

November 6, 2015

Reference No. 1417183-006-L-Rev0-1000

Mr. Doug Ramsey  
Vice President, Sustainability and Environmental Affairs  
Copper North Mining Corp.  
1120 – 1095 West Pender Street  
Vancouver, British Columbia, V6E 2M6

**ANNUAL INSPECTION, OCTOBER 14, 2015  
CARMACKS COPPER PROJECT, CARMACKS, YUKON**

Dear Mr. Ramsey,

## **1.0 INTRODUCTION**

Golder Associates, Ltd. (Golder) completed an inspection of the Carmacks Copper project site for Copper North Mining Corp. (CNMC) on October 14, 2015. The inspection of the proposed future site of the Carmacks Copper mine was completed as part of the requirements of the Quartz Mining License (QML – 0007) for an annual inspection. The inspection was carried out in accordance with Golder's proposal 1417183 Doc. No. 005 Rev1 dated October 9, 2015, and authorised by Doug Ramsey in an email dated October 9, 2015.

The purpose of the inspection was to evaluate the condition and stability of the existing facilities in the area of the proposed mine. The proposed mine would include the following facilities: a heap leach facility, water management ponds, an open pit, a waste rock storage area, a processing plant and related facilities, ore preparation facilities, ore stockpiles, and water diversion structures. The existing facilities on site comprise a mine exploration camp, which was not active at the time of the inspection. An inspection was, however, completed of the entire project area.

## **2.0 OBSERVATIONS**

The inspection was completed by Ben Cox of Golder. Doug Ramsey of CNMC was present during the inspection. The inspection focused on the existing site infrastructure and a review of the general site conditions. Photographs of the site at the time of the inspection are presented in Attachment 1. Data collected from thermistors during the site visit are presented together with data from previous years in Attachment 2.

The project is in the advanced exploration stage. The only infrastructure on site at the time of inspection was the exploration camp and access roads to the proposed open pit mine area and other areas of the property. The access roads were developed to provide access for exploration and investigation activities.



## 2.1 Exploration Camp Area

The inspection of the camp area (Photographs 1 and 2) indicated there is some thaw related settlement on the pad, which should be monitored as core storage racks may be affected. The inspection did not indicate erosion of sediments from the pad area into the surrounding natural area. There was some cracking observed in 2013 along the south edge of the pad (lower limited of pad), approximately 3 to 4 m from the pad edge. Additional cracking was observed in 2014 on the west edge of the pad, which is likely the result of thaw related settlement in the core storage area.

In 2015, new cracking was observed to the north of the southern row of core racks (Photographs 3 and 4). There is a trough, approximately 0.2 m deep located between the core racks, which is likely the result of thaw related settlement and does not pose an immediate safety concern.

The slope behind the camp (Photographs 5 and 6) is stable and does not pose a safety concern for the camp structures or current operations. There is minor ravelling of small sections of the slope, but these are not impacting camp safety nor would they represent an issue to workers on the project. Some regrowth of vegetation was observed in the camp area.

## 2.2 Proposed Heap Leach Facility Area

In addition to the camp, the inspection included the area proposed for the heap leach facility (Photograph 7), and water management pond. Site preparation in these areas has been limited to the clearing of trees and organic soils. This portion of the site also includes several access roads and drilling platforms previously used for exploration/investigation activities.

Since the initial clearing in 1997 and 1998, regrowth of vegetation has been occurring in the area (Photograph 8 and 9). Erosion and sediment control measures in this area were initially installed in September 2008 and further maintained in September 2009 and August 2010. The sediment control measures include ditches and berms to divert water into sediment catch basins, silt fences, and vegetated areas to break up flow and reduce the potential for erosion. The inspection indicated that there has been some erosion of sediments along the access roads and that the sediment basins are trapping and containing the sediment adequately.

Erosion of the access roads due to run-off appears to have continued in 2015 with the observation of gullies approximately 30 cm deep in the roads to the east and west of the existing camp. Erosion is also evident on the access roads in the area proposed for the heap leach facility, and on the access road north of the proposed waste rock storage area.

Further down slope of the proposed heap leach facility sediment pond, and within the floodplain of Williams Creek, silt fences have been installed and the area seeded where sediment from previous site erosion accumulated (Photographs 10 and 11). Grass seed was applied in 2009 to promote the re-establishment of vegetation and to further stabilize sediment. The approach was noted to be generally effective in 2011 and 2012, but with limited regrowth attributed to periodic pooling of water. The area was also re-vegetated with woody plants (willow cuttings), and plants appear to be tolerating saturated soil conditions. There was no evidence of sediment movement, indicating that re-vegetation has been effective in minimizing erosion.

