Institute of Meteorology and Water Management
National Research Institute

Małgorzata Kępińska-Kasprzak

AGROMETEOROLOGICAL SERVICE PROVIDED BY INSTITUTE OF METEOROLOGY AND WATER MANAGEMENT – NATIONAL RESEARCH INSTITUTE - POLAND

Agrometeorologists for farmers
in hotter, drier, wetter future
Ljubljana , 2016

POGODYNKA PL

http://agrometeo.pogodynka.pl/

AGROMETEO
POGODYNKA

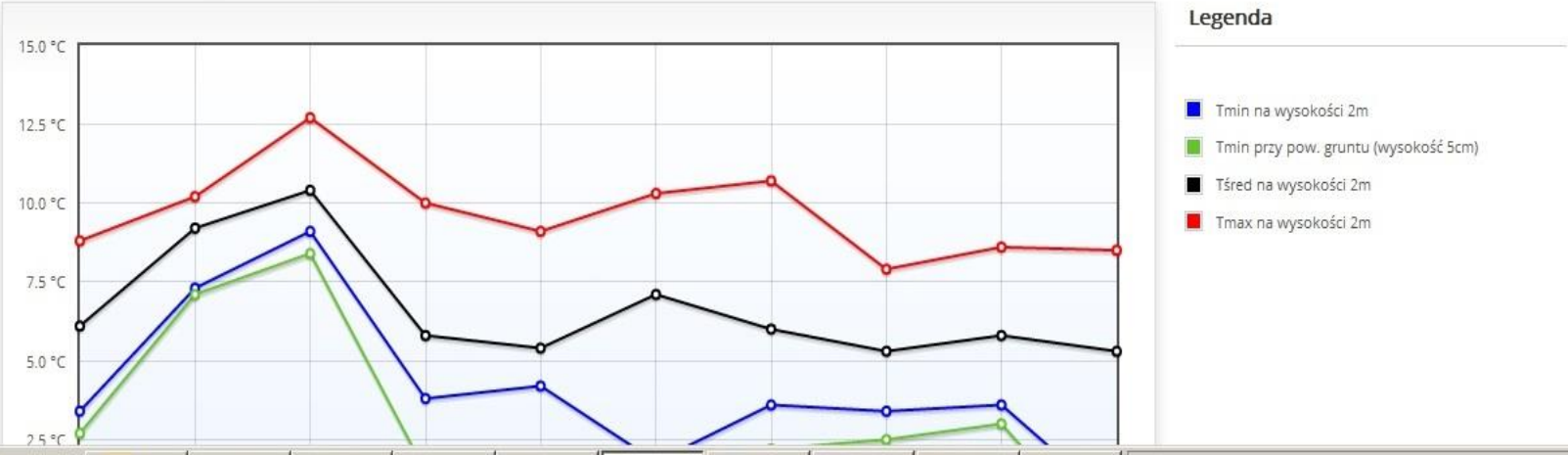
SERWIS IMGW-PIB
DLA ROLNIKÓW

POLUB NAS

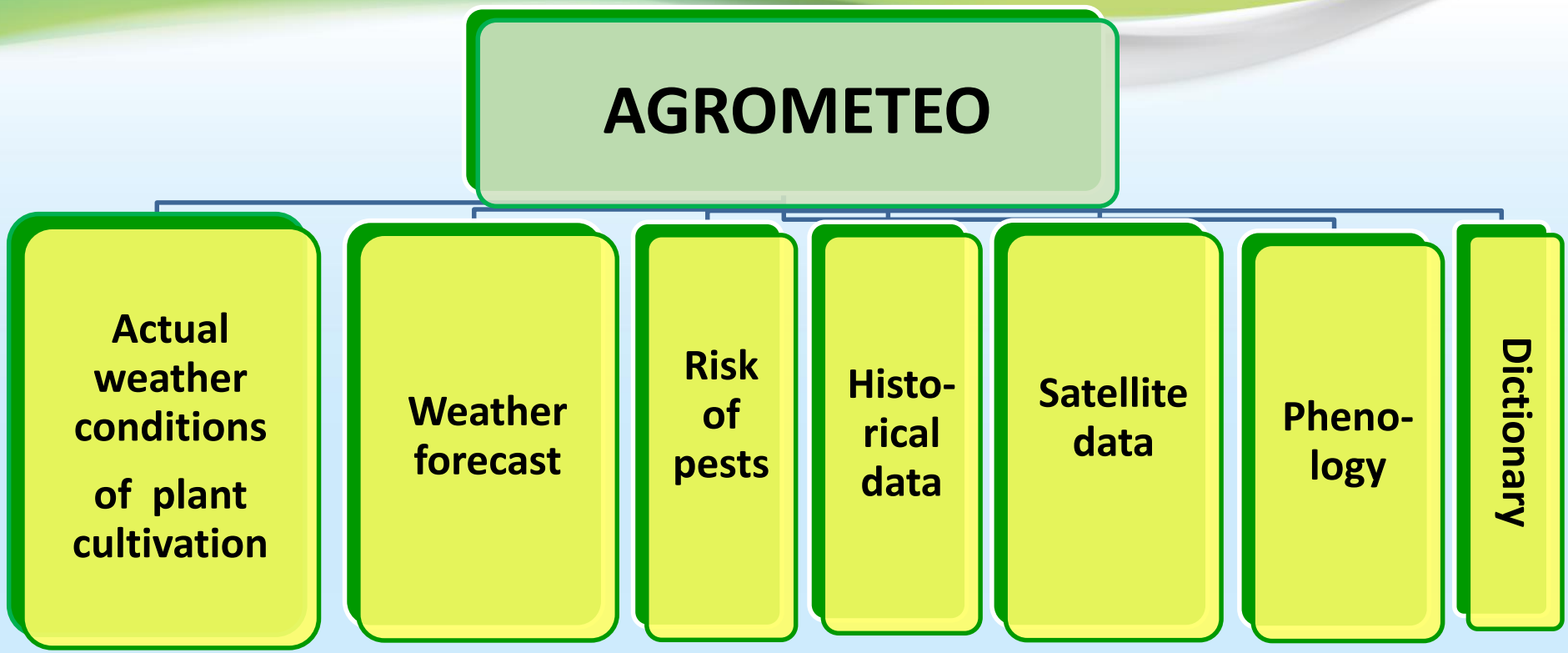
Aktualne warunki uprawy roślin | Pogoda | Wystąpienie zagrożeń agrofagami | Dane historyczne | Słownik pojęć | Obrazy satelitarne
Fenologia

Warszawa | POKAŻ WARUNKI

Warszawa - **Temperatura powietrza [° C]**

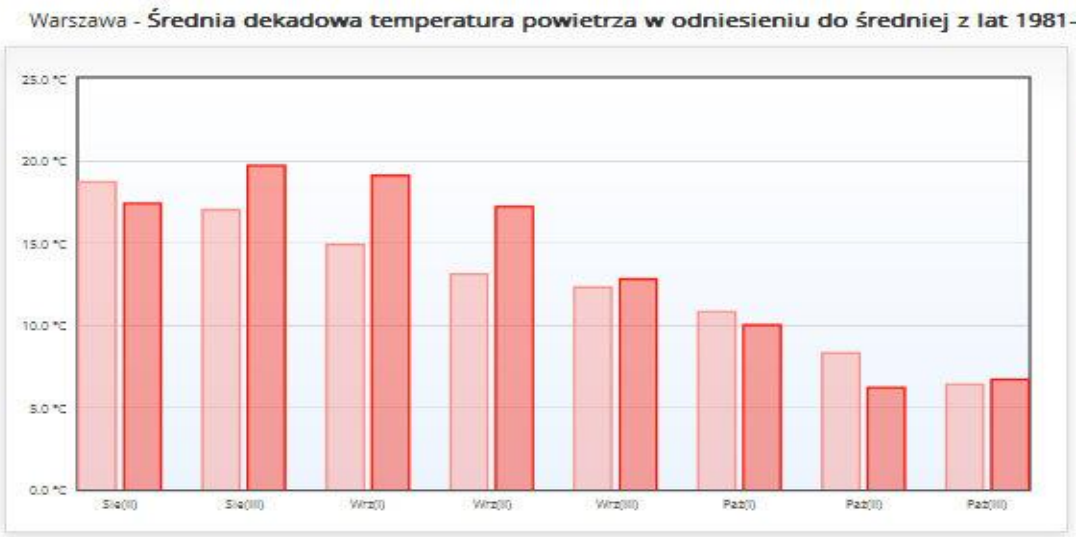


http://agrometeo.pogodynka.pl/

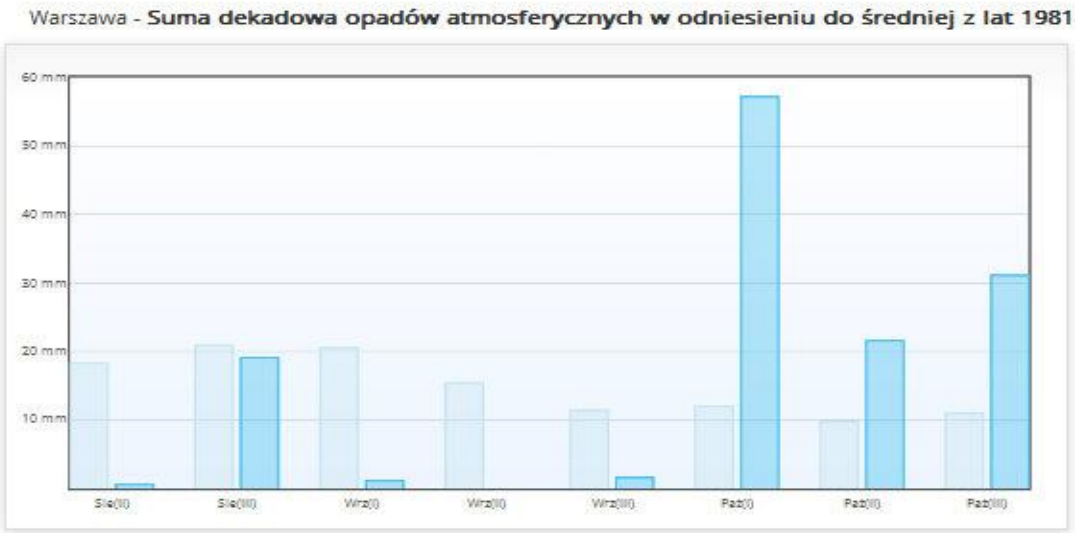


Actual weather conditions of plant cultivation - data for last 10 days

Actual weather conditions of plant cultivation - last 8 decades in comparison to 30 year average



Temperature
- average for each decade



Precipitation
- average sum for each decade

Weather forecast

Model COSMO Dokładna Prognoza Numeryczna	środa 02.11.2016	czwartek 03.11.2016	piątek 04.11.2016	sobota 05.11.2016

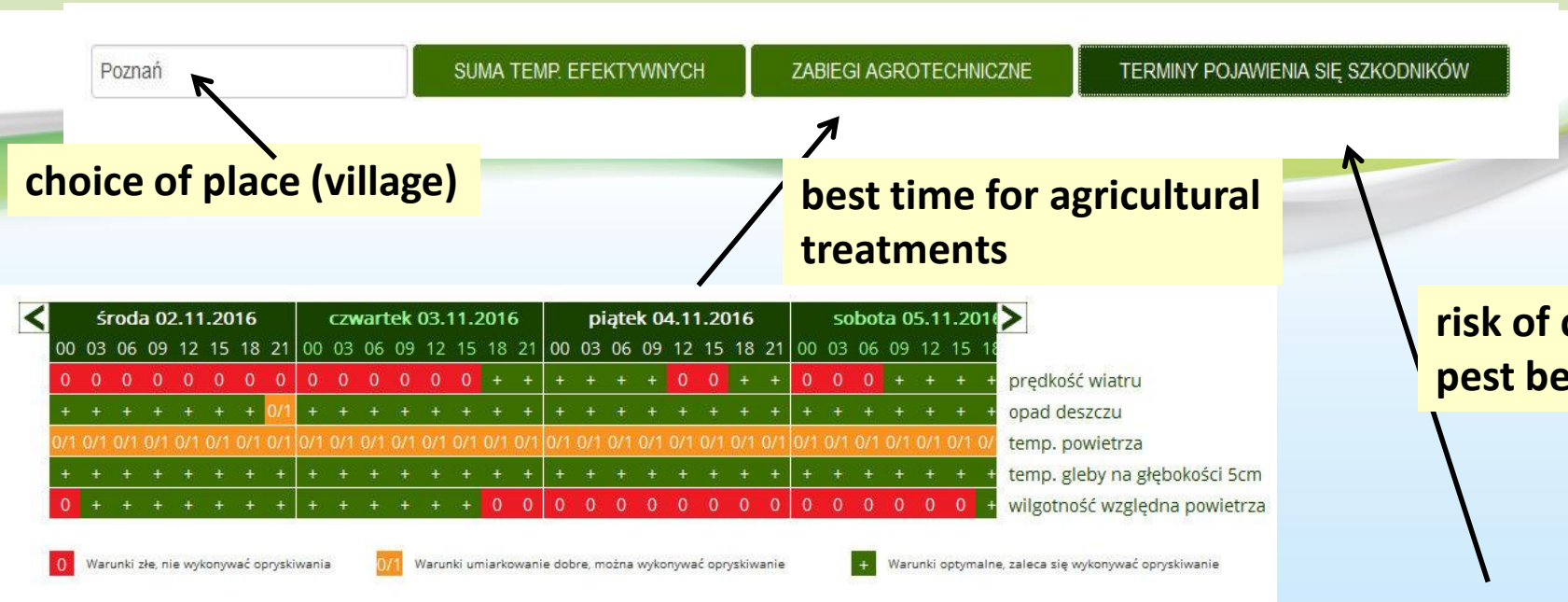
choice of Model and day

Model GFS Prognoza Długoterminowa	środa 02.11.2016	czwartek 03.11.2016	piątek 04.11.2016	sobota 05.11.2016	niedziela 06.11.2016	poniedziałek 07.11.2016	wtorek 08.11.2016

środa 02.11.2016	Model COSMO							
	01:00	04:00	07:00	10:00	13:00	16:00	19:00	22:00
temperatura powietrza na wys. 2m [°C]	7	7	6	6	7	6	5	3
temperatura przy powierzchni gruntu [°C]	7	7	6	6	7	6	4	3
prędkość wiatru [m/s]	4	5	4	6	7	5	6	6
kierunek wiatru [°]	273	273	254	243	268	286	289	293
zachmurzenie [%]	100	100	99	100	100	100	100	70
ciśnienie [hPa]	1002	1001	1000	999	997	997	999	1001
wilgotność względna powietrza [%]	92	85	89	86	84	86	80	81
wilgotność właściwa gleby [kg wody/kg gleby]	0.006	0.006	0.006	0.005	0.006	0.005	0.005	0.004
rodzaj opadu	brak opadu	deszcz	brak opadu	deszcz	brak opadu	deszcz	brak opadu	deszcz
wysokość opadu [mm/3h]	0	ślad opadu	0	0.1	0	0.8	0	0.1
temperatura [°C] gleby na głębokości:								
6 [cm]	8	7	7	7	7	6	6	4
18 [cm]	9	8	8	8	8	8	7	7
54 [cm]	9	9	9	9	9	9	9	9
162 [cm]	12	12	12	12	12	12	12	12

