

Metadata for GPR Fluvial Morphology and Urban Karst Development project

PASSCAL project #202215

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Institution: Department of Geosciences, University of Cincinnati

Project name: Fluvial Morphology and Urban Karst Development

Instrument: Ground penetrating radar with 1000, 500, and 250 MHz antennas

Purpose: We utilized the GRP in 3 research areas in varying environments in the Cincinnati, Ohio metro area. The projects are broadly related to understanding the details of fluvial morphology with relation to fluid flow in the shallow subsurface and interaction of fluid flow with urban infrastructure. These projects are briefly summarized below:

#1 (Projects 5-6): This project involved collecting GPR lines on the campus of the University of Cincinnati as part of a class exercise in the fall 2022 applied geophysics course taught by Dr. Sturmer.

#2 (Projects 7-8): These data were collected at the Theis Environmental Modeling and Monitoring site, which is located along the west bank of the Great Miami River near Miamitown, Ohio. This site is dedicated to understanding fluid and contaminant migration in the critical zone. The site has several monitoring wells and time-lapse electrical resistivity tomography monitoring. GPR data were collected along a point bar (Project 8) and an island in the middle of the river (Project 7) which are both exposed at low-flow conditions, but are submerged during spring runoff and large precipitation events.

#3 (Project 9): These lines were collected at the Cooper Creek Experimental Watershed in Blue Ash, Ohio. Cooper Creek is generally perennial but has a dry reach which is in the Experimental Watershed. The dry reach occurs next to a buried sanitary sewer line, so GPR was used to establish the accurate position of the sanitary sewer and to help investigate (with other added geophysical techniques) whether the dry reach is a result of streamflow being captured by the "urban karst" in the buried trench surrounding the sanitary sewer pipe.

Project layout and execution

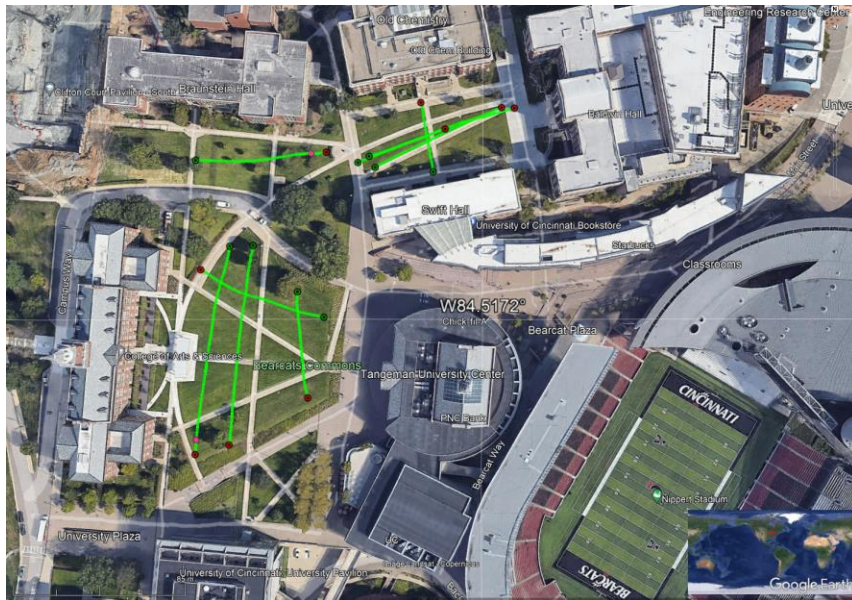
All GPR data were collected using the 250 MHz antenna over a series of day campaigns in July and August, 2022. outlined above and described below. Project data were acquired by the PI's, UC PhD student Cody Kessler, and several undergraduate researchers. The data are set up in project folders, and each "project" is described below. The projects with data have .kmz files with lines locations and .gpz data files. Some also include excel field interpretation reports. The descriptions below also have Google Earth images showing the line locations for each project. Note that these are pulled directly from the .kmz files included in the data set. North is up on all photo maps.

Projects 1-4: These project folders were used as we were trying to get the instruments connected and running. They do not contain data connected to the research projects mentioned above and do not contain kmz files.

Project 6: 6 lines across the quad at the University of Cincinnati acquired for a class project



The northeastern-most line in Project 6 (upper right on the image) overlapped with the three lines in project 5 as seen below.



