

Distribution and abundance of zooplankton species in East Antarctica over three decades: a collaborative study by Japan and Australia

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Long-term (multi-decadal) biological datasets are rare for the East Antarctic marine environment, but are crucial for assessing the impacts of climate change over space and time. International collaboration between organisations undertaking Antarctic marine research facilitates the creation of such data sets. The outcome is comprehensive, and increases spatial and temporal coverage for improved analysis and modelling. Japan and Australia have collaborated to produce a dataset of pelagic zooplankton species abundance and distribution in East Antarctica using samples from net trawls, spanning three decades from 1981 to the present. Approximately 1000 hauls are included in the combined data set. Analysis was by percentage number at broad taxonomic levels, using the groups defined by the Japanese data (for example: Euphausiacea, Salpa, Hydrozoa). Dissimilarities between hauls were calculated using the Bray-Curtis index on abundance data followed by UPGMA (hierarchical clustering) and nMDS (multidimensional scaling) analyses. Catch compositions could be categorised into six main groups: 1. euphausiid dominated; 2. fish and mollusc dominated; 3. general zooplankton including cheatognaths, copepods and siphonophores; 4. Amphipod dominated; 5. salp dominated and 6. copepod dominated (Figure 1). Distributions were broadly related to the continental shelf break and oceanic front features, and copepods dominated the majority of hauls (Figure 2). Euphausiids were most abundant over shelf areas, particularly off Terre Adelie and the Amery basin/Prydz bay region. Salps were generally distributed offshore north of the Southern Antarctic Circumpolar Current Front (SACCF) or close inshore in the Prydz Bay region, but more broadly from the coast out to the SACCF in the 140°E sector (Figure 3). Differences in community composition, abundance and distribution over time are also discussed.

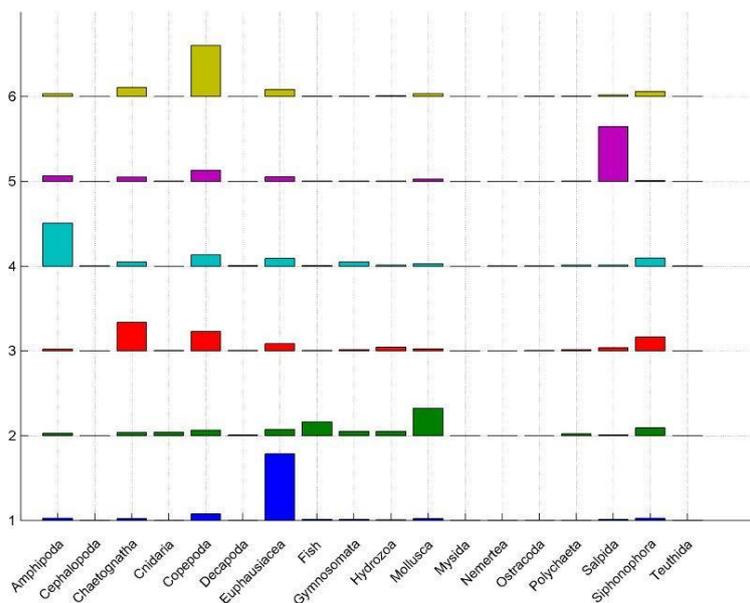


Figure 1. Relative dominance of pelagic zooplankton/fish taxonomic groups in net hauls defined six major community types: 1. Euphausiid dominated; 2. Mollusc and fish dominated; 3. General zooplankton including cheatognaths, copepods and siphonophores; 4. Amphipod dominated; 5. Salp dominated and 6. Copepod dominated.

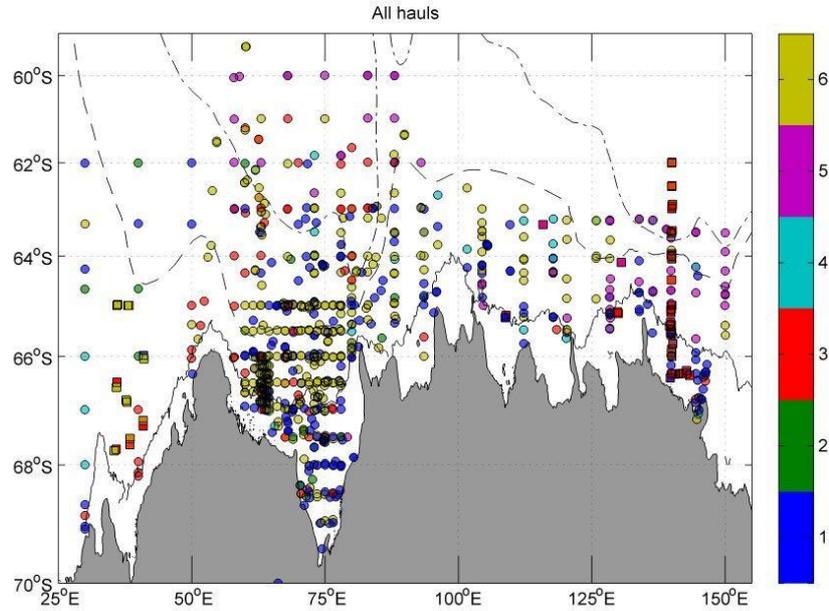


Figure 2. Map of East Antarctica showing the position of Rectangular Midwater Trawl 8 (RMT8) net hauls made by Australia and Japan during three decades from 1981 to the present day. The colours represent the dominant taxonomic groups in each haul, as defined in Figure 1. Circles are Australian data, squares are Japanese data.

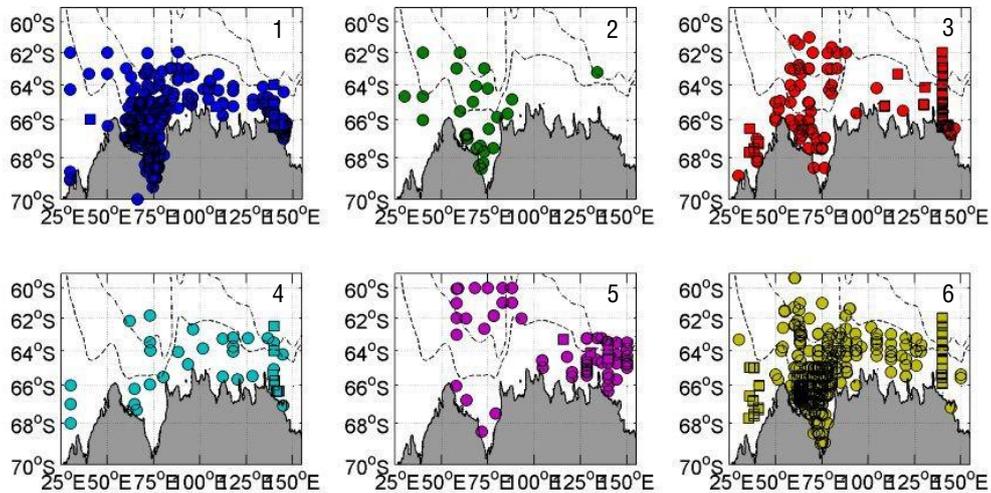


Figure 3. Maps of East Antarctica showing the broad-scale distribution of six major pelagic zooplankton/fish community types. 1. Euphausiid dominated; 2. Mollusc and fish dominated; 3. General zooplankton including cheatognaths, copepods and siphonophores; 4. Amphipod dominated; 5. Salp dominated and 6. Copepod dominated.