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New research reveals how the world's oceans could provide solutions to climate change

KAUST, Saudi Arabia - An international team of world leading experts in marine science, geo-engineering and climate change modelling have found evidence that a combination of marine-based solutions to climate change could solve the problem while enhancing conservation of marine ecosystems.

So far, efforts to combat climate change and its impacts have largely focused on land-based actions while relatively little attention has been paid to ocean-based potential. The ocean already removes about 25% of anthropogenic CO_2 emissions and has the potential to remove and store much more.

"Ocean-based actions could significantly reduce the magnitude and rate of ocean warming, ocean acidification, sea-level rise, as well as their impacts on marine ecosystems and ecosystem services. They could also play a significant role in helping to reduce global warming and its impacts on the non-ocean surface of the planet and on human society." Says Dr. Carlos Duarte, Professor of Marine Science in the Red Sea Research Center at King Abdullah's University of Science and Technology.

"However there may be associated risks to ocean life and people, and there is a lack of guidance for prioritizing ocean-based interventions since there has been relatively little research, development and deployment in this field, our research is changing that." He continued.

The scientists assessed the effectiveness of 13 measures offered by the Ocean to combat global warming. The solutions assessed include; reduction of atmospheric greenhouse gas concentrations, solar radiation management, protection of biota and ecosystems, and manipulation of biological and ecological adaptation.

"Marine renewable energy and solutions based on carbon storage by plants offer numerous benefits and are easy to implement. In contrast, measures based on the control of solar radiation, which is global, are controversial in the scientific community because of numerous technological unknowns and the risks. Evaluating such actions enables us to inform policymakers on the risks associated with them." Says lead author, Dr. Jean-Pierre Gattuso, Research Director at the Centre National de la Recherche Scientifique (CNRS).

The researchers assessed the potential of ocean-based measures or schemes to reduce climate-related drivers, as well as to reduce adverse impacts on marine ecosystems. Research into understanding the role, pressures, functioning and response to pressures of the global ocean is a key area of study within the KAUST Red Sea Research Center. The study, published in Frontiers in Marine Science will inform decision makers who are set to meet in December at COP24 in Katowice, Poland.

In order to protect future generations from the adverse effects of are ocean warming, ocean acidification and sea level rise the study recommends specific action; developing renewable energies, conserving and restoring marine plants which fix and store CO2, creating marine protected areas, reducing pollution, limiting over exploitation of resources, protecting the ocean against solar radiation by increasing the reflecting capacity of clouds or of the ocean surface, and direct interventions to increase biological and ecological adaptation of marine plants and animals, such as by relocalizing species.

As part of the study the technical feasability and cost effectiveness of the proposed measures is assessed in addition to their global governability and potential methods for implementation. The research is funded by King Abdullah University of Science and Technology (KAUST), the Prince

Albert II of Monaco Foundation, the Veolia Foundation, the IAEA Ocean Acidification International Coordination Centre, the French Global Environment Facility (FFEM), and the Monegasque Association on Ocean Acidification.

To read the full paper : *Frontiers in Marine Science*. http://bit.ly/2MVx4pm

Notes to Editors :

Animated video:

- English : http://bit.ly/2Q8ipcn
- French : http://bit.ly/2QcUetB
- English subtitled in Arabic : http://bit.ly/2zuQhuI
- English subtitled in Spanish : http://bit.ly/2Q8LDrH
- English subtitled in Chinese : http://bit.ly/2QalwAO

Images:

Paper: Ocean solutions to address climate change and its effects on marine ecosystems

Authors: Gattuso J.-P., Magnan A.K., Bopp L., Cheung W.W.L., Duarte C.M., Hinkel J., McLeod J., Micheli F., Oschlies A., Williamson P., Billé R., Chalastani V., Gates R.D., Irisson J.-O., Middleburg J.J., Pörtner H.-O., Rau G.H., 2018. *Frontiers in Marine Science*. http://bit.ly/2MVx4pm

About The Ocean Solutions Initiative

Its objective is to provide decision makers key information on the solutions offered by the ocean to reduce climate change and its impacts of marine organisms and ecosystems. It comprises 15 scientists from 10 countries. The Ocean Solutions Initiative is coordinated by CNRS, Iddri and Sorbonne University and is supported by the Prince Albert II of Monaco Foundation, VEOLIA Foundation, Ocean Acidification International Coordination Centre and the French Global Environment Facility and the Monegasque Association on ocean acidification. Pour more d'informations : http://bit.ly/2xJ3EV6.

About KAUST:

Established in 2009, KAUST is a graduate-level research university located on the shores of the Red Sea in Saudi Arabia. The University is dedicated to advancing science and technology through interdisciplinary research, education and innovation. Curiosity-driven and goal-oriented research is conducted by students, faculty, scientists and engineers to address the world's pressing scientific and technological challenges related to food, water, energy and the environment. Visit kaust.edu.sa for more information.

Contacts :

KAUST
Contact: Alexander Buxton, Senior Communications Advisor, KAUST
Email: alexander.buxton@kaust.edu.sa
Mob: +966 544701577

CNRS
Contact : Jean-Pierre Gattuso
Email : gattuso@obs-vlf.fr
Mob : +33 (0)6 95 92 68 80