At the time of the inspection, it was observed that the silt fencing surrounding these areas is working effectively; the fences are overgrown. No evidence of movement of sediment beyond the existing silt fences was observed, nor does it appear that sediment has entered Williams Creek. Limited growth of willow cuttings was observed. Silt fences are of a temporary nature that should be inspected annually and ongoing minor maintenance activities should be anticipated.

## **2.3 Proposed Open Pit Mine Area**

The area proposed for the open pit mine was inspected (Photographs 12 and 13). The slopes of the trenches excavated as part of the effort to obtain bulk samples during exploration activities were observed to be in reasonable condition and there was no observed slumping or failures of these slopes. The leached ore pile from the off-site test pad adjacent to the trench was observed to be stable and there was no erosion or slope movement of the material. Several of the closed drill pads were inspected and there did not appear to be any erosion noted from these areas that would require attention.

## **2.4 Proposed Waste Rock Storage Area**

The proposed waste rock storage area was inspected. The waste rock storage area is still tree covered and the drill pads and access roads in the area are re-vegetating by volunteer species (Photograph 14). The small sediment catch basins at the drill pads still have capacity to manage additional sediment, if required.

Local erosion on the main access road to the north of the waste rock storage area continues. The shoulders of the road at the culvert on North Williams Creek have eroded (Photograph 15 and 16). The access road should be inspected annually and ongoing maintenance of local erosion features should be anticipated.

## **2.5 Proposed Camp Site Location**

The proposed camp site was inspected and it is still tree covered. The site adjacent to the camp, which contains two water wells, was also inspected and there is no apparent movement of sediment beyond the work pads around the wells.

The site development required to support operations has not started yet. Therefore, there is no stability concern associated with the undeveloped facilities and no maintenance is required. No permanent water diversion structures are in place. There are, however, temporary water management diversion structures (i.e., ditches and sediment catch basins) in place that are appropriate for the exploration stage of the property. It is recommended that these diversion structures continue to be inspected annually and that ongoing maintenance be conducted, as deemed necessary.

## **2.6 Site Access Roads**

The culvert in the site access road, which allowed Williams Creek to flow under the road was previously removed in 2013. The crossing is now a 'ford' with the road bed depressed over a length of 10 m to a maximum depth of 0.4 m below the adjacent road grade or crest elevation (Photograph 17). The rockfill in the ford is well-graded and there is no indication of movement of finer materials. Ponded water was observed on the upstream side of the road, with flow across the road (Photograph 18).

The rockfill of the ford appears to be stable. It is recommended that the ford is inspected annually and monitored for erosion of finer materials, particularly following large rainfall events, and maintained as required. The ford is appropriate for the current status of the project. However, prior to site development, it is recommended that the culvert at the Williams Creek crossing is replaced and the access road armored against erosion at this location.

The access road crossing at Merrice Creek includes a single-span bridge set on grade. Following recommendations in the July 2014 inspection memorandum, the bridge was extended by approximately 3 m and seated 1 to 2 m on the abutments. Approximately 3 m of steel was welded to the existing span, bridge decking was replaced and extended, and the approaches were re-graded to the bridge deck elevation (Photographs 19 and 20). Further work is not required as the bridge seems appropriate for the current status of the project.

### 3.0 THERMISTOR DATA

Ground temperatures derived from thermistor data collected during the site visit are presented in Attachment 2. Data from thermistors installed in 1995 and 1996 were not collected as these thermistors require equipment to take readings that was not available. The thermistor plots indicate that the measured temperature of the ground has decreased from previous measurements at the following locations:

- Southwest of proposed heap leach facility area in BH-01-07 between depths of 5 and 15 m, and in BH-03-07 between depths of 5 and 19 m;
- Proposed water management pond, south of the proposed heap leach facility area, in BH-06-07 between depths of 10 and 35 m;
- Proposed heap leach facility area in BH-17-07 at 25 m depth; and
- Proposed waste rock storage area in BH-18-07 between depths of 7 and 37 m, and in BH-29-07 between depths of 15 and 20 m.

