

WHEN SCIENTISTS GO UNDER THE WATER

Is it getting warmer?

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What is Science in Blue?

The SCIENCEinBLUE Project is an initiative funded by the European Union, aimed at raising awareness about ocean and underwater research and innovation. It seeks to bring researchers working in the field of underwater science and technology together with the public. The consortium, consisting of Galatasaray University, Akdeniz University, and the Boğaziçi University Underwater Research Center, will demonstrate the role of researchers in society and the economy, drawing on their worldwide experience, particularly referencing the EU projects their staff has worked on in the past.

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RESEARCHERS' NIGHT

Every year, the last week of September across Europe.

September 27-28, 2024
Galatasaray University

September 26-27, 2025
Akdeniz University



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MAVİ
HACKATHON
Denizin derinliklerinde teknoloji macerası başlıyor!
Mavi Hackathon, lise öğrencilerini İstanbul Boğazı'nı keşfetmeye ve kodlama becerilerini geliştirmeye çağırıyor. Galatasaray Üniversitesi'ndeki etkinlikte öğrenciler, boğazın verilerini toplayacak bir cihaz geliştirecek. Tasarlanan ürün bir ROV'a monte edilecek ve öğrenciler, kendi kodladıkları cihazın dalışını kamplerden izleyebilecekler.
MAVİDE BİLİM
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KÖPRÜÜSSÜ
SİMÜLATÖRÜ
27 Eylül 2024
09:00 - 18:00
Denizciliğe yelken açmaya hazır mısın?
MAVİDE BİLİM
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TEA TALK
27 Eylül 2024
AYDIN DOĞAN SALONU
16:00 - 17:00 Çay/Kahve İkramı
17:00 - 19:00 Sunumlar
The Science of Diving
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BOĞAZDA
GECE
DALIŞI
27 Eylül Cuma
17:00 - 23:00
MAVİDE BİLİM
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ARAŞTIRMA
VE
DALIŞ
ARAÇLARI
27 Eylül 2024
10:00 - 18:00
Cuma
SARAY BİNASI
SERGİ SALONU
MAVİDE BİLİM
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BOĞAZDA
SATIH
DESTEKLİ
BİLİMSEL
DALIŞ
28 Eylül Cumartesi
10:00 - 12:00
MAVİDE BİLİM
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DENİZLERİN
MİRASI
Okyanuslar ve sualtı kültür mirası hakkında ne kadar bilgiye sahibiz?
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ROBOTLAR
SENİ ÇAĞIRIYOR!
28 Eylül Cumartesi
13:30 - 18:00
Bu etkinlik, Boğaziçi Sualtı Araştırma Merkezi (DURC) tarafından sağlanan üç sualtı robotunun desteğiyle düzenlenecektir.
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RESEARCHERS AT THE SCHOOL

7 Bölgede
140 Okulda



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Assist. Prof. Dr. Çağlar ÇAKIR

Dr. Çağlar ÇAKIR was born in Samsun, Türkiye, in 1982. He graduated from the Department of Geography at Atatürk University in 2005. He completed his Master's and Doctoral studies in the Department of Physical Geography at the Institute of Social Sciences at the same university.

Between 2016 and 2017, he worked as an Assistant Professor in the Department of Geography at the Faculty of Letters, Atatürk University. In July 2017, he left Atatürk University to join the Department of Geography at the Faculty of Letters, Akdeniz University. Since then, he has been teaching undergraduate, Master's, and Doctoral-level courses.

His primary research interests include geomorphology, ecological risk, and paleoclimatology. Since 2021, he has been conducting underwater studies along the Mediterranean coasts, focusing on submarine geomorphology, underwater archaeology, and underwater cultural heritage.

How I Started Diving?

My first introduction to diving came in 1993, when I received free diving training from my swimming coach at the Samsun 19 Mayıs Swimming Club. However, it took a long time before I ventured into scuba diving. Interestingly, I began scuba diving far from the sea, in Erzurum—a city with an average altitude of 1,900 meters above sea level.In 2011, I started scuba diving through the "Diving Training for Tourism and Service Purposes in Inland Waters" project, supported by the Northeast Anatolia Development Agency. Since 2021, I have been actively involved in underwater archaeological research and excavations along the coasts of Antalya and Mersin, while continuing my studies in coastal and submarine geomorphology.

