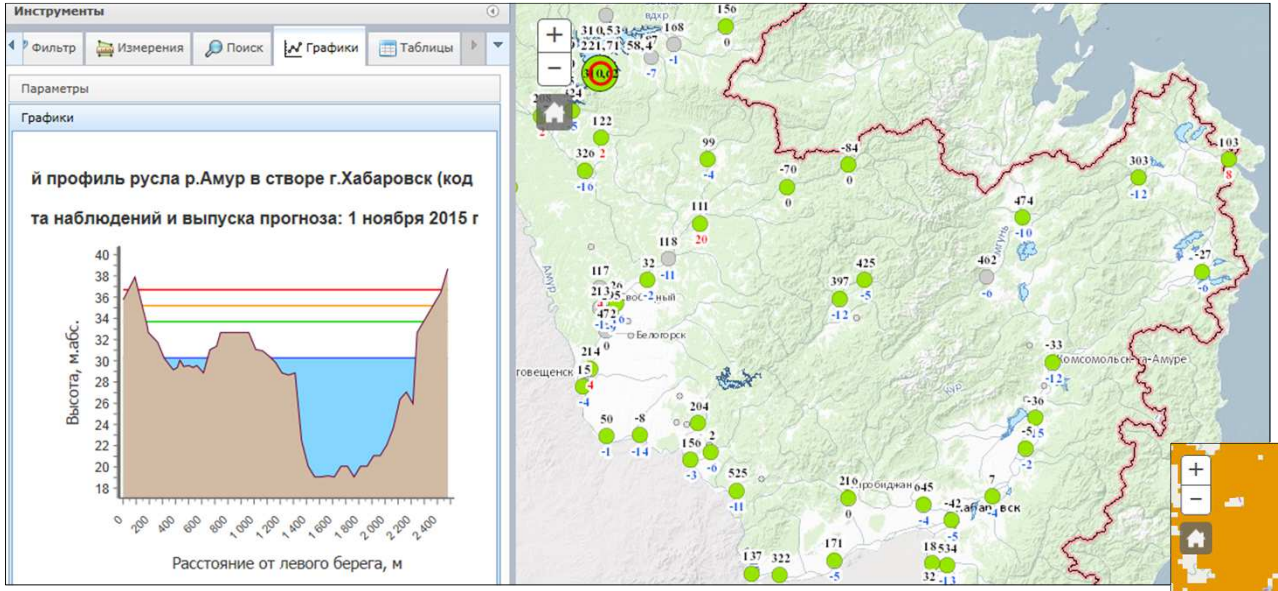
Flood forecasting, warning and response system

a Critical Chain of Events and Actions

Data	Communication	Forecast	Decision support	Notification	Coordination	Actions
Hydrological observations	Data transmission	Flood forecasting	Decisions	Appropriate Individuals & Groups	Preparedness, Response and Decisions	Evacuation and Rescue operations

