



DROUGHT MONITORING IN ARMENIA

Hydrometeorology and Monitoring Center

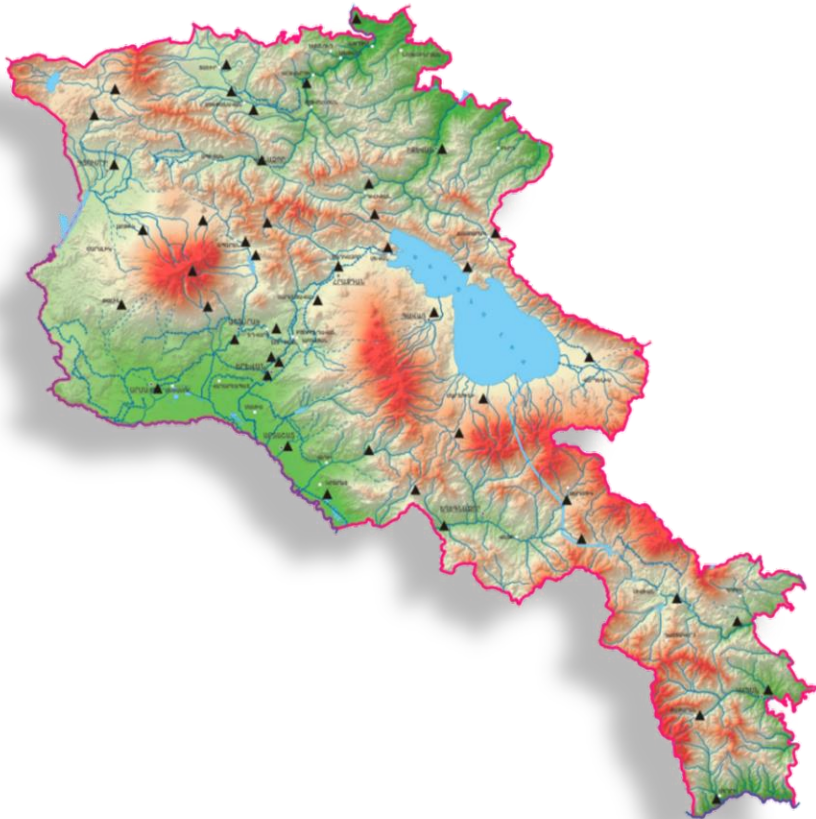
Hydrometeorology and Monitoring Center" SNCO under the Ministry of Environment of the Republic of Armenia was established on January 30/2020. By the decision of the Government of the Republic of Armenia.

- “Environmental Monitoring and Information Center”
- “Forest Monitoring Center”
- “Service of the Hydrometeorology and Active Influence on Atmospheric Phenomena”
- The mission of the HMC of Armenia is to ensure the hydrometeorological and environmental security of the Republic of Armenia and to provide reliable, accurate and timely information In the field of hydrometeorological observations, and the state of the environment, through the implementation of integrated, effective and operational monitoring of the environment and hydrometeorological activities

Main objectives of Hydrometeorology and Monitoring center

- Ensuring monitoring of the environment and hydrometeorological activities in accordance with international standards and planned programs
- Implementing the monitoring of the environment and hydrometeorological phenomena and processes, obtaining reliable information about their condition, entering the information received into a single database, and providing information to state bodies, non-governmental organizations and to the public.
- Provision of timely forecasts and warnings about dangerous hydrometeorological phenomena, as well as phenomena due to environmental pollution, allowing for the timely organization of work for ensuring life safety, protecting the property of the population and preventing possible damage to the RA economy.

The observation network in Hydrometeorology and Monitoring Center



45 Manual Meteorological Stations

38 Agrometeorological Stations

3 Actinometric Stations

1 Aerological Stations

29 Automatical Stations

Types of meteorological stations and frequency of observation

- In manual meteorological stations, observations are carry out around the clock, every 3 hours
- Automatic meteorological stations carry out observations every 10 minutes

