

Sectoral climate indices studies in Turkey

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What are Climate Services ?

Generating and providing information on past, present and future climate, and on its impacts on natural and human systems

- Historical climate data sets
- Climate monitoring
- Climate watches
- Monthly/Seasonal/Decadal climate predictions
- Climate change projections

Helping the user

- access the right product for decision making, and
- use it appropriately including aspects of uncertainty



Photo Credits: NASA, Pedro Sanchez, Renzo Taddei

Pre-requisites for climate services

Available: at time and space scales that the user needs,

Dependable: delivered regularly and on time,

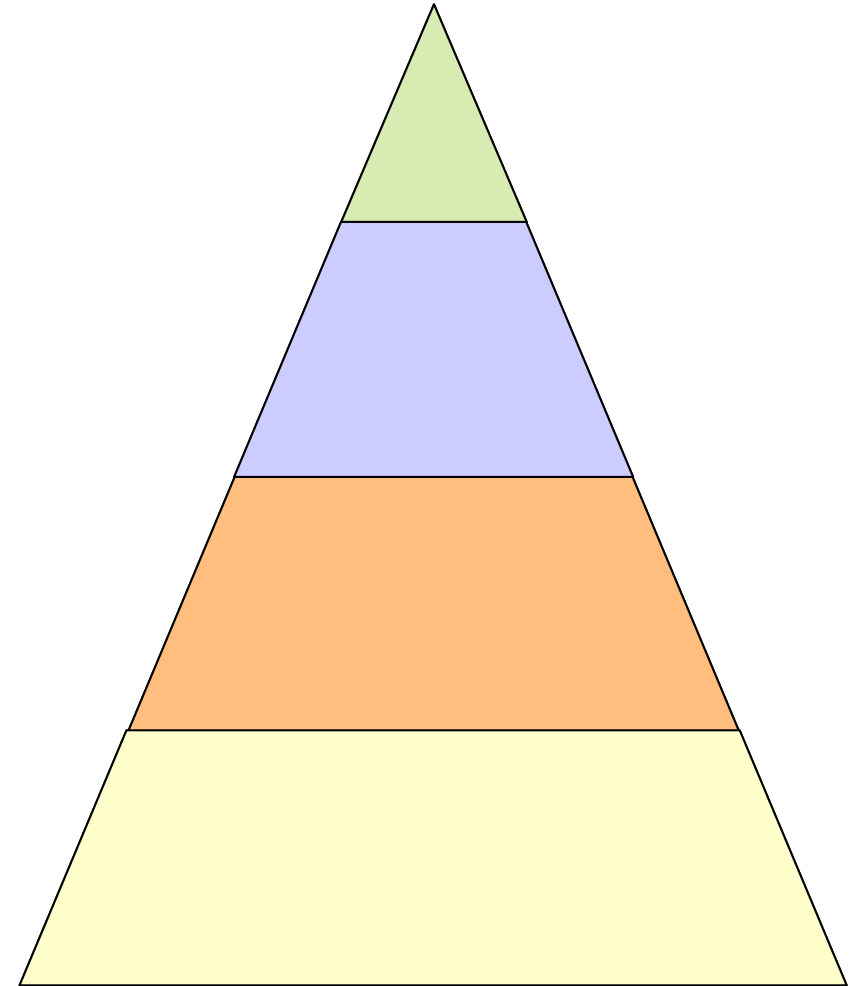
Usable: presented in user specific formats so that the client can fully understand,

Credible: for the user to confidently apply to decision-making

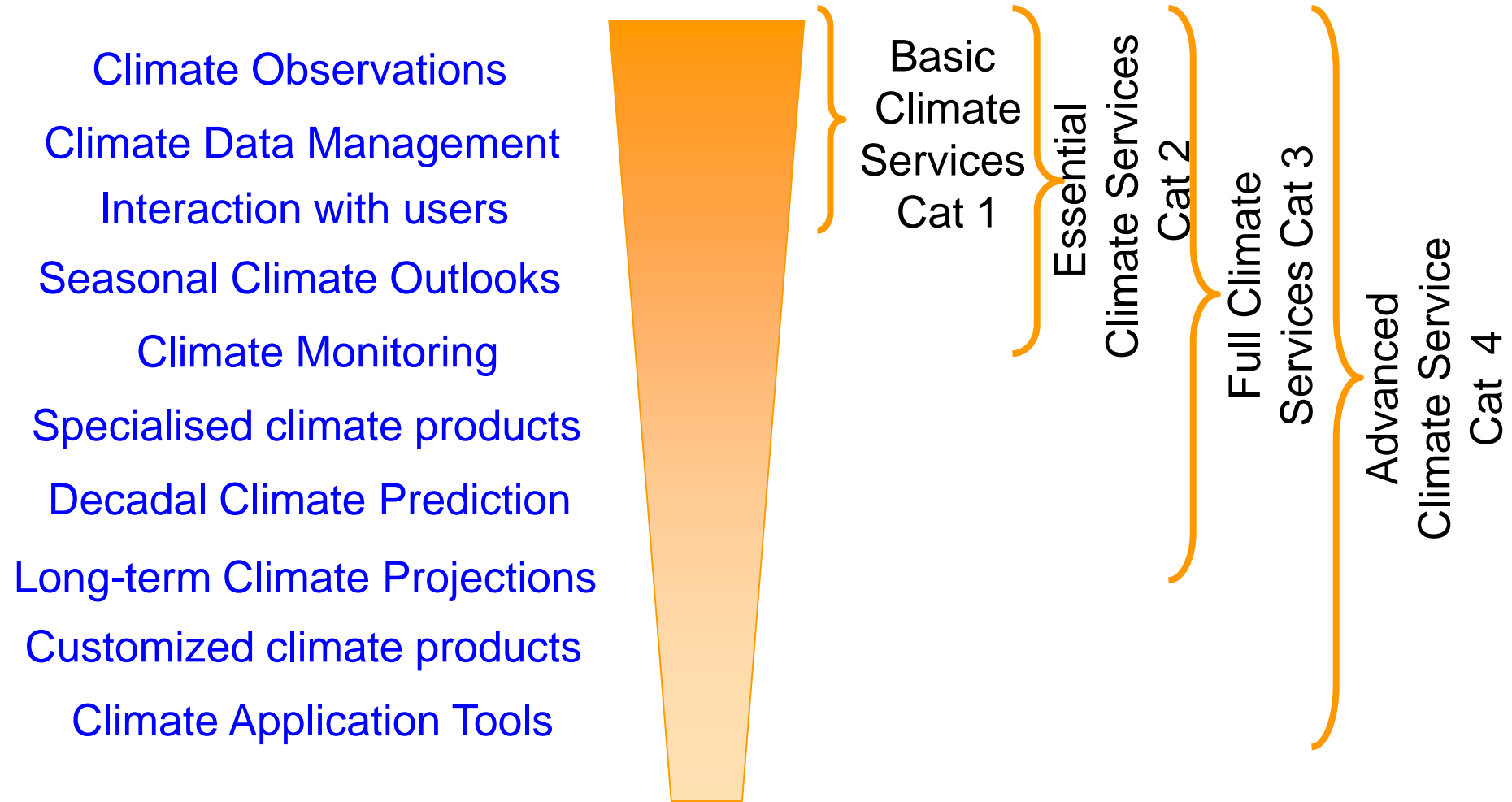
Authentic: entitled to be accepted by stakeholders in the given decision contexts

