Geophysical Research Abstracts
Vol. 20, EGU2018-17862, 2018
EGU General Assembly 2018

Black carbon rich aerosols can change bacterial biomass and community composition in a barrier reef system: Evidence from in situ and experimental studies

Markus Weinbauer, Chiaki Motegi, Christophe Migon, and Xavier Migon
Laboratoire d'Océanologie de Villefranche, Station Zoologique, Villefranche-sur-mer, France (wein@obs-vlfr.fr)

Black carbon-rich (BC) aerosols from natural and anthropogenic sources have the potential to change bacterial diversity, microbe-mediated food web processes, biogeochemical cycles and ecosystem functioning. Here, we explore this hypothesis by in situ and experimental investigations in the barrier reef system of New Caledonia. After an in situ deposition event of BC-rich aerosols (originating from a Nickel power plant) into the lagoon and off-reef system, bacterial production and biomass was elevated; particularly in the off-reef site, where attached bacterial production was measurable for the first time in long-term studies. This enhancing effect of BC-rich aerosols was also detected in roof-top and laboratory experiments with reference and in situ BC material. Concurrently, bacterial community composition (BCC) as assessed by 16S rDNA PCR based denaturing gradient gel electrophoresis (DGGE) changed upon BC in situ deposition and was also detectable in the attached fraction (no DNA amplification products were observed in previous studies for the attached fraction in off-reef sites without BC deposition events). In addition, experimental studies also revealed changes in BCC, particularly in experiments where organic particles were produced artificially thus further supporting the idea that BC-rich material is linked to particle formation. Sequence analyses of DGGE bands suggest that the reactions of the bacterial community to BC addition differed from other habitats. This study suggests that BC deposition can play a significant role for biodiversity and ecosystem functioning in the ocean.