REFERENCE PROJECTS

R1. GreenBubbles

- GreenBubbles is the first European Union-funded project focusing on sustainable SCUBA diving.

- The diving industry generates significant direct and indirect income for local communities and Marine Protected Areas (MPAs). Other benefits associated with diving include contributing to environmental and ocean conservation, supporting scientific research, promoting social inclusion, and fostering personal development. However, diving also has negative impacts, such as damage or disturbance to habitats and organisms, conflicts with local communities over access/use of resources, issues of equity, and cultural clashes.

- The main goal of GreenBubbles was to maximize the benefits associated with diving while minimizing its negative impacts, ensuring the environmental, economic, and social sustainability of the system.

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R5. MPA-ENGAGE

The MPA-ENGAGE project, funded by the European Union's Interreg MED program with a budget of approximately 3 million euros, was led by the Spanish National Research Council's Institute of Marine Sciences. The primary goal of the project was to support Mediterranean Marine Protected Areas (MPAs) in adapting to climate change and mitigating its adverse impacts on these areas. MPA-ENGAGE monitored the effects of climate change in a coordinated manner, conducted vulnerability assessments, and developed climate change adaptation plans for eight MPAs located across seven Mediterranean countries: Albania, Croatia, France, Greece, Italy, Malta, and Spain.

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R6. ROBOPISCES

The RoboPisces project was funded by the European Union's Erasmus+ program. The project has implemented specific actions in STEAM and digital skills education by fostering strong international collaboration among highly esteemed academic institutions and primary schools in countries such as Italy, Ireland, Latvia, Greece, Malta, and Croatia.

Aligned with the EU’s efforts to address challenges in education and training systems, RoboPisces aimed to contribute to improving quality and efficiency while supporting the achievement of EU targets for students with low proficiency levels in STEAM subjects.

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The primary objectives of the project are as follows:

1. To enhance students' achievement and engagement in STEAM fields through the implementation of robotics kits and innovative assessment strategies, as well as to ensure the acquisition of fundamental skills and competencies by employing effective and innovative teaching methods.

2. To equip students with transversal skills through the use of Educational Robotics (ER).

3. To introduce students to concepts of sustainability by presenting the theme of the marine environment through the RoboFish toolkit.

4. To promote the integration of digital competencies across the curriculum, tailored to specific age groups.

5. To reduce and prevent early school leaving (ESL) by increasing students' interest, participation, and motivation.

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Reference Projects – Subject Relationship

Global warming is having increasingly significant impacts on ocean and marine ecosystems, making sustainability efforts crucial. The Green Bubbles, MPA-Engage, and RoboPisces projects have been developed with various objectives to mitigate the effects of global warming on marine and coastal ecosystems, raise community awareness, and create more resilient systems against future threats. These projects offer comprehensive solutions to the environmental, economic, and social consequences of global warming, ranging from the sustainability of marine protected areas to educational and awareness initiatives.

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The Green Bubbles project addresses the environmental pressures of touristic activities such as SCUBA diving on marine ecosystems by adopting a systematic approach to enhance the sustainability of the diving industry. With the rising ocean temperatures and acidification due to global warming, more fragile ecosystems are forming in coral reefs and sensitive underwater habitats, increasing the risk of negative impacts from diving activities. In this context, Green Bubbles aims to support sustainable tourism by providing a roadmap on how to conduct diving activities without harming ecosystems, thereby enhancing the environmental awareness of the diving industry. This promotes sustainable diving practices that can cope with the effects of global warming and encourages the development of innovative business models in this direction.

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The MPA-Engage project emphasizes the crucial role of marine protected areas (MPAs) in combating global warming. MPAs in sensitive regions like the Mediterranean are warming 20% faster than marine areas worldwide, experiencing the direct effects of global warming on ecosystems. This project conducts vulnerability assessments on Mediterranean MPAs and develops adaptation plans in collaboration with local communities to better adapt to and mitigate the impacts of global warming. By collecting scientific data, MPA-Engage aims to preserve biodiversity and manage adaptation processes in MPAs, thereby reducing the effects of global warming. The efforts of this project not only help MPAs become more resilient to climate change but also provide a sustainable environmental protection model for communities.