Responsive and flexible: to the evolving user needs, and

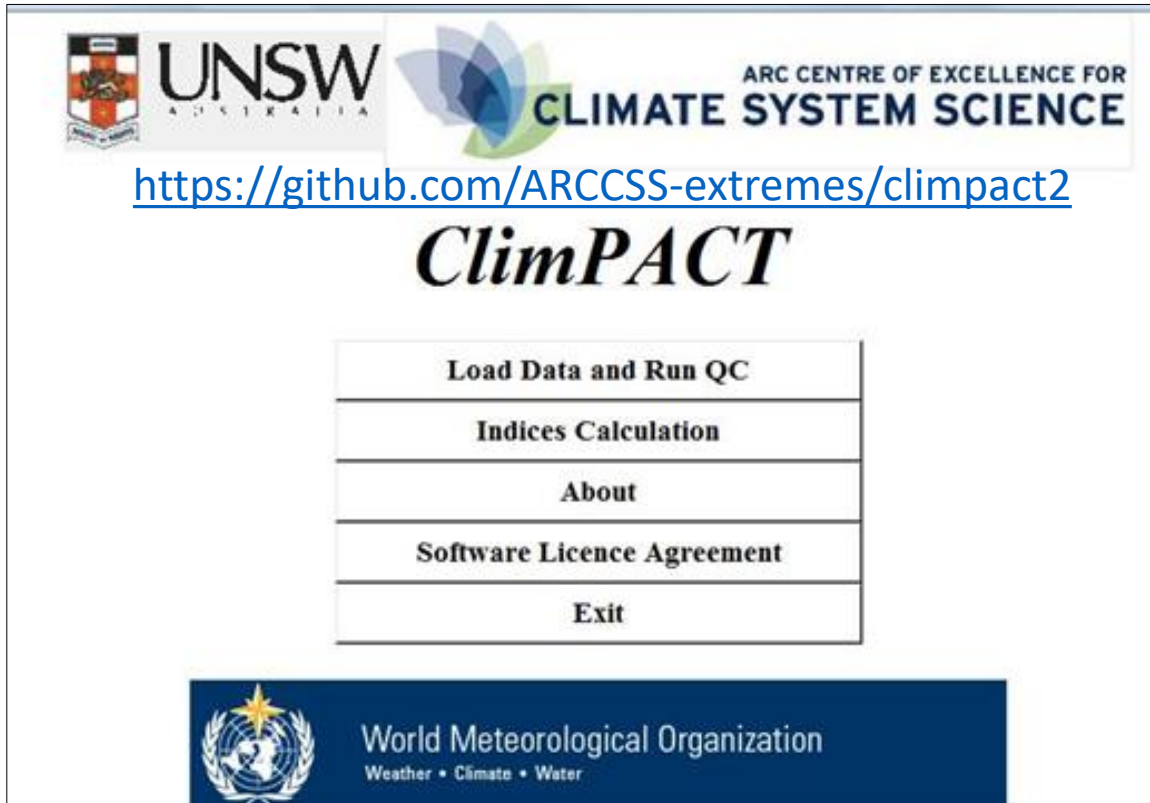
Sustainable: affordable and consistent over time.



Categories of Climate Services



Sector Specific Climate Indices



UNSW AUSTRALIA

ARC CENTRE OF EXCELLENCE FOR CLIMATE SYSTEM SCIENCE

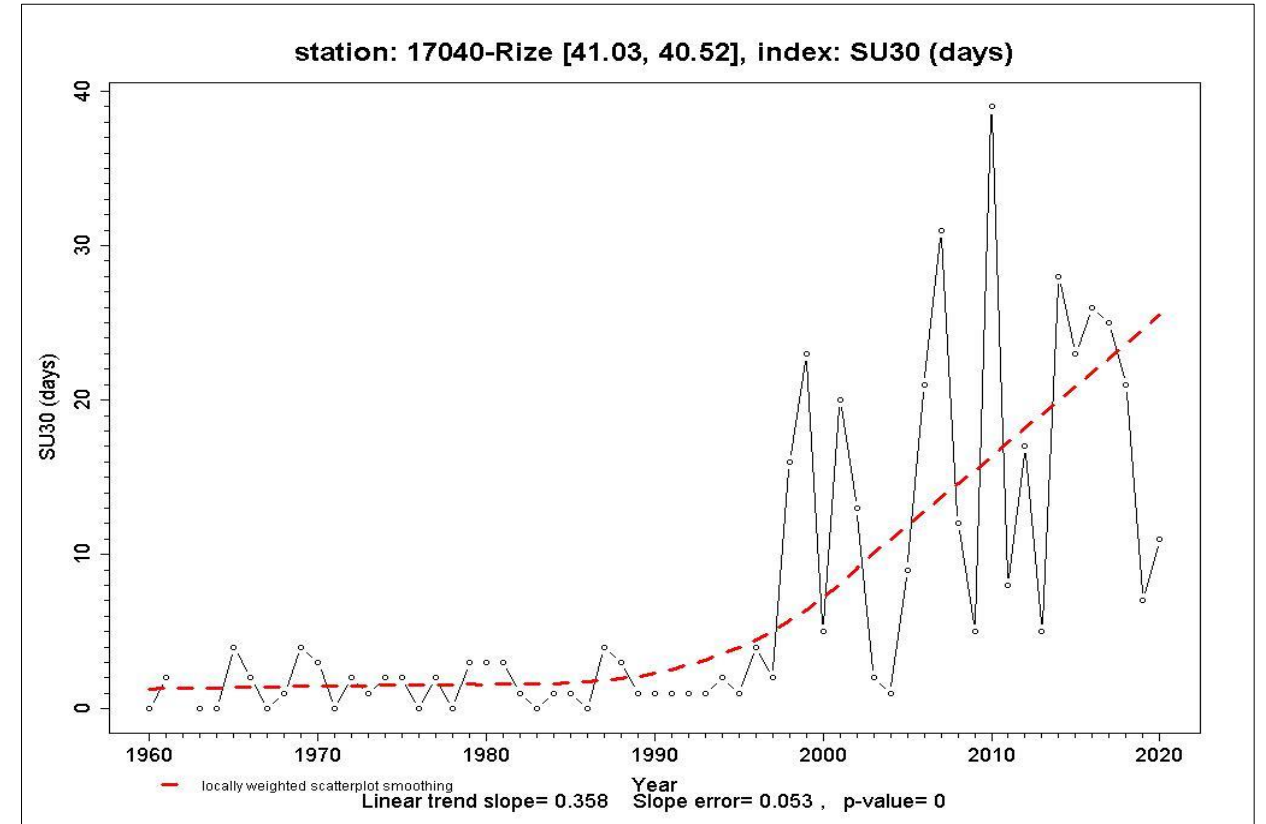
<https://github.com/ARCCSS-extremes/climpact2>

