WORKSHOP ON TRANSBOUNDARY FLOOD RISK MANAGEMENT

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Artemis Papapetrou
Head : Hydrometeorological Applications Section
Division of Climatology
Hellenic National Meteorological Service (HNMS)
FLOOD FORECASTING AND WARNING ON THE TRANSBOUNDARY GREEK AREAS

• Geographical characteristics of rivers and lakes
• Climate and hydrological status
• Current status on flood forecasting and warning
• Network of precipitation measurement stations
• Quantity forecast of precipitation
• Proposals
# Geographical characteristics of rivers and lakes

## Table 1. Rivers

<table>
<thead>
<tr>
<th>River name</th>
<th>Source country</th>
<th>Outfall country</th>
<th>Sharing countries</th>
<th>Total length (km)</th>
<th>Length on Greek territory (Km)</th>
<th>Total size of basin (km²)</th>
<th>Size of basin on Greek territory (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritza/Evros* / Meric</td>
<td>Bulgaria</td>
<td>Greece/Sea of Thrace</td>
<td>Bulgaria, Greece, Turkey</td>
<td>550</td>
<td>204</td>
<td>53.000</td>
<td>3180</td>
</tr>
<tr>
<td>Nestos/Mesta</td>
<td>Bulgaria</td>
<td>Greece/Sea of Thrace</td>
<td>Bulgaria, Greece</td>
<td>234</td>
<td>130</td>
<td>5.800</td>
<td>2.320</td>
</tr>
<tr>
<td>Strymon/Struma</td>
<td>Bulgaria</td>
<td>Greece/Northern Aegean Sea</td>
<td>Bulgaria, Greece</td>
<td>400</td>
<td>118</td>
<td>18.078</td>
<td>7.281</td>
</tr>
<tr>
<td>Axios/Vardar</td>
<td>FYROM</td>
<td>Greece/Thermaikos Gulf</td>
<td>FYROM, Greece</td>
<td>380</td>
<td>76</td>
<td>24.338</td>
<td>2981</td>
</tr>
<tr>
<td>Aoos/Vjosa</td>
<td>Greece</td>
<td>Albania/ Adriatic Sea</td>
<td>Greece, Albania</td>
<td>260</td>
<td>70</td>
<td>6.519</td>
<td>2.154</td>
</tr>
</tbody>
</table>

*The tributary Ardas: length 30 Km on Greek territory (of total 270), river basin 345 km² (of total 5.545)
<table>
<thead>
<tr>
<th>Lake name</th>
<th>Sharing countries</th>
<th>Total area (km²)</th>
<th>Area on Greek territory (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mikri- Small Prespa</td>
<td>Greece, Albania</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>Megali- Large Prespa</td>
<td>Greece, FYROM, Albania</td>
<td>288</td>
<td>37</td>
</tr>
<tr>
<td>Doirani /Dojran</td>
<td>Greece, FYROM</td>
<td>270</td>
<td>183</td>
</tr>
</tbody>
</table>
Map of the transboundary rivers and lakes
Climate and hydrological status

The climate in the North part of Greece is Mediterranean type in the coastal areas and continental in the interior part. The rainfall is nearly normally distributed during the seasons of the year, with often snowfalls in winter period and occasional thunderstorms mainly in spring and summer due to dynamic and thermal instability. Intense precipitation and snowmelt mainly occurred in spring and early summer period, often resulting in river floods, might cause a lot of damage in the Greek riparian areas. The average precipitation of the wet period of the year (October to April) ranges between 350 in the plain (lowland) to 850 mm in the mountain areas. The annual average discharge mainly in the rivers of North Greece ranges between 60 m³/s to 280 m³/s with the maximum values at spring season. In cases of flooding, discharge values often exceed 1500 m³/s.
Current Status of Flood Forecasting and Warning

A national general plan named “Xenokratis”, which is the official plan of our country for emergency cases, is operated in Greece for the prevention, mitigation and control of natural hazards including floods. In the section of flood forecasting and warning, this plan is now carried out in collaboration between the Hellenic National Meteorological Service (HNMS) and the Hellenic Civil Protection Authority (HCPA). The HNMS issues forecasts and warnings of intense precipitation, when it is needed. These products are disseminated to the HCPA, which respectively sends emergency warnings about the danger of flooding to the specific Regional Authorities, such as Prefectures and Municipalities. Additionally these warnings are disseminated to the general public and the media.
Network of precipitation measurement stations

Totally there are about 2000 hydrometeorological stations covering the whole country.

The Network of the Hellenic National Meteorological Service (HNMS) for the whole country consists of:

• Manned Meteorological Stations (M.S) (87)
• Automatic M.S. (35)
• Semi-Automatic M.S. (30)
• Weather Radars (7 C – band, 2 S- Band)
• Satellite Systems
  a. EUMETCAST (17)
  b. HRPT receiving data from NOAA, METOP, FY (3)
• Lightning Detection Network (8 sensors)
Satellite System EUMETCAST

Meteorological Satellites

DWD

EARS

SAFs

EUMETSAT DVB Uplink

EUMETSAT

DVB Broadcast EUROBIRD-9

Others...

Services – users (HNMS)
Satellite System HRPT (NOAA, METOP, FY)
Weather Radars - HNMS
Lightning Detection Network - HNMS
Weather monitoring, 25 March 2009

MET9_IR_0900 UTC
Quantity Forecast of Precipitation

The HNMS has daily reception of ECMWF atmospheric products based on 00 & 12 UTC deterministic forecast of 0.25 x 0.25 deg resolution. Additionally it operates 3 models for the numerical weather forecasting (including quantity precipitation forecast). These models with their characteristics are shown in the following table.

Table 3. Numerical weather forecasting models of HNMS

<table>
<thead>
<tr>
<th>Model name (non hydrostatic)</th>
<th>Analysis Initial values</th>
<th>Domain</th>
<th>Forecast horizon</th>
<th>Grid resolution</th>
<th>Data Assimilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKIRON</td>
<td>ECMWF 12:00-00:00</td>
<td>Europe</td>
<td>72 h</td>
<td>~ 6 Km</td>
<td></td>
</tr>
<tr>
<td>COSMO</td>
<td>ECMWF 12:00-00:00</td>
<td>Mediterranean Sea</td>
<td>72 h</td>
<td>~ 7 Km</td>
<td>nudging</td>
</tr>
<tr>
<td>RAMS</td>
<td>ECMWF 12:00</td>
<td>Mediterranean Sea, Hellas, Attica</td>
<td>60 h</td>
<td>48 Km Med. 12Km Hellas 3,6 Km Attica</td>
<td>LAPS</td>
</tr>
</tbody>
</table>
SKIRON - Total Precipitation (mm/12hr)
01/10/2005 12UTC – 02/10/2005 00UTC
Proposals

In the frame of an operational system of the transboundary flood risk management, there is a strong need for fruitful cooperation between the involved countries. The main goals are:

- Developing hydrological models in every country
- Coordination between Hydrological and Meteorological Services in national and transnational level
- Implementation of the European Flood Directive 2007/60
EVROS river
NESTOS river
STRYMONAS river
STRYMONAS river
AXIOS river
AOOS river
AOOS river
DOIRANI lake
PRESPES lakes
PRESPES lakes
Thank you very much for your attention …