

Characterization of seasonal variation in shell dissolution in *Limacina helicina* pteropods in the
Strait of Georgia, BC

by

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Abstract

Pteropods have been utilized as a model organism for the effects of ocean acidification on calcifying organisms due to their particularly fragile aragonite shells. This more soluble form of calcium carbonate means pteropod shells are more sensitive to changes in pH and ion availability in the water column. Ion availability and pH vary seasonally, suggesting pteropods could experience seasonal variation in dissolution as a response mechanism. Using an *in situ* adapted semi-quantitative rubric for dissolution characterization, this study analyzed seasonal changes in average dissolution experienced by pteropods of all sizes (250 μm to $>2000 \mu\text{m}$ in diameter) and correlated these changes to the seasonal variation in aragonite saturation state, a measure of aragonite structure stability. The relationship between size and dissolution was also evaluated, as pteropod spawning is a seasonal affair. The results suggest a seasonal variation in shell dissolution with a negative correlation to seasonal patterns in aragonite saturation state, as fall and winter samples experienced higher levels of dissolution at a lower aragonite saturation state than spring and summer samples. Spring samples displayed a negative relationship between size and level of dissolution, though this pattern was not observed in fall samples, perhaps to do with how pteropods utilize their resources each season. These results ultimately help us understand how calcifying organisms may respond to future ocean acidification.