REGIONAL ASSESSMENT OF METHANE EMISSION RATES FROM RESERVOIRS IN THE MIDWESTERN UNITED STATES

Reservoirs are a globally significant source of methane (CH4) to the atmosphere, but regional and global emission estimates are poorly constrained due to high variability in emission rates among reservoirs and a lack of measurements in some areas geographic areas. Methane emission rates can also exhibit a high degree of spatial and temporal variability within a reservoir, further complicating efforts to generate precise and accurate emission estimates. This study reports CH4 emissions measured at 32 reservoirs in the states Ohio, Kentucky, and Indiana (United States) during the summer of 2016. The reservoirs were selected to span gradients of agriculture/forest land-use (7 – 83% forested) and water depth (max depth: 3- 35 m). A generalized random tessellation survey (GRTS) design was used to select 15 – 30 sample sites per reservoir. GRTS survey designs are spatially balanced and provide for unbiased estimates of mean and variance at the whole-reservoir scale. Ebullitive emissions were measured using 15 – 24 hour inverted funnel deployments, and diffusive emissions via 5 minute floating chamber deployments. Overall emission rates ranged from 1 to 113 mg CH4 m-2 d-1, were dominated by ebullition in most systems (mean = 83%), and were positively correlated with agricultural land use. Spatial patterns in CH4 emission, including the role of watershed land use and reservoir depth, will be presented.