- Temp at 2meters
- Temp at 5cm
- wind speed
- wind direction
- cloudiness
- air pressure
- humidity
- soil moisture
- precipitation
- T of soil at 6, 18, 54, 162 cm

Risk of pests

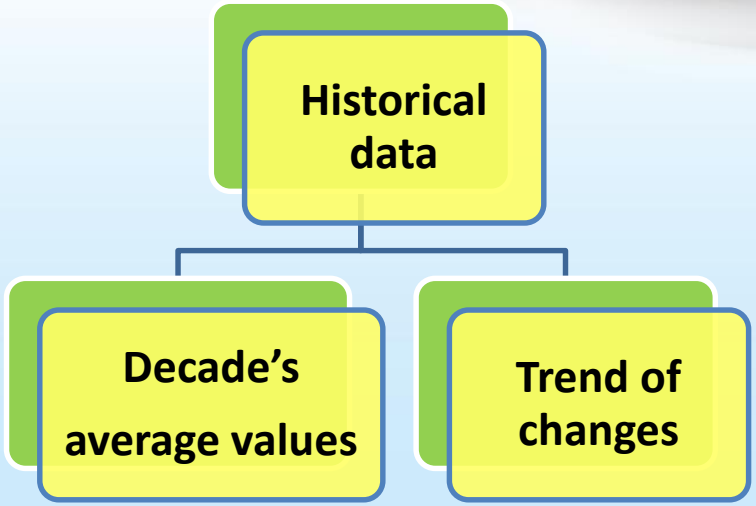


Poznań

Terminy pojawienia się szkodników roślin uprawnych i sadowniczych

Prognozowane elementy		niedziela 30.10.2016	poniedziałek 31.10.2016	wtorek 01.11.2016	środa 02.11.2016	czwartek 03.11.2016	piątek 04.11.2016	sobota 05.11.2016	niedziela 06.11.2016	poniedziałek 07.11.2016	wtorek 08.11.2016	środa 09.11.2016	czwartek 10.11.2016
		dni poprzednie			prognoza								
Szkodniki roślin uprawnych i sadowniczych (terminy pojawienia wyznaczone na podstawie ($\sum_{DD}$) - sum temperatur efektywnych)													
Stonka ziemniaczana (T_D = 11,5 °C)	$\sum_{DD}$=106°C	1114.75	1114.75	1114.81	1114.81	1114.81	1114.81	1114.81	1114.81	1114.81	1114.81	1114.81	1114.81
	$\sum_{DD}$=220°C												
Ploniarka zbożówka (T_D = 8,0 °C)	$\sum_{DD}$=400°C	1716.13	1716.77	1718.15	1718.15	1718.15	1718.15	1718.15	1718.37	1718.37	1718.37	1718.37	1718.37
Rolnica zbożówka (T_D = 10 °C)	$\sum_{DD}$=1000°C	1356.89	1356.89	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36
Paciornica lucernianka (T_D = 9,0 °C)	$\sum_{DD}$=222°C	1531.37	1531.59	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47
Owocówka jabłkóweczka (T_D = 10 °C)	$\sum_{DD}$=155°C	1356.89	1356.89	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36
	$\sum_{DD}$=230°C	1356.89	1356.89	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36
	$\sum_{DD}$=650°C	1356.89	1356.89	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36	1357.36
Owocówka śliwkóweczka (T_D = 9,0 °C)	$\sum_{DD}$=106°C	1531.37	1531.59	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47
	$\sum_{DD}$=120°C	1531.37	1531.59	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47	1532.47
Mszyca brzoskwiniowa (T_D = 3,0 °C)	$\sum_{DD}$=137°C	2809.66	2814.66	2820.16	2822.66	2823.61	2824.99	2826.68	2830.68	2832.18	2833.24	2834.24	2835.24
Mszyca jabłoniowa (T_D = 7,0 °C)	$\sum_{DD}$=114°C	1911.78	1913.00	1914.97	1915.16	1915.16	1915.16	1915.16	1915.80	1915.80	1915.80	1915.80	1915.80
Nasiennica trześniówka (T_D = 7,0 °C)	$\sum_{DD}$=317°C	1807.32	1808.07	1809.29	1810.24	1810.68	1810.84	1811.02	1812.02	1813.02	1813.52	1813.52	1813.52

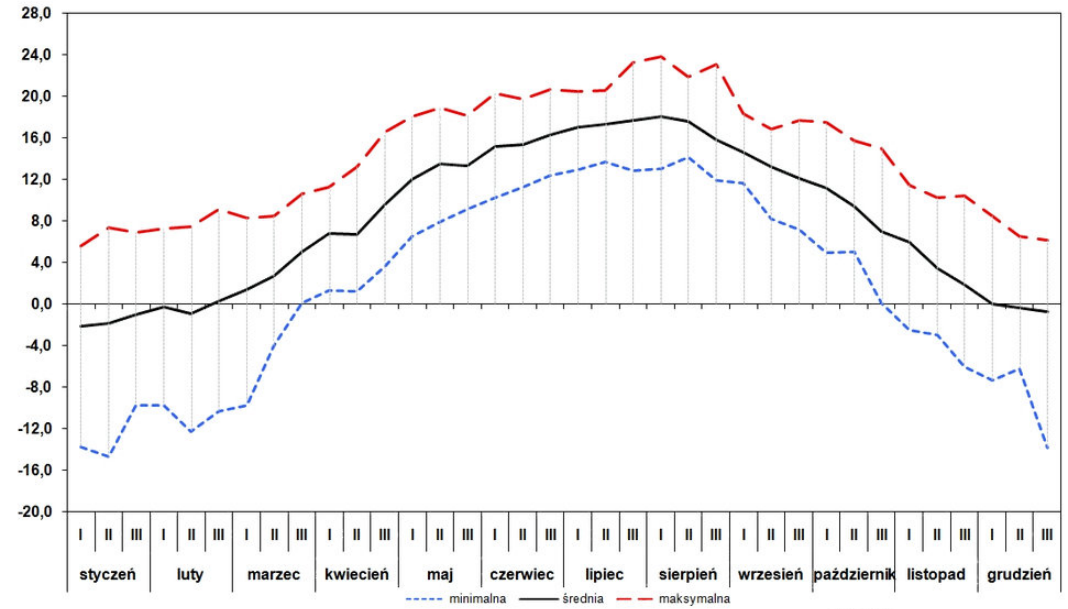
Historical data
calculated for synoptic stations (30 years)



18 different agrometeorological indices

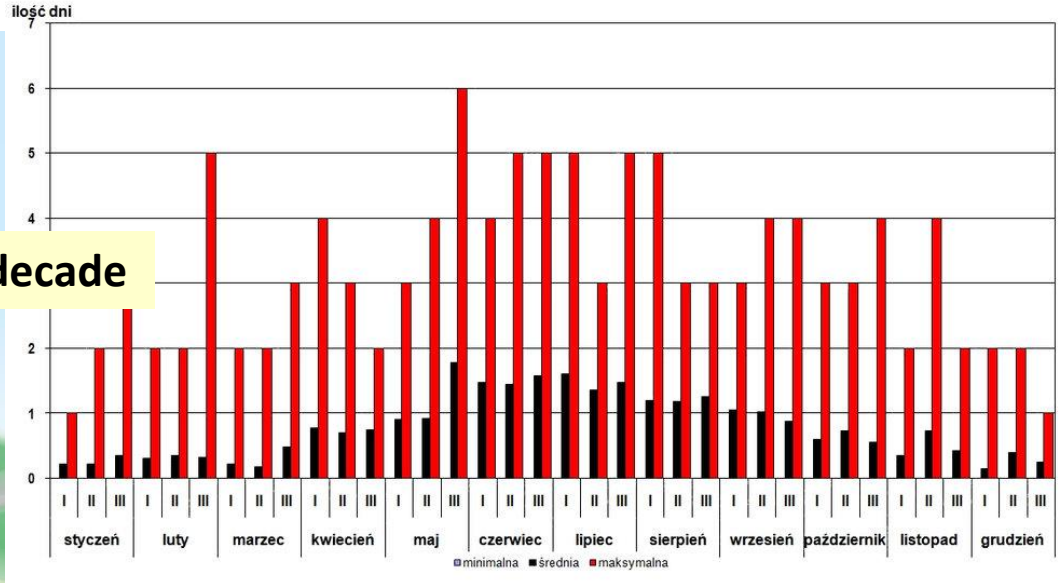
(temperature, precipitation, sunshine duration, evapotranspiration, snow cover, humidity, cloudiness, amount of hot days, amount of days with frost etc.etc.)

