The 5th Meeting of the Coordinating Group

of the RA II WIGOS Satellite Project

21 October, Vladivostok city, Russky Island,

Russia Far Eastern Federal University

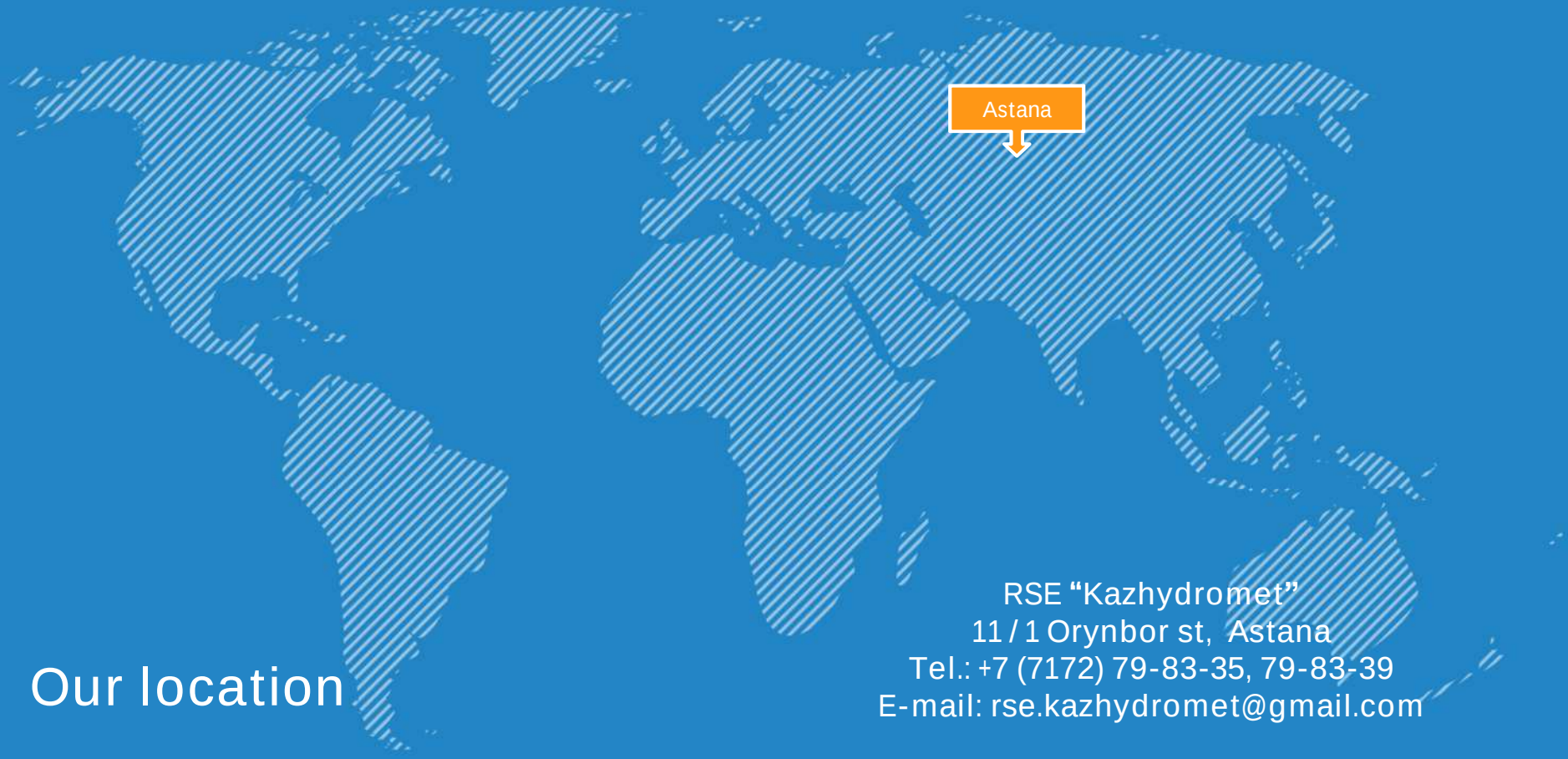
Ministry of Energy

NATIONAL HYDROMETEOROLOGICAL SERVICE OF THE REPUBLIC OF KAZAKHSTAN

National Hydrometeorological Service of the Republic of Kazakhstan was founded in January 1922. On March 2, 1999, it obtained the status of the Republican State Enterprise "Kazhydromet" in accordance with Resolution of the Government of the Republic of Kazakhstan No.185 before August 2012,

Kazhydromet RSE consisted of 16 subsidiary state enterprises, one in each oblast of the Republic of Kazakhstan, as well as in Almaty and Astana cities.

After the restructuring 15 branches remained with the staff comprising more than 3 thousand people.



Our location

RSE "Kazhydromet"
11 / 1 Orynbor st, Astana
Tel.: +7 (7172) 79-83-35, 79-83-39
E-mail: rse.kazhydromet@gmail.com

INFORMATION AVAILABILITY IN SOCIAL NETWORKS

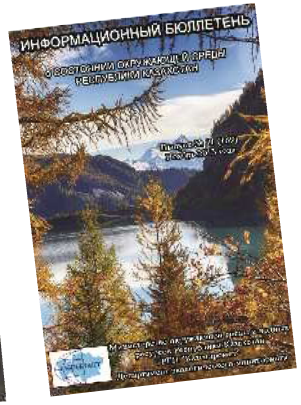
Web-site of RSE “Kazhydromet - WWW.KAZHYDROMET.KZ
Mobile application– KZMETEO (in stage of developing)
Mobile application of air pollution monitoring – in stage of developing
Web-portal - WWW.ATMOSPHERA.KZ

The main products, released by RSE “Kazhydromet”

- Storm warnings;
- Weather forecast for 1 day;
- Weather forecast for 2 and 3 days;
- Weather forecast for 1 week;
- Weather forecast for 1 ten day period;
- Weather forecast for 1 month and season;
- Flood forecasting;
- Annual data on surface water;
- Daily hydrological bulletin;
- Avalanche bulletin;
- Mudflow bulletin;
- Weekly bulletin on Caspian sea;
- Monthly ecological bulletin;
- Ten day bulletin on agro-meteorology;
- Agro-meteorological forecasts.

Weather forecast accuracy on 2016: short-term, medium-term and long-term with small lead-time weather forecasts:

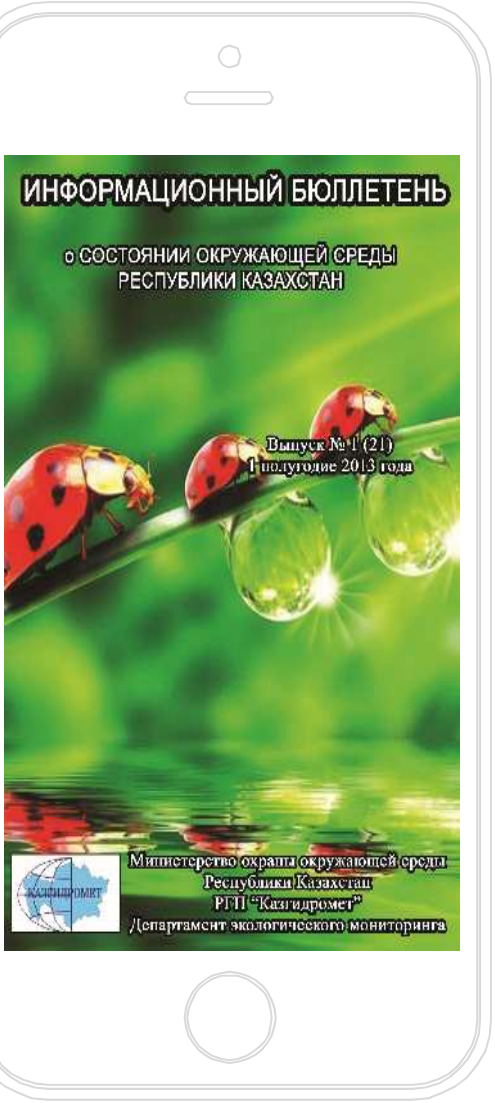
- By Kazakhstan for 1 day - 90%;
- By regions for 1 day - 96%;
- By regions for 2 day - 93%;
- By regions for 3 day– 92%;
- By regions for 1 week– 91%.



Ecological products

Information about ¥condition of environment pollution in the Republic of Kazakhstan is publishing in monthly, quarterly and half-yearly bulletins.

Ecological products are publishing on the web-site of Ministry of Energy www.energo.gov.kz - in «Information about environmental situation» section and also on the web-site of RSE “Kazhydromet” www.kazhydromet.kz - in «Ecology» section.



КАЗГИДРОМЕТ

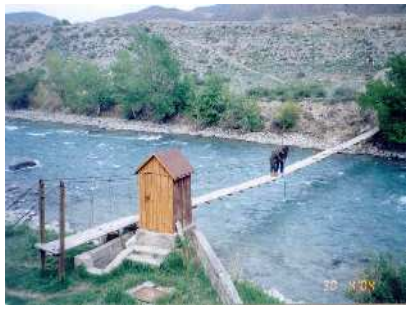
Hydrometeorological and ecological monitoring providing

Hydrometeorological monitoring provides by:

328 meteorological stations:
9 upper-air stations.
11 meteorological posts.
88 agro-meteorological posts.
307 hydrological posts.

Ecological monitoring provides by:

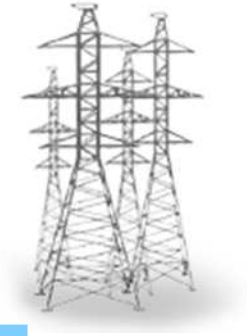
140 posts on air quality
133 water bodies on water quality
65 posts on contamination of soil condition
85 meteorological stations on radiation exposure
46 meteorological stations on chemical composition of atmospheric precipitation
39 meteorological stations on chemical composition of snow cover



Data collecting

Hydrometeorological stations

Telephone, internet, satellite connections



Hydrological posts

Local executives

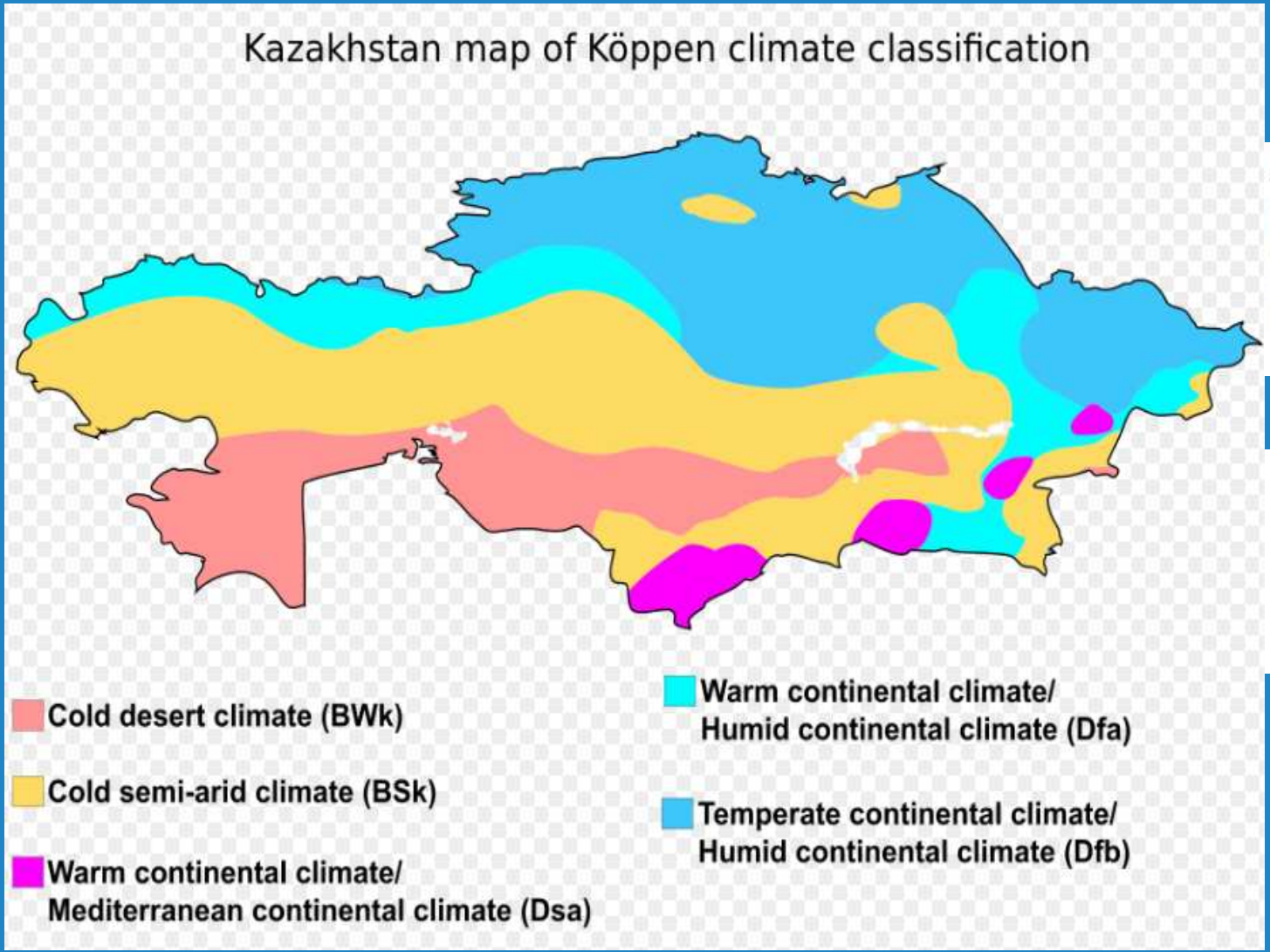
Data collecting and processing centre

Governmental bodies
Ministry of Agriculture, Ministry of Energy, Ministry of Internal Affairs

Country overview

Territory – 2,7 mln. thnd km²
Population – 17,5 mln. person
Official languages – kazakh (official), russian
Economy - mining industry (coal, oil, ore), agriculture (crops, livestock). tourism (ski, fishing, mineral springs).

