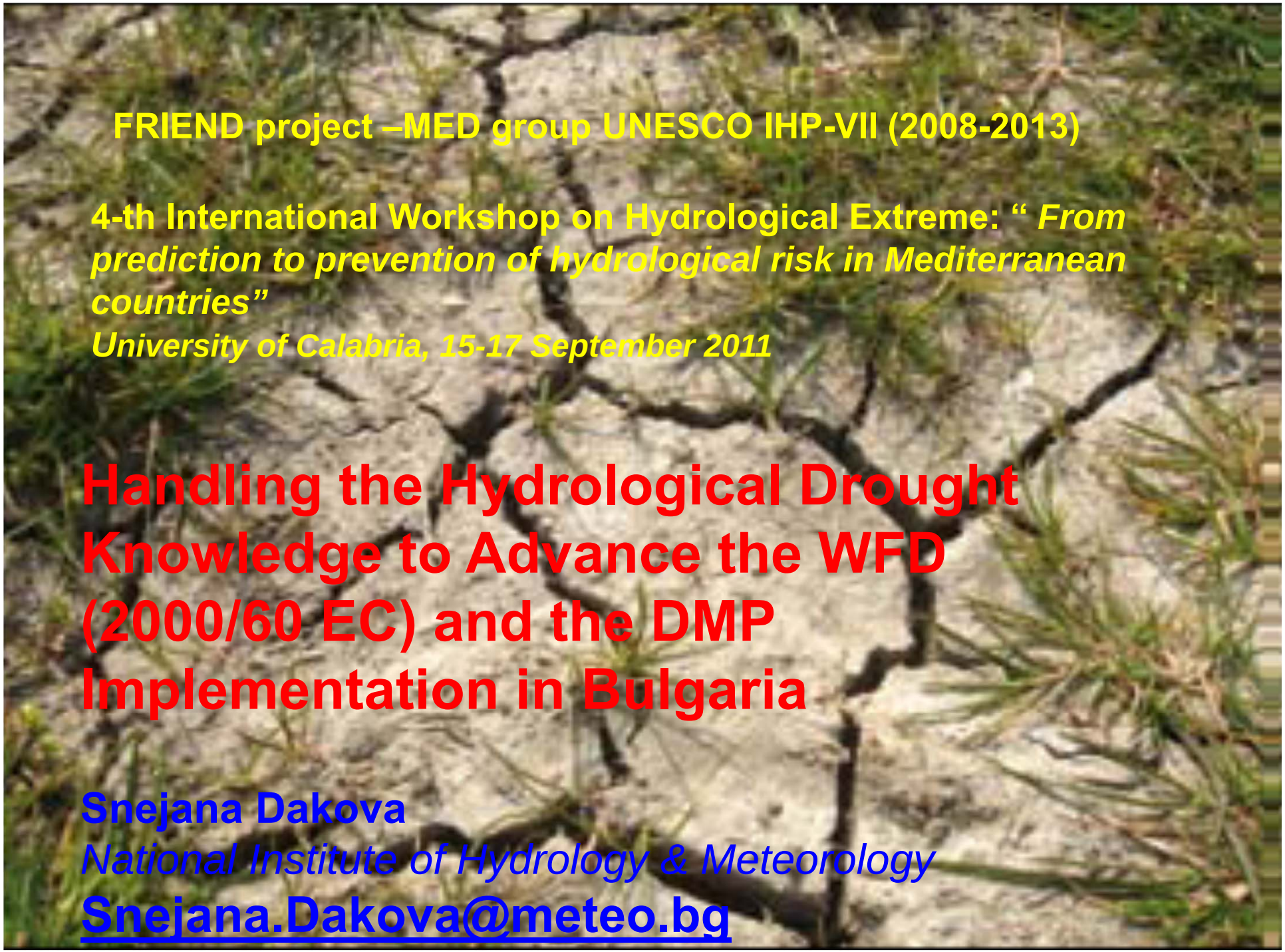

FRIEND project –MED group UNESCO IHP-VII (2008-2013)

4-th International Workshop on Hydrological Extreme: " *From prediction to prevention of hydrological risk in Mediterranean countries"*

