

October 9, 2012

Reference No. 1314270077-222-L-Rev0-1000

Sally Eyre  
President & CEO  
Copper North Mining Corp.  
2060 - 1111 West Georgia Street  
Vancouver, BC  
V6E 4M3

**ANNUAL INSPECTION, JULY 16, 2013  
CARMACKS COPPER PROJECT, CARMACKS, YUKON**

Dear Dr. Eyre

Golder Associates Ltd. (Golder) completed an inspection of the Carmacks Copper project site for Copper North Mining Corp. (CNMC), on July 16, 2013. The inspection of the proposed future site of the Carmacks Copper mine was completed as part of the requirement of the Quartz Mining License (QML – 0007) for an annual inspection. The inspection was to evaluate the condition and stability of the existing facilities in the area of the proposed new mine and the proposed facilities which will include a Heap Leach Facility and Events Pond, an open pit mine area, a Waste Rock Storage Area, a processing plant and related facilities, ore preparation facilities, ore stockpiles, water diversion structures and/or other related operations or facilities. The inspection was limited in that there are no structures on site at present with the exception of the mine exploration camp and there are no current activities currently at the site. An inspection was however, completed of the entire project area.

## **1.0 INSPECTION**

The inspection was completed by Ben Wickland of Golder with Mr. Scott Casselman – a representative of CNMC. CNMC staff Dr. Sally Eyre and Doug Ramsey were also present. The inspection focused on the existing site conditions and the limited site infrastructure. Photographs of the site at the time of the inspection are presented in Attachment 1. Data from thermistors collected during the site visit are presented in Attachment 2.

The project is in the advanced exploration stage and final permitting for the proposed future mine. As noted the only infrastructure on site, at present, are the exploration camp and a series of 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 activities.



The inspection of the camp area indicated there is no erosion of sediments from the pad area into the surrounding natural area. The slope behind the camp is stable and is not impacting or causing any safety issues with the camp structures or operations. There is minor slumping and 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 re-growth of vegetation was observed in the camp area. In addition, there was some cracking observed along the south edge of the pad (lower limit of pad), some 3 to 4 m from the pad edge.

In addition to the camp, the inspection included the area proposed for the Heap Leach Facility, Events Pond, Heap Leach Facility Sediment Pond, and Process Plant. None of these structures have been developed and site preparation in these areas has been limited to the clearing of trees and organic soils (completed in 1997-1998), development of a series of access roads and drilling platforms for the exploration programs. Since the initial clearing, vegetation re-growth has been occurring. Erosion and sediment control measures in this area were initially put into place in September 2008 and further maintained in September 2009 and August 2010. These include a series of ditches and berms to divert water into sediment catch basins, silt fences, and vegetated areas to break up flow to 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. Additional capacity remains within these catch basins, with the exception of one catch basin on the road to the east of the existing exploration camp, north of Williams Creek.

Erosion on roads due to run-off continues, developing gullies of approximately 30 cm depth in the roads to the east and west of the existing camp, and on the access roads in the areas of the Heap Leach Facility and the Waste Rock Storage Area. Larger eroded areas or wash-outs to approximately 60 cm depth were observed on access roads near the area of the Heap Leach Facility, near North Williams Creek, and near Williams Creek.

It is recommended that vegetation in the lower footprint area of the Heap Leach Facility and Confining Embankment be re-cleared of vegetation in 2013 or 2014 to promote thaw of permafrost ground prior to development of the area. Vegetation may allow re-establishment of permafrost and ground ice and should therefore the vegetation should be cleared to allow the ground to thaw over the warmer months.

Further down slope of the proposed Heap Leach Facility Sediment Pond, and within the floodplain of Williams Creek, a series of silt fences have been installed and the area seeded where sediment from previous site erosion has accumulated. At the time of the inspection, it was observed that the silt fencing surrounding these areas is working effectively and there is no evidence of recent sediment movement. Grass seed was used in 2009 to promote the re-establishment of vegetation and further stabilize the sediment. The approach was noted to be generally effective in 2011 and 2012, but with limited re-growth attributed to periodic pooling of water. The area was re-vegetated with woody plants (willow cuttings), and plants appear to be tolerating saturated soil conditions. Conditions in 2013 were similar to 2012, with limited growth of the willow cuttings. No movement of sediment beyond the existing silt fences was observed, nor does it appear that sediment has entered Williams Creek. These erosion control measures are of a temporary nature that should be inspected annually and ongoing minor maintenance activities should be anticipated.

