Integrated Drought Management
Programme in Central and Eastern Europe

Drought data exchange platform
(Activity 1.3)

Implementation Report

www.gwpceeforum.org

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1. Introduction and overview

The aim of this report is to give a short description of selected data exchange platform and report which data have been added to platform from contributing partners.

Several options for selection of data exchange platform for IDMP CEE project have been studied[1]. Main consideration was in decision to develop new services or to attach IDMP CEE project to one of the existing systems. Due to available time and resources, also after the project end, the decision to use existing platform has been made. Short description about European Drought Observatory (EDO[2]) is in Chapter 2 of this document[3]. IDMP CEE project description has been added to EDO webpage[4] as shown on Figure 1.

Figure 1: IDMP CEE project description on EDO webpage (http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1004).

[1] For more information see Chapter 2 in Implementation Guide (http://www.gwp.org/Global/GWP-CEE_Files/Regional/IDMP-Act.1.3-Implementation-Guide-Final.pdf)
[2] http://edo.jrc.ec.europa.eu/
[3] For detailed description about EDO see Chapter 4 and Appendix A in Implementation guide.
[4] Under Home -> Projects: http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1004.

Partners collected existing national data (SPI and any other indicators that are used in partner's countries for identifying or forecasting drought) and make them available through EDO.
Data about 26 products from 10 countries as shown in Table 1 have been added to EDO. More information about received data is in Chapter 3 of this document.

Table 1: Overview of received data.

	Product
Bulgaria	Monthly weather bulletin Precipitation anomaly SMI SPI
Czech Republic	Amount of usable water in loam soils in Czech Republic Basic water balance of grasslands in the Czech Republic Potential evapotranspiration of grassland, comparison with the long-term average 1961 - 2010 Weekly amount of precipitation, measured values
Hungary	Agro-meteorological maps Monthly integrated water balance report and forecast WAHASTRAT
Lithuania	Selianinov hydrothermal coefficient (HTC)
Moldova	Atlas. Climatic resources of the Republic of Moldova
Poland	SPI: Standardized Precipitation Index
Romania	Agrometeorological Bulletin Seasonal Meteorological Forecast Soil Moisture map SPI Index Map Weather warnings
Slovakia	Forecast of forest fire risk index
Slovenia	Agriculture Soil Water Balance Bulletin in Slovenia Drought Bulletin for SE Europe Precipitation Percentiles map Standardized Precipitation Index map SPI maps for cadastral municipalities in Slovenia
Ukraine	SPI

2. European Drought Observatory (EDO)

EDO (Fig. 2) is developed by Institute for Environment and Sustainability (IES[5]) of Joint Research Centre (JRC[6]), a department of the European Commission providing independent scientific and technological support for EU policy-making.

EDO provides:

- continental overview of information on drought,
- visualization and analysis,
- seamless access to regional and national drought information.

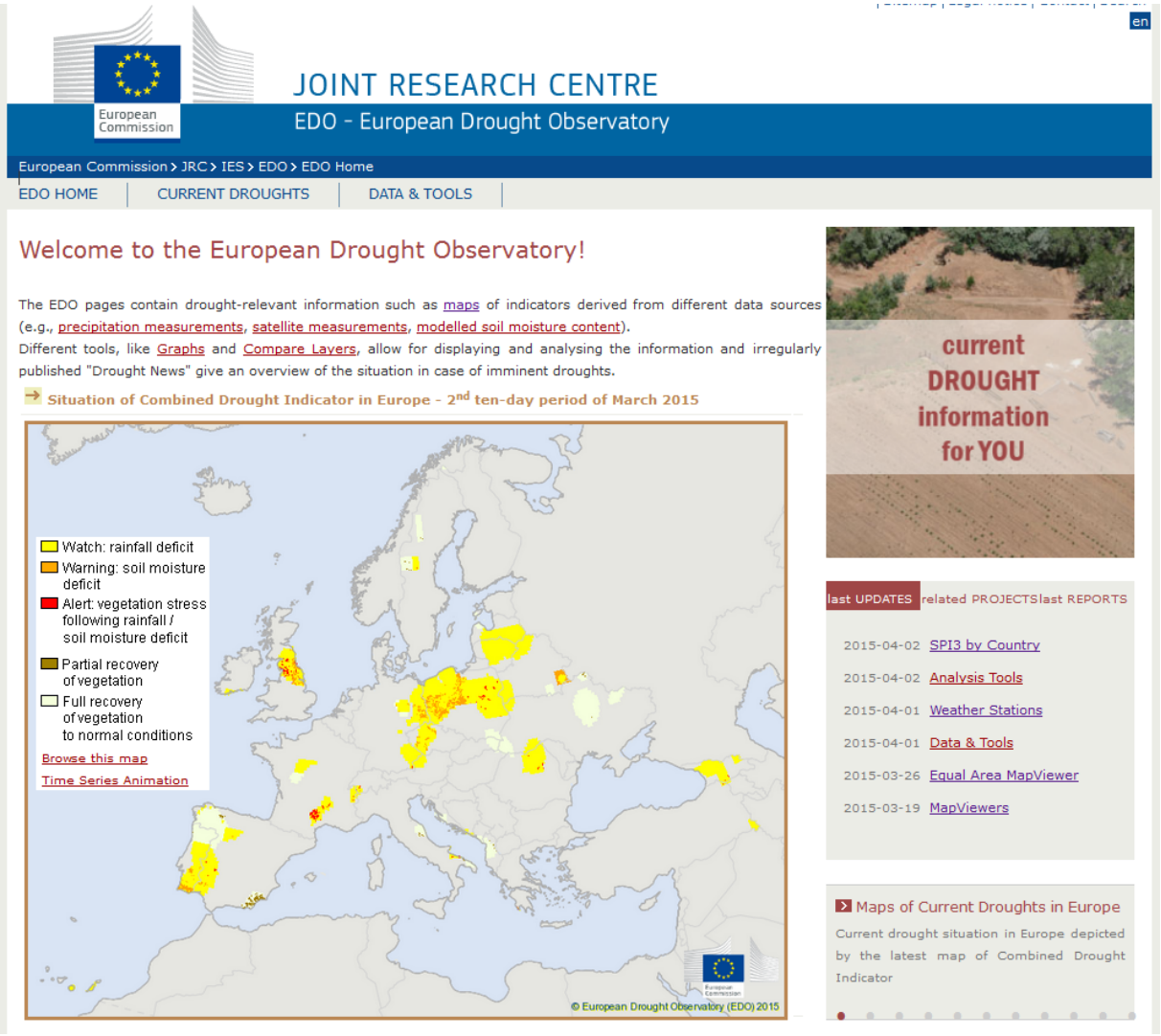

Figure 2: EDO homepage (http://edo.jrc.ec.europa.eu/) with map of current droughts based on combined index CDI.

[5] http://ies.jrc.ec.europa.eu/index.php
[6] http://ec.europa.eu/dgs/jrc/

EDO MapViewer[7] is a web mapping service (Figure 3), available on EDO webpage. It enables the visualisation, overlay/comparison and interrogation of spatial datasets over the Internet using WMS protocol.

