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# COLLOQUIUM

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## HUMAN IMPACTS ON THE EARTH'S GEOLOGIC CARBON CYCLE

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REFRESHMENTS AT 4:00PM

When fossil fuel CO<sub>2</sub> is released to the atmosphere, it essentially accumulates in the relatively rapidly cycling atmosphere / ocean / land biosphere carbon cycle. The atmospheric concentration of CO<sub>2</sub> spikes through a time period of CO<sub>2</sub> emissions, then is expected to slowly decline over the centuries as CO<sub>2</sub> invades the ocean. The “lifetime” of fossil fuel CO<sub>2</sub> in the atmosphere is a complicated question because there are multiple processes operating, but in general the CO<sub>2</sub> concentration will be higher than natural for hundreds of thousands of years.

Some components of the climate system, such as the ice sheets in Antarctica and Greenland, will respond most strongly to the “long tail” of the fossil fuel CO<sub>2</sub>, ultimately raising sea level by 10’s of meters, something like 100 times more than the IPCC forecast for the year 2100. The interaction of the long tail with orbital forcing has the capacity to alter the trajectory of the glacial / interglacial cycles for hundreds of thousands of years into the future.

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