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WORKSHOP ON TRANSBOUNDARY FLOOD RISK MANAGEMENT

Geneva, 22-23 April 2009

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FLOOD FORECASTING AND WARNING ON THE TRANSBOUDARY 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

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Geographical characteristics of rivers and lakes

Table 1. Rivers

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

**The tributary Ardas: length 30 Km on Greek territory (of total 270), river basin 345 km² (of total 5.545)*

Table 2. Lakes

Lake name	Sharing countries	Total area (km²)	Area on Greek territory (km²)
Mikri- Small Prespa	Greece Albania	48	44
Megali- Large Prespa	Greece FYROM Albania	288	37
Doirani /Dojran	Greece FYROM	270	183

Map of the transboundary rivers and lakes

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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 m^3/s to 280 m^3/s with the maximum values at spring season. In cases of flooding, discharge values often exceed 1500 m^3/s.

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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.

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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)

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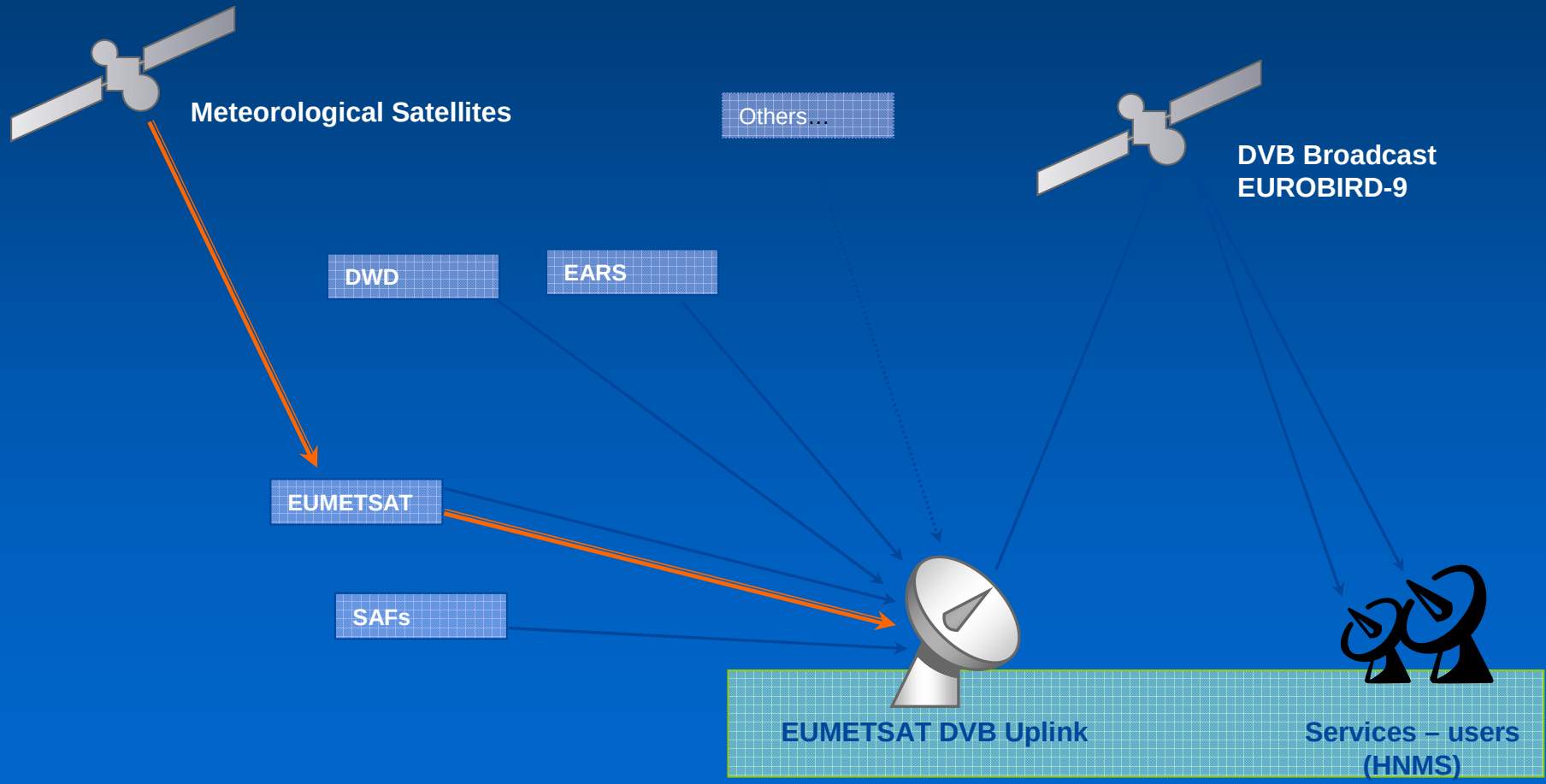
Satellite System EUMETCAST



