

Distinct metabolic capabilities of Marine Group II archaea adapted to low-salinity estuarine environments

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Marine Group II (MGII) archaea are among the most abundant archaeal populations in global oceans and are absent in freshwater ecosystems or salty lakes [1]. They are one of the key players of organic matter degradation in oceans [2]. However, their distribution and biogeochemical roles in low-salinity zones in estuaries is unknown. Here we conducted metagenomic studies of MGII archaea at the Pearl River Estuary, China and identified two distinct patterns of distribution along salinity gradient. Some novel lineages of MGII-a archaea were found only in zones of salinity between 10 and 20 ‰ (Figure 1). These lineages were distantly related to oceanic MGII archaea and possessed diverse functional mechanisms for adapting low salinity environment including magnesium transportation. Moreover, they had the potential to degrade distinct types of organic matters in estuarine low-salinity zones. The discovery of these novel archaeal lineages captures an evolutionary process in which marine archaea explore new ecological niches where rivers meet the sea.

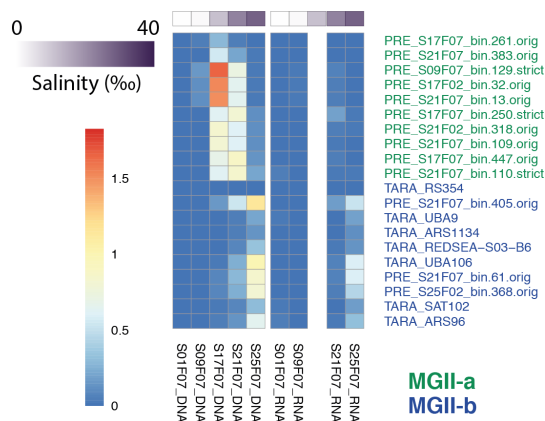


Figure 1: Distribution of MGII archaea along salinity gradient at the Pearl River Estuary, China.

[1] Rinke (2018) *ISME J.* **13**, 663-675; [2] Tully (2019) *Nat. commun* **10**, 271.