Historical data
Average values for decades

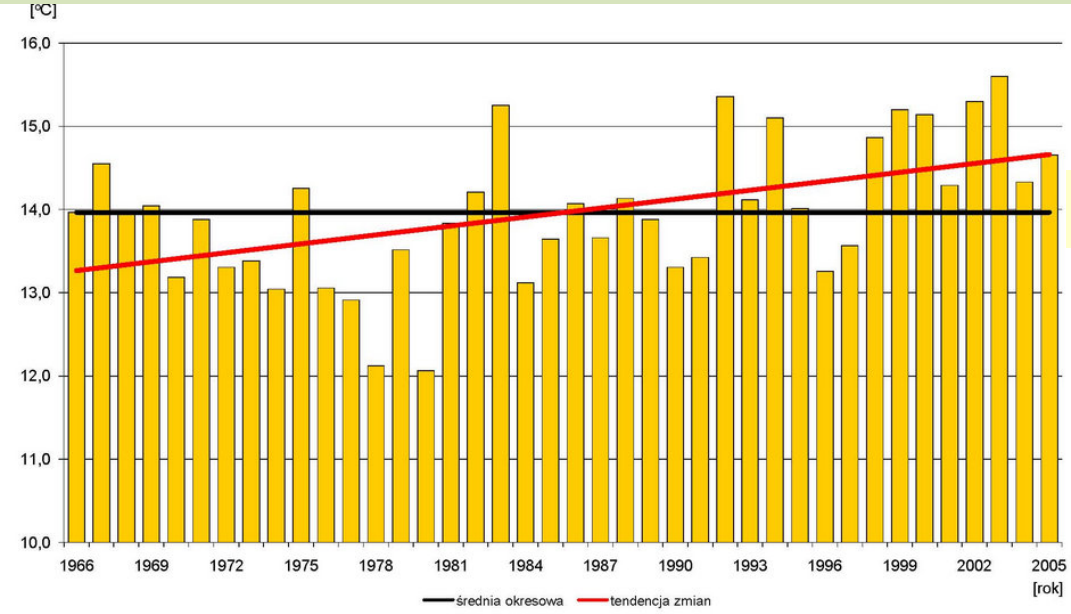


average temperaure in each decade

average sum of precipitation in each decade

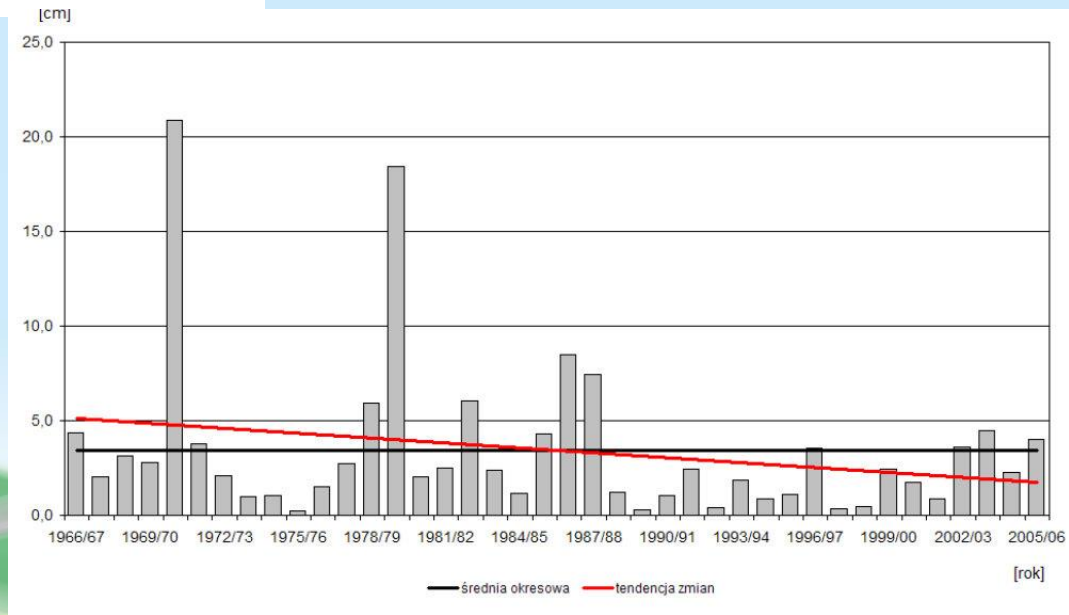


Historical data
Trend of changes



trend of the average air temperaure

trend of the snow cover

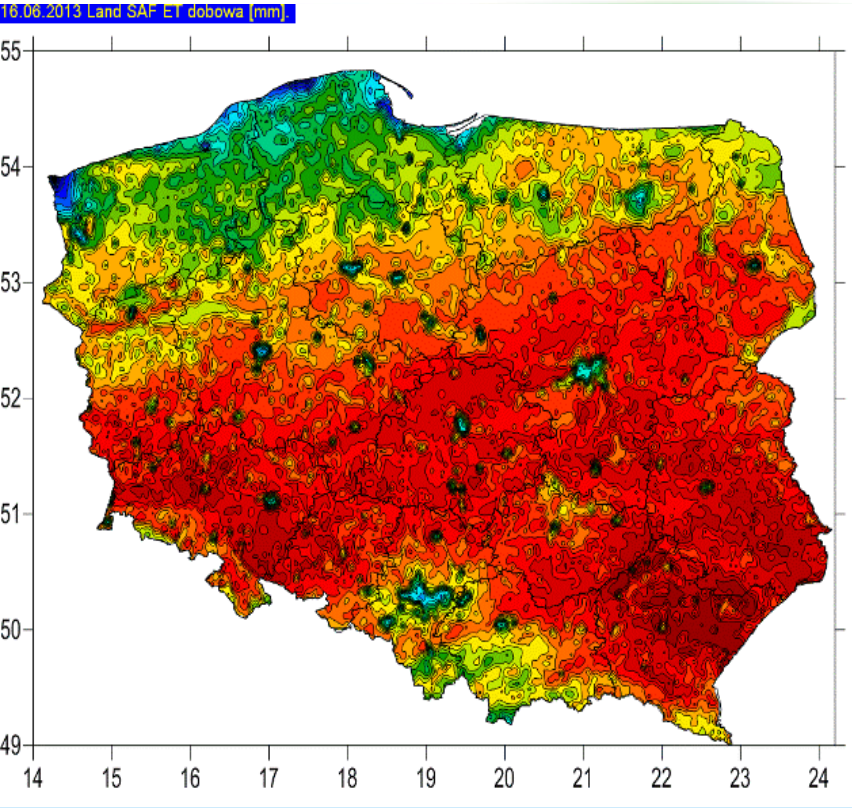


Satellite data

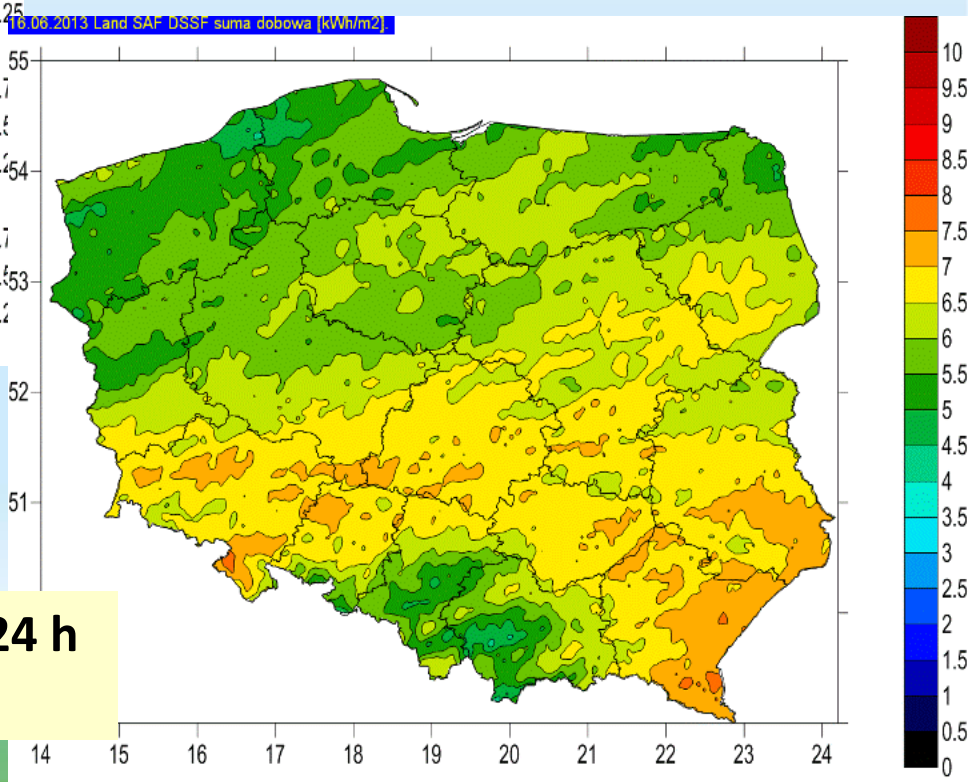
Spatial distribution of 12 different information based on satellite products:

- Evapotranspiration – sum for last 24h; last decade; last 30 days
- Downwelling Surface Shortwave radiation energy – sum for last 24h; last decade; last 30 days
- Soil moisture – layer 0-7 cm
  – layer 7-28 cm
  – layer 28-100 cm
  – layer 100-289 cm
- Leaf Area Index (LAI)
- Fraction of Absorbed Photosynthetic Active Radiation (fAPAR)

Satellite data

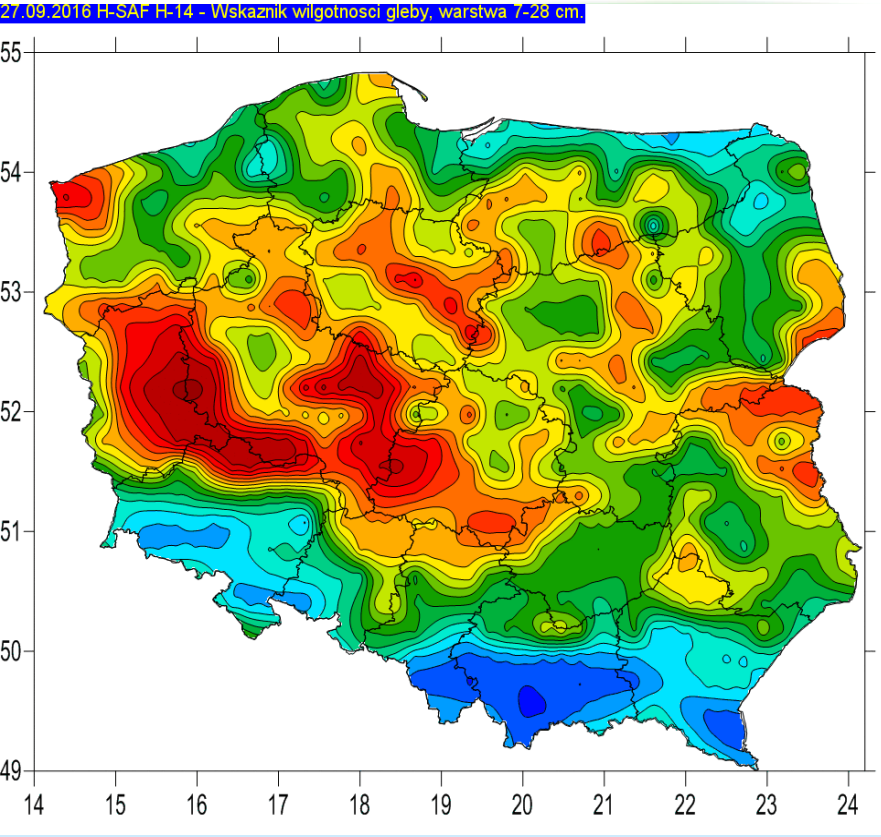


Evapotranspiration - sum for 24 h
16.06.2013

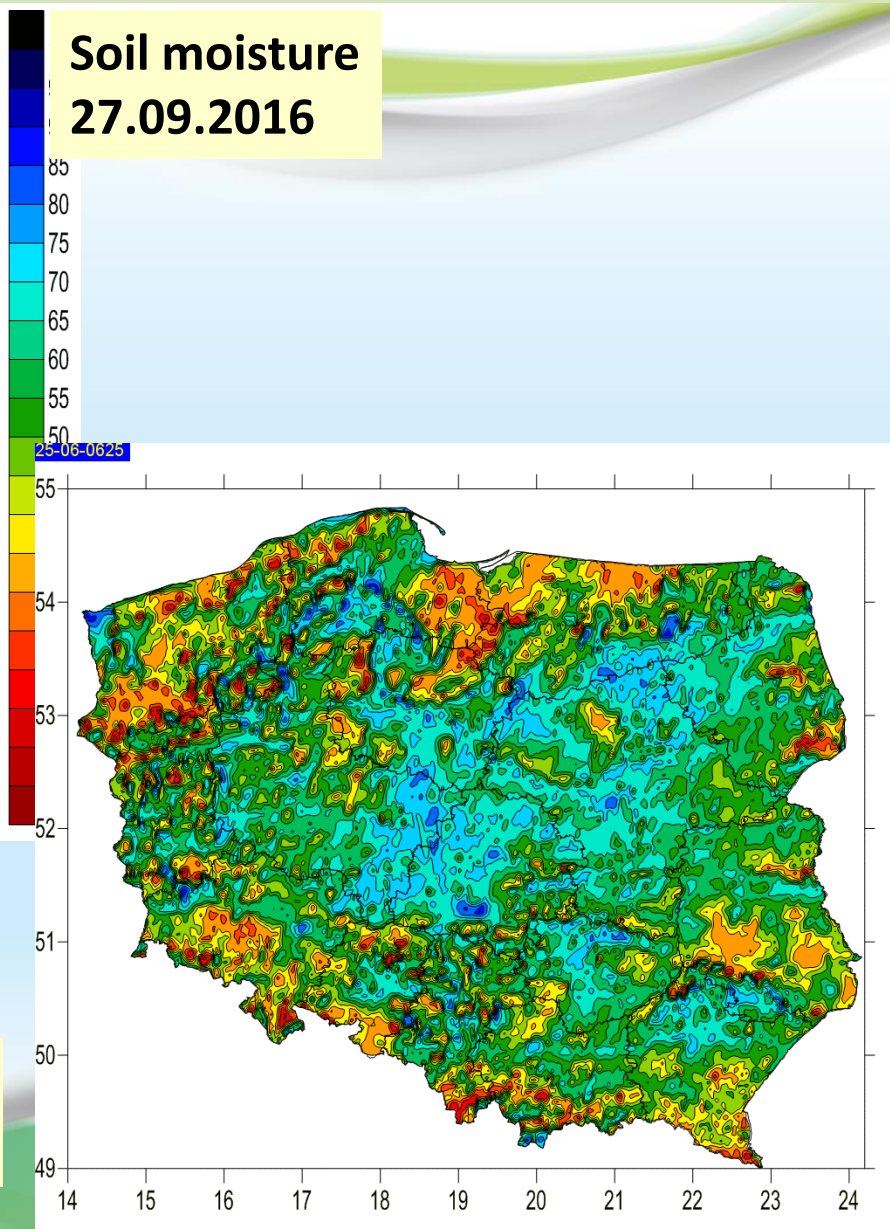


Shortwave radiation - sum for 24 h
16.06.2013

Satellite data

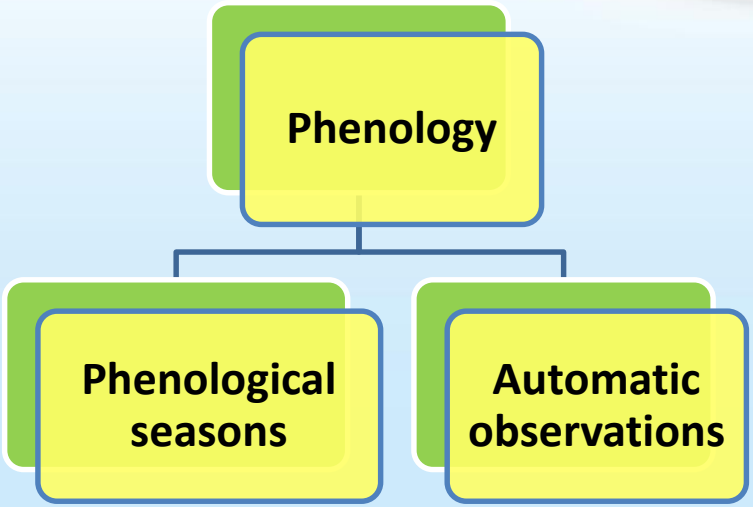


Soil moisture
27.09.2016

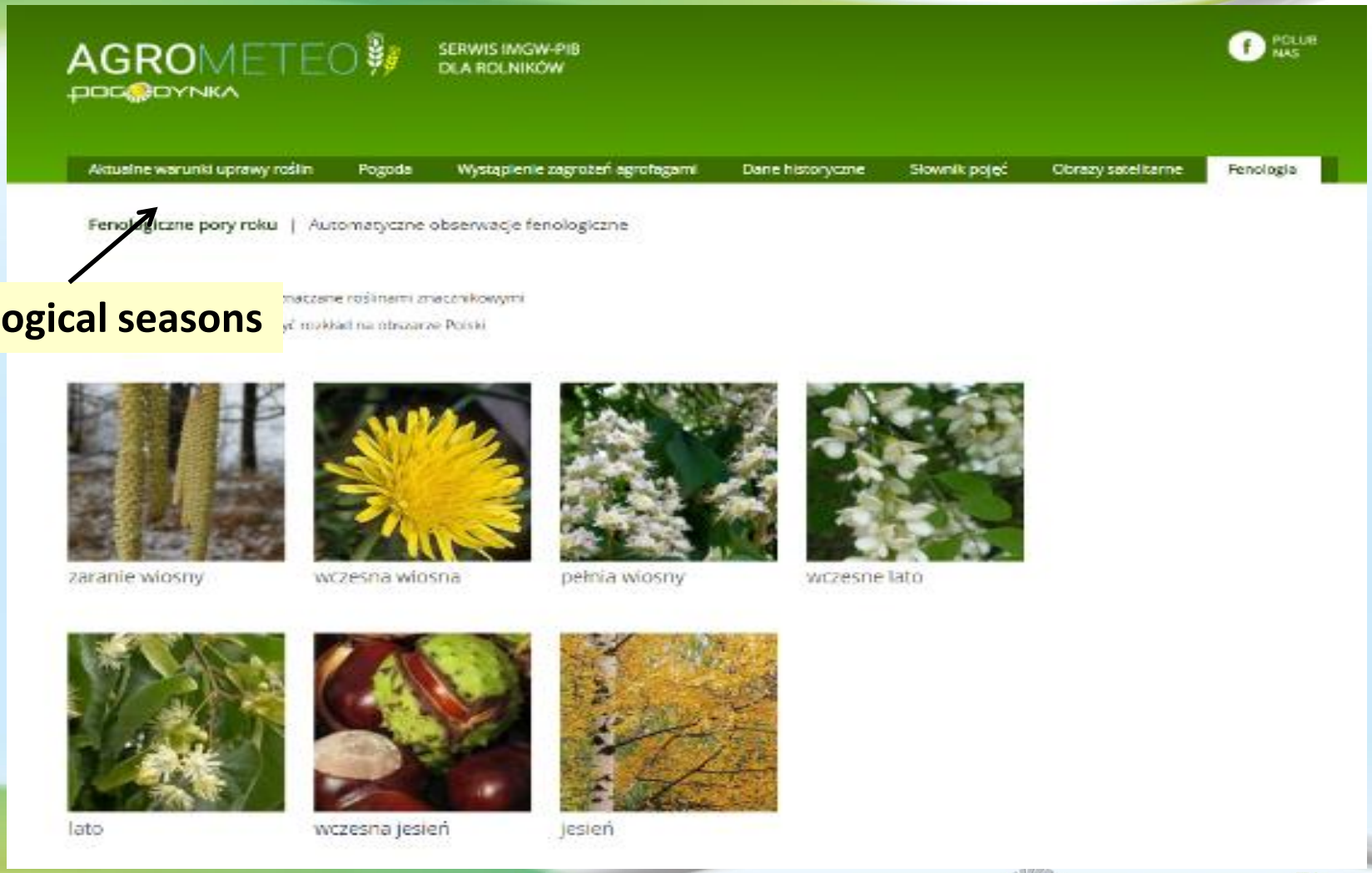


LAI
25.06.2015

Phenology



Phenology
Phenological seasons



phenological seasons

Phenology
Phenological seasons

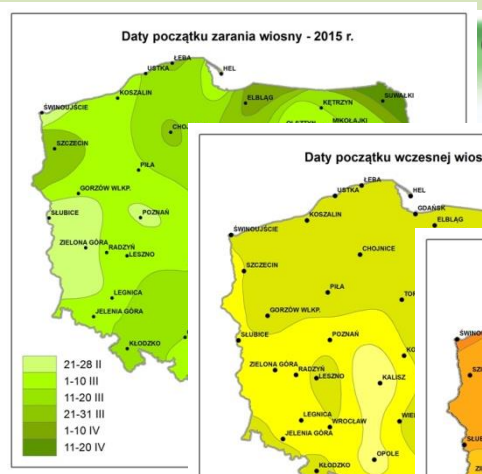
New network of the phenological observations conducted by IMGW since 2007 :