The depth of the active thaw layer is observed from the resulting thermistor plots. The difference in the plots can be attributed to the inspection occurring later in the year (October compared to previous readings in July), which is approaching the maximum thaw of the active layer. The thermistor plots indicate the thickness of the active thaw layer and permafrost in the following locations:

- Southwest of proposed heap leach facility area in BH-01-07 and BH-03-07 the active thaw layer is approximately 5 m thick with permafrost below 5 m;
- Proposed water management pond, south of the proposed heap leach facility area, in BH-06-07 the active thaw layer is approximately 5 m thick with permafrost below 5 m;
- Proposed heap leach facility area in BH-13-07, BH-23-07, and BH-26-07 there is no indication of permafrost and the bedrock ranged from a depth of 12 m to 17 m;
- Proposed heap leach facility area in BH-17-07 the active thaw layer is approximately 7 m with permafrost below 7 m; and
- Proposed waste rock storage area in BH-18-07 and BH-29-07 the active thaw layer is approximately 5 m thick with permafrost below 5 m.

### 4.0 RECOMMENDATIONS

The inspection of the Carmacks Copper project site was completed on October 14, 2015. Recommended actions based on the observations made during the site inspection are summarized below:

- Ongoing minor maintenance, as required, of access roads with regards to erosion and washouts potentially resulting in movement of sediment into local waterways, and
- Ongoing minor maintenance on the silt fences and sediment traps in the area between the proposed heap leach facility area and Williams Creek.

Golder understands that the recommended maintenance work will be carried out by CNMC.

November 6, 2015

## 5.0 CLOSURE

We trust that this letter satisfies your requirements. If you require additional information, please do not hesitate to contact us.

Yours truly,

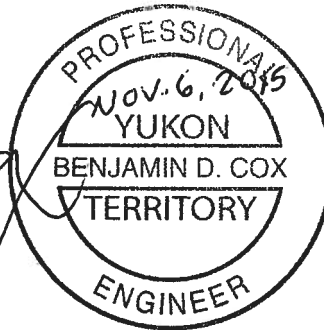
**GOLDER ASSOCIATES LTD.**



David Anstey  
Associate, Senior Tailings Consultant

DRA/BC/sb

Attachments:      Attachment 1 – Site Photographs  
                         Attachment 2 – Thermistor Data



Ben Cox, P.Eng.  
Geotechnical Engineer

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# ATTACHMENT 1

## Site Photographs





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photograph 1: View looking west to exploration camp*



*Photograph 2: View looking northeast exploration camp*





**ATTACHMENT 1**  
**Photographs**  
**Carmacks Copper Project Annual Inspection**



*Photograph 3: Cracking in pad at southwest core rack area*



*Photograph 4: Cracking in pad at southwest core rack area*





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



Photograph 5: View looking east to slope immediately north of exploration camp



Photograph 6: View looking east to slope immediately north of exploration camp





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 7: View looking north to area proposed for the heap leach facility and open pit area*



*Photograph 8: Re-vegetation of area proposed for the heap leach facility*





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photograph 9: View looking east of re-vegetated drill pad in the area proposed for the heap leach facility*



*Photograph 10: Re-vegetation and silt fence between area proposed for the heap leach facility and Williams Creek*





**ATTACHMENT 1**  
**Photographs**  
**Carmacks Copper Project Annual Inspection**



*Photograph 11: Re-vegetated area with willow cuttings between area proposed for heap leach facility and Williams Creek*



*Photograph 12: View looking northwest of bulk sample excavation site in the proposed open pit area*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 13: View looking east of bulk sample excavation site in the proposed open pit area*



*Photograph 14: View looking east of re-vegetated drill pad in the proposed waste rock storage area*





**ATTACHMENT 1**  
**Photographs**  
**Carmacks Copper Project Annual Inspection**



*Photograph 15: View looking north of ponded water and erosion above culvert on access road at North Williams Creek*



*Photograph 16: View looking east of erosion above culvert on access road at North Williams Creek*





**ATTACHMENT 1**  
**Photographs**  
**Carmacks Copper Project Annual Inspection**



*Photograph 17: View looking north of constructed 'ford' on access road at Williams Creek crossing*



*Photograph 18: View looking north of ponded water behind 'ford' on access road at Williams Creek crossing*





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photograph 19: Site access road crossing Merrice Creek, view in direction of Carmacks*



