Determining the abundance of bacterial endospores in hadal Trench sediments based on analysis of dipicolinic acid

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Endospores are bacterial resting stages and can survive for millions of years. Consequently, they can be expected to accumulate in the deep subsurface and contribute significantly to total bacterial cell counts in the deep biosphere. The number of endospores in the deep subsurface sediments has only rarely been quantified because of methodological problems, and consequently little is known about the quantitative distribution of endospores in the deep marine subsurface. In this study, the abundance of bacterial endospores in sediments from the New Britain Trench, NBT; Mariana Trench, MT and Mussau Trench, MsT was determined based on GC-MS analysis of dipicolinic acid and by a modified Schaeffer-Fulton staining method. Our results showed that endospore numbers ranged from 2.24×10^5 to 9.36×10^6 spores g^{-1} sediment and decrease with depth in all sediments. Endospores accounted for about 10% of bacterial cells in sediment core (NBT-10). Our results suggest that bacterial endospores constitute a significant fraction of microbial communities and they may play a role in biogeochemical cycles in the deep marine subsurface.