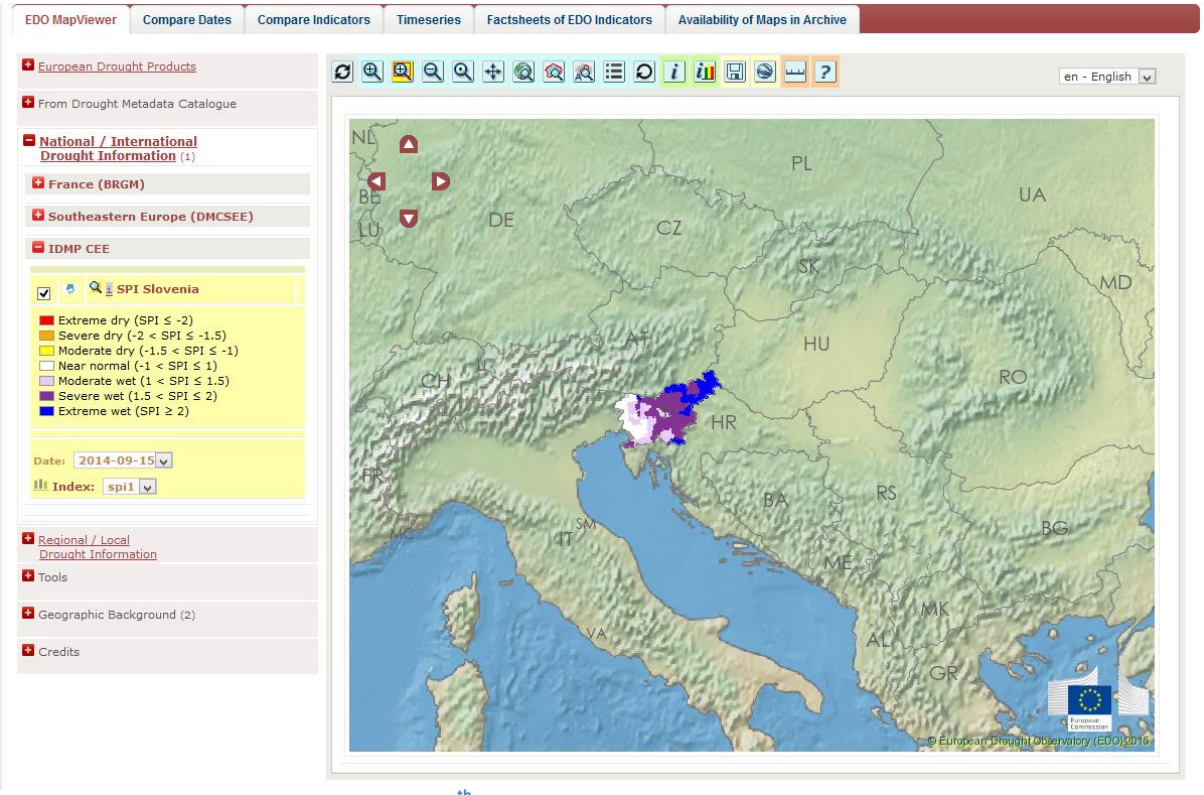

Figure 3. EDO MapViewer showing SPI1 for 15th of September 2015 from external source of Slovenian Environment Agency (http://www.arso.gov.si/en/).

Drought Metadata Catalogue[8] (Figure 4) is a web application for searching and updating the drought catalog, developed by the University of Zaragoza for EuroGEOSS FP7 Project[9].

[7] http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1120
[8] http://vap-xjedo.jrc.it/Search/Search.html
[9] http://www.eurogeoss.eu

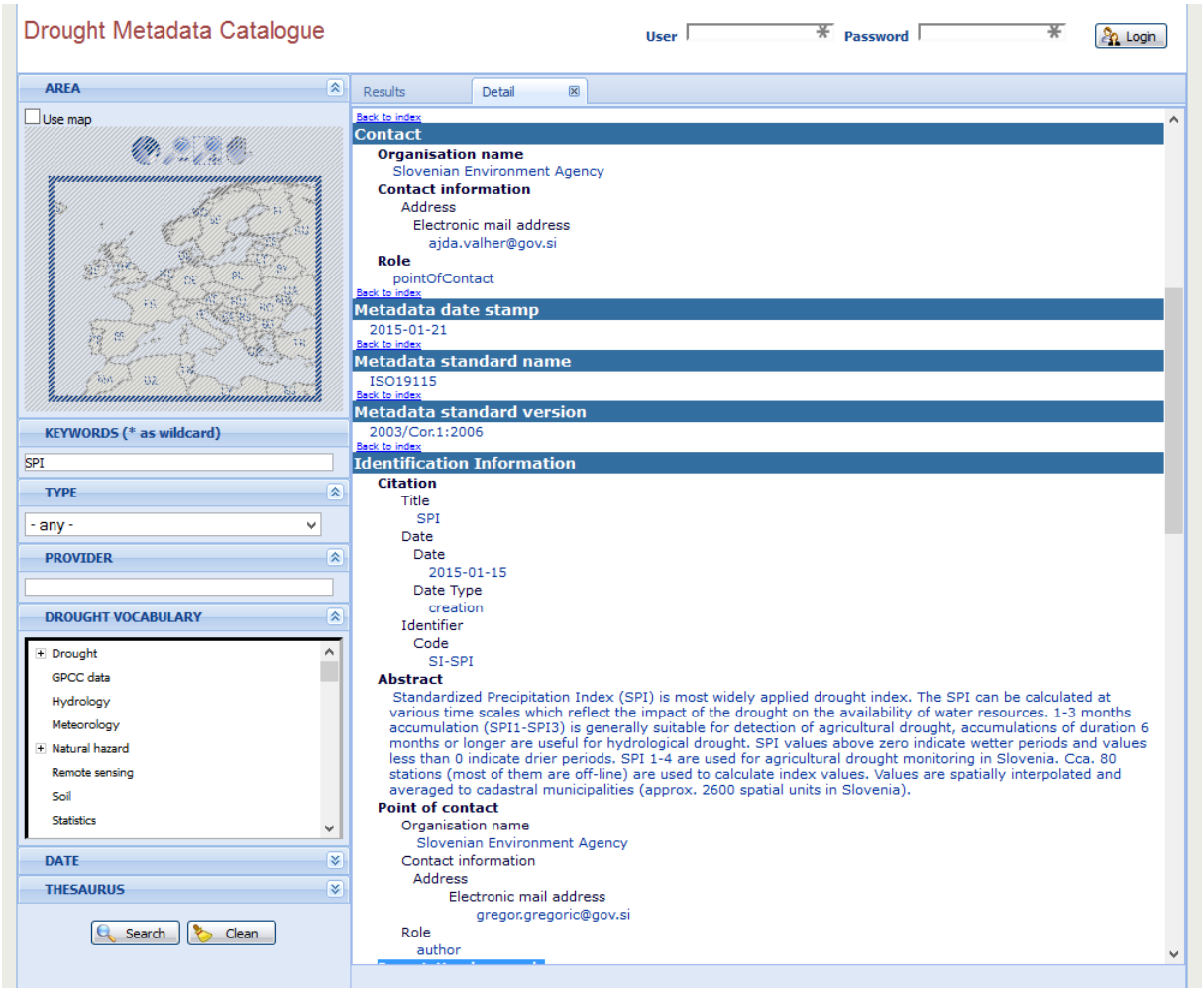

Figure 4: EDO Drought Metadata Catalogue example for Slovenian SPI product.