University of Calabria, 15-17 September 2011

Handling the Hydrological Drought Knowledge to Advance the WFD (2000/60 EC) and the DMP Implementation in Bulgaria

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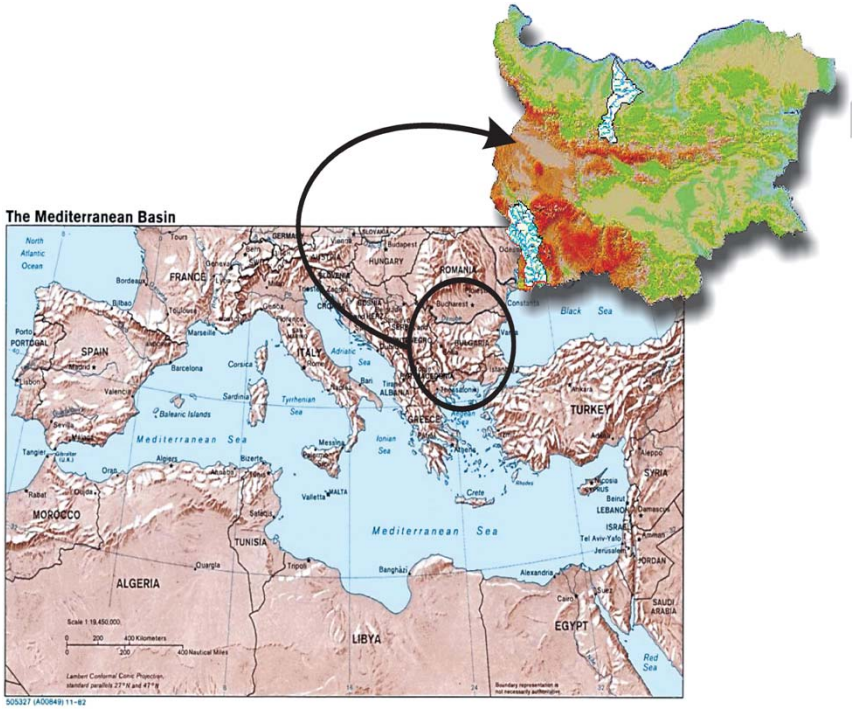
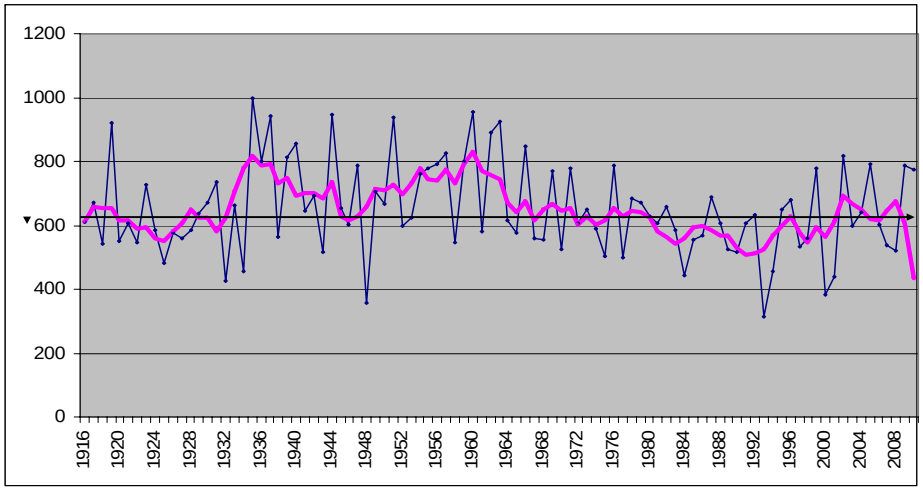
Brief information about Bulgaria