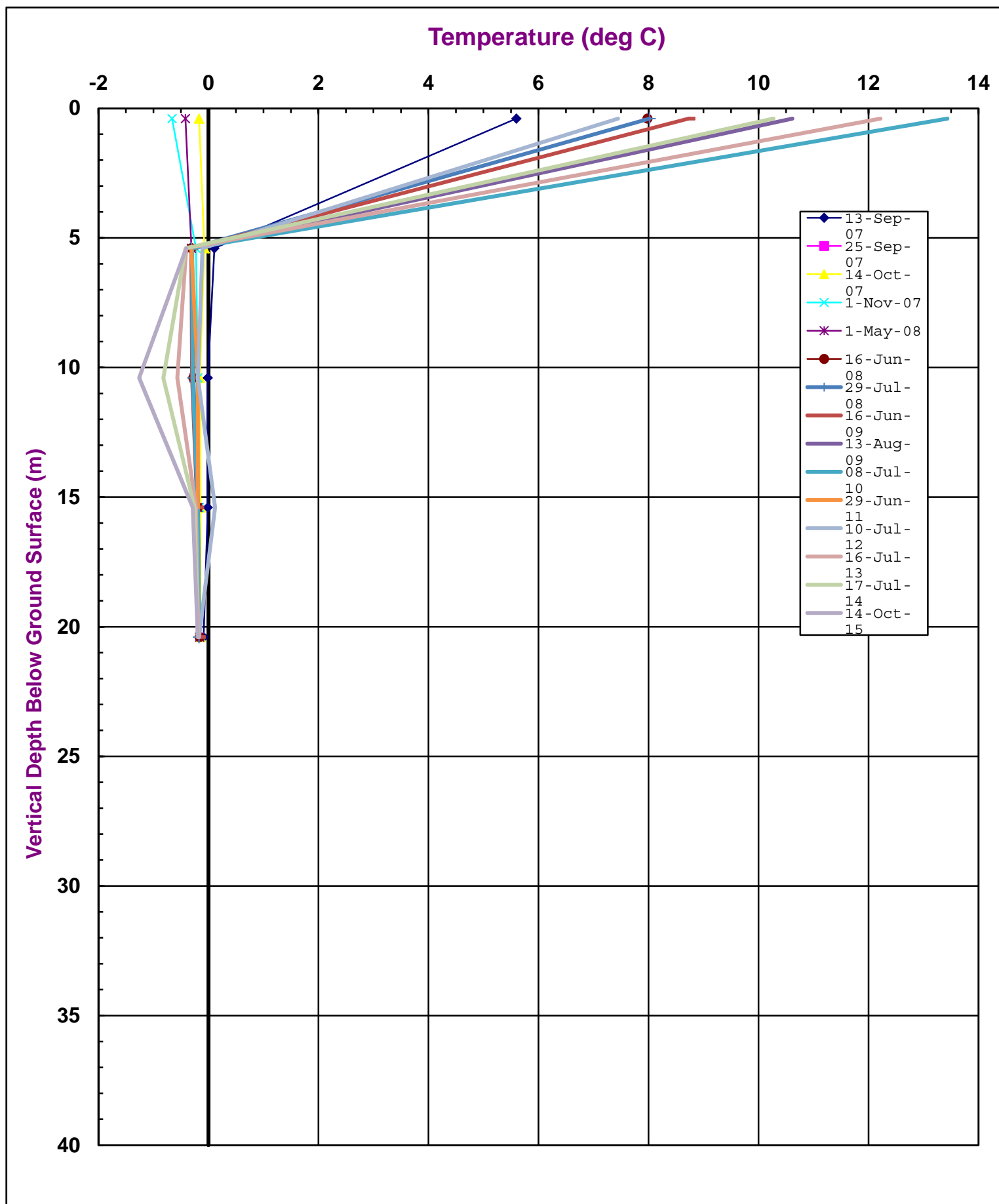
*Photograph 20: Site access road crossing Merrice Creek, view of extension and bridge abutment nearest to Carmacks*