ClimPACT

Load Data and Run QC
Indices Calculation
About
Software Licence Agreement
Exit

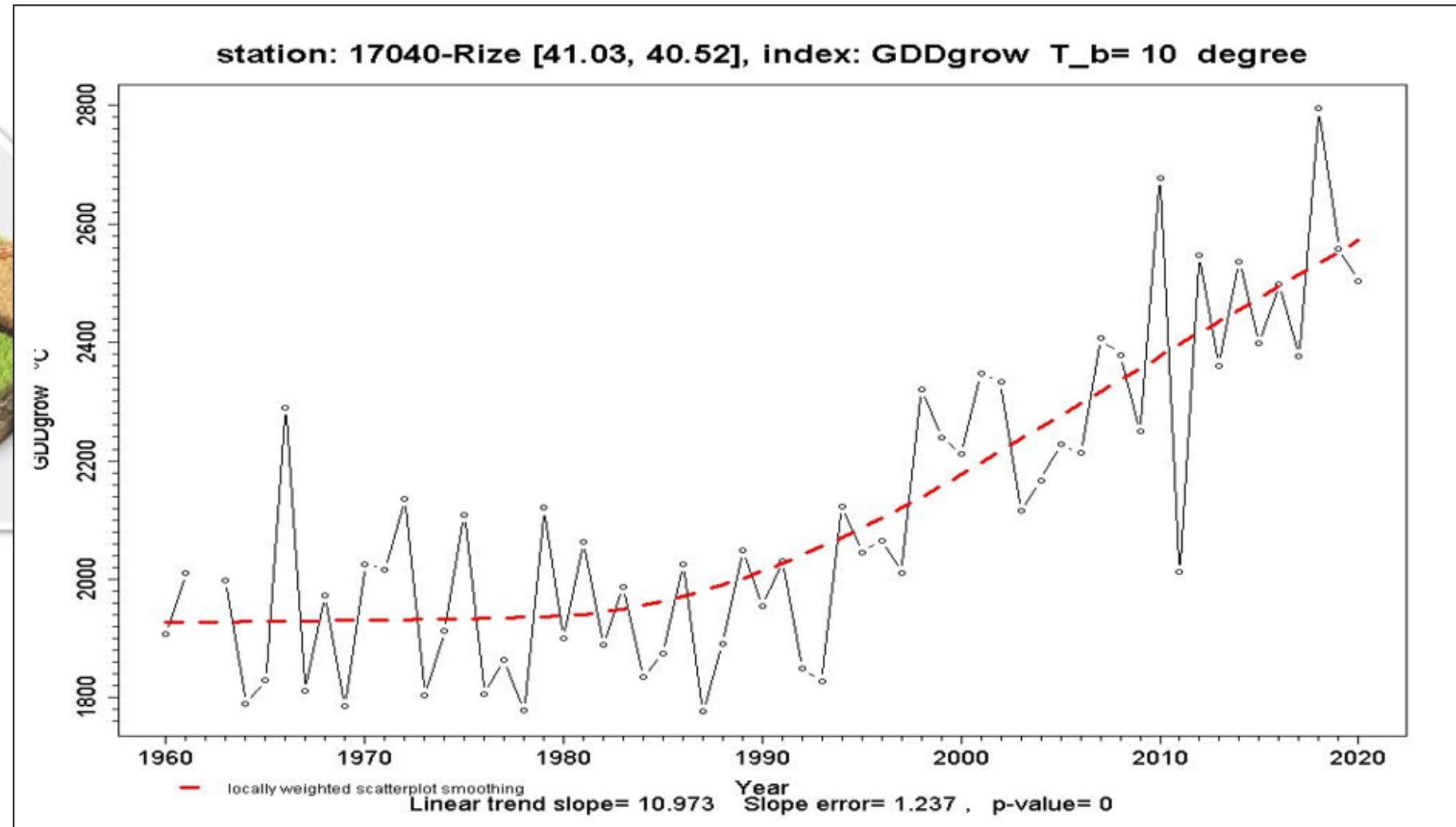
World Meteorological Organization
Weather • Climate • Water

In this study, ClimPACT software, which produces sector-specific indices for climate risk management, was used. This software generates 71 indices using daily max and min temperature and precipitation data. 27 of these indices are for Health, 18 for Water, 39 for Agriculture, 15 for energy and 15 for tourism.



