

A view from the south: use of composite time series data to determine how recruitment and mortality modulate krill population size.

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The strength of recruitment of larval *Euphausia superba* to the adult population varies greatly from year to year. On longer timescales their main population centre, the SW Atlantic sector, is warming rapidly, with regional declines in sea ice. Our study uses KRILLBASE, a circumpolar compilation of krill abundance and length frequency data, to analyse time trends in this sector from 1976-2014. We found a pole-wards shift in the distribution of krill. Fluctuations are synchronous across the whole sector, however, and mean summer abundance of krill shows a strong negative relationship to their mean length, signifying a population periodically boosted by strong recruitments from the larval phase. Absolute recruitment has declined more abruptly than total abundance, yet mean krill length has increased, suggesting a fundamental change in the recruitment/mortality dynamic over the last four decades. The Southern Annular Mode (SAM) appears to be a major climatic driver of this episodic recruitment, acting only partly through the seasonal cycle of sea ice. We use a simple model of krill population dynamics to investigate the effect of SAM projections on krill abundance, and assess the sensitivity of projections to changing mortality.

Key words

Antarctic krill, Southern Ocean, Southern Annular Mode, recruitment, mortality