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The RoboPisces project supports an education-based approach using robotics (ER) to increase societal awareness of the impacts of global warming. The primary aim of RoboPisces is to raise awareness among students about digital and environmental issues, thereby nurturing generations that are more sensitive to climate change and the effects of global warming. The RoboFISH toolkit developed as part of the project helps students understand sustainability concepts related to the protection of marine ecosystems. Focusing on the impacts of global warming on marine and ocean ecosystems, these educational activities aim to instill rational thinking and problem-solving skills in students, while also fostering environmental awareness. By combining environmental and climatic issues with digital skills and innovative learning strategies, RoboPisces equips students with the knowledge and capabilities to address and develop solutions for marine environment and global warming challenges.

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What is Global Warming?

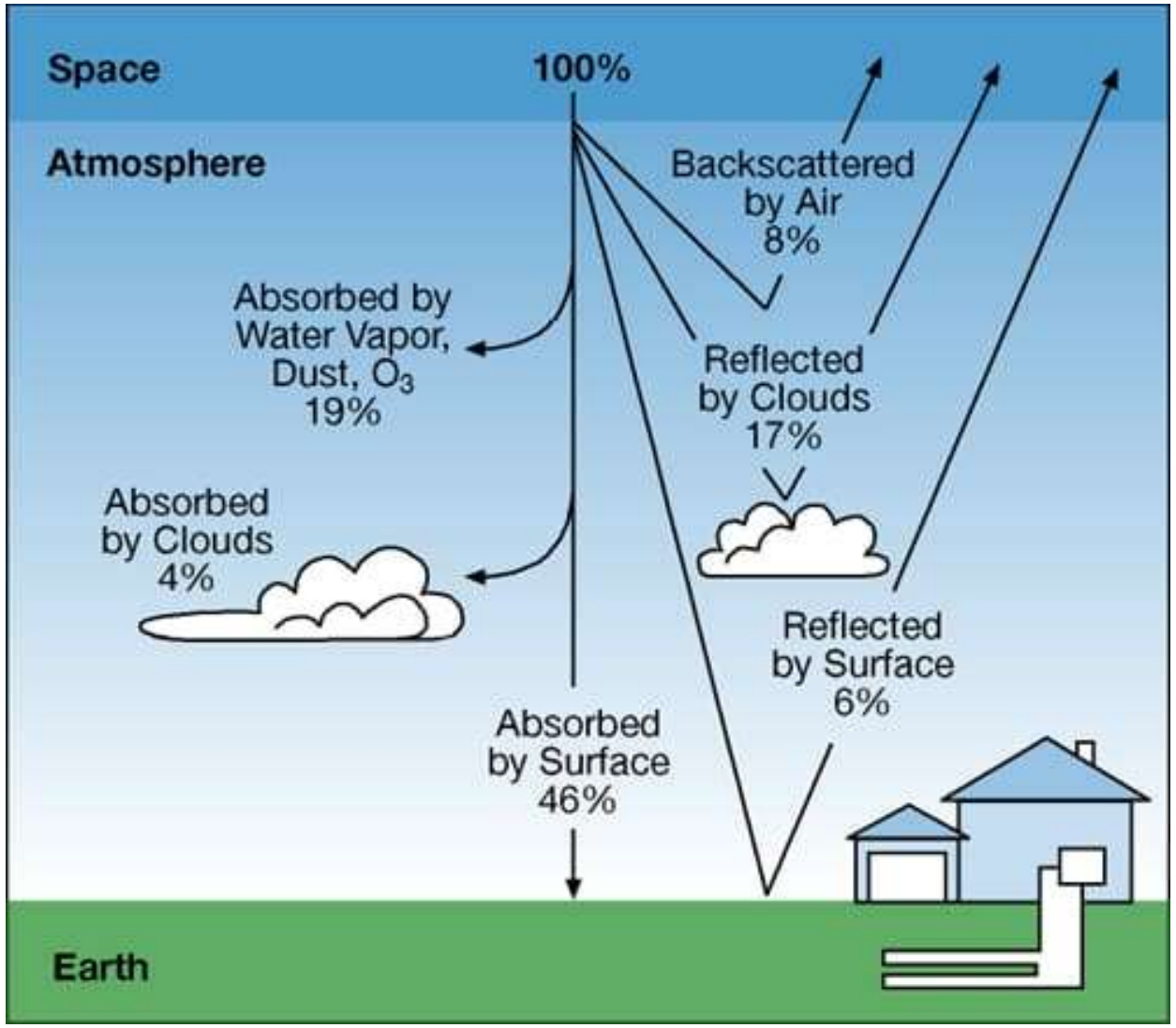
Global warming is the gradual increase in the Earth's surface, oceans, and atmosphere temperatures, primarily caused by the burning of fossil fuels and the release of other greenhouse gases into the atmosphere. This warming phenomenon has been observed over the long term since the Industrial Revolution (between 1760 and 1830).