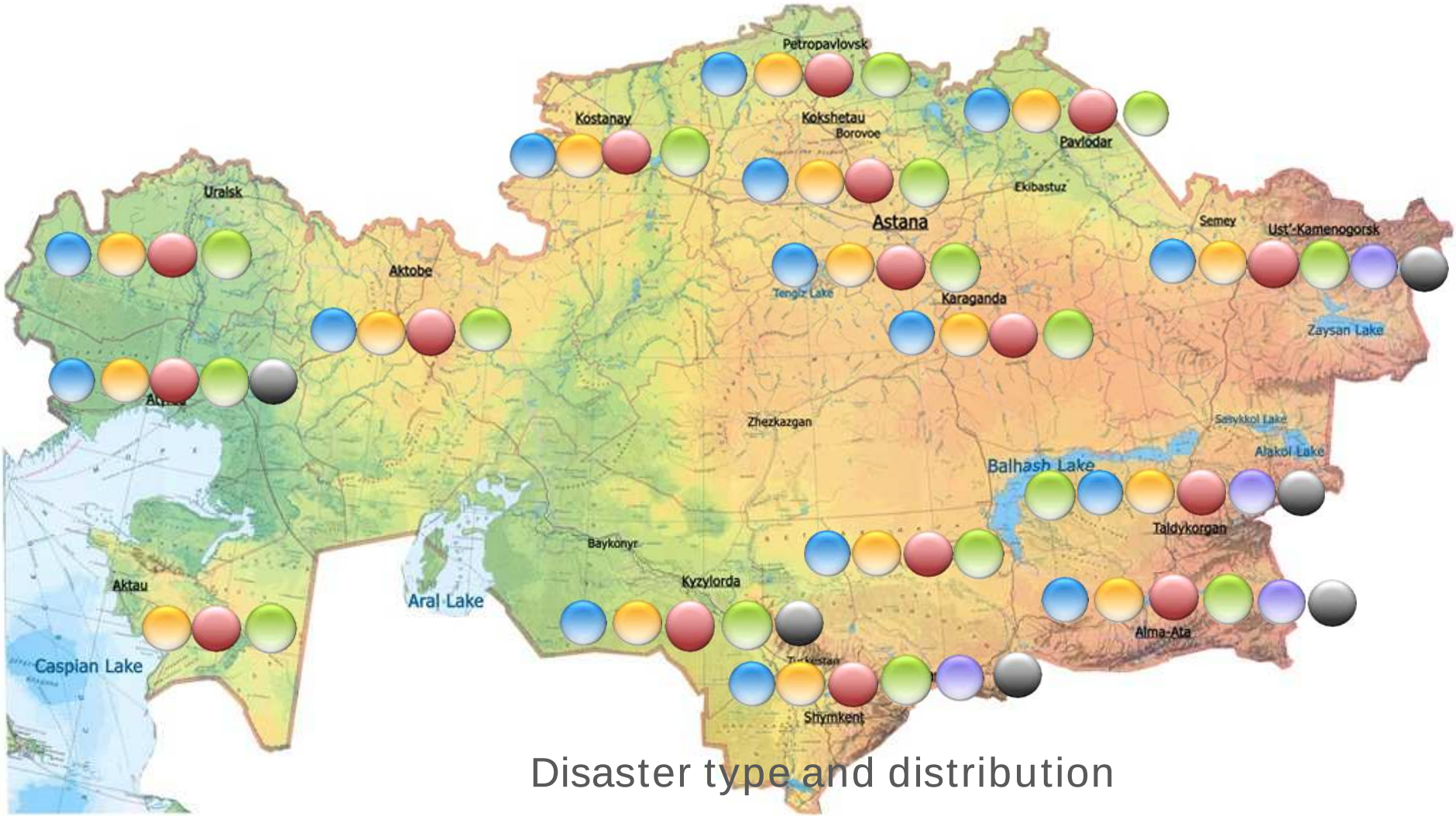
Climate



Main climates	Precipitation
A: equatorial	W: desert
B: arid	S: steppe
C: warm temperate	f: fully humid
D: snow	s: summer dry
E: polar	w: winter dry
	m: monsoonal

Temperature	
h: hot arid	F: polar frost
k: cold arid	T: polar tundra
a: hot summer	
b: warm summer	
c: cool summer	
d: extremely continental	

Territories at risk hydrometeorological disasters



Disaster type and distribution

- at risk floods
- at risk snow-storms, blizzards
- a heat wave, drought
- at risk a storm rain, hurricanes
- at risk a snow avalanche
- at risk of mudslides

Major historical hydrometeorological disasters

Disaster type and distribution

Kazakhstan is prone to a variety of natural disasters: strong winds, abnormal cold and abnormal heat, drought, heavy rainfall, blizzards, dust storms. earthquakes, floods, mudflows, avalanches, landslides and landfalls and flooding of the coastal areas where Kazakhstan meets the Caspian Sea.

The catastrophic flood on the territory of Kazakhstan associated with storm surge are observed in the delta river Ural and throughout the northeastern coast of the Caspian.

The most dangerous are the periods from October to December and in May, when the water level rises reach 2.0-2.5 m the Sea water penetrates tens of km into the interior of the territory.

River floods occur mainly in the spring and summer on the main rivers and their tributaries.

Snow- and rain-fed rivers tend to flood in the spring and much more quickly those fed by snow and glacial melt, which flood in late spring and summer Landslides during flood periods contribute to backwater through blocking channels, which when broken can sudden release significant surges.

Major hydrometeorological disasters

River floods

Major hydrometeorological disasters

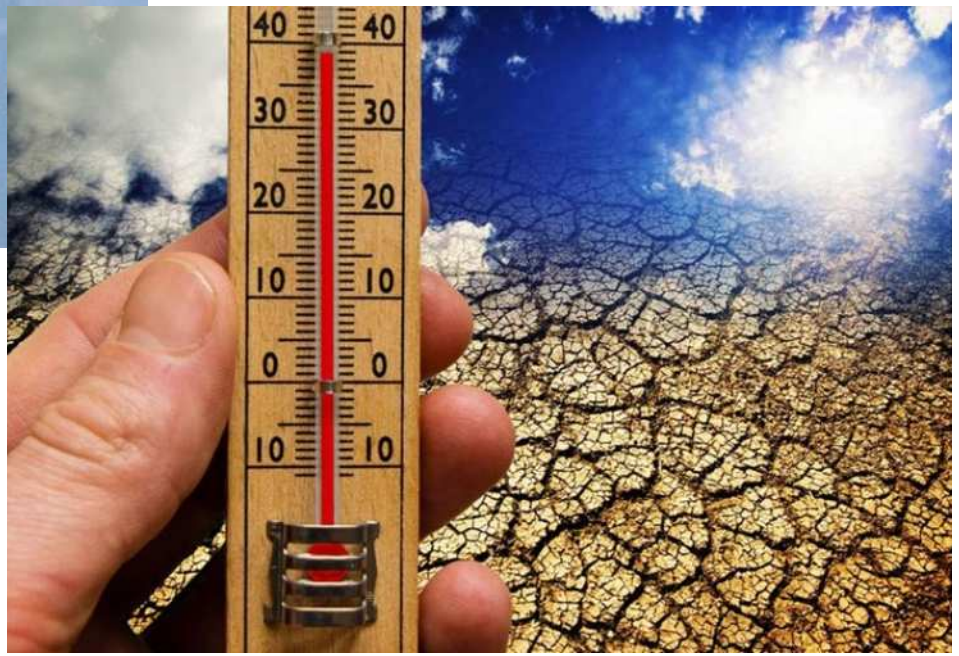
Mudflow

Major hydrometeorological disasters

Abnormal cold and abnormal heat

-40…-50°C

+40…+50°C



Major hydrometeorological disasters

Severe drought

Disaster type and distribution

River flooding in Kazakhstan has become more prevalent in the last 20-30 years Kazakhstan: mudflows threaten around 13% of the country's area (the southeastern portion), containing over 26% of its population (including the entire city of Almaty, with a population of 1.2 million). During the last 150 years around 800 mudflows have been registered

Approximately 75% of the country's terrain is exposed to a high risk of different types of natural disasters.

Floods caused by melting snow occur in almost every region of Kazakhstan. This type of flooding is likely to occur in Southern Kazakhstan from February to June each year. From March to July, it may occur in Eastern Kazakhstan. Flatland rivers may overflow from March to June. The heaviest damage caused by flooding usually occurs in the areas of the Irtysh, the Ural, the Tobol, the Ishym, the Nura, the Emba, the Turghai, and the Sary-Su rivers.

Life and economic loss Major national economic sectors

From 1966 to the present time increases the recurrence of severe and medium drought. In the main grain regions of Kazakhstan significant for agriculture drought (crop loss of 20% or more) have a probability of recurrence once in 3-5 years.
Severe drought leading to the reduction of the average regional grain yields by more than 50%, have a high frequency of occurrence in West-Kazakhstan, Aktobe, Karaganda and Kostanay regions – once in 4-5 years.

Every year, Kazakhstan registers approximately 3,000-4,000 natural disasters, resulting in approximately 3,000-5,000 injuries and several dozen fatalities.
The total damage caused by these disasters is estimated at more than 50 million USD.

Surface observations

Meteorological Network

328 stations
- 83 meteorological observatory stations;
- 16 stations of the Global Climate Observing System;
- 32 reference climate station;

256 MS

72 AMS

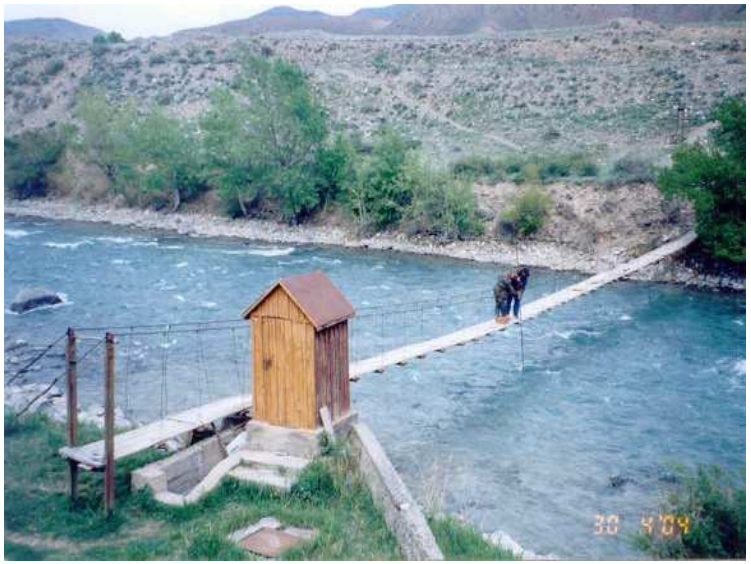
Agrometeorological Network

203 posts
- 115 weather stations
- 88 agrometeorological posts

Observations :
203 posts agrometeorological
177 posts route surveys

Hydrological observations

Hydrological observations are carried out at 302 gauging stations, including 258 river, 35 lake and 9 marine gauging stations, as well as 3 marine hydrometeorological stations that carry out observations on 155 rivers, 16 lakes, 6 reservoirs, 3 channels and 2 seas.
55 rivers cross the border of Kazakhstan (PRC - 24 rivers, Russia – 20 rivers, Kyrgyzstan – 9 rivers and Uzbekistan - 2 rivers).
33 stations operate on the most major water courses.



Marine observations

Marine forecasting and ice condition monitoring in Caspian sea

What we compile:

- Caspian sea level forecasting;
- Review of ice condition;
- Weekly bulletins;
- Weekly bulletin on heaving;
- Heaving forecasts for 5 parts of Middle Caspian sea;
- Overall bulletin with Caspian countries (www.caspcom.com);
- Heaving forecasts and sea level detection for oil production areas;

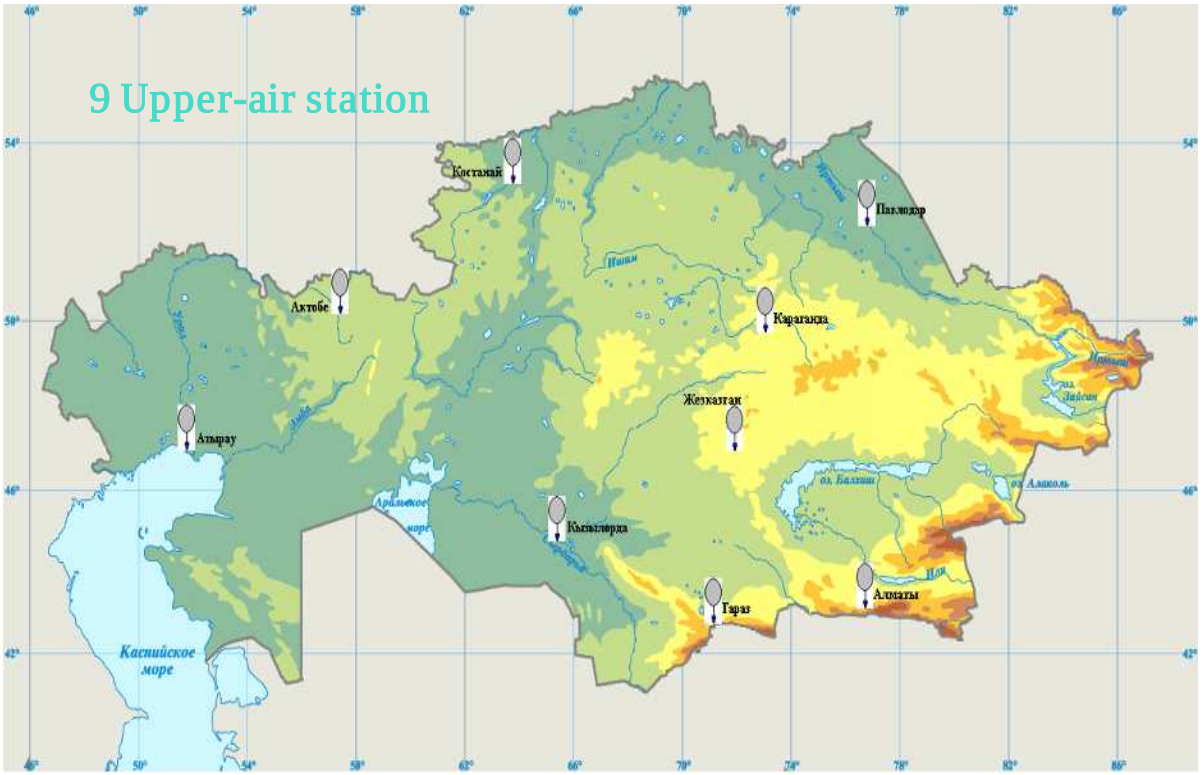
Automatic Hydrometeorological Buoy stations

7 sea automatic buoy stations were established in Mangistau and Atyrau regions in the period between 2014-2015.
Measurement parameters: oil content, direction and speed of flow, heaving and level of water, salinity and temperature of water, dissolved oxygen concentration in water, PH, turbidity.

