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Washington, Oct 15 (IANS) Arctic land and seas lock up as much as a fourth of the world's carbon dioxide, so the melting of Arctic ice can potentially alter climate, says a new study.

Current levels of global warming could diminish or reverse this vast Arctic sink — one of the world's biggest — possibly upsetting expected rates of climate change.

David McGuire of US Geological Survey and University of Alaska-Fairbanks and colleagues show that the Arctic has been a carbon sink since the last Ice Age ended, accounting for up to about 800 million tonnes, or 25 percent of accumulated carbon.

On average, says McGuire, the Arctic accounts for 10-15 percent of the earth's carbon sink. But the rapid rate of climate change in the area or about twice that of lower latitudes, could eliminate the sink and possibly make the Arctic a source of carbon dioxide.

Carbon generally enters the oceans and land masses of the Arctic from the air and accumulates in permafrost, the frozen layer of soil beneath the land surface.

Unlike active soils, permafrost does not decompose its carbon; thus, the carbon becomes trapped in the frozen soil. Surface cold conditions have also slowed the rate of organic matter decomposition, McGuire says, allowing Arctic carbon accumulation to exceed its release.

But recent warming trends could upset this balance. Warmer temperatures can accelerate the rate of surface decomposition, releasing more carbon dioxide into the air.

More worrisome, says McGuire, is that the permafrost has begun to thaw, exposing previously frozen soil to decomposition and erosion.

Thawing permafrost could also cause a more waterlogged Arctic, decades later, says McGuire, which could only encourage the activity of methane-producing bugs.

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Currently, the Arctic releases as much as 50 million tonnes of methane per year, compared to the 400 million tonnes of carbon dioxide the Arctic sequesters yearly, says a Geological Survey release.

But methane is a very potent greenhouse gas – about 23 times more effective at trapping heat than carbon dioxide on a 100-year time scale. If the release of Arctic methane accelerates, global warming could increase at a much faster rate.

These findings were published in Ecological Monographs.

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