3. Detail report

Partners listed in Table 2 collected existing national data (SPI and any other indicators that are used in partner's countries for identifying or forecasting drought) and make them available through Drought Metadata Catalogue. In Catalogue information about drought can be added with abstract (description of variable), keywords, link and contact. This information can be data (raster or vector), links to documents (field reports, bulletins etc.) or national web pages providing drought information.
As already said data for 26 products from 10 countries have been received and imported into Drought Metadata Catalogue. One of the products has been integrated into EDO MapViewer as well. In subchapter 3.2 each product is shortly described, divided by country.

Table 2: List of partners.

Country	Partners
Bulgaria	National Scientific Coordination Center of Global Changes
Czech Republic	Research Institute for Soil and Water Conservation in Prague
Hungary	Lower-Tisza District Water Directorate
Lithuania	Department of Hydrology and Climatology, Vilnius University
Moldova	Institute of Ecology and Geography
Poland	GWP Poland supported by Institute of Meteorology and Water Management
Romania	National Meteorological Administration
Slovakia	Slovak Hydrometeorological Institute
Slovenia	Slovenian Environment Agency / DMCSEE
Ukraine	UkrHydroMetCentr

3.1 Work chronology

Work on Activity 1.3. started in autumn 2013. We gave first presentation[10] about this activity on the workshop in October 2013 in Bratislava. Until January 2014 draft version of Implementation Guide has been prepared which was send to partners with survey about existing operational products for drought monitoring in their countries. Until second workshop in April in Ljubljana we have received surveys from 7 partners (missing Bulgaria, Hungary and Poland[11]). On this workshop training on activity 1.3[12] has been given with overview of available data from partners countries based on received survey. Representatives of 7 partners have attended this training (missing Hungary, Slovakia and Ukraine). Based on input from partners and constructive remarks from PRG final version of Implementation guide with detailed description how to prepare metadata for Drought Metadata Catalogue has been prepared in June 2014 and send to partners. In October 2014 received products until then have been presented on the workshop in Budapest[13]. After numerous reminders metadata from all partners have been received in February 2015, imported into the Drought Metadata Catalogue and final version of Implementation report has been prepared.

[10] Available on: http://www.slideshare.net/gwpceewaterpartnership/6-act-13-platformgregoric.
[11] Comment: received after workshop.
[12] Available on: http://www.slideshare.net/gwpceewaterpartnership/14-drought-information-exchange-platform-honzakgregoric.
[13] Available on: http://www.slideshare.net/gwpceewaterpartnership/12-act-13-gregoric.

3.2 Description of products by countries

3.2.1 Bulgaria

For identifying drought National Institute of Meteorology and Hydrology of the Bulgarian Academy of Sciences[14] uses different products: SPI, SMI, precipitation anomaly etc. Most of them are publicly available.

Monthly weather bulletin

- Abstract:
  The NIMH monthly weather bulletin is published every month on the internet as well as on a hard copy. It is provided to the government, parliament and presidency. All other interested users can see it on the internet. Some weather data are presented into the bulletin, but mainly maps, figures and text are presented at the weather bulletin. When during a month drought conditions occur there are maps, e.g. those with precipitation (soil moisture, as well as river runoff) anomalies are drawn and compared to the normal climate conditions.
- Availability:
  http://www.meteo.bg/

Precipitation anomaly

- Abstract:
  Precipitation anomalies are calculated for periods with different duration (hours , days, months , etc.)in order to figure out eventual drought events. The information center at the NIMH produces usually monthly or seasonal maps of precipitation anomalies. most of these maps are published on internet using mainly native (Bulgarian) language.
- Availability:
  http://www.meteo.bg/

SMI

- Abstract:
  The agricultural drought index SMI classifies land through measured or modeled values of soil moisture. He characterized soil drought different than normal to extreme, the degree of drought increases with decrease of the index value.
  For calculating the index of drought are used data from measurements of soil moisture in the agro-meteorological network of NIMH, which is part of the meteorological network. It consists of 29 agro-meteorological stations located in areas of agricultural production at an altitude below 800 m.
  Measurements of soil moisture are carried out by gravimetric method up to 1 m in 10 cm every ten days during the potential vegetation season. In the resting period measurements are made once a month at the same depth, but twice measurements are carried out at a depth of 2 m in the 20 cm layer 100-200 cm.
  Hydrological calculations, the index of drought is determined by the calculated soil moisture topsoil 0-30 cm.
  The maps presented spatial distribution of SMI. For this purpose, used ArcGIS Geostatistical Analyst. Interpolation is done by Inverse Distance Weighting.
- Availability:
  http://www.meteo.bg/

[14] www.meteo.bg

SPI

- Abstract:
  Is a widely used index (McKee et al., 1993; Lloyd-Hughes and Saunders, 2002), which consists of fitting and transforming a long-term precipitation record into a normal distribution that has zero mean and unit standard deviation. SPI values of -0.5 to -1 correspond to mild droughts, -1 to -1.5 to moderate droughts, -1.5 to -2 to severe droughts, and below -2 to extreme droughts. Similarly, values from 0 to 2 correspond to mildly wet to severely wet conditions, and values above 2 to extremely wet conditions (Lloyd-Hughes and Saunders, 2002) (Table 1);
  - Allows us to compare and emphasize the drought intensity and length over different climatic areas;
  - SPI tries to quantify the dry and wet periods for different time scales (from 1 month up to 48 months). This flexibility is one of his main advantages when compared with other indices;
  - SPI can be used for any kind of landscape and topography;
  - The SPI is an index based on the probability of recording a given amount of precipitation, and the probabilities are standardized so that an index of zero indicates the median precipitation amount (half of the historical precipitation amounts are below the median, and half are above the median).

  The index is negative for drought, and positive for wet conditions. As the dry or wet conditions become more severe, the index becomes more negative or positive.
  - It has been developed by McKee, Doesken and Kleist at the beginning of 1990'.

  SPI index is more and more popular in the world. it is because of the only weather element needed to calculate it - precipitation. During the last years SPI is calculated in many units but according a contract between the Ministry of Waters and Environment and NIMH SPI maps must be calculated every month and published on the internet for free use. Advantages: the index allows:
  - Comparison of the drought severity in areas with very different climate;
  - It can be calculated for different scales of time (1…n months);
  - It can emphasize the occurrence of some droughts months in advance and can emphasize the drought severity;
  - It is monthly updated;
  - Allows the spatial – temporal visualization of the values from a high number of points.