The area where the open pit is to be developed was inspected. The excavation slopes of the trenches developed 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 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 require attention.

The area of the proposed Waste Rock Storage Area and the present access road crossing at North Williams Creek 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. The small sediment catch basins at the drill pads still have capacity to manage more 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, reducing the road crest width at the culvert location. The road is washed out approximately 30 m past the culvert. A ponded area adjacent the road is anticipated to have temporarily flowed over and eroded the road fill due to reduced flow in the culvert near this location. The inlet of the culvert was observed to be bent. It is recommended that the culvert mouth be reshaped or opened to allow flow at capacity. The eroded area on the road should be filled with gravel to level the grade and re-establish the road.

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

The general site development has not started yet. Therefore, there are no stability concerns associated with the undeveloped facilities and no maintenance 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 they continue to be inspected annually and that ongoing maintenance be conducted, as deemed necessary.

The culvert in the site access road which allowed Williams Creek to flow by the road was recently removed. The crossing is now a 'ford' with the road bed depressed over a length of 10 m to a maximum depth of 0.8 m below the adjacent road grade or crest elevation. Ponded water was observed on the upstream side of the road, with flow across the road. Scott Casselman reported that the culvert as angled upwards with the inlet in the air, and the culvert was therefore removed and the depression regarded as observed on July 10, 2013.

Some erosion noted during the 2012 inspection, indicated that flow had previously appeared to pass over an additional segment of the road near the Williams Creek crossing, eroding the road bed some 18 m south of the culvert location. It is anticipated that this was a temporary condition, which likely occurred at the beginning of the freshet, potentially when the culvert was still frozen/blocked by snow and ice. This southern eroded area was observed to have been repaired. Scott Casselman reported that the eroded area was repaired on July 10, 2013.

Without further erosion protection, it is anticipated that the general fill of the roadbed at Williams Creek will erode at the crossing location during high flow events. The culvert should therefore be replaced and armoured or the 'ford' should be upgraded to operate through next spring.

The access road crossing at Merrice Creek includes a single span bridge set on grade. No steelwork or abutment foundations were observed. In July 2012 the creek banks were being eroded and under cut at the crossing location. Scott Casselman reported that the bridge span was re-set on July 10, 2013, following recommendations in the July 2012 inspection memorandum. The abutment on the Village of Carmacks side of the bridge was reportedly leveled, or cut down, and then the span dragged back and re-set. During the July 2013 inspection the length of span seated on the Village side abutment was 0.5 to 0.75. The slope of the ground at the abutment immediately under the span at this location was observed to be over-steepened, approximately 1 horizontal to 2 vertical. The measures to stabilize the span therefore appear temporary and it is anticipated that the bridge will have to be re-set again in 2014 or in 2015.

## 2.0 THERMISTOR DATA

Ground temperatures derived from thermistor data collected during the site visit are presented in Attachment 2. The thermistor plots indicate cooling of ground at the following locations:

- Heap Leach Facility area in BH-17-07 at 25 m depth;
- Southwest of the 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 17 m;
- Events Pond embankment toe area in BH-06-07 between depths of 10 and 35 m; and
- 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.

It is recommended that vegetation in the lower footprint area of the Heap Leach Facility and Confining Embankment be re-cleared of vegetation in 2013 or 2014 to promote thaw of permafrost ground prior to development of the area. Vegetation may allow the re-establishment of permafrost and ground ice and the vegetation should therefore be cleared to allow the ground to thaw over the warmer months.

## 3.0 RECOMMENDED ACTIONS

The inspection of the Carmacks Copper project site was completed on July 16, 2013 and indicated that as the site development has not been started yet; there is limited infrastructure and limited requirements for maintenance or further investigations. Recommended actions are summarized as follows:

- Clearing of vegetation in the footprint of the area of the lower Heap Leach Facility area and Confining Embankment to promote thaw of permafrost ground.
- Re-installation of the culvert on the site access road crossing of Williams Creek. The road embankment should be armored against erosion at the culvert location.
- Maintenance of the culvert on the main access road immediately north of the proposed Waste Rock Storage Facility.
- Filling and grading of the washouts on access roads in the Heap Leach Facility and Waste Rock Storage Facility areas.
- Clearing of the sediment trap on the access road to the lower re-vegetated area near Williams Creek east of the exploration camp, near the proposed Heap Leach Facility Sediment Pond location.



