

Regional differences in body condition of *Pleuragramma antarcticum* – causes and consequences

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The Antarctic silverfish *Pleuragramma antarcticum* is a mesopelagic zooplankton feeding species with a circum-Antarctic distribution. *P. antarcticum* occurs in shoals and represents a major trophic link in the Antarctic marine food web. Due to the lack of a swim bladder neutral buoyancy is mainly attained by large amounts of lipids which are stored in lipid sacks. However, the functional role of lipids in *P. antarcticum* is not yet fully understood, i.e. it is not clear whether the function of lipids is limited to buoyancy or they serve as energy deposit as well. If the lipids are used as energy storage, differences in nutritional state should be reflected in the amount of body lipid content.

During the RV Polarstern expedition ANT XXVII-3 in 2011 samples of *P. antarcticum* were taken by means of bottom trawls and benthic-pelagic nets from 5 different regions along a north-south gradient: The South Orkney Islands, King George Island, western Weddell Sea (Larsen A and B), and the south-eastern Weddell Sea.

Condition factors of *P. antarcticum* significantly differed between regions, indicating a decline in individual nutritional state from the north to the south (highest condition at South Orkneys, lowest in the south-eastern Weddell Sea). To get a better understanding for the observed differences Magnetic Resonance Imaging (MRI) was used to determine body composition of preserved individuals from all stations.

High resolution morphological 2D- and 3D-MR images could be obtained from *P. antarcticum* for the first time. Digital image processing allowed determining the overall fat and muscle distribution and a calculation of individual lipid and water contents. Percentage overall lipid contents were in good correlation with literature data obtained from standard destructive techniques.

The first few datasets showed substantial regional differences in %lipid content. Lipid content was relatively high in individuals from the South Orkneys and King George Island, and low in individuals from the south-eastern Weddell Sea, following the trend of the condition factors. However, individuals from Larsen A show extraordinary high lipid contents compared to all others, and individuals from Larsen B extraordinary low lipid contents. These differences might indicate extensive differences in nutrient availability in both Larsen areas. However, this will not explain the discrepancy in condition factor and lipid content. Analyses of lipid composition in muscle and liver tissues are currently under way to test for potential causes.