

# KlimaCampus Colloquium

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## **Abstract**

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### **“Coral reefs, ocean acidification, and transformation of the global energy system”**

This talk will discuss our recent field work in Australia’s Great Barrier Reef in the ocean, acidification in the broader context of the global climate system, and the need for the development of near-zero emission global energy and transportation systems.

We have conducted the first-ever experiments in which a plume of water with high carbon dioxide concentrations was allowed to flow over a natural coral reef community without any artificial confinement. Our preliminary results indicate that the carbon dioxide harmed coral reef growth by increasing the rate of dissolution of the calcium carbonate minerals that make up much of the coral reef.

Ocean acidification and climate change are two consequences of continuing to use the sky as a dump for our carbon dioxide waste. When we release carbon dioxide to the atmosphere, some of it remains in the atmosphere, inhibiting the flow of heat energy to space. Some of it is absorbed by land plants, where carbon dioxide can hasten plant growth. However, ultimately, most of it will be absorbed by the ocean, where the carbon dioxide reacts with seawater to form carbonic acid. Increased concentrations of carbonic acid can harm many forms of marine life, especially those with shells or skeletons made out of calcium carbonate. Harm to coral reefs is just one of the many adverse impacts of our carbon dioxide emissions.

Our industrial society emits carbon dioxide primarily through chimneys, smokestacks, and tailpipes. If we are to reduce the amount of climate damage that occurs, we need to stop using the sky as a waste dump for our CO<sub>2</sub> pollution, we need to stop building things with chimneys, smokestacks, or tailpipes. This would require a massive transformation in the way we power our homes and workplaces, the way we produce the goods and services that we consume, and the way that we transport ourselves around our communities and around the world. This transformation remains a political and technological challenge – one of the most important challenges for this and coming generations.