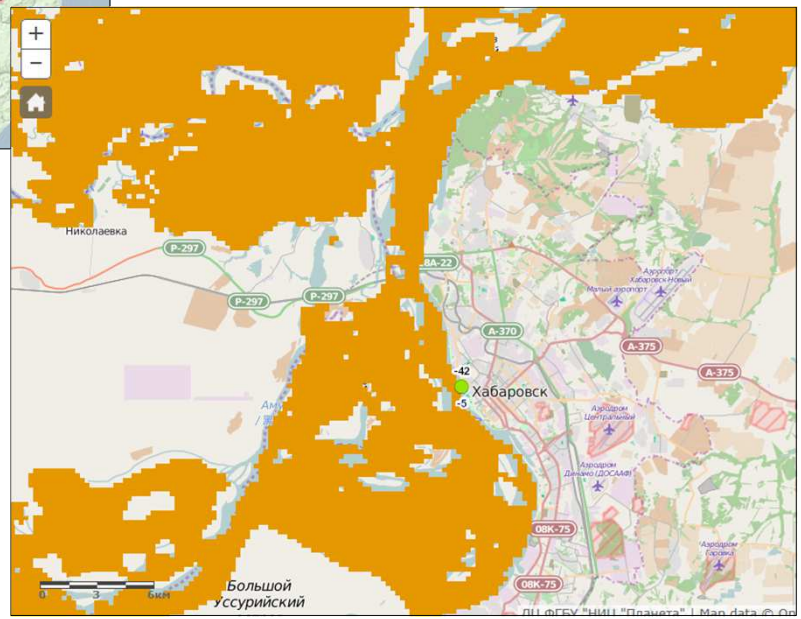


Short to medium range flood forecasting systems

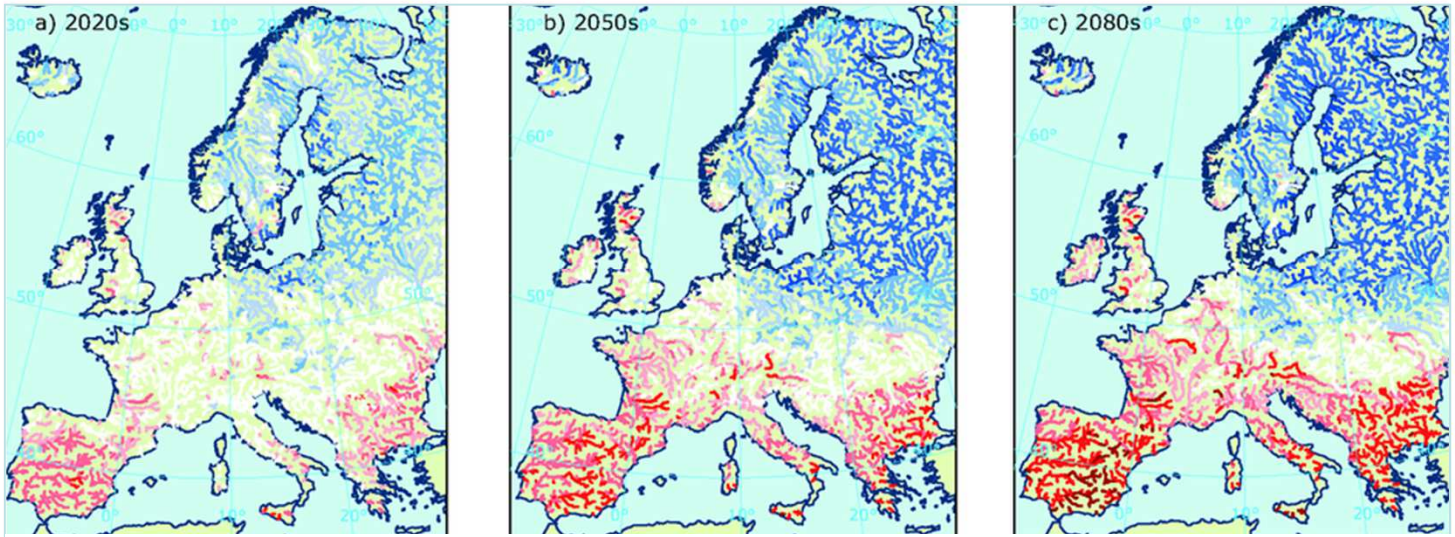


A real-time flood forecasting in short range perspective (days)

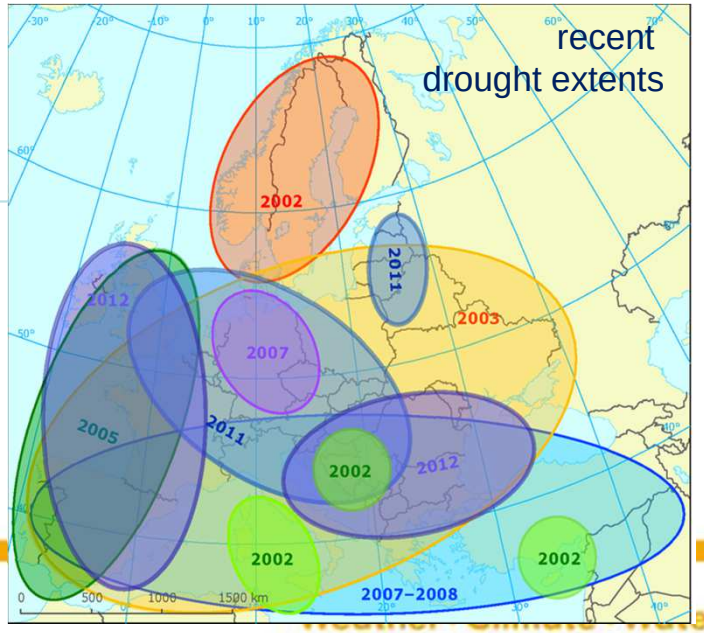
Flood risk inundation mapping using hydrological models / satellites



