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Investigation of prokaryotic metabolism in the deep ocean using natural abundance radiocarbon

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Natural abundances of radiocarbon in various organic and inorganic carbon pools in the environment have provided invaluable insights into the pathways of carbon flow and carbon residence time in various reservoirs. Radiocarbon has been particularly valuable in delineating the carbon cycle of the deep ocean. For example, without radiocarbon measurements the extremely long residence time of dissolved organic carbon in the deep ocean ($\sim$6000 radiocarbon years) would never have been approximated. Of particular relevance to our study are the relatively distinct radiocarbon signatures of various carbon pools in the meso- and bathypelagic. In this study we capitalize on the measured distinctions to add a new dimension to carbon cycling in these environments – identifying the carbon sources fuelling microbial production. Here we present a depth profile (surface, 670 m and 915 m) of the radiocarbon content of nucleic acids from size-fractionated particles, which indicate vertical heterogeneity in the carbon sources fuelling microbial production. 16S rRNA phylogeny and potential metabolic capabilities of the sampled microbial community are also detailed.