Investigating the Trakas Holocaust Mass Execution Site: Subsurface Imaging

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Abstract

The Trakas-Pempiškis woods, located to the south of Rokiškis, Lithuania, is the site of a mass execution of an estimated 28 Svėdasai Jews in the summer of 1941. During WWII, 95 percent of the Jewish population in Lithuania were killed by the Nazis, Lithuanian militiamen and Nazi sympathizers. The militiamen were of a group known as the Lithuanian Activist Front (LAF) and as the then-Soviet occupied Lithuania awaited the inevitable German invasion of the Soviet Union, LAF used this opportunity to eliminate the Jewish presence in Lithuania under the guise of patriotism and support for the Nazis. According eyewitness accounts, the 28 Jews who were killed at Trakas were brought to the forest in horse-drawn carts. Two eyewitnesses identified two potential locations for the mass grave. In the summer of 2018, an investigation of the subsurface of the two potential burial sites was undertaken. Ground penetrating radar (GPR) was used to examine the stratigraphic layers of each site, and a laser-leveler was used to take topographic measurements at each location. The datasets gathered at Trakas have proven effective, showing indications of what may be a mass grave; just as GPR has done so in past studies of mass burial sites.

Methodology

Ground penetrating radar (GPR) is a non-invasive subsurface imaging technique which allows for the underlying stratigraphy to be examined. GPR does this by emitting electromagnetic waves into the subsurface while recording the subsequent reflections. After the reflections are transmitted back to the antennae the data is recorded in units of time. From here the reflections can be converted into units of depth (Jol and Bristow, 2003). Areas of different sedimentary composition can cause reflections in the GPR data. Such factors include: grain size, porosity, and water content (Davis and Annan, 1989). In collaboration with local archaeologists, two locations south of Rokiškis were chosen as our sites for the GPR survey (Figure 2). These sites were chosen based upon two eye-witness accounts (Figure 3). As these sites were located in the forest, vegetation needed to be cleared before the grids could be completed. The first grid measured 8m X 13m in length and the second grid was 6.75m X 8m (Figure 4). Each GPR grid was collected using a Sensors and Software pulseEKKO GPR system, equipped with a 500 MHz antenna (Figure 5). For both grids, each line was spaced at 0.25 meters apart with a step size of 0.02 meters. Each line originated from the x-axis. After the lines were collected, they were uploaded into GFP_Edit, were the lines could be arranged into the proper grid format. Then, the lines were exported into EKKO_Project, where the lines could be processed and interpreted. Interpretations were completed using both individual line profiles and vertical Slice View depth slices. 3D models of the grids were also created. To create a 3D model of the grid, the depth slices were brought into Voxler 3 as hdf files. A point field was then created to make a 3D image of the grid. This was then clipped to reveal stratigraphic layers within the grid. Topography of each grid was collected using a Topcon RL-H4C laser leveler.



Figure 2. Map displaying location of the Trakas execution site in the Rokiskis Region of Lithuania.



Figure 3. Local Lithuanian eye-witness showing the location of the Trakas Mass Grave.

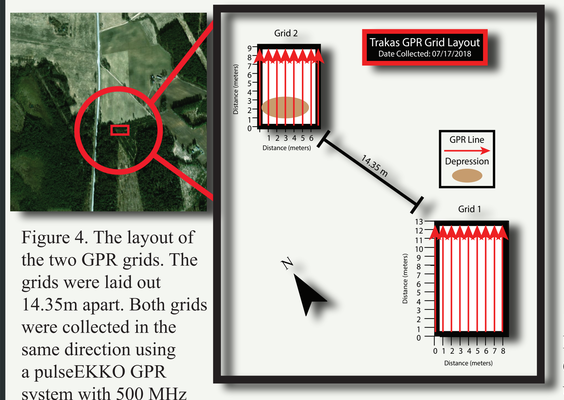

Figure 4. The layout of the two GPR grids. The grids were laid out 14.35m apart. Both grids were collected in the same direction using a pulseEKKO GPR system with 500 MHz antenna.Lines were spaced every 0.25m apart with a step-size of 0.02m.