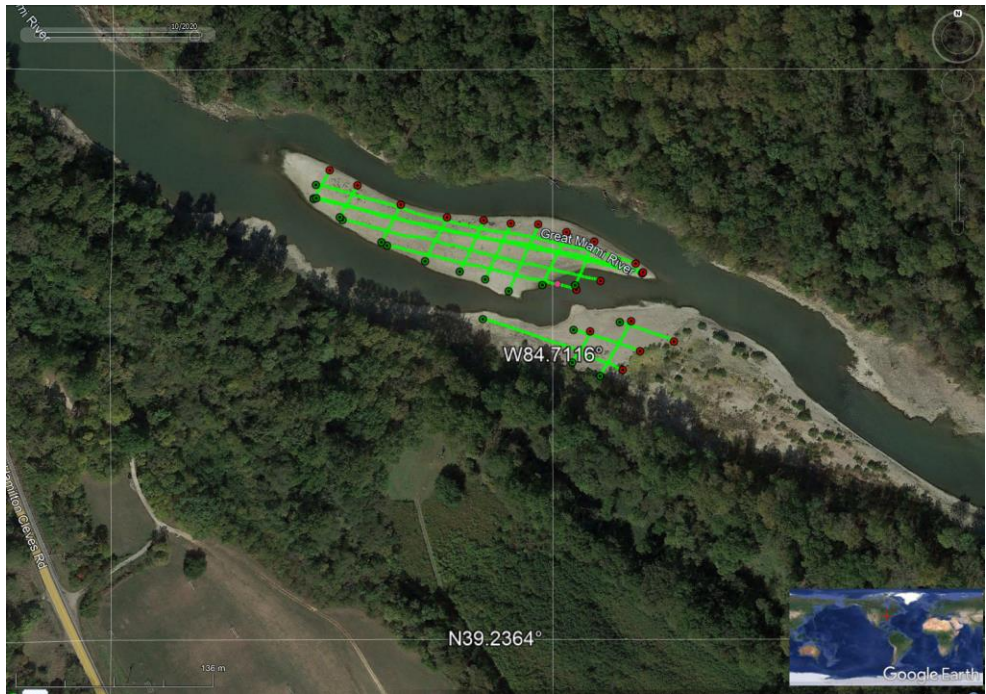
Project 7: 5 lines along and 9 lines across an island in the Great Miami River at the Theis Environmental Modeling and Monitoring site near Miamitown, Ohio. Note that this island is fully submerged during times of high flow.



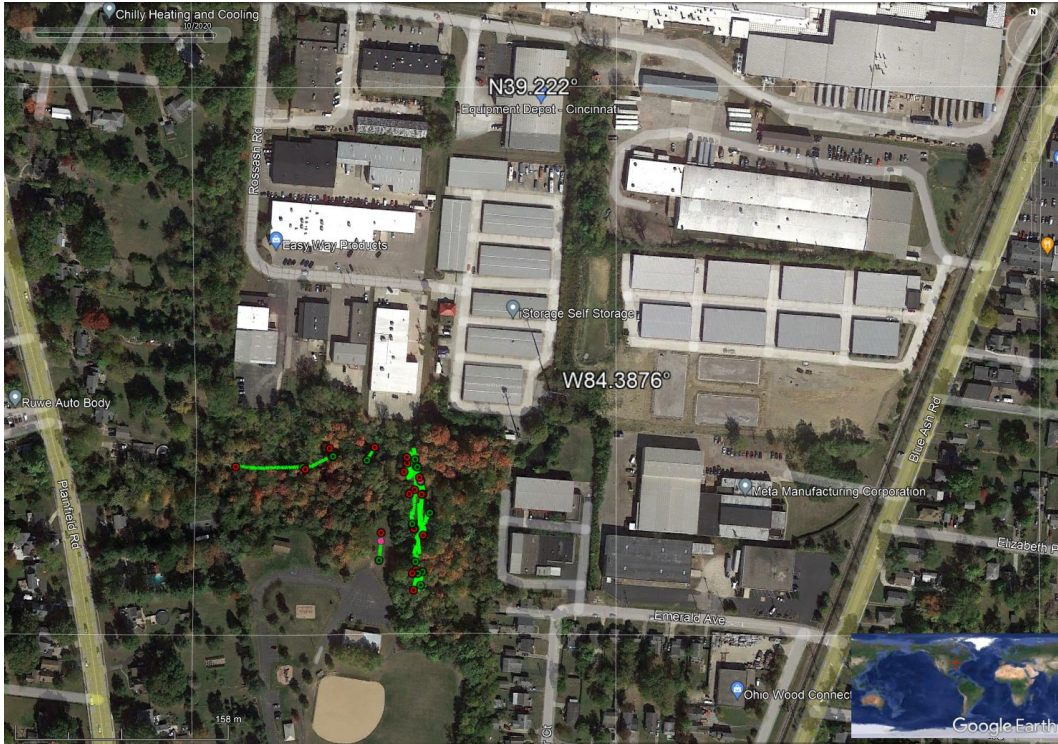
Project 8: 3 lines along and 2 lines across point bar at the Great Miami River at the Theis Environmental Modeling and Monitoring site near Miamitown, Ohio. The point bar is just to the southeast of the island that was analyzed in Project 7.



Lines for projects 7 and 8 on the same map.



Project 9: 17 lines were acquired in and around Cooper Creek at the Cooper Creek Demonstration Watershed at Bechtold Park in Blue Ash, Ohio.



Zoomed in view of lines