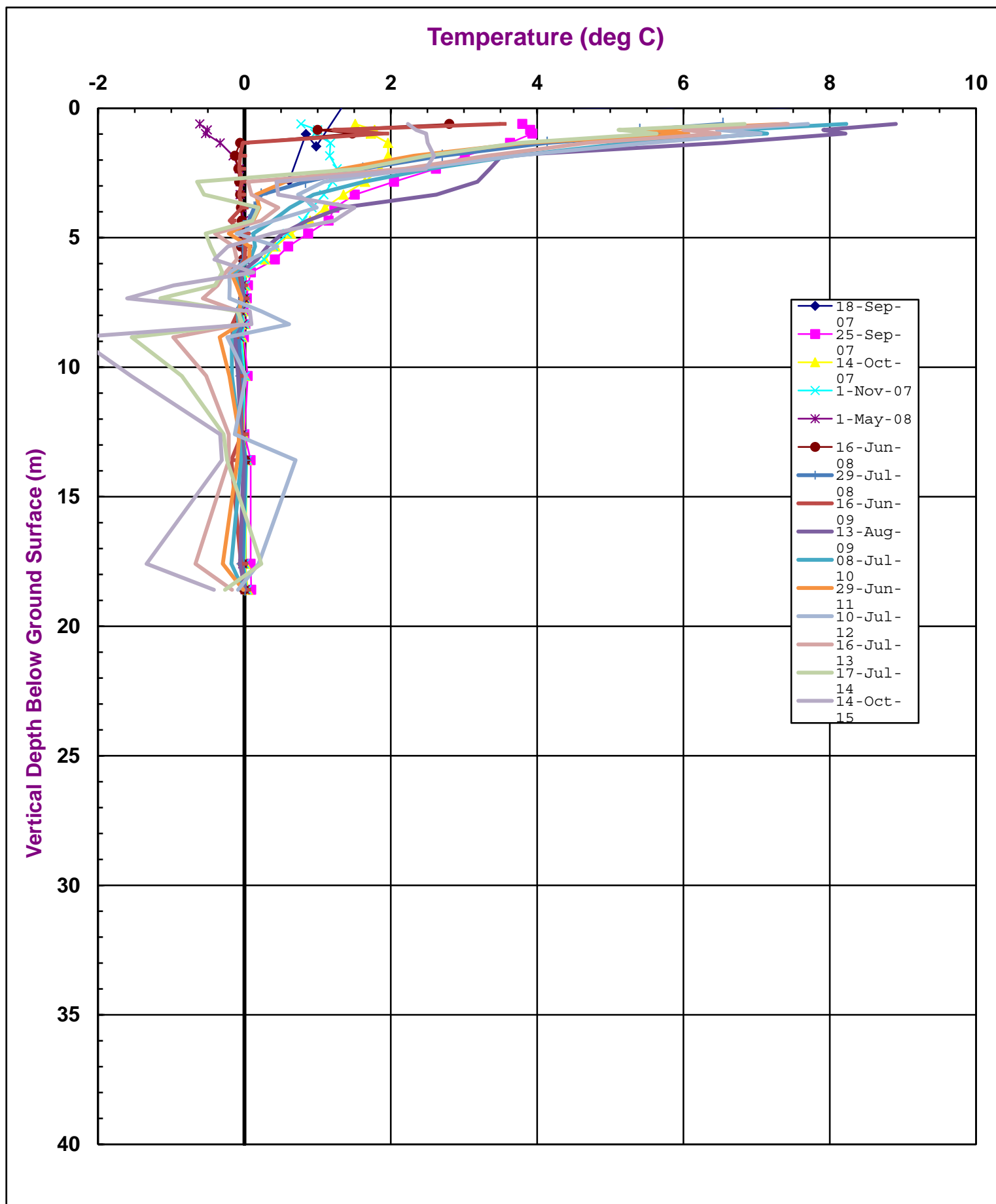
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