  Disadvantages: In order to establish the index, it is necessary to calculate the statistical parameters of the average rainfalls for different time scales.
- Availability:
  http://www.meteo.bg/

Summary:

- No. of products in Drought Metadata Catalogue: 4
- No. of maps potentially to be suitable for integration into EDO MapViewer: 2
- No. of maps integrated into EDO MapViewer: 0

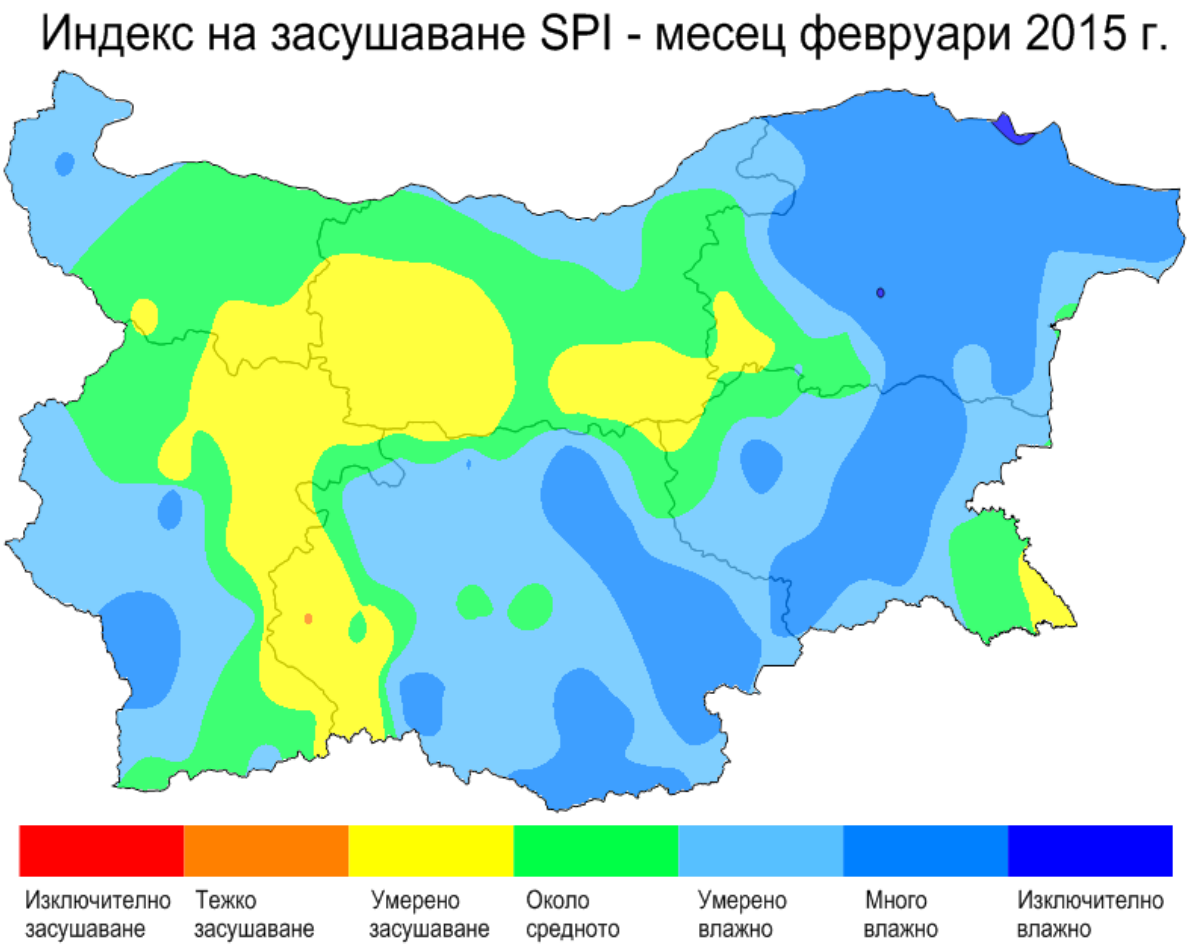

Figure 5: Example of SPI map for Bulgaria.

3.2.2 Czech Republic

In Czech Republic two services are dedicated for identifying drought. Drought Monitor[15] is developed by Czech Hydrometeorological Institute (CHMI)[16]. Integrated system for drought monitoring (The Drought Monitor)[17], is still under development by Academy of Sciences, Mendel University, Masaryk University and CHMI.

Amount of usable water in loam soils in Czech Republic

- Abstract:
  Amount of usable water in loam soils with available water capacity 170 mm for 1 m deep soil profile under grassland in the Czech Republic, the current status for any given Sunday. Processing in a weekly step (on Tuesday)from daily values of usable water supplies in the soil modeled by model AVISO (CHMI, Brno branch) for 198 automatic meteorological stations CHMI station network. Presented as one of the outcomes of drought monitoring in the warm half of the year in section soil drought on a publicly accessible website CHMI.
- Availability:
  http://portal.chmi.cz/portal/dt?action=content&provider=JSPTabContainer&menu=JSPTabContainer/P10_0_Aktualni_situace/P10_4_SUCHO&nc=1&portal_lang=cs#PP_SUCHO

Basic water balance of grasslands in the Czech Republic

- Abstract:
  Basic water balance of grassland (difference between precipitation and potential evapotranspiration) in the Czech Republic, since 1.3 as of any given Sunday. It is processed in weekly step(Tuesday) from the measured values of daily precipitation amounts and daily values of modeled potential evapotranspiration from model AVISO (CHMI, Brno branch) for 198 automatic meteorological stations of CHMI station network. Presented as one of the outcomes of drought monitoring in the warm half of the year in section climatological drought on a publicly accessible website CHMI.
- Availability:
  http://portal.chmi.cz/portal/dt?action=content&provider=JSPTabContainer&menu=JSPTabContainer/P10_0_Aktualni_situace/P10_4_SUCHO&nc=1&portal_lang=cs#PP_SUCHO

Potential evapotranspiration of grassland, comparison with the long-term average 1961 – 2010

- Abstract:
  Potential evapotranspiration from grassland in the Czech Republic, comparison of the amount from 1.3. until any given Sunday with the long-term average 1961 – 2010. Processing in a weekly step (on Tuesday) from the daily values of modeled potential evapotranspiration (model AVISO, CHMI, Brno branch) for 198 automatic meteorological stations CHMI station network. Presented as one of the outcomes of drought monitoring in the warm half of the year in section climatological drought on a publicly accessible website CHMI.
- Availability:
  http://portal.chmi.cz/portal/dt?action=content&provider=JSPTabContainer&menu=JSPTabContainer/P10_0_Aktualni_situace/P10_4_SUCHO&nc=1&portal_lang=cs#PP_SUCHO

Weekly amount of precipitation, measured values

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15 http://portal.chmi.cz/portal/dt?action=content&provider=JSPTabContainer&menu=JSPTabContainer/P10_0_Aktualni_situace/P10_4_SUCHO&nc=1&portal_lang=cs#PP_SUCHO

16 http://www.chmi.cz

17 http://www.intersucho.cz/

- Abstract:
  Precipitation amount in the Czech Republic for the previous week, from Monday to Sunday. Processing of the daily value total precipitation measured by 198 climatological stations of automatic station network of CHMI. Presented as one of the outcomes of drought monitoring in the warm half of the year in section climatological drought on a publicly accessible website CHMI.
- Availability:
  http://portal.chmi.cz/portal/dt?action=content&provider=JSPTabContainer&menu=JSPTabContainer/P10_0_Aktualni_situace/P10_4_SUCHO&nc=1&portal_lang=cs#PP_SUCHO

Summary:

- No. of products in Drought Metadata Catalogue: 4
- No. of maps potentially to be suitable for integration into EDO MapViewer: 3
- No. of maps integrated into EDO MapViewer: 0

