

Conference on Climate Change

Thanks to the help of AKMA (Advancing Knowledge of Methane in the Arctic) Project Researchers - a group of Norwegian scientists involved in scientific researches in the Arctic - the 7th grade students of the G. Simoni Middle School in Medicina have undertaken the preparation of this event.

To spread environmental awareness based on scientific evidence.

To spread a scientific culture based on method and accuracy.



Medicina, May 28th 2022

Arctic ecosystem and global warming

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The Arctic is a geographical region of the northern hemisphere of the Earth, surrounding the North Pole. It is characterized by the presence of the Arctic cap and the Arctic ice pack and it is made up of parts of other continents. The living beings that populate the Arctic are used to living in the cold, so a rise in temperature can cause the death of many organisms that are unable to adapt to these sudden changes. Studying the Arctic is important because it is an extremely vulnerable region of our planet. The researchers of the AKMA project are doing research in this regard. They are studying in particular the methane emissions emanating from the seabed of that region. They are doing this through expeditions with a ship equipped with state-of-the-art scientific instruments designed for advanced research.

Global warming : the effects on sea levels

N. Conti, G. Busi, A. Monti

Global warming is a climate phenomenon that causes the earth's average temperature to rise and is caused by the greenhouse effect. Scientific evidence tells us that the Arctic is warming twice as fast as the rest of the planet and these rapid changes are affecting land and marine life. The Arctic has undergone a further acceleration in the past 3 years due to excess heat caused by human emissions of greenhouse gases. In two years, the ice has thinned by about 50 centimeters, that is a third of its volume, an impressive figure that should no longer be underestimated. We are witnessing the melting of deep permafrost, which had not defrosted since the last Ice Age, about 10,000 years ago. In addition to the loss of biodiversity caused by this melting, there is the risk of the leakage of methane gas that is located below the permafrost. We know that methane is a powerful greenhouse gas. The melting of glaciers is one of the main causes of sea level rise. If all the glaciers were to melt, the sea level would rise by about 58 meters. Another phenomenon we are witnessing is the acidification of the seas. The acidification of the oceans is caused by an increase in atmospheric carbon dioxide which is absorbed by the water. In fact, the ocean absorbs about 30% of all anthropogenic CO₂. The change in the pH of the sea causes loss of biodiversity . Examples are the organisms made up of a limestone structure or shell such as molluscs, corals, phytoplankton and other species.

Climate change and biodiversity at risk

C. Ruffini, V. Zanni, G. El Asmai

Biodiversity can be defined as the richness of life on Earth: the millions of plants, animals and microorganisms that make up the biosphere. This variety not only refers to the shape and structure of living beings, but also includes diversity as abundance. Man-made climate change is creating major imbalances in various ecosystems of the planet Earth. Many animal and plant species are undergoing changes in their life cycle, for example some species are migrating northwards and towards higher altitudes, while several invasive species have settled in territories that did not previously host them. This causes a rearrangement of the balance between flora, fauna and the physical environment.

Unfortunately, the speed with which this is happening risks the extinction of many species, for example koalas, which are highly specialized animals and are unable to adapt to such changes. Another animal at risk is the snowy owl: the rise in temperatures causes the melting of the snow and ice in its habitat and affects its diet. Finally, there is great attention and alarm on the risk of extinction of bees, very important animals because they are pollinators and, if they were to become extinct, our eating habits would be in danger.

Extreme weather events

S. Romagnoli, F. Rubbi, A. Fasciano

An extreme weather event is a highly dangerous situation, creating a lot of damage to human activity and to the biological environment. Climate change is the cause of the significant recent increase in extreme weather events. In 2021, 187 meteorological phenomena occurred in Italy, with victims and significant damage in 637 municipalities. The summer of 2021 recorded record temperatures in Europe (in Italy in Syracuse on 11 August they reached 48.8 degrees). Damage from intense hailstorms and landslides from violent rains are on the rise. Among the extreme phenomena that cause damage and even victims, both among humans and animals, there are: hurricanes, drought which often causes fires, floods. Other phenomena that are not extreme but dangerous are the loss of permafrost, because it is melting, and the melting of glaciers, especially continental ones, which are the cause of rising sea levels.

Climate change : the risks for our health

M. Zuffa, A. Catone, S. Magri, A. Ouarga

Mankind has always recognized the climate changes produced during its history, but only since the 17th century, with the introduction of instrumental measurements of meteorological quantities, has it been able to quantify these changes, at least on a local / regional scale. For a global vision of climate change, in reality, it is only from the mid-nineteenth century that we have had available a series of instrumental data, reliable and sufficiently distributed to be representative in scientific terms. Currently, we are trying to understand if there is a link between human health and climate change. Meanwhile, thinking about food and how we produce it, we understand that the increasing need for food leads us to intensify production, but drought and other extreme events force men to find solutions that are often not compatible with human health. For example, climate change has brought many species of parasites to areas of the world where they were not present, such as the Asian bug in Italy, or others. This leads to an increase in the use of pesticides that can cause problems for human health. Furthermore, some studies show that climate change is related to pandemics, past, present and future. This was stated in a study published in "Nature", predicting how global warming will displace wildlife habitats, thus increasing encounters between species capable of exchanging pathogens; in this study they managed, with simulations, to quantify how many times the viruses will jump between species. The spillover is the cause of the evolution of new viruses that can infect men.

Future scenarios in Italy

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The IPCC (Intergovernmental Panel on Climate Change) evaluates all scientific, technical and socio-economic information worldwide to explain climate change. In Italy, the IPCC has identified 5 possible scenarios, through which future changes relating to greenhouse gas emissions are analyzed. It has predicted that by 2040 the global temperature will increase by more than 1.5 ° C. Among the various events that will create big problems we can list: the reduction in total rainfall per year, the increase in periods of drought with heat waves, the potential reduction in productivity for spring-summer cycle crops (e.g. corn), up to -40% of the water flow in rivers in 2080, floods that will contribute to the pollution of water bodies. To remedy all this, some possible paths have been identified to achieve a reduction in emissions in our Country by 2050 between 80% and 100% compared to the 1990 level. There are several studies and monitoring to understand which works of mitigation can be put in place. In our research we have examined the case of Bologna and Naples. Finally, we took the city of Bolzano as an example of a sustainable green city.

Special IPCC report on climate change

D. Zecchino, D. Baciù, M. Bergamini

The Intergovernmental Panel on Climate Change (IPCC), is an intergovernmental and scientific body that every six years or so summarizes the current state of knowledge on climate change and evaluates it from a scientific point of view. The IPCC does not carry out its own research, but relies on publications recognized and subjected to the peer-reviewed process. The IPCC provides a basis for science-based policy decisions, but makes no specific recommendations on how to act. The IPCC has existed since 1988 and was founded by the United Nations Environment Program (UN Environment) and the World Meteorological Organization (WMO). Currently the IPCC, based in Geneva, has 195 member states. IPCC reports are discussed in Inter-State Conferences (COPs), the last being in Glasgow in 2021. During these conferences, the attending States agree to draft protocols that serve to mitigate the impact that climate change has on the entire planet. Among the various protocols, the first was that of Kyoto. The most important was the Paris Agreement which was also ratified in the Glasgow COP. With this agreement, the States undertake to ensure that the maximum temperature increase is equal to 1.5 °. In fact, a higher increase could trigger irreversible processes for the whole planet.