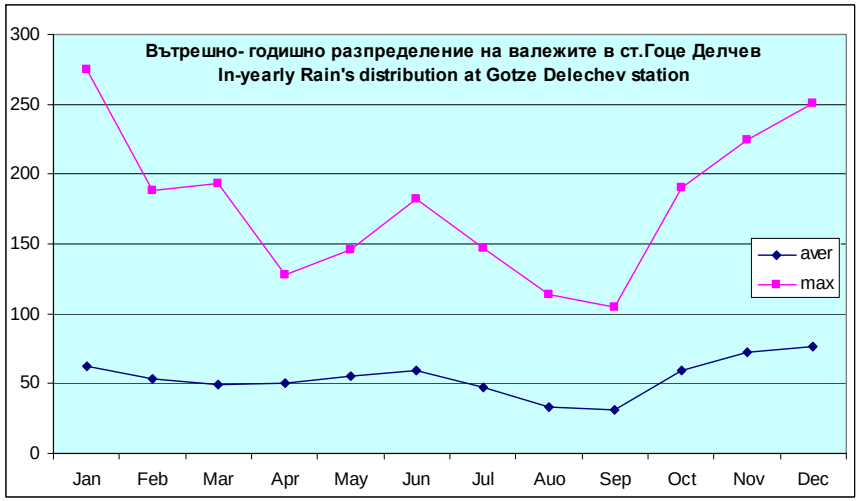


Area 111 sq km.

- Moderate continental climate on North
- High Mountain climate in the mountain
- Moderate Mediterranean Climate – on south of
- Stara Planina (Balkan) mountain

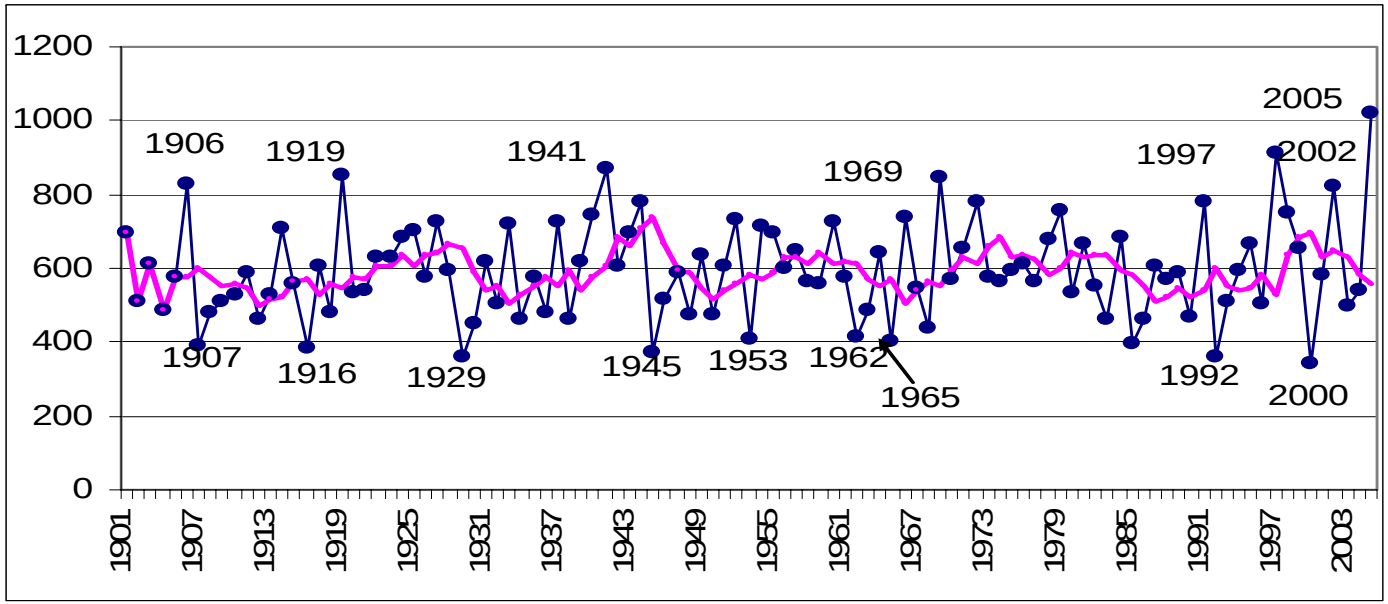
Precipitations: from 560- 1260 mm annual sum





Why the phenomenon Drought is important and for Bulgaria

Drought is a normal natural event for Bulgaria. Almost 40 rivers have been dried before 1956 in natural conditions. Coping with drought, more than 2200 reservoirs have been built, up to 1975. The majority of them are with seasonal regulation of flow. Multi- yearly regulation have little reservoirs. As a result, the streamflow of almost all rivers is alterated. Since 1975 the stream flow is relatively stable in general terms, but natural flow is irrevocable. So, the returned period for discharge estimation has to be 1975-2010 - presenting the flow availability now.