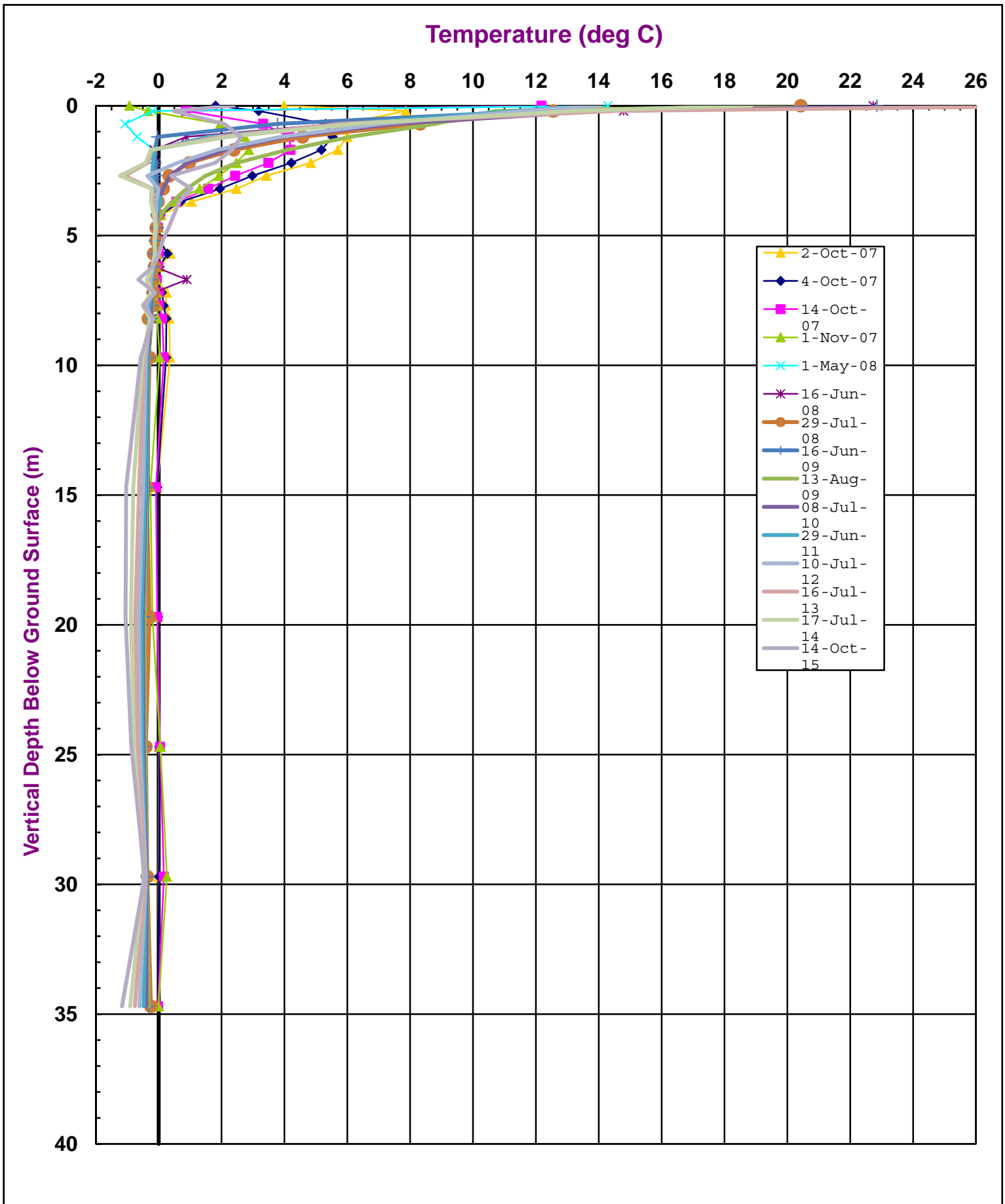
# ATTACHMENT 2

