Session 1: Flood forecasting

Giacomo Teruggi - WMO

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Why is flood forecasting important?

“There are two types of levees, those that have been overtopped by floodwaters, and those that will be”

- William Hammon Hall, first State Engineer of California, 1880 circa

• Human pressure and increased urbanization have led the majority of the world population to live in flood-prone areas

• Exposure to floods can only be reduced, but should be integrated by preparedness

• Preparedness requires to know when (and possibly how) a flood is going to occur

Types of water-related natural disasters, 1990–2001
Planning a flood forecasting system: preliminary considerations

- Need to understand:
  - the hydro-morphological characteristics of the basin topography, geology and soils, and the degree of structural development;
  - the main physical processes occurring during hydro meteorological events; and
  - the type of service that is required and that can be achieved technically and economically.
Flood Forecasting and Early Warning Systems – main components

a) Collection of real-time data for the prediction of flood severity, including time of onset and extent and magnitude of flooding;
b) Preparation of forecast information and warning messages, giving clear statements on what is happening, forecasts of what may happen and expected impact;
c) Communication and dissemination of such messages, which can also include what action should be taken;
d) Interpretation of the forecast and flood observations, in order to provide situation updates to determine possible impacts on communities and infrastructure;
e) Response to the warnings by the agencies and communities involved;
f) Review of the warning system and improvements to the system after flood events.

The above need additional institutional arrangements to ensure transboundary cooperation
Requirements for a flood forecasting and early warning system

Data:
- Meteorological
- Hydrological
- Topographic
- Socio-economic

Infrastructure:
- Safe place
- Availability of calculus

Human Resources (24/7):
- Hydrologists
- Meteorologists
- IT experts
- Communication experts

- real-time data collection
- Numerical Weather Prediction outputs
- Combination Recalibration Error correction
- Catchment model
- Routing model (hydrological or hydrodynamic)
- Communication network / decision support system
- Tidal and estuary modelling
Manual on Flood Forecasting and Early Warning

- NOT a step-by-step “menu” to create a flood forecasting and warning service
- Presents examples of practices and technologies to reflect different levels of development, ranges of needs, capacities, etc
- Examines the constituent parts of flood forecasting and warning, the wide ranging science involved, tools, practicalities and organisation required
- Exemplifies also how warnings can operate in different societal frameworks

Available at http://www.wmo.int/pages/prog/hwrp/manuals.php
Development of a decision-aiding tool for the selection of flood forecasting models

- Based on an intercomparison of 18 operational flood forecasting models
- Outcome of a WMO international workshop held in Koblenz in 2011
Thank you for your attention