Diary 4 – 26 March 2012

Balancing greenhouse gasses

Daneborg

The amount of CO_2 in the atmosphere is rapidly rising. It is perhaps not widely known, that the atmospheric concentration of CO_2 would be much higher if it were not for the world's oceans. The oceans have been our ally in the fight to curb greenhouse gas-induced climate warming by having taken in between 30%-50% of the CO_2 that society has released. A traditional view is that the Arctic Ocean does not take in significant amounts of CO_2 because it is assumed that the region's thick perennial sea ice cover prevents CO_2 from entering (or leaving) the ocean. This paradigm is changing as we now know that sea ice participates in the ocean - air CO_2 transport. The summer sea ice cover is vastly reduced and annually more and more young and thinner sea ice is replacing the thick perennial pack that was once covered much of the Arctic. Now large expanses of the Arctic Ocean are seasonally covered by ice that forms, thickens and melts each year. Researchers feel that processes surrounding rapid ice growth transports large amounts of CO_2 (and other forms of carbon) from the sea surface and deep into the water column thereby promoting uptake from the atmosphere. Although measurements from previous experiments support this theory, there remain many questions on the mechanisms of CO_2 transport and its fate once in the ocean. The Arctic climate remains inhospitable and the Ocean is vast and remote. Good measurements on the region's carbon cycle are lacking. The international cohort of researchers as part of the 2012 winter/spring Daneborg experiment have the unique opportunity to carefully measure the flow of CO_2 between the air, ice, and ocean to specifically target what we believe to be the main uncertainties in our understanding of the sea ice CO_2 system. The team works with climate modellers to incorporate these new findings into global climate models so that the community can do a better job of predicting how changing sea ice will affect future CO_2 budgets, the ocean ecosystem and climate. Resulting information will assist policymakers around the world who make decisions that impact the global carbon budget and climate.

Tim Papakyriakou

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