- 50 synoptic stations
- 10 wild plants
- 5 pheno-phases
- on this base 7 phenological seasons are determined (earliest spring, early spring, spring, early summer, summer, early autumn, autumn)

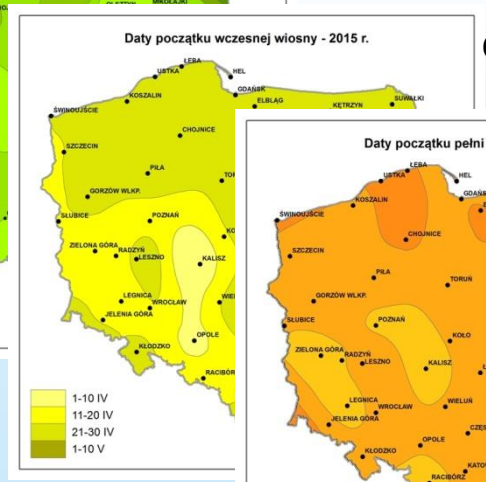
- date of the beginning of the phenological season: average date of the beginning of phenological phases

Maps of phenological seasons

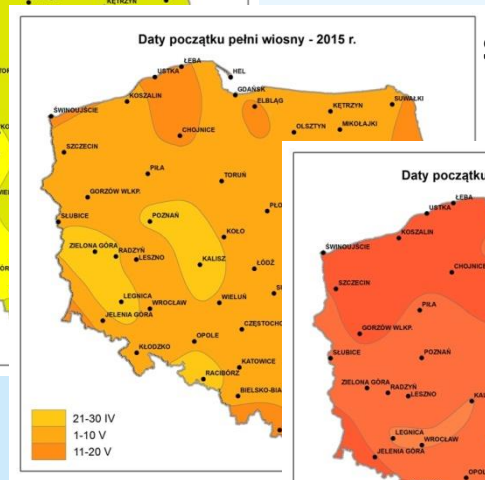
earliest spring



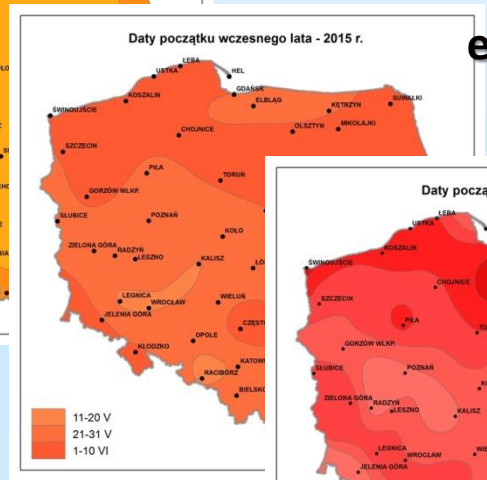
early spring



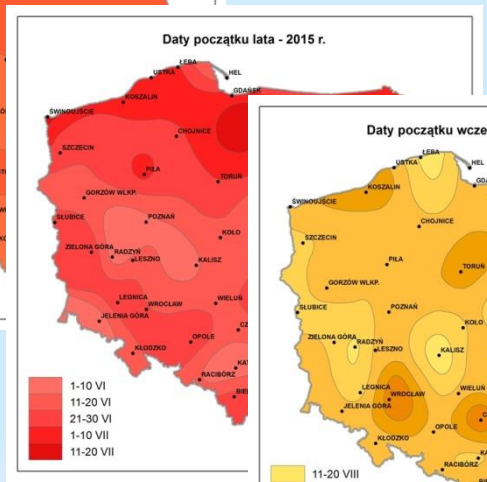
spring



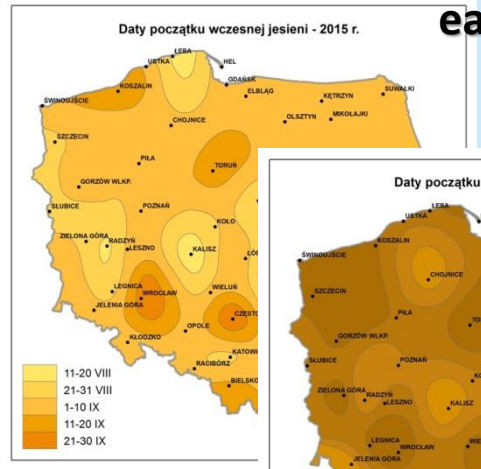
early summer



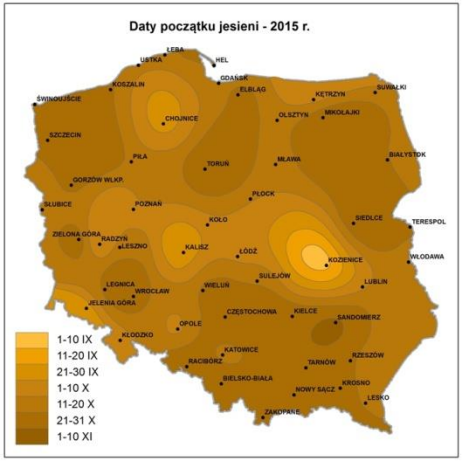
summer



early autumn

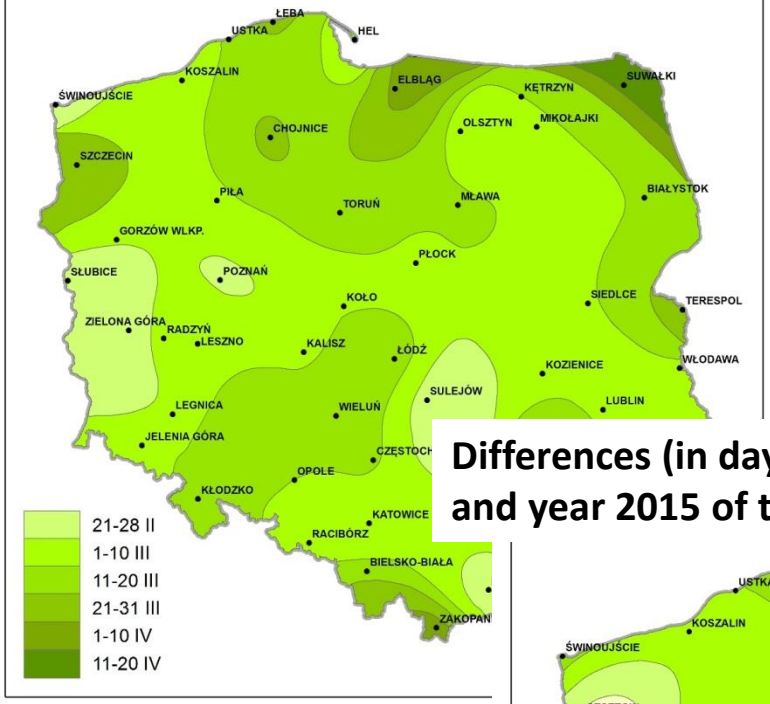


autumn

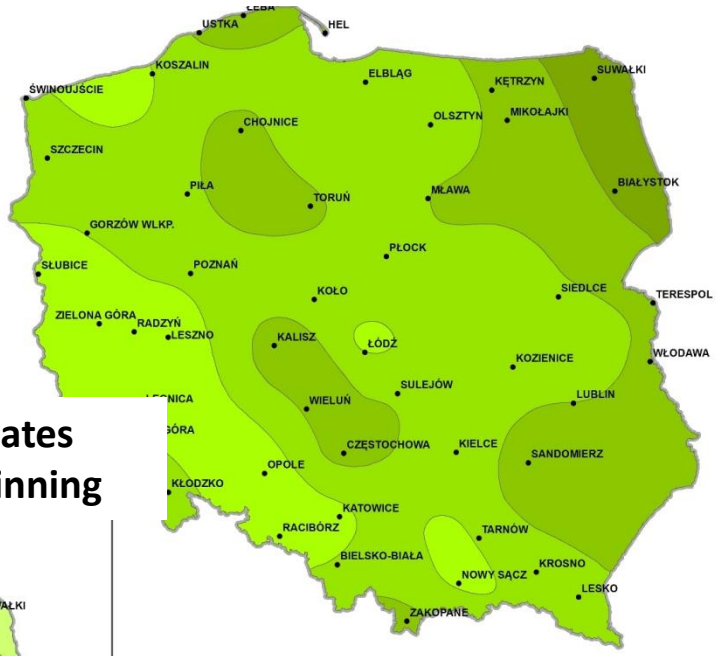


Maps of phenological seasons

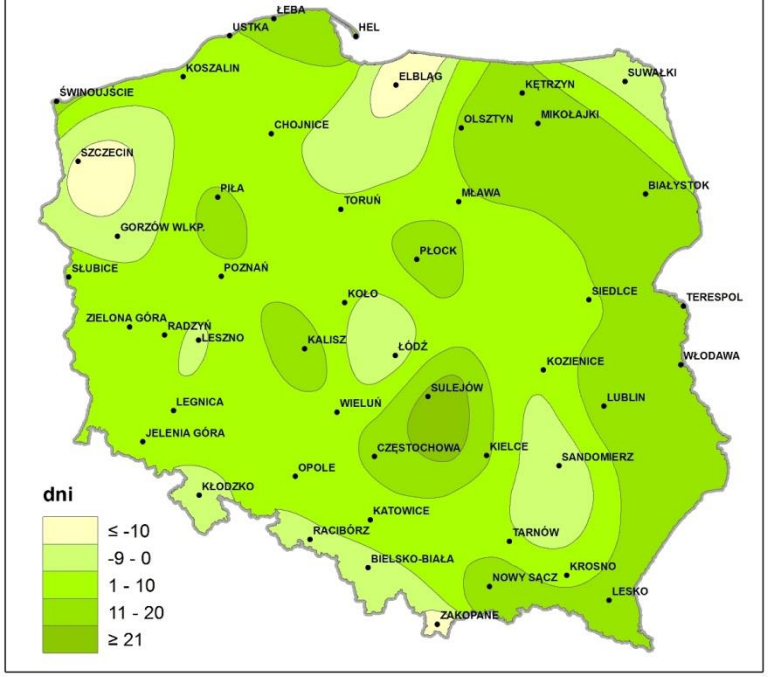
Date of the earliest spring beginning



Average dates of the earliest spring beginning (2007-2014)



Differences (in days) between average dates and year 2015 of the earliest spring beginning



„ + „ earlier beginning

„ - „ later begining

Phenology
Automatic phenological observations

village 20 km from Poznan

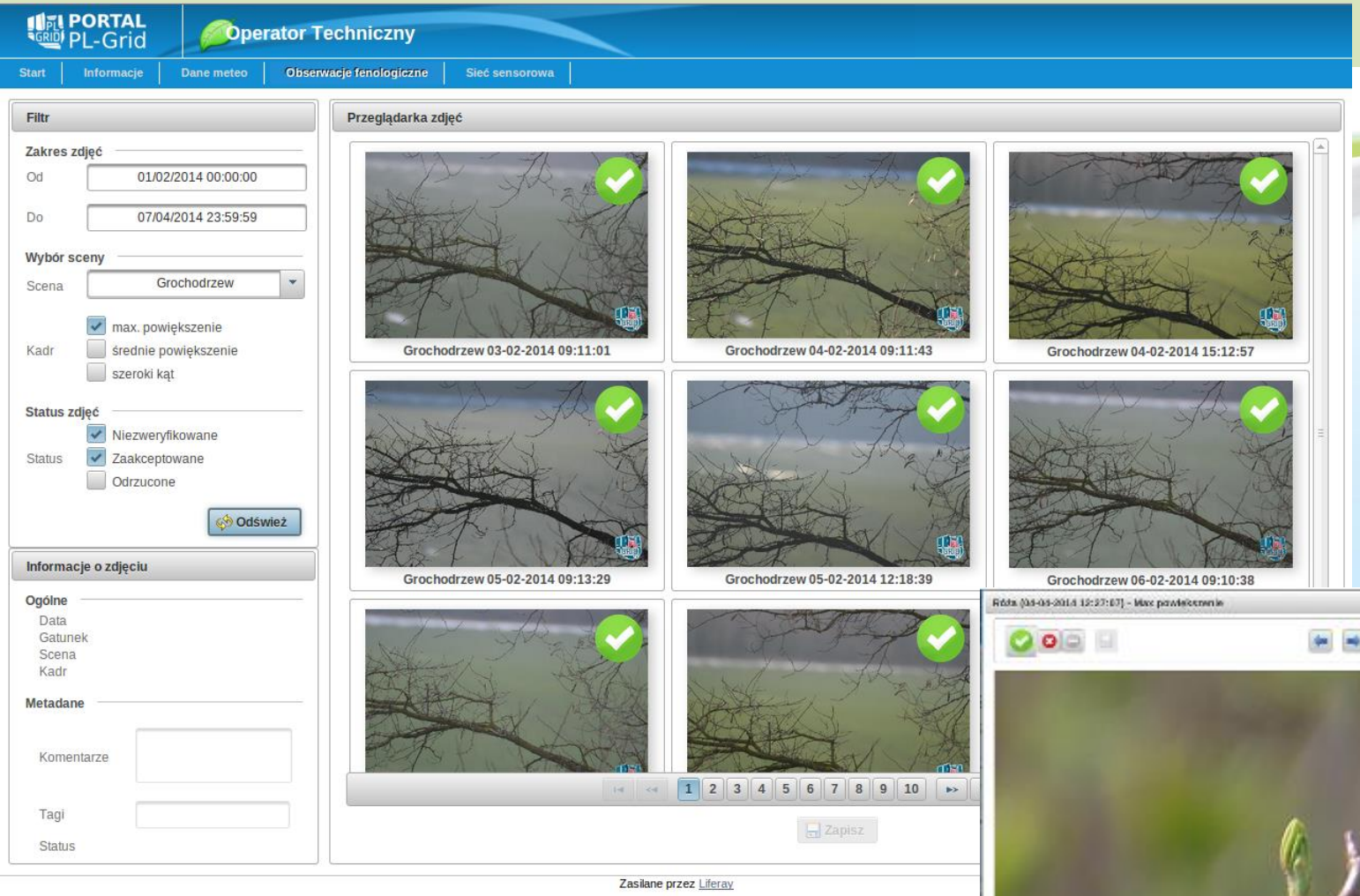
Automatic phenological observations

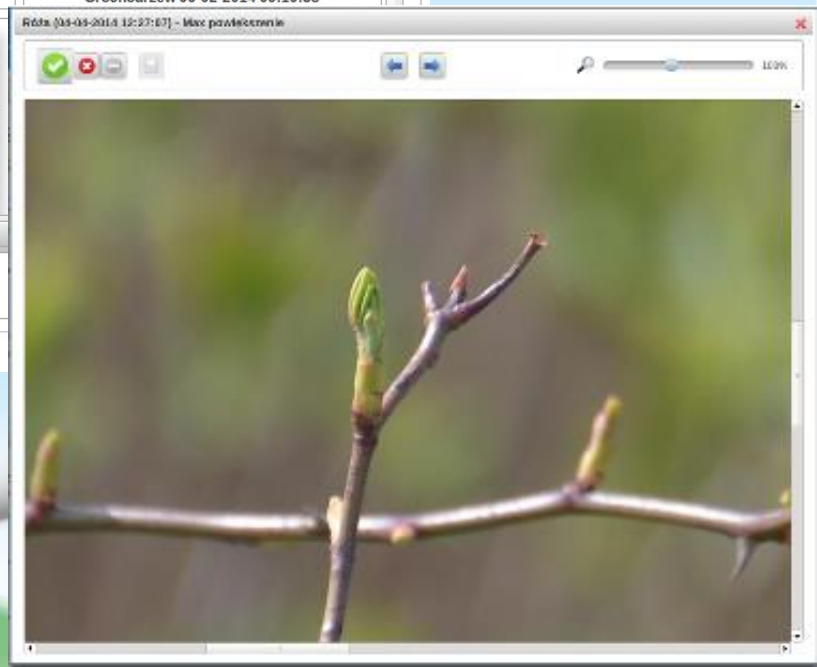
Observed 6 wild plants:

- horse-chestnut *(Aesculus hippocastanum L.)*
- black locust *(Robinia pseudoacacia L.)*
- small-leaved lime *(Tilia cordata Mill.)*
- dog rose *(Rosa canina L.)*
- European larch *(Larix decidua Mill.)*
- common lilac *(Syringa vulgaris L.)*

- and a cultivated field (2015: maize; 2016: winter triticale)

Automatic phenological observations



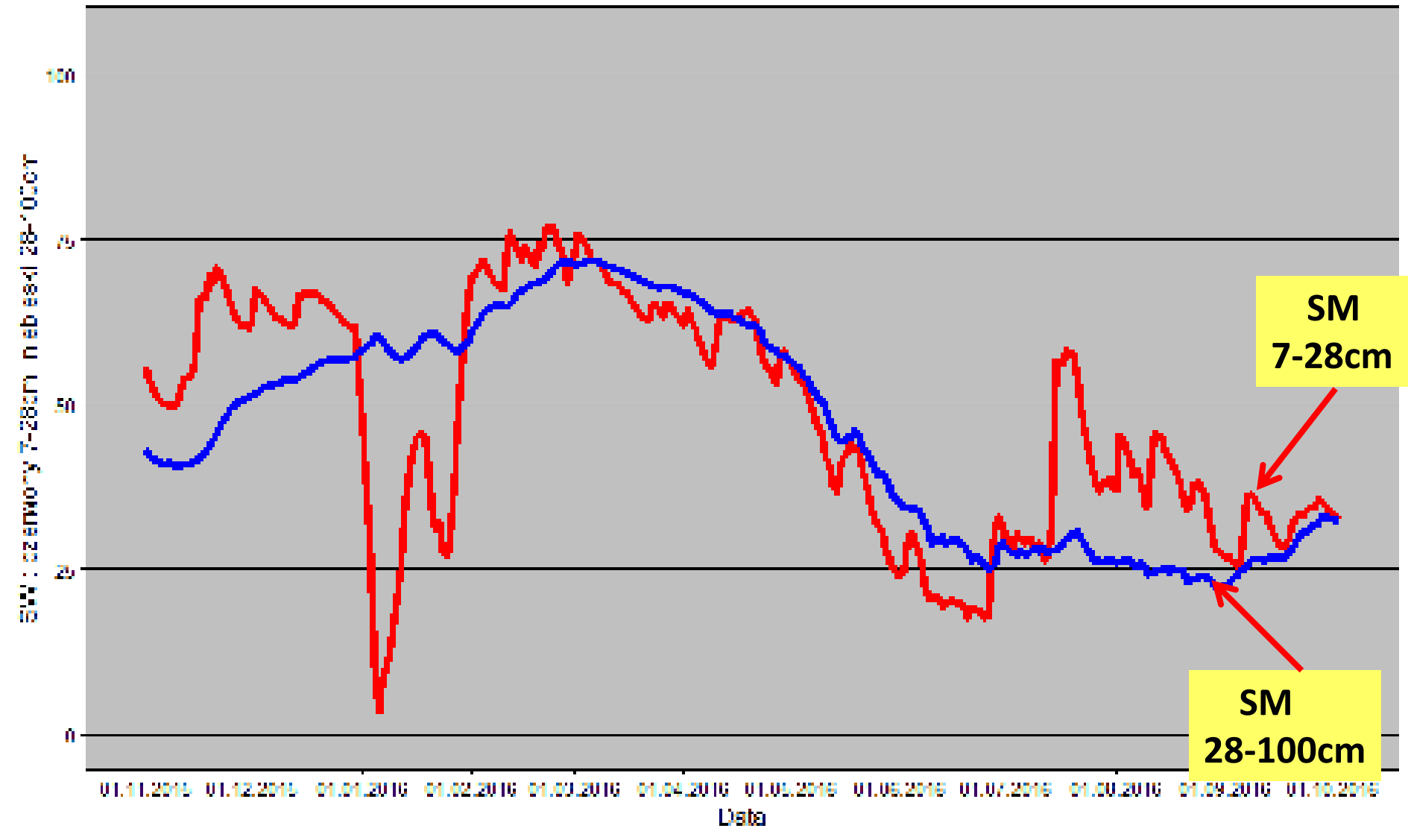


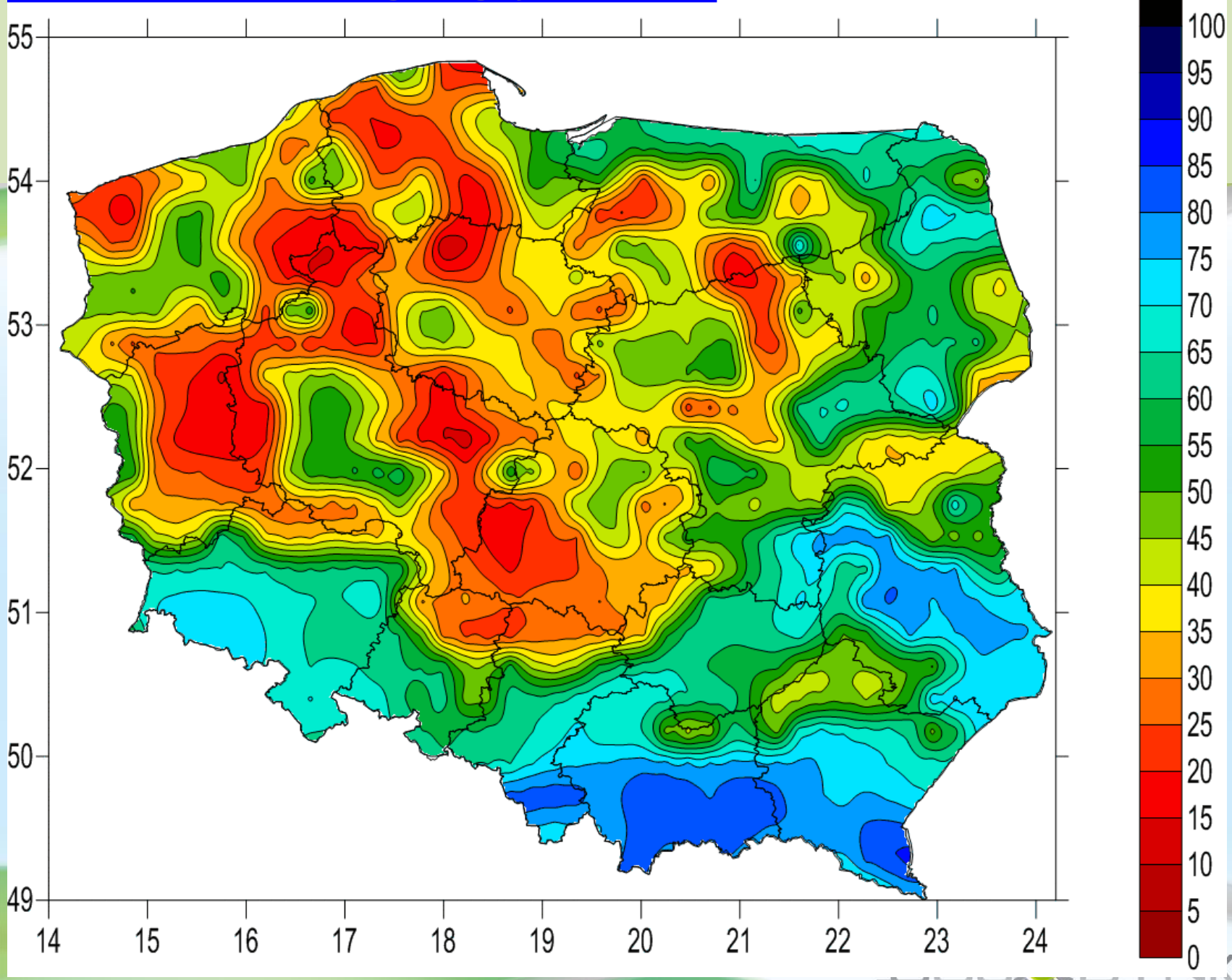
Plans for future

(just in preparation!)

- Monitoring of Drought
  - Monitoring of soil drought
    - Soil moisture - graphs
      - Choice of voivodship
        - Choice of district
    - Soil moisture - spatial distribution
      - Soil moisture on the depth 7-28 cm
      - Soil moisture on the depth 28-100 cm
  - Balance of precipitation and evapotranspiration
    - 