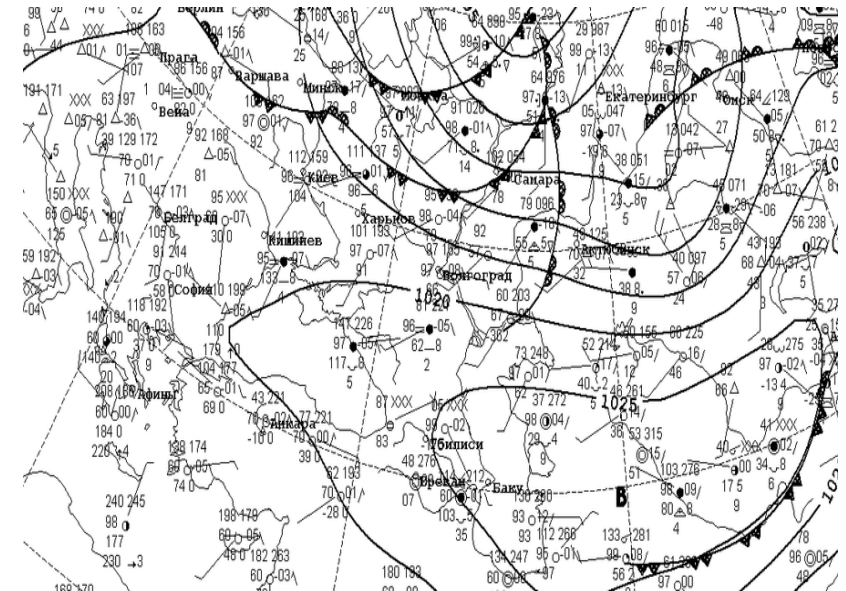
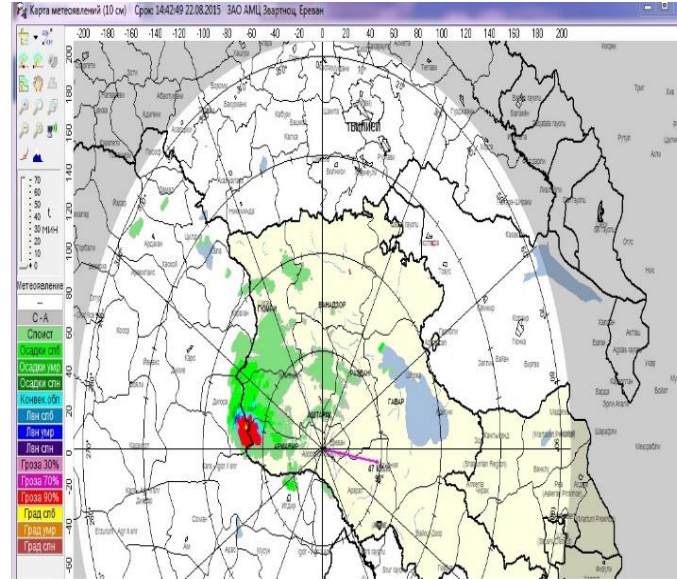
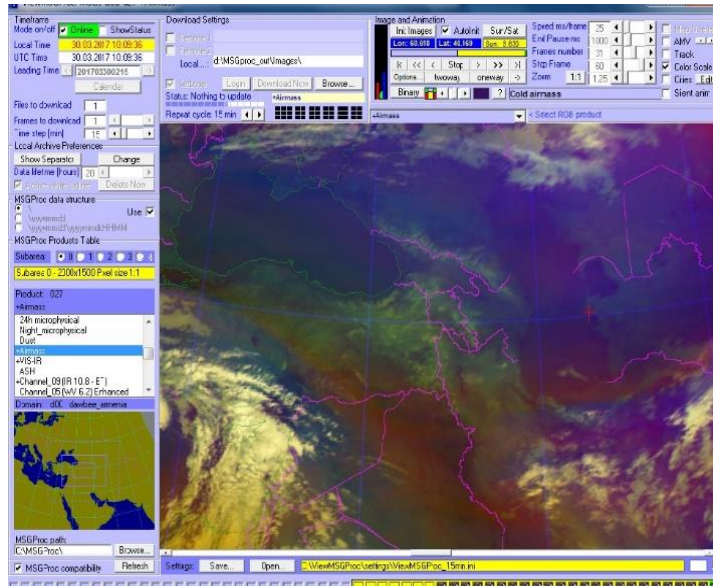


Meteorological observations

- Soil surface temperature (at observation time, maximum, minimum)
- Cloudiness
- Horizontal visibility
- Air temperature (at observation time, maximum, minimum)
- Air Moisture
- Wind (direction, speed)
- Amount of precipitation
- Pressure
- Atmospheric phenomena
- Snow cover



The way of getting information



- Receiving, checking and decoding data once every 3 hours, receiving information about hazardous phenomena
- satellite information (EUMETcast)
- radar information analysis and evaluation of the synoptic situation according to the information received from the stations,
- forecast models of synoptic maps