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

Yours very truly,

**GOLDER ASSOCIATES LTD.**

**ORIGINAL SIGNED**

Ben Wickland, Ph.D., P.Eng. (BC)  
Senior Geotechnical Engineer

BEW/JAH/md

Attachments: Attachment 1 – Photographs  
Attachment 2 – Thermistor Data

**ORIGINAL SIGNED AND SEALED**

John Hull, P.Eng. (BC, NWT, NU, YK)  
Principal

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## **ATTACHMENT 1**

### **Photographs**



## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photographs 1 - 5: Carmacks exploration camp – views looking east to camp (top), looking west to camp (middle), slope immediately north of camp looking west (bottom left) and east (bottom right)*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photographs 6 - 7: Silt fences located between the area of the proposed Heap Leach Facility Sediment Pond and Williams Creek and re-vegetated area. Re-establishment of grass vegetation in this area appears to be hampered by the periodic pooling of water. Willow cuttings planted in 2011 had taken hold with limited new growth visible in 2013.*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 8: View of proposed Heap Leach Facility and open pit areas (far slope) from site access road, looking north.*

*Date Taken: July 16, 2013*



*Photograph 9: View of proposed Heap Leach Facility (foreground) looking south west.*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 10: Re-vegetation on drill access road in the Events Pond area.*

*Date Taken: July 16, 2013*



*Photograph 11: Re-vegetation at BH17-07 drill pad in the Heap Leach Facility area.*

*Date Taken: July 16, 2013*





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

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*Photograph 12: Re-vegetation on BH-26-07 drill pad in the Heap Leach Facility area.*

*Date Taken: July 16, 2013*



*Photograph 13: Re-vegetation at DH95-H drill pad in the Heap Leach Facility area.*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 14: Drill pad sediment basin trap near the proposed Events Pond.*

*Date Taken: July 16, 2013*



*Photograph 16: Bulk sample excavation site.*

*Date Taken: July 16,, 2013*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



*Photograph 17: Water supply well and pad near proposed camp site.*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

#### Carmacks Copper Project Annual Inspection



Photographs 18 and 19: Inlet (left) and outlet (right) of culvert on main access road crossing of North Williams Creek located north of the Waste Rock Storage Area.

Date Taken: July 16, 2013



Photograph 20: Erosion on road near North Williams Creek crossing.

Date Taken: July 16, 2013





## ATTACHMENT 1

Photographs  
Carmacks Copper Project Annual Inspection



Photographs 21 - 22: View of access road crossing of Williams Creek looking north (top) and south (bottom).

Date Taken: July 16, 2013





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

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*Photograph 23: View of access road repair just south of Williams Creek, looking south.*

*Date Taken: July 16, 2013*





## ATTACHMENT 1

### Photographs

### Carmacks Copper Project Annual Inspection



*Photograph 24: Site access road crossing of Merrice Creek, view of bridge abutment nearest to the Village of Carmacks.*

