Effects of Hydrocarbon Spills on the Physical, Chemical, and Microbial Properties of Soils around Scott Base, Antarctica. (S05-paetzold073722-Oral)

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Abstract:

The effects of hydrocarbon spills on soil temperature and moisture regimes were investigated by comparing the properties of existing oil-contaminated sites with those of nearby uncontaminated sites. Summer mean weekly maximum near surface soil temperatures were warmer, sometimes by more than 10 deg C, at the contaminated site. Soil albedo was lower, and hydrophobicity was higher, in the contaminated soils. There were no significant differences in moisture retention between sites. Polyaromatic hydrocarbon levels detected in these soils range from 41 to 8105 ng/g dry soil in samples from contaminated sites and were not detected in control site samples. For soil bioremediation, indigenous microbes that degrade hydrocarbons are required as the Antarctic Treaty prohibits the importation of foreign organisms. Comparison of the in situ bacterial diversity of hydrocarbon and control soil indicates a significant decrease in diversity in response to hydrocarbon contamination. The presence of alkane and aromatic degrading bacteria in soils of the Ross Sea region provides support for the application of bioremediation for cleanup of hydrocarbon-contaminated sites.

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