

**TITLE:** Comparing resistome profiles of impacted and non-impacted areas of South Shetland Islands – Maritime Antarctica

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### **ABSTRACT**

Whalers Bay in Deception Island has one of the most anthropogenically impacted areas in Maritime Antarctica. However, considering the volcanic nature (high concentrations of heavy metals) of Deception Island's soils, this putative impact should be viewed with caution. In this context, the objective of this study was to compare resistome profiles of impacted and non-impacted areas in Deception Island (Whalers Bay, Crater Lake, and Fumarole Bay) and Livingston Island (Hannah Point). The metagenomic approach was used to search genes of resistance/tolerance to antibiotics, biocides, and heavy metals. The results showed that impacted areas have a greater abundance of resistance/tolerance genes, suggesting that anthropogenic activities may enrich resistance features in the microbiome at the genetic level. Whalers Bay has a greater diversity of antibiotic, biocide, and heavy metal resistance classes found in its microbiomes. However, Hannah Point, at Livingston Island, has a greater abundance of antibiotic and biocide resistance/tolerance genes. The microbiome of Deception Island's non-impacted areas (Crater Lake and Fumarole Bay) shows only resistance/tolerance genes to heavy metals. The non-metric multidimensional scaling (NMDS) analysis revealed a biological influence and a higher concentration of Pb in Whalers Bay soil, indicating human contamination. Despite the effect of Pb on the microbial communities of Whalers Bay, most heavy metal concentrations do not have a significant impact on the resistome genes. This suggests that the volcanic soil heavy metal concentration of Deception Island has little biological influence. However, the impact extension of the Deception eruptions on the other islands is still unknown.

**Keywords:** Resistance/Tolerance genes, Anthropogenic impact, Deception Island, Livingston Island, Metagenomics.

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