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Satellite System HRPT (NOAA, METOP, FY)

KAVOYRI
ATHENS

EARS
EUMETSAT
Advanced
Retransmission
Service

Larissa Regional Met Center

HNMS

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Weather Radars -HNMS

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Lightning Detection Network - HNMS

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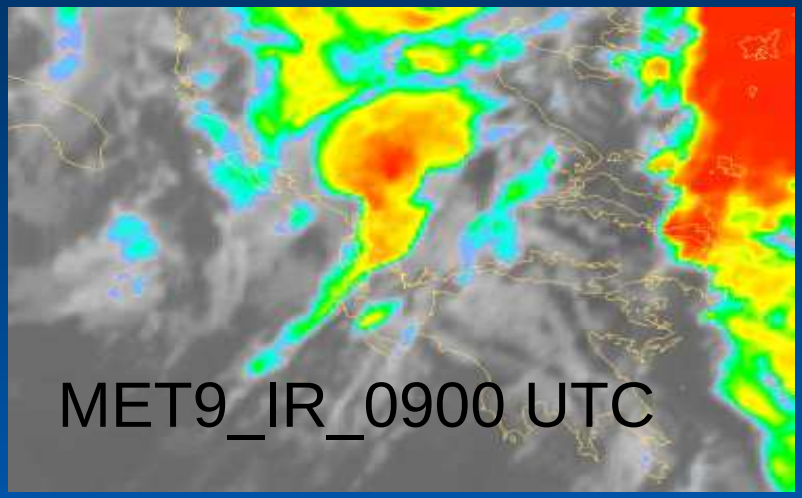
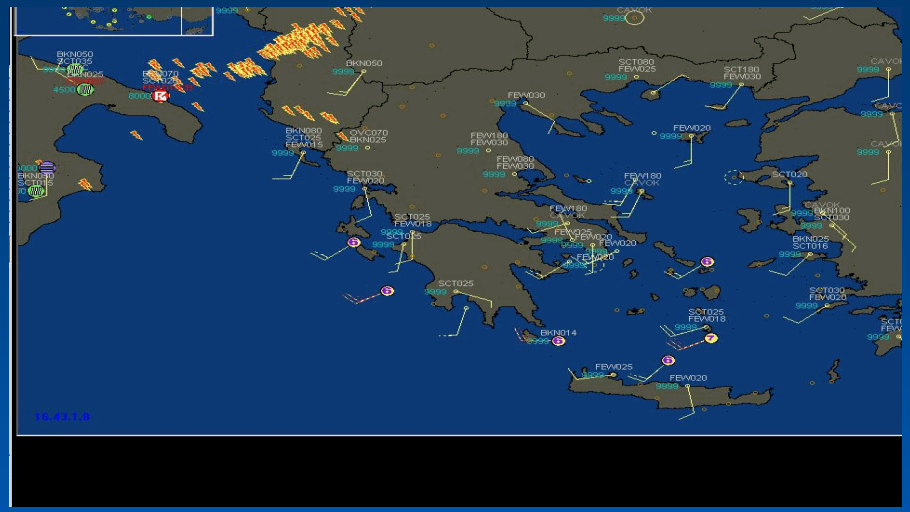
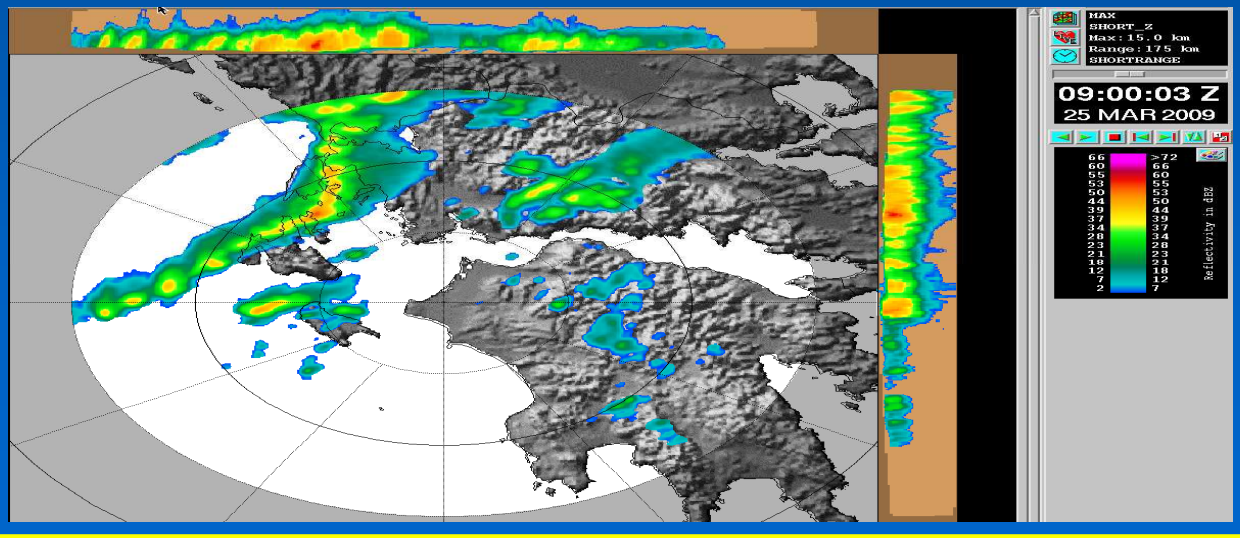
Weather monitoring, 25 March 2009