Soil moisture – Graphs
an example for 2016 – Opoczno district

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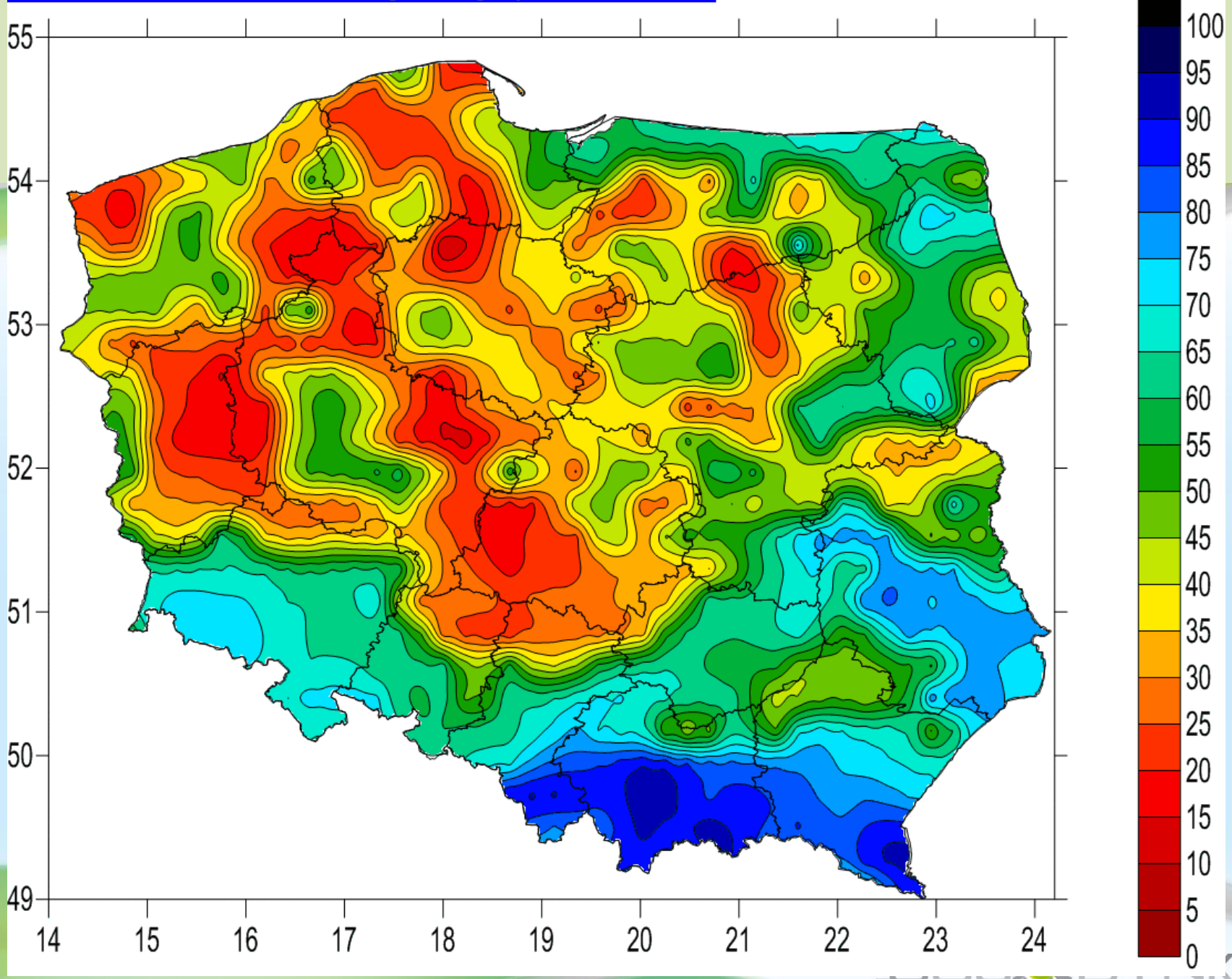
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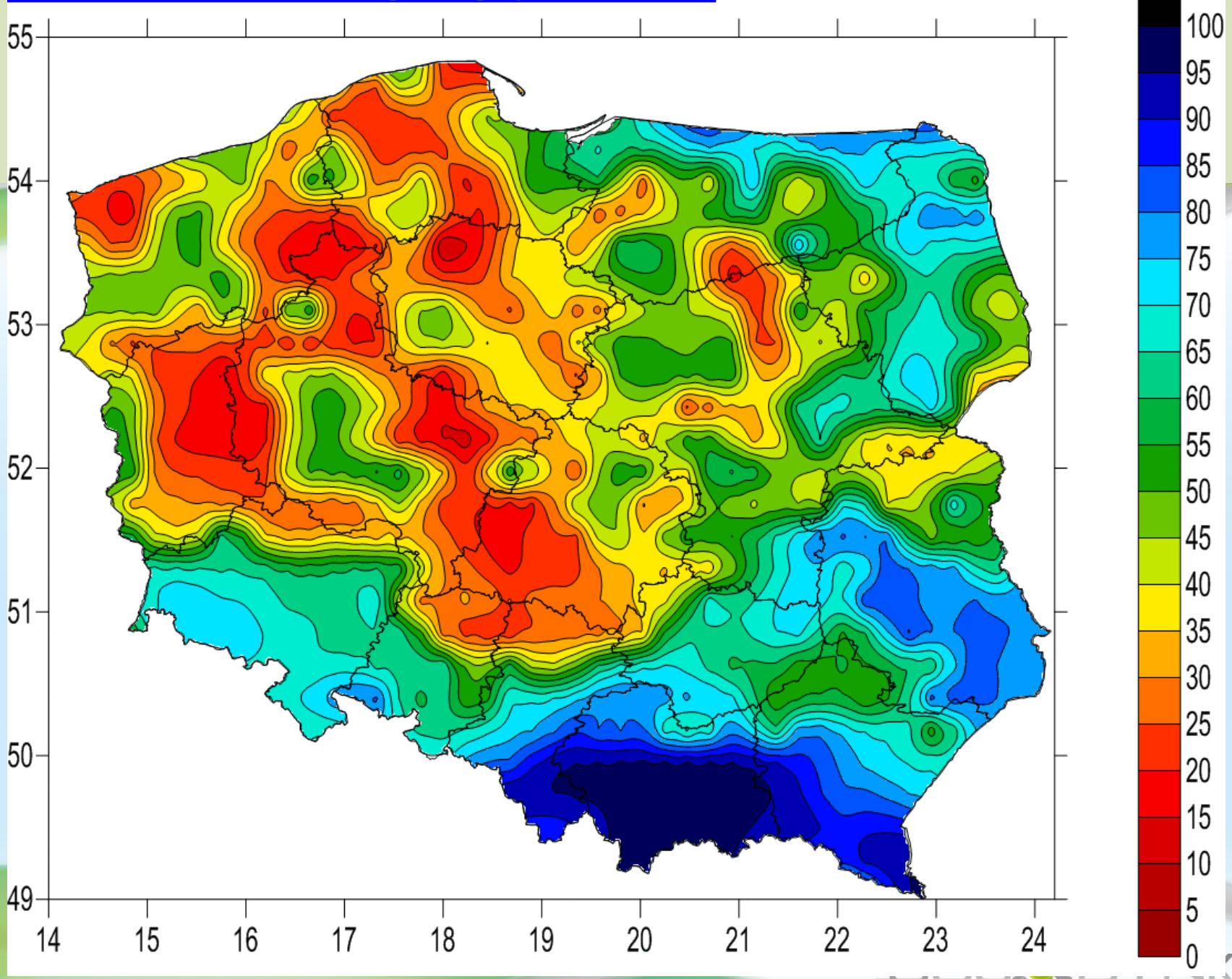
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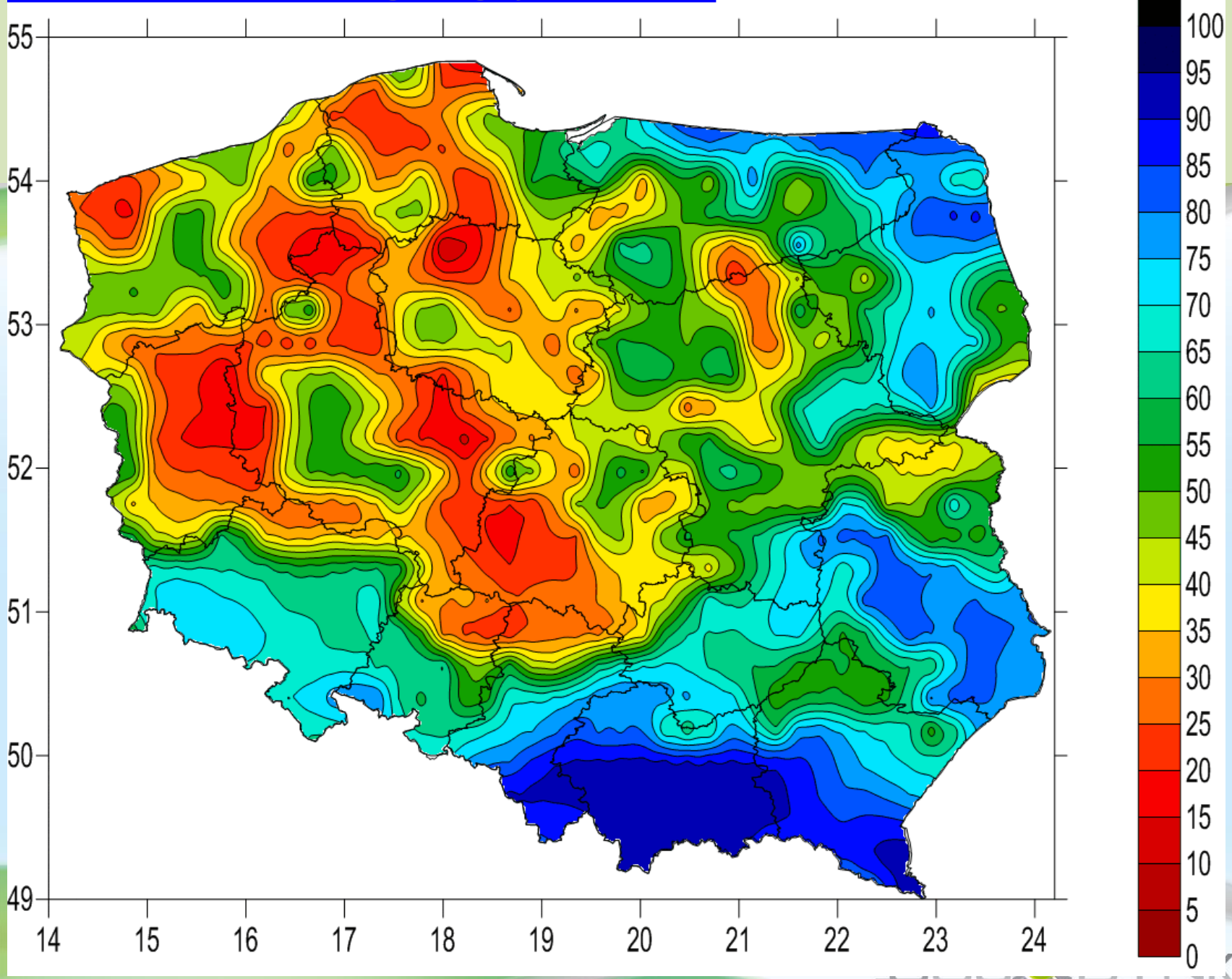
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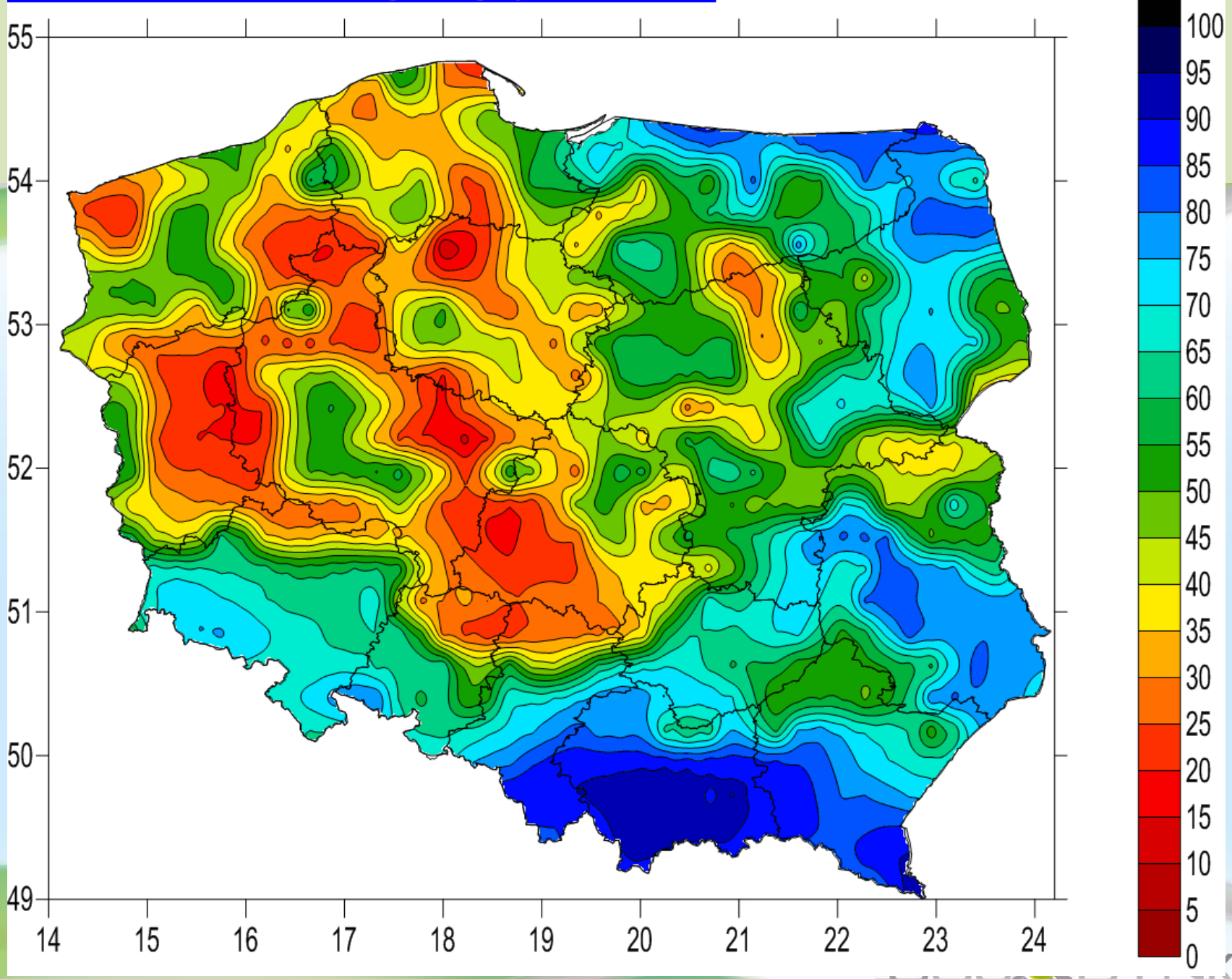
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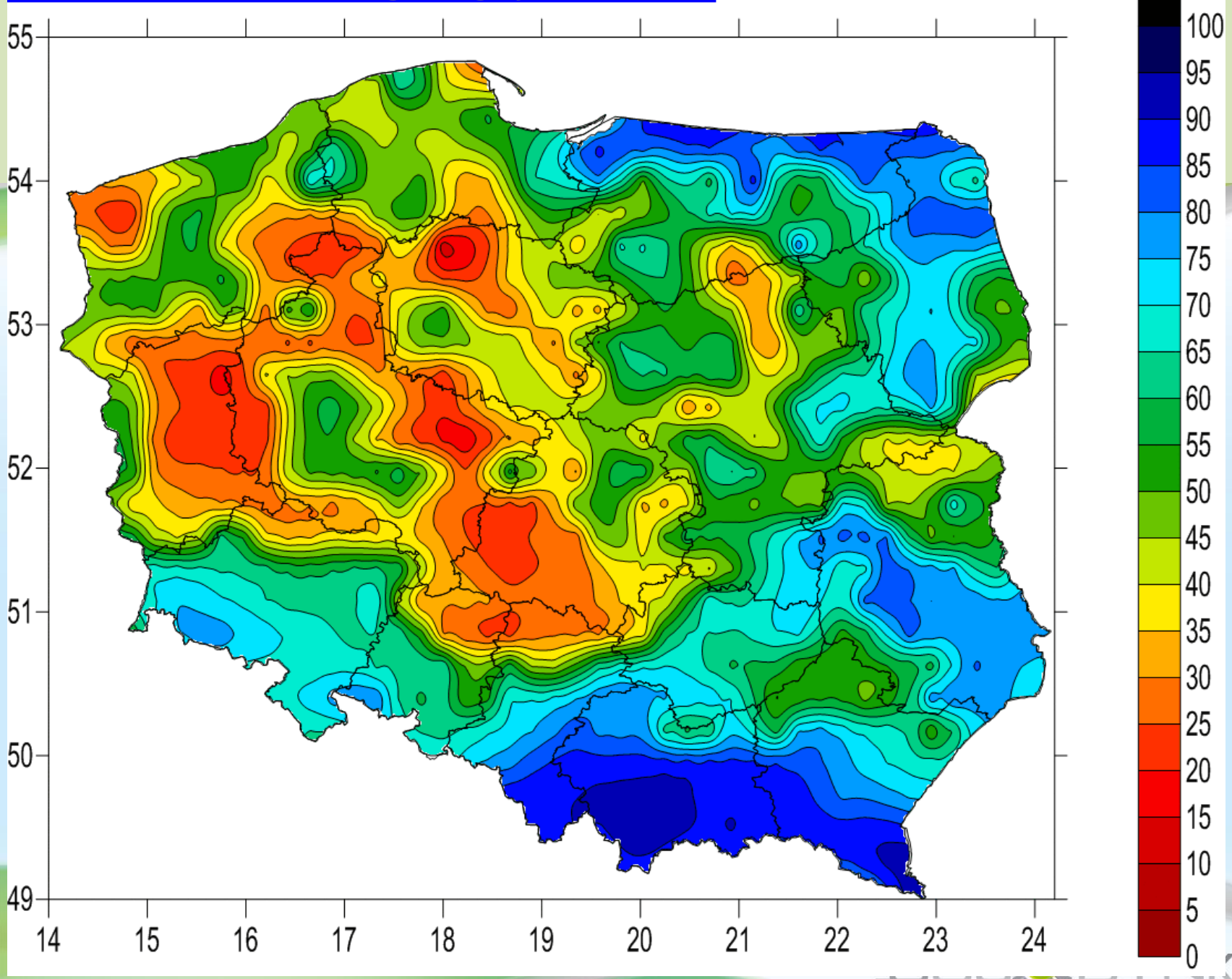