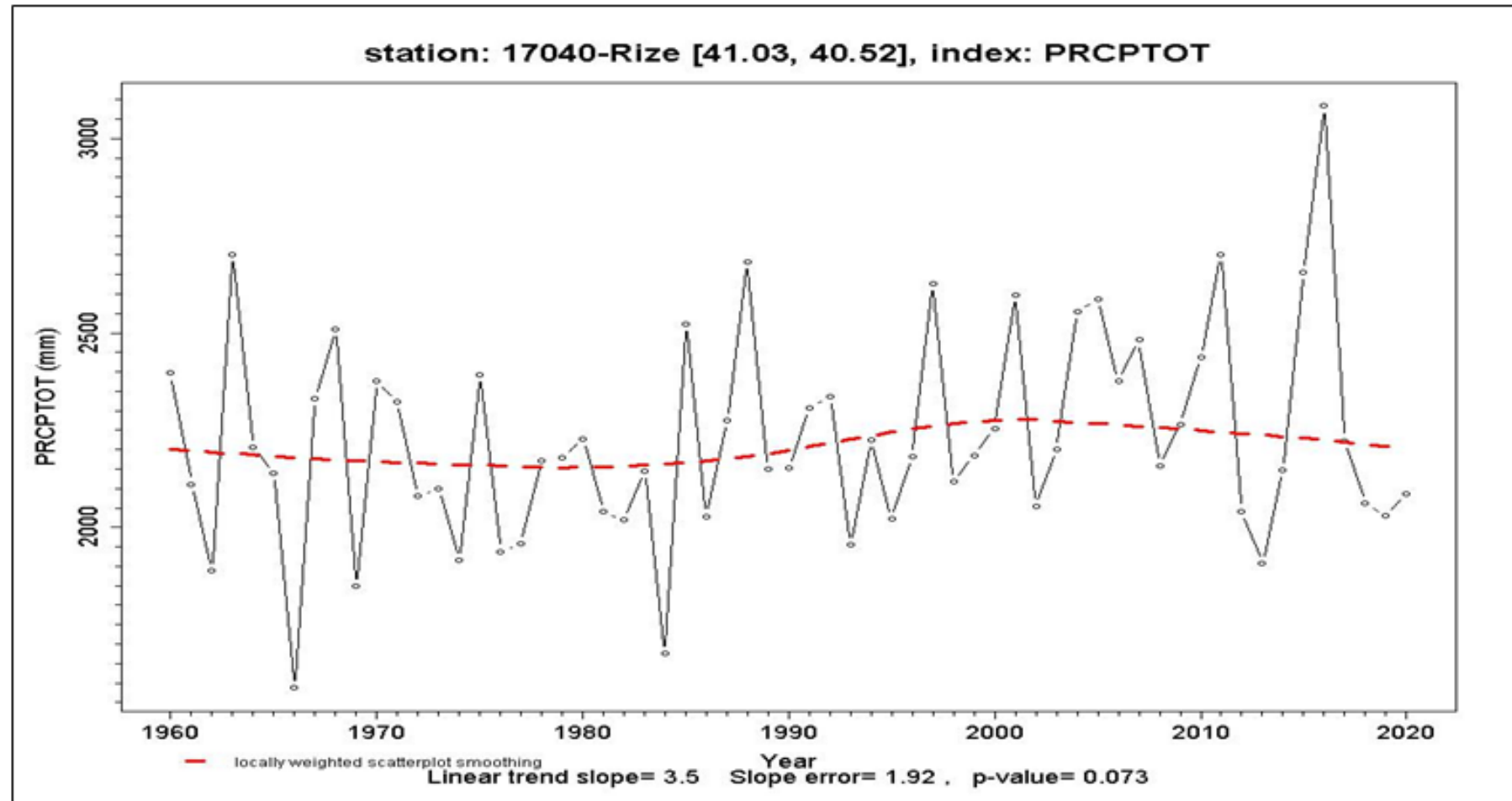
As an example of the results of the index; The number of tropical days in Rize shows a strong increasing trend, especially after 1990, in the trend of 0.348 days/year or 35 days/100 years. The number of tropical days per year, which was around 2 in the 1960s, has increased to 25 days per year by 2020.

Indices relevant to the agriculture and food security sectors



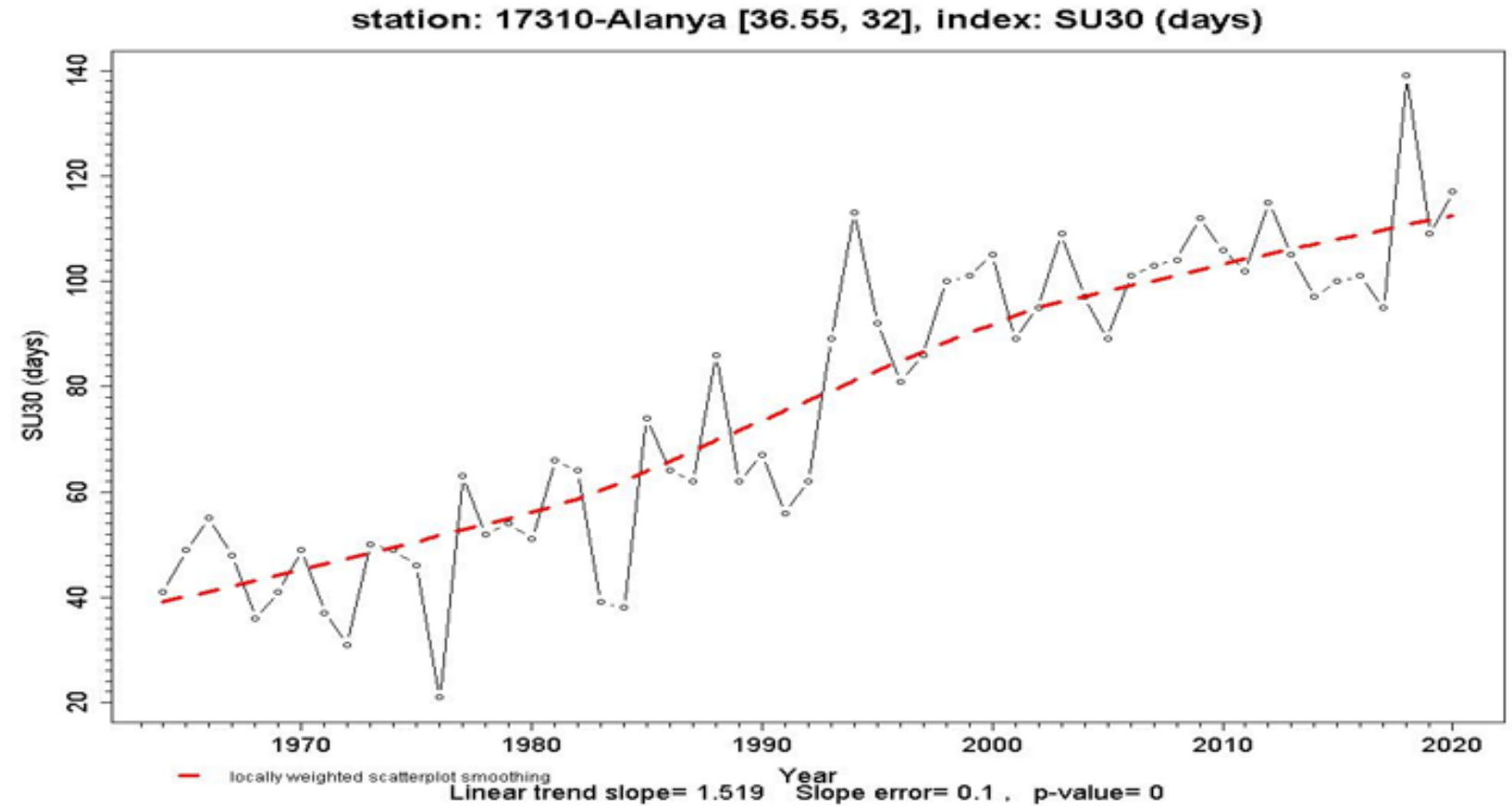
In Rize, the trend of increase in the growing degree-days is 11 days-degrees/year. The growing degree-days in Rize started to increase significantly after the 1990s and reached 2600 day-degrees.

