

Ghosts, history & radar

Idaho Penitentiary - Feb 2019

SEG-BSU club

The colored figures show the echoes in time and space of electromagnetic waves (**radar**) that **penetrated** the **ground** and were measured on the air-ground interface. Hence the name *ground penetrating radar* (GPR).

If the subsurface were made of just flat layers (like a pile of really wide pancakes), the echoes would look flat as well (and boring). If an object were buried in between these pancakes, its echo would show distorted from the surrounding valley of boring.

We are showing two transects that were made as shown in Figure 1-**b** and displayed in Figures 2 and 3. They are in downhill view from the cemetery.

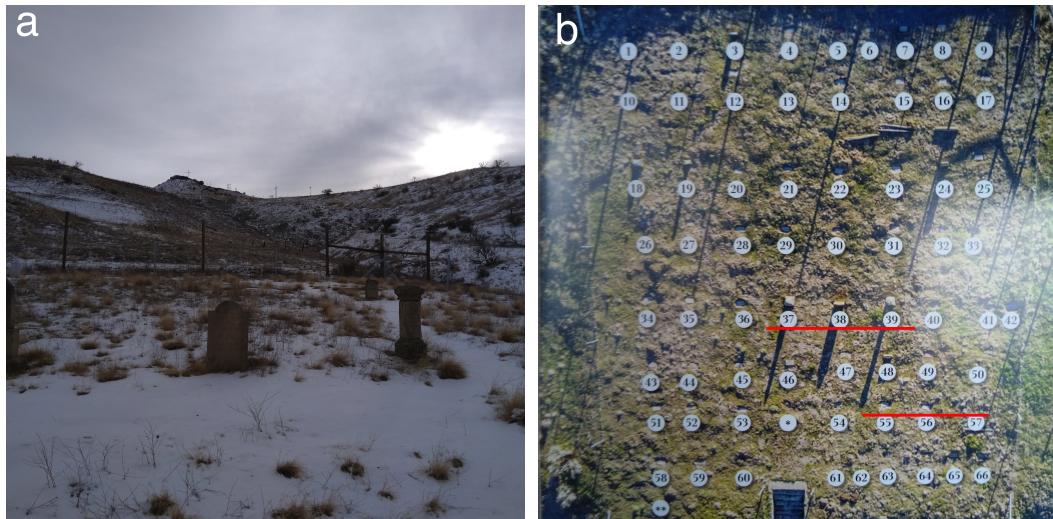


Figure 1: Idaho Penitentiary cemetery two weeks prior to our survey in **a**, and a map-view with markers on known graves and the displayed survey lines in **b**.

Common offset gathers

This type of survey consists of moving a source-receiver pair along the survey line with a constant offset and is not sensitive to depth in the subsurface. Different events in time at the same space location might come from the same subsurface anomaly because the radio-wave bounced back and forth in this location of space.