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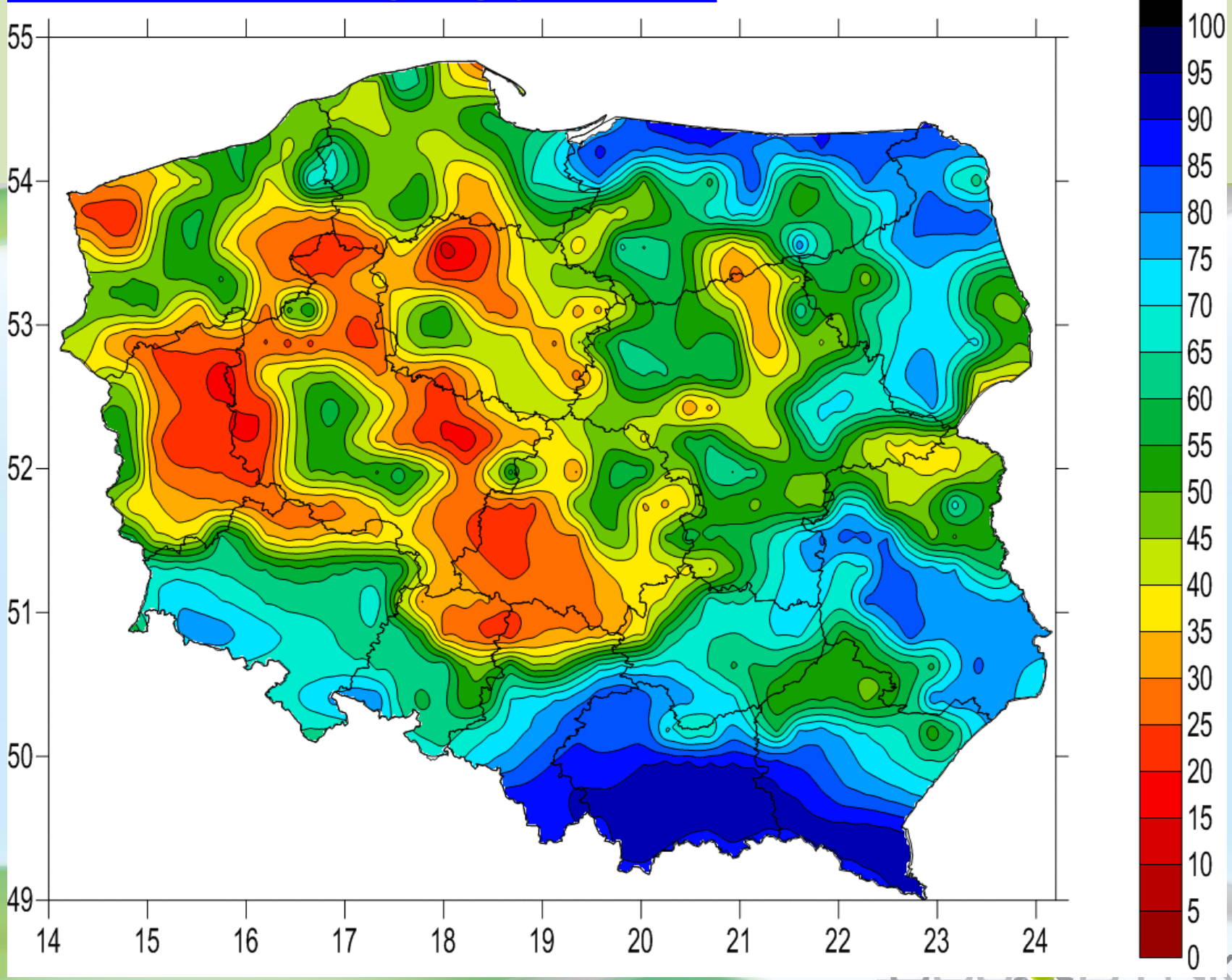
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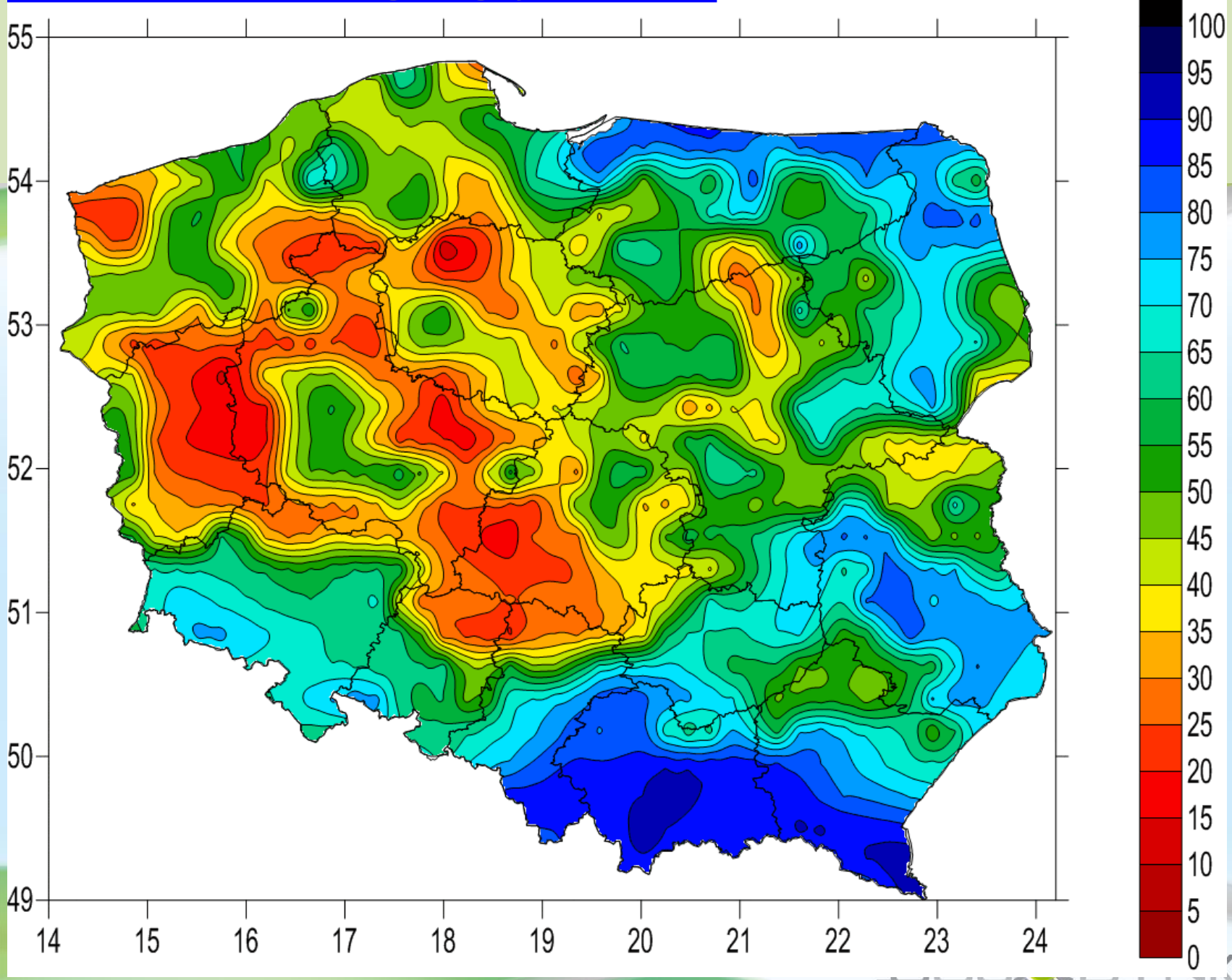
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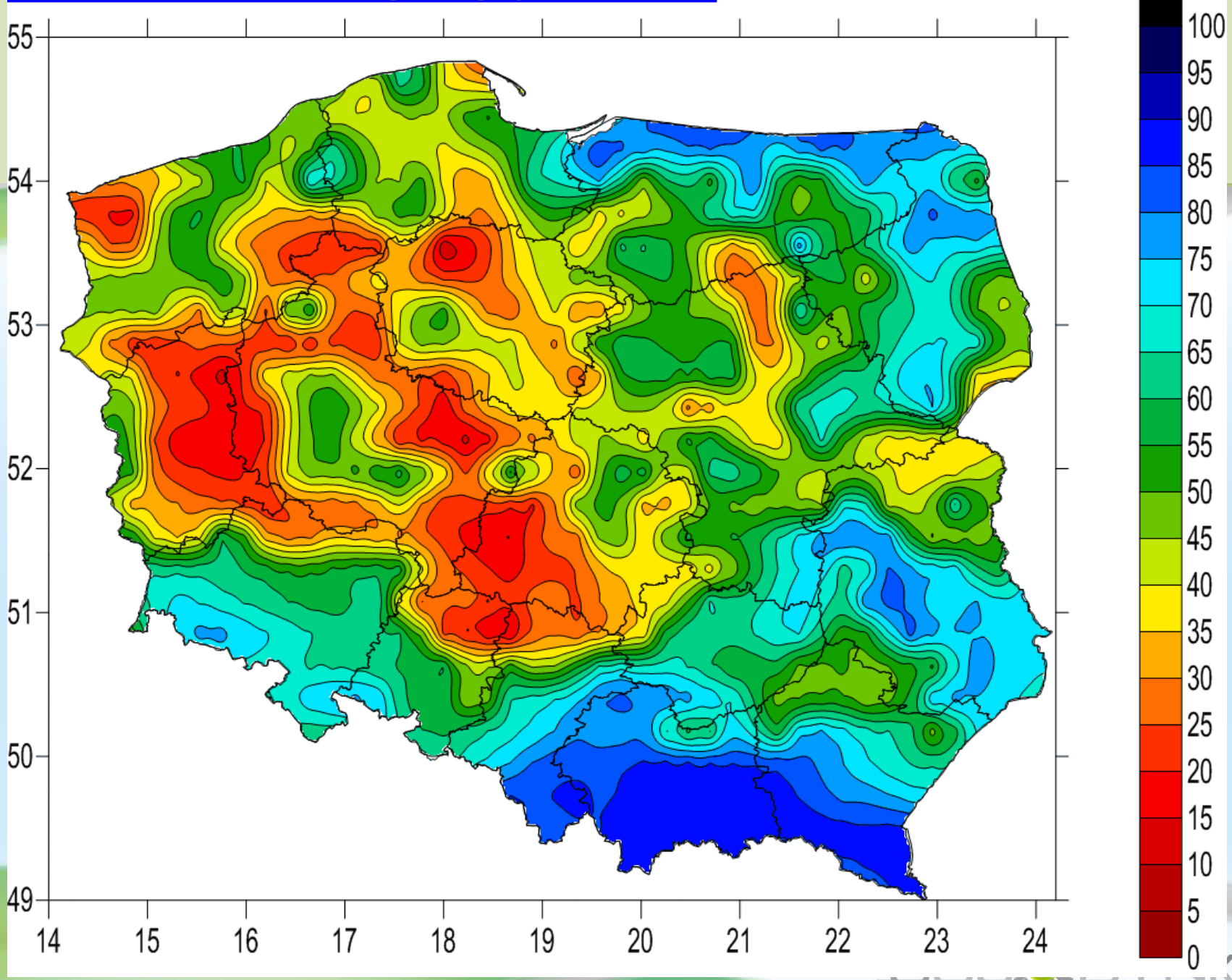
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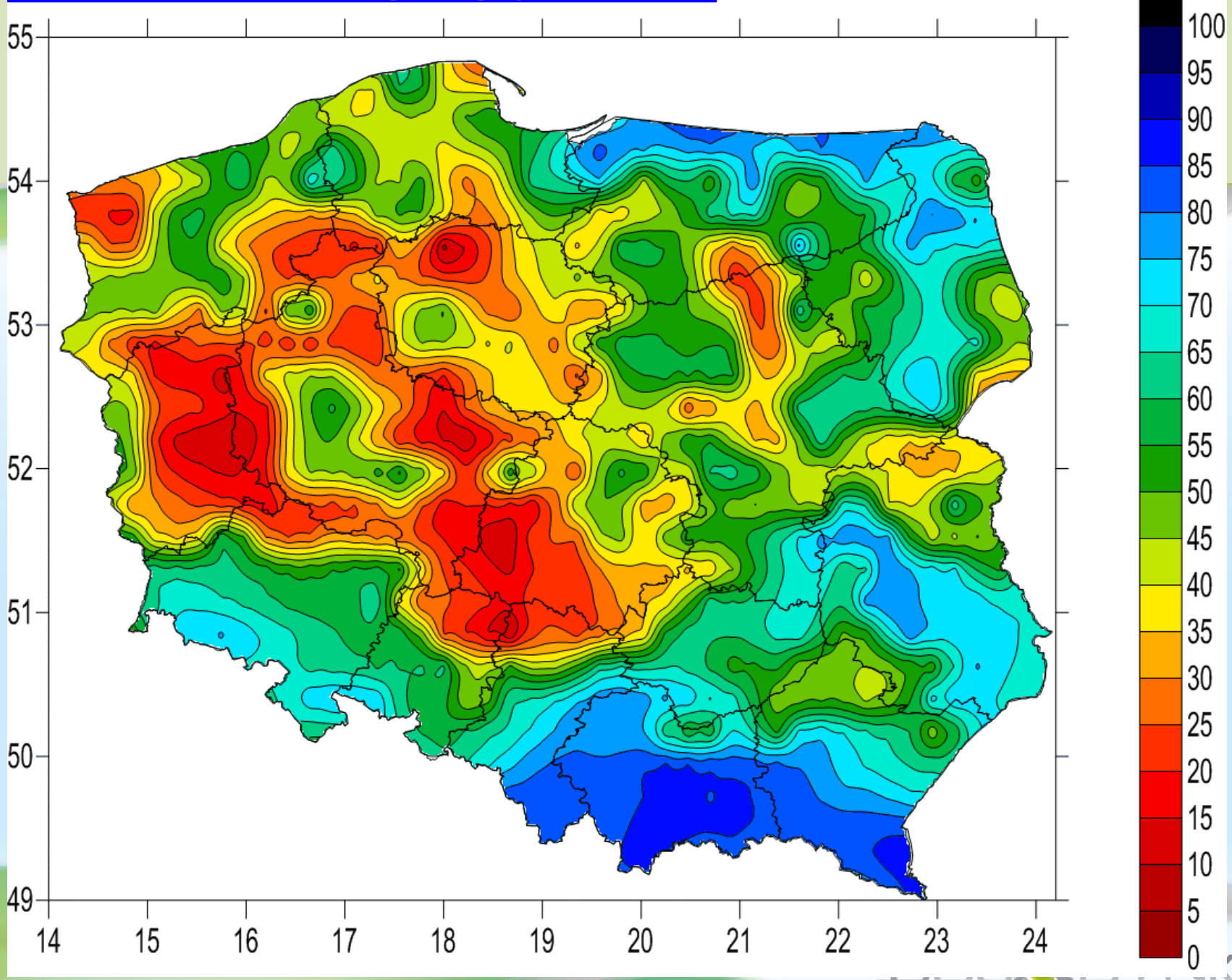
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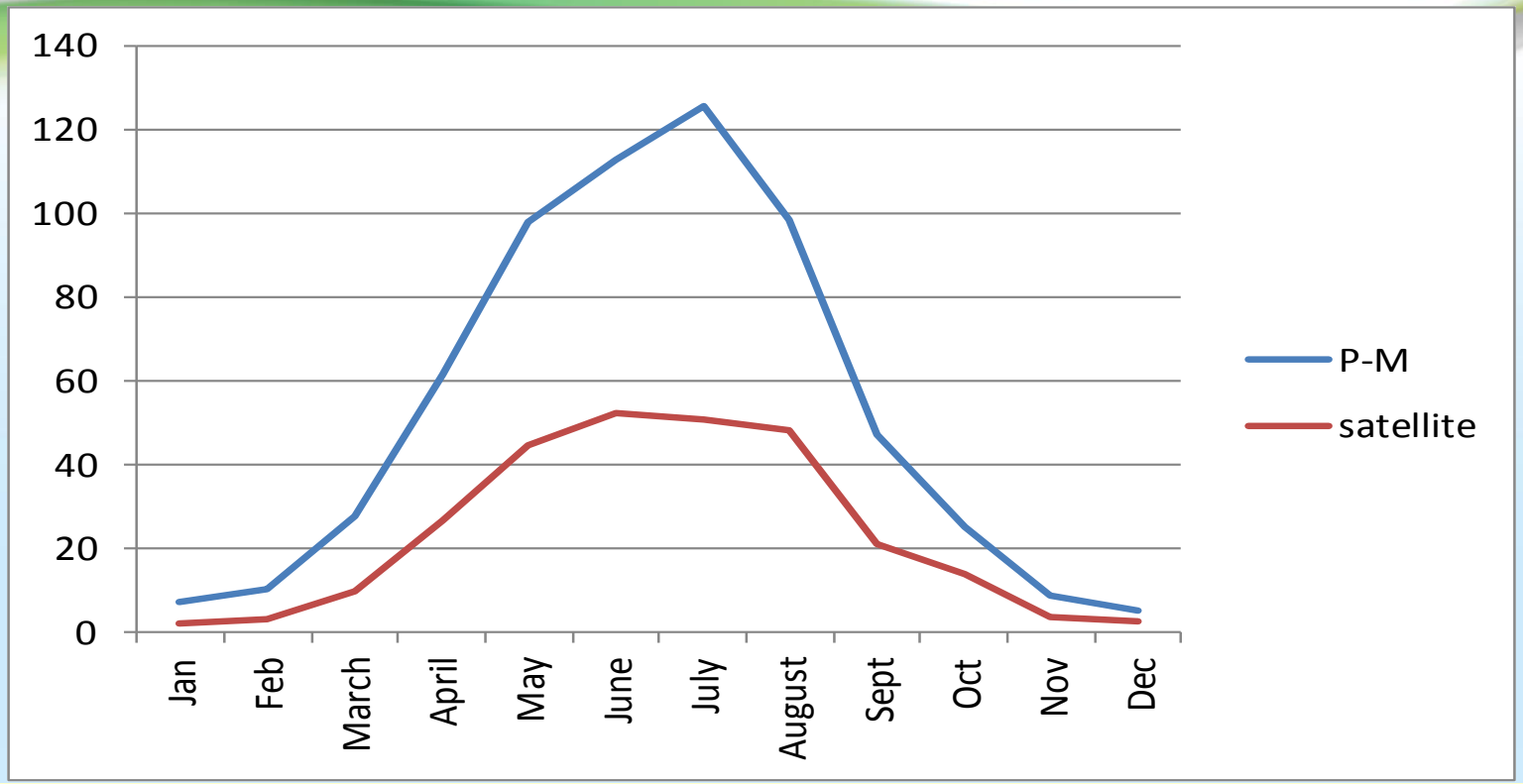
Plans for future

