The ubiquitous SAR202 Chloroflexi and their role in deepsea sediments

V. CARVALHO[1,2*], P. OFFRE[1], J. RAPP[1,2], C. PALA[1], M. BACH[1], AND A. BOETIUS[1,2]

[1] Max Planck Institute for Marine Microbiology, Celsiusstrasse 1, 28359 Bremen, Germany (*correspondance: vcarvalh@mpi-bremen.de)

[2] Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, 27570 Bremerhaven, Germany

Bacteria of the SAR202 clade were first discovered in surface waters from the Atlantic and Pacific Ocean [1], but they contribute most to communities of the meso- and bathypelagic waters, where they account for 10% or more of the microbial community between the twilight zone and the deep ocean at several thousand meter water depth [e.g., 2, 3]. Recent studies identified SAR202 also among the dominant community members, e.g., in sediments around hydrothermal vents [4], and in sponge tissue [5].

We study the oxic oligotrophic deep-sea sediments at >2000 m water depth of the Fram Strait – the deep water gateway between the Arctic and the North Atlantic, where SAR202 is a relevant member of the benthic bacterial community. They constitute ~3% of this community as revealed by 16S rDNA tag sequencing, which we also validate by CARD-FISH counts. Metatranscriptomic studies indicate that they are members of the active community. Phylogenetic analysis suggests a high diversity within the SAR202 clade, and our data extensively expands the four previously suggested SAR202 sub-clusters [2], while adding at least two new ones to it. No clustering according to ecotype or habitat origin is currently apparent, suggesting substantial undersampling of their global diversity. Previous studies indicate that SAR202 are involved in DOM recycling in the deep ocean [3]. To reveal the functional niche of the benthic members of the SAR202 clade, we produced 20 single-cell genomes from Fram Strait sediments, spanning also all SAR202 subclusters. These first data of benthic SAR202 will be compared to the recently published single-cell genomes of water-borne SAR202 [6]. We aim at identifying niche-adapted representatives of pelagic and benthic SAR202 ecotypes to further investigate their yet uncharacterized ecophysiological roles in the dark ocean.

[1] Giovannoni *et al*. (1996) *PNAS* **93**, 7979-7984. [2] Morris *et al*. (2004) *AEM* **70**, 2836-2842. [3] Varela *et al*. (2008) *EM* **10**, 1903-1911. [4] Schauer *et al*. (2011) *EM* **13**, 2633-2648. [5] Kennedy *et al*. (2014) PloS one **9**, e91092. [6] Landy (2016) doctoral dissertation OSU.