Long-term drought frequencies



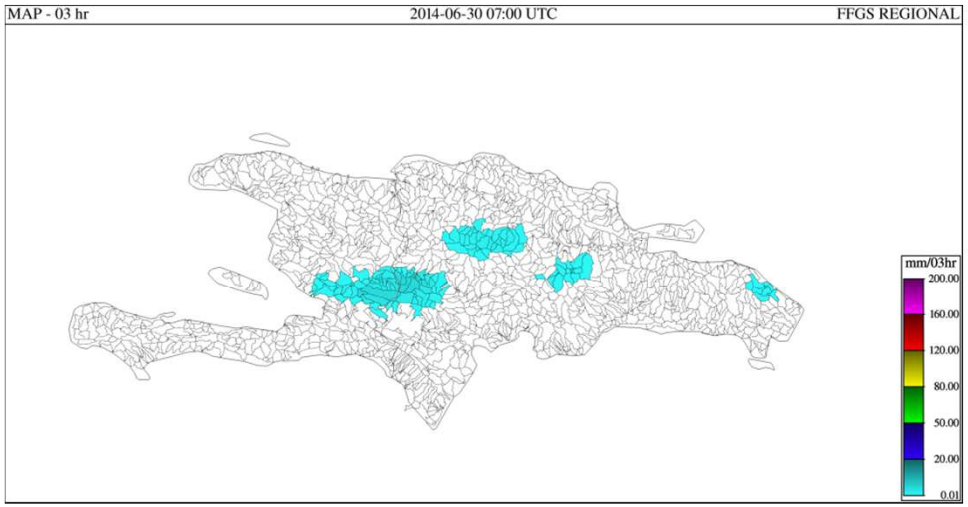
Relative change in minimum river flow with return period of 20 years compared with 1961-1990