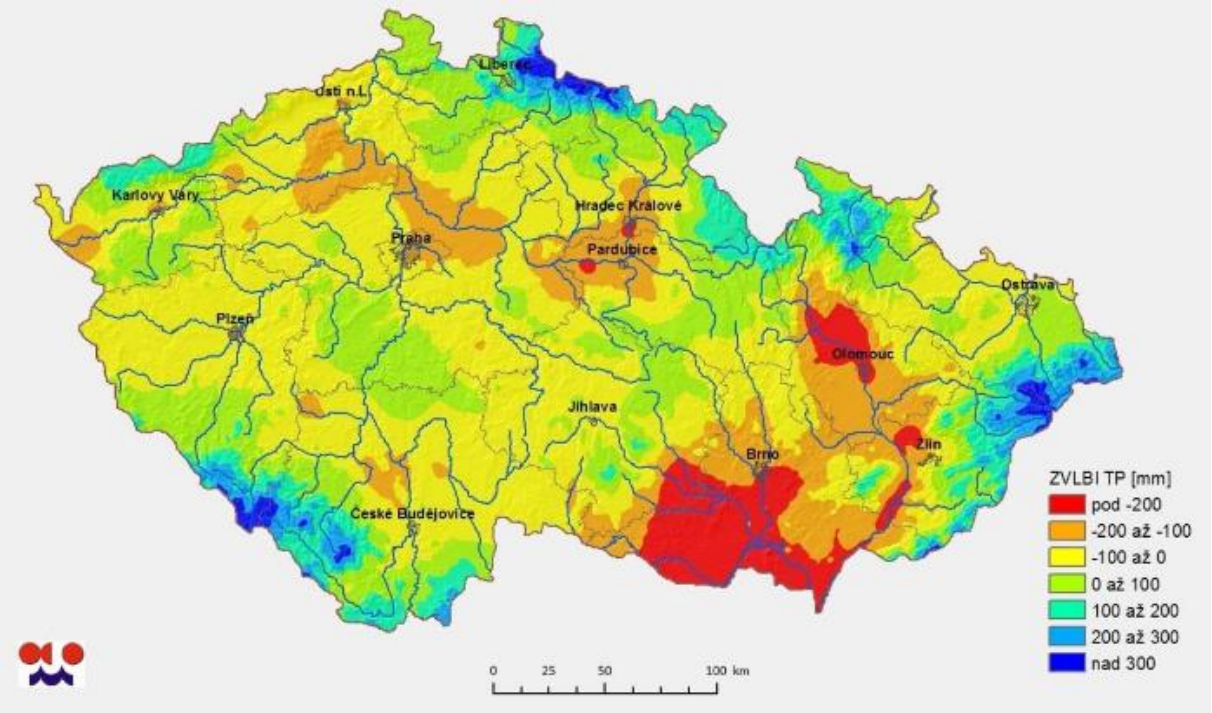

Figure 6: Example of Basic water balance of grasslands in the Czech Republic.

3.2.3 Hungary

In Hungary two services are used for identifying drought. One is maintained by Hungarian Meteorological Service (OMSZ[18]), another by General Directorate of Water Management (OVH[19]).

Agro-meteorological maps

- Abstract:
  The webpage of the Hungarian Meteorological Service (abbr. OMSZ in Hungarian) contains maps describing the actual precipitation and temperature anomalies. Anomaly refers to the difference of actual values and the long-term average values. The agro-meteorological maps also show soil moisture, and surface temperature data. The data can be acquired for the last 1-5-30 and 90 days.
- Availability:
  www.met.hu/idojaras/agrometeorologia/

Monthly integrated water balance report and forecast

- Abstract:
  Integrated water balance report and forecast (abbr. VHTE in Hungarian) is a brief monthly report of the current hydro-meteorological situation of Hungary. The documents contain the country-wide spatial distribution of precipitation, temperature and soil moisture data of the past month, while it is also give a forecast of probable hydrologic conditions of the next month. The forecast consists of three (normal, wet, dry) weather variants, and estimates intensity of spatial distribution of drought or excess water inundation related to weather conditions
- Availability:
  http://www.vizugy.hu/

WAHASTRAT

- Abstract:
  Webpage of the WAHASTRAT (2013-2014) project (Water shortage hazard and adaptive water management strategies in the Hungarian-Serbian cross-border region). Containing drought maps (PAI, PADI, SPI* and Humidity index) from 1961-2013, lecture and workshop presentations and documents. *: SPI values are not calculated in the internationally accepted methodology.
- Availability:
  http://wahastrat.vizugy.hu/

Summary:

- No. of products in Drought Metadata Catalogue: 3
- No. of maps potentially to be suitable for integration into EDO MapViewer: 1
- No. of maps integrated into EDO MapViewer: 0

