

The role of calorimetry in assessing the impact of climate change on the global carbon cycle.

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Climate change is one of the biggest challenges facing scientists worldwide nowadays. Interdisciplinary knowledge is of paramount importance to climate change research, because climate directly affects all aspects of life on earth: from natural and experimental sciences, to economics, social sciences and human health.

The research needed to adapt life on earth to the predicted effect of climate on our planet, and to mitigate to some extent its impact on human life and on human society, will require many different scientific disciplines working together in close collaboration.

The predictions are worrisome. According to the European Environmental Agency (EEA 2008), the Intergovernmental Panel on Climate Change (IPCC), and the World Health Organization (WHO) the global average surface temperature is projected to increase between 1.4 and 5.8 °C this century. The Arctic sea ice is melting at a rate of 2.7 % per decade, and mountain glaciers are contracting. Both impact sea levels, which have increased 1.8 mm per year since 1961.

The number of people at risk of flooding by coastal storms is projected to increase from the current 75 million to 200 million. But this is not all. All these issues directly impact human health due to extreme heat and cold, changes in air and water quality, and changes in the ecology of infectious diseases. At the core of these threats to human health lies the effect of temperature on two of the vital primary resources on earth: soil and water.

On the face of the aforementioned impact of climate change on all living systems, we should be measuring the effect of temperatures on life. We should monitor what happens to a certain living system with increasing or decreasing temperatures, when those temperatures hit extreme cold or hot levels, and when the exposure time to such extreme temperatures raises. This measuring and monitoring is the object of biocalorimetry.

Latest calorimetric devices allow us to monitor changes in the metabolic rates of living systems under changing temperatures continuously and in real time, making these experimental phases faster and easier than other methods, and opening a wide range of useful scientific applications in this age of changing global climate.

These applications not only involve the study of soil, plants, microorganisms and pathogens that threaten human food supplies. They also involve studying how to fight such pathogens and the role of temperature on them.

On the whole, calorimetry can and should make key contributions to our knowledge about the real impact of temperature on life. This basic knowledge is essential to provide the best strategies to preserve human welfare and safety under the climate change conditions.