## Seasonality Constraints on the rate of Pteropod Habitat Compression under 21st Century Climate Change

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Under anthropogenic climate change, ocean acidificaiton is expected to pose mounting threats to ocean ecosystems. Here we consider habitat compression for the case of Pteropods over the North Pacific and Southern Ocean using a large ensemble suite with an Earth system model (GFDL's ESM2M considered for RCP8.5, RCP4.5, and RCP2.6 concentration pathways). Given that pteropods are vertically migrating and that their habitat is tied to the depth of the ocean's well-lit euphotic zone, our analysis of acidification is considered at both the surface and the euphotic zone depth. Our main finding is that the transition time between saturation and undersaturation is controlled by the ratio of the seasonal cycle amplitude to the rate of the secular trend of acidification. This is significanly more rapid at the euphotic zone base than at the sea surface, due to differenes in the amplitude of the seasonal cycle. The implications for adapataion will be considered.

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