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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

Model name (non hydrostatic)	Analysis Initial values	Domain	Forecast horizon	Grid resolution	Data Assimilation
SKIRON	ECMWF 12:00-00:00	Europe	72 h	~ 6 Km	
COSMO	ECMWF 12:00-00:00	Mediterranean Sea	72 h	~ 7 Km	nudging
RAMS	ECMWF 12:00	Mediterranean Sea, Hellas, Attica	60 h	48 Km Med. 12Km Hellas 3,6 Km Attica	LAPS

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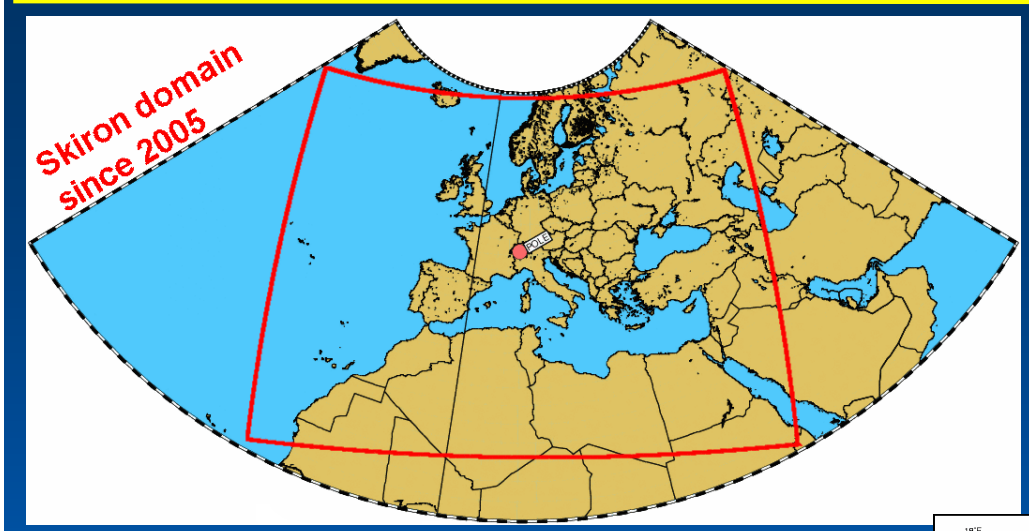
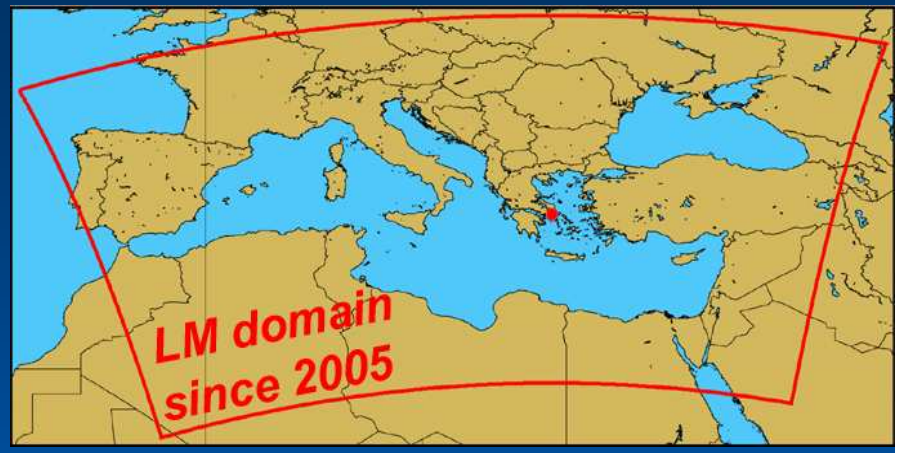
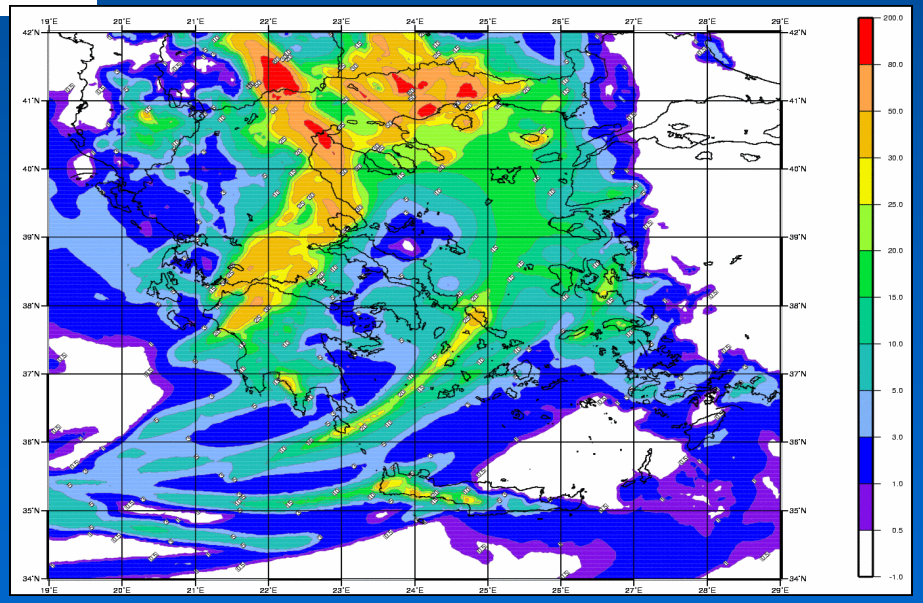




SKIRON - Total Precipitation (mm/12hr)

01/10/2005 12UTC – 02/10/2005 00UTC



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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

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EVROS river

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NESTOS river

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STRYMONAS river

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STRYMONAS river

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AXIOS river

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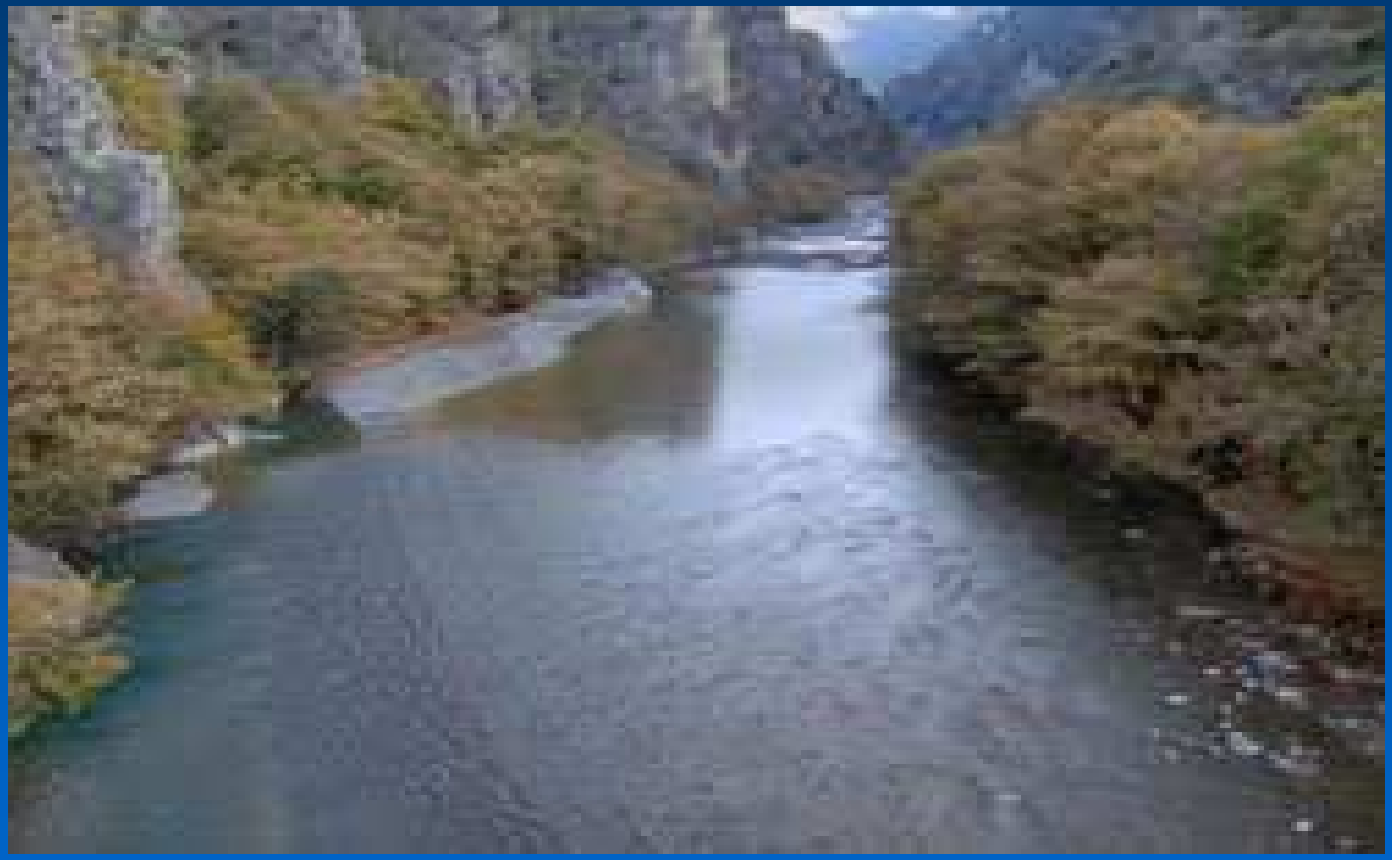
AOOS river