*Date Taken: July 16, 2013*

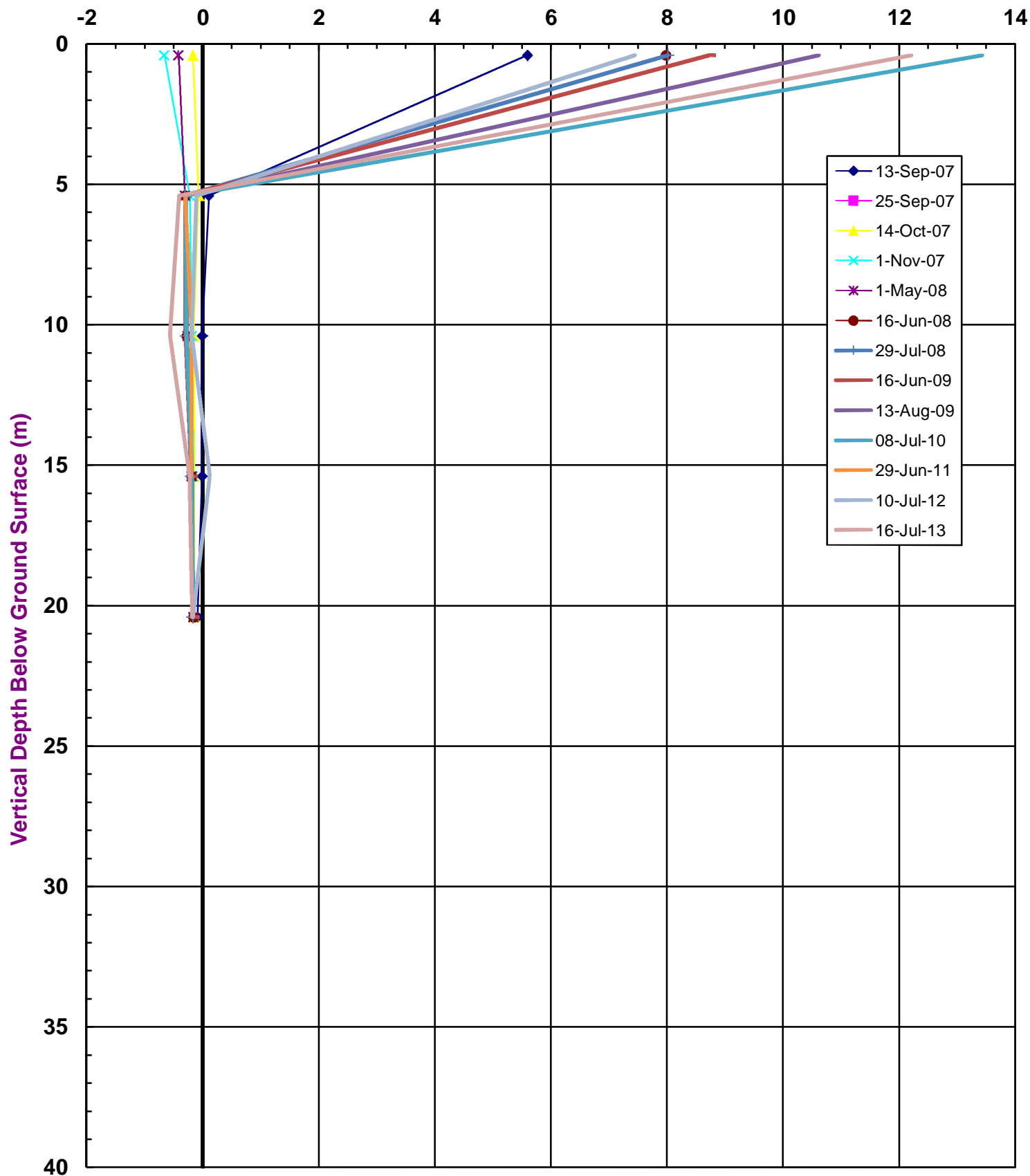
