# Dissolved inorganic carbon fixation of *Thaumarchaeota* vs. *Bacteria* in the meso- and upper bathypelagic waters of the world's oceans differentiated with the use of metabolic inhibitors

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Recent studies suggest that the dark ocean prokaryotes fix inorganic carbon at rates substantially higher than assumed. We have studied the contribution of Archaea vs. Bacteria to total prokaryotic fixation of dissolved inorganic carbon (DIC) in the meso- and upper bathypelagic waters of the world's oceans during the Malaspina circumnavigation expedition carried out between December 2010 and July 2011. We used the metabolic inhibitor Erythromycin, an antibiotic specifically inhibiting growth of Bacteria but not affecting Archaea. Bacteria dominated throughout the water column in the three major ocean basins (54% of the total DAPI counts), decreasing in their relative contribution to total prokaryotic abundance from the surface to the meso- and bathypelagic waters. By contrast, the relative contribution of *Thaumarchaeota* was generally higher in the meso- and bathypelagic layers than in the surface waters (up to 29% of the total DAPI counts in the Pacific Ocean). Averaged over the entire water column, *Thaumarchaeota* contributed 8%, 33% and 18% to the total prokaryotic DIC fixation in the Indian, Pacific and Atlantic Ocean, respectively. The contribution of *Thaumarchaeota* to total prokaryotic DIC fixation increased with depth, particularly in the Atlantic below 1000 m depth and in the lower mesopelagic zone of the Pacific Ocean. Preliminary results from an station in the Atlantic Ocean, combining microautoradiography and fluorescence in situ hybridization (MICRO-CARD-FISH), confirmed that both *Thaumarchaeota* and some bacterial groups such as SAR 324 take up DIC. *Thaumarchaeota* and SAR 324 accounted for 7 % and 12% of DIC-positive DAPI-stained cells, respectively, as revealed by MICRO-CARD-FISH. Our results suggest that some phylogenetic groups may be significant contributors to the dark ocean chemoautotrophy.