Synoptic codes and decoding

32999 21301 10069 20003 38168 48589 54000 80001=
 32999 00000 10078 21033 37934 48445 52003=
 32999 00000 10010 21038 38018 48591 54000=
 32999 20301 10142 20015 38677 48573 52004 80004=
 32997 02601 10153 20058 38230 48569 52002=
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 32998 13001 10145 21022 38690 48563 58023 80001=
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 42998 03002 10131 21017 38484 48560 57013=
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 32998 03104 10135 20068 39690 40219 52003=
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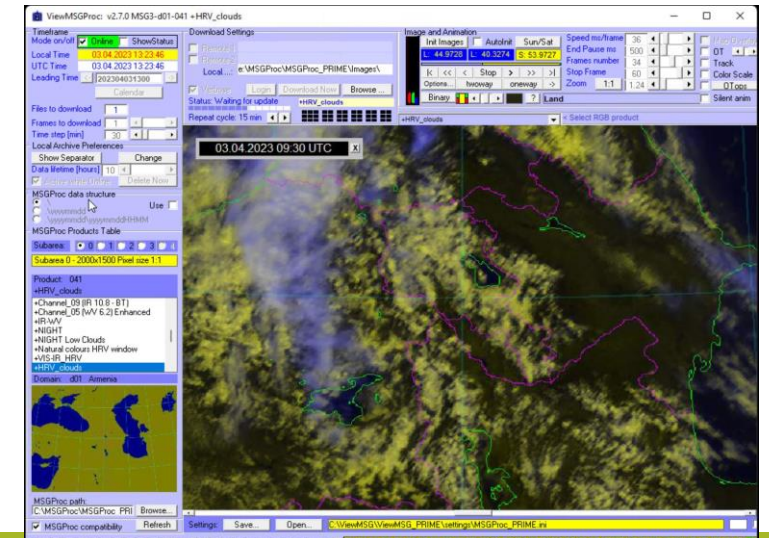
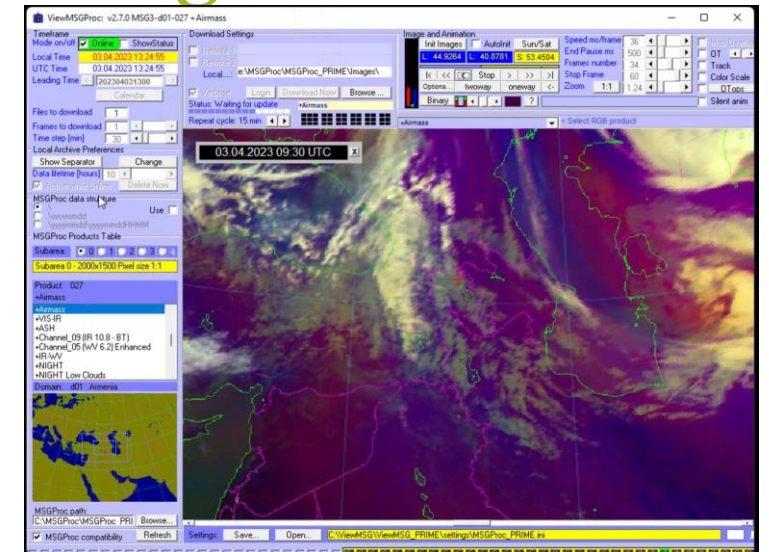
STATIONS		THE METEOROLOGICAL DATA ON ARMENIA FOR [11/22/15 - 11/23/15]																													
NN	Name	Top	Cloudiness						Temperature of Air								T			T.Gr	Wind										
			09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	MAX		MIN	06	MAX	MIN	09	12	15	18	21	00	03
626	Bagratashen	453	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	14	18	12	6	4	4	1		19	0		3	-1	-2	VNW\2	VNW\2	0\0	ESE\2	ESE\2	0\0	0\0
711	Ijevan	732	0/0	0/0	0/0	0/0	0/0	0/0	0/0		20	18	16	12	10	9	11		20	9		7	1	0	VNW\3	NNE\3	SSE\4	VSV\4	SV\2	VSV\4	VSV\2
706	Dilijan	1256	0/0	0/0	0/0	0/0	0/0	0/0	0/0		14	16	9	4	2	3	1		18	0		2		-5	S\3	SSV\2	SSV\2	0\0	SSV\2	0\0	0\0
627	Odzun	1200	0/0	0/0	0/0	0/0	0/0	0/0	0/0		13	15	9	7	5	4	3		16	2		2	1	1	NNW\1	E\1	E\1	E\1	N\2	N\1	V\2
704	Vanadzor	1350	3/0	3/0	2/0	0/0	0/0	0/0	0/0		12	13	8	3	1	-3	-3		14	-4		1	-3	-8	NW\4	VNW\5	VNW\4	VNW\3	VNW\2	V\2	VNW\2
693	Stepanavan	1397	6/3	3/2	2/2	1/0	2/2	2/2	2/2		15	15	3	-1	-4	-4	-6		17	-6		2	-2	-10	ESE\1	SSV\4	SSV\1	SV\1	VSV\2	SSV\3	SV\4
618	Tashir	1502	0/0	7/1	4/1	0/0	0/0	0/0	4/2		14	14	6	-4	-6	-9	-8		15	-9		3	-11	-11	VSV\7	S\5	SSV\2	0\0	0\0	0\0	SSV\3
686	Gumri	1530	0/0	2/0	0/0	0/0	0/0	0/0	0/0		8	10	4	-3	-5	-6	-10		10	-10		0	-2	-12	0\0	0\0	0\0	0\0	0\0	0\0	0\0
689	Artik	1750	2/2	2/1	0/0	0/0	0/0	2/2	4/2		5	8	2	0	-1	-4	-5		10	-5		3	-1	-9	V\1	VSV\1	ESE\2	ESE\1	ESE\1	E\1	SSV\1
682	Amasia	1876	2/0	2/0	0/0	0/0	0/0	0/0	0/0		5	6	0	-3	-4	-4	-5		8	-5		2	1	-7	0\0	S\1	0\0	NNW\1	N\2	NNW\1	N\2
609	Ashotsk	2009	3/3	0/0	0/0	0/0	0/0	0/0	0/0		4	7	1	-5	-6	-7	-10		8	-11		1	0	-40	0\0	0\0	0\0	0\0	0\0	0\0	0\0
815	Masrik	1940	0/0	5/5	1/1	0/0	0/0	2/2	2/2		5	10	3	-2	-4	-6	-7		10	-8		2	-1	-10	0\0	VSV\1	ESE\1	ENE\2	0\0	E\2	E\3
808	Martuni	1945	0/0	7/0	6/0	2/0	0/0	0/0	0/0		10	7	2	2	1	0	-3		12	-3		2	0	-8	VSV\6	N\2	S\3	S\4	S\2	SV\3	SSV\4
802	Shorja	1945	0/0	0/0	0/0	0/0	0/0	0/0	0/0		8	9	3	1	1	0	0		10	-1		1	0	-1	SV\5	NN\3	V\3	N\3	NN\2	V\2	NN\2
801	Gavar	1961	2/2	2/2	2/2	0/0	2/2	0/0	0/0		7	7	0	-4	-6	-7	-7		8	-8		1	1	-10	ESE\1	ESE\1	ESE\1	0\0	0\0	0\0	0\0
717	Sevan(like)	2100	4/2	4/2	3/2	2/0	1/0	0/0	0/0		8	9	5	3	3	2	1		9	0		2	1	-8	SSV\3	SSV\4	VSV\2	0\0	SE\1	0\0	0\0
708	Semyonovka	2114	3/0	3/2	2/0	0/0	0/0	0/0	0/0		6	7	2	2	2	0	-1		7	-1		2	1	53	SSV\7	S\6	ESE\1	VSV\3	ESE\3	ENE\2	ENE\2
792	Hrazdan	1765	2/0	2/0	2/0	2/0	2/0	2/0	2/0		7	8	3	-2	-3	-3	-4		9	-4		1	-2	90	V\3	V\3	VSV\3	V\2	V\2	V\2	V\3

Available satellite data for weather forecasting which can be considered for drought forecasting too

- **DAWBEE**: Receiving system *EUMETCast EUROPE*

From Internet

- Official web site *EUMETSAT*
- Official web site НИЦ «Планета»
<http://sputnik.infospace.ru>