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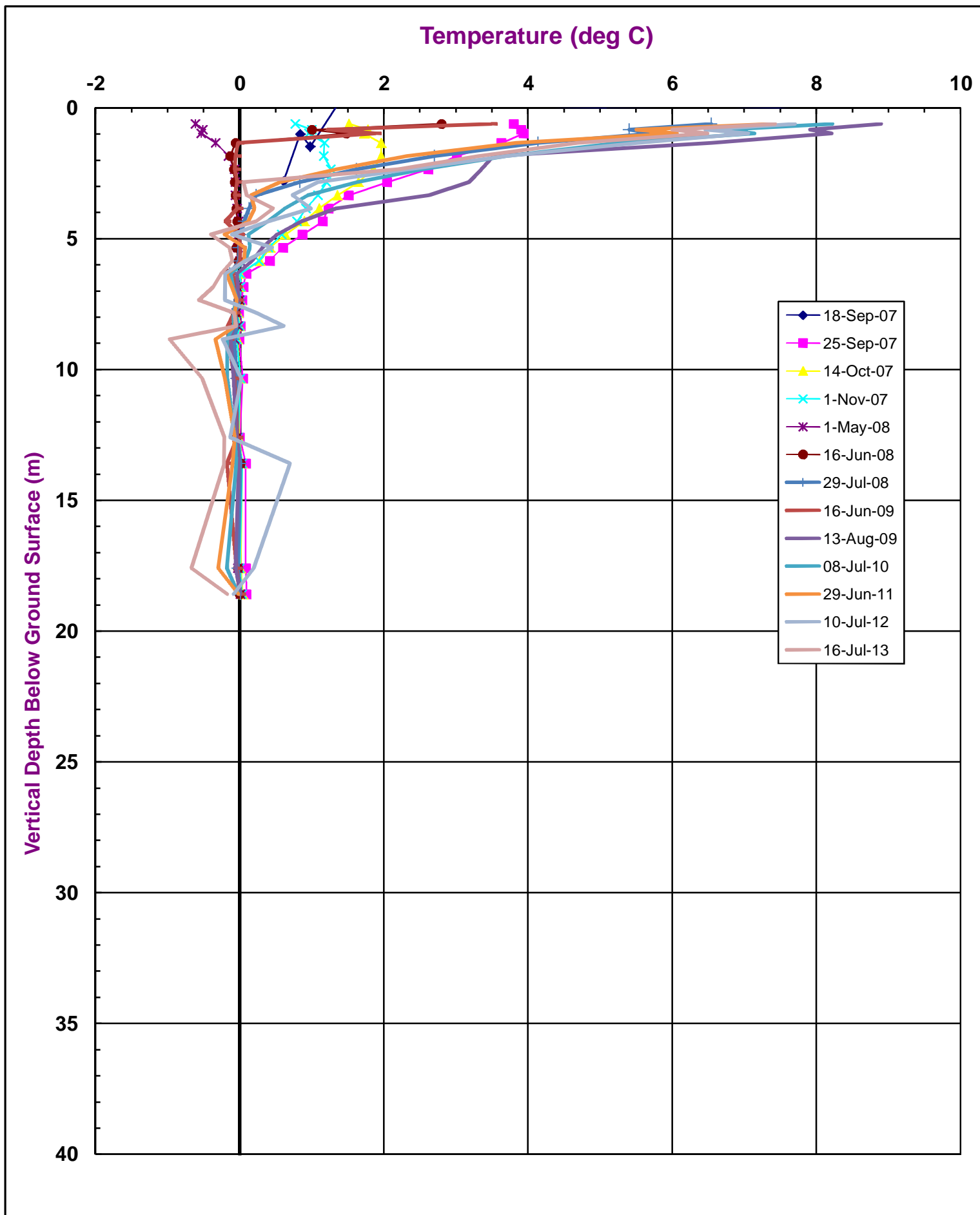
## **ATTACHMENT 2**

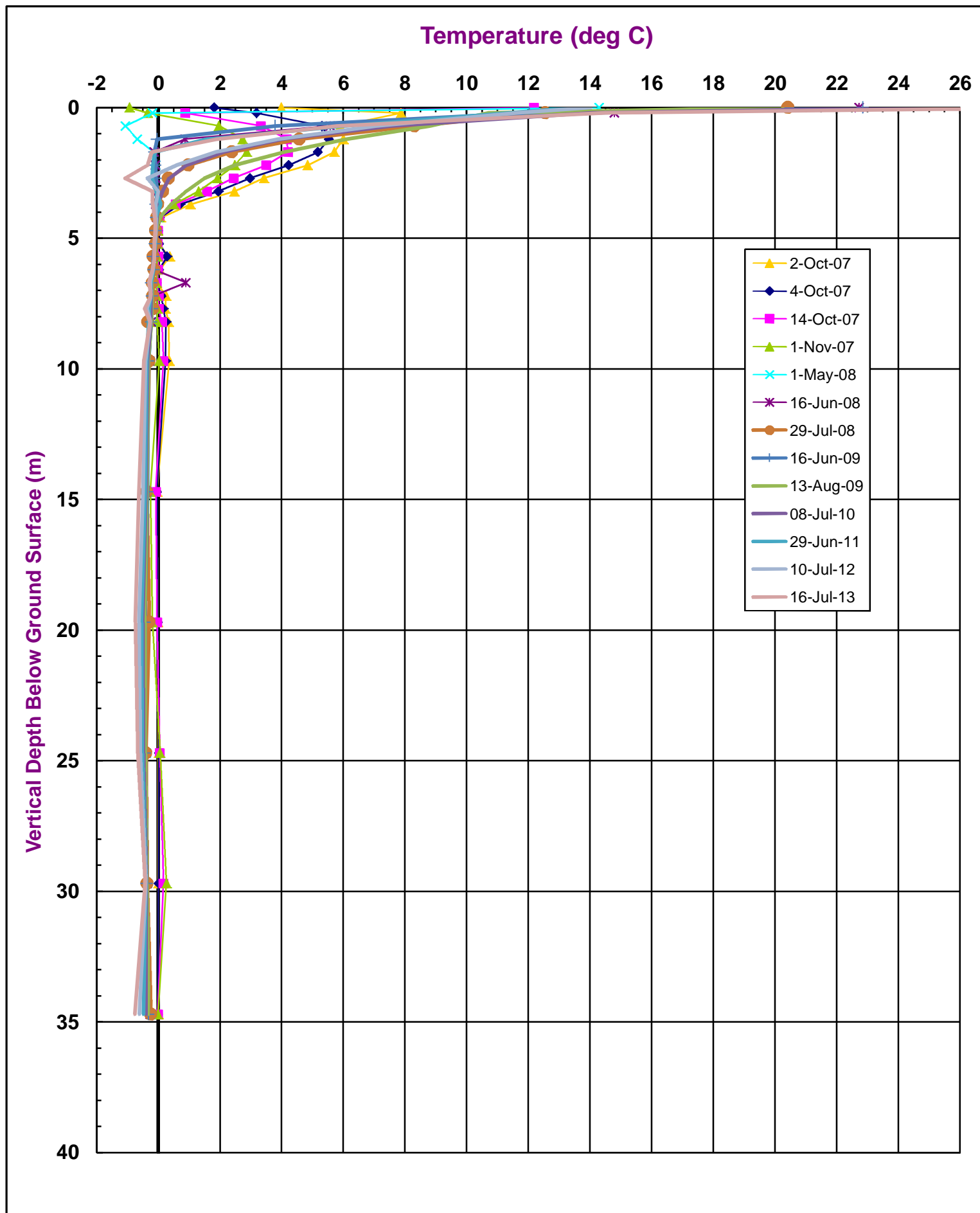
### **Thermistor Data**

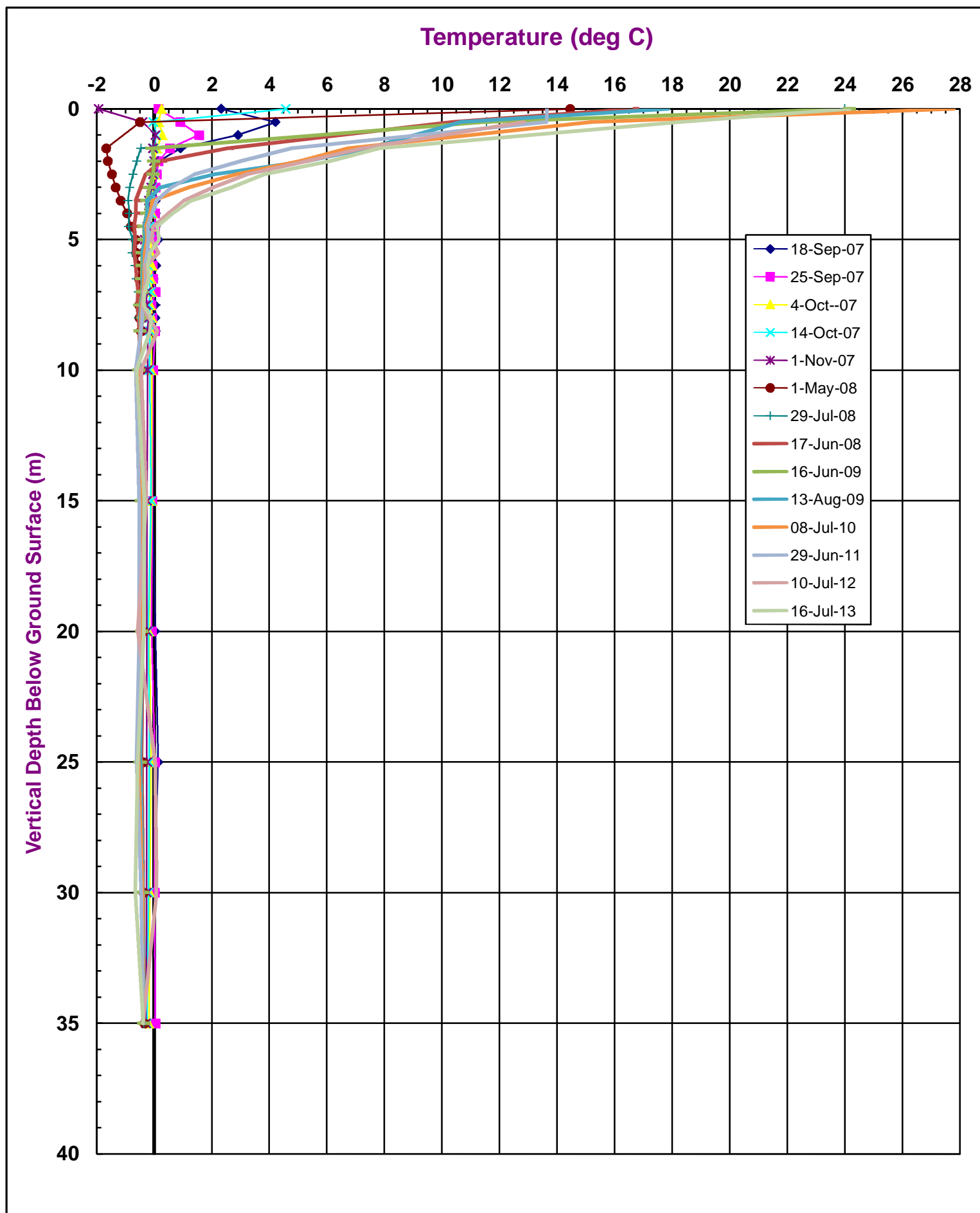


