

Environmental factors drive interannual variation in estuarine food-chain length

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Highlights

- Estuarine food-chain is resilient to environmental and climatic factors.
- Seasonality influences more the food-chain length than climatic events.
- Food-chain length varied from 2.45 to 4.60 along the 9-yr study period.
- Zoobenthivorous lengthen the food chain in the shallow-water community.

Abstract

Biological communities are strongly affected by environmental factors and their variability. Estuarine biota is driven by abiotic factors such as salinity, rainfall, and river flow, varying at distinct spatial and time scales. The *El Niño* is a coupled ocean–atmosphere phenomenon occurring at irregular time scales that affects biological communities worldwide, including changes in species composition and diversity patterns. One of the most important attributes in community ecology is the food-chain length (FCL) because affects the ecosystem functioning. Based on the ‘intermediate disturbance’ theory and prior evidences showing effects of *El Niño* on animal diversity, we hypothesized this phenomenon will increase richness (both at species and trophic guilds levels) and FCL in a shallow-water estuarine community. To evaluate our hypothesis, we analyzed a 9-yr dataset of carbon and nitrogen stable isotope ratios of food web components in a shallow embayment of a subtropical estuary. We estimated consumer's trophic positions (TP) using a recent Bayesian approach that incorporates individual variability and sampling error in isotope fractionation, isotopic baselines and consumers. As expected, both species and trophic guilds richness were higher during *El Niño* events. FCL ranged from 2.45 to 4.60, but against our prediction showed a slight decreased during higher rainfall periods. These finding suggest FCL in estuaries is resilient to environmental variability and natural climatic perturbations.

Graphical abstract

