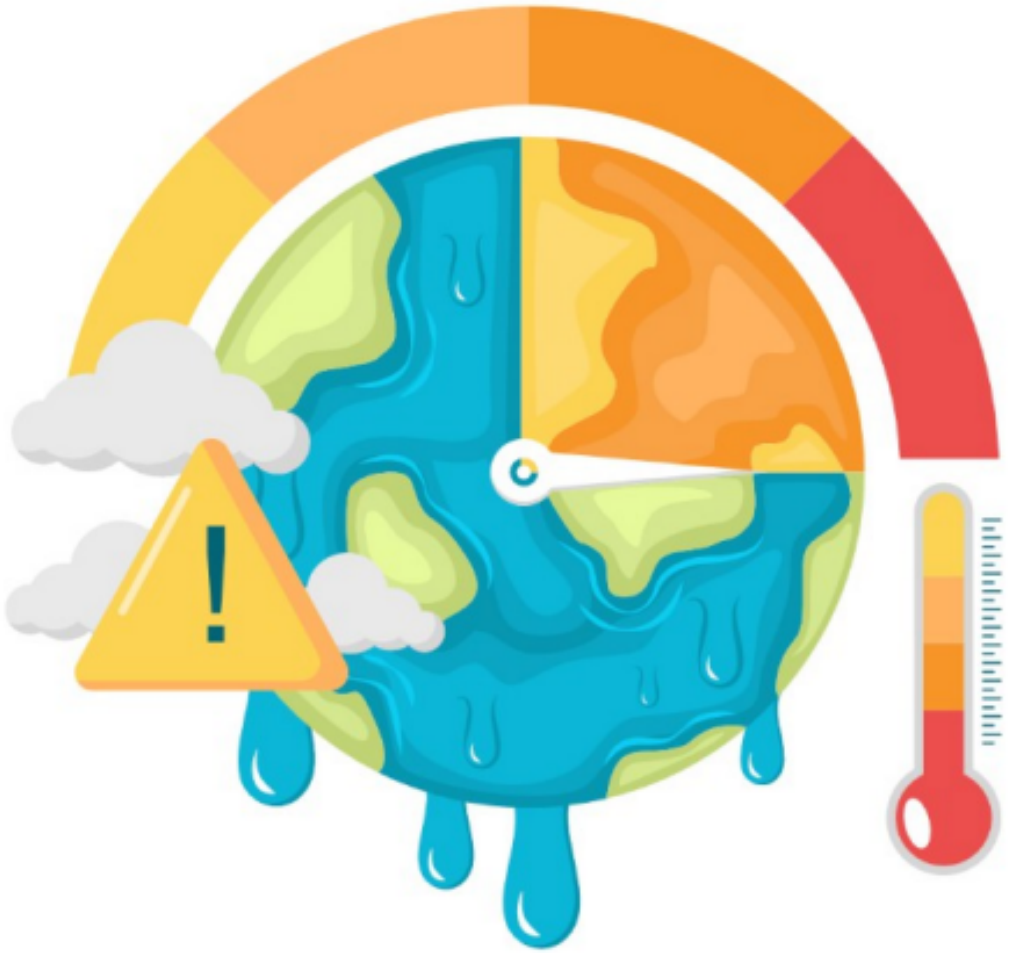
Πανελλήνιος Διαγωνισμός STEM 2024

Open category STEM
(Junior High School)

Mediterranean: The hotspot of climate change



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Introduction

The Mediterranean is home to 450 million people on average, with the population expected to double by 2025. This will have increased to 520 million, with 150 of them concentrated in coastal areas or in close proximity to them. Furthermore,The Mediterranean is a major tourist destination. Every year, around 200 million people visit.

Scientists have identified the Mediterranean region as a climate change hotspot. The sea threatens areas of southern Europe, western Asia, and northern Africa. Pollution, wildfires, extreme heat, and severe weather

Threat for mediterranean

The intergovernmental committee's classification of the major threats to the Mediterranean region of the United Nations on Climate Change are:

- **Deadly heat waves**

"Heat waves are becoming more common in the Mediterranean as a result of climate change." exacerbated in cities as a result of urbanization initiatives," resulting in disease and deaths, according to the IPCC's 2022 report on the repercussions. Adaptation and Climate Change.
According to a 2010 study conducted by the University of Bern, estimate the heat wave strength, length, and number in the east Mediterranean populations have increased by 6 or 7 times since the 1960s.

- **Threats to agricultural production**

According to Stanford University academics, "most It is already having a big negative impact on Mediterranean crops. Changes in the climate. Northern African farmers are already bracing for weak harvests this year. Drought has hampered the harvest of fodder, grain, and horticulture.