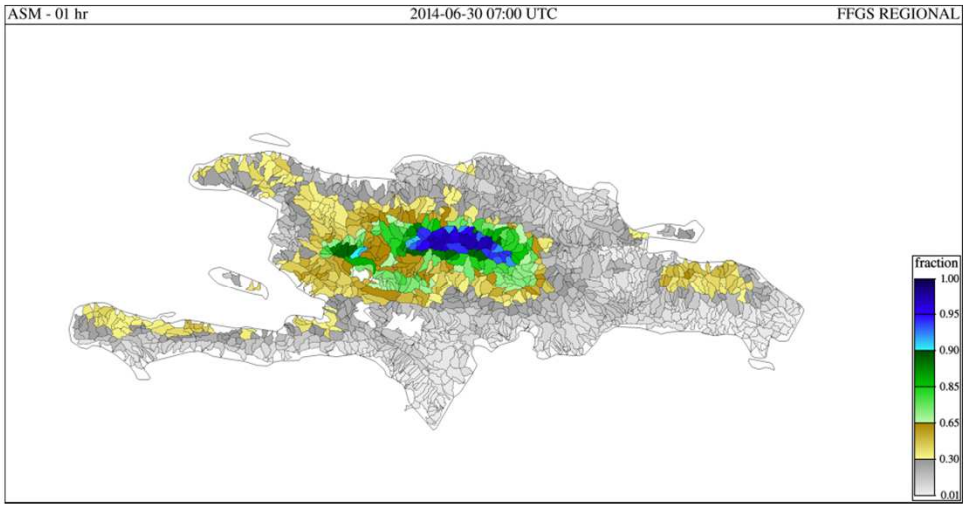


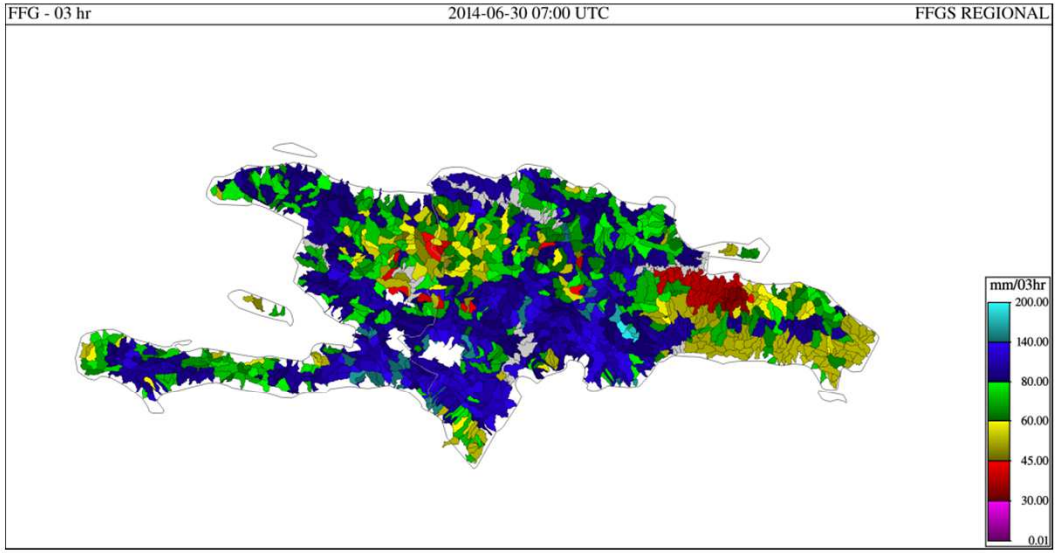
based on climate projections, catchment data and hydrological modelling, statistical analyses