[18] http://www.met.hu/
[19] http://www.ovf.hu/

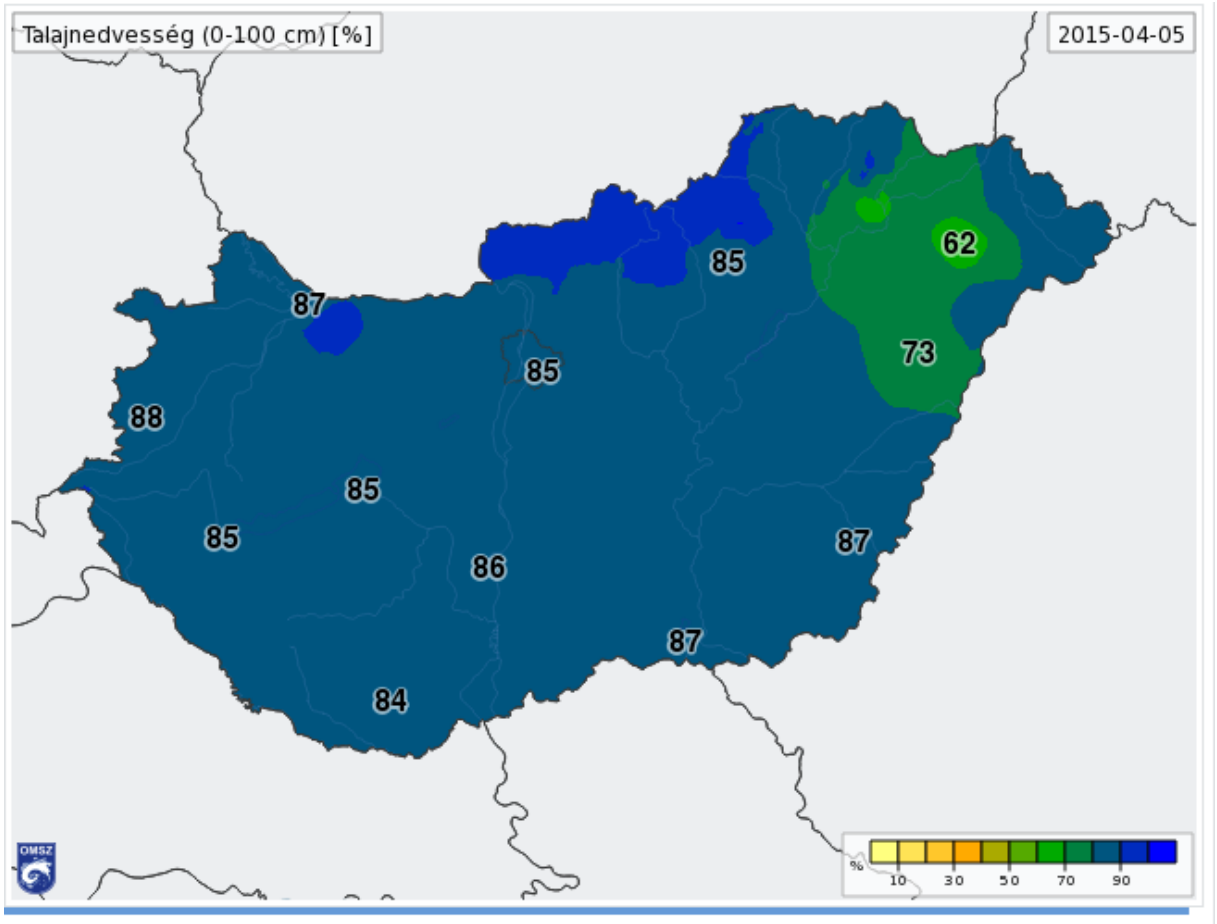

Figure 7: Example of Soil moisture map in Hungary.

3.2.4 Lithuania

For identifying drought Lithuanian Hydrometeorological Service under the Ministry of Environment[20] use Selianinov hydrothermal coefficient.

Selianinov hydrothermal coefficient (HTC)

- Abstract:
  The HTC is determined by dividing sum of precipitation - P in mm and the sum of the mean day temperatures – T in °C, for the same period, divided to 10.HTC=∑P (mm) / ΣT/10where ΣP – sum of the precipitation, and ΣT – sum of the mean air temperature for 30 consecutive days. Values of the HTC are calculated for the active plants vegetation periods (when mean air temperature is higher than 10 °C). HTC are calculated daily, starting from 30th day of the active plants vegetation period, because each value is calculated from the sum of the precipitation and the mean air temperature data of the 29 previous and the current day. Extreme drought definition − 30 days or longer periods with HTC<0,5.Maps are published in Lithuanian Hydrometeorological Service under Ministry of Environment web page each week in active plants vegetation period. The interpretation of the HTC values is as follows: <0,5 – severe drought; <0,7 – medium drought; <0,9 – weak drought; >1 – sufficient moisture; >1,5 – excessive moisture.
- Availability:
  http://www.meteo.lt/dregmes_salygos.php

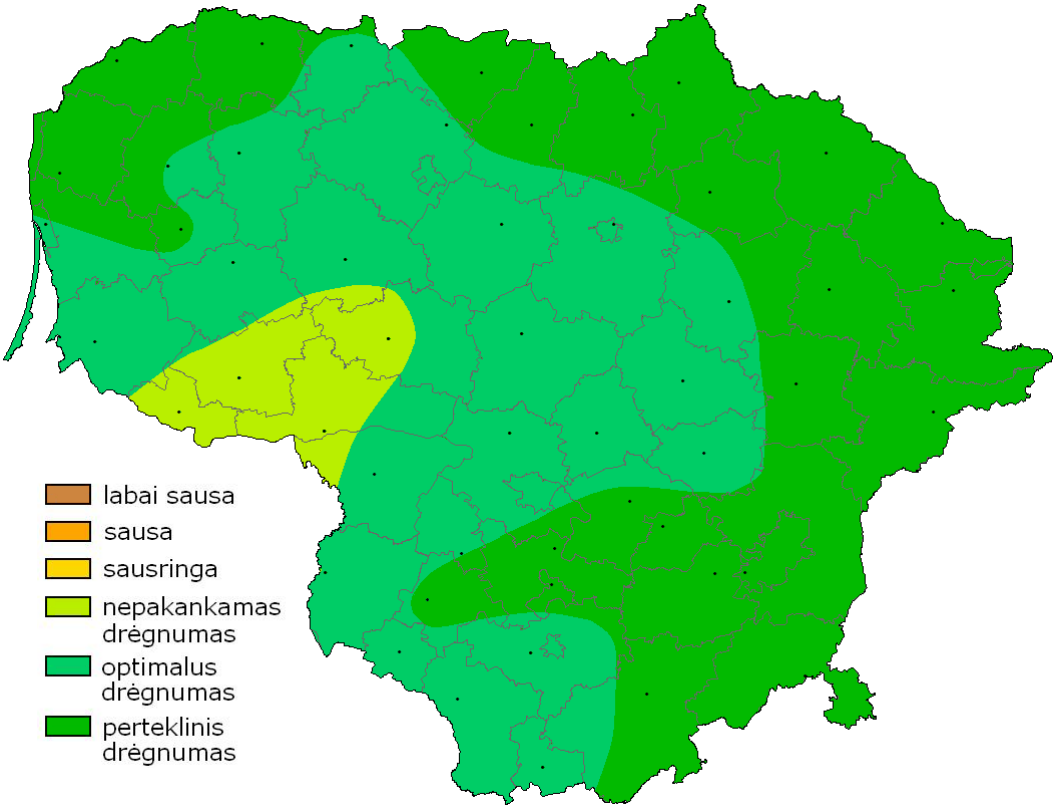

Figure 8: Example of HTC map for Lithuania.

[20] http://www.meteo.lt

Summary:

- No. of products in Drought Metadata Catalogue: 1
- No. of maps potentially to be suitable for integration into EDO MapViewer: 1
- No. of maps integrated into EDO MapViewer: 0

3.2.5 Moldova

For identifying drought Institute of Ecology and Geography of Academy of Sciences[21] use SPI, Martonne index and dry periods index (sum of dry days in May-August compared to multiyear average). However these products are not operational and are available only upon request from authority (ministries etc.). Therefore we would recommend to establish a regular operational service also for less qualified users. In that case also Moldavian products will be added to EDO.

Atlas. Climatic resources of the Republic of Moldova

- Abstract:
  The atlas contains a set of thematic maps reflecting the spatial distribution of monthly, seasonal, and annual mean air temperature, the average amount of monthly, seasonal and annual precipitations for a period of 30 years (1981-2010). The data recorded from meteorological stations and posts of State Hidrometeorological Service served as starting material. All maps were developed at scale 1:1500000 in Universal Transversal Mercator projection (UTM), using cartographic modelling. Collected data corresponds to meteorological shelter height (2 m).
- Availability:
  http://ieg.asm.md/sites/default/files/Atlas-2013.pdf

Summary:

- No. of products in Drought Metadata Catalogue: 1
- No. of maps potentially to be suitable for integration into EDO MapViewer: 0
- No. of maps integrated into EDO MapViewer: 0

[21] http://ieg.asm.md/

3.2.6 Poland

For identifying drought Institution of Meteorology and Water Management, National Research Institute[22] have prepared special webpage: http://posucha.imgw.pl/. Main used product is SPI.