Mr. Reece and friends

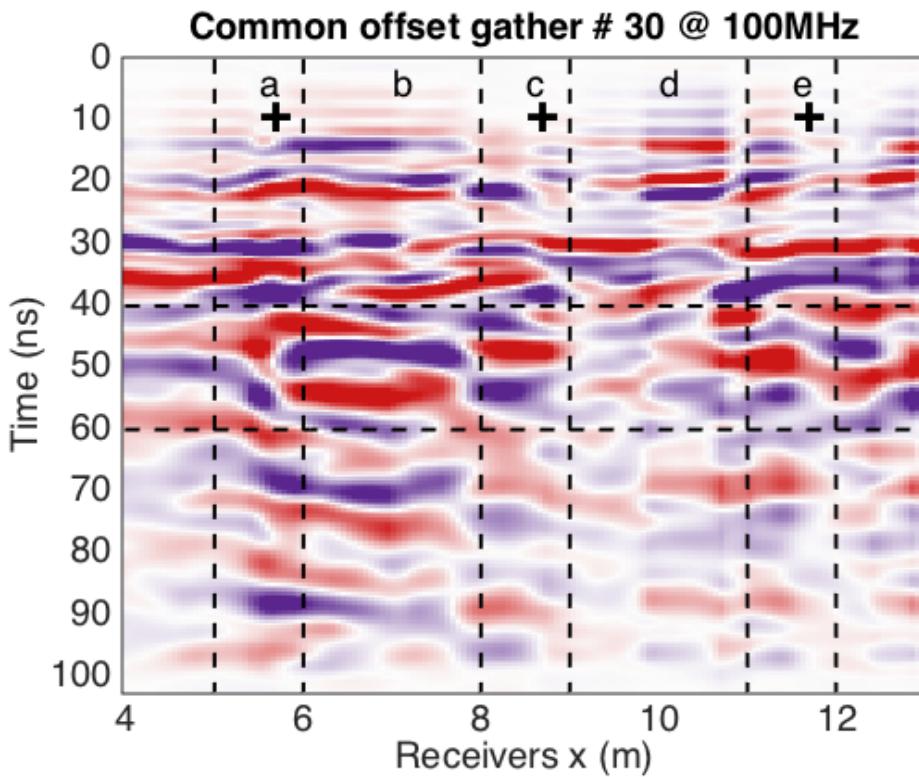


Figure 2: Crosses indicate a marker on the map of Figure 1-**b**. Marker # 39 lies in section **a**, Mr. Reece's marker lies in section **c**, and marker # 37 lies in section **e**.

Sections **a**, **c** and **e** in Figure 2 show clear echoes not part of the valley of boring, specially visible between 40 and 60ns.

Section **d** also shows not-boring echoes splitting in time (vertically) at 10m. This section is not marked with a grave on the map of Figure 1 **b**.

Unknown neighbors?

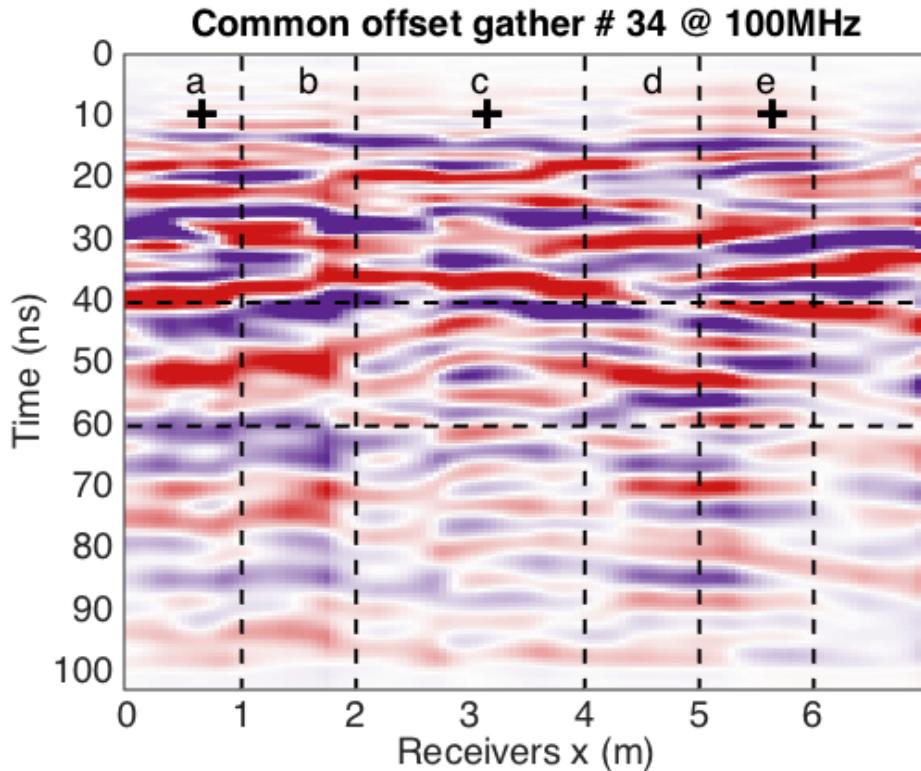


Figure 3: Crosses indicate a marker on the map of Figure 1-**b**. Marker # 57 lies in section **a**, marker # 56 lies in section **c**, and marker # 55 lies in section **e**.