Figure 5. Sensors and Software pulseEKKO GPR system equipped with 500 MHz antenna used to conduct the GPR survey.

Introduction

The Trakas-Pempiškis woods, located to the south of Rokiškis, Lithuania, is the site of a mass execution of an estimated 28 Svėdasai Jews in the summer of 1941. During that summer and fall, 95 percent of the Jewish population in Lithuania were killed; not all by the Nazis, but by Lithuanian militiamen and Nazi sympathizers (Figure 1). These militiamen were of a group known as the Lithuanian Activist Front (LAF) (Freund: personal communication, 2018). LAF believed that Lithuania was meant to be made up of ethnic Lithuanians, exclusively. As then-Soviet occupied Lithuania awaited the inevitable German invasion of the Soviet Union, LAF used this opportunity to eliminate the Jewish presence in Lithuania under the guise of patriotism and support for the Nazis. According eyewitness accounts, the 28 Jews who were killed at Trakas – all of whom were reported to have been from wealthier families – were brought to the forest in horse-drawn carts (Freund: personal communication, 2018).



Figure 1. LAF members arresting Lithuanian Jews in the Summer of 1941 in Kaunas, Lithuania.

After being stripped of their possessions, the captives were gathered at the edge of the forest, where they were shot and buried. The two eyewitnesses identified two potential locations for the mass grave (Mieliauskienė, Kujelis, and Rudokas, 2017). In the summer of 2018, an investigation of the subsurface of the two potential burial sites was undertaken. Ground penetrating radar (GPR) was used to examine the stratigraphic layers of each site, and a laser-leveler was used to take topographic measurements at each location. The datasets gathered at Trakas have proven effective, showing indications of what may be a mass grave; just as GPR has done so in past studies of mass burial sites (Conyers, 2006).

Results

The processed GPR Slice View depth slices in Grid 2 show a rectangular anomaly roughly 1.5m X 4.5m in width at a depth of 0.7m (Figure 6). This rectangular anomaly is likely the result of the area having a different soil structure than the surrounding area (Fernández-Álvare et al, 2016). This is evident by the anomaly having a lower amount of reflectance signature than the surrounding area. This may indicate evidence of human activity (Fernández-Álvare et al, 2016). When analyzing individual horizontal GPR profiles that intersect this rectangular feature within Grid 2, there is a truncation in the stratigraphy at 0.7 meters in depth (Figure 7) (Conyers, 2006). When shown in Voxler, the same rectangular anomaly can be seen as in the depth sliced images (Figure 8). When analyzing the Grid 1 depth slices, there are no such rectangular structures. When viewing the horizontal profiles within Grid 1, there are also no truncational features that could suggest the evidence of a potential grave as found in Grid 2 (Figure 9).

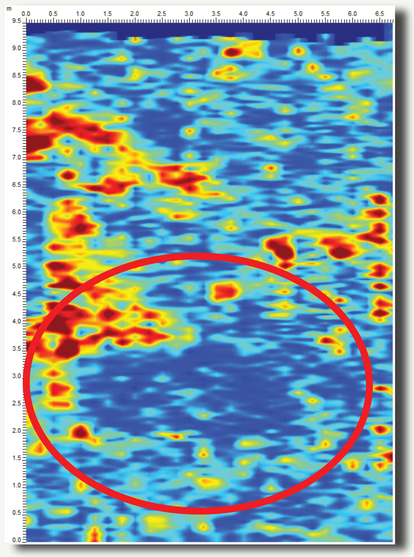

Figure 6. Slice View image from Grid 2 displaying an rectangular anomaly located at 0.70-0.75m in depth. The anomaly is the dark blue area located within the red circle.

