

REPORTS

Bacterial Taxa That Limit Sulfur Flux from the Ocean

Erinn C. Howard,¹ James R. Henriksen,¹ Alison Buchan,³ Chris R. Reisch,¹ Helmut Bürgmann,² Rory Welsh,² Wenying Ye,² José M. González,⁴ Kimberly Mace,² Samantha B. Joye,² Ronald P. Kiene,^{5,6} William B. Whitman,¹ Mary Ann Moran^{2*}

Flux of dimethylsulfide (DMS) from ocean surface waters is the predominant natural source of sulfur to the atmosphere and influences climate by aerosol formation. Marine bacterioplankton regulate sulfur flux by converting the precursor dimethylsulfoniopropionate (DMSP) either to DMS or to sulfur compounds that are not climatically active. Through the discovery of a glycine cleavage T-family protein with DMSP methyltransferase activity, marine bacterioplankton in the Roseobacter and SAR11 taxa were identified as primary mediators of DMSP demethylation to methylmercaptopropionate. One-third of surface ocean bacteria harbor a DMSP demethylase homolog and thereby route a substantial fraction of global marine primary production away from DMS formation and into the marine microbial food web.