the sleeping giant in Arctic permafrost

presented by science at NASA flying low

and slow above the pristine terrain of

Alaska's North Slope research scientist

Charles Miller of NASA's Jet Propulsion Laboratory surveys the white expanse of

tundra and permafrost below on the horizon long dark line appears his plane

draws nearer and the mysterious object reveals itself to be a massive heard of migrating caribou stretching for miles

it's a sight Miller won't soon forget

seeing there's caribou marching

ing single-file across the tundra puts what
we're doing here in the Arctic into perspective says Miller who is on a five-year mission named carve to study how climate change is affecting the Arctic's carbon cycle carve is short for the carbon in Arctic reservoirs vulnerability experiment now in its third year the airborne campaign is testing the hypothesis that Arctic carbon reservoirs are vulnerable to warming while delivering the first source maps of greenhouse gases carbon dioxide and methane about two dozen scientists from 12 institutions are
participating the Arctic is critical to understanding global climate says Miller.

Climate change is already happening in the Arctic faster than its ecosystems can adapt looking at the Arctic is like looking at the canary in the coal mine for the entire Earth System.

Over hundreds of millennia Arctic permafrost soils have accumulated vast stores of organic carbon an estimated 1,400 to 1,850 billion metric tons of it that's about half of all the estimated organic carbon stored in Earth's soils in comparison about 350 billion metric.
tons of carbon have been emitted from

all fossil fueled combustion and human

activities since 1850 of the Arctic

sequestered carbon is located in thov ulnar abul top soils within three meters

of the surface but as scientists are learning permafrost and it's stored

carbon may not be as permanent as the name implies and that has them concerned

permafrost soils are warming even faster than artic air temperatures as much as

one and a half to two and a half degrees

Celsius in just the past 30 years says

Miller as heat from Earth's surface

penetrates into permafrost it stimulates
soil processes that mobilize these organic carbon reservoirs and release them into the atmosphere as carbon dioxide and methane upsetting the Arctic's carbon balance and greatly exacerbating global warming.

Karve campaign flights are conducted aboard especially instrumented NASA C-23 Sherpa aircraft from NASA's Wallops Flight Facility on Wallops Island in Virginia. The C-23 won't win any beauty contests its pilots refer to it as a UPS truck with a bad nose job inside it's extremely noisy the pilots and crew wear.
noise-cancelling headphones to communicate when you take the headphones off it's like being at a NASCAR race.

Miller quipped but what the C-23 lacks in beauty and quiet it makes up for reliability and its ability to fly down in the mud most of the time it flies about 150 meters above ground level with periodic ascents to higher altitudes to collect background data on board the plane sophisticated instruments sniff the atmosphere for greenhouse gases we need to fly very close to the surface in the Arctic to capture the interesting
exchanges of carbon taking place between the Earth’s surface and atmosphere

Miller says the carve team flew test flights in 2011 and science flights in 2012 so far in 2013 they’ve completed three monthly campaigns in April, May, and June with four more to go from a base in Fairbanks, Alaska. The C-23 flies up to eight hours a day to sites on Alaska’s North Slope, interior, and Yukon River Valley over Tundra, permafrost, boreal forests, peatlands, and wetlands soaring over the Arctic terrain. Miller has seen many things he won’t forget like the
caribou the data may prove unforgettable

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