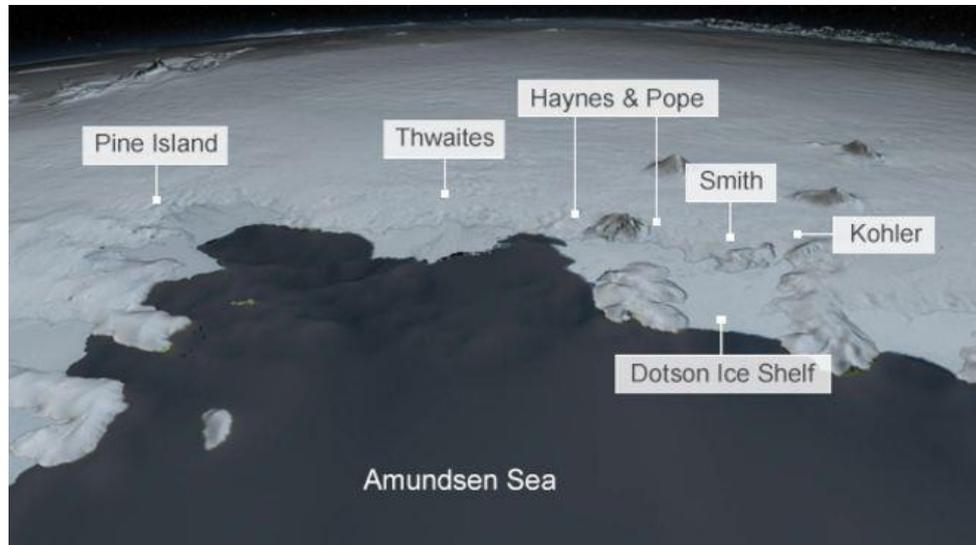


Satellites spy Antarctic 'upside-down ice canyon'

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Scientists have identified a way in which the effects of Antarctic melting can be enhanced. Their new satellite observations of the Dotson Ice Shelf show its losses, far from being even, are actually focused on a long, narrow sector. In places, this has cut an inverted canyon through more than half the thickness of the shelf structure. If the melting continued unabated, it would break Dotson in 40-50 years, not the 200 years currently projected.

Dr. Gourmelen's new study uses the European Space Agency's Cryosat and Sentinel-1 spacecraft to make a detailed examination of the thickness and movement of Dotson. The 70km by 40km ice shelf is the floating projection of two glaciers, Kohler and Smith. As they stream off the west of Antarctica, their fronts lift up and join together, pushing out over the Amundsen Sea. The shelf acts as a buttress to the ice behind. If Dotson were not present, Kohler and Smith would flow much faster, dumping more of their mass in the ocean, contributing to sea-level rise. Satellites have long tracked the behaviour of the shelf, but in Cryosat in particular researchers now have an altimeter instrument that is able to retrieve much higher-resolution elevation information than ever before.

Taking the period of its observations from 2010-2016, Dotson's surface is lowering on average by about 26cm per year, which suggests the roughly 400m-thick shelf as a whole is thinning by about 2.5m per year. But Cryosat's sharper vision also reveals that this thinning is concentrated at a surface depression that is roughly 5km wide and 60km long. It extends from the point where the glacier ice starts to float as it comes off the land, all the way out to the front edge of the shelf where icebergs are calved into the ocean.