It is estimated that human activities have increased the global average temperature of the Earth by approximately 1°C since the pre-industrial era, and this increase is currently observed to be over 0.2°C per decade. The current warming trend is a clear result of human activities since the 1950s and is progressing at an unprecedented rate not seen for millennia.

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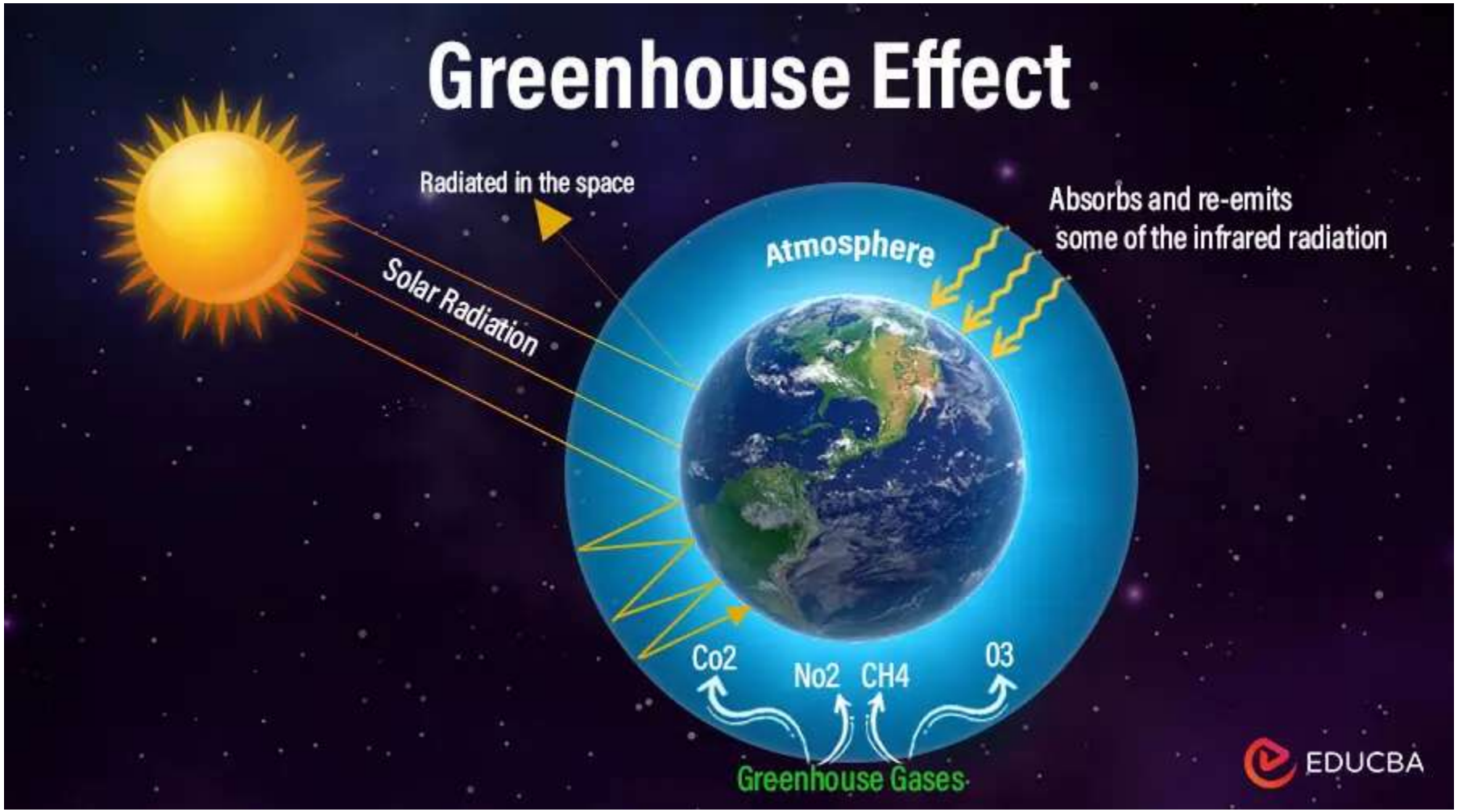
The greenhouse effect is a natural process that warms the Earth's surface. What transforms this natural process into an unnatural one is the increase in the concentration of greenhouse gases in the atmosphere. Certain gases in the atmosphere act like the glass panels covering greenhouses. These greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3). In this process, a portion of the radiation from the Sun is reflected back into space from the Earth's upper atmosphere (8%). Another portion is reflected back into the atmosphere from the upper surfaces of clouds (17%) and the Earth's surface (6%). The remaining portion is absorbed by greenhouse gases and dust particles in the atmosphere, as well as by the Earth's surface and clouds. Greenhouse gases trap the reflected radiation, preventing it from escaping back into space, and thus increase the Earth's surface temperature.