- **Water and politics**

Climate Change, according to the Intergovernmental Panel on Climate Change study, will exacerbate water scarcity throughout the majority of the Mediterranean. It anticipates a drop. up to 45% of lake and reservoir water reserves during of the century and up to a 55% decline in surface water availability in Africa's North.
At the same time, "both terrestrial and freshwater ecosystems" Climate Change in the Mediterranean is causing habitat loss and biodiversity". According to the European Drought Observatory, Half of the Mediterranean areas had already reached low levels by June.

- **Sea level rise**

During this period, sea level in the Mediterranean region climbed by 2.8 mm each year. recent decades, endangering coastal areas and towns such as Venice. Floods are becoming more common. "Sea level rise is already affecting the Mediterranean's coastal waters." perimeter and is likely to raise the risk of flooding, soil erosion, and other problems.... coastal salinization," the IPCC cautions. "These occurrences can have serious consequences."
Agriculture, fisheries and aquaculture, urban growth, and port development activities, tourism, archaeological sites, and a plethora of coastal ones ecosystems"

- **Marine pollution**

According to study, the Mediterranean is one of Europe's most contaminated waters. Every year, thousands of tons of garbage wind up in the Mediterranean Sea. causing harm to or possibly killing iconic marine species, some of which are endangered Sea turtles, cetaceans, and other endangered species are protected, while They also drastically harm marine and coastal habitats.

Climate Data

International and national organizations' ideas to deal with and stop the phenomenon Climate change impacts are mostly data-driven. Climate changes Temperature, atmospheric conditions, and quantity data are examples of data. a given location's precipitation, etc. Climate information is comparable to meteorological data, but with an emphasis on longer time periods, such as the average Temperature of a country during the last decade rather than the recent week.

Sensors must be placed at strategic locations to collect climate data. around the world. Various sensors capture various forms of data. Being able to collect temperature data in a thermometer, for example, Rain gauges monitor rainfall in a certain geographic area.

The Challenge

SChoose one or more of the dangers to the Mediterranean region and conduct a search for information. You design your own self-contained device for collecting climatic data.
Your system should be able to collect data in real time. If necessary, it will be processed in order to retrieve reliable information. Wirelessly transmitted data will be viewed on another machine or PC.

The team

The team consists of:

- The coach (over 20 years old)
- 3-6 high school students (12 to 15 years old during the current school/academic year)

Rules

The autonomous system

- can be made of any material and employ any method. Any microcontroller or microcomputer can be programmed. language or environment for programming
- may accommodate up to four sensors linked to a microcontroller or microcomputer.
- The programme for data collection, processing, and transmission should be running. only on a microcontroller or microcomputer
- can talk using any wireless technology auxiliary system
- does not need to be assembled or programmed on site on the day of the competition.

The auxiliary system:

- can be a downloadable microcomputer or microcontroller and display of the data it will receive from the autonomous system

The team:

- will display her work in the space designated by the organizer and will be available for viewing. during the tendering process in preparation for its presentation.
- He is unable to converse with individuals outside of the playing field (parents or coaches, for example). Instead, it is encouraged to contact judges and contestants for the exchange. know-how, experiences, and so on. If it becomes necessary to communicate with someone outside the organization, This will be done with the necessary license and in the presence of a referee.

Deliverable

Each team must deliver a portfolio no later than 10 days before the day of the competition which will include:

- A PDF report with a description of the research and its key axes will be provided. The concept on which the robotic system is founded, the solutions that the system provides, and the tactics that the system employs details about it (materials, electronic components, programme). This report should not be distributed, to be more than 10 pages (excluding the cover and appendix). while a citation of sources and corresponding references is necessary.
- video of a total duration of up to 2 minutes in which the robotic solution will be presented to function, and the team will explain its individual functions.

The delivery of the portfolio is particularly important as it is evaluated and graded on the one hand. On the other hand, it helps the team explain their work better and the judges, respectively, to understand more about their work).

Competition Day

The team arrives on the scheduled date and time at the pitch and sets up her work in the space that will be indicated to them by the organizer. It should have been prepared so that to present its work (including the autonomous system in operation) to at least two panels of judges but also to other groups and guests.

Evaluation

The evaluation of the team by the panels of judges will be carried out according to the following table.

Evaluation Table

Project Name:
Team:
Judge:

Project and innovation		
Research and reporting completeness	15	
Idea, quality and creativity	15	
Efficiency	10	
Robotic Solution		
Construction and mechanical parameters	10	
Code efficiency and programming logic	10	
Demonstration of robotic solution/ operation	15	
Presentation		
Presence and project presentation	15	
understanding problem and solution	15	
team spirit	10	

Grading	115 (max)	

Comments: