Appendix 2-C. Expanded Basin Setting

Contents

Expanded Basin Setting

This Appendix provides further background information for Section 2.2 - Basin Setting, such as additional geologic maps, cross-sections, and groundwater elevation maps.

Groundwater Elevation

Water level changes are shown in Figure 13 for the period between Spring 1978 and Spring 2018. Groundwater Elevations in Spring 2019 are shown in Figure 1. Spring 2018 groundwater elevations are shown in Figure 3. Spring 2017 groundwater elevations are shown in Figure 4. Spring 2016 groundwater elevations are shown in Figure 5. Spring 2008 groundwater elevations are shown in Figure 8. Spring 1991 groundwater elevations are shown in Figure 9. Spring 1986 groundwater elevations are shown in Figure 10. Spring 1979 groundwater elevations are shown in Figure 11.

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
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## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

Groundwater elevation in Shasta Valley, in feet above mean sea level.

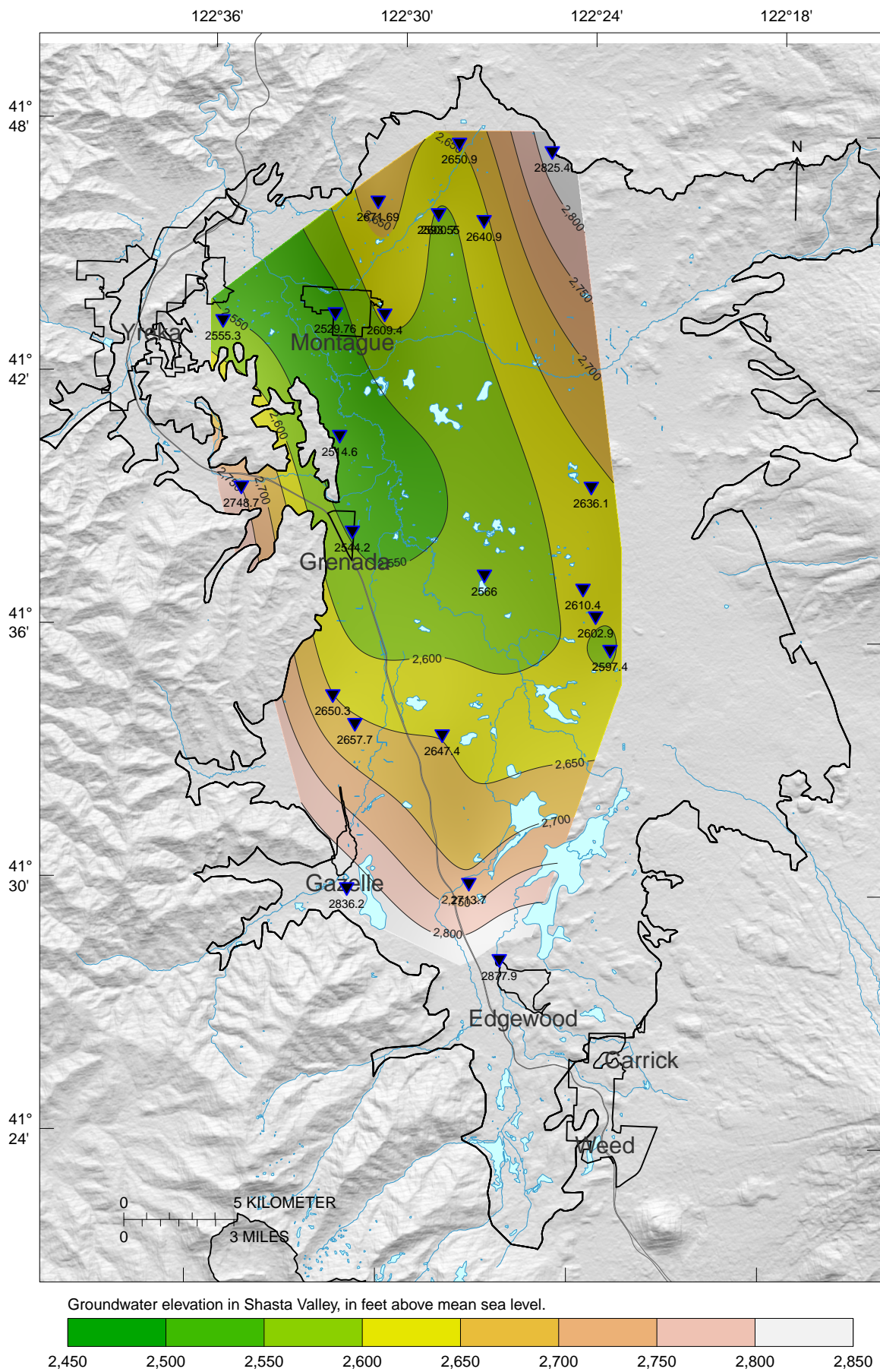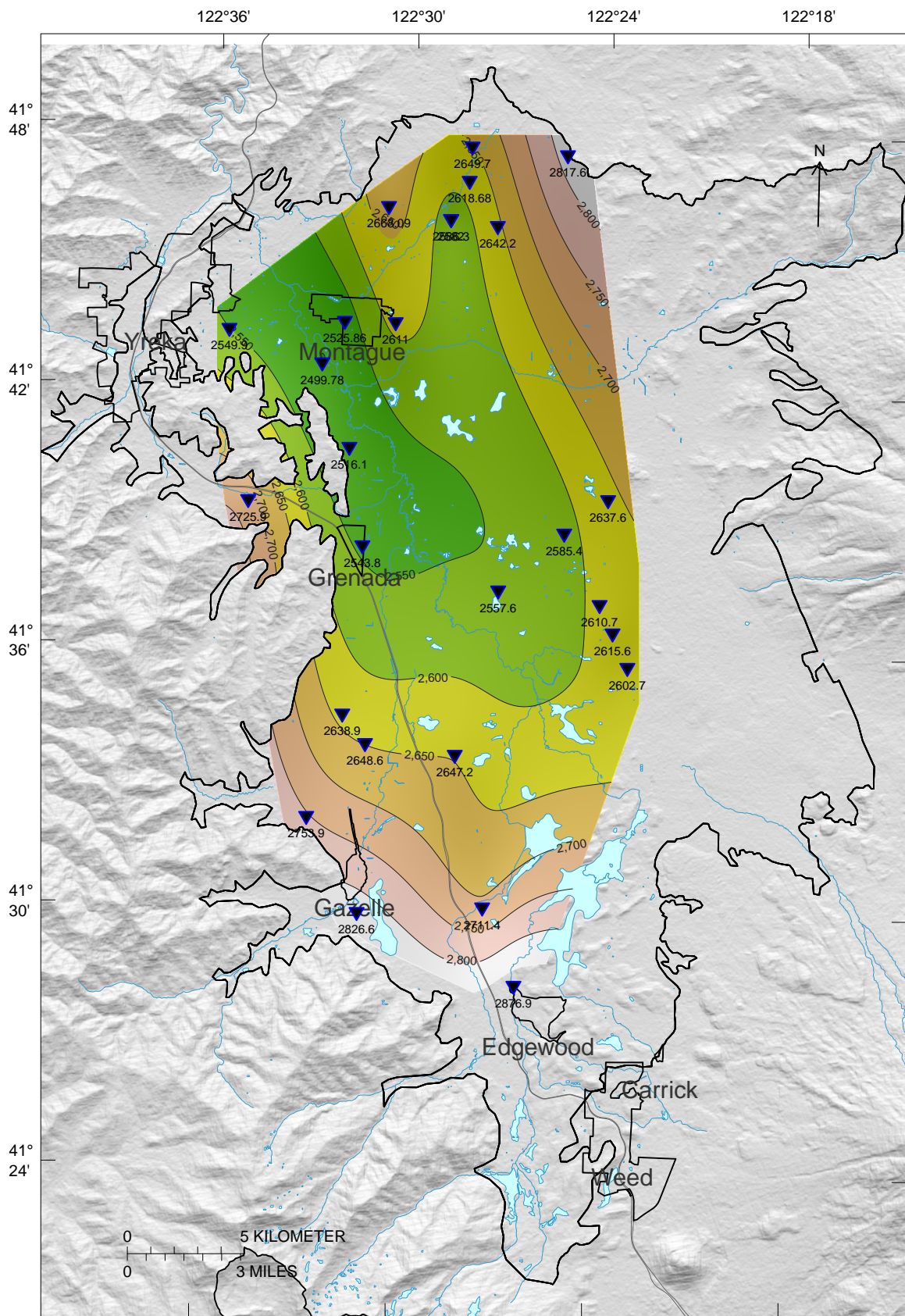| 2,450 | 2,500 | 2,550 | 2,600 | 2,650 | 2,700 | 2,750 | 2,800 | 2,850 |

Figure 1: Shasta Valley Groundwater Elevations, Spring 2019

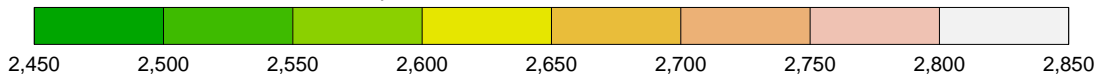Groundwater elevation in Shasta Valley, in feet above mean sea level.
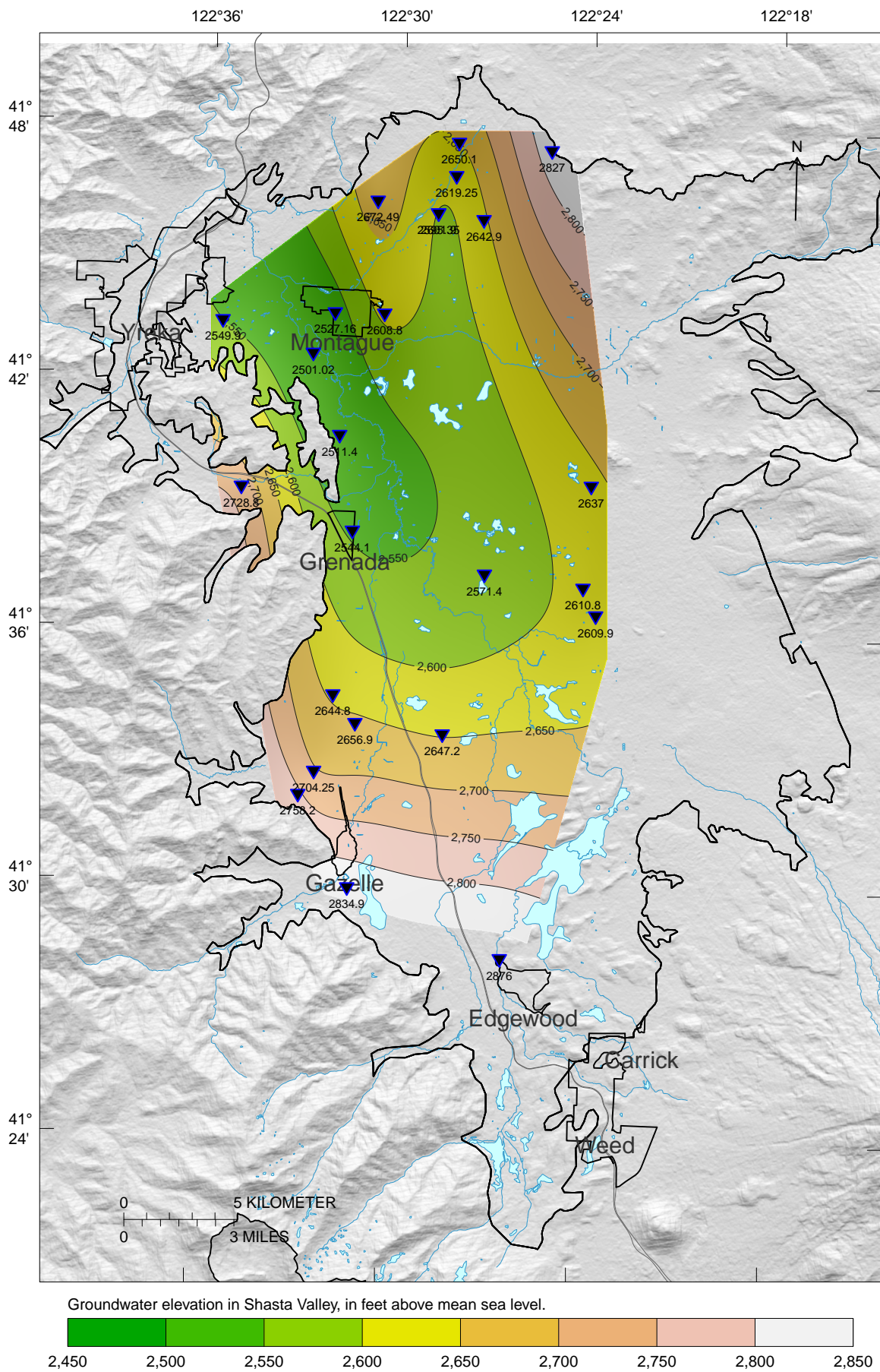
Figure 2: Shasta Valley Groundwater Elevations, Fall 2018

Groundwater elevation in Shasta Valley, in feet above mean sea level.
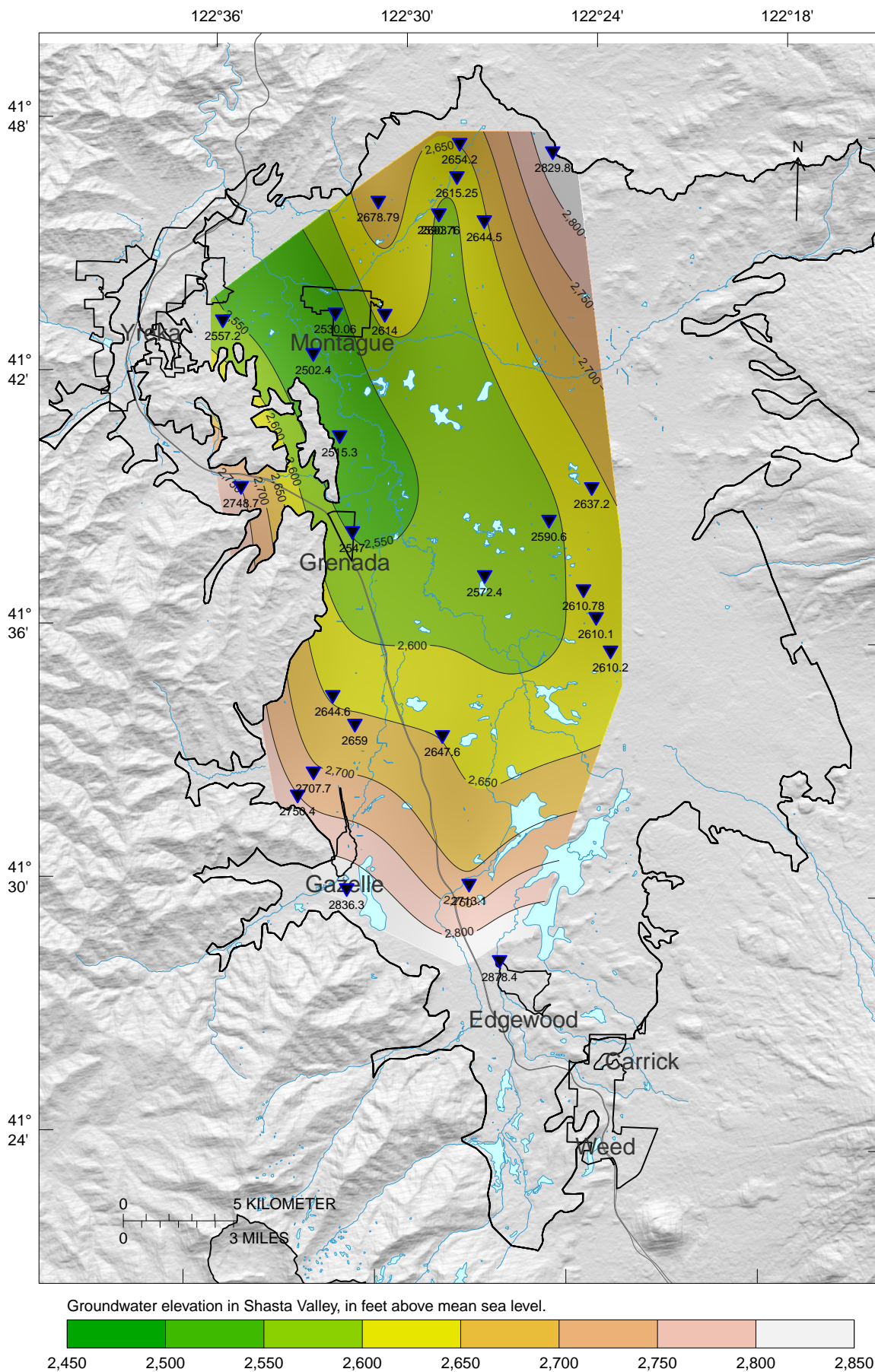
Figure 3: Shasta Valley Groundwater Elevations, Spring 2018

Groundwater elevation in Shasta Valley, in feet above mean sea level.

Figure 4: Shasta Valley Groundwater Elevations, Spring 2017

Groundwater elevation in Shasta Valley, in feet above mean sea level.
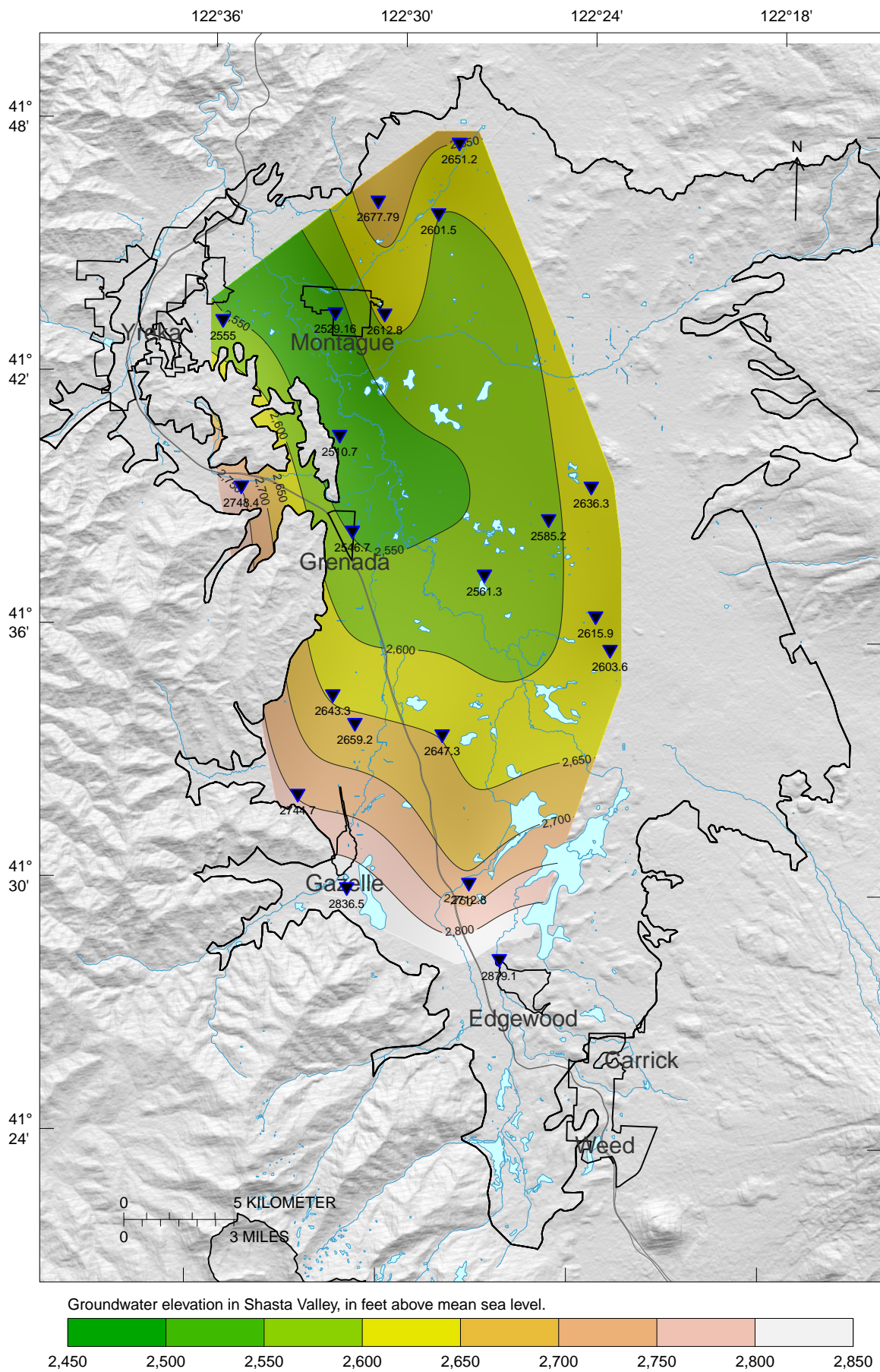
Figure 5: Shasta Valley Groundwater Elevations, Spring 2016

Groundwater elevation in Shasta Valley, in feet above mean sea level.
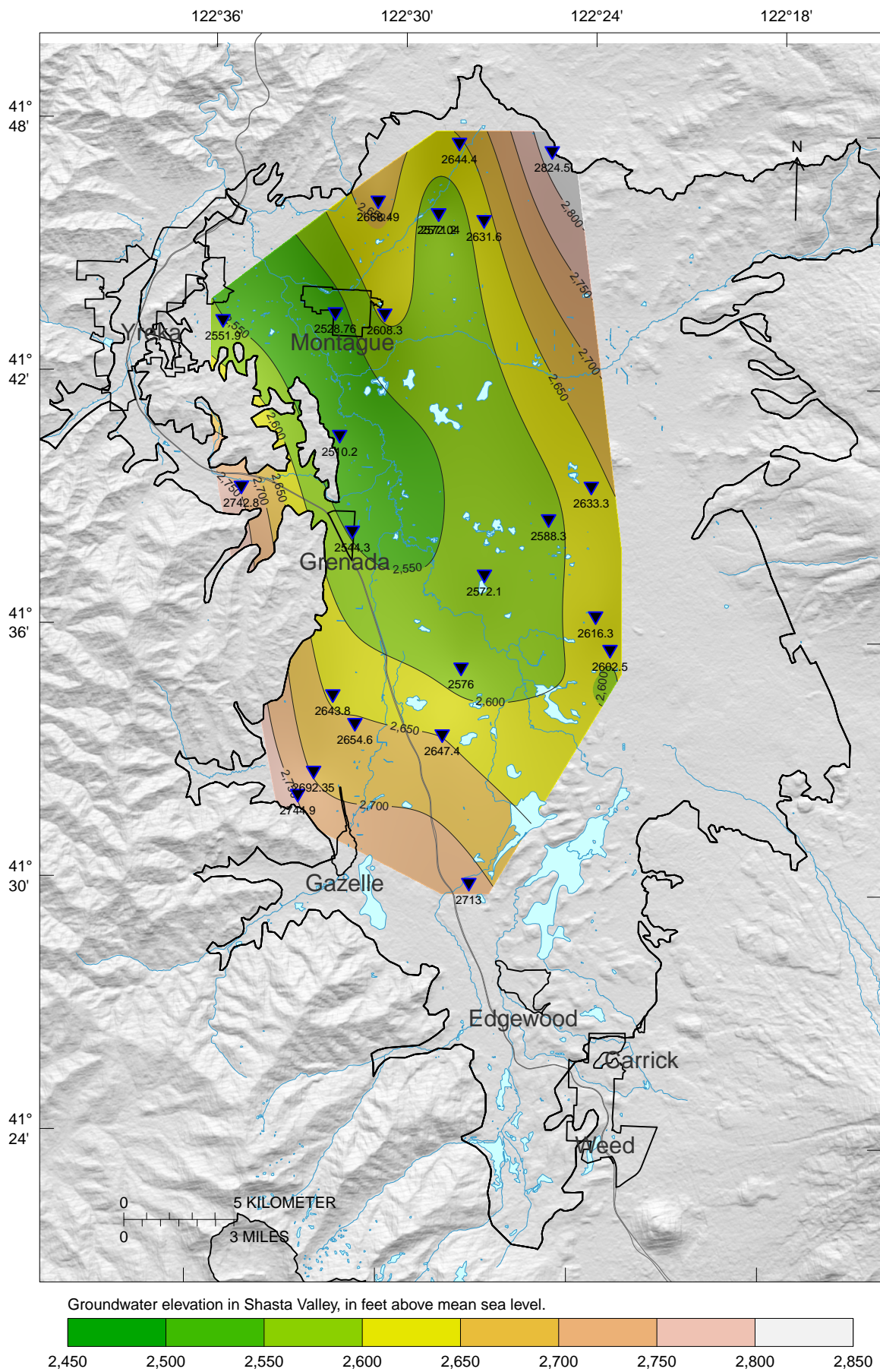
Figure 6: Shasta Valley Groundwater Elevations, Spring 2015

Groundwater elevation in Shasta Valley, in feet above mean sea level.

2,450	2,500	2,550	2,600	2,650	2,700	2,750	2,800	2,850
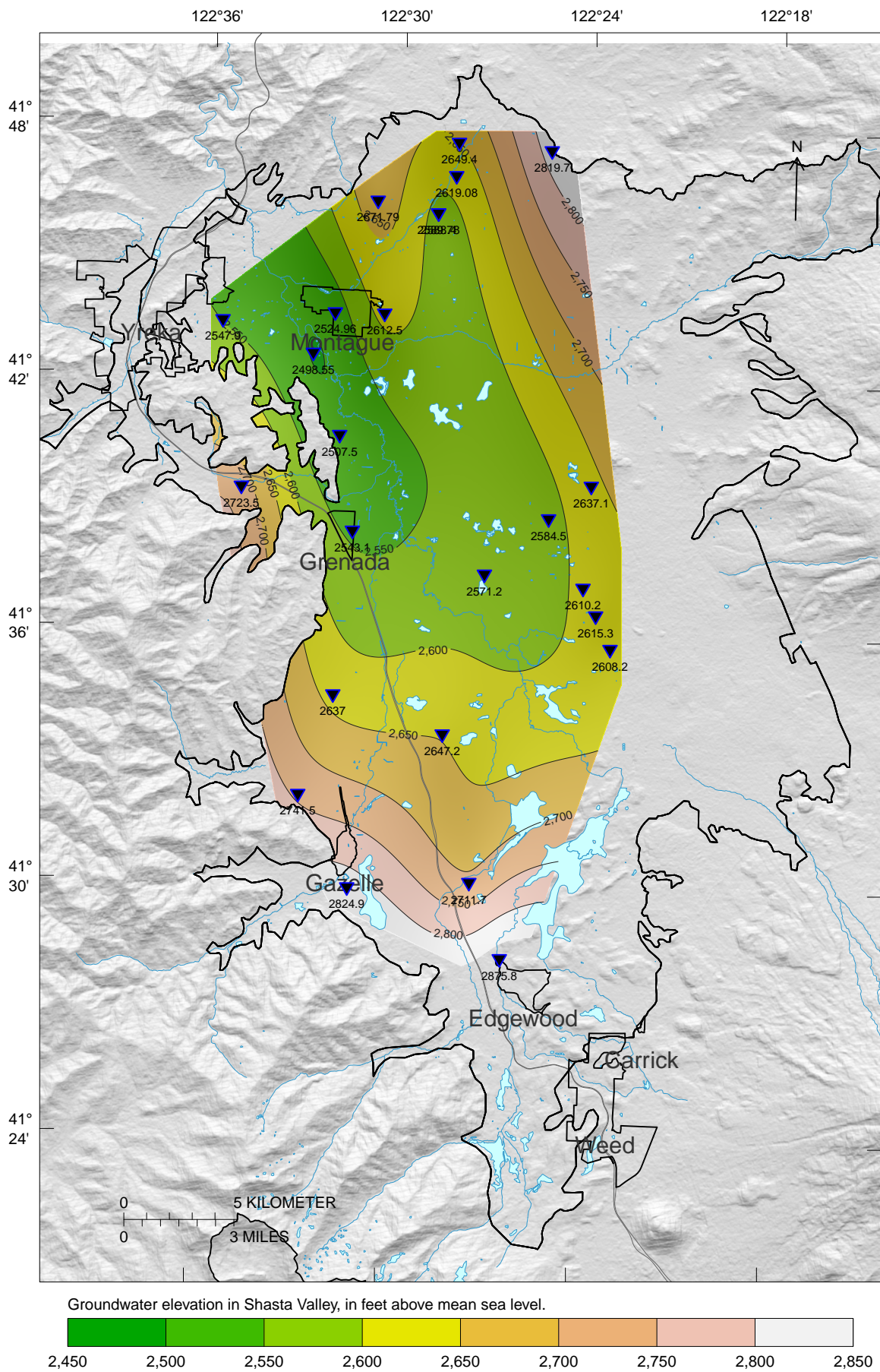
Figure 7: Shasta Valley Groundwater Elevations, Fall 2015

Groundwater elevation in Shasta Valley, in feet above mean sea level.
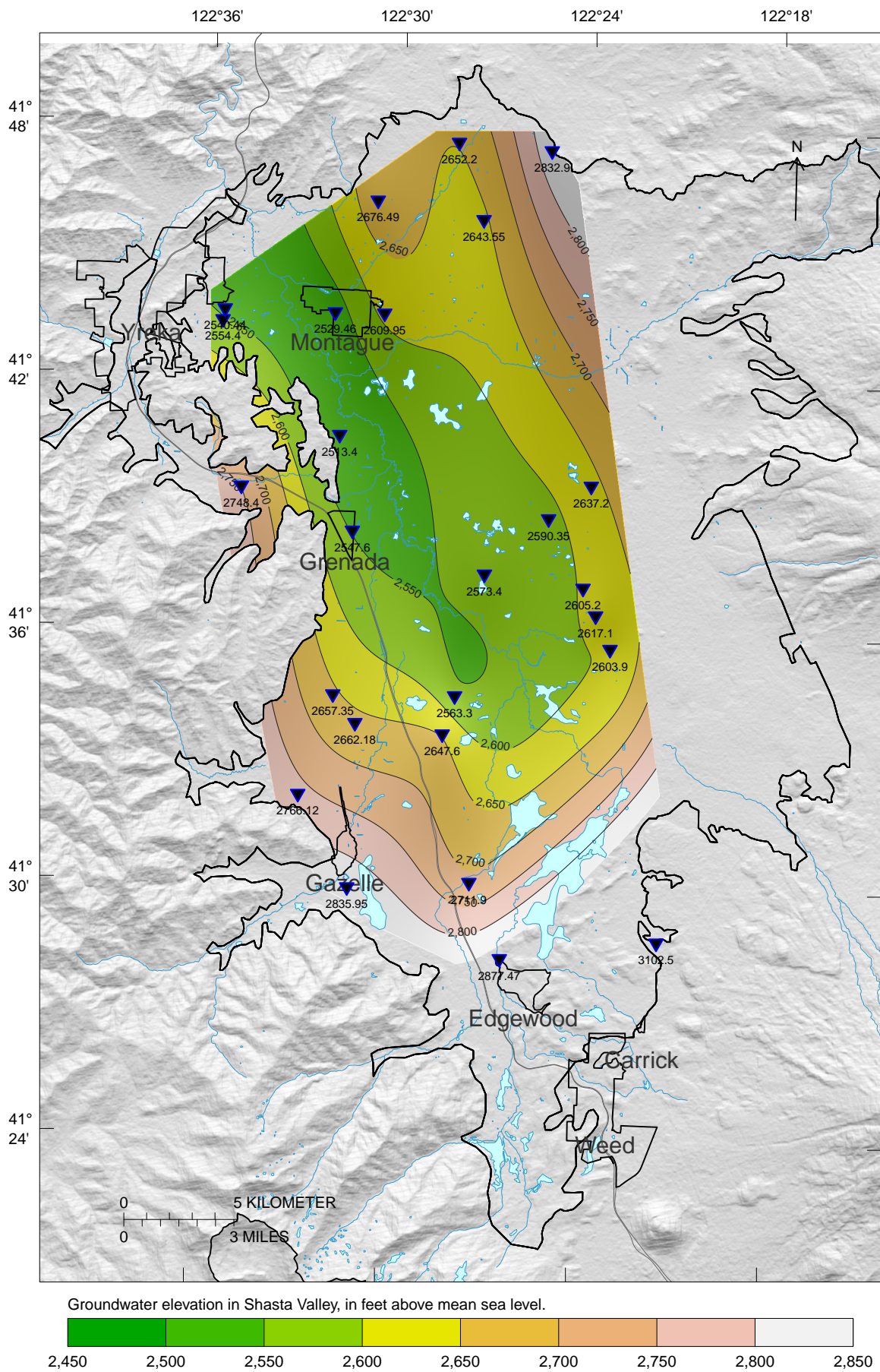
Figure 8: Shasta Valley Groundwater Elevations, Spring 2008

Groundwater elevation in Shasta Valley, in feet above mean sea level.
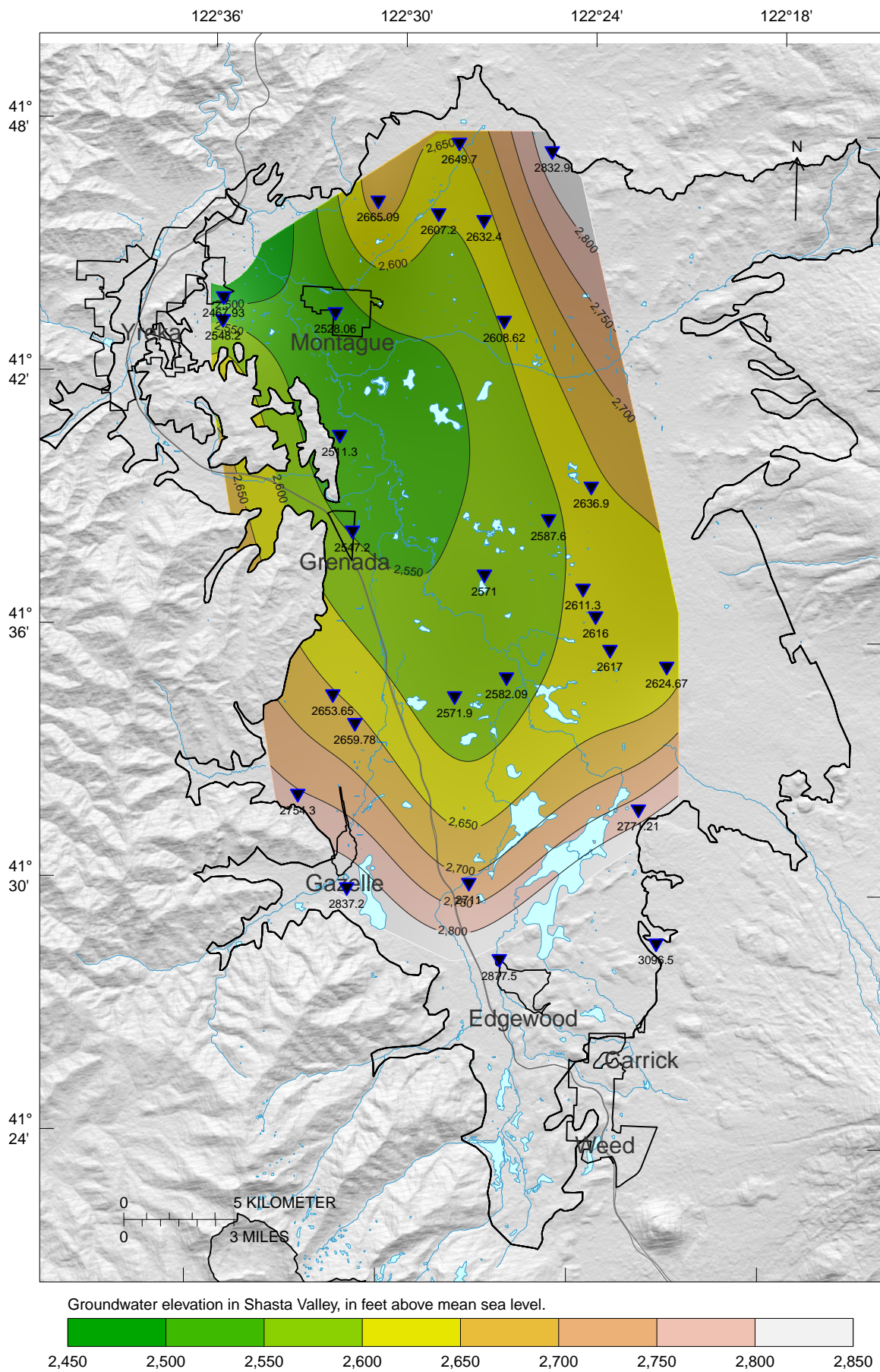
Figure 9: Shasta Valley Groundwater Elevations, Spring 1991

Groundwater elevation in Shasta Valley, in feet above mean sea level.
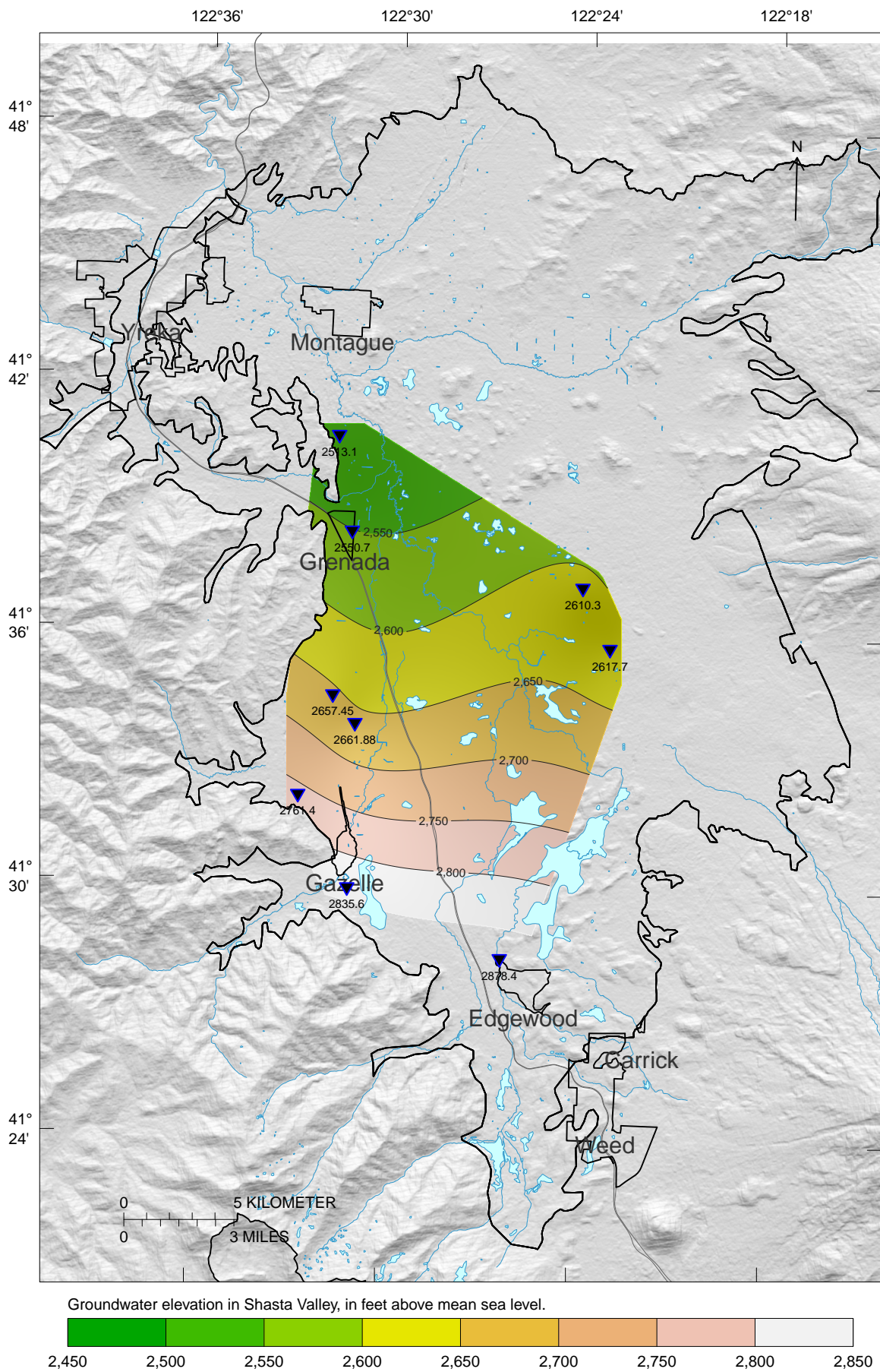
Figure 10: Shasta Valley Groundwater Elevations, Spring 1986

```
30  ## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
31  ## intersection at or near point -200123.40045424999 401671.69310635998
```

```
32  ## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
33  ## intersection at or near point -200123.40045424999 401671.69310635998
```

```
34  ## Warning in min(x): no non-missing arguments to min; returning Inf
```

```
35  ## Warning in max(x): no non-missing arguments to max; returning -Inf
```

```
36  ## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
37  ## intersection at or near point -200123.40045424999 401671.69310635998
```

```
38  ## Warning in contour.default(x = xFromCol(x, 1:ncol(x)), y = yFromRow(x,
39  ## nrow(x):1), : all z values are NA
```

```
40  ## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
41  ## intersection at or near point -200123.40045424999 401671.69310635998
```

```
42  ## Warning in gw_elevation.raster_spring_1986 - gw_elevation.raster_spring_2018:
43  ## Raster objects have different extents. Result for their intersection is returned
```

```
44  ## Warning in sp::proj4string(obj): CRS object has comment, which is lost in output
```

```
45  ## Warning: One tm layer group has duplicated layer types, which are omitted. To
46  ## draw multiple layers of the same type, use multiple layer groups (i.e. specify
47  ## tm_shape prior to each of them).
```

Groundwater elevation in Shasta Valley, in feet above mean sea level.

| 2,450 | 2,500 | 2,550 | 2,600 | 2,650 | 2,700 | 2,750 | 2,800 | 2,850 |
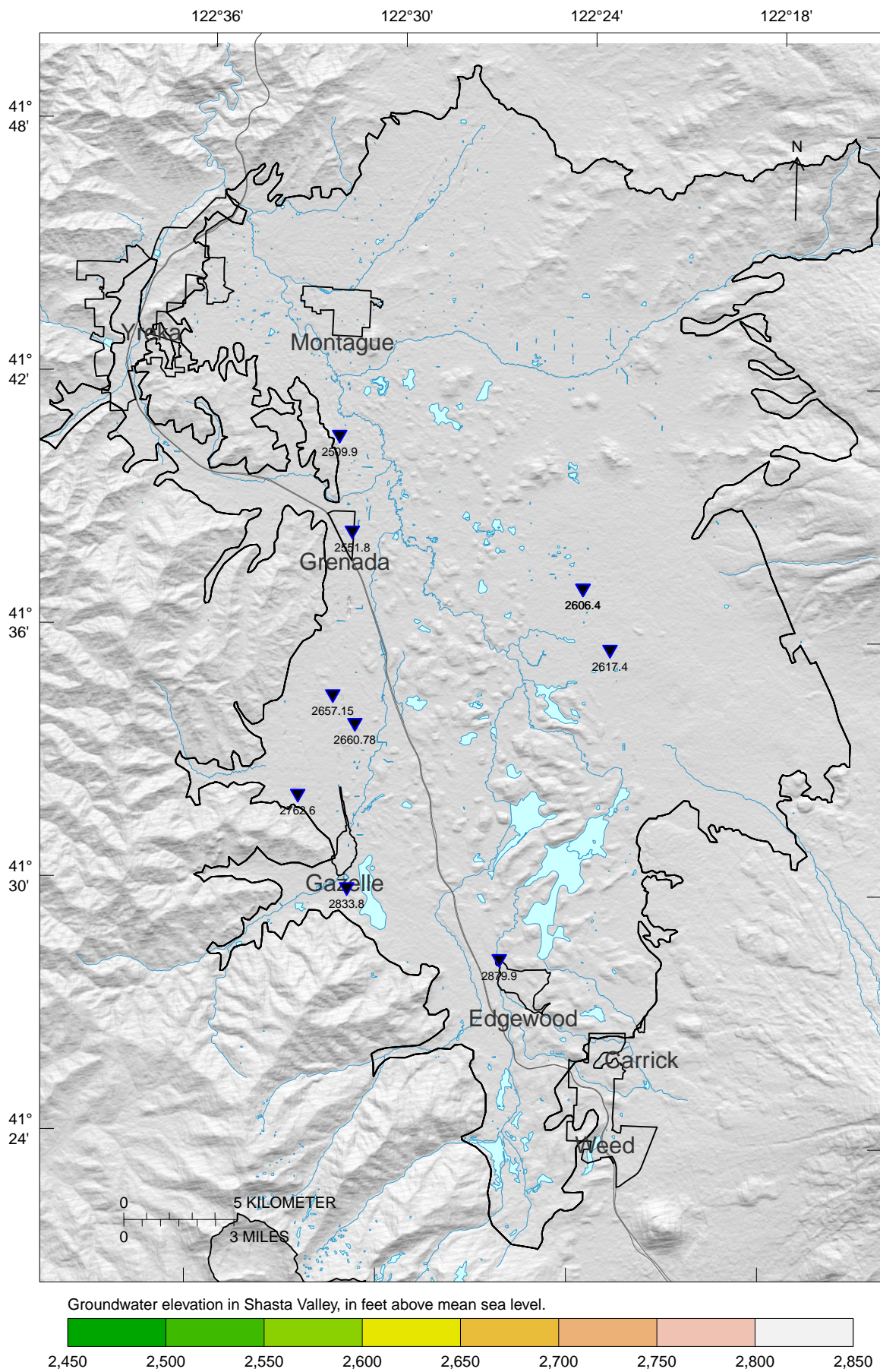
Figure 11: Shasta Valley Groundwater Elevations, Spring 1979

Groundwater elevation in Shasta Valley, in feet above mean sea level.
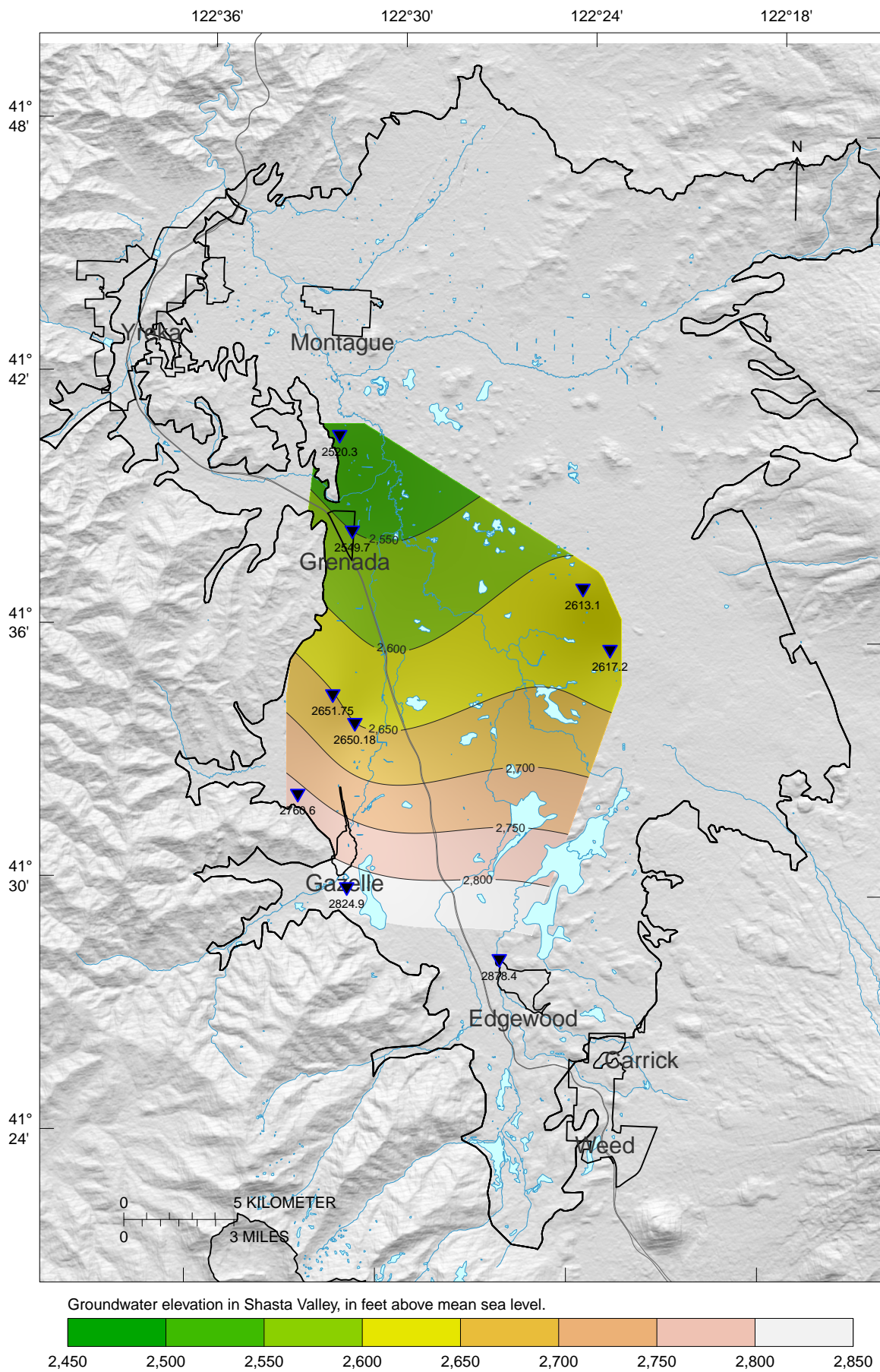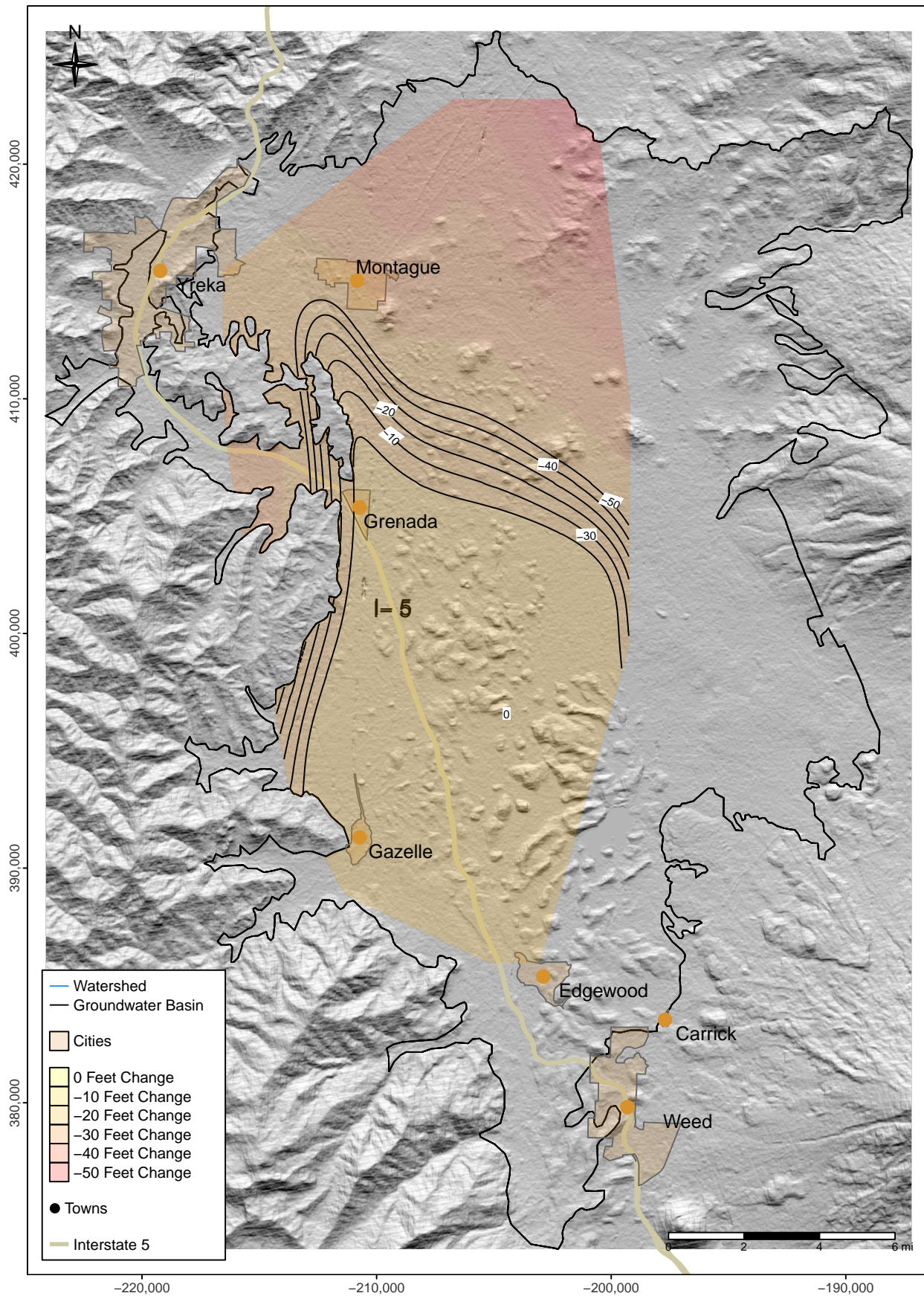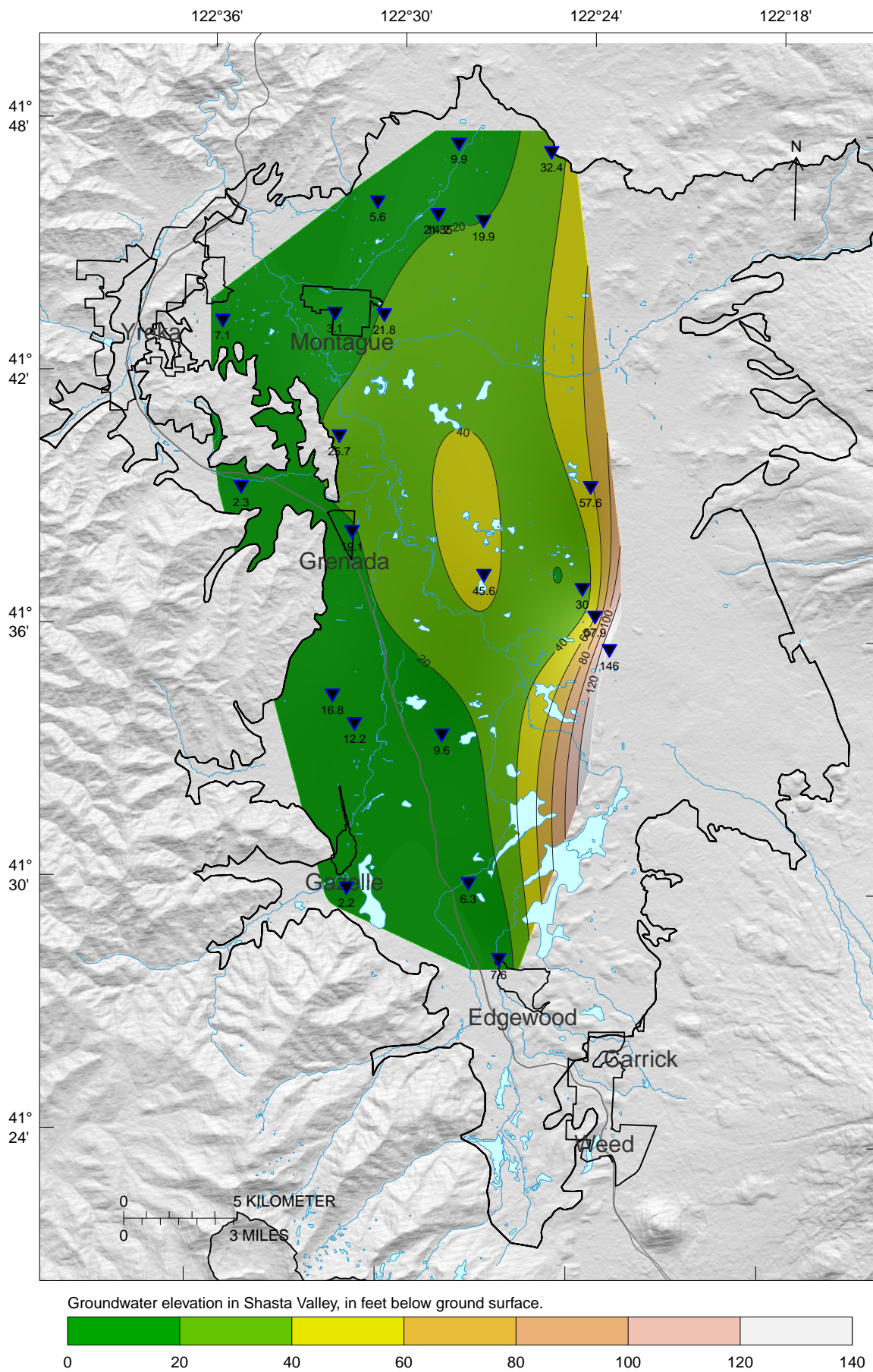
Figure 12: Shasta Valley Groundwater Elevations, Fall 1979

Figure 13: Shasta Valley Groundwater Change from Spring 1986 to Spring 2018

Groundwater Contour Maps - Depth Below Groundwater Surface

Water level changes are shown in Figure 24 for the period between Spring 1978 and Spring 2018. Groundwater contours for depth below ground surface are below.

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in RGEOSUnaryPredFunc(spgeom, byid, "rgeos_isvalid"): Ring Self-
## intersection at or near point -200123.40045424999 401671.69310635998
```

```
## Warning in gw_elevation.raster_spring_1986 - gw_elevation.raster_spring_2018:
## Raster objects have different extents. Result for their intersection is returned
```

```
## Warning in sp::proj4string(obj): CRS object has comment, which is lost in output
```

```
## Warning: One tm layer group has duplicated layer types, which are omitted. To
## draw multiple layers of the same type, use multiple layer groups (i.e. specify
## tm_shape prior to each of them).
```
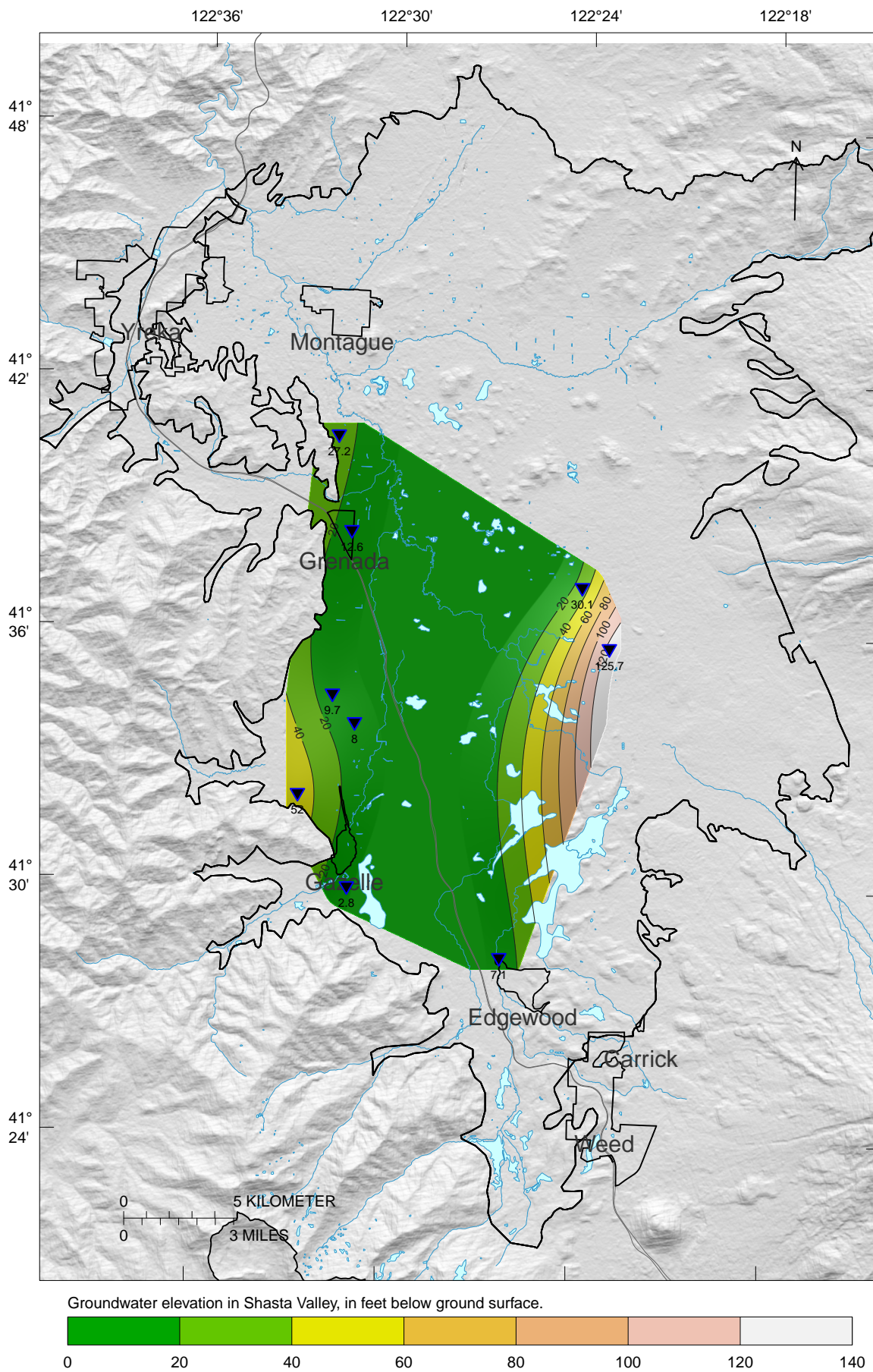
Groundwater elevation in Shasta Valley, in feet below ground surface.

Figure 14: Shasta Valley Groundwater Contours, Spring 2019

Groundwater elevation in Shasta Valley, in feet below ground surface.
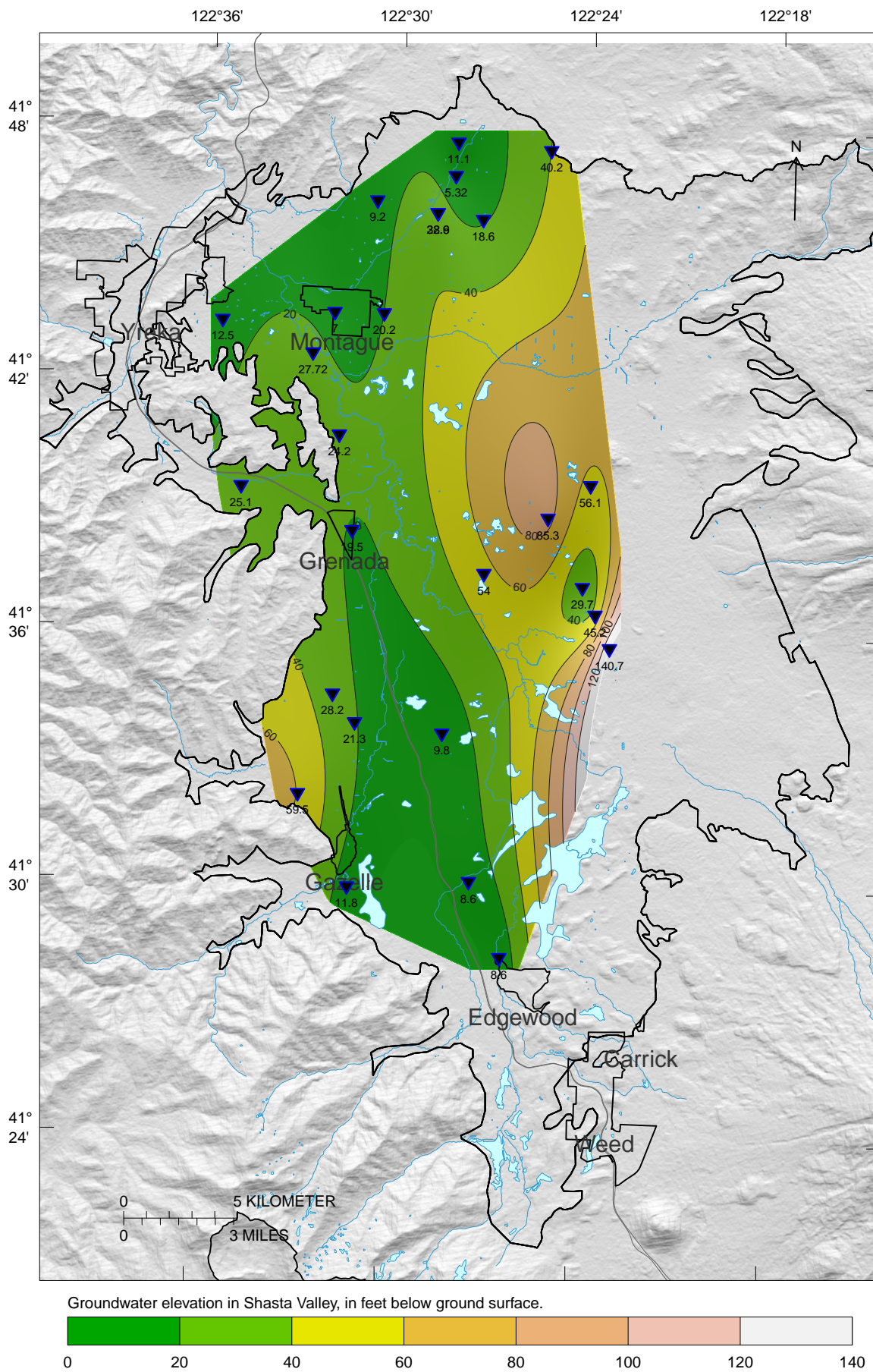
Figure 15: Shasta Valley Groundwater Contours, Fall 2018

Groundwater elevation in Shasta Valley, in feet below ground surface.
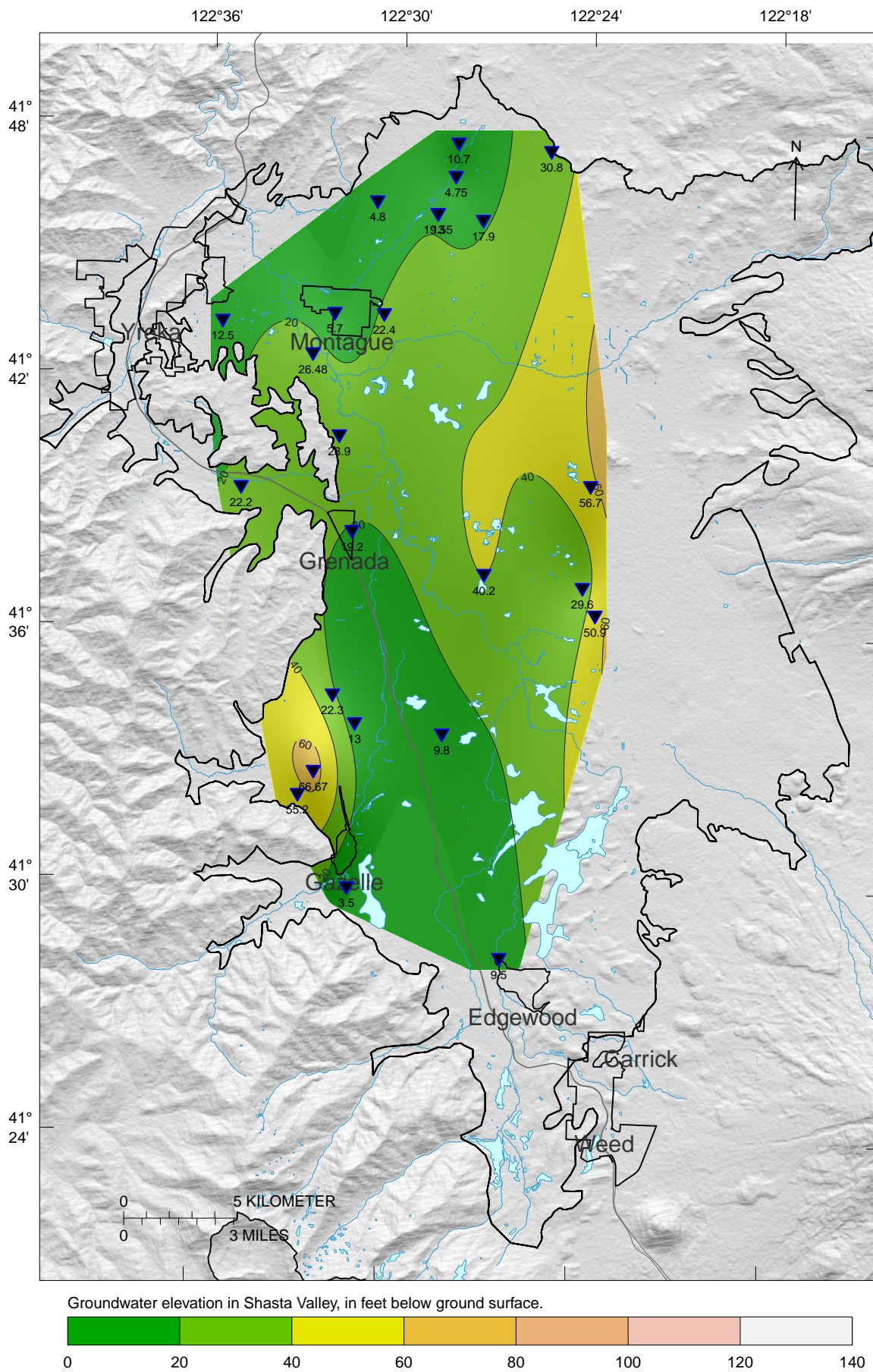
Figure 16: Shasta Valley Groundwater Contours, Spring 2018

Groundwater elevation in Shasta Valley, in feet below ground surface.
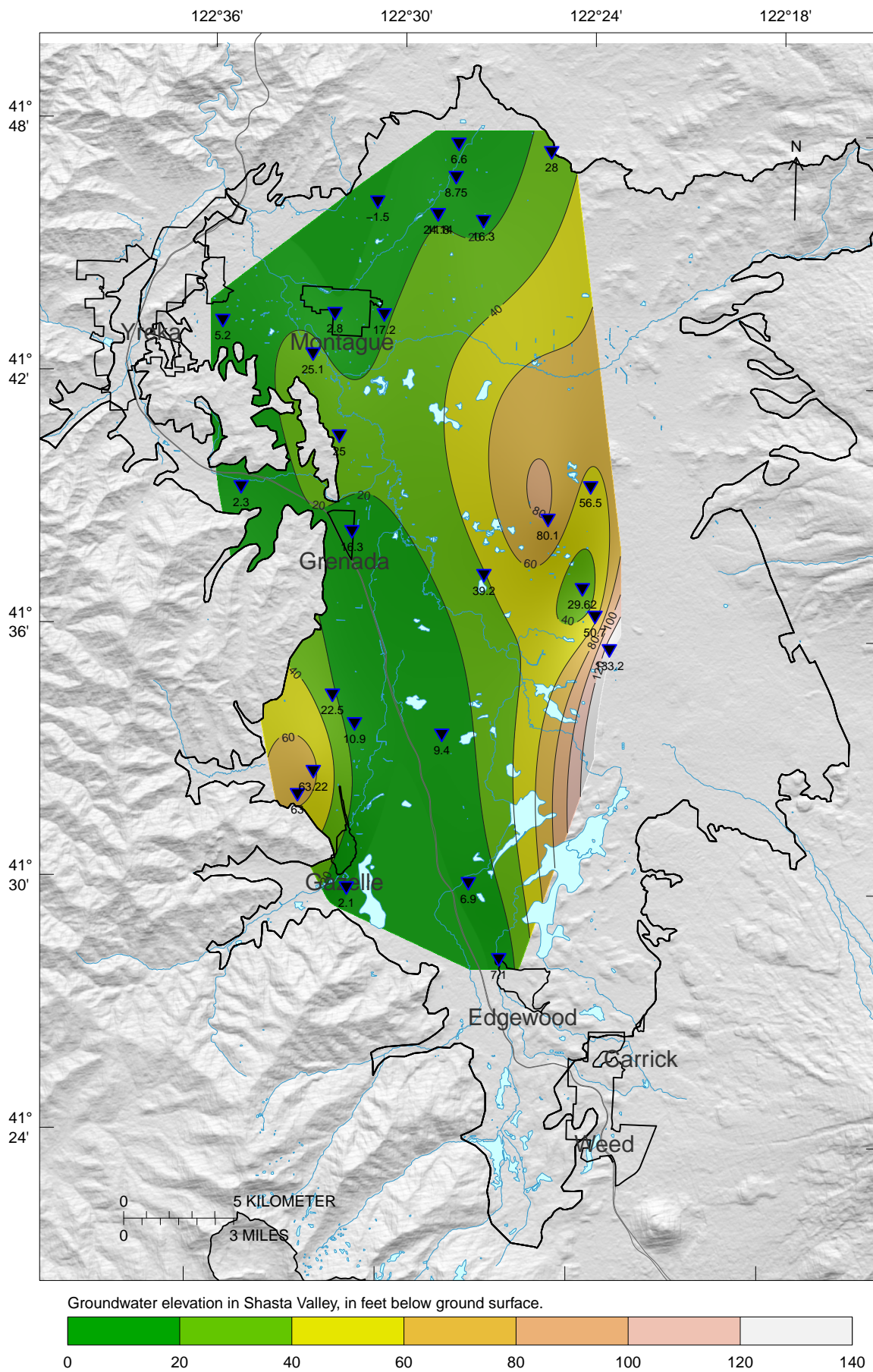
Figure 17: Shasta Valley Groundwater Contours, Spring 2017

Groundwater elevation in Shasta Valley, in feet below ground surface.
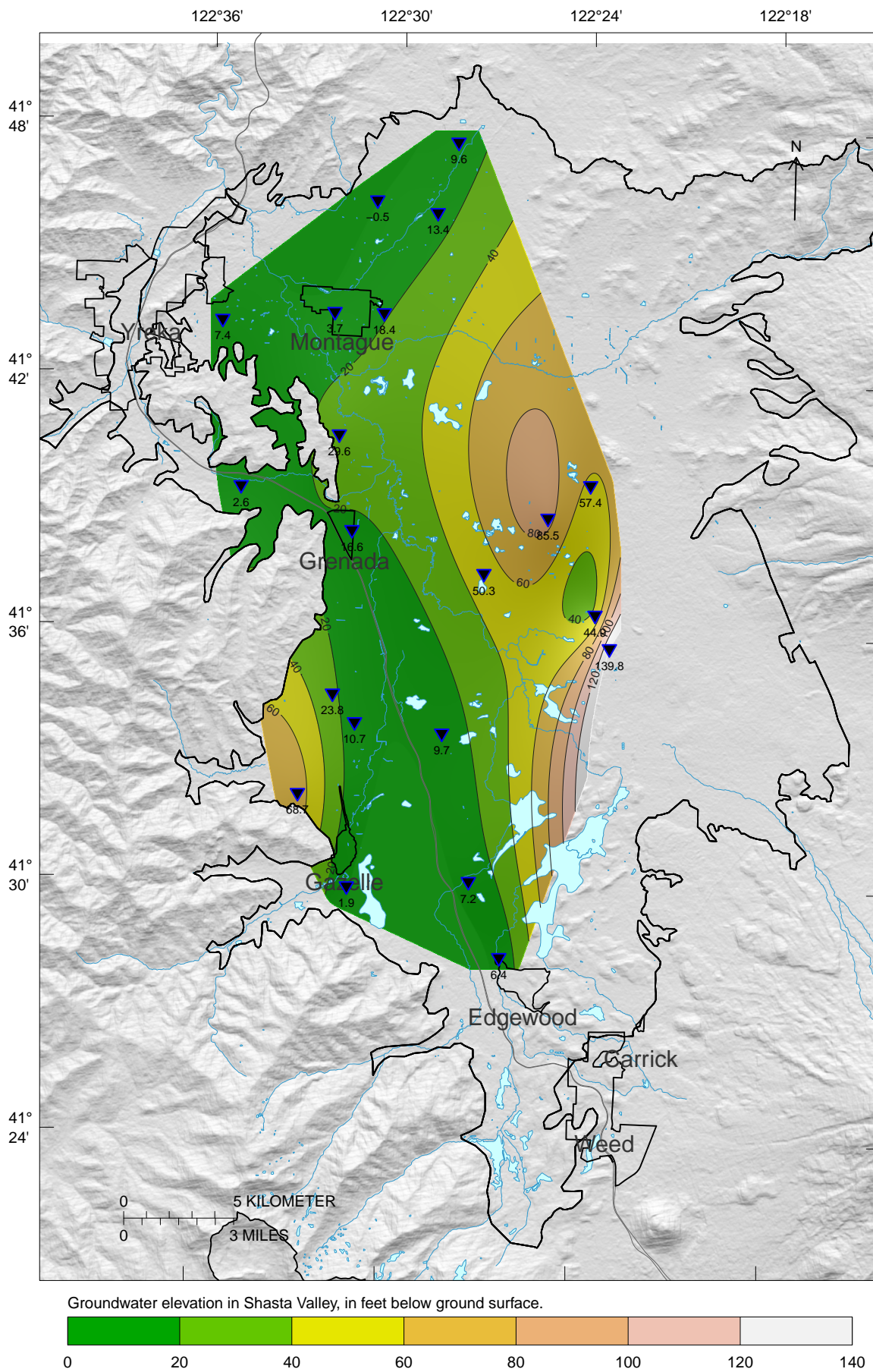
Figure 18: Shasta Valley Groundwater Contours, Spring 2016

Groundwater elevation in Shasta Valley, in feet below ground surface.
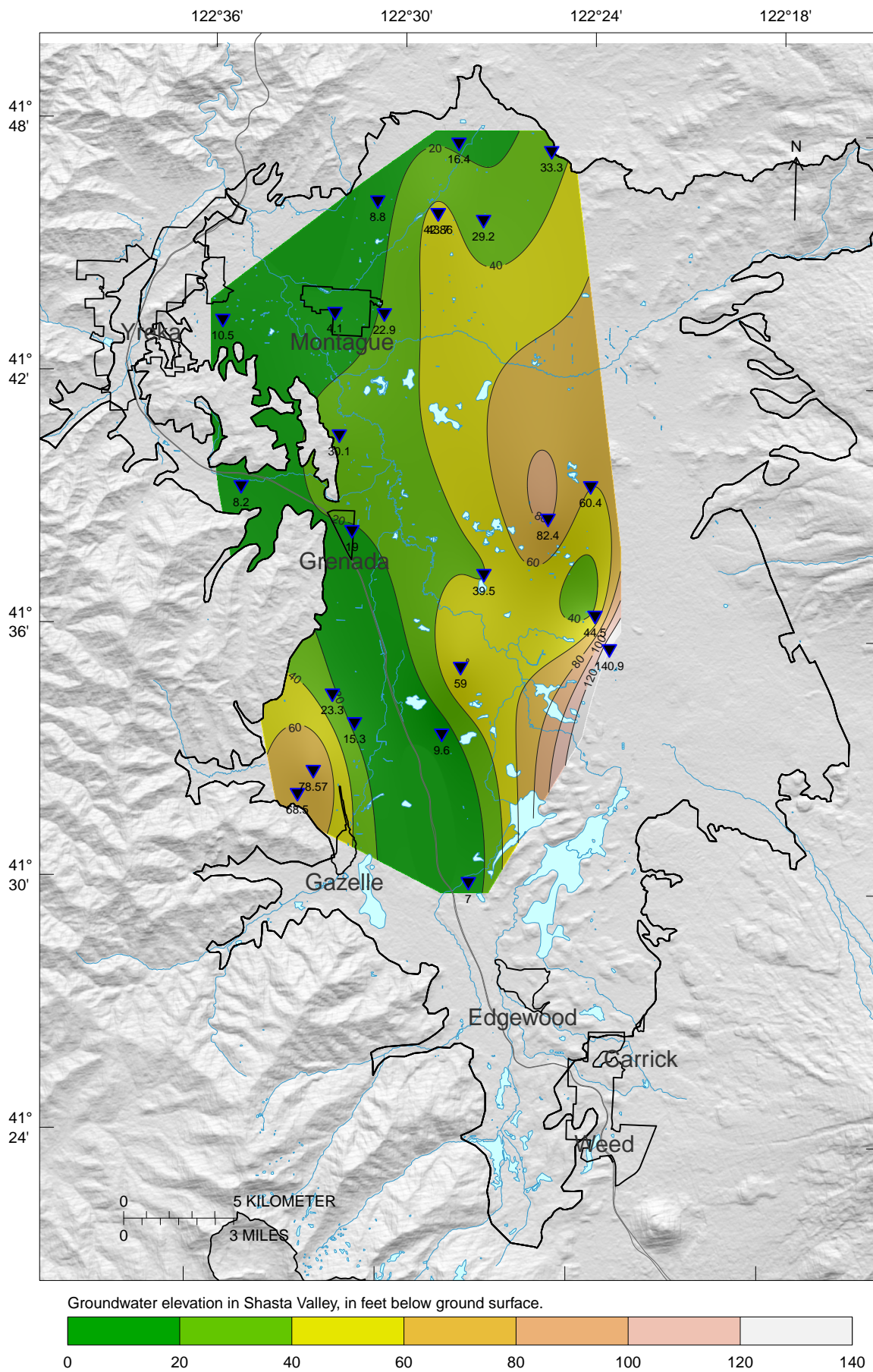
Figure 19: Shasta Valley Groundwater Contour, Spring 2015

Groundwater elevation in Shasta Valley, in feet below ground surface.
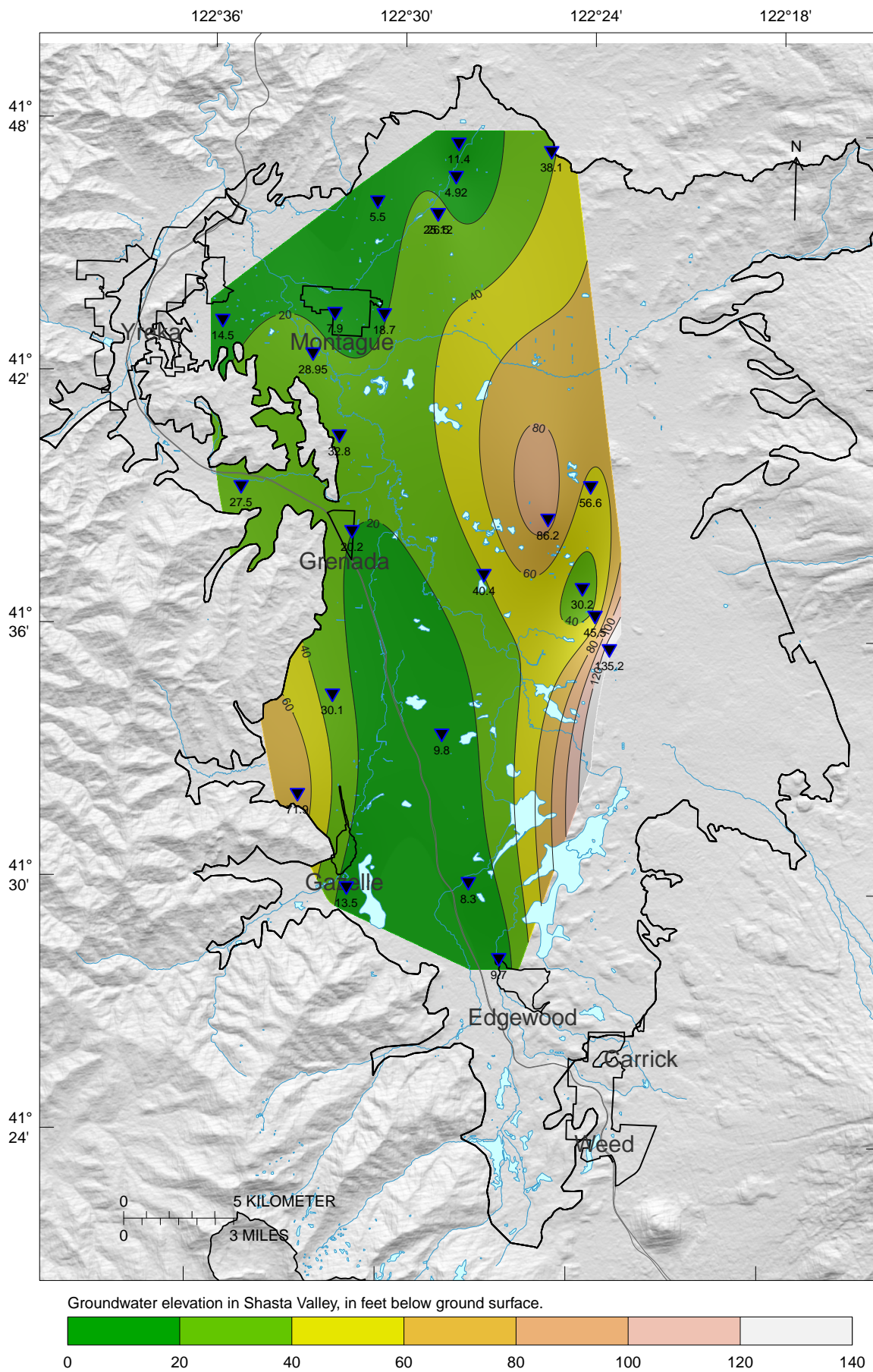
Figure 20: Shasta Valley Groundwater Contour, Fall 2015

Groundwater elevation in Shasta Valley, in feet below ground surface.
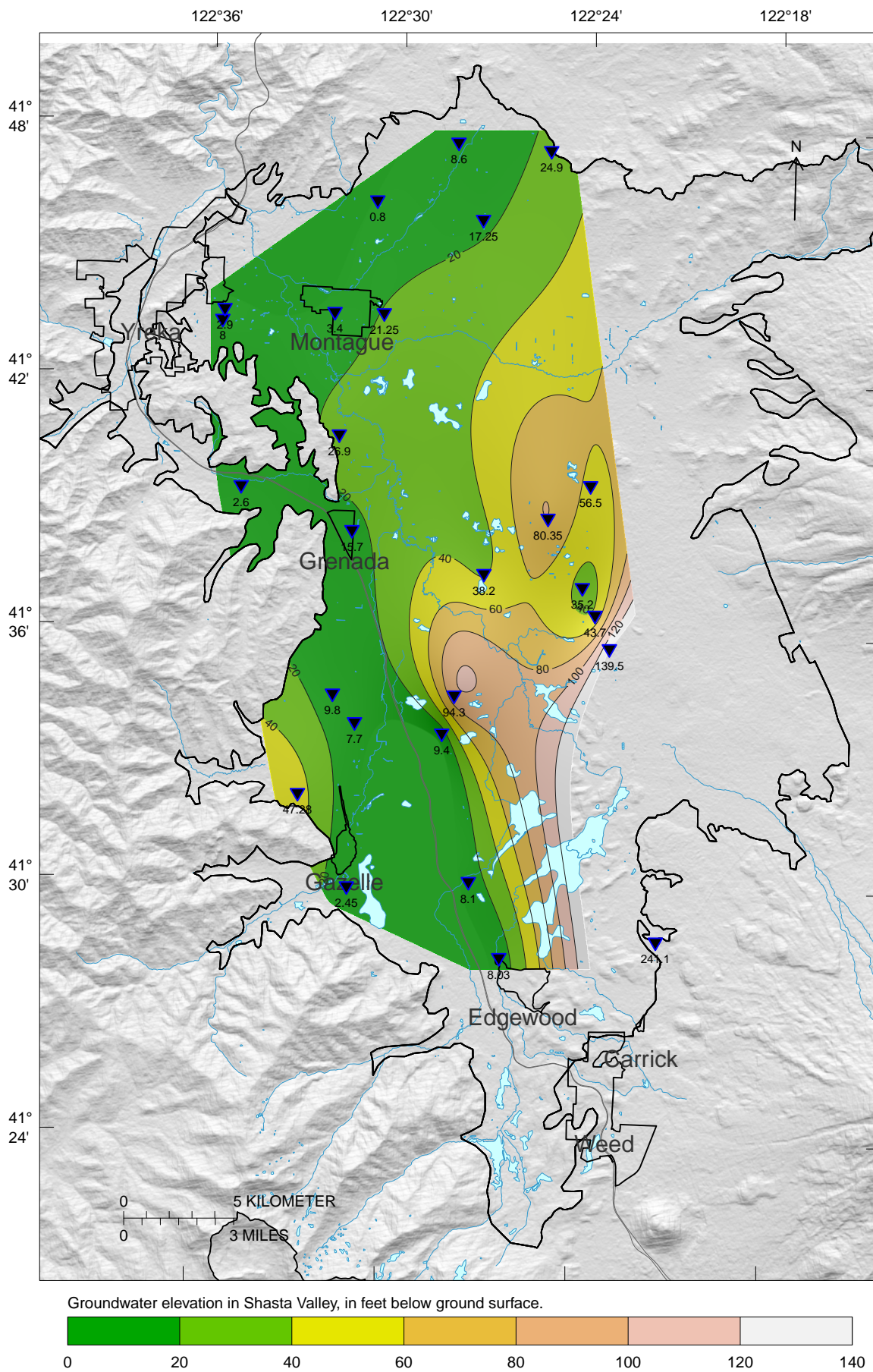
Figure 21: Shasta Valley Groundwater Contours, Spring 2008

Groundwater elevation in Shasta Valley, in feet below ground surface.
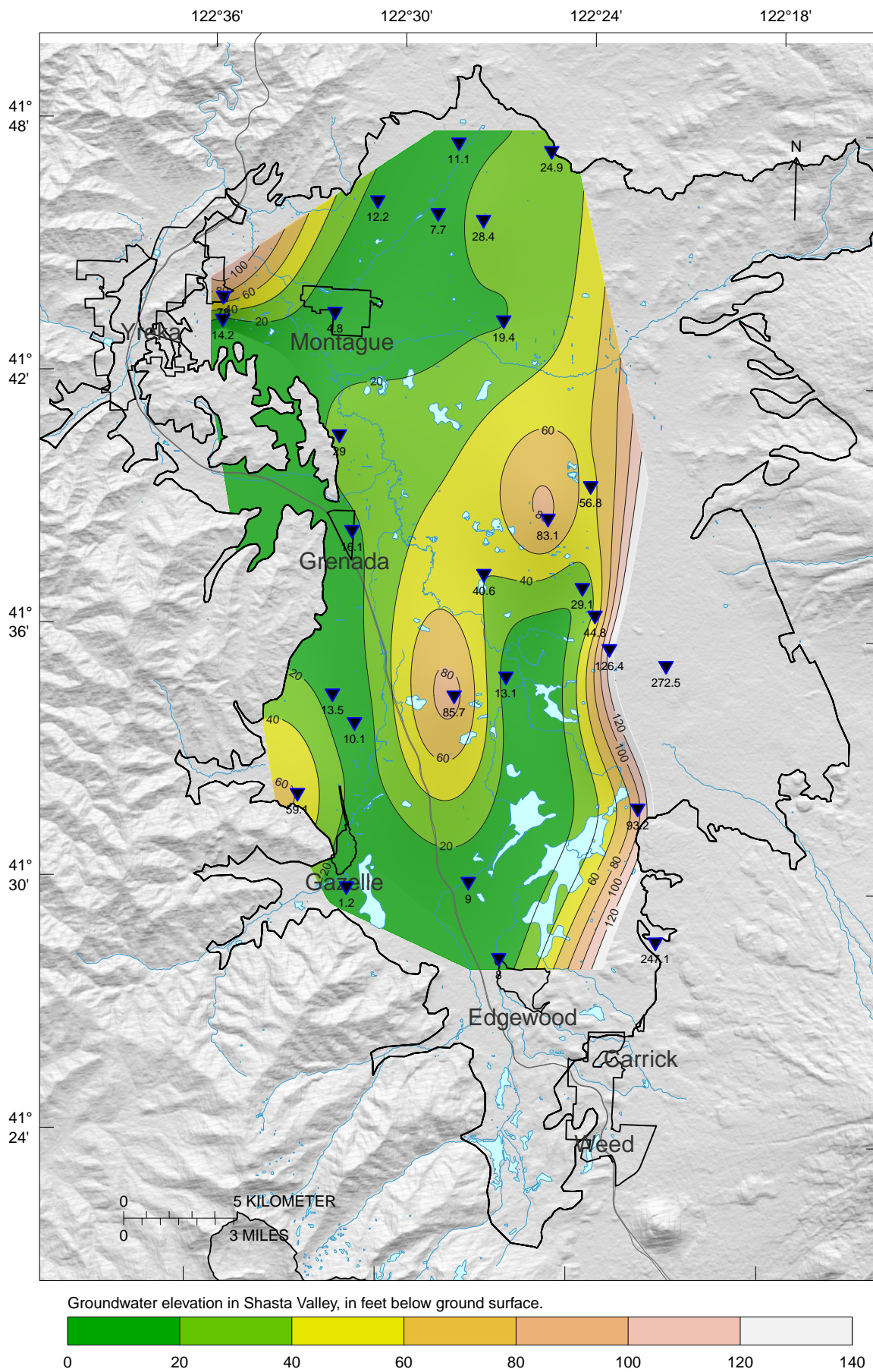
Figure 22: Shasta Valley Groundwater Contours, Spring 1991

Groundwater elevation in Shasta Valley, in feet below ground surface.

Figure 23: Shasta Valley Groundwater Contours, Spring 1986
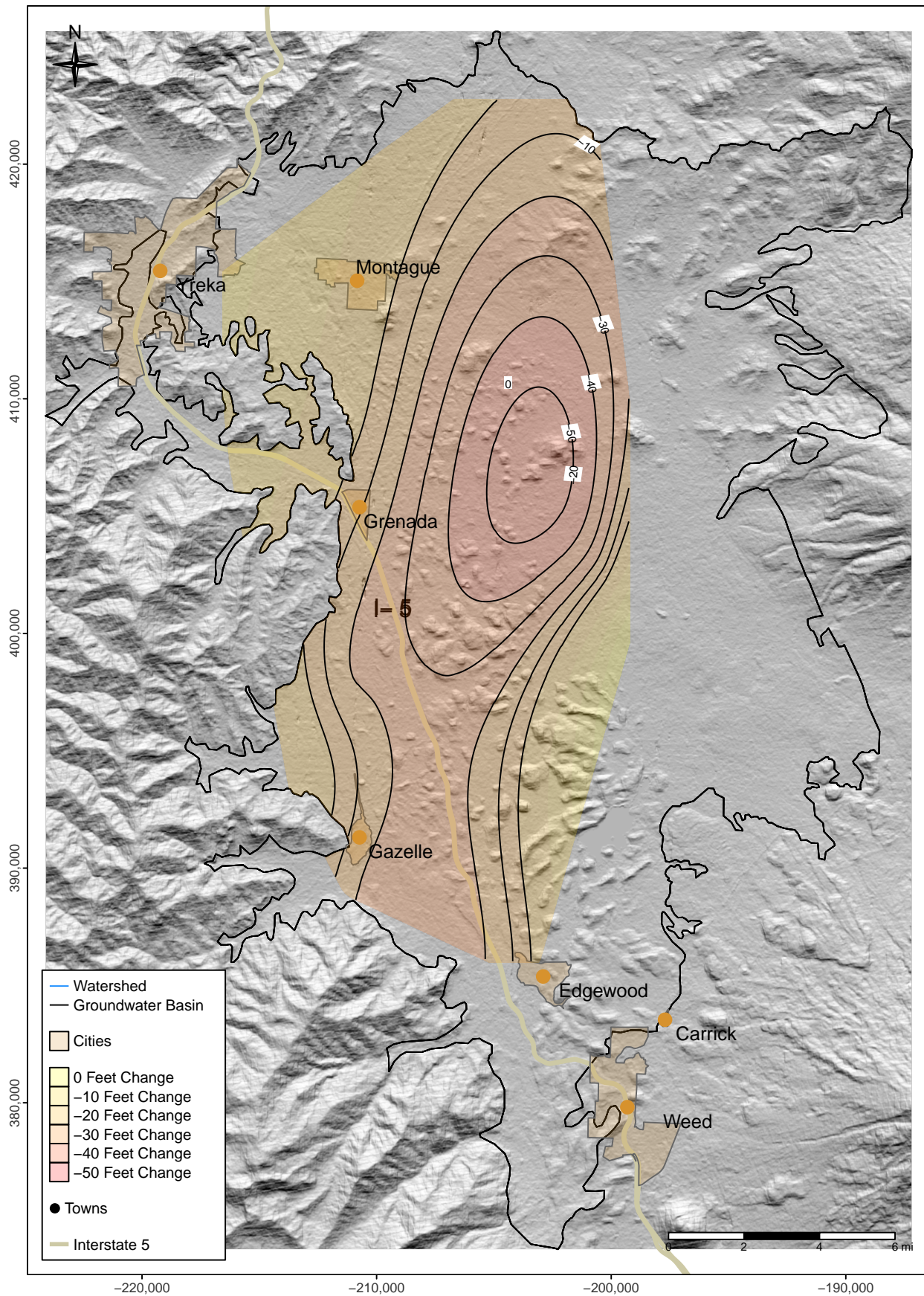
Figure 24: Shasta Valley Groundwater Change from Spring 1986 to Spring 2018

77 **Hydrographs**

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79