SPI: Standardized Precipitation Index

- Abstract:
  The Standardized Precipitation Index (SPI) is calculated on a monthly basis for the calendar months. The applied reference period is 1966-2005. Values obtained for stations are interpolated with the use of Inverse Distance Weighting method to the grid of resolution 0.1 x 0.1 deg.
- Availability:
  http://posucha.imgw.pl/

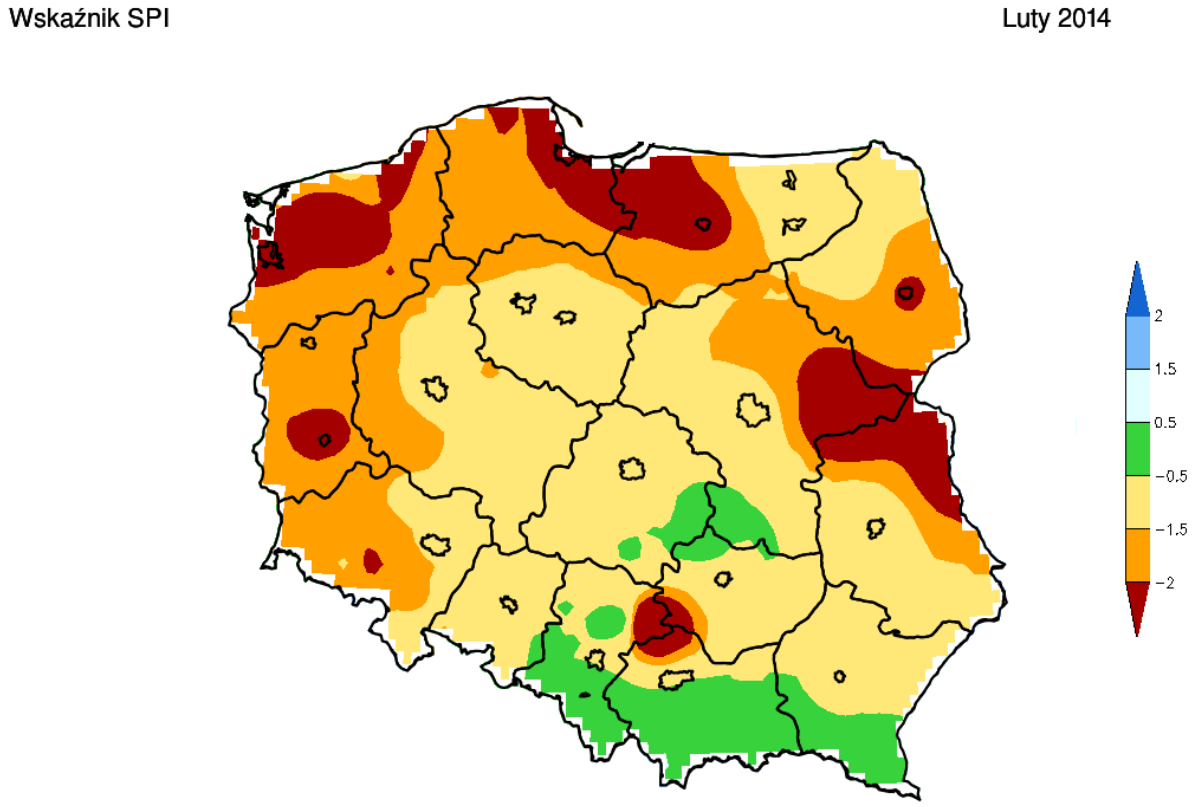

Figure 9: Example of SPI map for Poland.

Summary:

- No. of products in Drought Metadata Catalogue: 1
- No. of maps potentially to be suitable for integration into EDO MapViewer: 1
- No. of maps integrated into EDO MapViewer: 0

[22] http://imgw.pl/

3.2.7 Romania

For identifying drought National Meteorological Administration[23] use a lot of different information: rainfall amounts, ETP, SPI, remote sensing data etc. Some of these products and agrometeorological bulletin are publicly available.

Agrometeorological Bulletin

- Abstract:
  AgroMeteorological Bulletin includes Meteorological Forecast, information about soil moisture and vegetation stages of the main crops in Romania.
  Period: Wednesday to Thursday
  Frequency: Weekly
  - Availability:
  http://www.meteoromania.ro/anm/?lang=ro_ro

Seasonal Meteorological Forecast

- Abstract:
  Seasonal Meteorological Forecast
  Frequency: every 3 months
- Availability:
  http://www.meteoromania.ro/anm/?lang=ro_ro

Soil Moisture map

- Abstract:
  Soil Moisture Map for Romania information about soil moisture in different depths correlated with vegetation crop stages
  Period: Everyday
  Frequency: Daily
- Availability:
  http://www.meteoromania.ro/anm/?lang=ro_ro

SPI Index Map

- Abstract:
  Standardized Precipitation Index map
  Frequency: Monthly
- Availability:
  http://www.meteoromania.ro/anm/?lang=ro_ro

Weather warnings

- Abstract:
  Weather warnings contained information and maps using symbols and color codes and provide the latest warnings of severe weather expected
- Availability:
  http://www.meteoromania.ro/anm/?lang=ro_ro

Summary:

- No. of products in Drought Metadata Catalogue: 6
- No. of maps potentially to be suitable for integration into EDO MapViewer: 2
- No. of maps integrated into EDO MapViewer: 0

[23] http://www.meteoromania.ro/

3.2.8 Slovakia

For identifying drought SHMI (Slovak Hydrometeorological Institute)[24] use SPI of different periods and PDSI index, however these indexes are not publicly available. Product which is directly connected to drought and is publicly available is forecast of forest fire risk index.

Forecast of forest fire risk index

- Abstract:
  - maps in NetCDF format
  - updated daily
  - automatic generation using programming language C and Fortran and data flow is controlled in Perl scripts
  - interpolation based on combination of IDW and linear regression with altitude using temperature data and precipitation data (precipitation is interpolated without linear regression) from climatological station in the territory of Slovakia
  - no calibration period
  - index evaluates the possibility of fire as a result of insufficient supply of moisture in plant canopy
- Availability:
  http://www.shmu.sk/en/?page=1&id=klimat_dennemapy

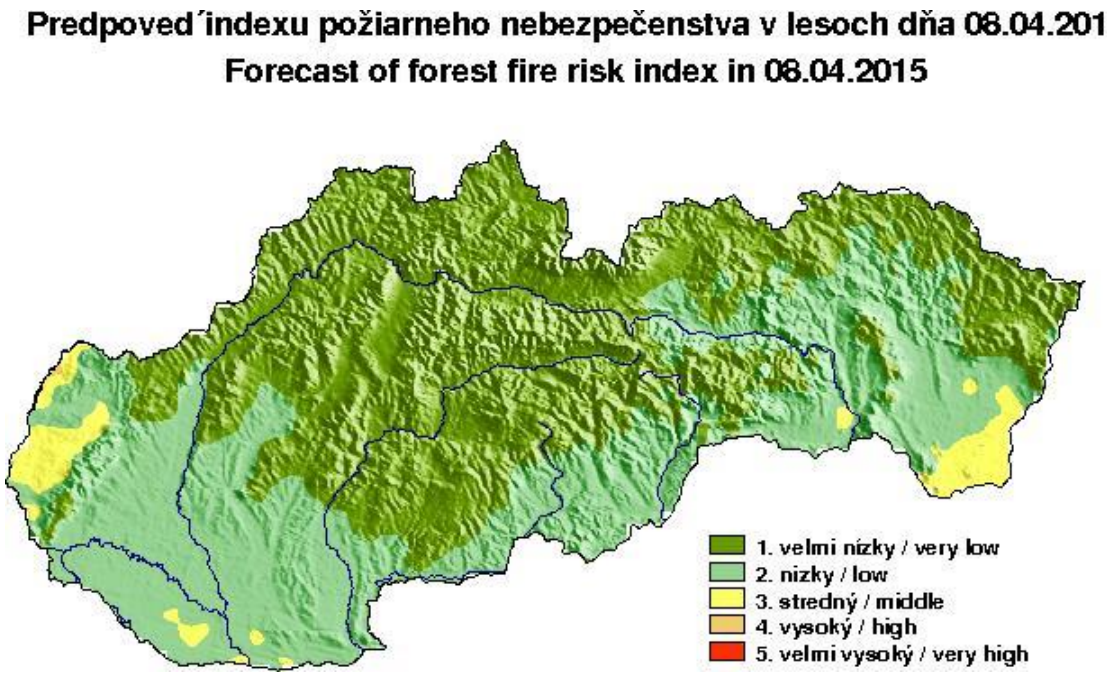

Figure 10: Example of Forecast of forest fire risk index for Slovakia.

