Feeding ecology of Southern Ocean seastars

inferred from stable isotopes ratios

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Antarctic continent and Southern Ocean subjected to strong and contrasted impacts of climate change => Impacts on marine food webs?

Sea stars will be subjected to new stress and environmental constraints due to climate change

Objective: Investigating trophic ecology of antarctic seastars

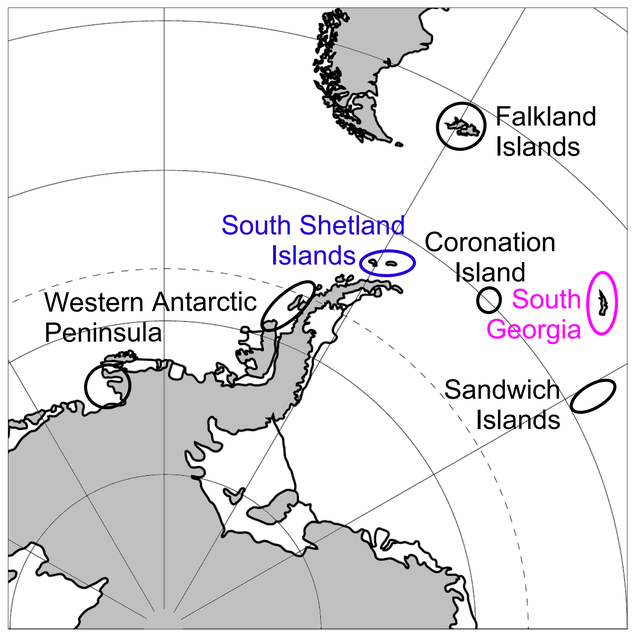
213 seastars (16 species) were sampled in western Antarctic (South Shetland Islands, Coronation Islands, Western Antarctic Peninsula) and near subantarctic islands (South Georgia, South Sandwich Islands, Falkland Islands) during the summer

Stable isotope ratios of C ($\delta^{13}C$), N ($\delta^{15}N$) and S ($\delta^{34}S$) in tegument were measured by CF-EA-IRMS

Examples of sampled seastar species
(pictures: Dirk Schories and Norbert Wu)

Lophaster sp.

Odontaster validus and *Acodontaster* sp.

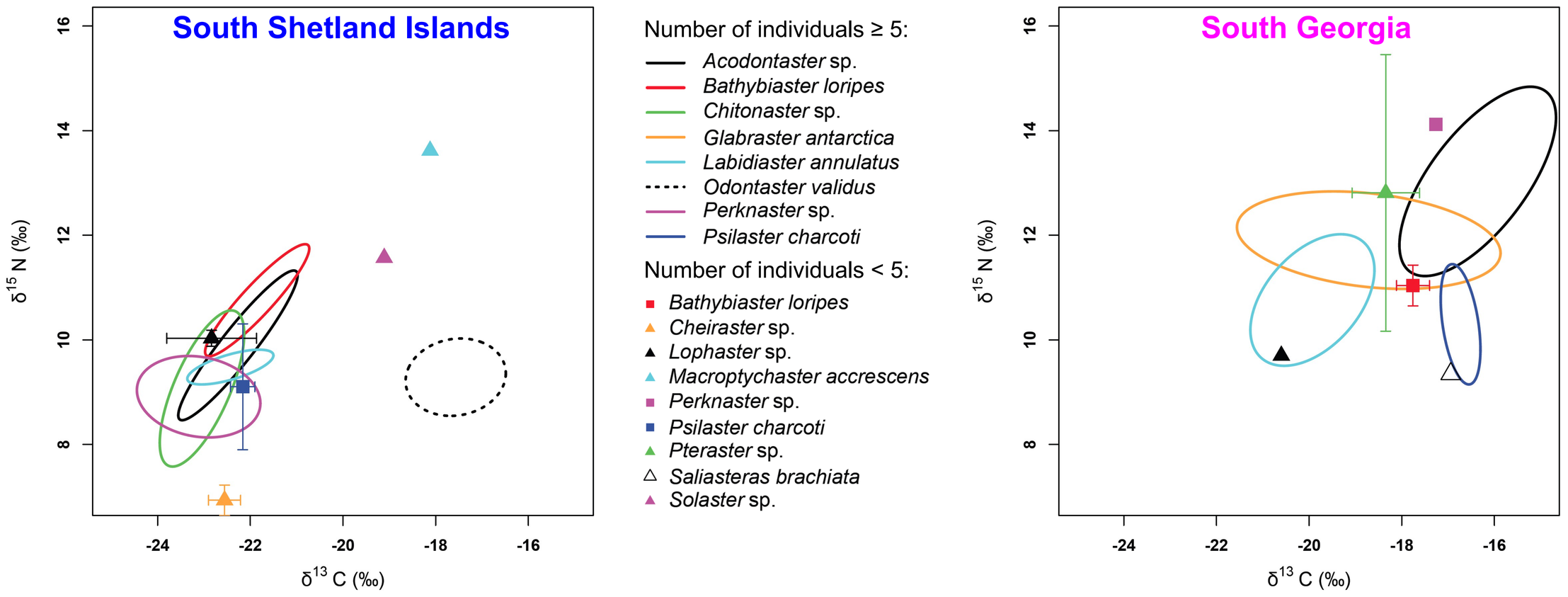


Examples of sampled seastar species
(pictures: Shawn Harper and Dirk Schories)

Glabraster antarctica

Labidiaster annulatus

Analyses of variance and post-hoc tests show differences in stable isotope ratios between the South Shetland Islands and South Georgia



Low $\delta^{13}C$ range and low dispersion of stable isotope ratios in the South Shetland Islands (if we exclude *Odontaster validus*)
➡ smaller isotopic niche areas and more overlap in the South Shetland Islands than in South Georgia

South Shetland Islands: abundant "Food bank"?

1- Important particle flux from the pelagos to the benthos during summer after sea ice melting ➡ "Food bank"[1,2]

2- Dominance of suspension and deposit feeders in the benthic community of the South Shetland Islands[3,4]

3- $\delta^{13}C$ of seastars close to those of sinking particles and detritivorous echinoids[1,5]

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Seastars of the South Shetland Islands may exploit a common resource (i.e. community feeding on sinking particles)

South Georgia: scarce ressources?

Benthic communities have been poorly studied[6]

No sea ice and low pelagic primary production[7]

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Low particle flux from the pelagos to the benthos?
➡ no "Food bank"?

⬇

Do seastars of South Georgia show high trophic segregation to avoid competition?

Seastars of South Shetland Islands may depend on sea ice inputs of organic particles in the food bank

Decrease of sea ice extent in Antarctic Peninsula[8] may reduce food bank availability for seastars in South Shetland Islands and thus lead to competition for resources and/or trophic segregation in the future

1 Khim BK, Kim D, Shin HC, Kim DY. 2005. Ocean Science Journal 40, 167-176, 2 Isla E, Gerdes D, Palanques A, et al. 2006. Polar Biology 29, 249-256, 3 Sáiz-Salinas JI, Ramos A, García FJ, et al. 1997. Polar Biology 17, 393-400, 4 Arnaud PM, López CM, Olaso I, et al. 1998. Polar Biology 19, 160-166, 5 Michel LN, David B, Dubois P, et al. 2016. Polar Biology 39, 913-923, 6 Hogg OT, Barnes DK, Griffiths HJ. 2011. PLoS One 6, e19795, 7 Ward P, Whitehouse M, Meredith M, et al. 2002. Deep-Sea Research I, 49, 2183-2202, 8 Parkinson CL, Cavalieri DJ. 2012. The Cryosphere 6, 871-880

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