Indices relevant to the water resources and hydrology sectors



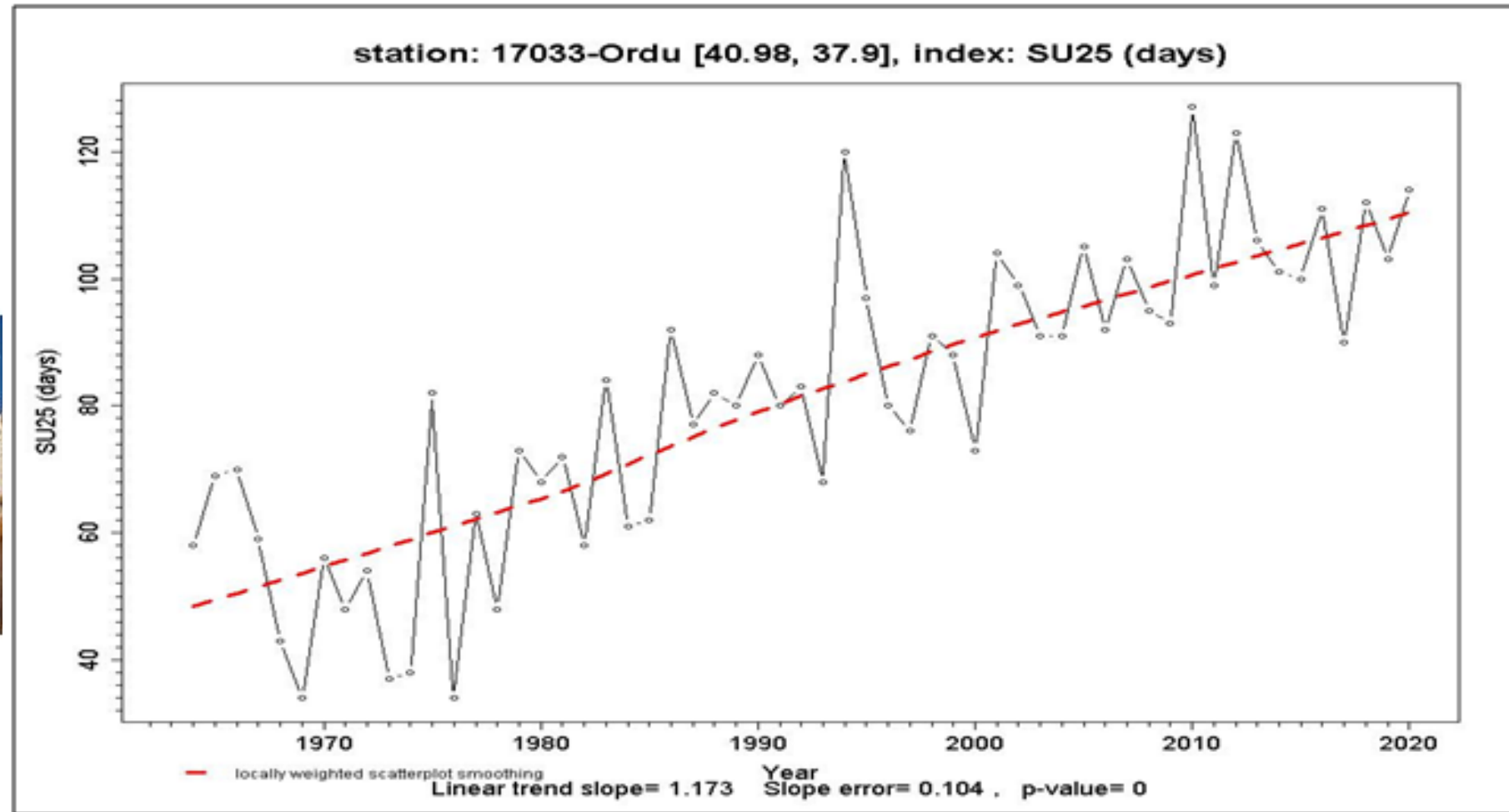
The trend of annual precipitation totals in Rize shows an increasing trend of 3.5 mm/year. Rize precipitation, which is already high (2200mm), increased to 2300 mm in the 2020s, and even exceeded 3000mm in 2016. This situation increases disasters such as floods and landslides in the region.

Indices relevant to the health sectors



The number of tropical days in Alanya shows a strong increasing trend, especially after 1990, in the trend of 1.519 days/year or 152 days/100 years. The number of tropical days per year, which was around 40 in the 1960s, has increased to 120 days per year by 2020. This increase in the number of tropical days in the Mediterranean Region will require the people of the region and tourists not to go out at noon unless it is necessary, and for those going out to use their personal protective equipment.

Indices related to the tourism sectors



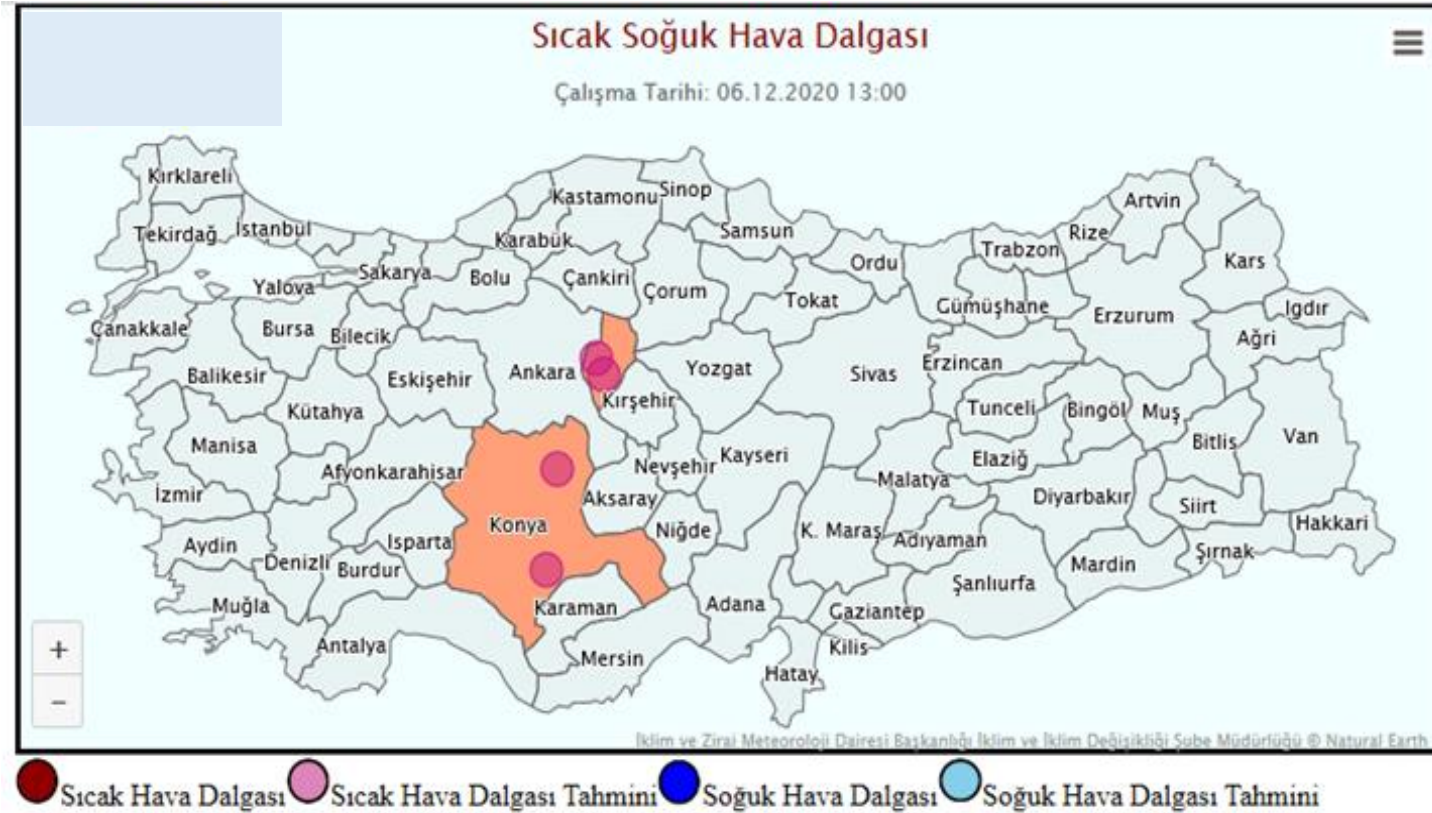
The number of summer days in Ordu shows a strong increasing trend of 1.2 days/year. The number of summer days a year, which was around 50 in the 1960s, has exceeded 100 days a year by 2020. This increase in the number of summer days in the Eastern Black Sea will extend the holiday period in the region and this will have a positive impact on tourism in the region.