Upper-air observations

6 station - MARL-A system (a small-size upper-air radar produced in Russia)

3 station- the system GRAW (Germany)



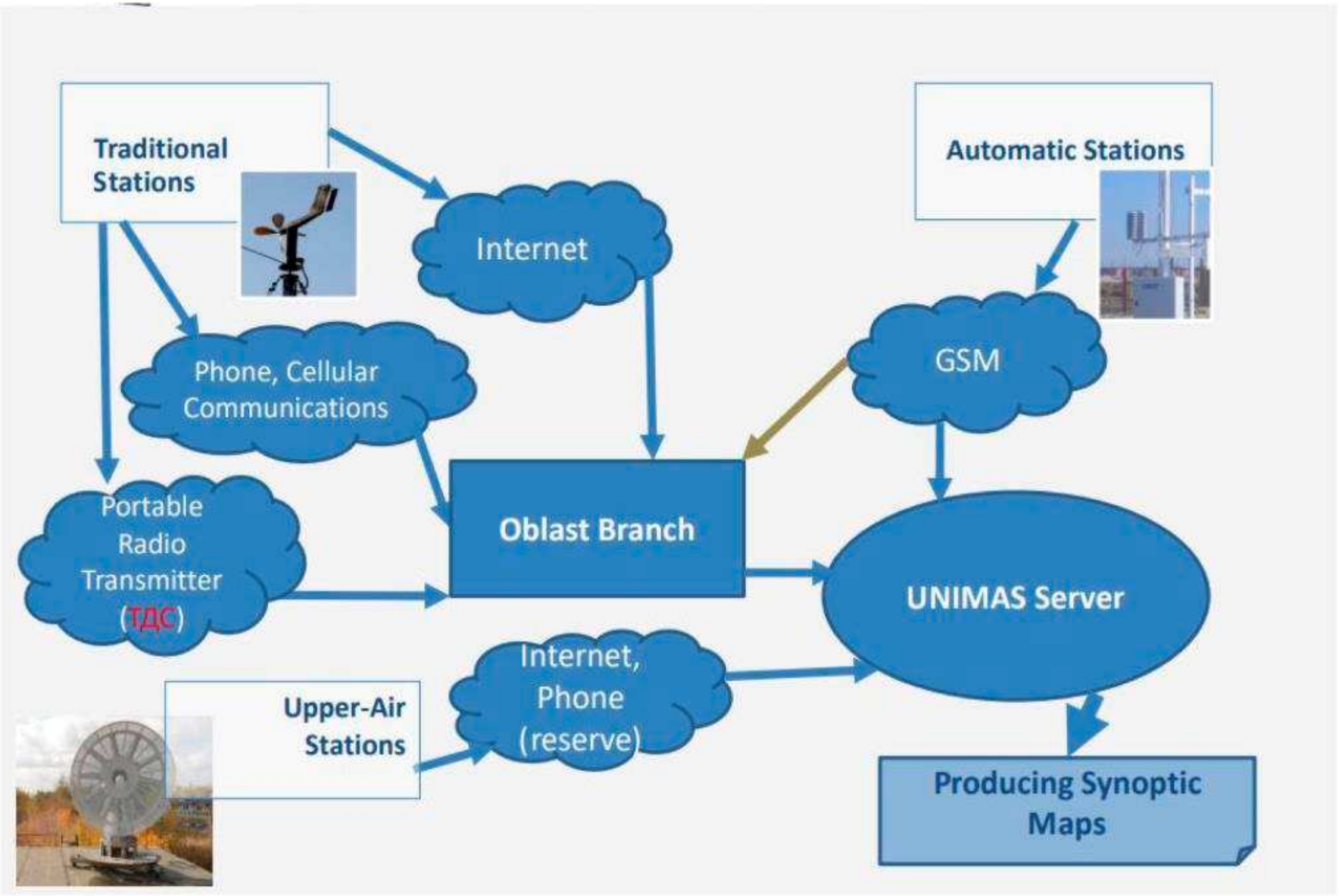
9 upper-air stations, radiosondes, attached to free-rising balloons, make measurements of pressure, wind velocity, temperature and humidity from just above ground to heights of up to 30 km.
Over two thirds of the stations make observations at 0000 UTC and 1200UTC.

Other observation platforms

- 40 stations with solar radiation observations
- 13 stations undertake full-scope time-bound observations (actinometer, pyranometer and radiation balance gauge with a galvanometer
- 27 stations automatic weather stations undertake continuous recording of the total solar radiation (CMP6)

5 stations observations for a total ozone content in the atmosphere.

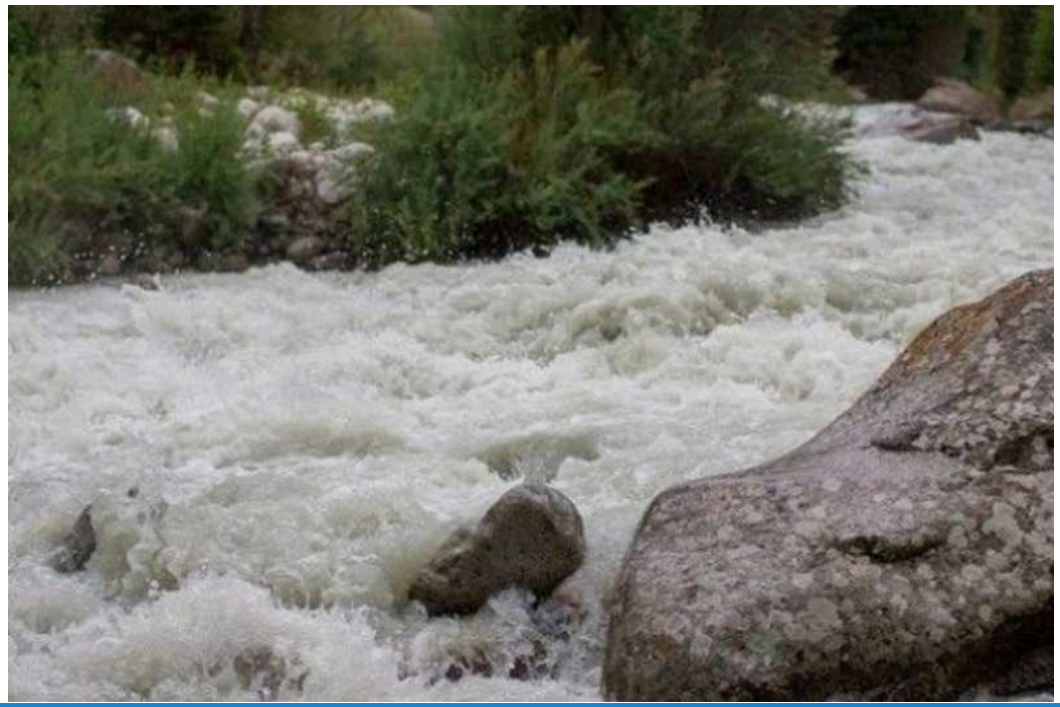
COLLECTING AND TRANSMITTING METEOROLOGICAL INFORMATION



Central Asia Region Flash Flood Guidance (CARFFG)

The goal of the Flash Flood Guidance System with global coverage is to:

- enhance NMHSs capacities to issue timely and accurate flash flood warnings to mitigate the adverse impacts of hydrometeorological hazards;
- generating flash flood early warning products using state-of-the-art hydrometeorological forecasting models;
- providing extensive training to the hydrometeorological forecasters;
- improving collaboration between NMHSs (between meteorology and hydrology) and Disaster Management Agencies .



Satellite observations

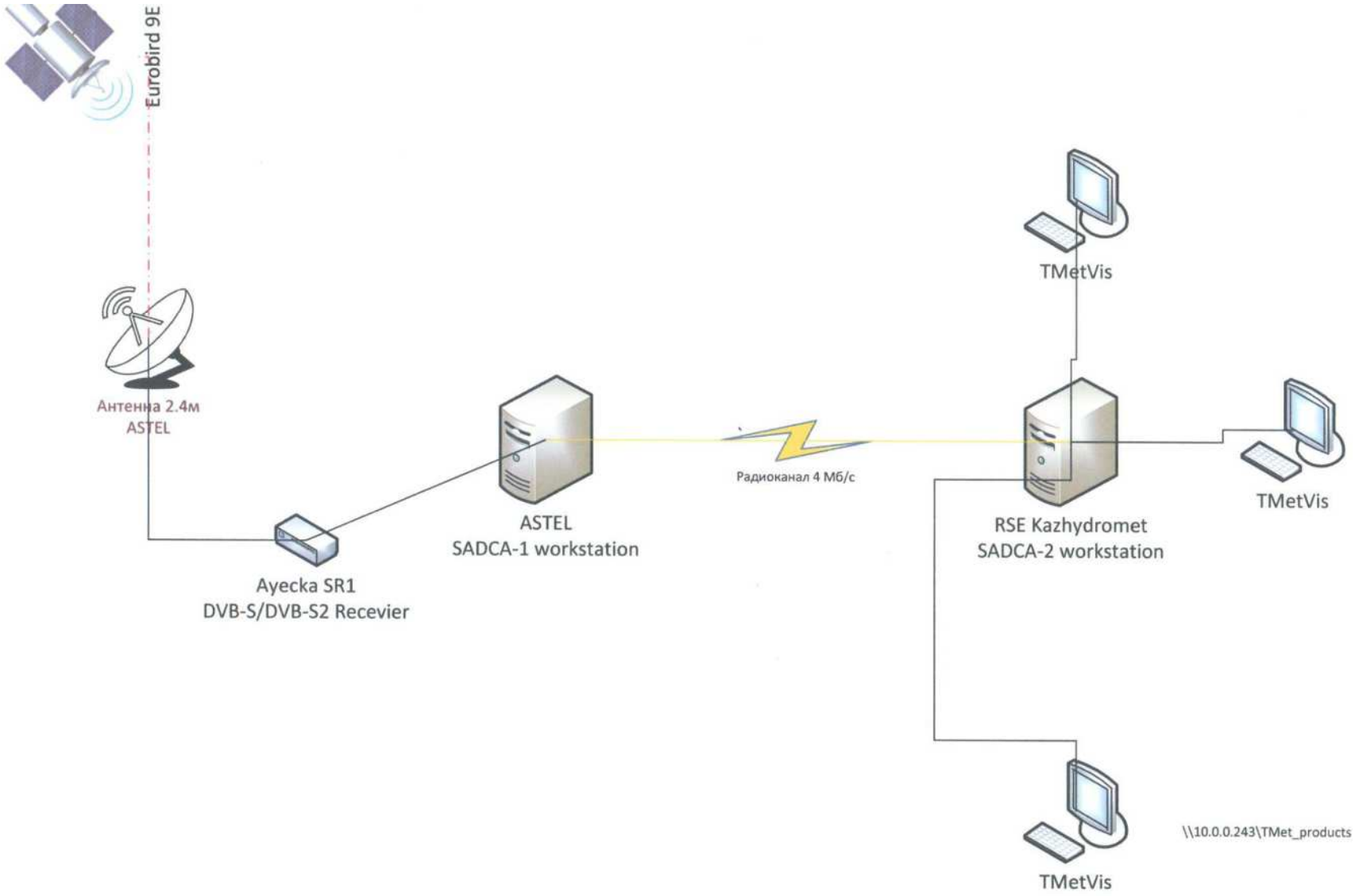
The Intergovernmental organization ETSAT in 2014 year NHMS of the Republic of Kazakhstan in the project's boundaries SADCA (Application of meteorological satellite data for the territory of Central Asia) has been installed software package TMet.

TMet is a software package has used for processing and visualization of the meteorological data and results of satellites.