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*https://sageography.co.za/wiki/grade-10/the-atmosphere/heating-of-the-atmosphere/Son Erişim Tarihi: 11.11.2024

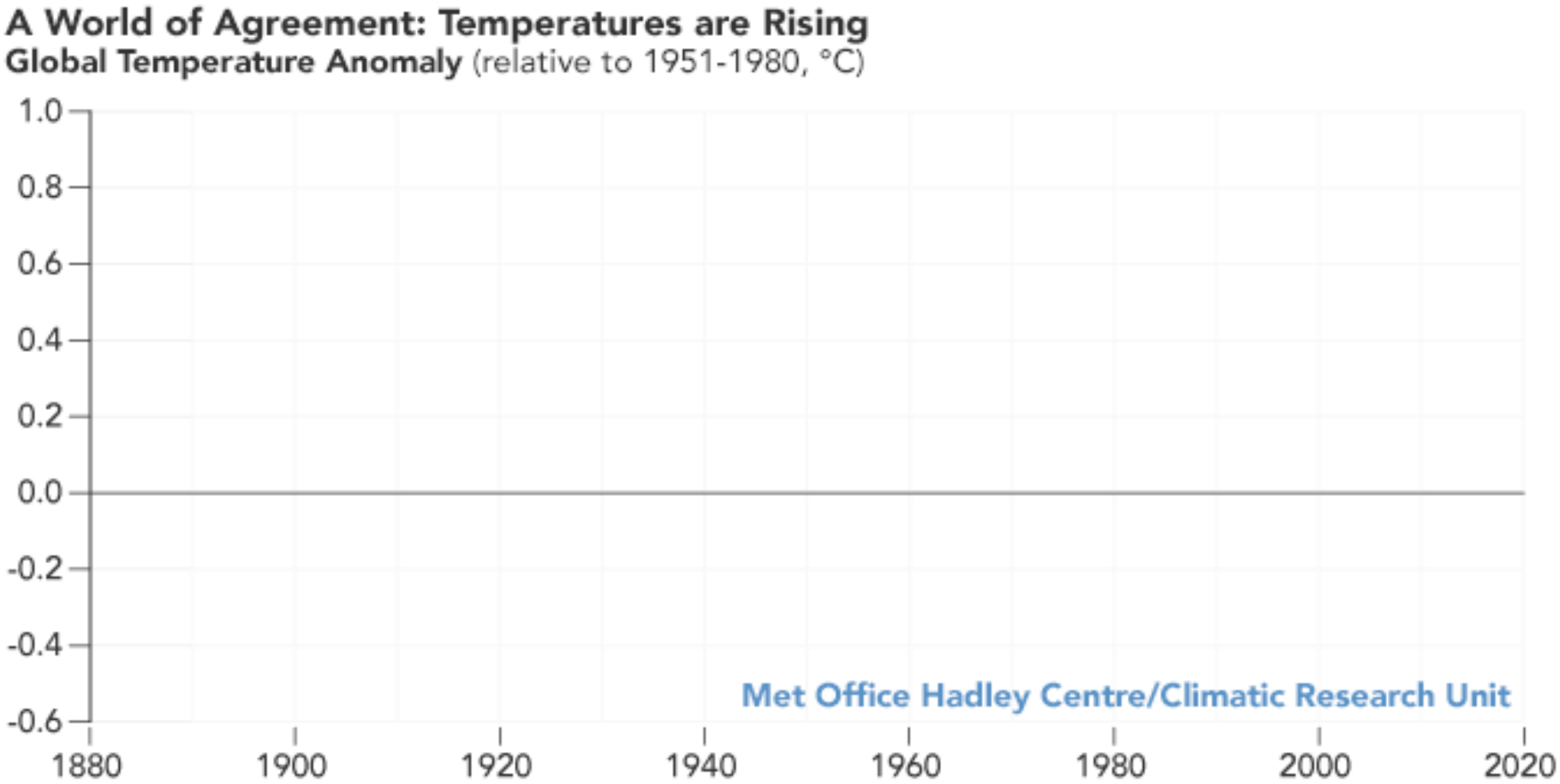
