

Summary of Antarctic Ice Sheets and Climate Change
Lecture: 21st June 2006

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The potential for partial or complete collapse of the Antarctic Ice Sheets has exercised scientists and policymakers for several decades. The concern is because the ice sheets hold enough water to raise global sea level by over 60 m. This talk explained the theory behind ice sheet collapse, and discussed the latest results from studies aimed at understanding the stability of these ice sheets. Current studies include satellite remote sensing, work from aircraft, and ground-based measurements. The East Antarctic Ice Sheet, which holds the vast majority of the water, is a relatively stable feature and seems unlikely to shrink significantly this century. Indeed, the dominant behaviour is the reverse of intuitive expectation: the East Antarctic ice sheet is actually expanding slightly as the warming of the atmosphere enables the air to carry more moisture, leading to greater snowfall on the ice sheet.

The West Antarctic Ice Sheet, although smaller, has more complicated behaviour. Parts of the ice sheet have been thinning slowly ever since the end of the ice age and so their behaviour is dominated by events more than 10,000 years ago. Other parts, especially in the Antarctic Peninsula and the Amundsen Sea embayment are showing rapid change in recent decades with collapsing ice shelves, retreating glaciers, and speed up of several major glaciers flowing into the sea. In such areas the ice sheet is thinning rapidly. Finally, there are a smaller number of glaciers that have slowed down and thickened.

The net effect (or mass balance) of these different, and sometimes opposing effects, is that the ice sheet is currently growing overall, thereby *offsetting* some of the global sea level rise from other sources. Depending on the rate of thinning and velocity increase in the Amundsen Sea embayment and Antarctic Peninsula this will eventually shift to a net contribution to global sea level rise. Latest results suggest that complete collapse of the West Antarctic Ice Sheet is rather unlikely but partial collapse is possible and some scientists believe it may even be underway. If correct, this will cause a sea level rise of > 1m in the coming decades and centuries.