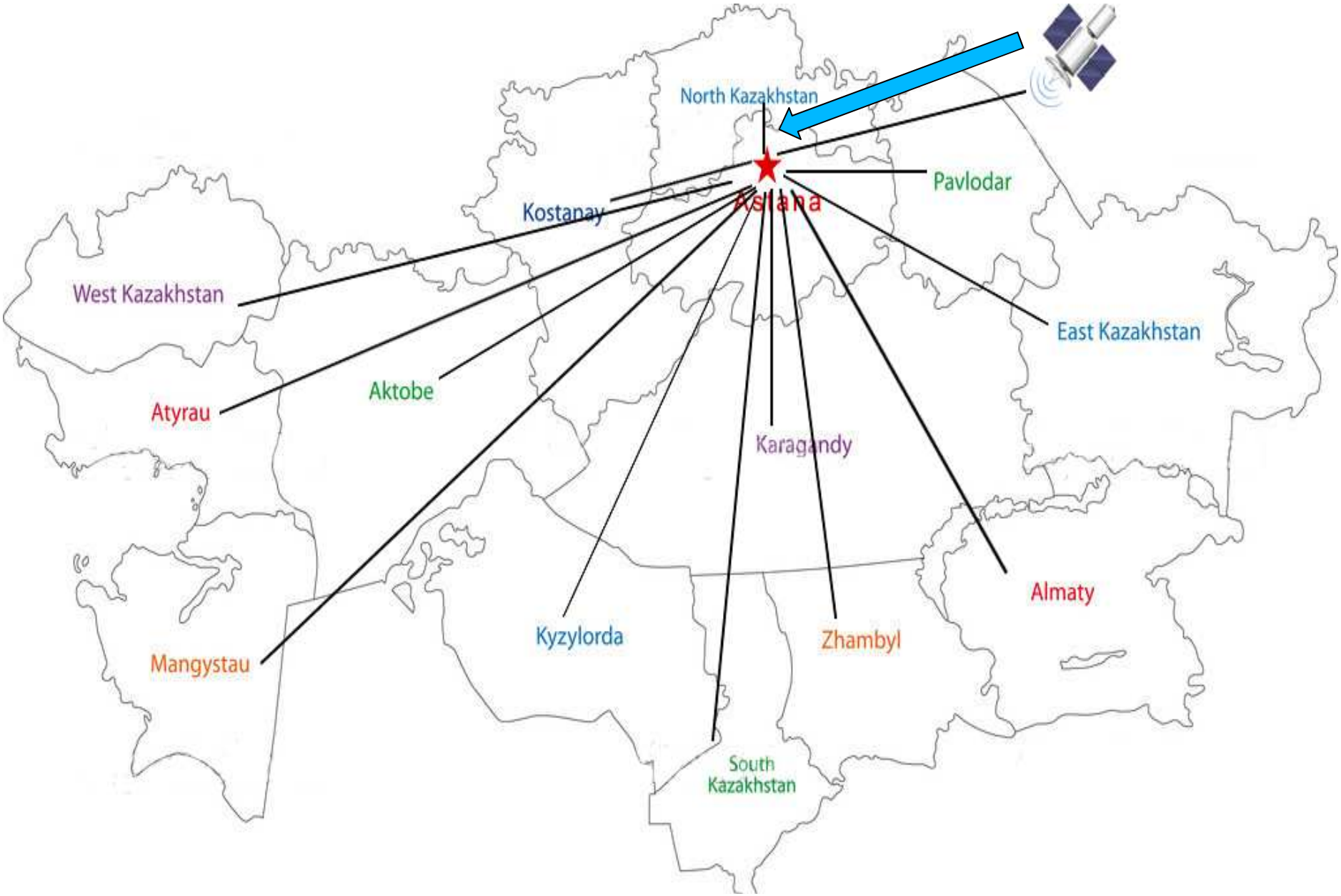
TMetPro the first part of the package consisting of input data, which allows for further processing and conversion.

TMetVis – part of the TMet software package, which displays the elements generated in the process TMTetro

The scheme for obtaining information from SADCA

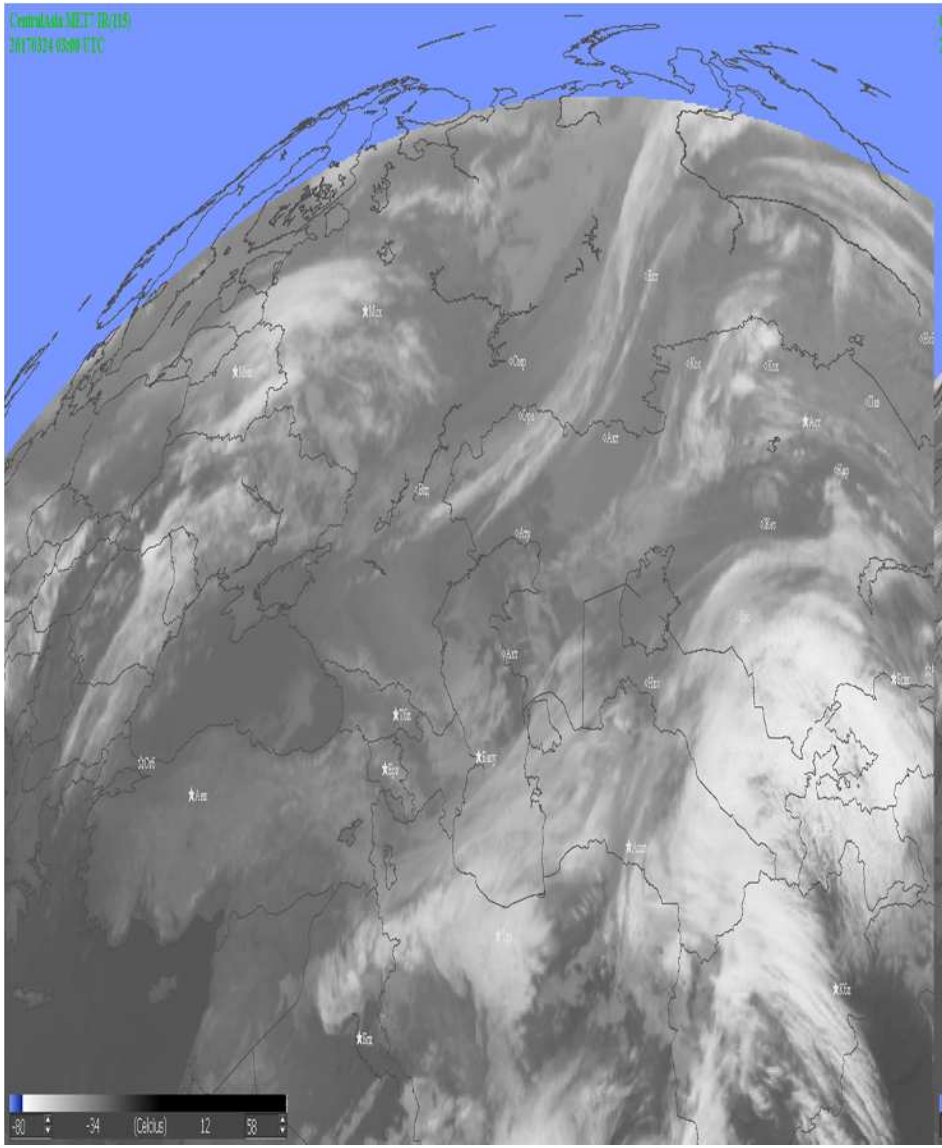


The scheme of transfer of the product Meteosat-8 MSG

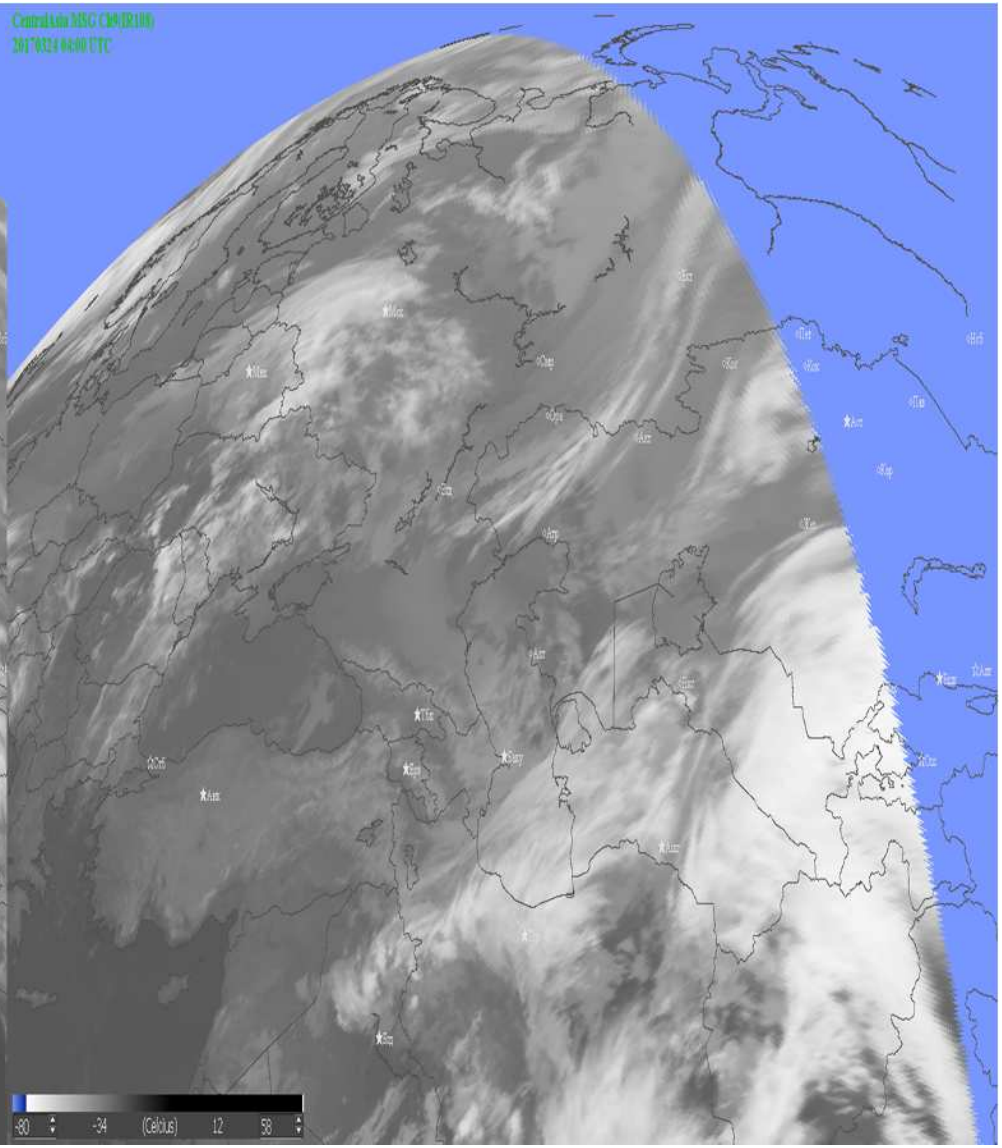


Satellite image

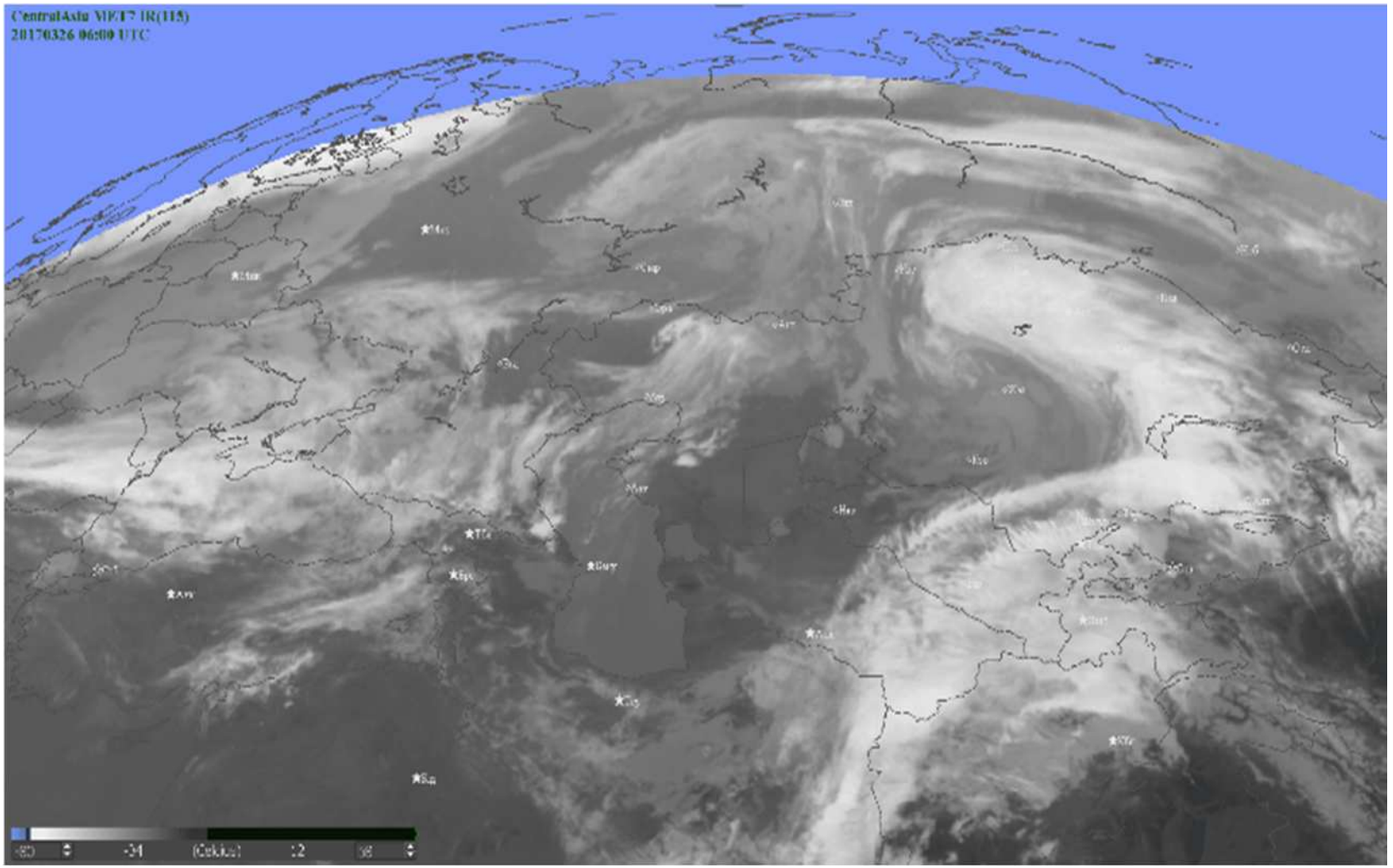
Meteosat 9 (every 3 hours)