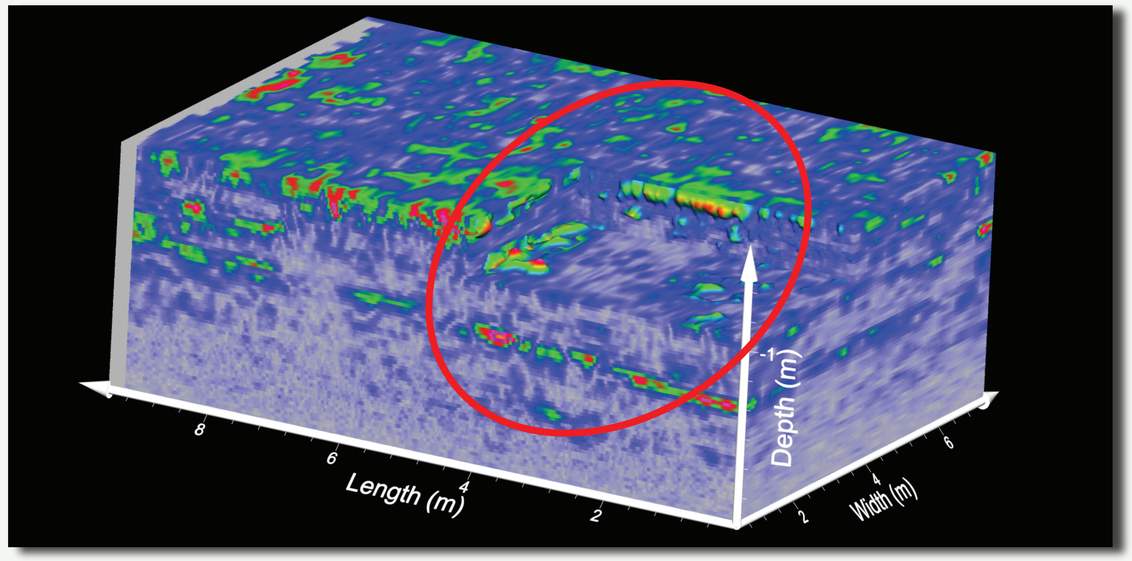

Figure 8. 3D profile of Grid 2 created in Voxler 3. The 3D profile of the GPR grid shows the same rectangular area of low reflectance that can be seen in figure 6.

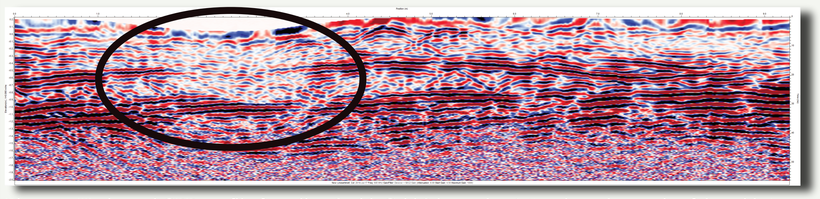

Figure 7. Horizontal GPR profile from line 6 with Grid 2 located at 1.5m along the x-axis of the grid. A truncation in the stratigraphy can be seen at 1.75m and 3.5 meters. The area between the two truncations is an area of low reflectance. This area of low reflectance is the same anomaly found in Figure 5.

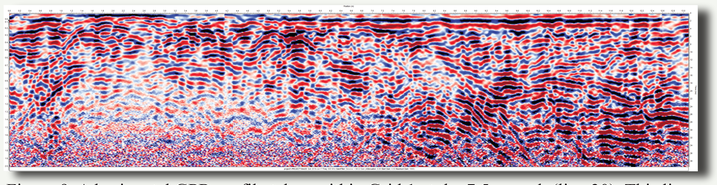

Figure 9. A horizontal GPR profile taken within Grid 1 at the 7.5m mark (line 30). This line represents the results from Grid 2. In this profile there are no features that suggest the existence of a potential grave. There are no truncations or other stratigraphic anomalies that would suggest human activity.

Conclusions

After analyzing our results of the GPR data, we found supporting evidence for a location of graves for the Jews who were murdered outside the city of Rokiškis, in August of 1941. Our evidence comes for the 500 MHz antennae identifying a 1.5m X 4.5m anomaly of low reflectance. This area of low reflectance is located where local Lithuanians had suggested the grave could be located. Furthermore, this anomaly was found between two truncations in the stratigraphy of the soil; and the anomaly was seen in all three interpretation formats: horizontal, time slices and 3D models of Grid 2. Our results of this study provide evidence for the location of these graves in hopes that the area will become memorialized in homage of the victims of this terrible tragedy.

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