Source: European Environment Agency

Haiti and Dominican Republic FFGS

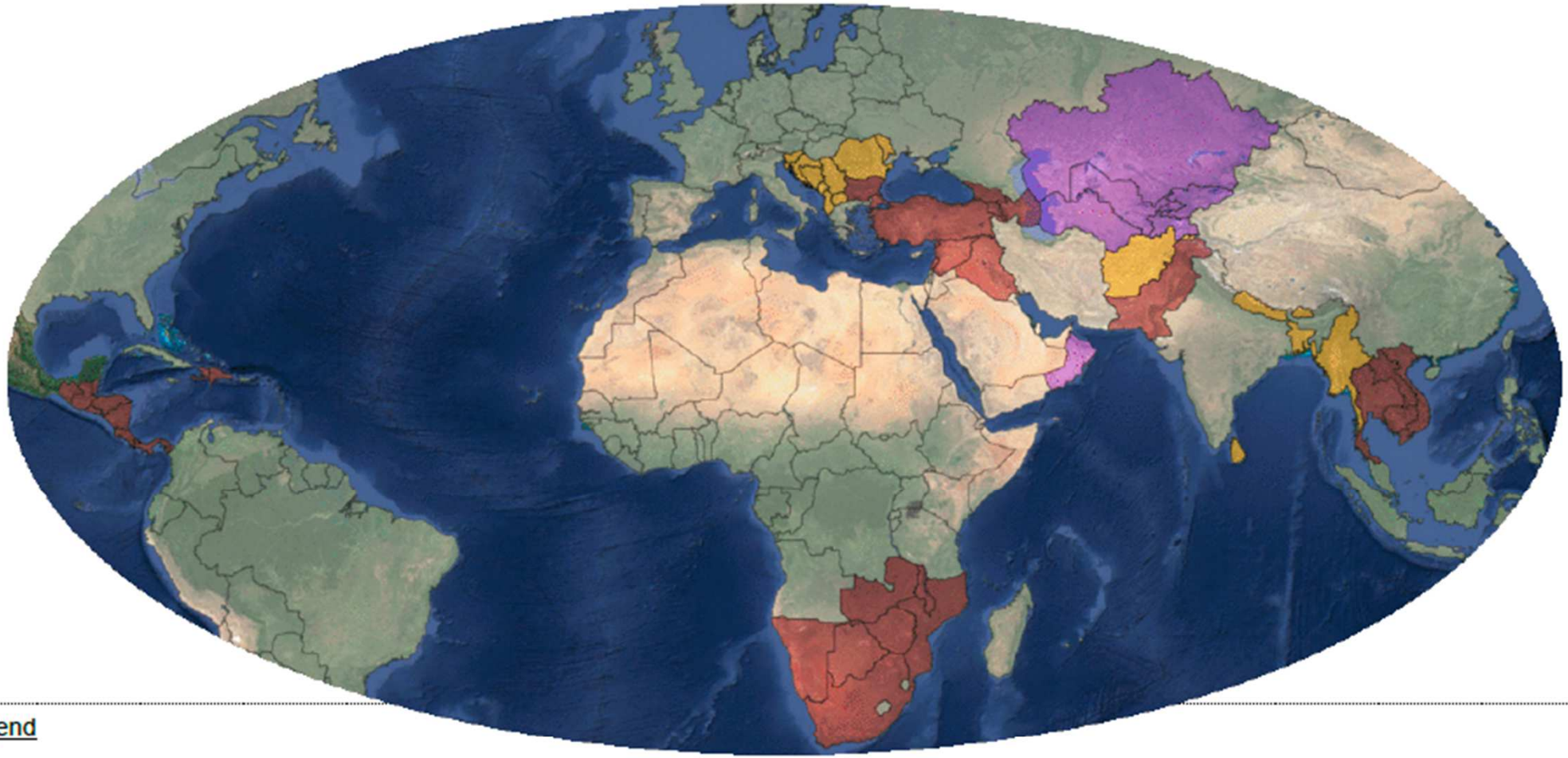






Source: HRC

Global distribution of FFGS



Legend

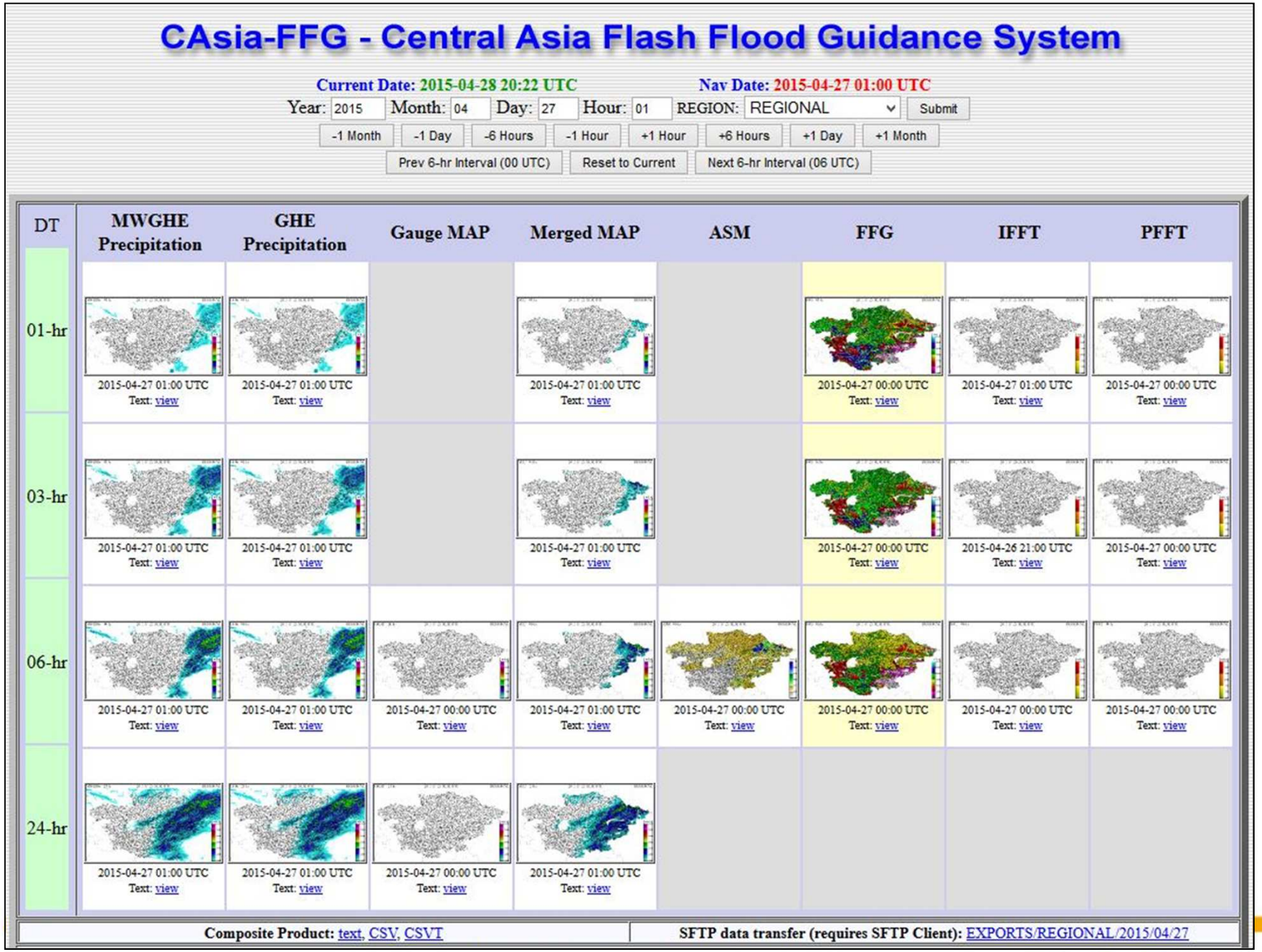
FFG Implementation Status

	Completed	In Progress	Under Planning	Total
Total # Countries	30	15	6	**51**
Total Population Reached	645,698,967	184,846,165	65,542,913	**896,088,045**

Multi-hazard approach

- one of the main objectives of FFI – strengthening cooperation between NMSs and NHSs;
- design criteria for hydrometeorological networks for multi-hazard forecasting system implementation;
