Methods

# Observed data

Biological and chemical conditions were sampled at seven sites in the Puget Sound over three years with three sample events per year (April, July, and October, n = 56). Biological samples included XYZ. Chemical conditions were sampled with CTD sensor profiles from the surface to the maximum depth at each station. For each cast, chemical parameters were measured in situ or estimated in the laboratory from Niskin samples collected at each depth. Chemical data included water temperature (C), dissolved oxygen (), pCO (), CO (), pH, salinity (psu), and aragonite saturation state (). For each cast, water chemistry variables were summarized to describe the minimum, average, maximum, and standard deviation of values across the depth profile. These estimates were used to describe the range of conditions that pteropods may be exposed to in the water column at each station.

Environmental data at the monitoring sites were evaluated to identify similarities among chemical conditions between sites related to spatial, seasonal, and annual differences that could explain variation in pteropod response measures. Salinity, temperature, oxygen, and aragonite saturation state observations were evaluated to describe variation among sites related to oceanic influences and dominant acidificaion gradients. Sites were clustered using the average chemical values for each site across years for the same month to identify dominant seasonal patterns. Hierarchical clustering was used that was based on the unweighted pair group method and euclidean dissimilarity measures of standardized variables between sites. This produced a dendrogram that was used to manually identify dominant groupings of sites. PCA….

how dissolution was compared with env variables - individual regression analyses by season and year, also co-occurrence models of oxy/temp with aragonite

Cumulative stress measures - how, with equations = S = D + M

Figures:

* station map
* cluster results and dissimilarity matrices by season
* ts of aragontie simulatiorns or obs. time series (e.g., cohort years by month, station)
* PCA figure
* type 3 dissolution vs min ara, by season/year
* interaction plots of o2 and min aragonite