108. ENIGMA Sediment Metabolomics

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Project Goals: 1) Sediment metabolomic methods development 2) Examine the diverse substrate pool available to support growth in FRC sediment

Abstract: One aim of the ENIGMA SFA is to understand the relationship between microbial community structure and environmental parameters. A critical yet poorly understood parameter is the composition of the organic pool that serves as electron donors at our FRC field site. Here we describe our efforts to use liquid chromatography mass spectrometry (LC/MS) to characterize the available soluble substrate pool from FRC sediment samples. To maximize the number of metabolites detected we used two types of stationary phases, hydrophilic interaction liquid chromatography (HILIC) for polar metabolites and reverse phase (RP) for non-polar metabolites. Sediment metabolomic methods were initially developed using a library of 102 compounds representative of multiple classes of metabolites (organic and amino acids, sugars, lipids, fatty acids, vitamins, etc.). These methods were then used to characterize aqueous extractions of chloroform fumigated FRC sediment. This revealed that FRC sediments contain a wide range of mono-, di- and oligosaccharides, amino acids, fatty acids, lipids, nucleobases, nucleotides and many novel metabolites. These results are informing the design of medias for investigation of microbial assemblies ultimately to determine the role of the substrate pool in structuring FRC communities.

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