Dr. Gil Bohrer, Professor at the Department of Civil, Environmental and Geodetic Engineering at the Ohio State University completed an Ohio Water Resources Center funded project via USGS 104(b) and OEE subaward. This project titled **"Baseline measurements of methane emissions from Piedmond Lake - current and future fracking area"** aimed to provide baseline measurements of methane emissions from natural and agricultural aquatic ecosystems around the proposed locations of a hydrofracking site. These observations allow for development of an empirical model for the natural methane emissions from the water system at the site and will allow determining whether these emissions increase due to diffused methane release into the ground water after the drilling operations started.

Figure 1 Installation of flux tower on proposed hydrofracking site

Methane is an important green house gas that affects the global climate. A large uncertainty surrounds both the quantity and mechanisms of natural methane emissions from lakes and wetlands, and fugitive methane emissions during hydrofracking. Therefore, there is a strong need for baseline observations of the natural emissions, which will be used to distinguish those from additional emissions, if present, related to fracking. There are several hypothetical sources and pathways for fugitive methane emissions during the hydrofracking process. One possible and understudied pathway for fugitive methane emissions is methane that is diffusively emitted from soil and waters surrounding the shale development sites. We conducted methane chamber measurements and flux tower measurements on an alternative site due to the original site unavailability (Figure 1). This site started fracking few months after we started baseline measurements and analysis. Our preliminary results showed that the grass field produces no methane, although some very low rate of methane oxidation occur in the soil. As expected, some methane emission occurred from the river (Figure 2). Nonetheless, the emissions from the river were very low. For example, they are about two orders of magnitude lower than emissions we typically observe in natural wetlands. Measurements on this site will continue on NSF funded project to comprehensively quantify methane emissions.

Researcher Profile: Dr. Gil Bohrer develops and uses physical and empirical models of the interactions between individual, biological organisms and atmospheric and hydrological processes.

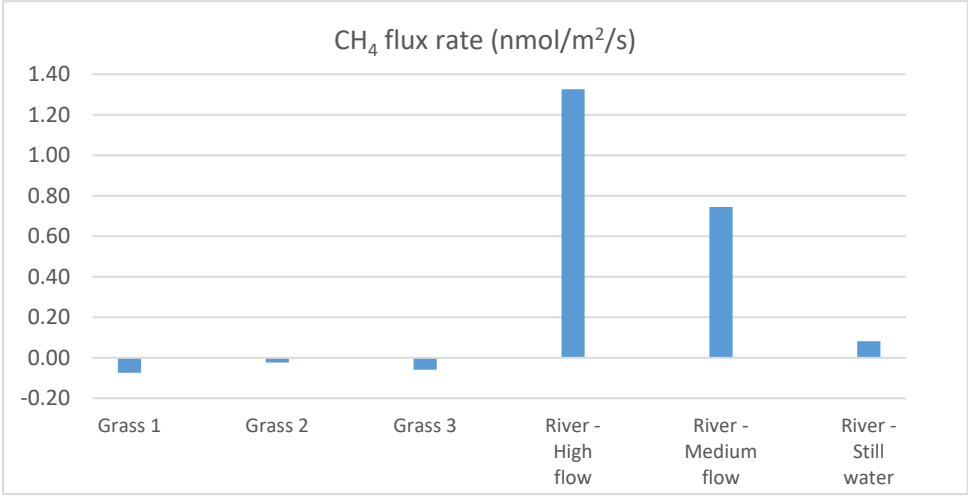


Figure 2 Methane fluxes from grass field and river near flux tower location and fracking site. All measurement are done in duplicate and site locations in triplicate