Sections **a** and **c** in Figure 3 show echoes not part of the valley of boring, specially visible between 40 and 60ns.

Section **e** in Figure 3 still shows a signal different from its surroundings but it seems to overlap with section **d**. Maybe the echoes are coming from underground topography, maybe there is also a grave in section **d** or maybe grave # 55 is between sections **e** and **d**.

Section **b** shows an interesting shift upwards in time compared to section **a** suggesting an anomaly in this section. This section is not marked with a grave on the map of Figure 1 **b**.

Common source gathers

This type of survey consists of fixing the source location and moving the receivers along the survey line with a constant offset. Then the source location is moved and the process is repeated. This approach is sensitive to depth.

Unknown neighbors?

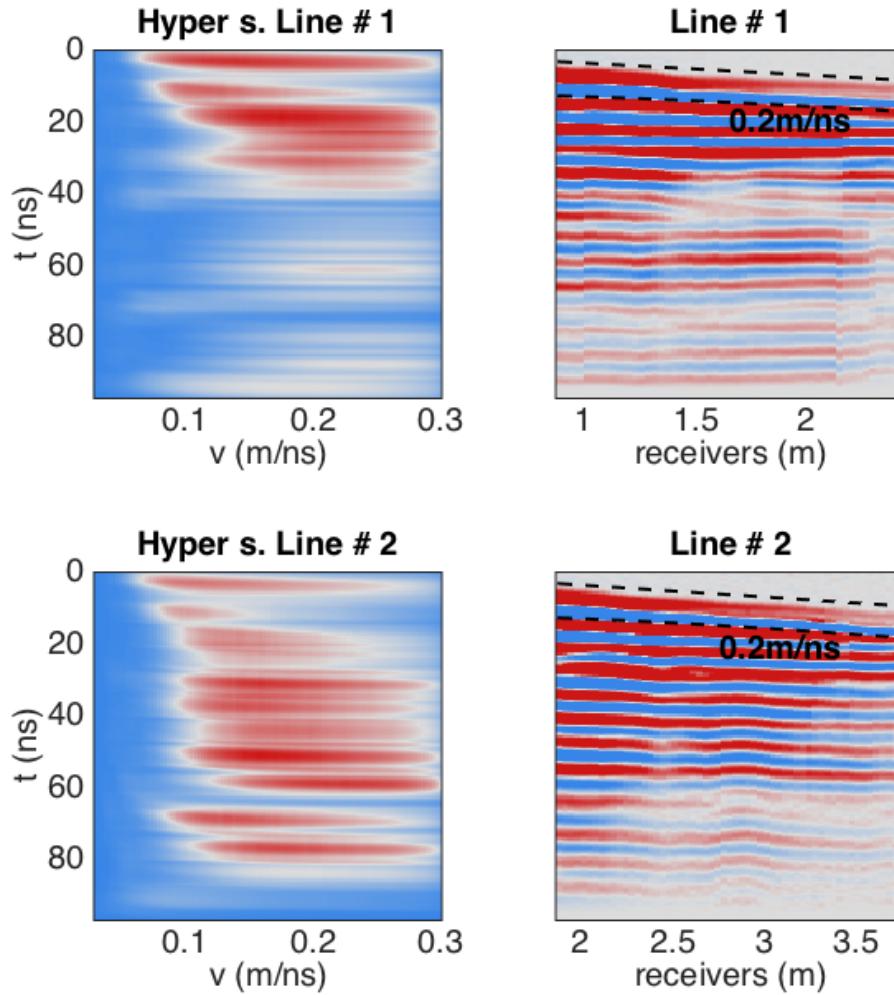


Figure 4: These lines match receiver offset with Figure 2. 200 MHz.