Indices relevant to the health sectors

Effects of heat wave on human health:

- Thermal stress, weakness, irritability,
- Circulatory and respiratory disorders
- heat stroke
- muscle cramps
- thermal shock, death

The heat wave especially affects the elderly and children, whose bodies do not adjust thermal comfort well.

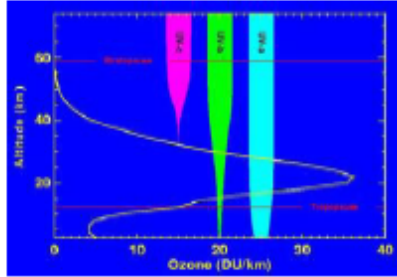


Heat wave is daily maximum temperature on more than five consecutive days exceeding the average maximum temperature by 5°C (Frich et al., 2002). Cold wave is daily minimum temperature on more than five consecutive days below the average minimum temperature by 5°C.

Health sector, Ozone and UV Studies

WHAT IS THE ULTRAVIOLET RADIATION?

The ultraviolet radiation is a part of particular visible light and the shorter wavelength of the electromagnetic spectrum. UV-A, UV-B and UV-C parts are analyzed as three parts of spectrum.



UV-A : Wavelength of 315-400 nm (nanometers) which is among the ultra-violet radiation. UV-A reaches the ground through the stratosphere layer. It goes down to the layers under the skin and causes skin darkening. In addition, it is increased the development of skin cancer.

UV-B : Ultraviolet radiation is between 280-315 nm wavelength. Stratospheric ozone in the atmosphere reaches the earth surface at different rates depending on the concentration. It has a harmful effect on all living things in case of prolonged exposure.

UV-C : UV-C radiation is less than 280 nm wavelength ultraviolet radiation. UV-C radiation is the most dangerous part of UV radiation, it is totally absorbed by the ozone and oxygen.

WHAT IS THE RELATIONSHIP BETWEEN OZONE AND ULTRAVIOLET RADIATION?

The amount of ultraviolet radiation reaching the earth surface decreases by the increased level of ozone in the atmosphere. In contrast, ozone depletion causes more UV-B radiation reaches to surface and causes more damages on living species .

If the people are exposed to UV rays for a long time, can occur skin cancer and other skin problems, cataracts and other eye problems and may face serious health problems, such as suppression of the immune system.

In case of excessive UV-B rays, sea planktons will be reduced, their reproductive capacity will be spoiled. Planktons use huge amount of CO₂ in their photosynthesis. So they are very important for CO₂ reduction in the atmosphere. Reduction of plankton may lead to an increase in the greenhouse effect.

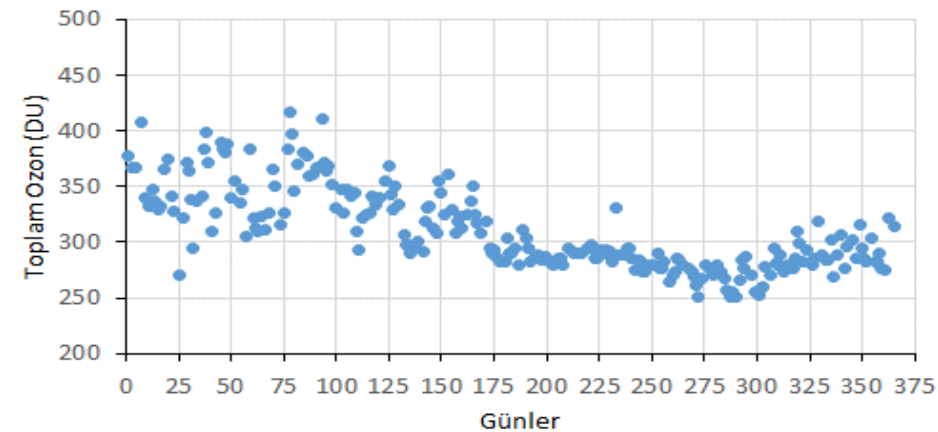
UV INDEX VALUE	UV INDEX LEVEL
< 2	LOW
3 - 5	MODERATE
6 - 7	HIGH
8 - 10	VERY HIGH
11 +	EXTREME

Low risk means that there is nothing to worry about - the sun will not harm you. Redness (erythema) will appear in 2 hours or more (11:00-15:00 GMT) in a summer,

Medium risk means that the sun is not dangerous, but you should avoid being in direct sunlight for more than 1 to 2 hours. Redness (erythema) will be appeared after longer exposition. Burners should apply sunscreen which skin protection factor (SPF) is 15. All people should wear UV-A+B sun glasses,

