

Snowball Antarctica -early Drake passage opening led to global change

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Antarctica and global cooling

New results shed light on how Antarctica became the icy, barren continent that we know today. British Antarctic Survey (BAS) scientists have discovered that 30-50 million years ago, South America and Antarctica split apart very rapidly. This formed the Drake Passage and resulted in a major global cooling. The findings are published in the latest issue of Earth and Planetary Science Letters.

Lead Author Dr Roy Livermore says 'we deciphered the remarkable 'herringbone' pattern of ridges that were etched into the Earth's crust beneath the remote Weddell Sea when South America moved away from Antarctica. This revealed that the two continents separated extremely quickly in geological time forming a shallow 'gateway' between the Pacific and Atlantic oceans. We estimate that this happened some ten to twenty million years earlier than the previous oldest estimate. Even a shallow (less than 1000 metres) gateway would have had a profound effect on Southern Ocean circulation and subsequently climate".

Such a gateway, by completing a circuit of water around Antarctica, eventually led to the formation of the Antarctic Circumpolar Current, the world's largest deep current which now transports some 130 million cubic metres of water through the Drake Passage every second. The effect was to cut Antarctica off from warm southward flowing currents leaving it frozen and desolate.

This new research reinforces findings from deep-sea sediments cores taken from the Southern Ocean and supports the theory that the opening of the Drake Passage could have triggered the abrupt global cooling event and extensive growth of the Antarctic ice sheet 33-34 million years ago.

Source: British Antarctic Survey

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