Agrometeorological observations in Armenia

Agrometeorological observations include

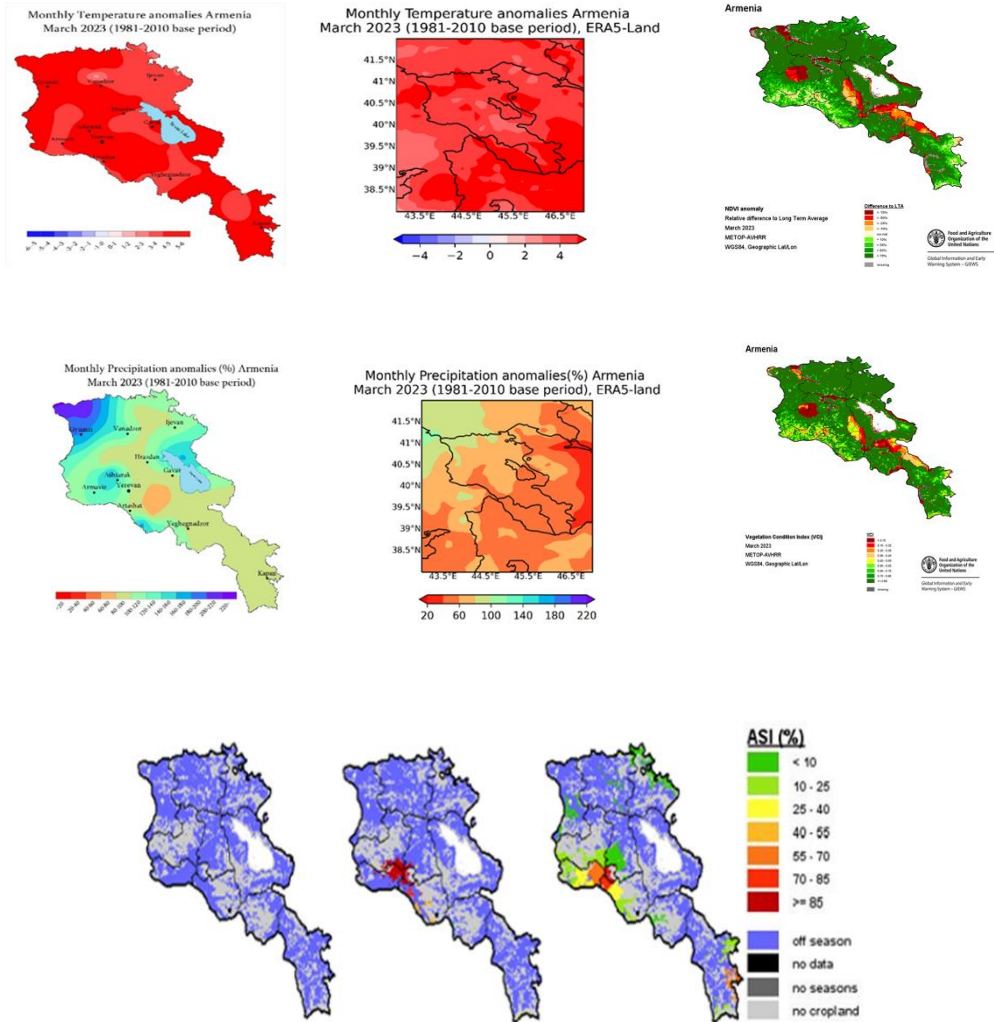
- phenological stages
- application of agrotechnical measures
- damage of crops
- viability of winter wheat and fruit trees
- Soil moisture (1 station)
- Soil temperature

Agrometeorological observations are carried out on 31 crops

- Cereal
- fruit trees
- Grapes
- vegetable garden
- potatoes



Drought monitoring in Armenia



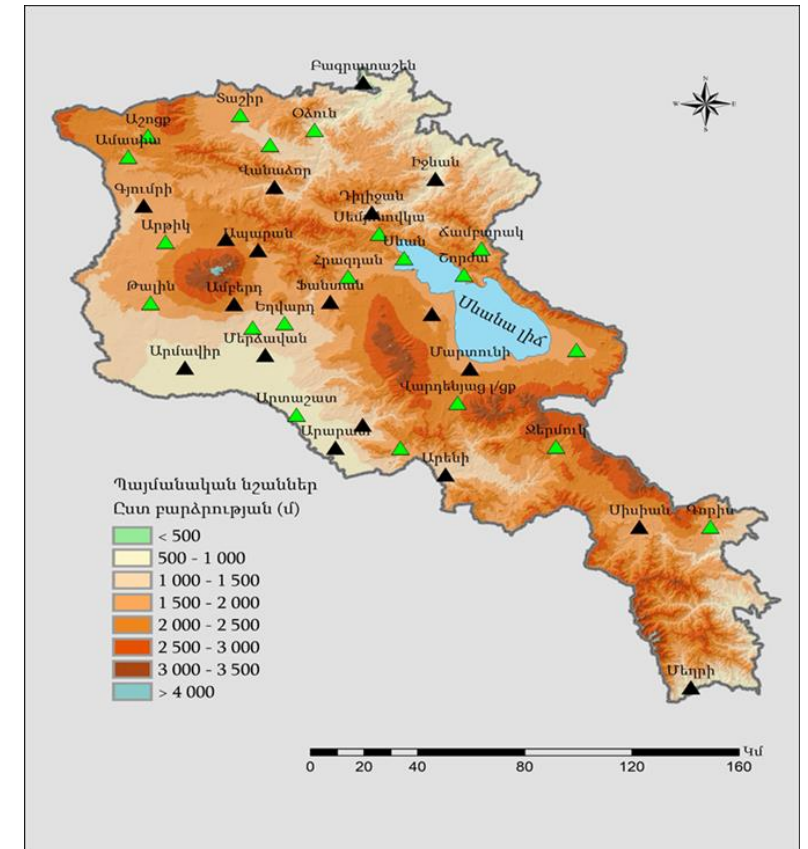
The analysis of drought indices is carried out according to the satellite data posted on the official website of the World Food Organization.