Meteosat 9 (every hours)

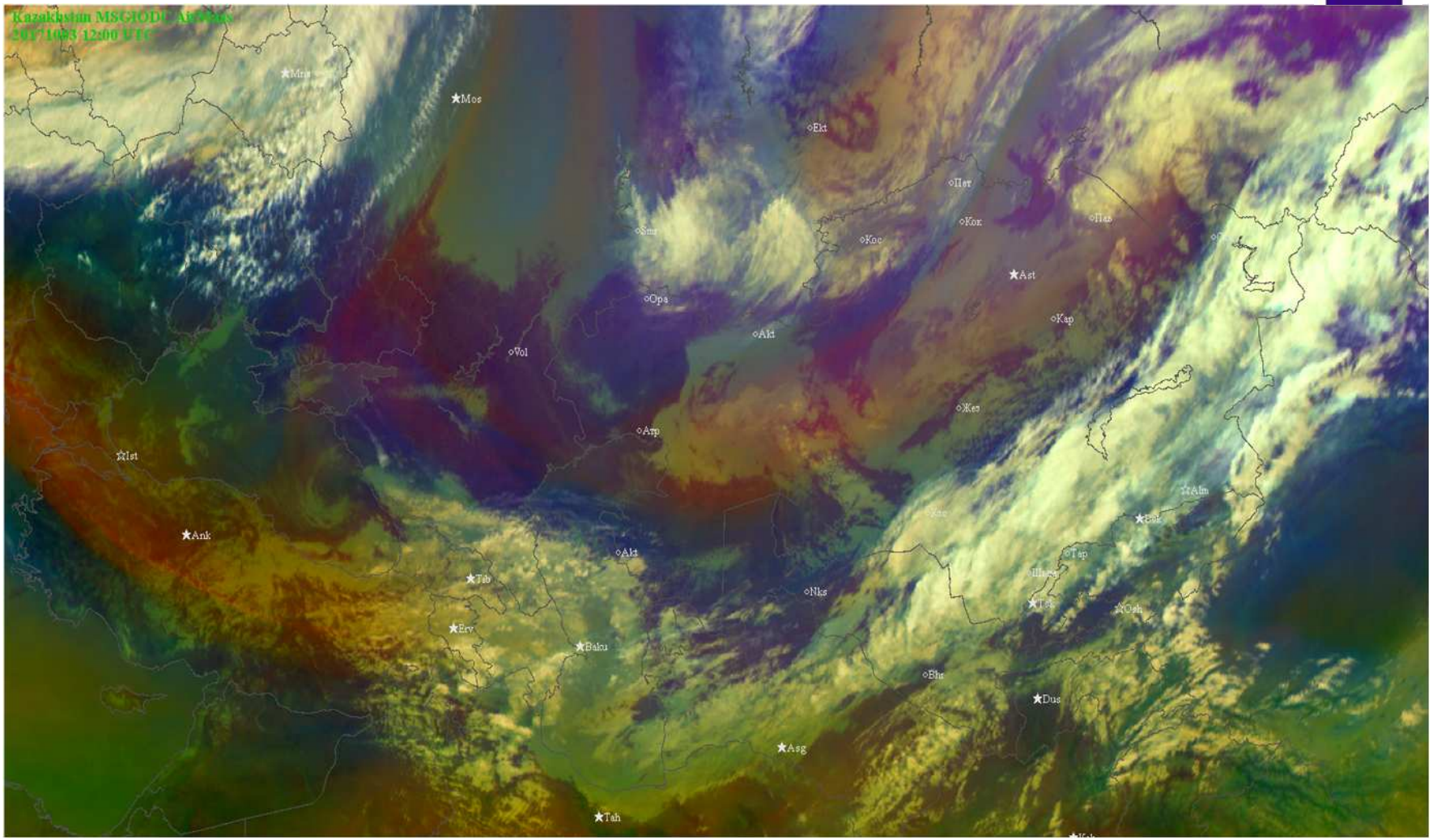


Satellite images of clouds of satellite Meteosat 8



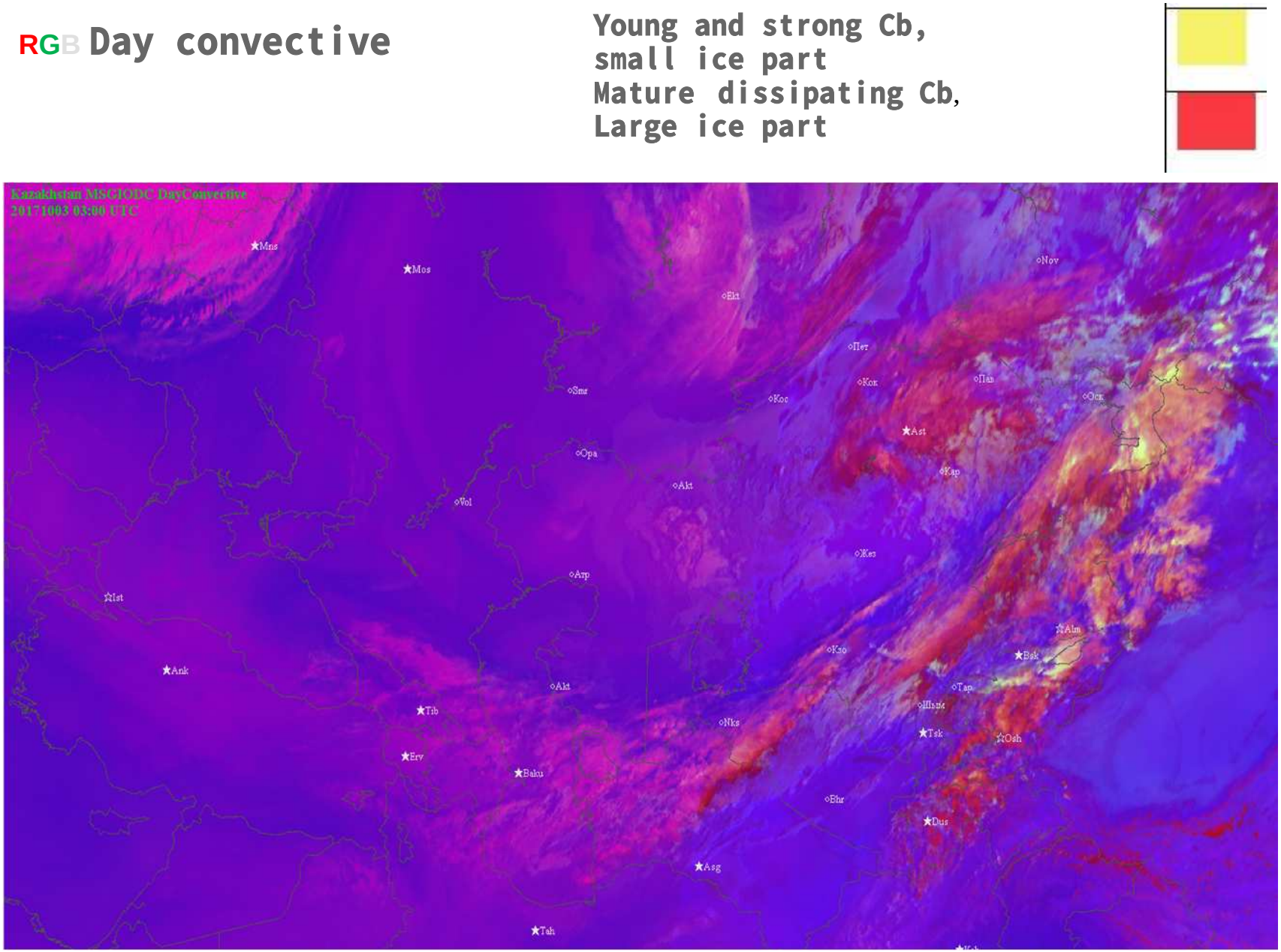
RGB Air mass

Warm airmass
Advection jet
Cold airmass



RGB Day convective

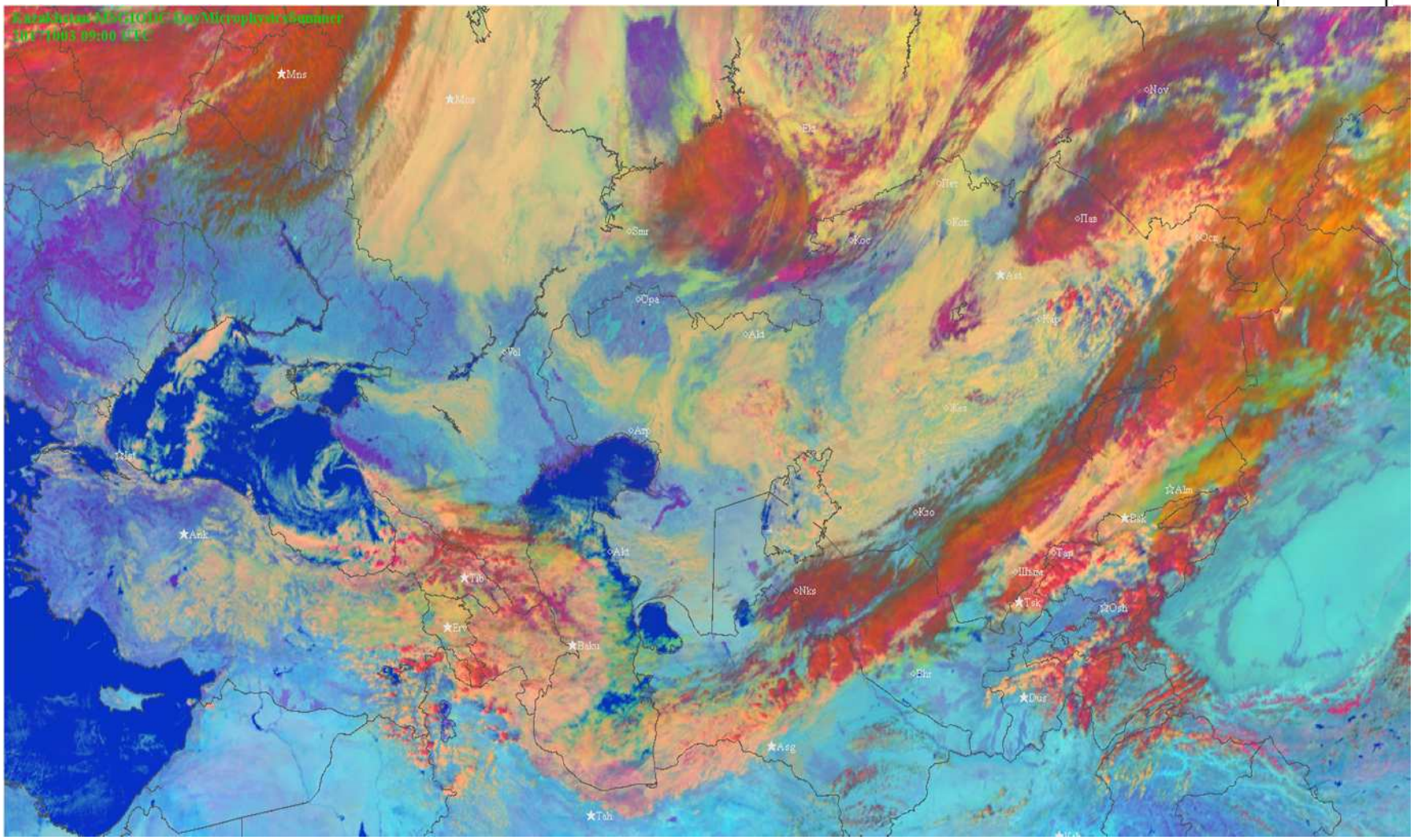
Young and strong Cb,
small ice part
Mature dissipating Cb,
Large ice part