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AOOS river

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DOIRANI lake

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PRESPES lakes

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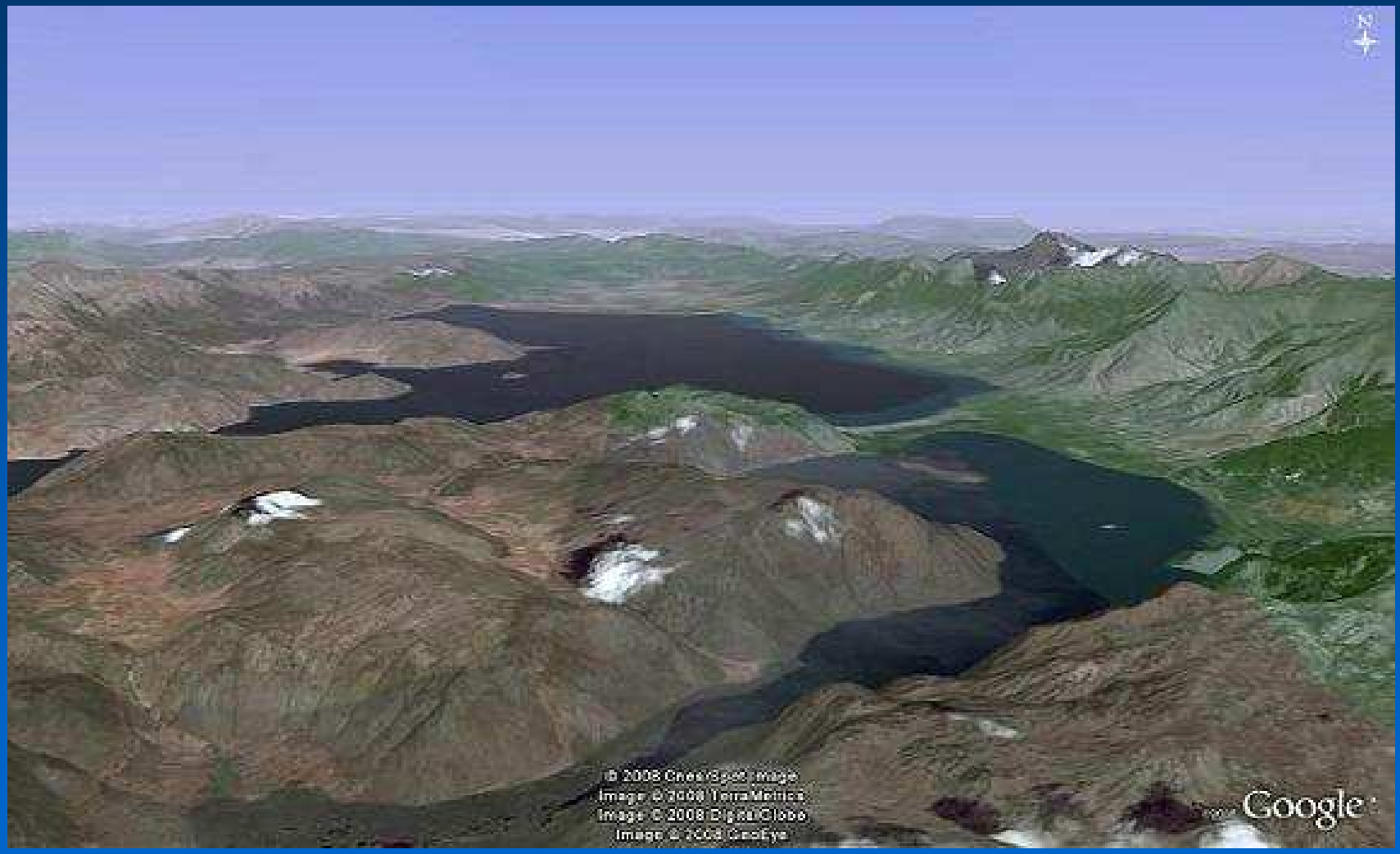
PRESPES lakes



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Thank you very much for your attention …