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SHORT LECTURE SERIES

The Basics of Global Warming

June 27, 2024

Department of Earth Sciences – DST Unifi
AULA A (019)

Via G. La Pira 4,
Firenze

DST
DIPARTIMENTO DI SCIENZE DELLA TERRA

ECCELLENZA 2023-27

Short series of three lectures

providing a simple, physical overview to understand the main causes of global warming, its main impacts on temperatures and water resources, and the solutions



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Program:

- **Lecture 1 (11:00-11:45) – Radiation and temperature**

Lecture 1 focuses on radiation and temperatures. We look at radiation as the main driver of temperatures, how greenhouse gases affect radiative fluxes and what this means for temperatures, patterns of temperature change and why the frequency of hot temperatures increases disproportionately with global warming.



- **Lecture 2 (15:00 -15:45) – Hydrological cycle**

Lecture 2 focuses on the hydrological cycle, with its fluxes of evaporation and precipitation. Evaporation of water requires a lot of energy, so it is a major part of the surface energy balance. This energy is released when precipitation occurs, driving much of the dynamics within the atmosphere. We assess how these dynamics change with global warming and what this means for the frequency of droughts and extreme precipitation events.



- **Lecture 3 (16:00-16:45) – Solution to global warming**

Lecture 3 focuses on the solution to global warming through a transition to renewable energy and modern technologies based on electricity rather than combustion, thus moving forward without the need for fossil fuels. We will discuss why photovoltaics is by far the most efficient way to generate energy from sunlight compared to other renewable energy sources, and why the shift from combustion to electricity has significant potential to reduce our demand for primary energy.