## Thermistor Data

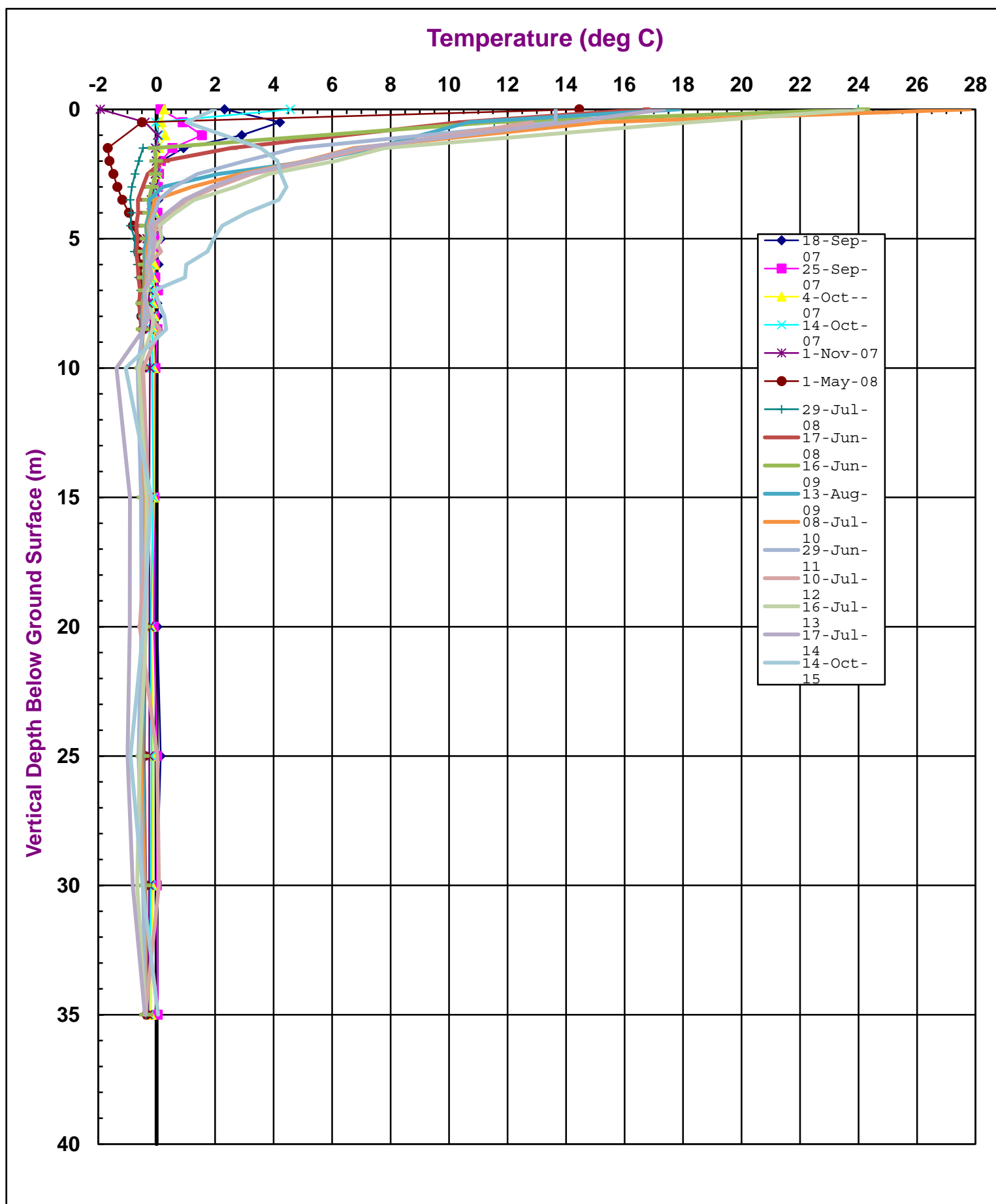


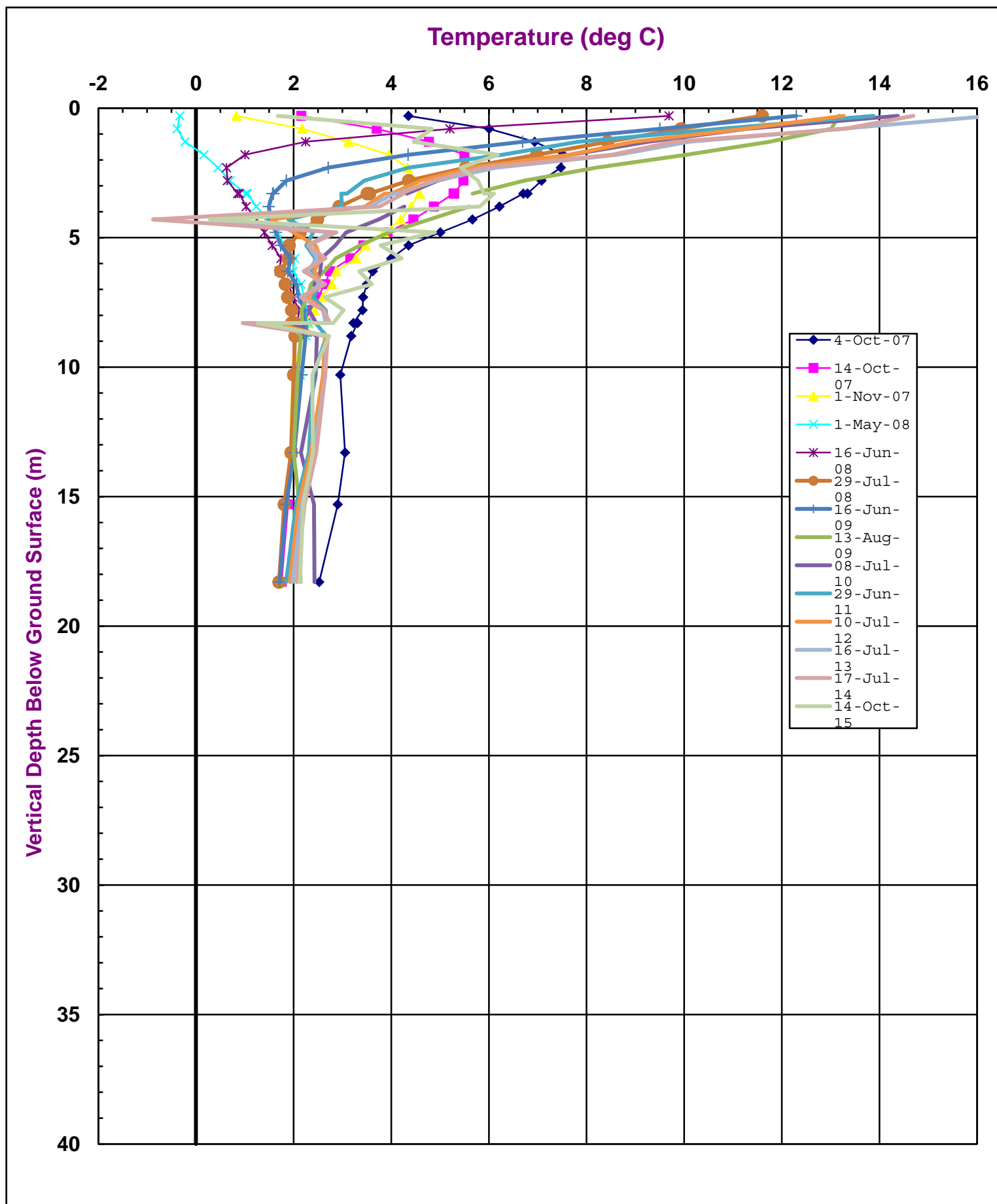