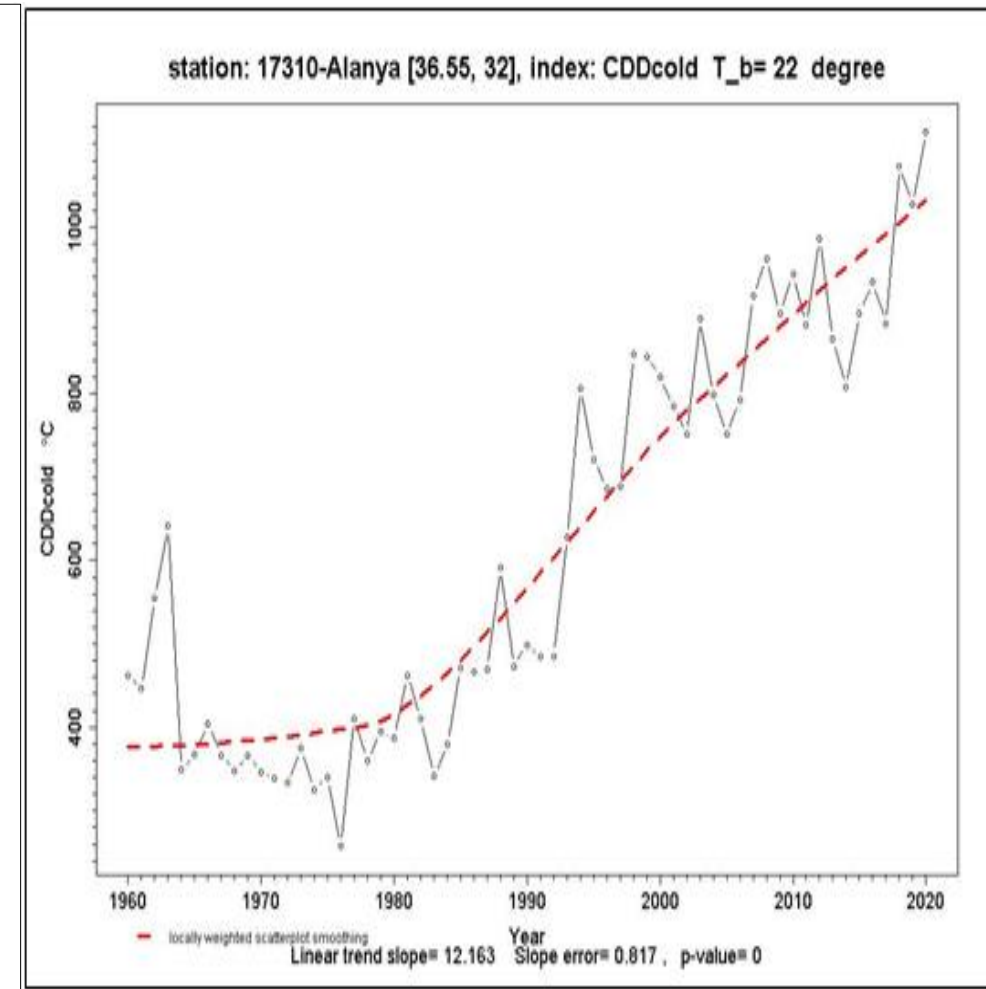
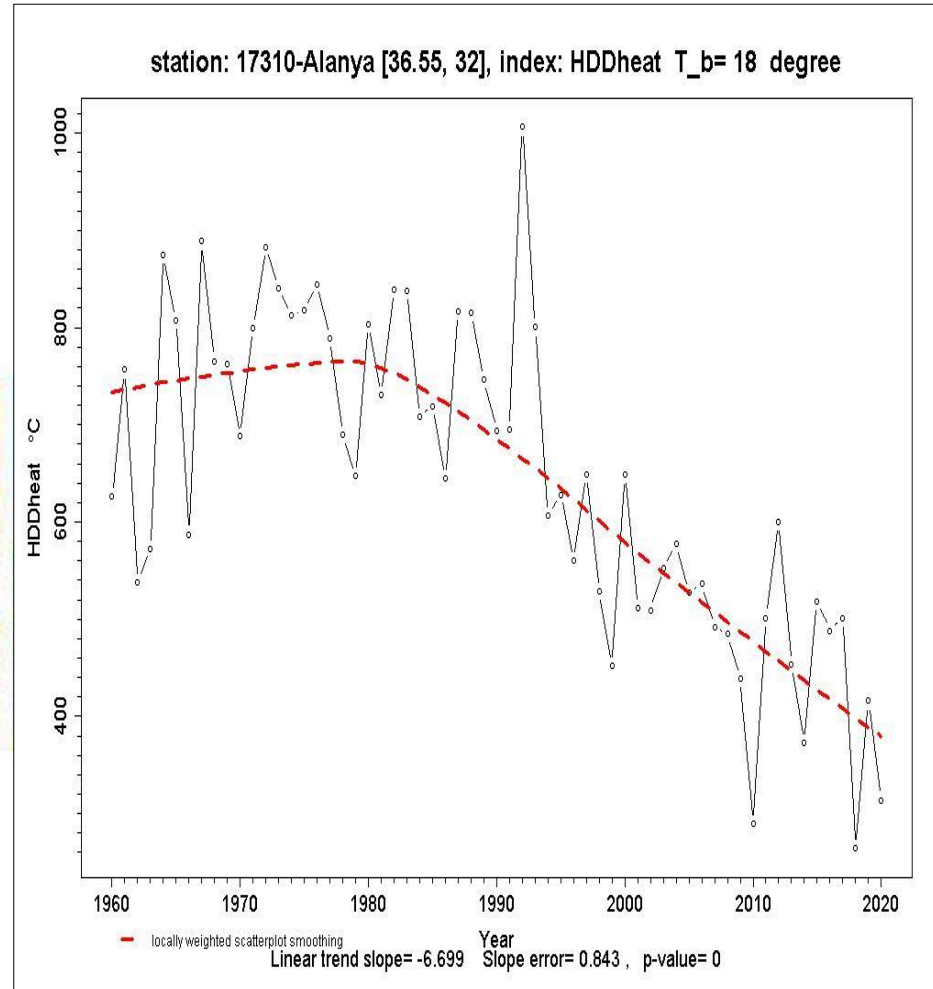
High risk means you could burn in 30 to 60 minutes. Try to keep out of direct sunlight, wear protective clothing, hat and sunglasses and use sunscreen lotion SPF >15.

Very high risk means that you could burn severely in 20 to 30 minutes. Stay out of direct sunlight, wear protective clothing, hat and sunglasses and use sunscreen lotion SPF >15. People have regular skin color, especially children and babies have risk of eye



Source: <http://ozoneaq.gsfc.nasa.gov/>

Indices related to energy sector



In Alanya, the cooling degree-days show a significant increase in the trend of 12.2 degree-days/year. The cooling requirement, which was 400 degree-days in the 1960s and 1970s, has exceeded 1000 degree-days by the 2020s. The increase in cooling requirements has exceeded 3 times that of heating. This will increase the pressure on the energy sector on the Mediterranean coast.

