# New Study Destroys 'Doomsday Glacier' Narrative…Today's Ice 8 Times *Thicker* Than Last 8000 Years

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**Scientists have determined there is no measured data to "indicate thicker than present ice after 4ka" at a West Antarctic study site near the Thwaites "Doomsday" Glacier. Any ice melt observed today is thus "reversible"… and natural.**

The Thwaites, Pine Island, and Pope Glaciers in the Amundsen Sea region of West Antarctica are all situated on a hotbed of active geothermal heat flux, which has led to anomalously high regional melt rates. Indeed, "there is a conspicuously large amount of heat from Earth's interior beneath the ice" in the very locations where the ice melt is most pronounced.

While the Earth's crust has an average thickness of about 40 km, in the Thwaites-Pine Island-

Pope Glacier region the anomalously thinner crust (10 to 18 km) more readily exposes the base of the ice to 580°C tectonic trenches. The "elevated geothermal heat flow band is interpreted as caused by an anomalously thin crust underlain by a hot mantle," which is exerting a "profound influence on the flow dynamics of the Western Antarctic Ice Sheet" (Dziadek et al., 2021).

Despite the established natural causes of ice melt this region (see also Schroeder et al., 2014, Loose et al., 2018), it has nonetheless become commonplace for those who believe human behaviors are the climate's "control knob" to claim the melting of the Thwaites Glacier – dubbed the "Doomsday Glacier" by alarmists – is caused by humans driving gasoline-powered trucks or using natural gas for energy.

But a new study categorically undermines claims that the ice melt occurring in the Thwaites-Pine Island-Pope Glacier region is unusual, unprecedented, or unnatural.

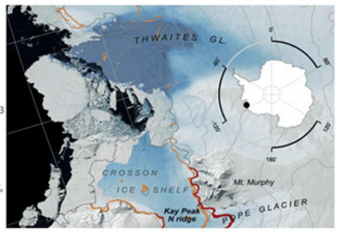
The thickness of the ice sheet at this Amundsen Sea region site averages about 40 m today.

Scientists (Balco et al., 2023) have used cosmogenic-nuclide concentrations and bedrock cores to determine the ice sheet is presently around 8 times *thicker* than it was for most of the last 8,000 years of the Holocene, when the ice thickness ranged between 2 m and 7 m.

*"…the West Antarctic Ice Sheet (WAIS) at a site between Thwaites and Pope glaciers was at least 35m thinner than present in the past several thousand years"*

European Geosciences Union

Holocene ice sheet thickness: 2-7 m
Present ice sheet thickness: 35-40 m

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Reversible ice sheet thinning in the Amundsen Sea Embayment during the Late Holocene

Greg Balco, Nathan Brown, Keir Nichols, Ryan A. Venturelli, Jonathan Adams, Scott Braddock, Seth Campbell, Brent Goehring, Joanne S. Johnson, Dylan H. Rood, Klaus Wilcken, Brenda Hall, and John Woodward

Cosmogenic-nuclide concentrations in subglacial bedrock cores show that the West Antarctic Ice Sheet (WAIS) at a site between Thwaites and Pope glaciers was at least 35 m thinner than present in the past several thousand years and then subsequently thickened. This is important because of concern that present thinning and grounding line retreat at these and nearby glaciers in the Amundsen Sea Embayment may irreversibly lead to deglaciation of significant portions of the WAIS, with decimeter- to meter-scale sea level rise within decades to centuries. A past episode of ice sheet thinning that took place in a similar, although not identical, climate was not irreversible. We propose that the past thinning–thickening cycle was due to a glacioisostatic rebound feedback, similar to that invoked as a possible stabilizing mechanism for current grounding line retreat, in which isostatic uplift caused by Early Holocene thinning led to relative sea level fall favoring grounding line advance.

In contrast to the IRSL data, the cosmogenic-nuclide data require that ice at the core sites was thinner sometime during the Holocene than it is now.

The hypothesis predicts $^{10}Be$, $^{26}Al$, and $^{14}C$ concentrations in the range of 100–200, 900–1500, and 1300–2600 atoms $g^{-1}$, respectively (Fig. 7), and is thus clearly rejected by the observations. Therefore, the ice sheet was thinner during the Holocene than it is now.

Ice thickness change histories generated by the random search algorithm that fit the bedrock core data uniformly include a period of several thousand years during which the ice was several meters thick at the core sites (Figs. 9 and 7 as well as Methods 3 in the Supplement). Ice thickness during this lowstand is in the range of 2–5, 3–6, and 4–7 m at 19-KP-H1, 19-KP-H4, and 19-KP-H5, respectively, implying 30–35 m of thinning relative to present.

There are no exposure-age data in the Amundsen Sea region indicating thicker than present ice after 4 ka (Johnson et al., 2022). Thus, existing observations require either (i) zero change in ice thickness in the last several thousand years or (ii) continued thinning below the present ice surface, followed by thickening to the present configuration. Zero change in ice thickness for millennia appears unlikely given dynamic Late Holocene boundary conditions, including relative sea level (RSL) change forced by eustatic and glacioisostatic effects, climate and oceanographic changes (Walker and Holland, 2007; Hillenbrand et al., 2017), and changes in grounding line position elsewhere in Antarctica (Venturelli et al., 2020; King et al., 2022).

To summarize, although IRSL data show that bedrock at the core sites was not ice-free in the Holocene, the cosmogenic-nuclide data show that ice at the core sites was 30–35 m thinner than present for at least 3000 years, and possibly as long as 8000 years, during the Middle to Late Holocene. The coincidence of IRSL data that preclude direct exposure of rock surfaces to sunlight and cosmogenic-nuclide data that require significant ice thinning is consistent with the present geometry of ice and rock on the exposed portion of Kay Peak Ridge.

Evidence for basal melting and subglacial erosion during the LGM is only present near the present ice margin where LGM ice cover was thickest, and it is not present at higher elevations, implying that the freezing isotherm at the LGM was near the elevation of the present ice margin.

Thus, *failing to find* cosmogenic-nuclide concentrations above background in core samples does not prove that the ice sheet was *never* thinner at the core site. However, the opposite is not true: *finding* cosmogenic-nuclide concentrations above background in core samples, as we have done here, not only requires that the ice was thinner at the core site in the past but also strictly limits the possible amount of later subglacial erosion. Thus, the presence of $^{14}C$ above background in core samples requires Holocene thinning and precludes significant subsequent erosion.

**Image Source: Balco et al., 2023**

Even more interesting, the scientists found there are "no exposure-age data in the Amundsen Sea region indicating thicker than present ice after 4 ka," suggesting that the present thickness is close to the most pronounced it has been over the last 4,000 years.

Any ice melt from this region, then, is not only natural, but the opposite of "unprecedented." The scientists thus characterize modern changes to the West Antarctic ice sheet as "reversible" instead.

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