RGB Day microphysics summer

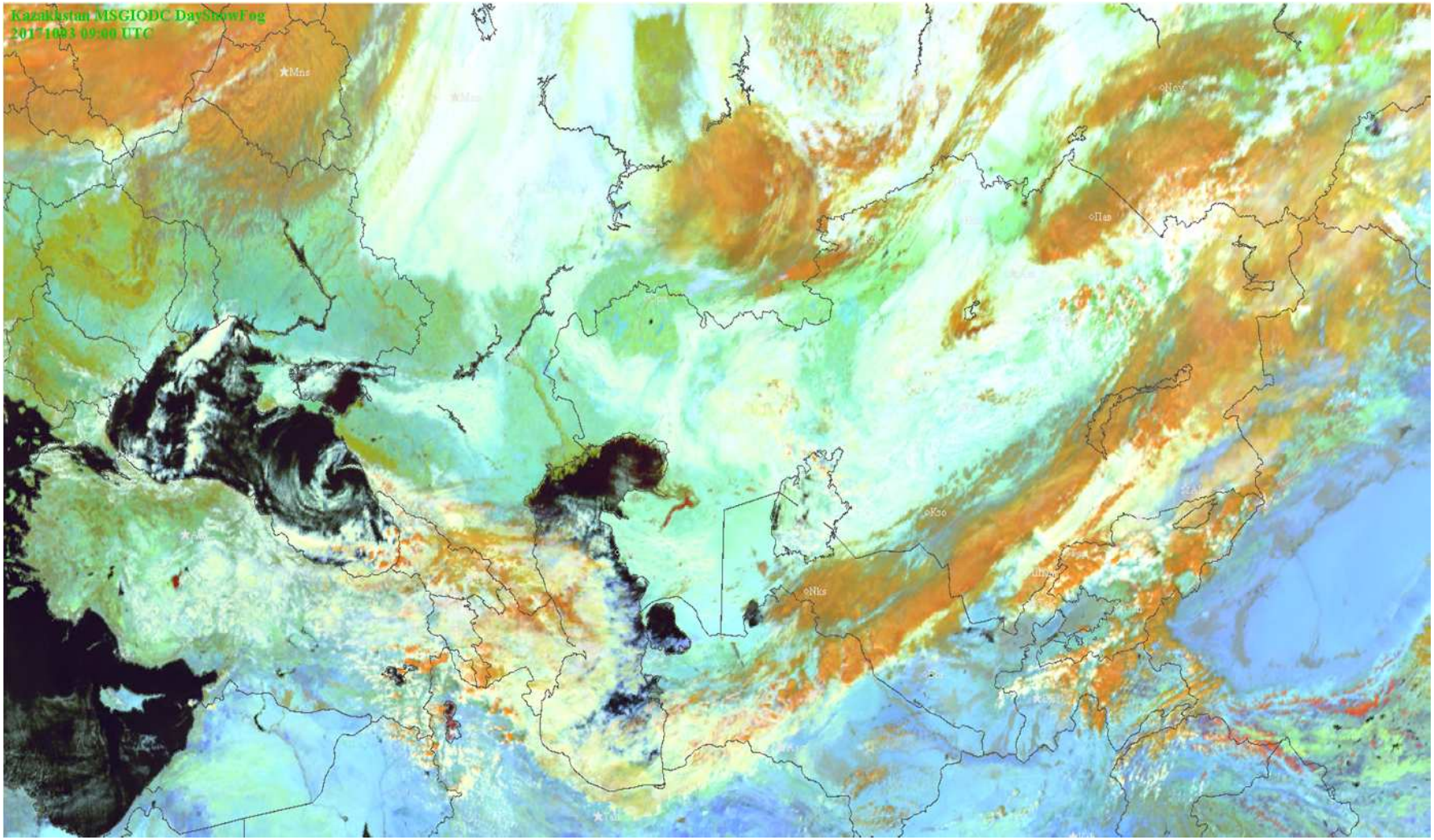
Cb small ice part

Cb large ice part



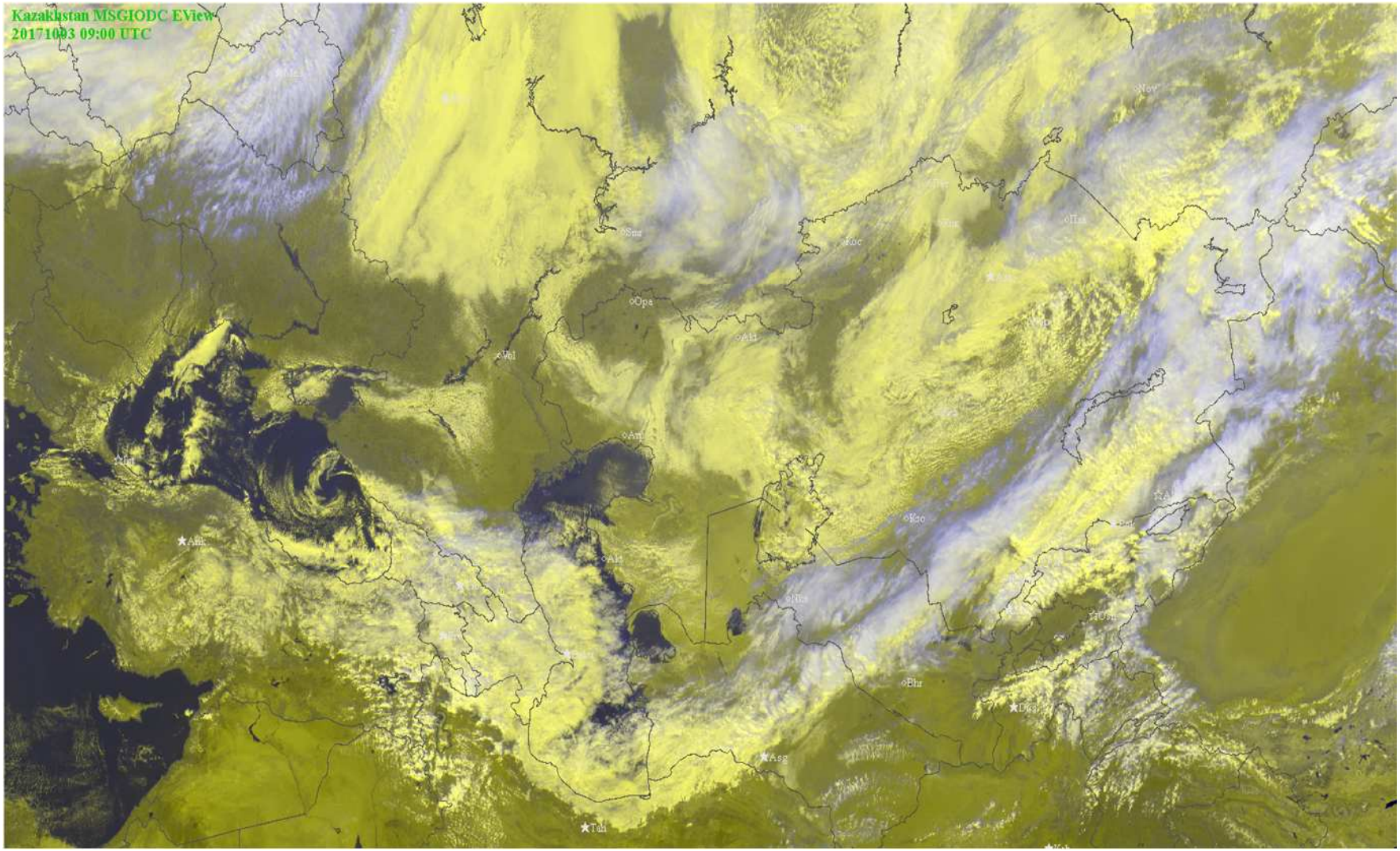
RGB Day Snow Fog

Fog/Stratus
Snow cover



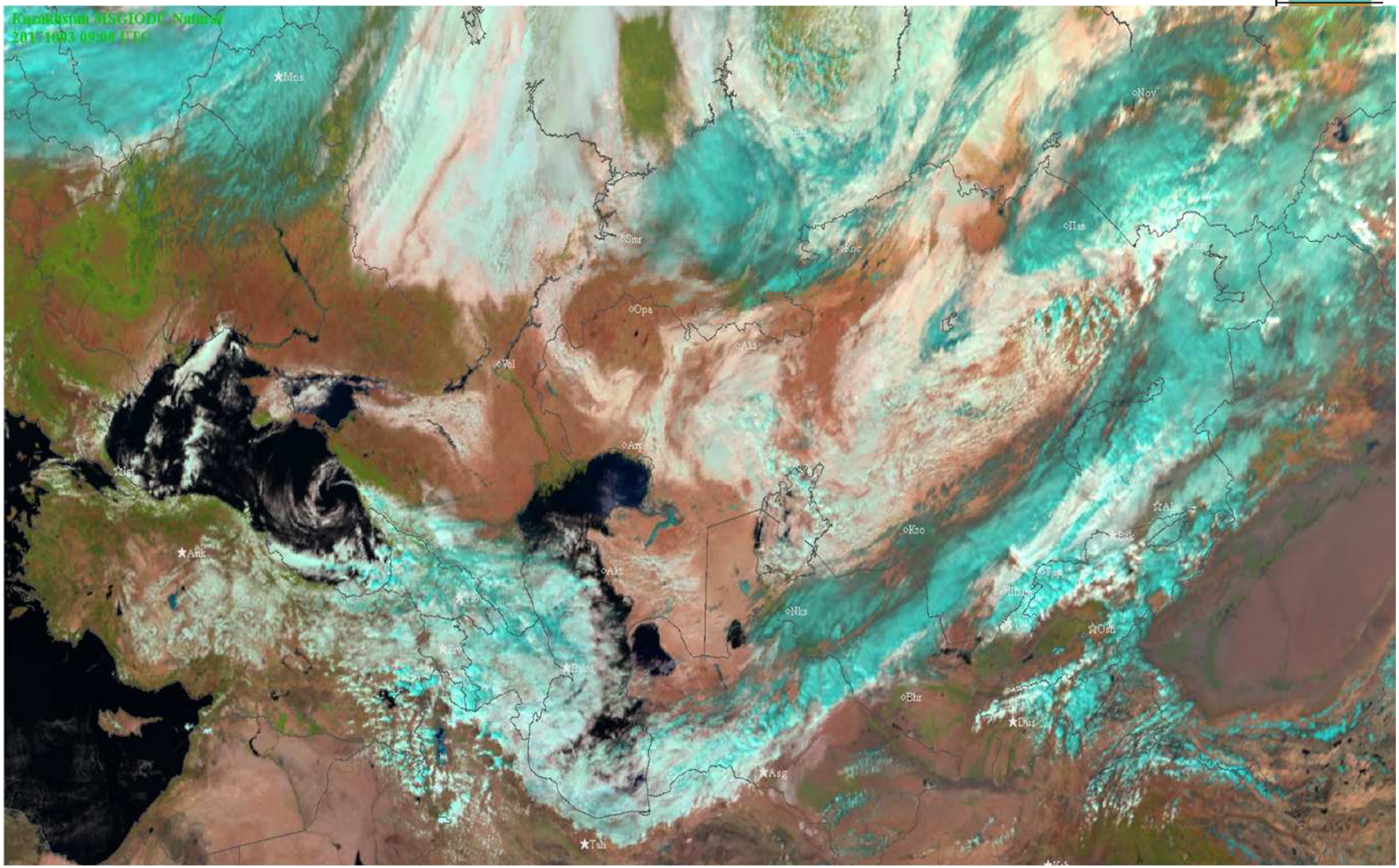
RGB view

Cold thin clouds
Cold thick clouds Cb-Ns



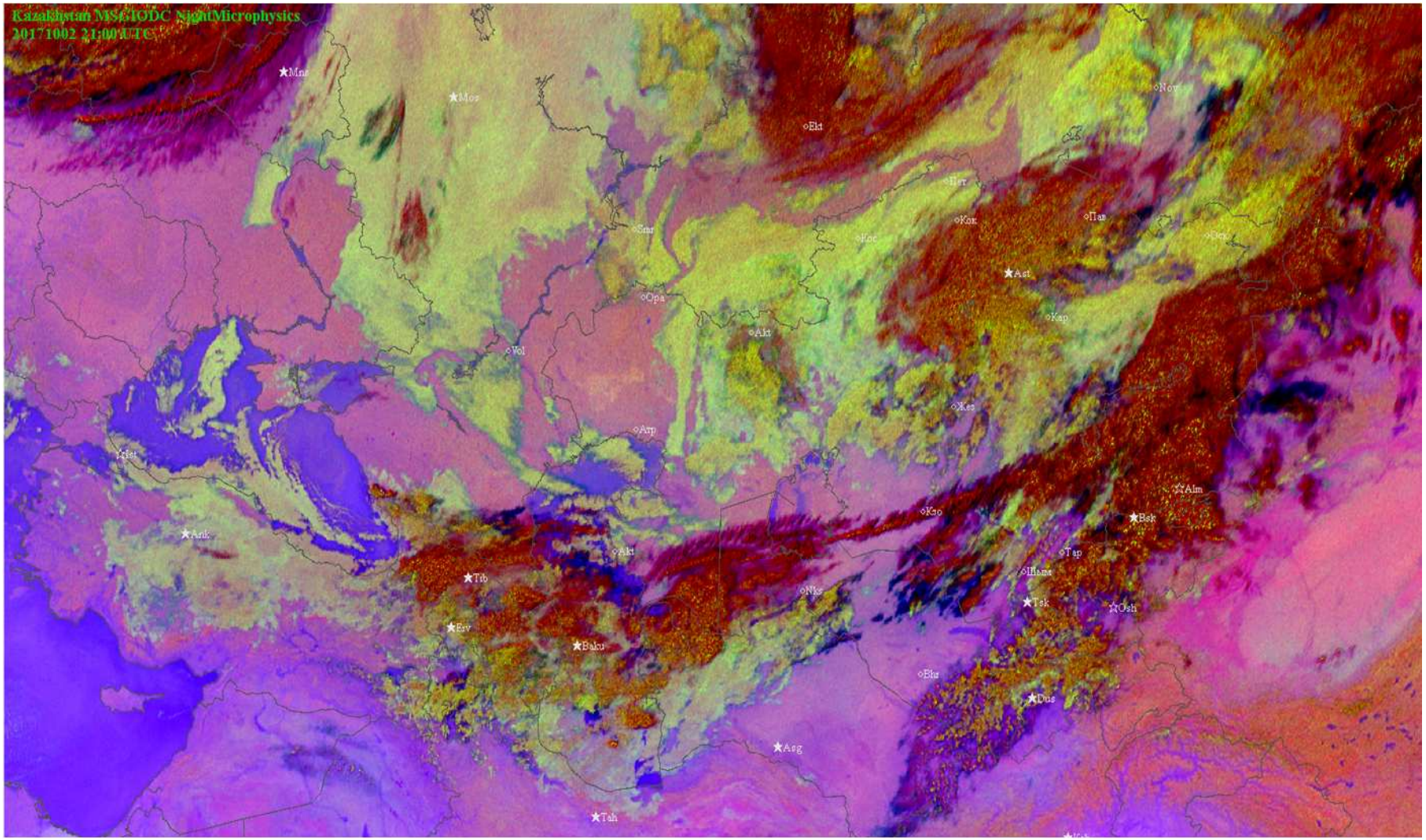
RGB Natural

Snow cover
Vegetation
Fog/Stratus
Ice Cloud

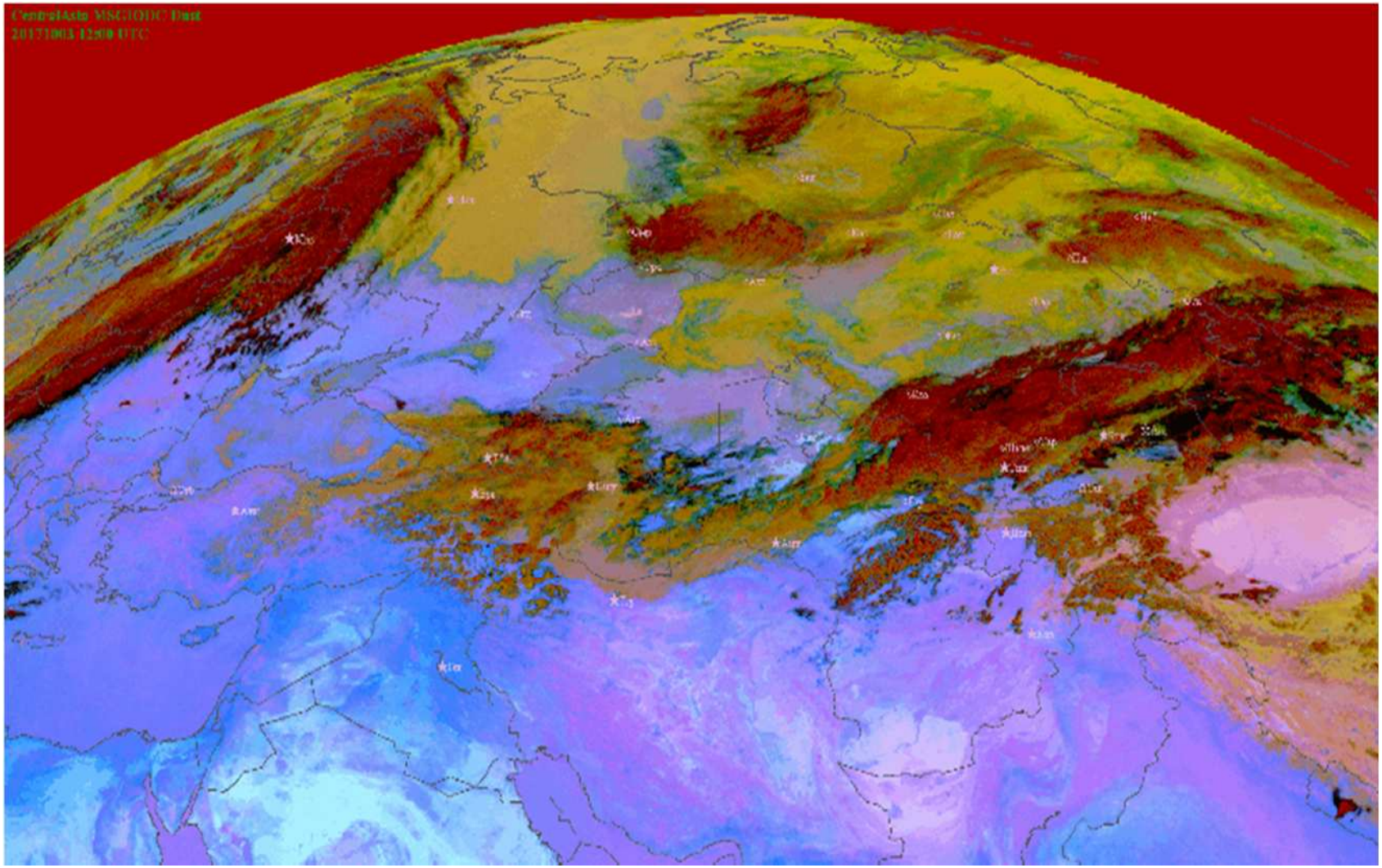


RGB Night microphysics

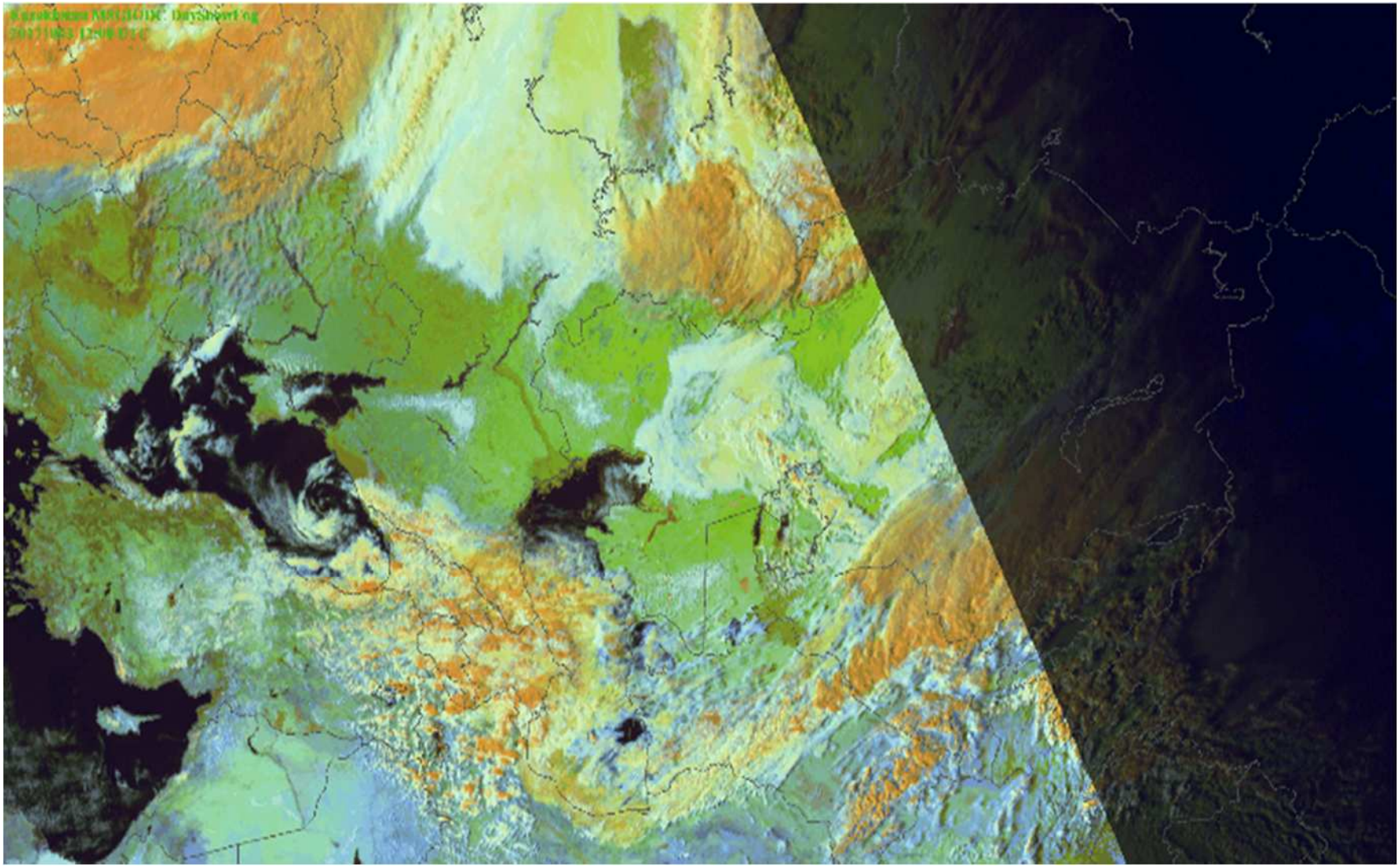