Meteorological drought is estimated by Selyaniv's hydrothermal coefficient based on 10-day temperature and precipitation data obtained from 38 meteorological stations.

Meteorological drought assessment on the base of Hydro-thermal Coefficient of Selyaninov

Meteorological stations

Կայաններ	Օգոստոս 3	Օգոստոս 2	Օգոստոս 1	Գունարային	Բանաձևում	Կարգ			Կարգ	Միջ.
Արմավիր										
միջին	285.6	280	275.8	841.4	0.0	1		շատ ուժեղ	1	0-0,19
տեղում	0	0	0.5	0.5				ուժեղ	2	0,2-0,39
Արարատ										
միջին	299.7	297.6	293.3	890.6	0.02	1		միջին	3	0,4-0,6
տեղում	0	0	1.4	1.4				թույլ	4	0,61-0,75
Բագրատաշեն										
միջին	264.7	264.7	256.8	786.2	0.03	1		բացակա	5	0,76-5,0
տեղում	0	0	2.4	2.4						
Մեղրի										
միջին	294.9	292.6	281.9	869.4	0.01	1				
տեղում	0	0	0.5	0.5						
Իժնասուն										



Assessment of meteorological drought intensity

Մարզ	Կայան	21.08-31.08
Շիրակ	Գյումրի	1
	Ամասիա	2
	Արթիկ	2
	Աշոցք	2
Լոռի	Օձուն	2
	Տաշիր	1
	Վանաձոր	2
	Ստեփանավան	5
Տավուշ	Բագրատաշեն	1
	Իջևան	2
	Գիլիջան	2
Գեղարքունիք	Սևան	2
	Սեւյունովկա	4
	Գավառ	3
	Շորժա	4
	Մարտունի	1
	Ճամբարակ	2
	Մասրիկ	1
	Վարդենյանց	1

Մարզ	Կայան	21.08-31.08
Կոտայք	Հրազդան	2
	Եղվարդ	1
	Ֆանտան	1
Արագածոտն	Թային	1
	Ապարան	3
	Աշտարակ	1
	Ամբերդ	1
	Ծաղկահովիտ	3
Վայոց Ձոր	Արենի	1
	Ջերմուկ	1
Սյունիք	Մխիհան	1
	Գորիս	1
	Մեղրի	1
Արարատ	Արարատ	1
	Ուրցաձոր	1
	Անանուն յ/ցք	1
	Արտաշատ	1
Արմավիր	Արմավիր	1
	Մերձավան	1

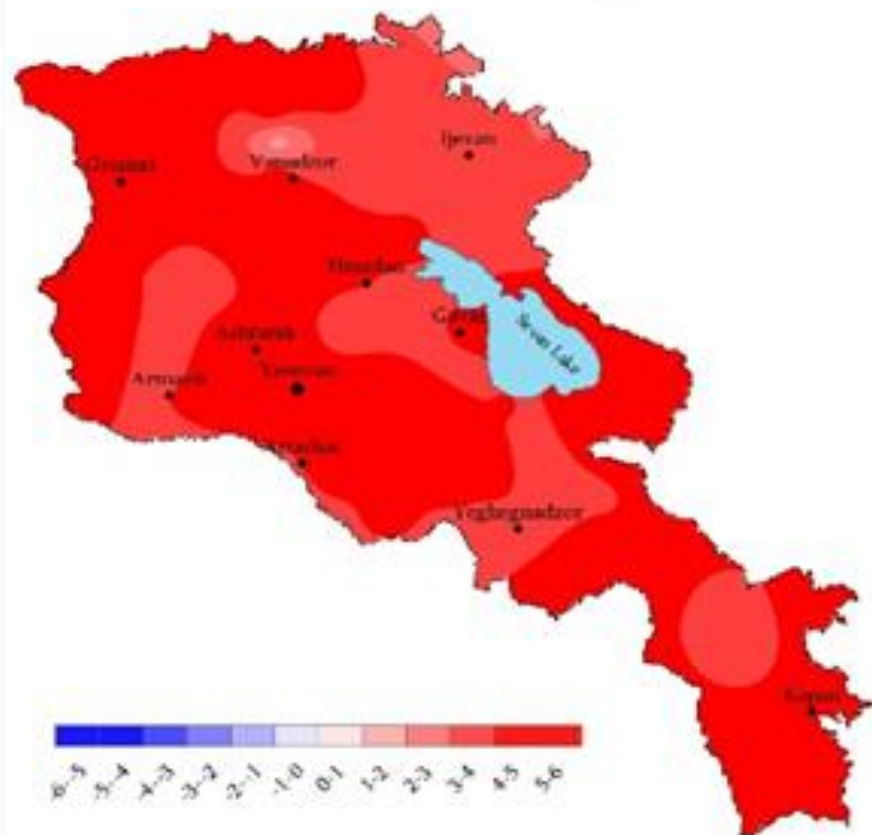
1. Strongest
2. Strong
3. Medium
4. Week
5. Absence

