

Spatial Variability in Estuaries
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- 1) Vertical structure of stratification and circulation
 - a) Competing effects of mixing and straining
 - Role of along-channel shear and vertical shear

- 2) Variations to stratification and circulation produced by bathymetric effects through along-estuary variations (e.g. sills, bumps)
 - a) Constant Salinity Gradient-how long is an estuary?
 - b) Curvature in gradient --drives frontogenesis
 - c) Hydraulic Effects of sills and bumps.

- 3) Variations to stratification and circulation produced by bathymetric effects through across-estuary variations (e.g. channels/shoals).
 - a) Bathymetric effects on density-driven flows
 - b) Bathymetric effects on wind-driven flows
 - c) Bathymetric effects on tidally driven flows.
 - d) Synthesis via Ekman vs. Kelvin numbers.

- 4) Nonlinear effects through coastline curvature.