Fog/Stratus
Cold and Thick clouds
High and thin clouds



Animation Dust Storm



Animation fog/stratus

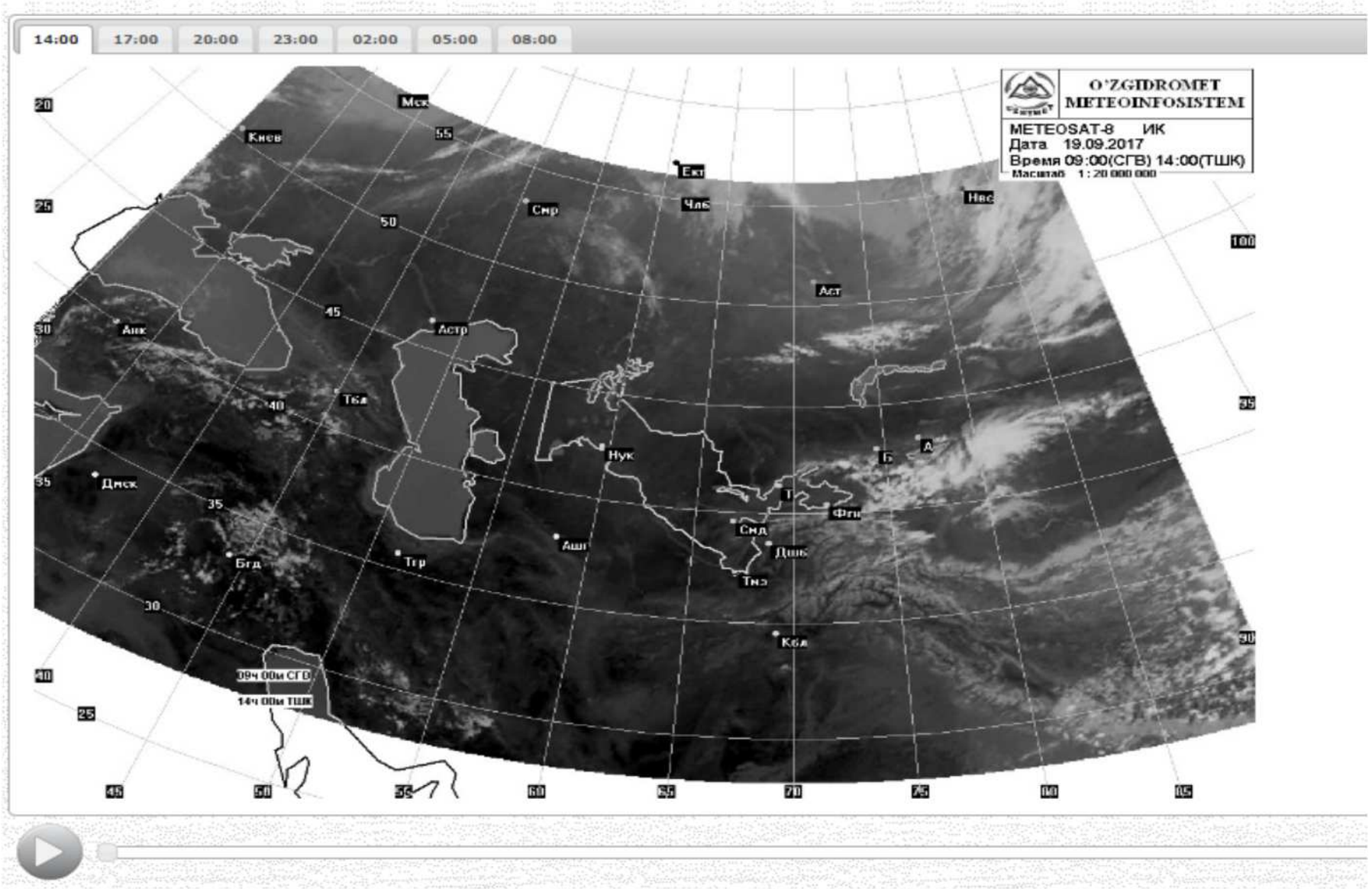


List of satellites currently used operationally for NWP, nowcasting and other applications.

- http://swfdp-ca.meteoinfo.ru/actual-weather/sputnikovaya-produktsiya
- http://eumetview.eumetsat.int/mapviewer/
- http://meteosputnik.ru/item236
- http://planeta.infospace.ru/prod-cgi/last.pl?product=98
- http://www.hobitus.com/