1200
1000
800
600
400
200
0
1906
1919
1941
1969
1997
2005
2002
1907
1916
1929
1945
1953
1962
1965
1992
2000
1901
1907
1913
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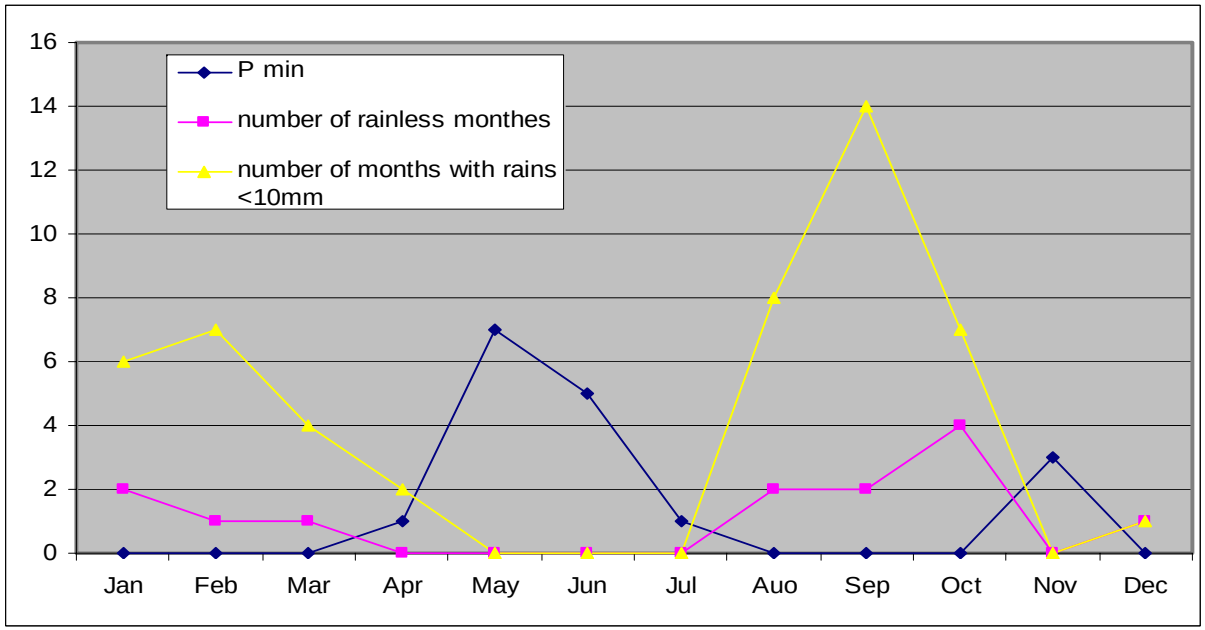
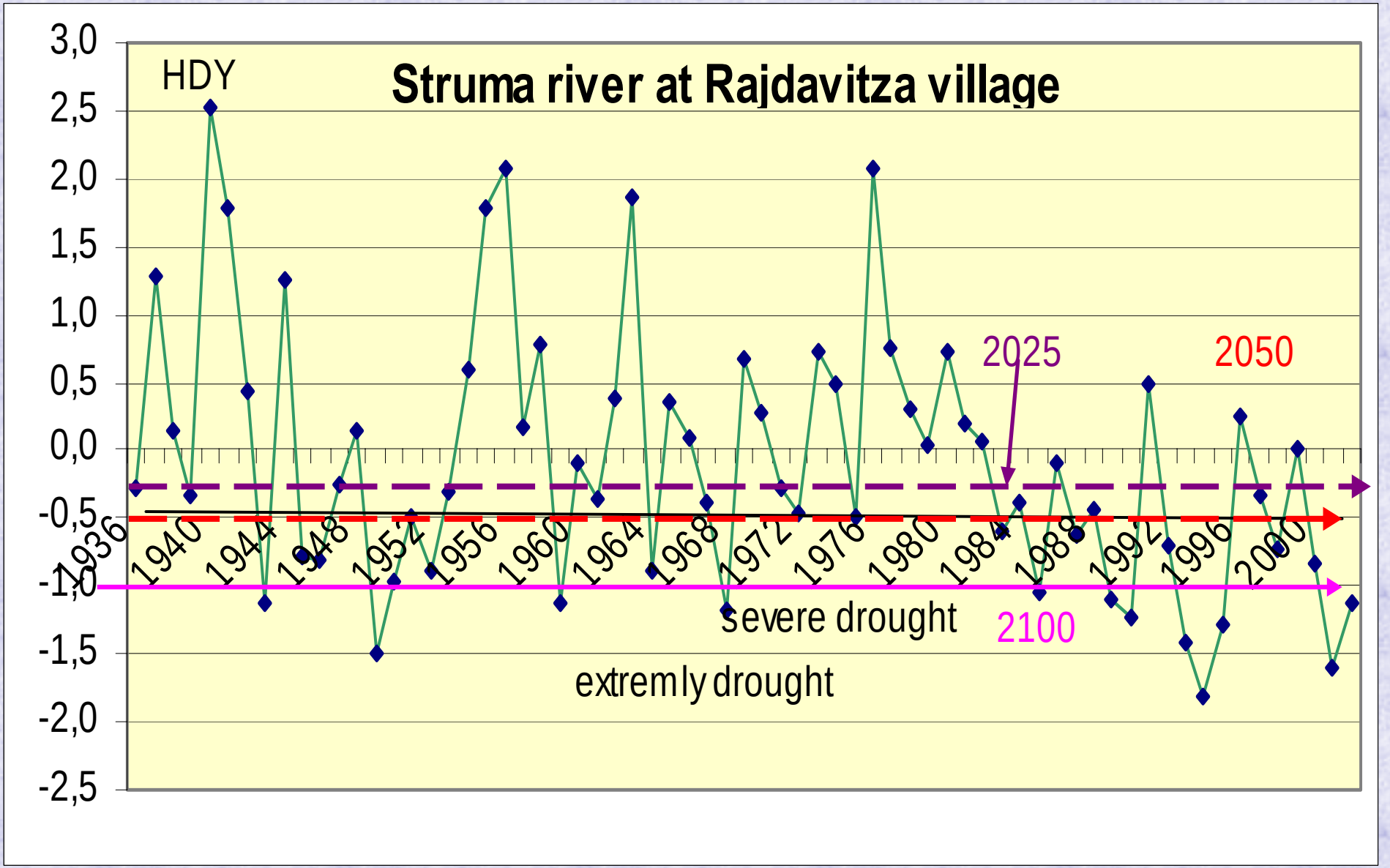
2003