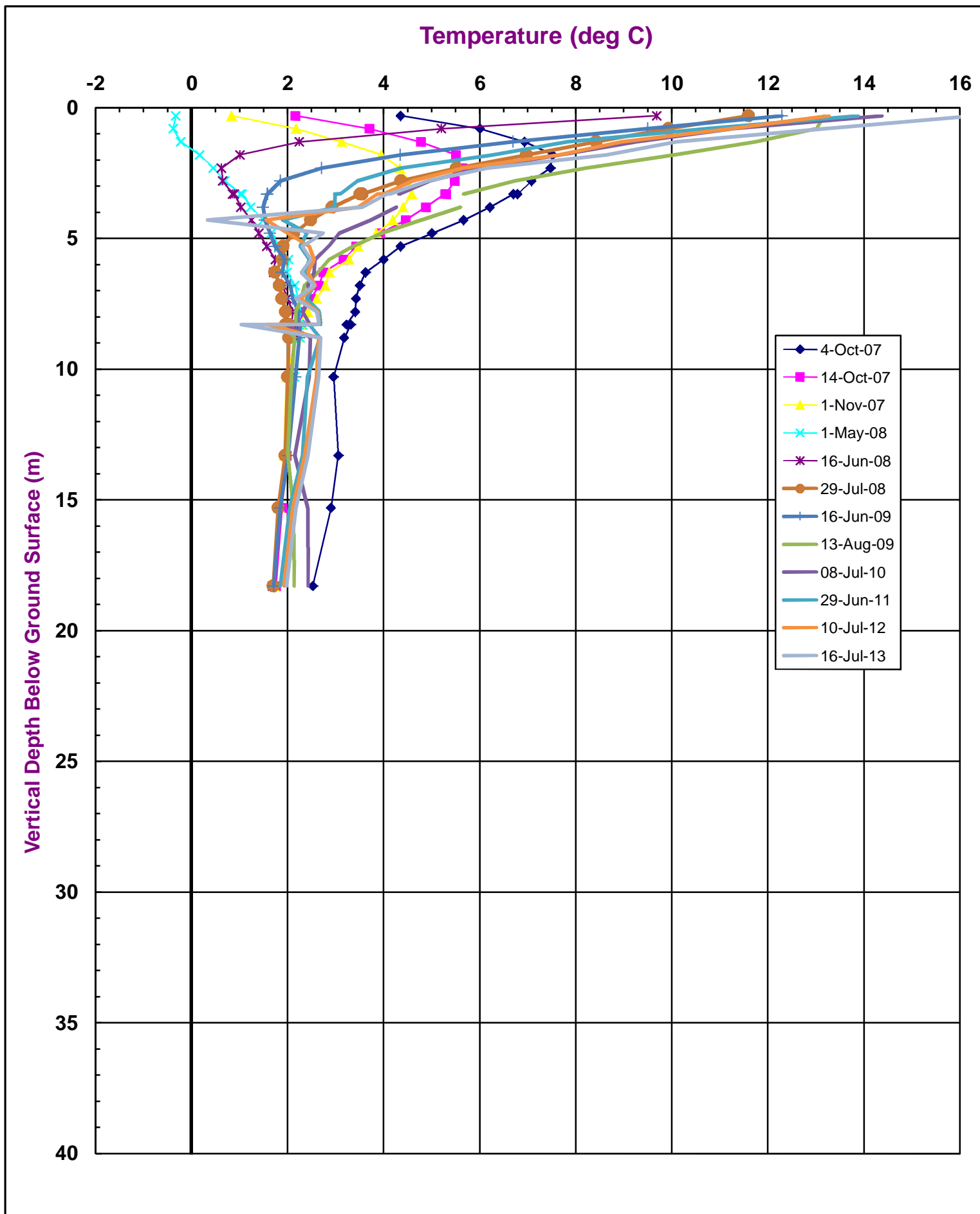
## Temperature (deg C)

