

SESSION: Ecosystems, Biodiversity and Biodiscovery

MARS Themes:

Understanding scales of biodiversity from molecular to ecosystem

Title:

Disentangling the effects of the Agulhas Current on marine viruses

Author(s)

Nyasha Mafumo ^[1]

Oliver Bezuidt ^[1]

Thulani P Makhwanyane ^[1,2]

Affiliation:

1. University of Pretoria

2. University of Stellenbosch

Abstract:

Microbial communities are essential in the functioning of ocean ecosystems, and they contribute to biogeochemical processes. Viruses play a pivotal role in these communities, as they actively influence the abundance, diversity, and evolution of their cellular hosts. Thanks in part to several large scale marine expeditions (Tara Oceans, Malaspina, Pacific Ocean Virome), we are beginning to understand the distribution and biodiversity of viral communities in most global oceans. However, we still lack comparative insights of viruses in the Agulhas Current and Southern Ocean, both of which are important in mitigating the effects of climate change. Here, we assess the diversity and potential function of viruses in the Agulhas Current and Southern Ocean. Cyanophages and Pelagiphages dominated these regions. A total of 5625 viral Auxiliary Metabolic Genes (AMGs) were annotated from the viral genomes and classified into 206 KEGG orthologous groups. The majority of the AMGs were associated with carbon metabolism and vitamin/co-factor metabolism. Of the energy metabolism AMGs, there were more genes involved in sulfur metabolism compared photosynthesis. These genes included *dsrA*, *dsrC*, and *soxY*, which alleviate bottleneck steps in host mediated sulfur metabolism during infection. Overall, our study suggest that viruses in the Agulhas Current and Southern ocean potentially influence the biogeochemical cycling of carbon and sulfur, through viral lysis and AMG expression. Given that approximately half of ocean microbes are infected by viruses at any given time, findings from this study emphasize the importance of incorporating viral contributions in global biogeochemical cycling models.

Format:

5-min oral

Keywords:

Southern Ocean; Agulhas Current; Viruses; Auxiliary Metabolic Genes