Summary:

- No. of products in Drought Metadata Catalogue: 1
- No. of maps potentially to be suitable for integration into EDO MapViewer: 0
- No. of maps integrated into EDO MapViewer: 0

[24] http://www.shmu.sk/

3.2.9 Slovenia/SEE

For identifying drought Slovenian Environment Agency[25] and DMCSEE (Drought Management Centre for Southeastern Europe[26]) use a lot of different products, most of them are publicly available.

Agriculture Soil Water Balance Bulletin in Slovenia

- Abstract:
  Water balance bulletin is composed by:
  -Meteorological condition
  -Crop condition
  -Evapotranspiration / in vegetation season
  -Water balance / in vegetation season
  -Air temperature anomaly map* / in vegetation season
  -Share of solar radiation map* / in vegetation season
  -Share of precipitation map* / in vegetation season
  -Water balance anomaly map* / in vegetation season
  -Standardized precipitation index (1-, 3-, 6-, 12-months) / in vegetation season
  -Cumulative effective air temperature graph (> 5 °C) / in dormance season
  -Cumulative water balance graph / in dormance season
  -Soil temperature and condition / in dormance season
  *long-term average 1971-2000
  It comes out every ten days from April to September and every month from October to March.
- Availability:
  http://meteo.arso.gov.si/met/sl/agromet/recent/wb/currentyear/

Drought Bulletin for SE Europe

- Abstract:
  Drought bulletin contains descriptions of the conditions of:
  -Average air temperature (60-days anomaly and percentile classes)
  -Water balance (60-days accumulated actual or anomaly and percentile classes)
  -Standardized Precipitation Index (SPI) for 1 and 3 months
  -Impact report
  -Remote sensing products
  -Fraction of vegetation cover (FVC)
  -Outlook (Long-term average: 1979–2012)
  Frequency: Monthly (at the beginning of the month for previous month; from April to November)
- Availability:
  http://www.dmcsee.org/en/drought_bulletin/

Precipitation Percentiles map

- Abstract:
  A percentile is the value of a variable below which a certain percent of observations fall. Long term precipitation record is sort by rank by month; 50 years period (1951-2000) was used. The 5th (10th, 15th etc.) percentile is the value below which 5 (10, 15 etc.) percent of the observations may be found. The 25th percentile is also known as the first quartile; the

[25] http://arso.gov.si, http://www.meteo.si
[26] http://www.dmcsee.org/

50th percentile as the median. Percentile values above 50 indicate wetter periods and values less than 50 indicate drier periods.
Maps are available from year 1951.

- Availability:
  http://www.dmcsee.org/en/drought_monitor/

Standardized Precipitation Index map

- Abstract:
  The Standardized Precipitation Index (SPI) calculation is based on the distribution of precipitation over long time periods (30 years (1961-1990) was used). The long term precipitation record is fit to a probability distribution, which is then normalized so that the mean (average) SPI for any place and time period is zero. SPI values above zero indicate wetter periods and values less than 0 indicate drier periods. SPI maps for 1-, 3-, 6- and 12-months are prepared.
- Availability:
  http://www.dmcsee.org/en/drought_monitor/

SPI maps for cadastral municipalities in Slovenia

- Abstract:
  Standardized Precipitation Index (SPI) is most widely applied drought index. The SPI can be calculated at various time scales which reflect the impact of the drought on the availability of water resources. 1-3 months accumulation (SPI1-SPI3) is generally suitable for detection of agricultural drought, accumulations of duration 6 months or longer are useful for hydrological drought.
  SPI values above zero indicate wetter periods and values less than 0 indicate drier periods.
  SPI 1-4 are used for agricultural drought monitoring in Slovenia. Ca. 80 stations (most of them are off-line) are used to calculate index values. Values are spatially interpolated and averaged to cadastral municipalities (approx. 2600 spatial units in Slovenia).
- Availability:
  EDO MapViewer (example on Figure 3).

Summary:

- No. of products in Drought Metadata Catalogue: 5
- No. of maps potentially to be suitable for integration into EDO MapViewer: 1
- No. of maps integrated into EDO MapViewer: 1

3.2.10 Ukraine

For identifying drought Ukrainian Hydrometeorological Center[27] use Selianinov hydrothermal coefficient and Standardized Precipitation Index, which is publicly available.

SPI

- Abstract:
  SPI is calculated for the period from 1961 to the current time.
  For 167 Ukrainian meteorological stations.
  Time-scale, 1, 3, 5, 6, 7, 9, 12 months.
- Availability:
  http://info.meteo.gov.ua/download/p6e5FW2a0Iuv24eBRfCN/

Summary:

- No. of products in Drought Metadata Catalogue: 1
- No. of maps potentially to be suitable for integration into EDO MapViewer: 0
- No. of maps integrated into EDO MapViewer: 0

[27] http://meteo.gov.ua/

4. Conclusions and outlook

Implementation of drought information platform is important step in common efforts to exchange knowledge and data, relevant for drought, in CEE region. We have received 26 products from 10 countries and imported them into the Drought Metadata Catalogue, which is part of the European Drought Observatory (EDO) – a common European drought information platform, which was selected as the information platform for this IDMP project.
Almost all countries use operational products for monitoring drought conditions. Moreover all countries have capacity to implement common set of drought indicators (e.g. to calculate SPI in operational manner). However a lot of different products are used due to historical reasons; some of countries use a lot of different data sources, others rely only on one indicator. It is difficult (and, in fact, we are not sure if it is also wise) to force implementation of common indicators.
In this activity we established and completed first step in interoperability. Map of institutions and completed database in the Drought Metadata Catalogue is basic condition to enable search for data and also use of national drought monitoring products by international organizations.

Significant amount of work remains to be done. Due to many already explained, reasons, EDO has proved to be an appropriate platform for exchange of data, relevant for drought analysis in Europe and we suggest using it in follow-up projects. Logical next step would be continuation of integration of services to EDO MapViewer. At that time (besides regional DMCSEE products) only one product from Slovenia has been integrated fully into EDO MapViewer. Further integration should be relatively easy, since maps of products are already available online in most of partners' countries. However for integration purposes significant work effort and specific expertise should be planned in order to achieve this goal.