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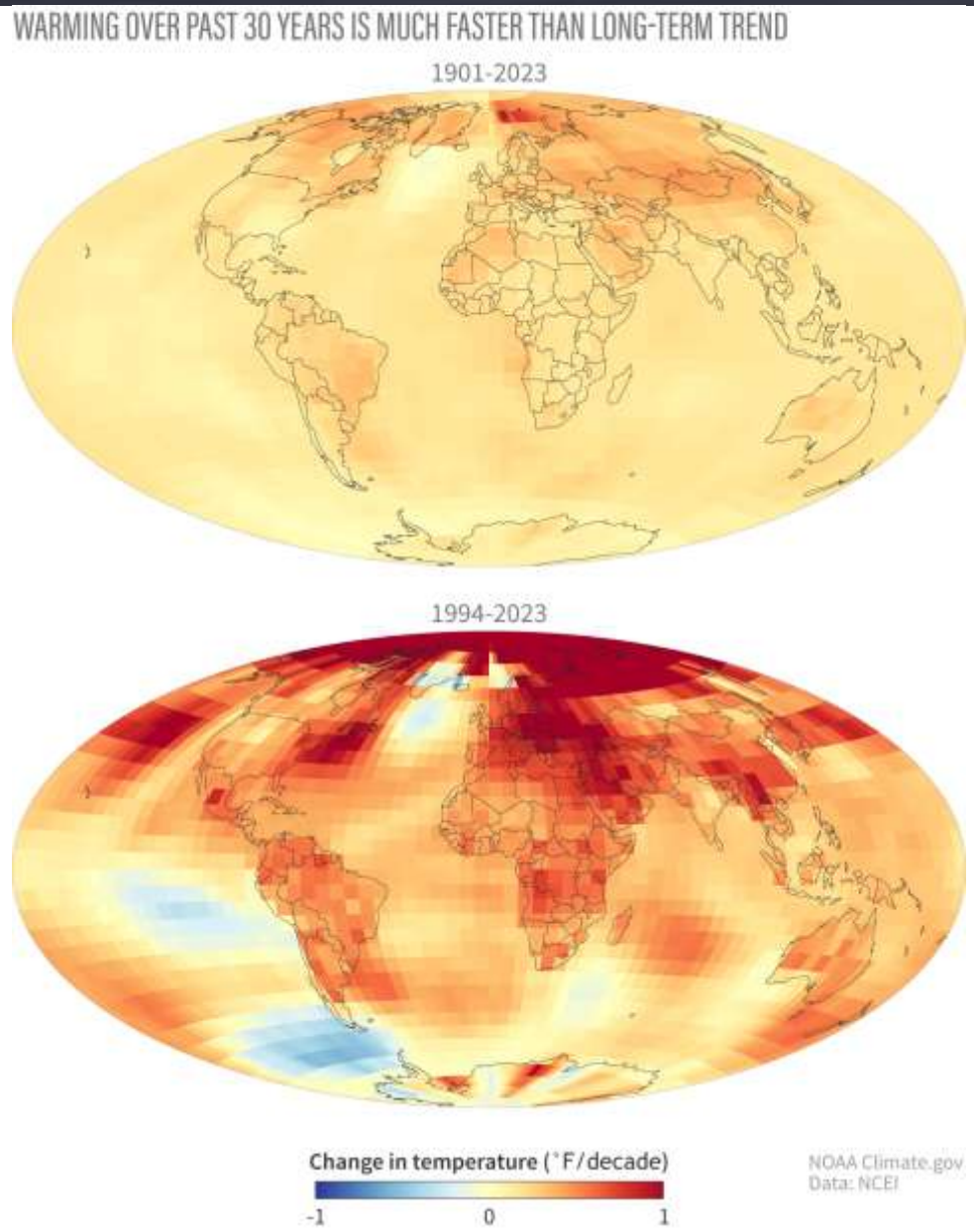
* https://www.educba.com/essay-on-greenhouse-effect/ Son Erişim Tarihi: 11.11.2024