16
14
12
10
8
6
4
2
0
P min
number of rainless monthes
number of months with rains <10mm
Jan
Feb
Mar
Apr
May
Jun
Jul
Auo
Sep
Oct
Nov
Dec

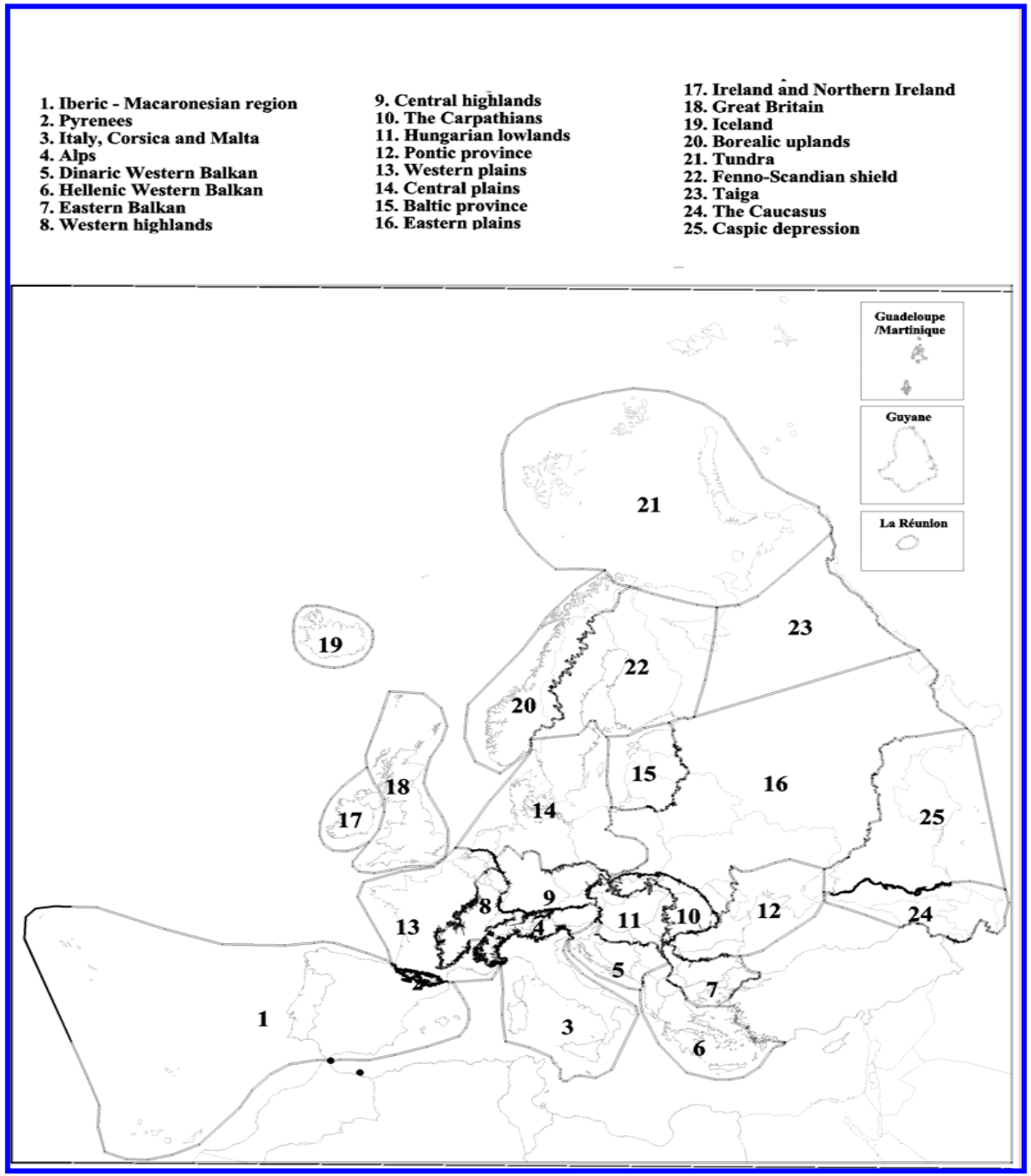
Future of the drought

- According to the Reports of the Intergovernmental Panel on Climate Change (IPCC) and spatially the recent regional studies in NIMH, climate change will impact upon water resources. The severity of drought (mean annual values) at time level 2025 would be decrease about 14-22%.
- The degree of diminishing of water in the next time levels will be grown up. The second order tributaries will be dry toward 2050, 2100.
- The gradient of diminishing would be increase from north to the south situated river.


Struma river at Rajdavitza village
HDY
3,0
2,5
2,0
1,5
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
-2,5
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2025
2050
2100
severe drought
extremly drought

From crisis management to drought planning.

In the recent years in Bulgaria, the need of more sustainable and integrated approach to managing water resources is already reflected in water-related policy and legislation. The implementation of the WFD 2000/60 EC is the most important action in the MOEW because WFD reduce the risk by preventing measures. The WMP have been already adopted (in the beginning of 2010).,



EU Regions (WFD)

Bulgaria:

12 Pontiac province or (Danube basin and North Black sea tributaries)

7 Eastern Balkans (or the rivers in Thrace and south tributaries of the Black sea and river basins of Aegean sea basin

WFD requirements

Although the WFD is not directly designed to tackle quantitative issues, its purposes include contributing to the mitigation of drought effects (art. 1. e) and the promotion of sustainable water use (art 1.b) and its environmental objectives include ensuring a balance between abstraction and recharge of groundwater (art 4.1(b)ii). Furthermore, water quantity can have a strong impact on water quality and therefore on good ecological and chemical status. In this respect, the Directive can be an instrument for addressing drought and water scarcity management.

According article 13.5 WFD when and where needed, a specific "Drought Management (sub) Plan (DMP)" should be developed by Member States. The content of drought management plans must in any case respect all WFD requirements including all conditions set in articles 4.4, 4.5, 4.6, 4.7 and 9.

Policy relevance with Drought

- Water Framework Directive WFD (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy)
- Communication of the EC to the Council and European Parliament: "Addressing the challenge of water scarcity and droughts in the European Union" (published on July 2007)
- Communication of the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: "Thematic Strategy on the sustainable use of natural resources" (published on December 2005)
- Communication of the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan (published on July 2008)
- OECD National Accounting Matrix with Environmental Accounts (NAMEA)
- United Nations Statistics Division System of Environmental-Economic Accounting for Water (SEEAW)
- Etc.

Basic pillars of DMP:

DIAGNOSIS : (challenge to hydrology scientist)

- General basin characterization under drought conditions
- Analysis of historical droughts and drought characterization
- Definition of indicators, thrasholds and drought phases.
- Preparing easy applying tools for assessment and prevention

PROGRAM OF MEASURES:

- Definition of general measures and specific ones for each area and drought phase

MANAGEMENT AND FOLLOW-UP SYSTEMS

- Organization and management systems (drought mitigation measures; Drought early warning system, etc)

challenge to hydrology scientist

To use and
adapt
all knowledge,
assessment, models,
approaches,
researches
details etc.

TO Real practice:
Operational systems
Monitoring organization,
Decision support systems
Management systems
Drought early
warning system

First step: Adaptation to the operational activities and monitoring needs for advances in drought research

Development of vulnerability assessment methodologies under different environmental conditions

- Development and dissemination of drought hazard, vulnerability and risk assessment tools.
- Addressing the existing gaps and research needs for adequate risk methodologies in order to establish objective links between drought indicators and thresholds on one hand, and operational alarm levels on the other.

Second step: drought research (together with MOEW) 2012

- Development of decision support models for the dissemination of drought related information to end users.
- Development of information systems to disseminate drought-related information to specifically various end user communities and to encourage their feedback on the usefulness of the presented products.
- Support of initiatives related to the development, improvement, promotion, and inter-linkage of early-warning systems.
- Development of comprehensive drought reduction strategies that emphasize monitoring and early warning, risk assessment, mitigation and response as an essential part of drought preparedness

State of Play now:

- The water Scarcity & Drought EG has been established in the EU Commission, Directorate Environment
- EG has proposed 2 levels of indicators:
  - an overall level for awareness raising to show developments and trends & have a comparable picture for the whole EU
  - more detailed indicators to be used primarily for management purposes by national or local authorities or in the RBDs.
- Bg object: Developing effective indicators and indices to detect and assess drought situations throughout Bulgaria

The follow WS&D Indicators has been proposed:

- **Standard Precipitation Index** (SPI) -indicator to reflect drought situations, in comparison to historical records-period, distributions?
- **Standardized Runoff Index** (SRI)
- **Relevant Water Stress Indicator**
- (RWSI)- RWSI = ABS / RWA ;
- ABS = Total Freshwater Abstracted-the borders of surface and grown water basin do not coincide
- RWA = Renewable Water Availability
- RWA = P – Eta + I – EF + R
- **Storage Indicator** (St) -Total volume of water in hm3 stored in the catchment, both in surface and groundwater reservoirs
- **Water Use per sector** (WUs) Total Volume of all freshwater used
- **Snowpack (SN)**
- **Groundwater level** (H)- impact of abstraction must be decoupled in order to assess the natural reduction in groundwater level (not the one caused by over abstraction).
- **SRI, Groundwater, Snowpack, Soil moisture** and **Vegetation Response** indicators reflect the combined action of droughts and water scarcity and their social, economic and environmental effects


THANK YOU
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