



Icebergs in the Southern Ocean – towards an IPY census

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A “Southern Ocean Iceberg Census” is one of the two themes of the IPY CRAC-ICE umbrella project. It aims to assess the spatial distribution and temporal variability of the iceberg population and input of melt water to the ocean. Icebergs calve from the Antarctic ice cover, drift with ocean currents, and transport fresh water away from the continent. They drift westwards round the coast, northwards through preferred corridors, then eastwards with the Antarctic Circumpolar Current, and can reach mid-latitudes. The fresh water input strengthens the weak stratification present in the near surface layer of the ocean. The preferred drift paths means that the spatial distribution of the melt input is far from uniform. The episodic nature of calving events, recruitment, and break-up of icebergs, produce a strong temporal variability.

In an initial survey, data from a mix of satellite-borne sensors are used to assess iceberg dimensions and their drift rates. Four basic classes of sensor are: optical or microwave, combined with imaging or altimeter mode. Each class has advantages and disadvantages. For the Southern Ocean, cloud cover obscures much of the surface for optical sensors. Microwave observations are not limited by clouds, but are affected by variations in the contrast of backscatter from the ocean and iceberg surfaces. Horizontal dimensions and drift rates are derived using radar imaging systems, coarse resolution images synthesized from scatterometer data, and optical imaging systems such as MODIS. Altimeters give an estimate of thickness deduced from the iceberg free-board height. Data from the initial survey illustrate the issues linked with the different sensors and the scale of the survey. Combinations of data provide opportunities to progress, and new estimates of the iceberg population characteristics.