Armenia drought bulletin content

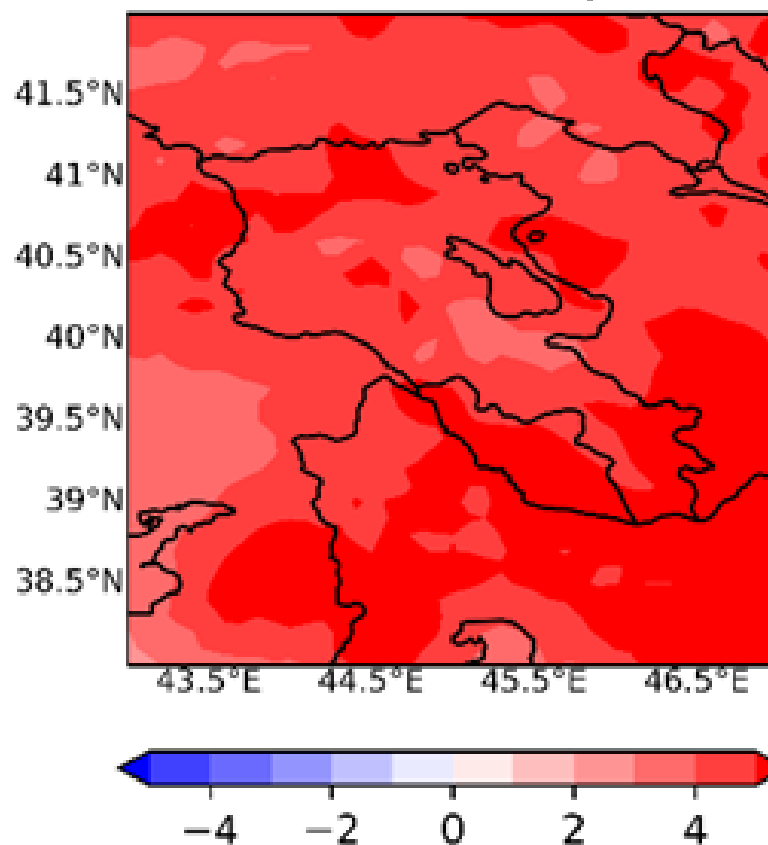
- 1. Monthly temperature anomaly
- 2. Monthly precipitation anomaly
- 3. Drought indices
 - 3.1 Vegetation Condition Index (VCI)
 - 3.2 Normalized Difference Vegetation Index (NDVI)
 - 3.3 Agricultural Stress Index (ASI)
 - 3.4 Assessment of meteorological drought intensity

1. 1. Monthly temperature anomaly

Monthly Temperature anomalies Armenia
March 2023 (1981-2010 base period)

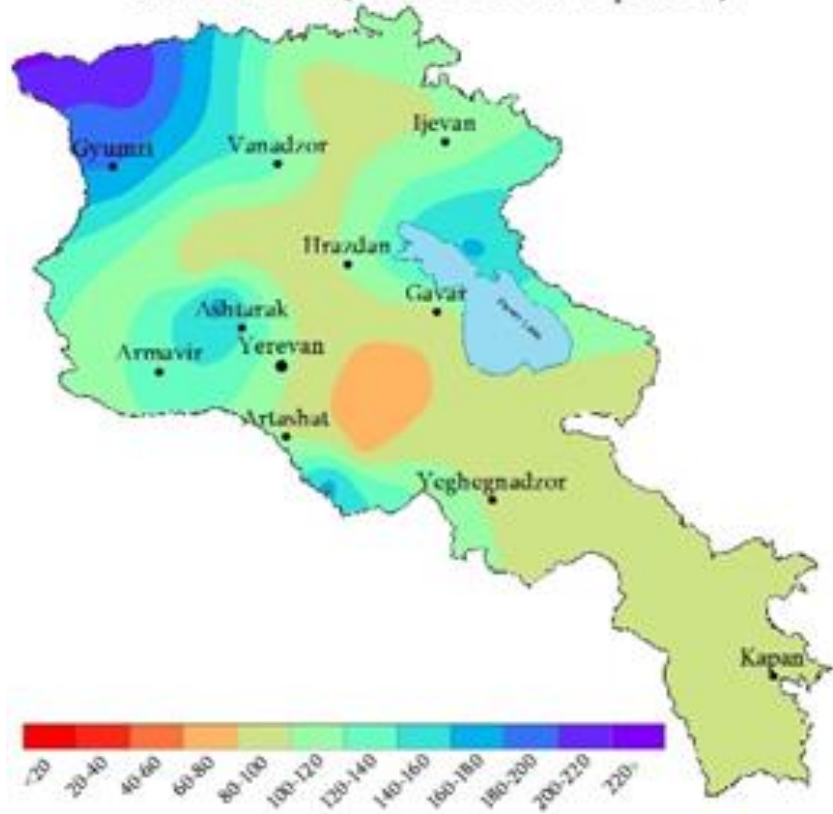


Monthly Temperature anomalies Armenia
March 2023 (1981-2010 base period), ERA5-Land

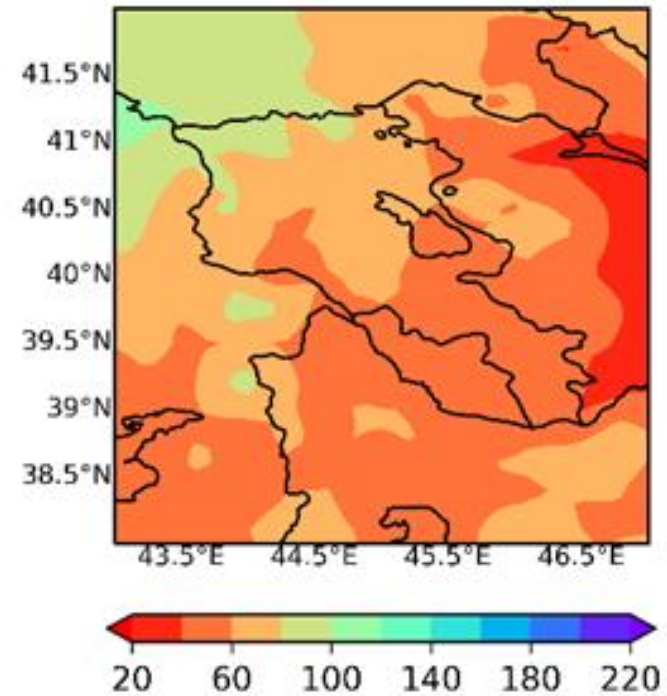


2. Monthly anomalies of precipitation

Monthly Precipitation anomalies (%) Armenia
March 2023 (1981-2010 base period)