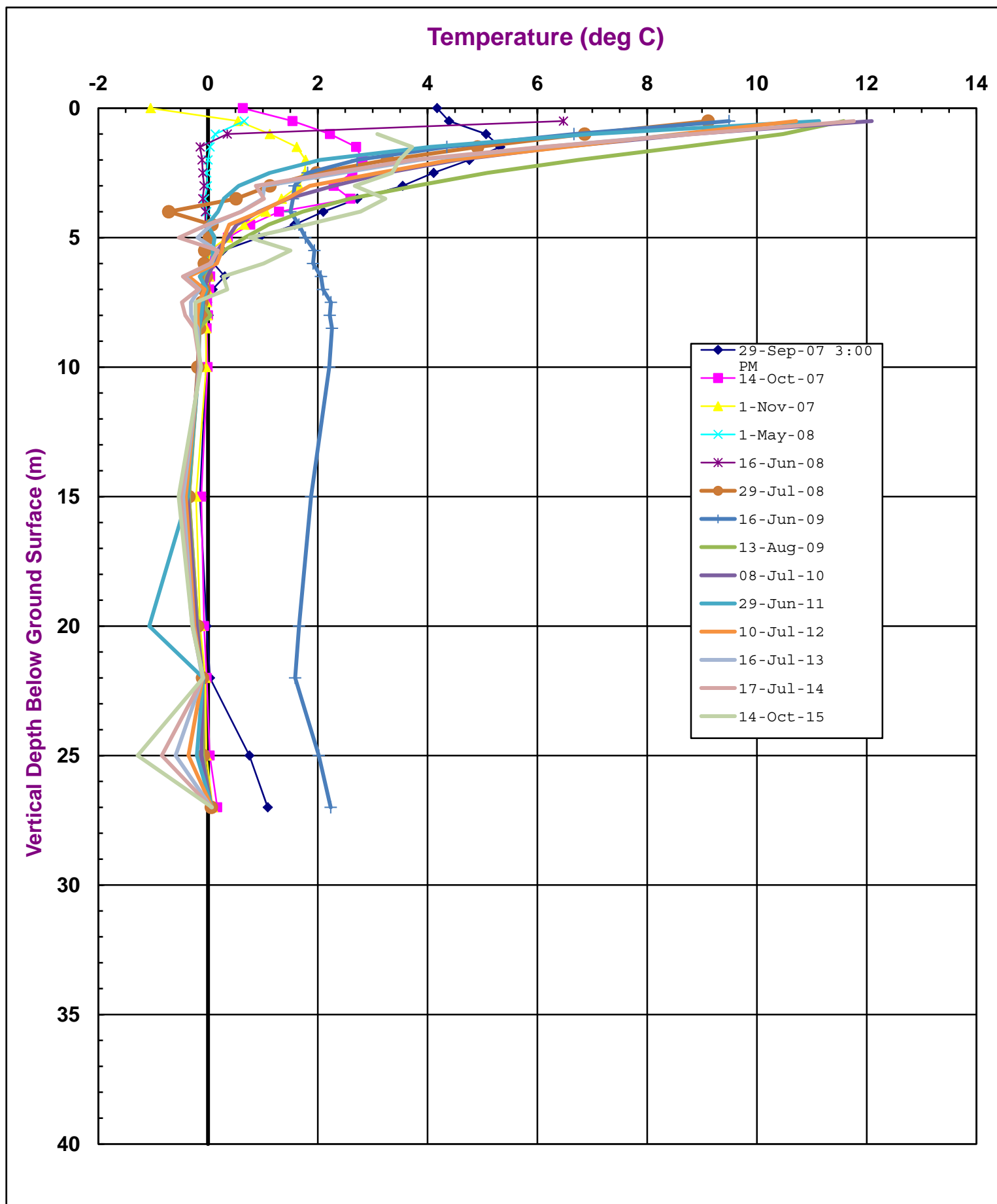














## Temperature (deg C)

