119 - T112. Halo-Dash: The Deep and Shallow History of Aquatic Life's Passages between Marine and Freshwater Habitats

Monday, 10 October 2022
1:30 PM - 5:30 PM

119-2: HALO-DASH—EXAMINING THE ORIGIN AND DIVERSIFICATION OF NON-MARINE FAUNAS

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Abstract

Life in the ocean and in freshwaters have forever been intertwined; multiple major branches of the tree of life originated in the oceans and then adapted to and diversified in freshwaters. Lakes and other continental environments developed after the stabilization of the marine realm. Feedback loops between the biosphere and geosphere were established slowly during the Paleozoic but as these large-scale geochemical cycles began to take hold, they concurrently facilitated and were facilitated by the continental invasion of the faunas and floras throughout the Phanerozoic. These invasions occurred through estuaries during episodes of marine transgression. This process had a dramatic macroevolutionary impact; metazoan phyla that colonized continental habitats predominate in modern standing diversity, comprising an estimated 99.59% of species. Even setting aside arthropods, the diversity disparity remains decisive (97.13% of species). Although phyla that invaded freshwater have higher diversity than those that did not, marine species predominate within them. Throughout the Phanerozoic, phyla have invaded multiple times. The greatest number of invasions is in the phyla with the greatest number of species, exemplified by the arthropods, which has the greatest frequency of invasions and the highest species diversity. The timing and mechanisms of how faunas established themselves within the continental realm is critical to our understanding of clade origination and radiation.

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