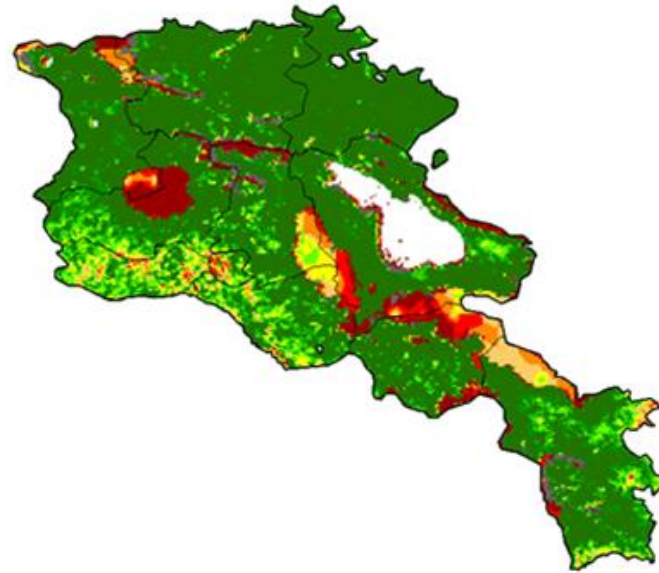
Monthly Precipitation anomalies(%) Armenia
March 2023 (1981-2010 base period), ERA5-land



3. Indices of drought intensity

3.1 Vegetation Condition Index (VCI)

Armenia



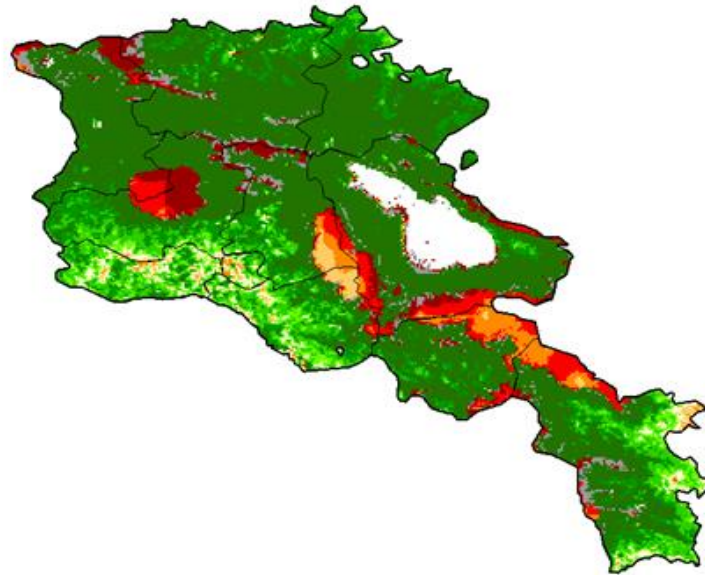
Vegetation Condition Index (VCI)
March 2023
METOP-AVHRR
WGS84, Geographic Lat/Lon



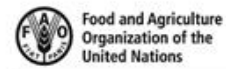
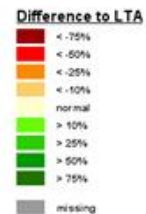
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3.2 Normalized Difference Vegetation Index (NDVI)

