West Antarctic ice sheet formed earlier than thought

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About 34 million years ago, Earth transitioned from a warm "greenhouse" climate to a cold "icehouse" climate, marking the transition between the Eocene and Oligocene epochs. This transition has been associated with the formation of a large ice sheet on Antarctica.

However, as scientists tried to simulate the growing Antarctic ice sheet, they found that the models could not produce the large volume of ice that independent data suggested to have existed on Earth at that time. For these models, scientists suggested that although the East Antarctic Ice Sheet formed during the transition, the West Antarctic Ice Sheet formed during the middle Miocene, about 20 million years later. Another site was needed, possibly in the Northern Hemisphere, to accommodate the missing ice.

The previous simulations of growing ice at the Eocene-Oligocene transition assumed that West Antarctica was mostly below sea level, as it is today. In a new simulation, Wilson et al. take into account the long-term evolution of the landscape. They suggest that much of West Antarctica was above sea level during that time and was thus capable of supporting terrestrially grounded ice, even at a time when ocean temperatures were too warm to support an ice sheet grounded below sea level as today.

Their new ice sheet model shows how the predecessor to the modern West Antarctic Ice Sheet could have developed at the Eocene-Oligocene transition, 20 million years earlier than some scientists have supposed.

Therefore, they conclude that Antarctica accommodated all of the ice that formed at the climate transition.

More information: Wilson, D. Initiation of the West Antarctic Ice Sheet and estimates of total Antarctic ice volume in the earliest Oligocene, *Geophysical Research Letters*. DOI: 10.1002/grl.50797 , 2013 onlinelibrary.wiley.com/doi/10 … 2/grl.50797/abstract

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