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*https://earthobservatory.nasa.gov/world-of-change/global temperatures#:~:text=According%20to%20an%20ongoing%20temperature,1.9%C2%B0%20Fahrenheit)%20since%201880.

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Causes of Global Warming

Global warming has both anthropogenic (human-induced) and natural causes.

A - Anthropogenic (Human-induced) Causes	B- Natural Causes
I) Industrialization	I) Water Vapor
II) Deforestation	II) Thawing of Permafrost
III) Transportation Choices	III) Wildfires
IV) Industrial Agriculture	
V) Overconsumption	
VI) Overpopulation	

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A-Human-Induced Causes

I) Industrialization

The use of fossil fuels in industrial activities results in significant carbon dioxide emissions. The combustion of fossil fuels such as coal, oil, and natural gas accelerates carbon emissions and, consequently, the accumulation of greenhouse gases in the atmosphere.



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II) Deforestation

Trees significantly reduce the amount of carbon dioxide in the atmosphere. However, as forest areas are destroyed, their capacity to absorb carbon dioxide decreases. This leads to an increase in atmospheric carbon levels, thereby intensifying the greenhouse effect.



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III) Ulaşım Tercihleri

Trafiğe çıkan araç sayısının her geçen gün artması karbon salınımını da doğrudan artırır. Kara, deniz ve hava taşıtlarında kullanılan fosil yakıtlar, sera gazı oranının normalin üzerine çıkmasına neden olur. Böylece atmosferdeki ısınma eğilimini artırır.



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IV) Industrial Agriculture

Industrial agriculture involves the extensive use of pesticides, fertilizers, and animal waste. The chemicals in pesticides and fertilizers, along with emissions from animal waste, increase the release of methane and nitrous oxide, both of which contribute significantly to global warming.



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V) Overconsumption

Unnecessary and excessive consumption leads to increased production and, consequently, more waste. To meet growing demand, factories operate at higher capacities, resulting in greater carbon emissions and more waste being released into the environment.



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VI) Overpopulation

Although the carbon dioxide released through human respiration has a negligible impact on global warming, the primary effect of overpopulation lies in the increasing demand for resources. To meet the needs of a growing population, industrial facilities must ramp up production, leading to a significant rise in greenhouse gas emissions into the atmosphere.