Armenia

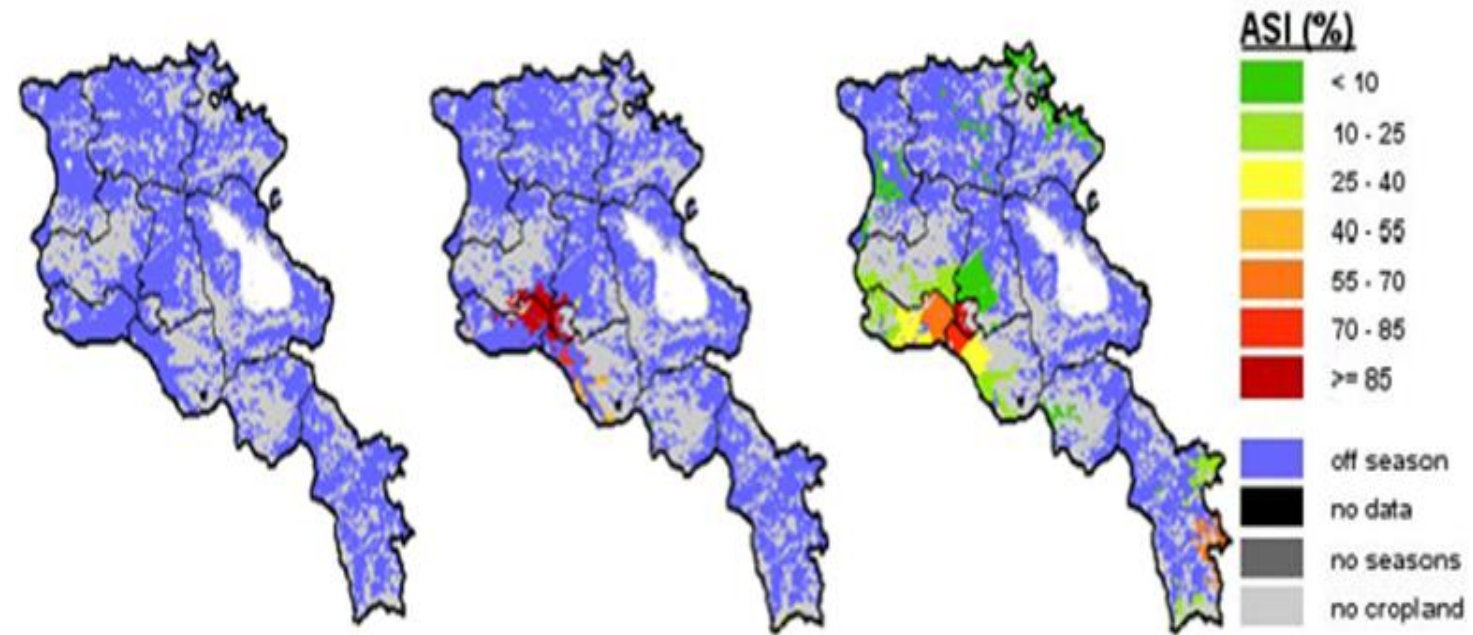


NDVI anomaly
Relative difference to Long Term Average
March 2023
METOP-AVHRR
WGS84, Geographic Lat/Lon

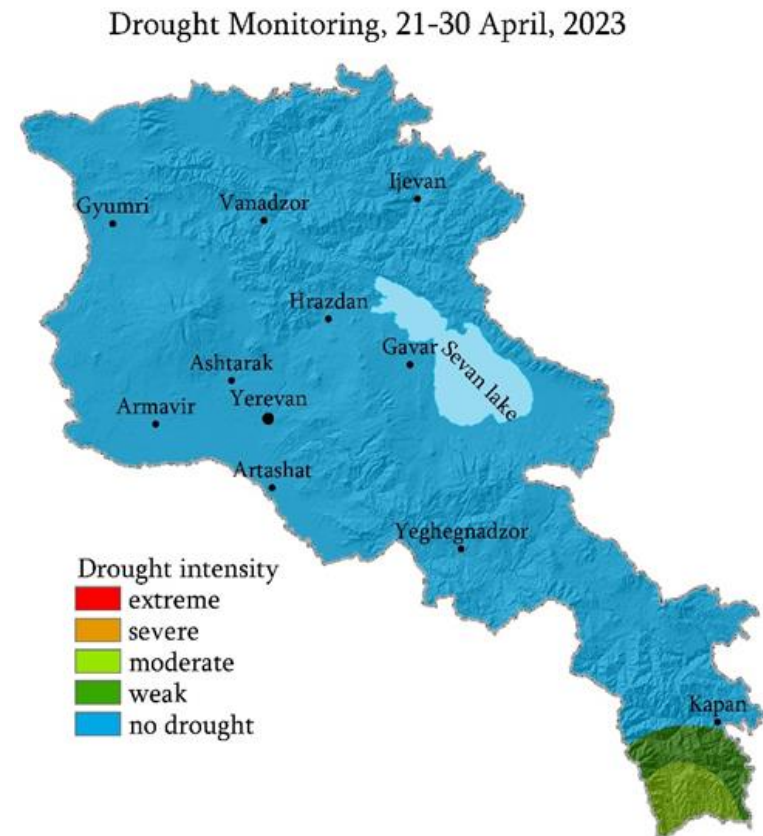
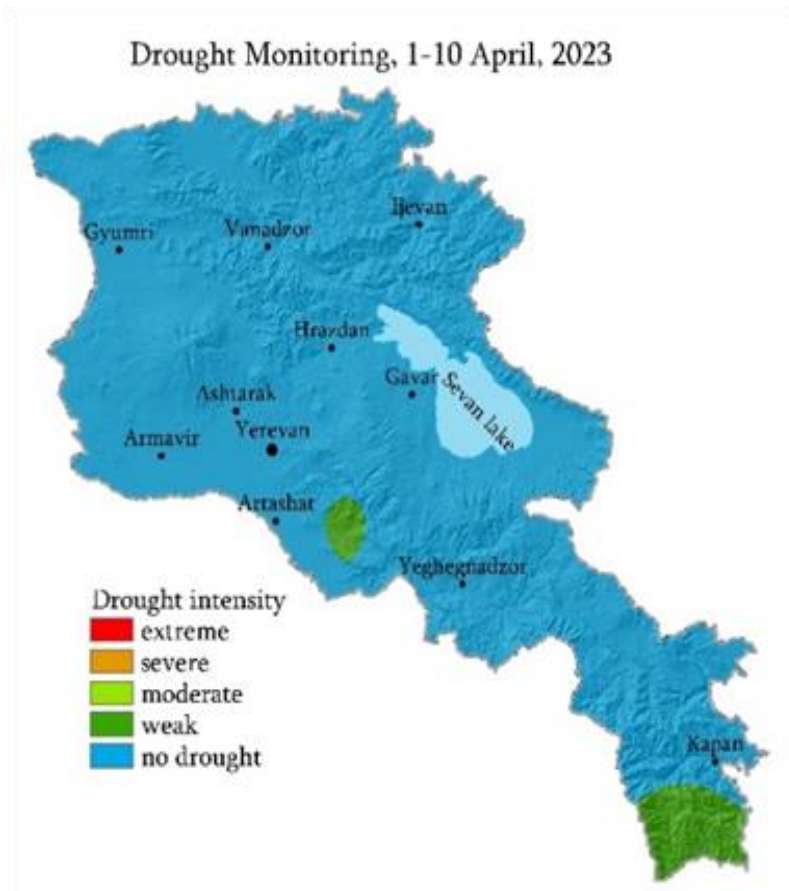


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3. 3 Agricultural Stress Index (ASI)



3. 4 Drought monitoring map base of Hydro-thermal Coefficient of Selyaninov





Thank you for your attention