Balance of precipitation and ACTUAL evapotranspiration



Actual evapotranspiration during summer months in Poland in 2015 was significantly lower than potential evapotranspiration.

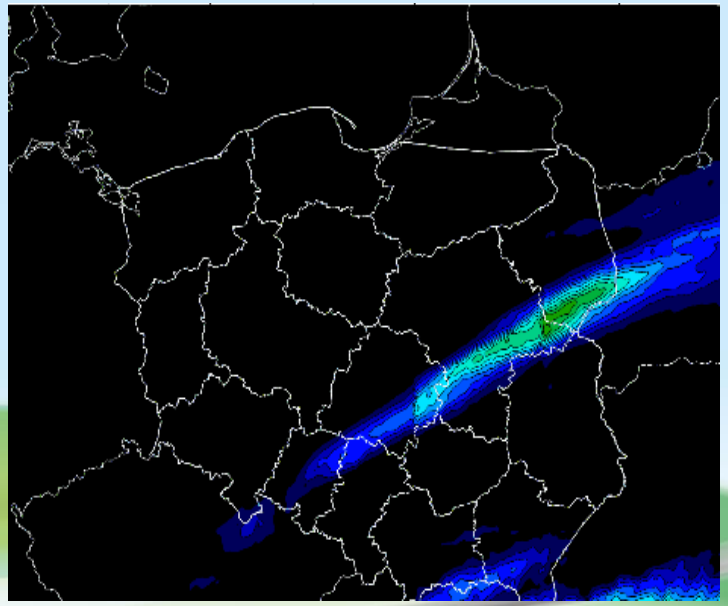
It was result of the severe drought which occurred in Poland in 2015. In such conditions, the amount of the available water for evaporation and transpiration is very low and the total sum of the evapotranspiration is much lower than calculated from Penman-Monteith formula.

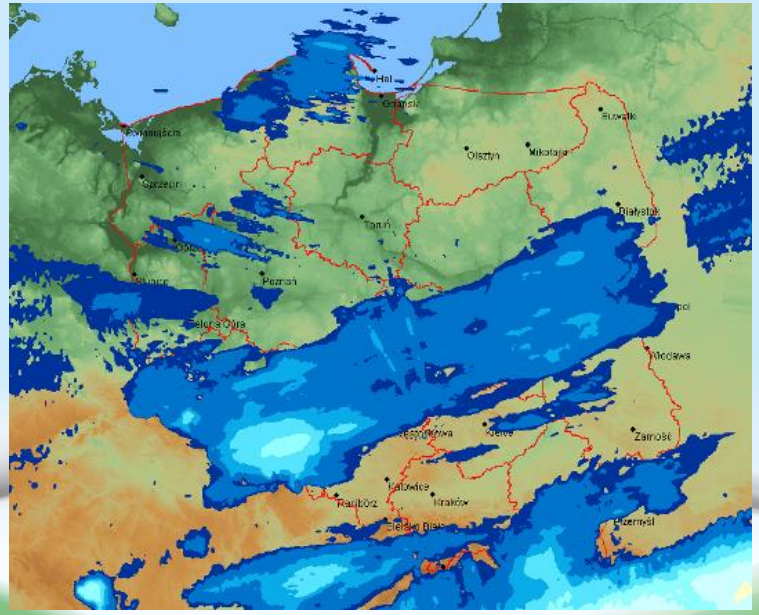
Plans for future

Balance of PRECIPITATION and actual evapotranspiration

Values of the precipitation measured on meteorological stations, usually are lower than the real amount of rain/snow. Information from satellites also has not very good quality.
The new **blended precipitation product** of IMGW-PIB, called **„Rain GRS”**, could be the good alternative solution to the balance calculation.

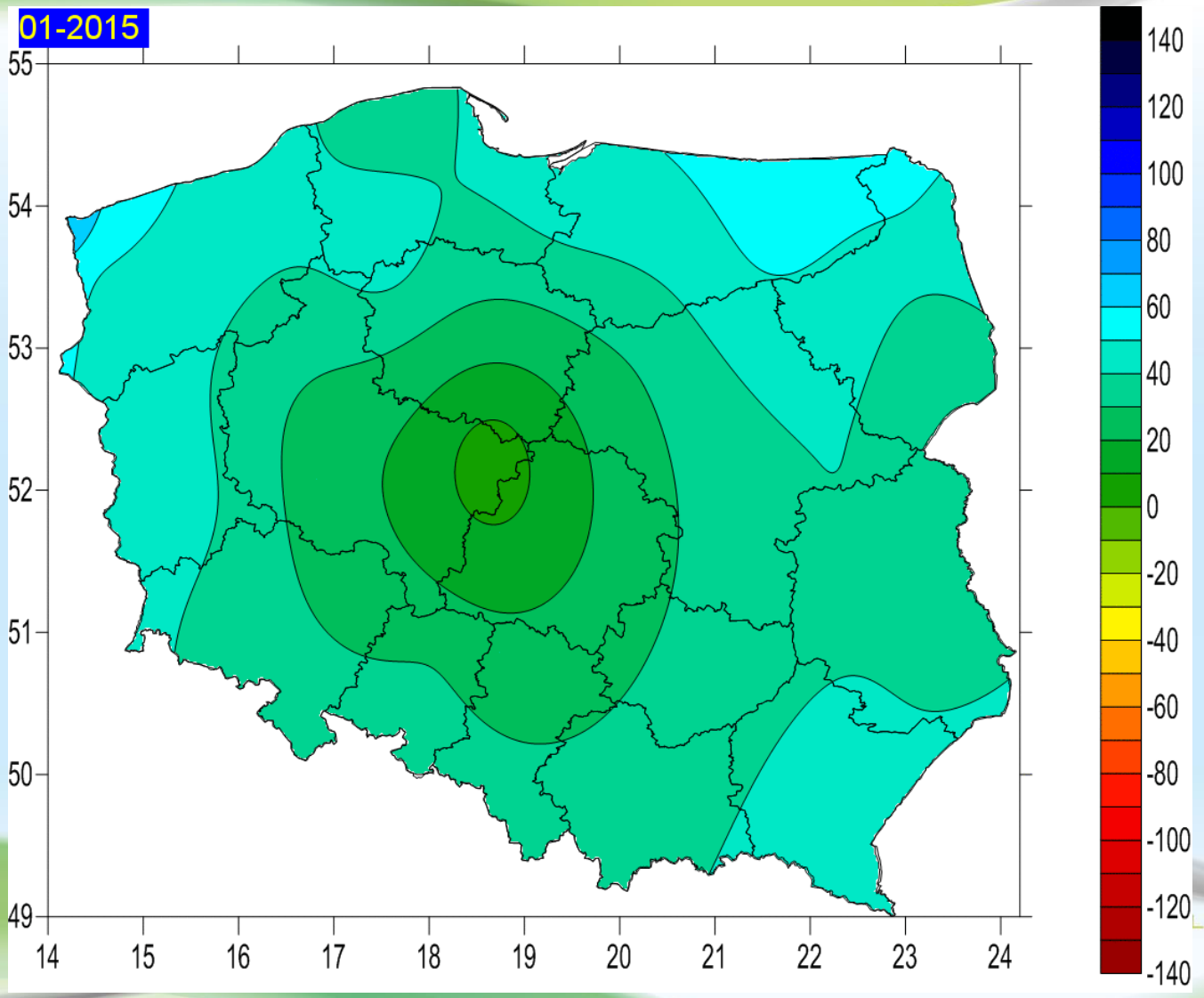
Sum of 3-hours rain from satellite picture (left) and from GRS product (right). It is evident that satellite data show too lower values of rain in that and many other cases.





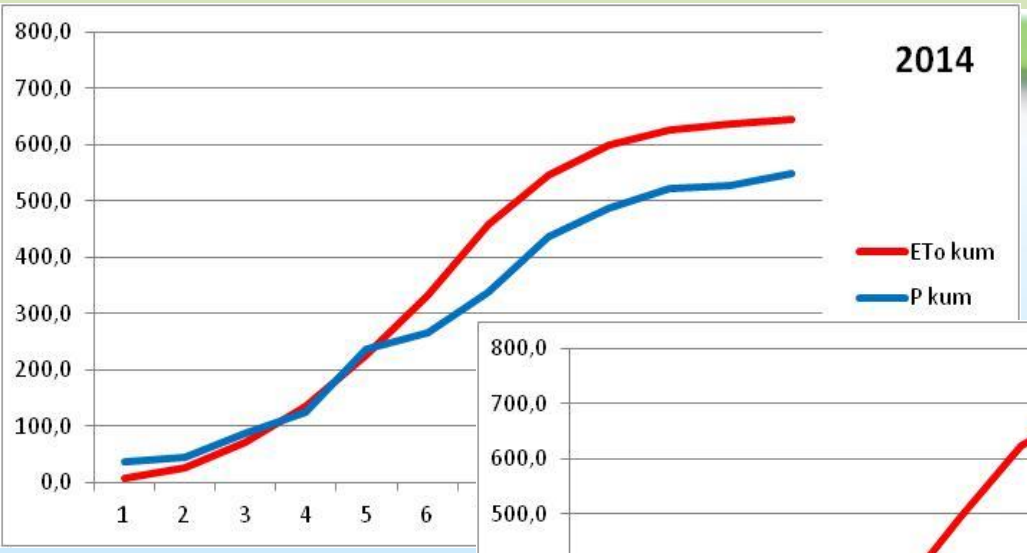
In preparation

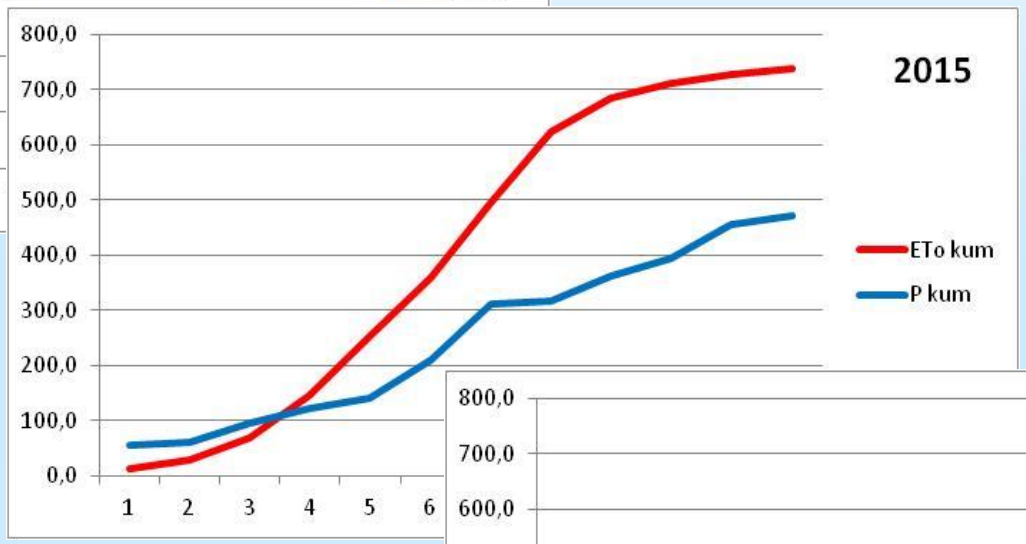
Balance of precipitation and actual evapotranspiration



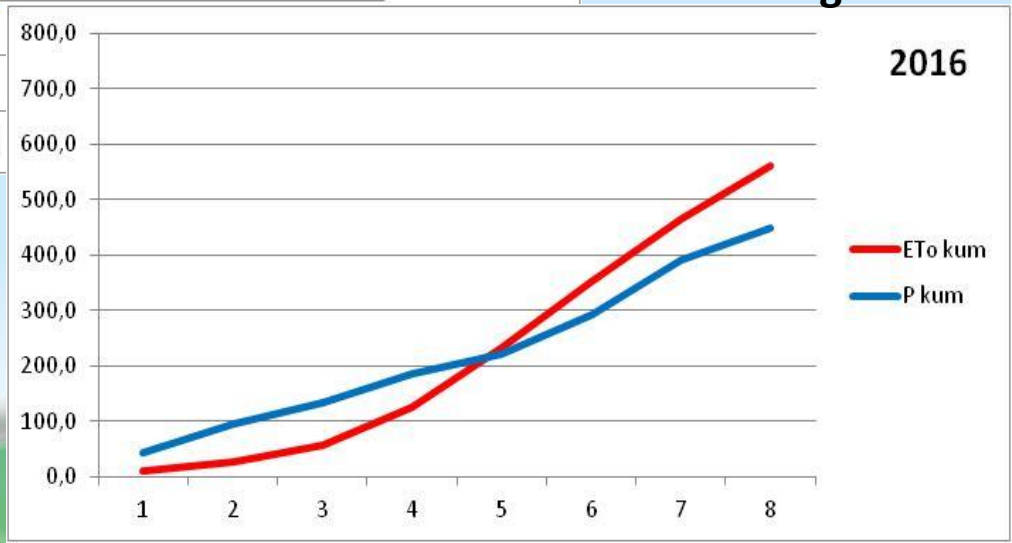
Plans for future

Balance of precipitation and potential evapotranspiration





data till Aug 2016



THANK YOU

FOR YOUR ATTENTION

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