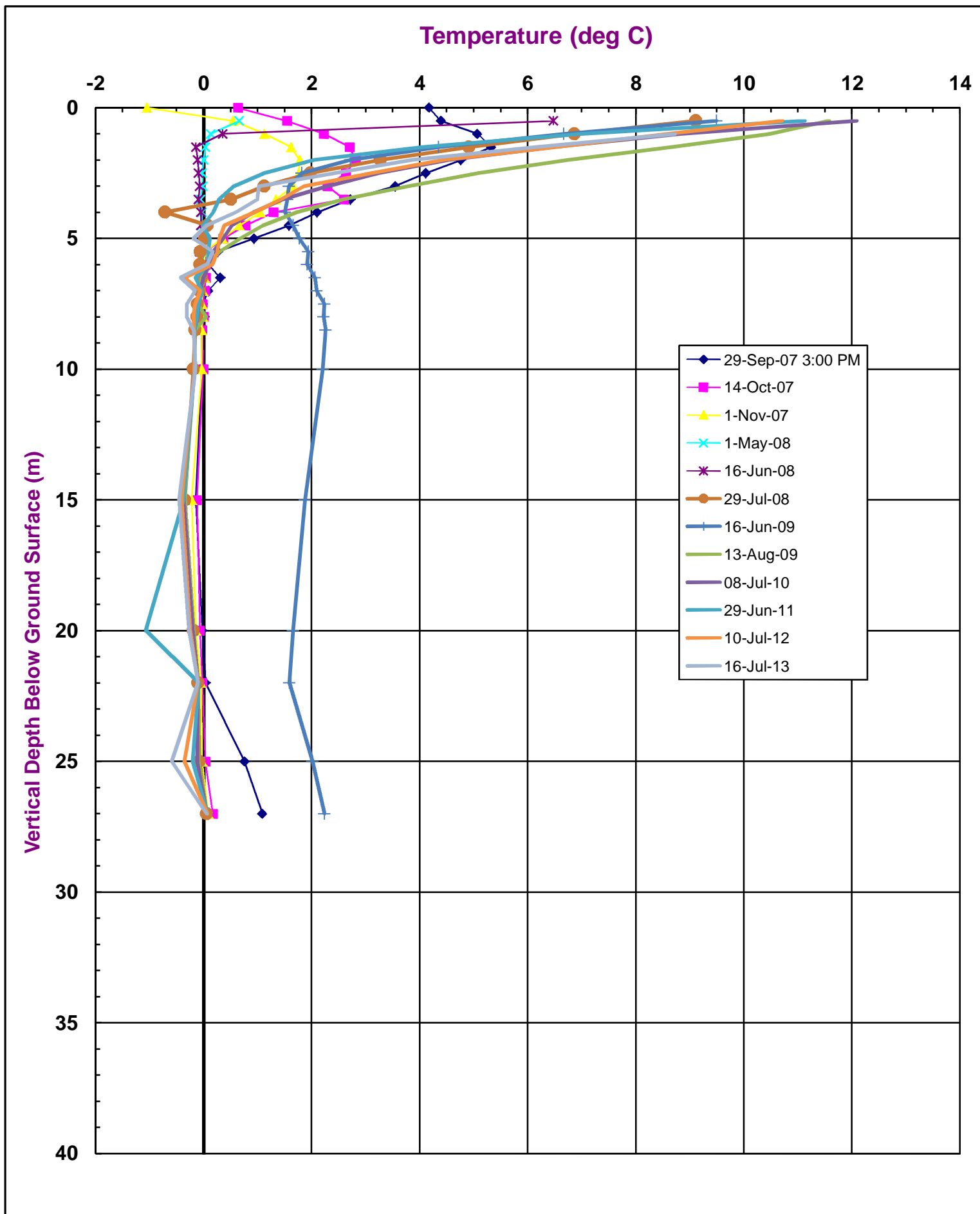












## Temperature (deg C)