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B-Natural Causes

I) Water Vapor

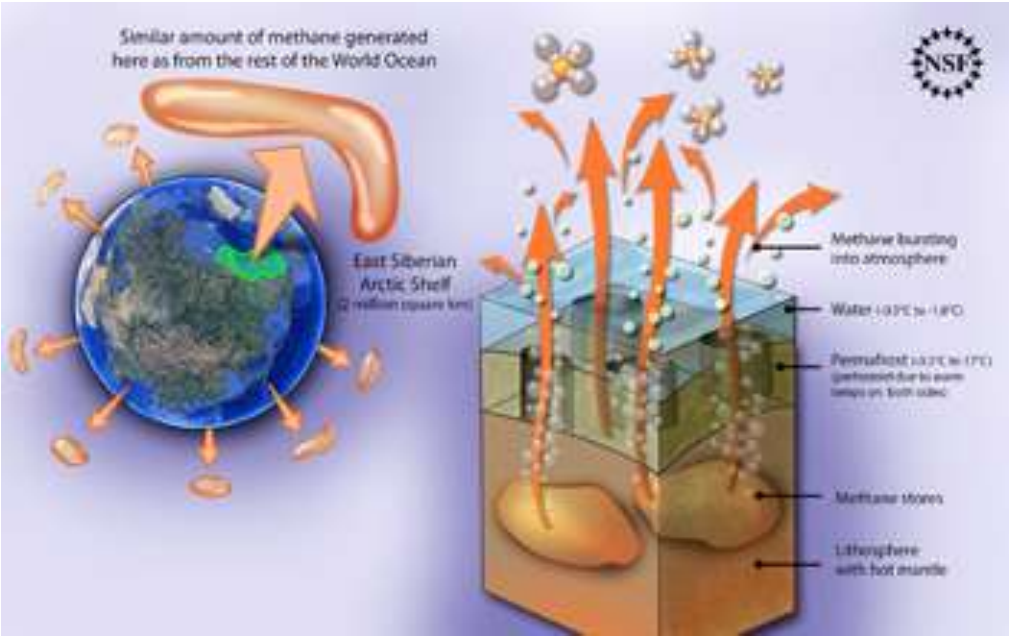
Water vapor is also a greenhouse gas. As average temperatures rise, evaporation from water bodies increases. This leads to a higher concentration of water vapor in the atmosphere, which in turn exacerbates global warming.



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II) Thawing of Permafrost

As the permafrost layer thaws, methane gas, produced through biological activity beneath the frozen soil, is released into the atmosphere. Methane is one of the most dangerous greenhouse gases, as it has 84-87 times more potent greenhouse effects than carbon dioxide.



Kaynak: https://www.nsf.gov/news/news_summ.jsp?cntn_id=116532

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III) Wildfires

The carbon dioxide that trees have stored in their trunks through photosynthesis over decades or even centuries is suddenly released into the atmosphere due to natural forest fires. This increases the amount of carbon dioxide in the atmosphere, intensifying global warming.



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Consequences of Global Warming

Global warming causes a variety of widespread effects on living organisms and natural systems. The main impacts of global warming are:

I) Extreme Weather Events

As a result of global warming, rising temperatures may lead to more frequent and intense extreme weather events (storms, hurricanes, tornadoes, hail, etc.).

II) Seasonal Changes

Due to global warming, the durations and intensities of seasons may change. For instance, in the Mid-Latitudes, winters may become milder while summers become excessively hot and dry.

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III) Melting Glaciers and Sea Level Changes

As average global temperatures rise, glaciers in the polar regions and mountains will melt, leading to an increase in sea levels.

IV) Migration and Ecosystem Disruption

Due to rising temperatures, droughts and food shortages will force large-scale human migration. This migration will not be limited to humans. Global warming may cause some animal species to migrate to new habitats. This disruption will upset ecosystem balance and may result in the extinction of certain species.

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V) Decreased Crop Yields

Temperature increases and droughts caused by global warming reduce agricultural productivity and may lead to food supply issues in the future.

VI) Reduction of Water Resources

Droughts and changing rainfall patterns negatively affect water resources, leading to water shortages for both humans and ecosystems.

VII) Increased Ocean and Sea Water Acidity

The increased concentration of carbon dioxide in the atmosphere leads to greater absorption of CO_2 by the oceans, making sea water more acidic and disrupting oceanic and marine ecosystems.

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VIII) Diseases

Rising temperatures increase the risk of the spread of insect-borne diseases.

IX) Wildfires

Higher temperatures and droughts can increase the frequency and severity of forest fires, leading to deforestation.

X) Soil Erosion

The loss of forest cover due to forest fires, along with heavy rainfall and storms, exacerbates soil erosion. This can negatively affect agricultural lands and natural habitats.

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XI) Shift in Climate Zones

Due to the increasing average temperature of the Earth's surface, the tropical zone expands while the temperate and polar zones shrink.

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How Can We Prevent Global Warming and Related Climate Change?



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QUESTIONS?



Kaynak: https://www.abyss.com.au/en/blog/viewpost/456/discover-the-surprising-benefits-of-scuba-diving-for-health

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ETKİNLİK ADI



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