- multi-hazard decision making tools that integrate forecasting products from different forecasting systems and projects (FFGS, SWFDP, CIFDP)

Multi-hazard decision tool



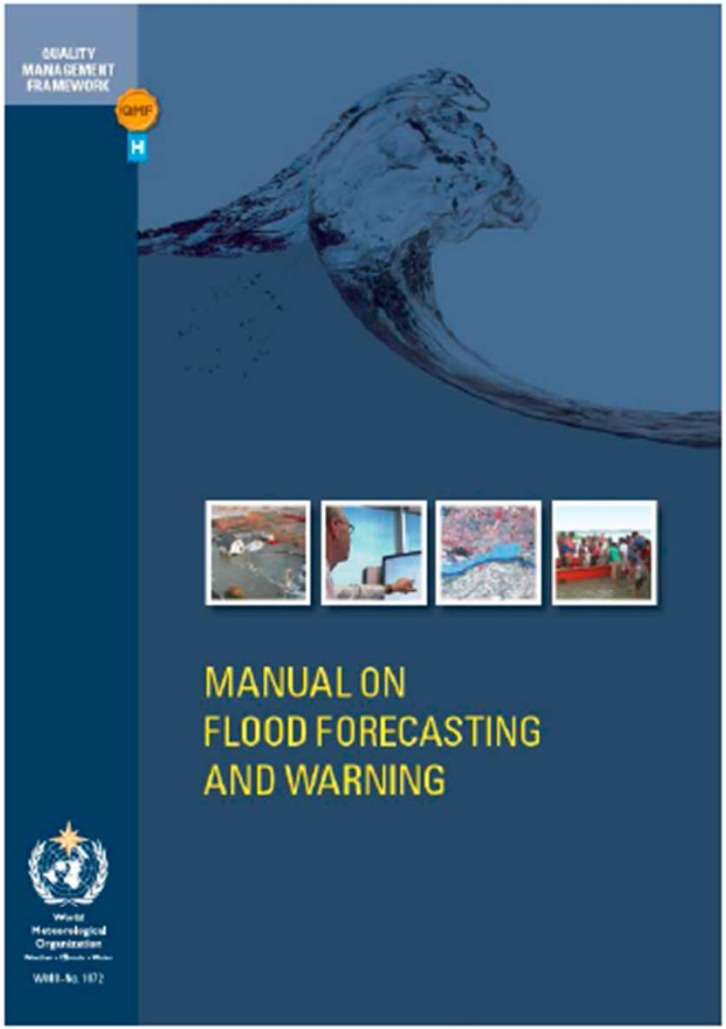
Standard methods for hydrological risk assessment

- Standard practices of flood risk assessment:
  - data, measurements, flood models etc.;
  - Site specific, different data availability;
- CHy input:
  - preparation of a Manual on Flood Risk Mapping (including vulnerability and hazard);
  - guidance material (Guide to hydrological practice, Flood forecasting and warning, etc.);
  - etc.

