POSTER PRESENTATION

DIRECT OBSERVATION OF AEOLIAN TRANSPORT OF DIATOMS IN THE MCMURDO DRY VALLEYS, ANTARCTICA: IMPLICATIONS FOR MICROBIAL BIOGEOGRAPHY AND LANDSCAPE CONNECTIVITY

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In the McMurdo Dry Valleys (MDVs), Antarctica desert, aeolian processes are major drivers of sediment transport and biogeochemical processes. Aeolian dispersal of microorganisms may also contribute to microbial community assembly processes in aquatic habitats in the MDVs (lakes, ephemeral streams, and glacier cryoconite). Diatoms are abundant in MDV stream and lake benthic microbial mats and are also common in glacier and lake ice cryoconite, with some taxonomic similarity between stream and glacier cryoconite communities. The objective of this study was to characterize the similarity of aeolian diatom community composition and species richness to those of local and regional aquatic communities. Wind-blown sediments from 4 sites along a near coastal-to-inland gradient through Taylor Valley were collected by passive samplers 55 cm above the sediment surface during one austral winter. Aeolian sediments were examined using compound light microscopy for preliminary characterization of diatom community composition and presence of cytoplasm. Aeolian communities were compared to stream, lake, and cryoconite communities across Taylor Valley from over 10 years of sampling by the McMurdo Dry Valleys Long-Term Ecological Research program. Overall, aeolian communities were dominated by taxa common in local aquatic habitats. Diatom valves of all shapes and sizes known in the MDVs were observed in the aeolian material, and only 2-5% of individuals per site had clearly visible cytoplasmic material. Diatom community species richness and composition in aeolian material were found to vary spatially along the valley gradient. Whole community similarity between aeolian and local samples was low and insignificant. These results, while preliminary, suggest predominantly local transport of organisms by near-surface wind, potential species-specificity for survival ability in the wind, and strong environmental filtering of taxa after dispersal. Local sourcing of diatoms is consistent with previous isotope sediment analysis that indicated a primarily local origin of the wind-blown sediments. In this study, we directly observed the aeolian transport of diatoms representative of stream microbial mats, thereby establishing an important link between previously observed taxonomic similarity between MDV stream and glacial cryoconite diatom communities. Our results suggest wind-mediated dispersal of microorganisms is an important driver of biological connectivity over the MDV landscape.