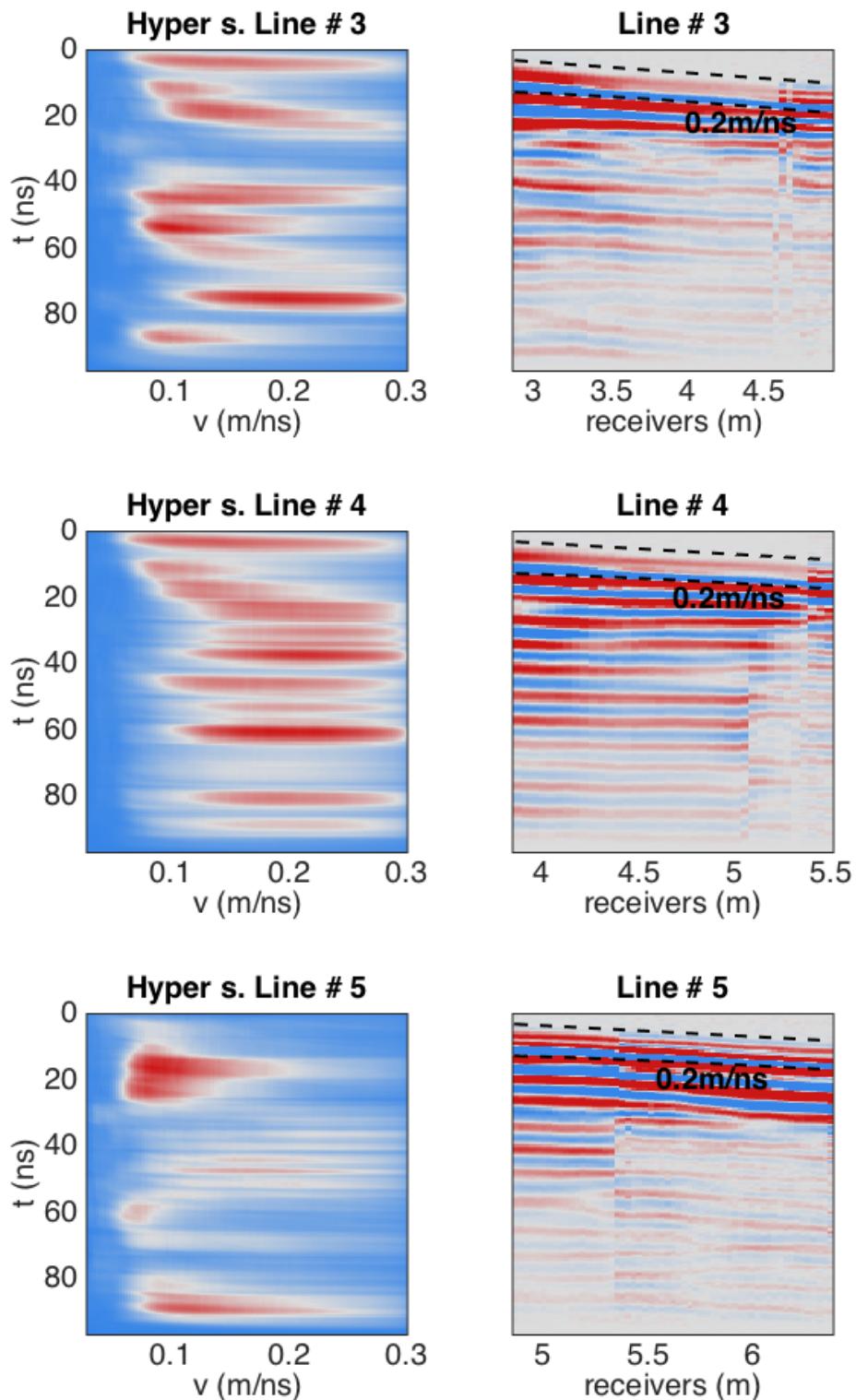


Figure 5: These lines match receiver offset with Figure 2. 200 MHz.