CHy guidance material

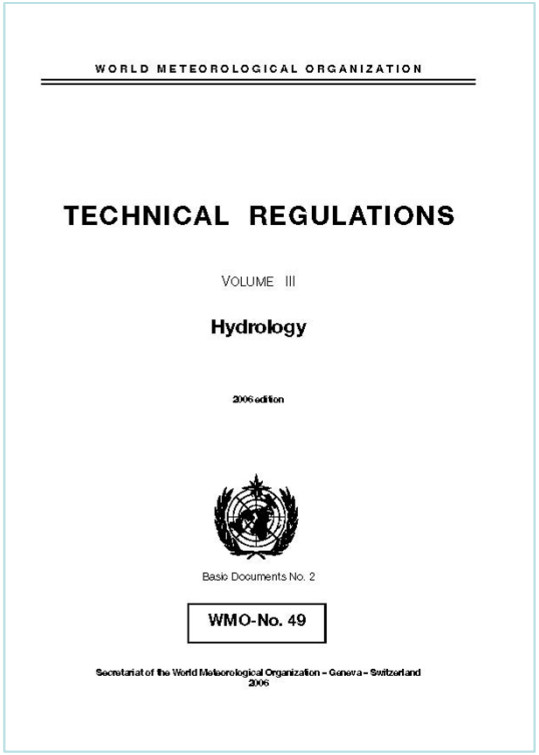
Provides basic knowledge and guidance to develop flood forecasting and warning systems

- **Addressed to National Meteorological Services**
- **Not a step-by-step guide, rather examples of different practices and technologies for the components of a flood warning system:**
  - design of flood forecasting system
  - implementation and operation of the system
  - flood warnings
  - training



CHy documents

Technical Regulations, volume III: Hydrology 2006

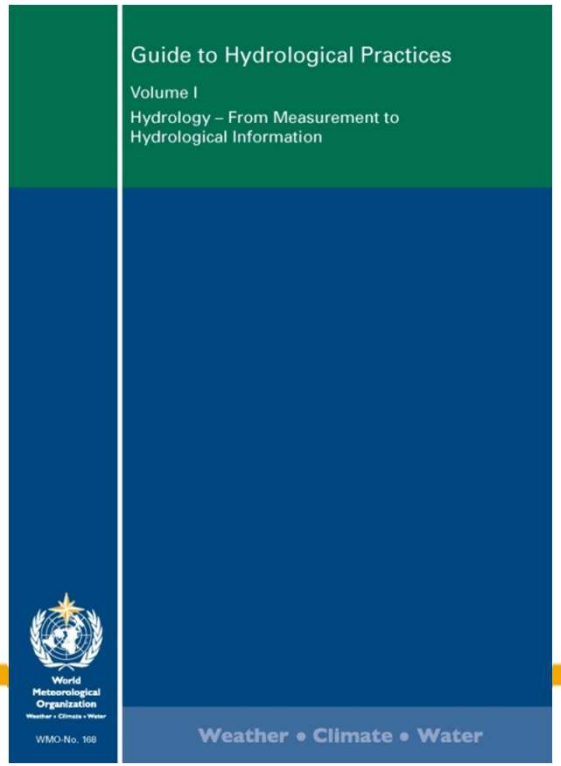


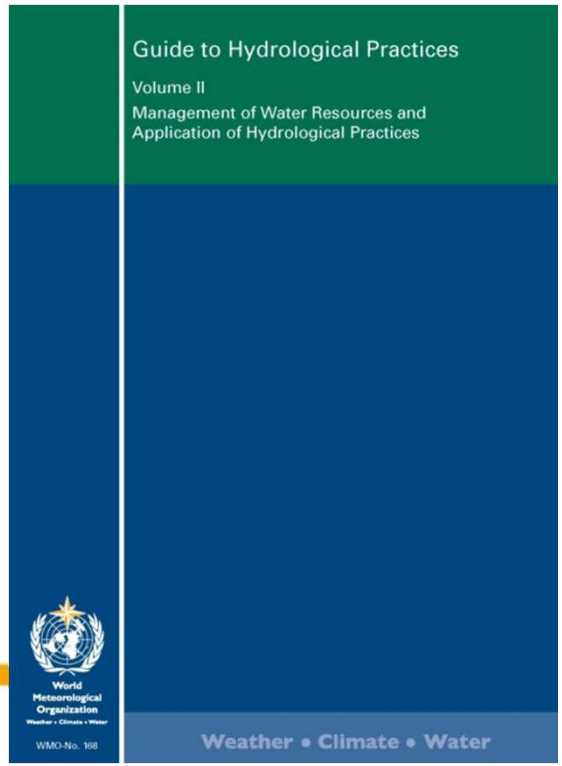
Manuals *(see next slide)*

[International Glossary of Hydrology – with UNESCO]

Guidelines / guidance material especially the Guide to Hydrological Practices 2008

Technical documents *(see next but one slide)*





CHy guidance material