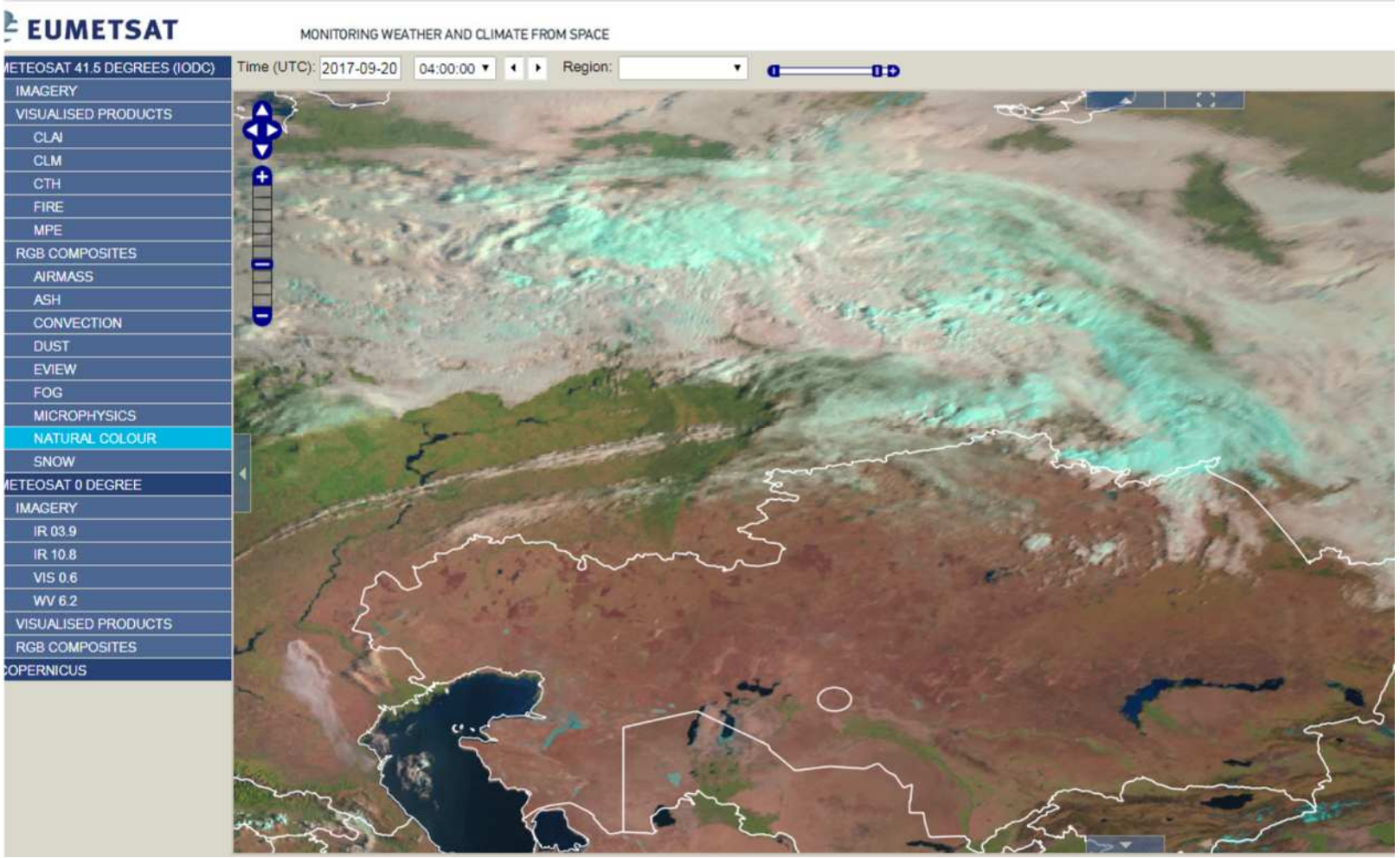
Satellite images

- http://swfdp-ca.meteoinfo.ru/actual-weather/sputnikovaya-produktsiya



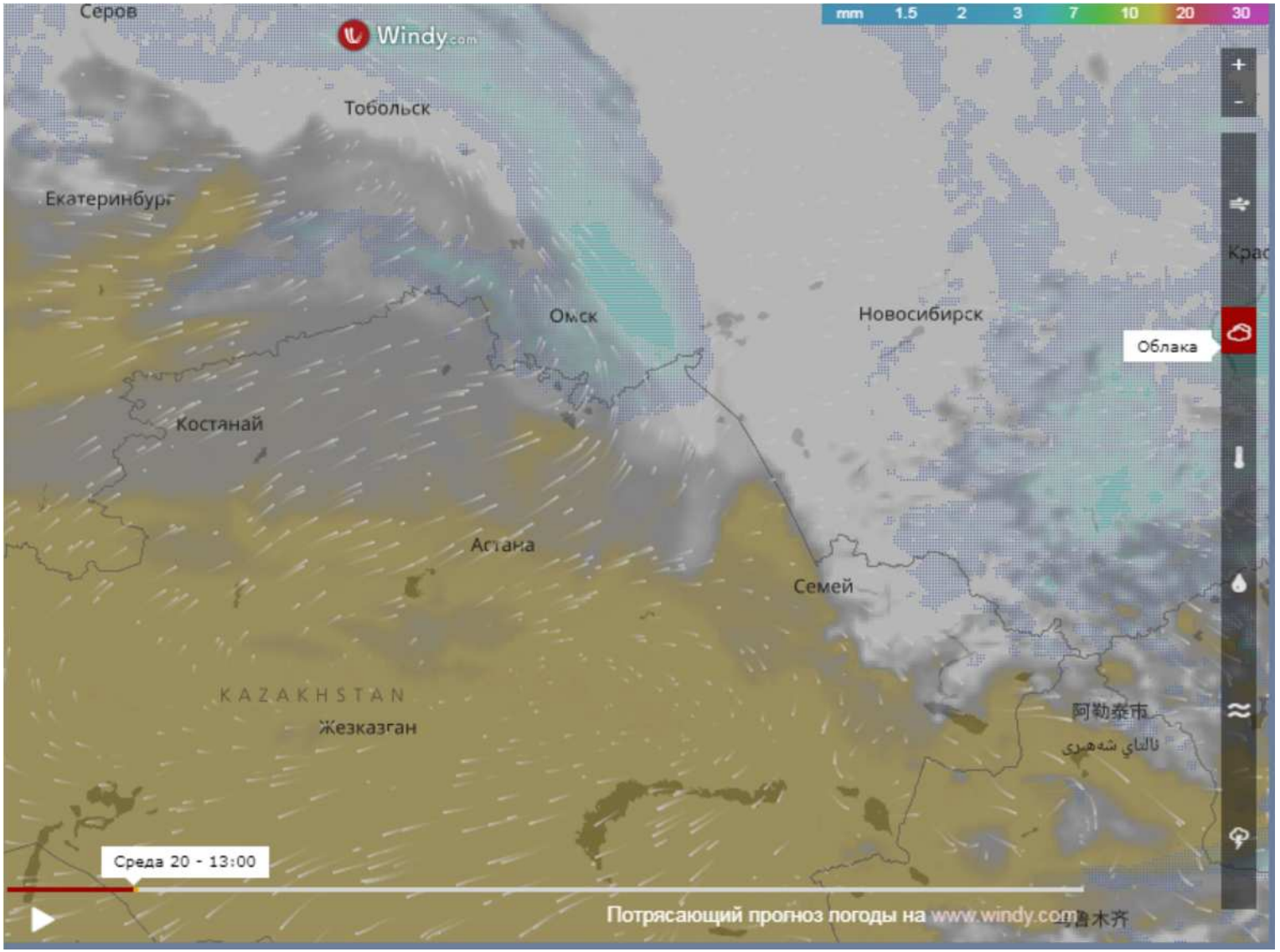
Satellite images

- http://eumetview.eumetsat.int/mapviewer/



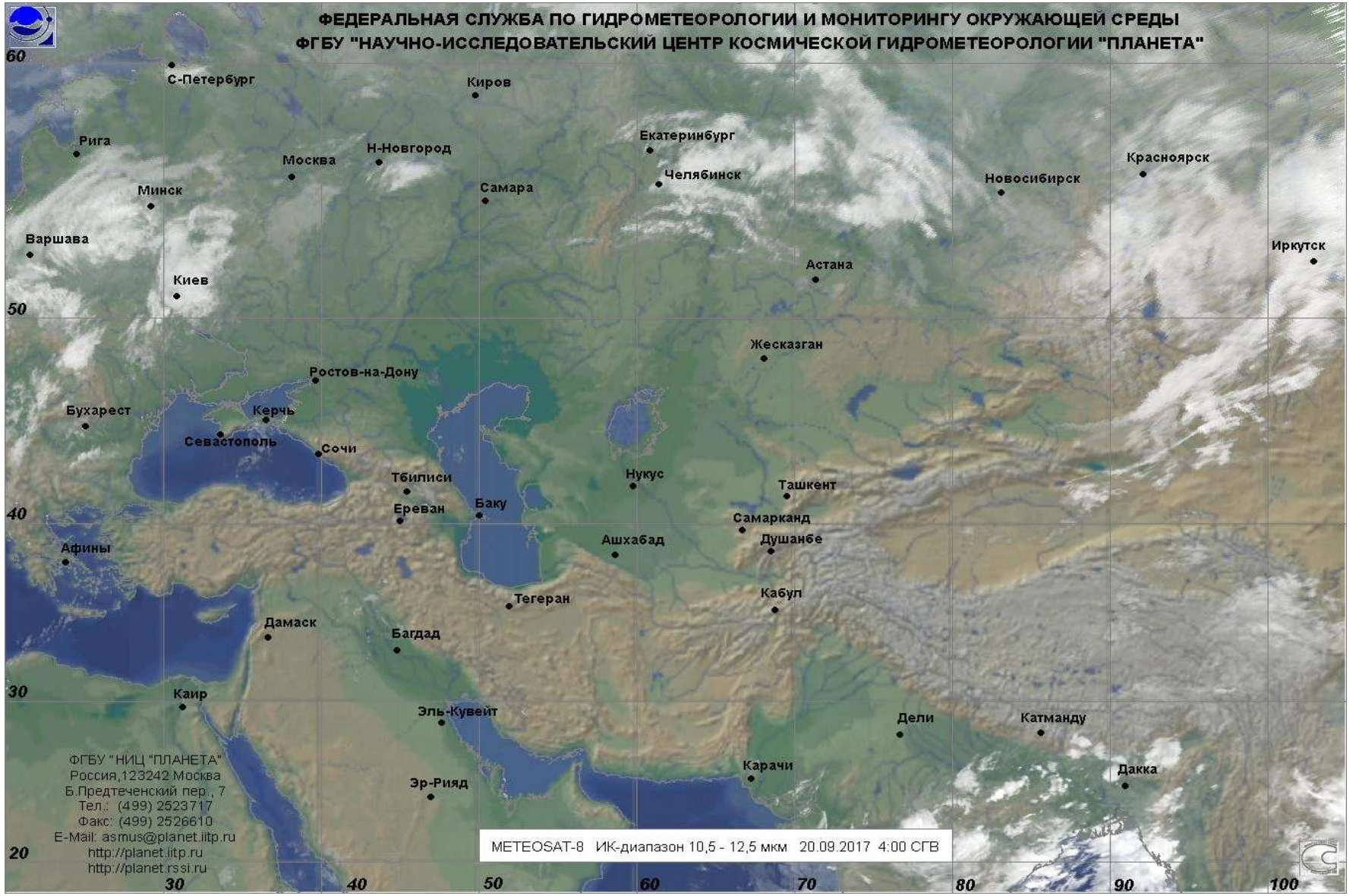
Satellite images

- http://meteosputnik.ru/item236



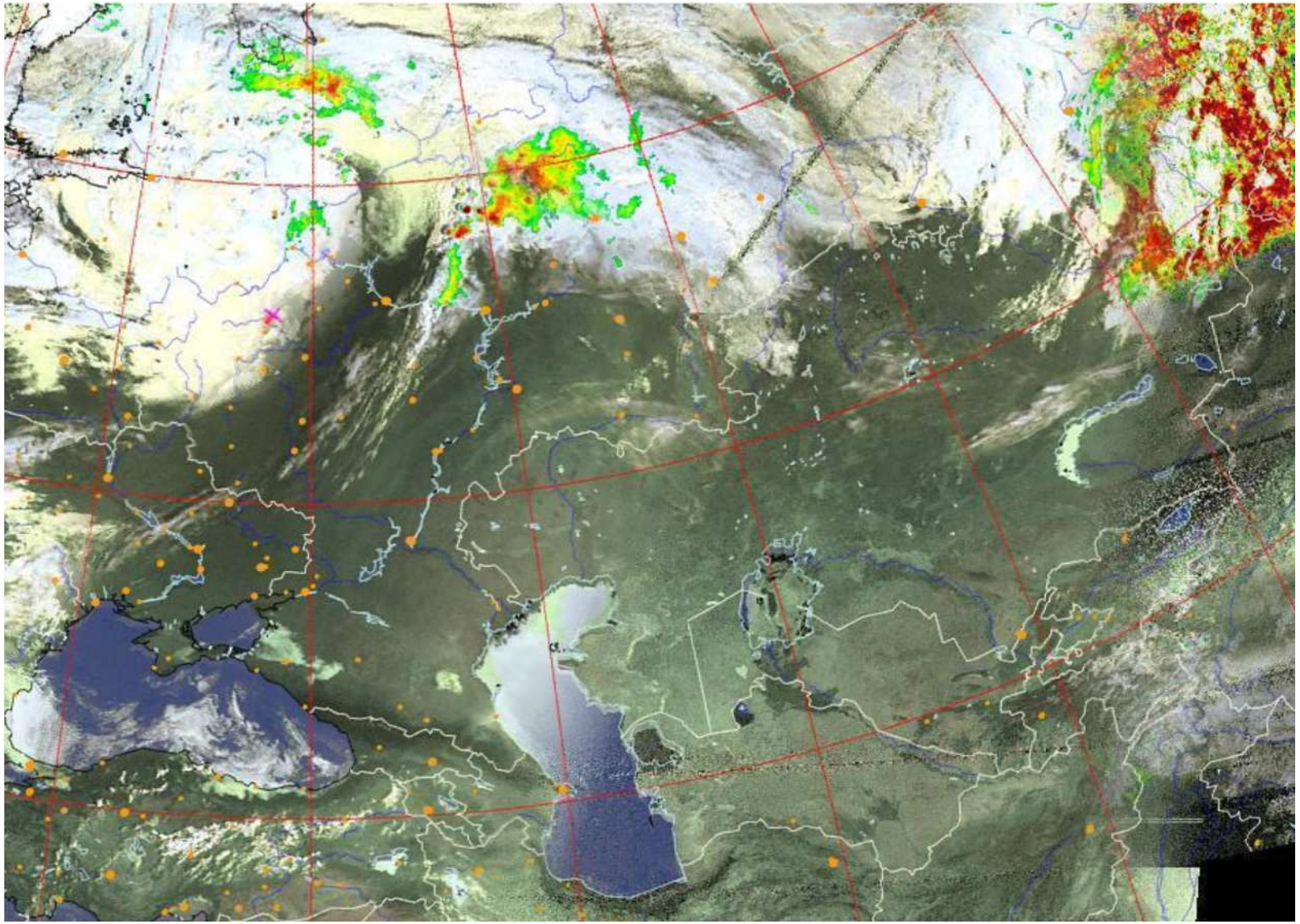
Satellite images

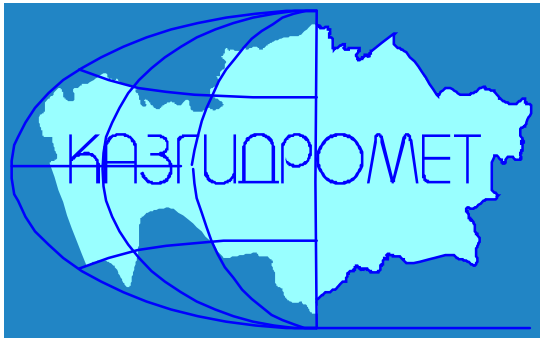
- http://planeta.infospace.ru/prod-cgi/last.pl?product=98



Satellite images

- http://www.hobitus.com/





Thank you
for your attention