National Climate Outlook Forum(NCOF)



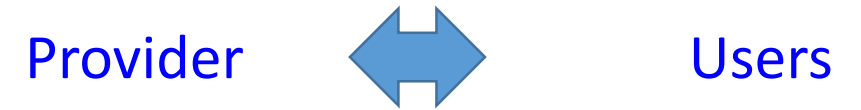
National Climate Outlook Forums and National Climate Forums

Concept Note

Background

A climate service provides “climate information in a way that assists decision-making by individuals and organizations” (WMO, 2014)¹. The service component involves appropriate engagement, an effective access mechanism and responsiveness to user needs. Such services typically generate and provide contextualized information on past, present and future climate and its impacts on natural and human systems, and apply that information for decision-making at all levels of society.

National Meteorological and Hydrological Services (NMHS), as recognized in the Convention of the World Meteorological Organization (WMO), are a fundamental part of the national infrastructure and play an important role in supporting vital functions of governments. NMHSs provide climate and hydrological information products to enable key economic sectors such as agriculture, fisheries, water resources, forestry and health to anticipate, prepare and respond to climate anomalies and extreme events. Severe weather forecasts with one to three days lead-time are useful in responding to hazards to minimize the loss of assets



Climate Watch Advisory



Guidance on **precipitation** ID: 202114-u4

**Area concerned: southwestern European
Russia, Georgia, Armenia, north-eastern
Turkey**

**Initial statement issued on 6 August 2021
First Update issued on 13 August 2021
Second Update issued on 20 August 2021
Third Update issued on 27 August 2021
Fourth Update issued on 3 September 2021**

**Valid:
Begin: 3 September 2021
End: 10 September 2021**

To: Climate Watch focal points of NMHS of Russia, Georgia, Armenia, Turkey



Climate Watch Advisories provide information about ongoing or foreseen climate anomalies leading to unusual and high-impact weather conditions. The time scales extend from several days to weeks.

RCC Activities

As WMO RA VI RCC Node,

- ✓ Climate data(ERA-5)
- ✓ Climate monitoring
- ✓ Climate prediction
- ✓ Climate Watch Advisories(CWA)

Eastern Mediterranean Climate Centre Provides;

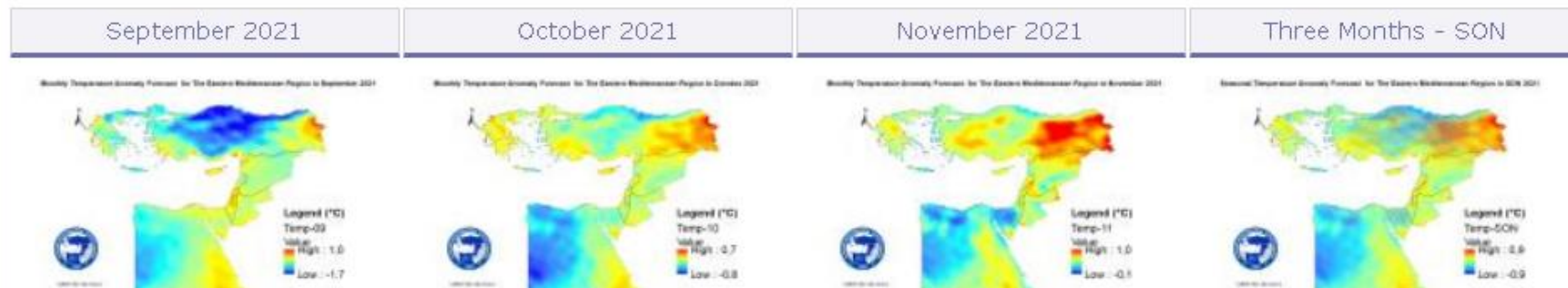
www.emcc.mgm.gov.tr

Prediction

Monthly Precipitation Rate Anomaly for The Eastern Mediterranean Region



2 m Temperature Anomaly for The Eastern Mediterranean Region



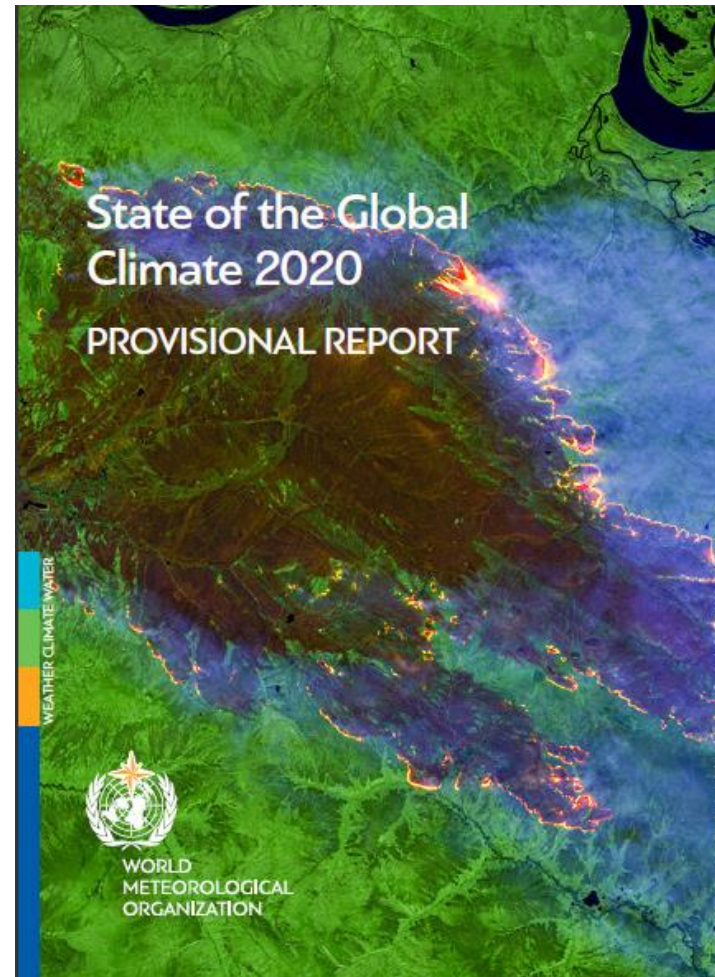
WMO SERCOM Studies

Expert Team on Climate Monitoring and Assessment (ET-CMA)

Terms of Reference

Promote fit-for-purpose climate monitoring applications including climate analysis and watches derived from in-situ observations, reanalysis, satellite and other emerging data sources

Provision of expert leadership for and review of the WMO flagship climate products, e.g. WMO Statements, Climate indicators, World Records of Weather and Climate Extremes, in support of climate policy and actions..



Guidelines on Climate Watches

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Will be updated

Thanks for your attention...