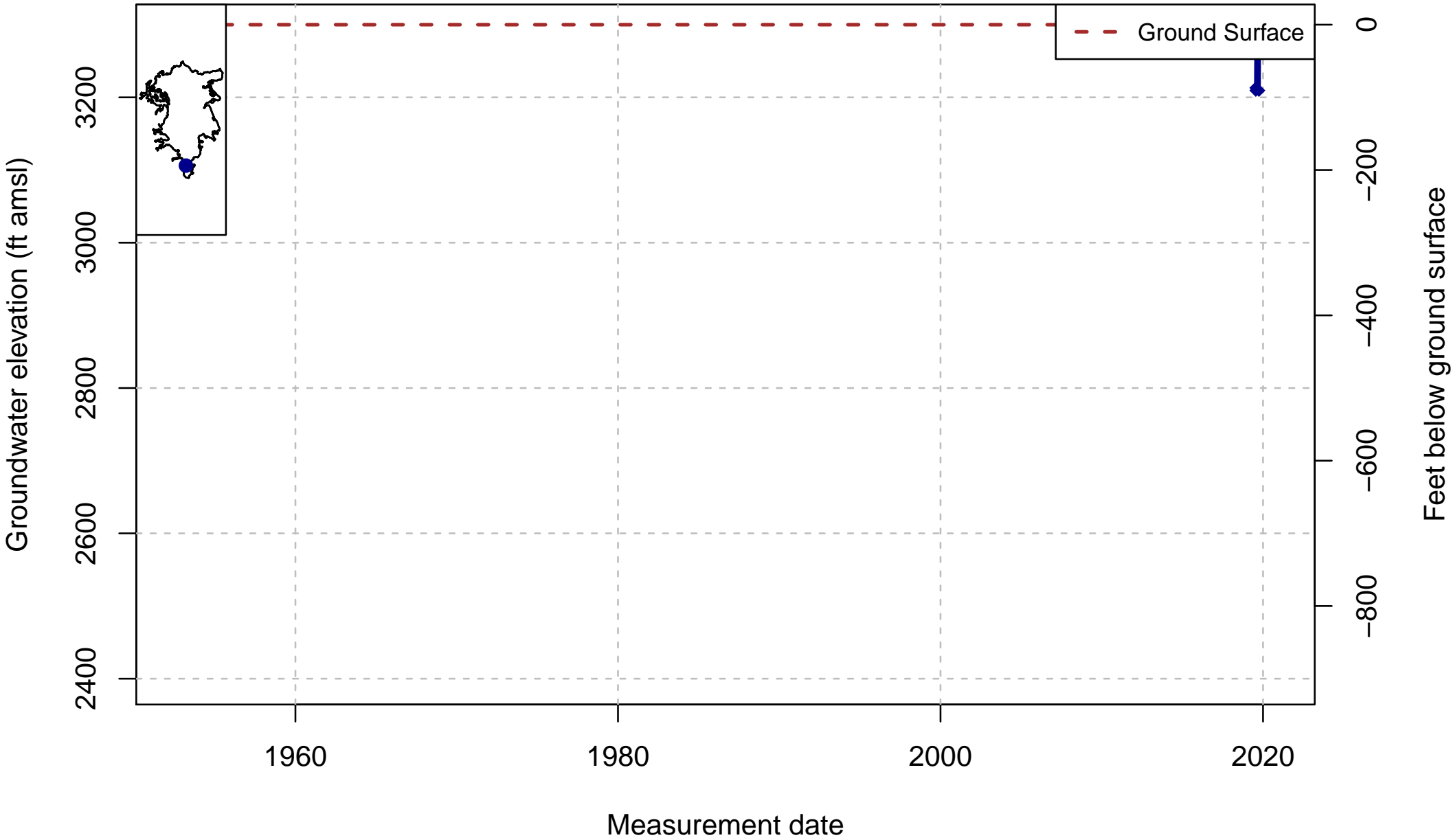
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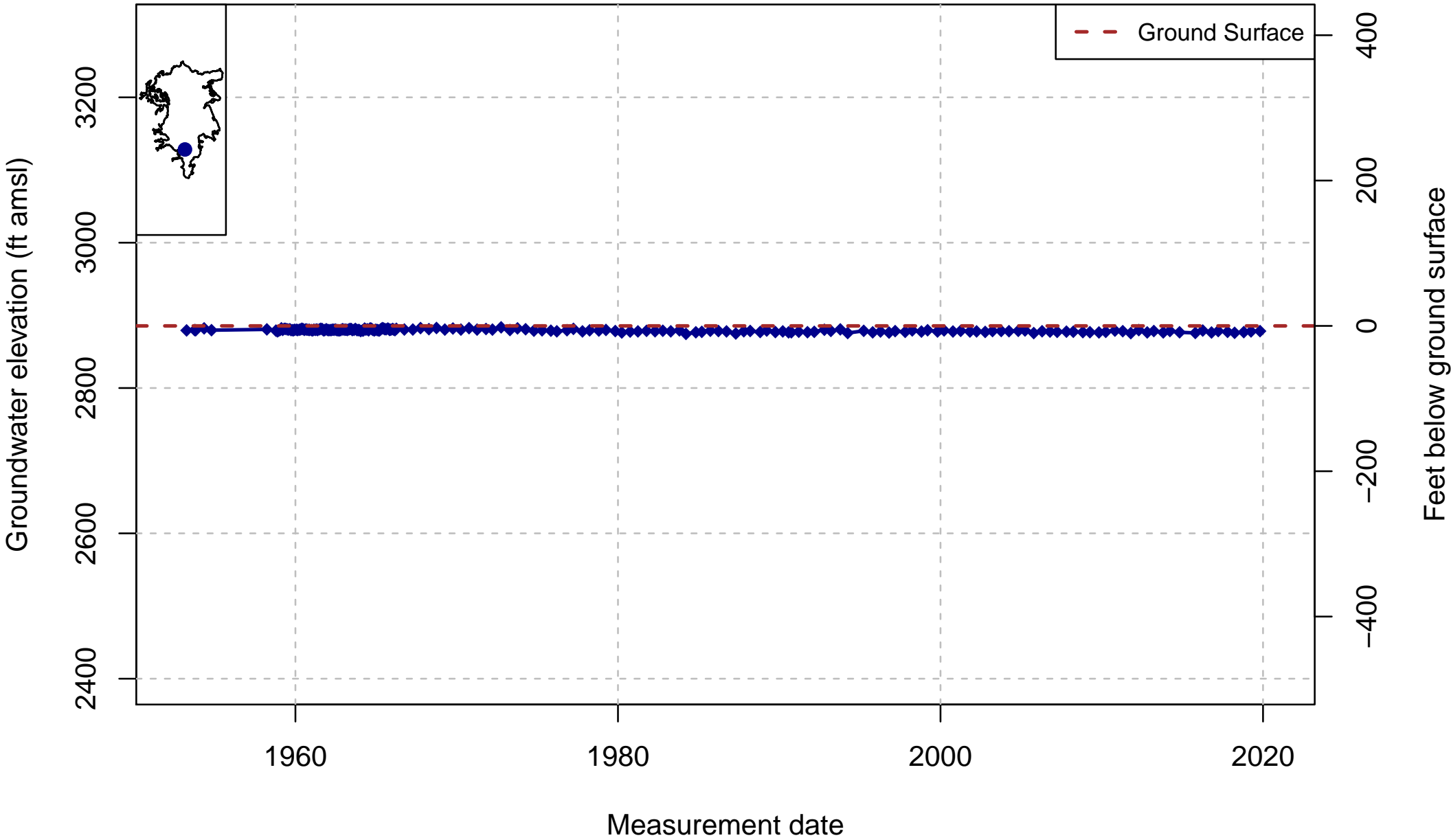
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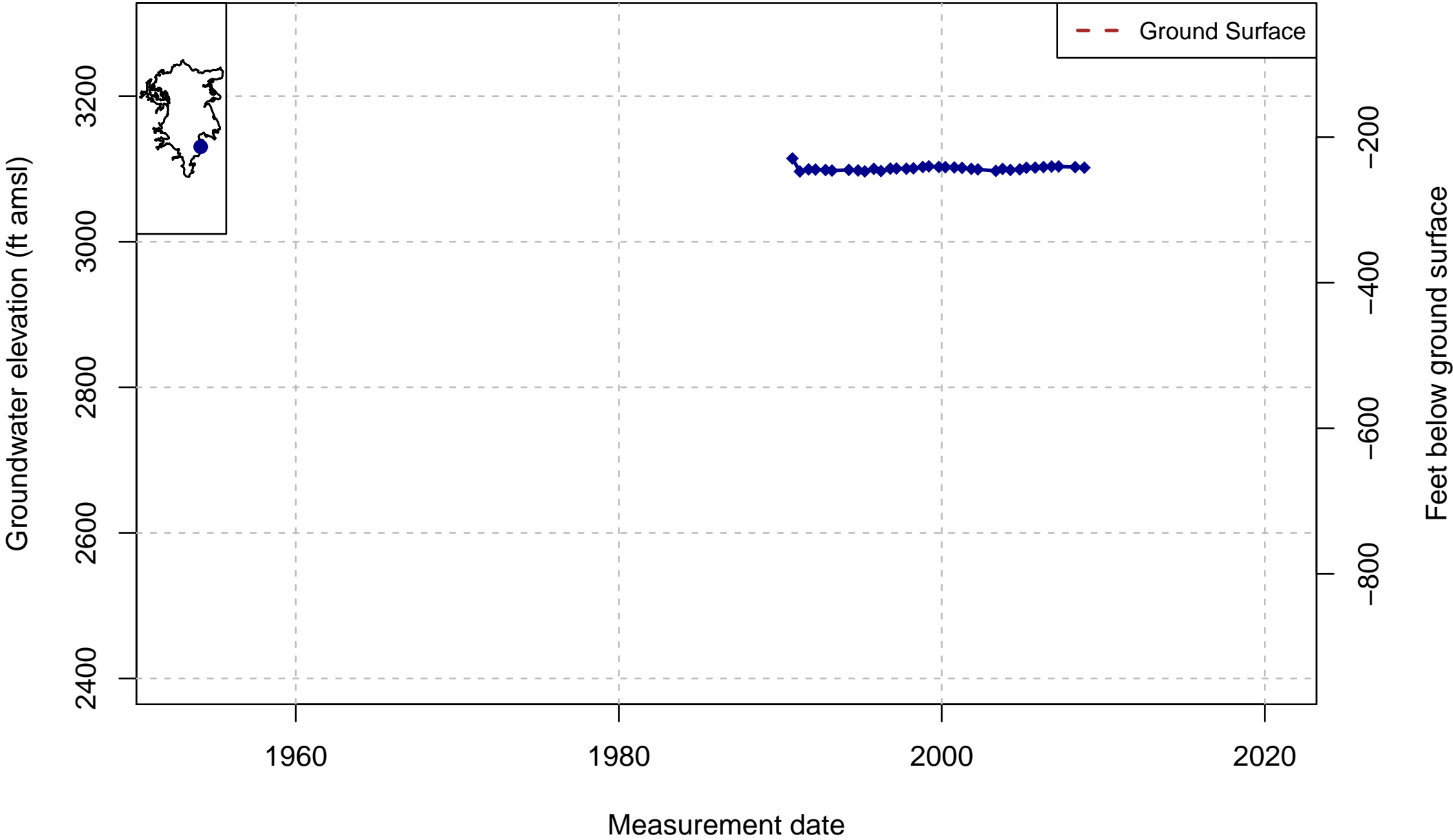
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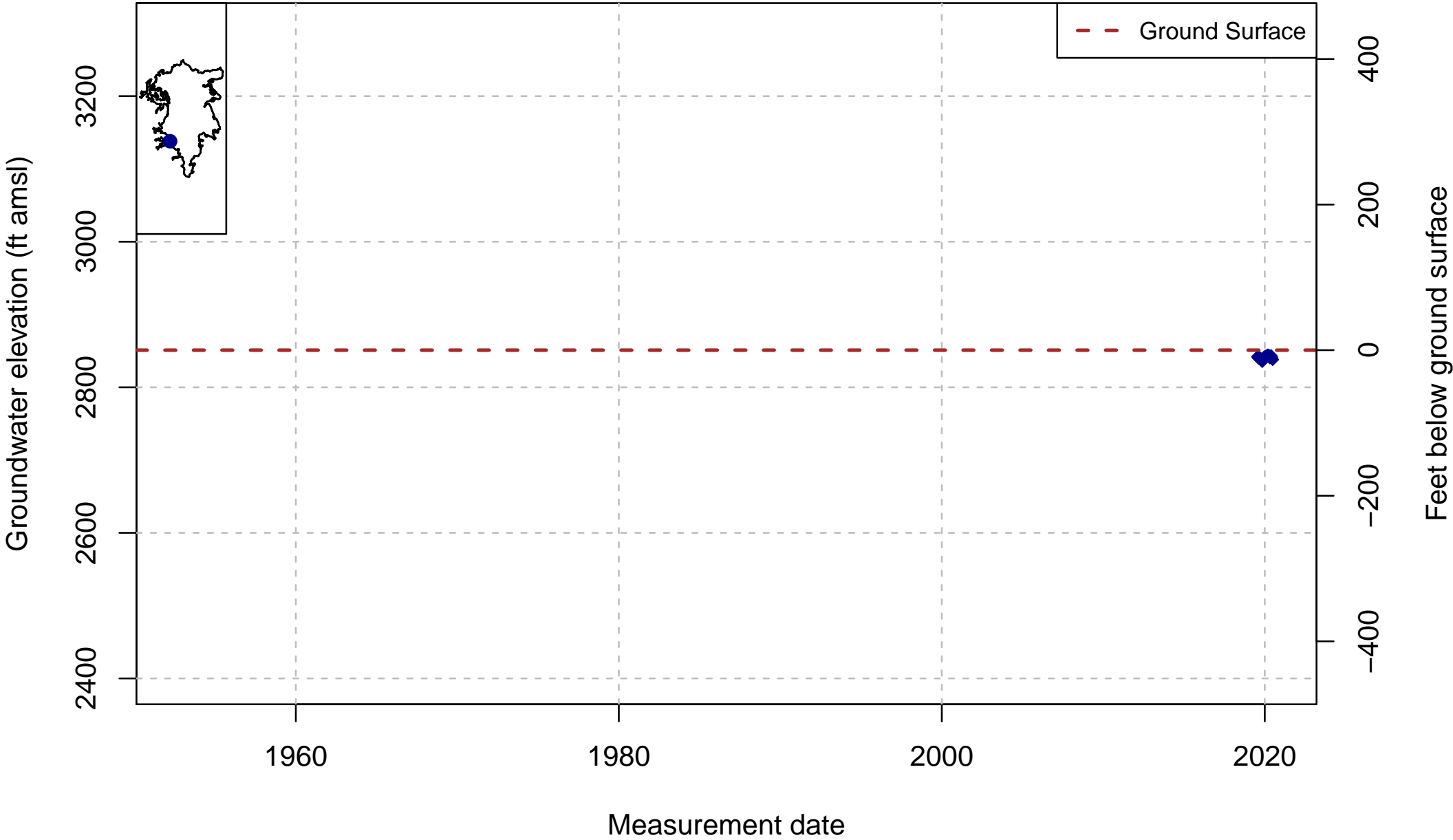
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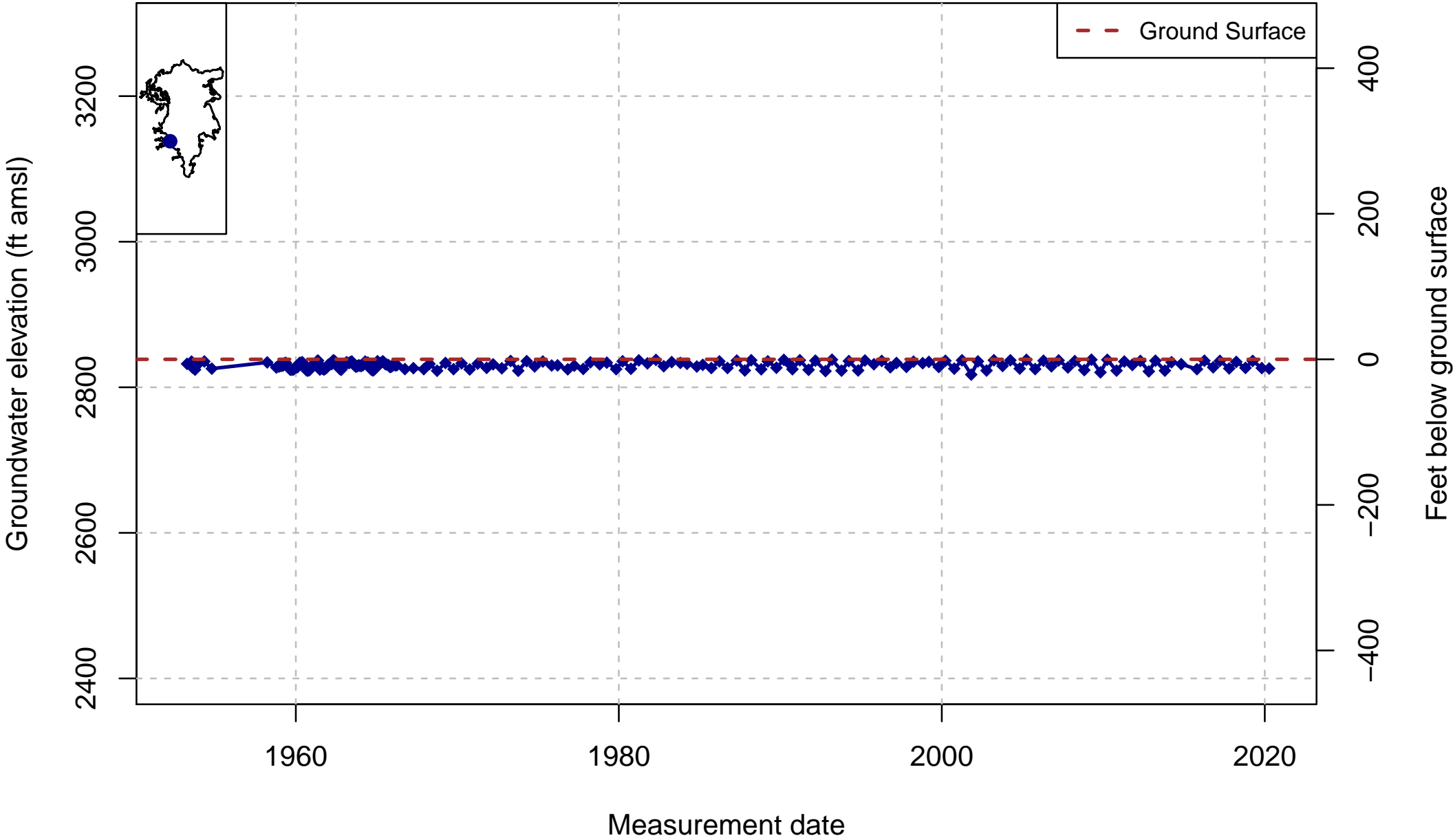
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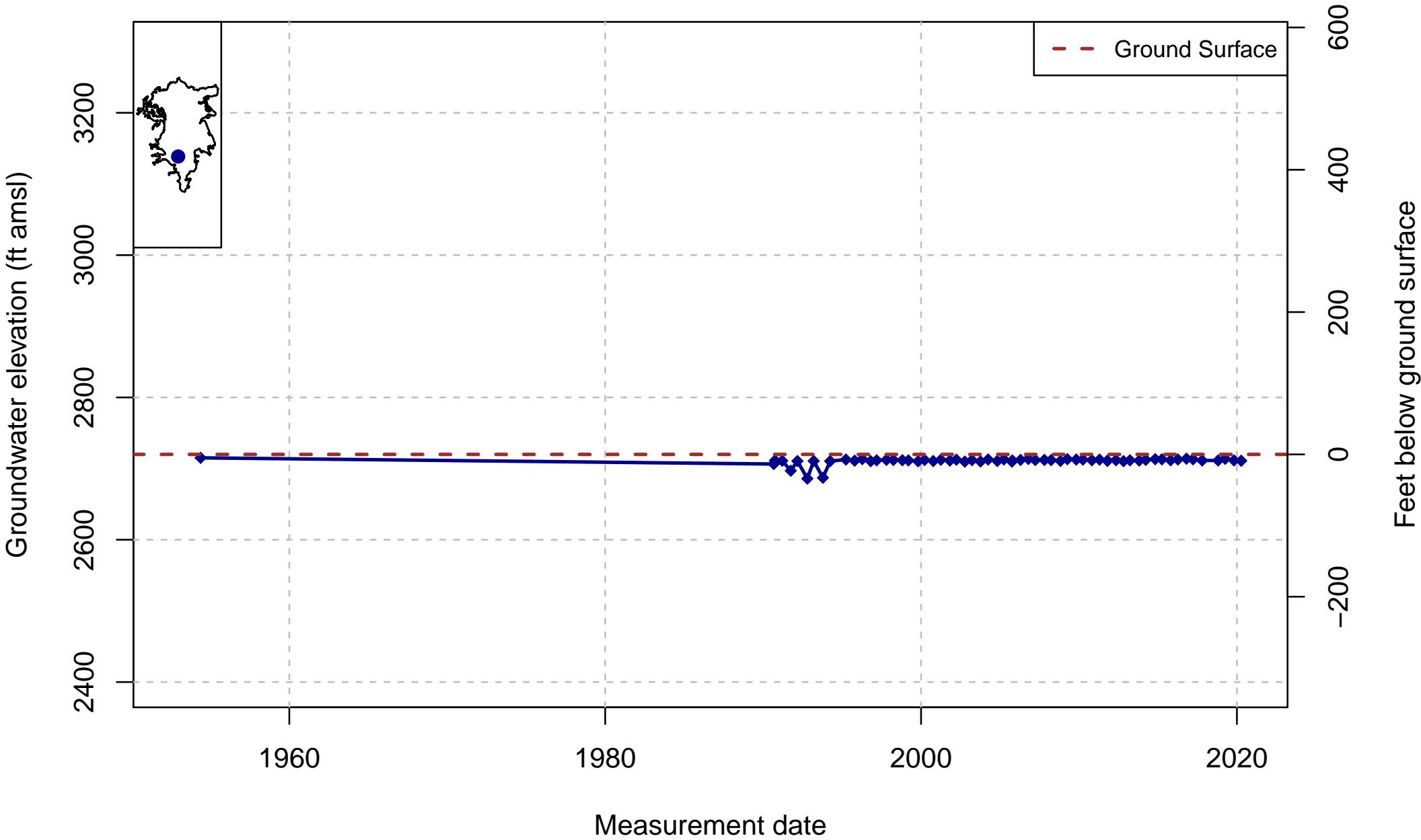
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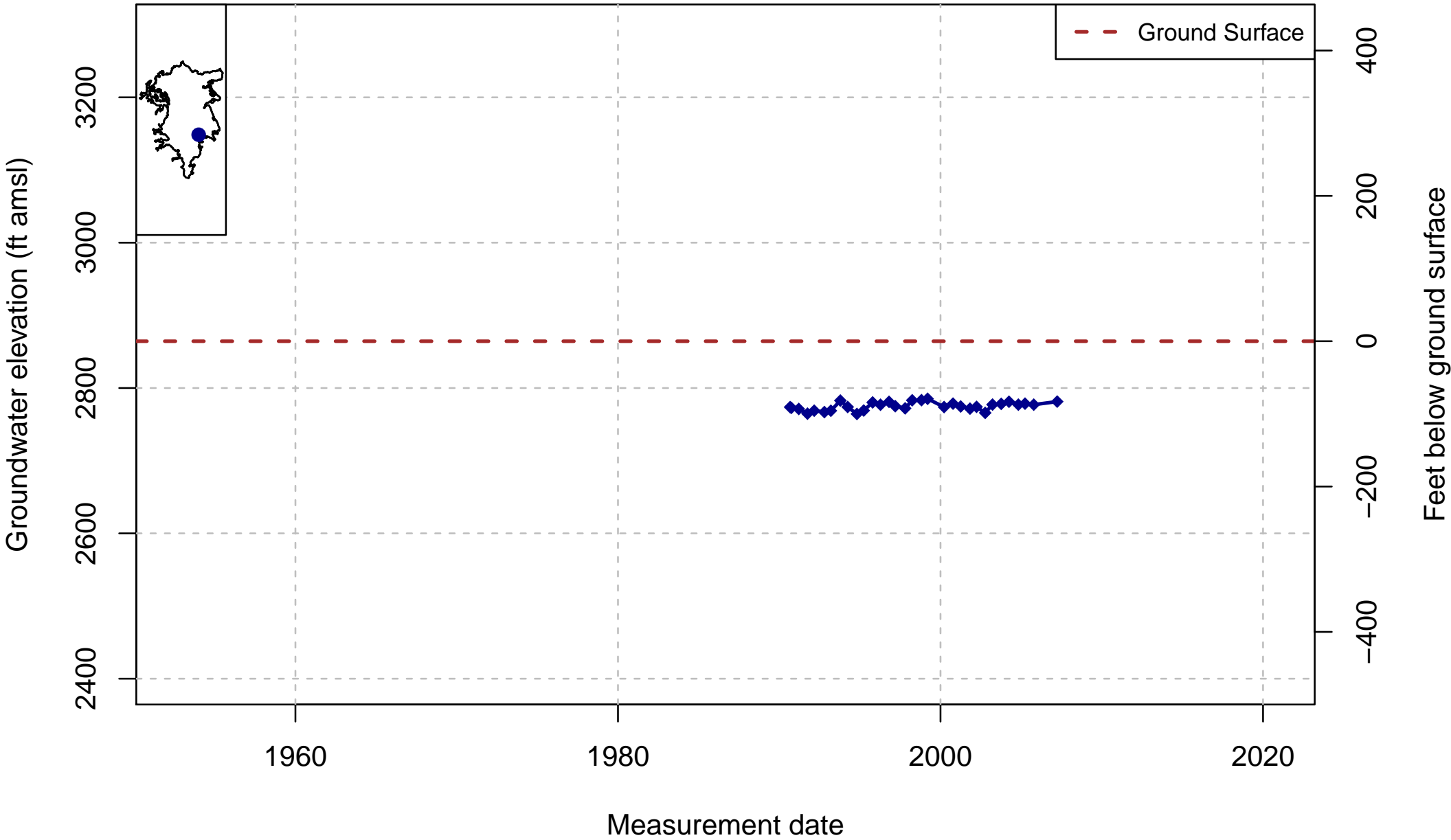
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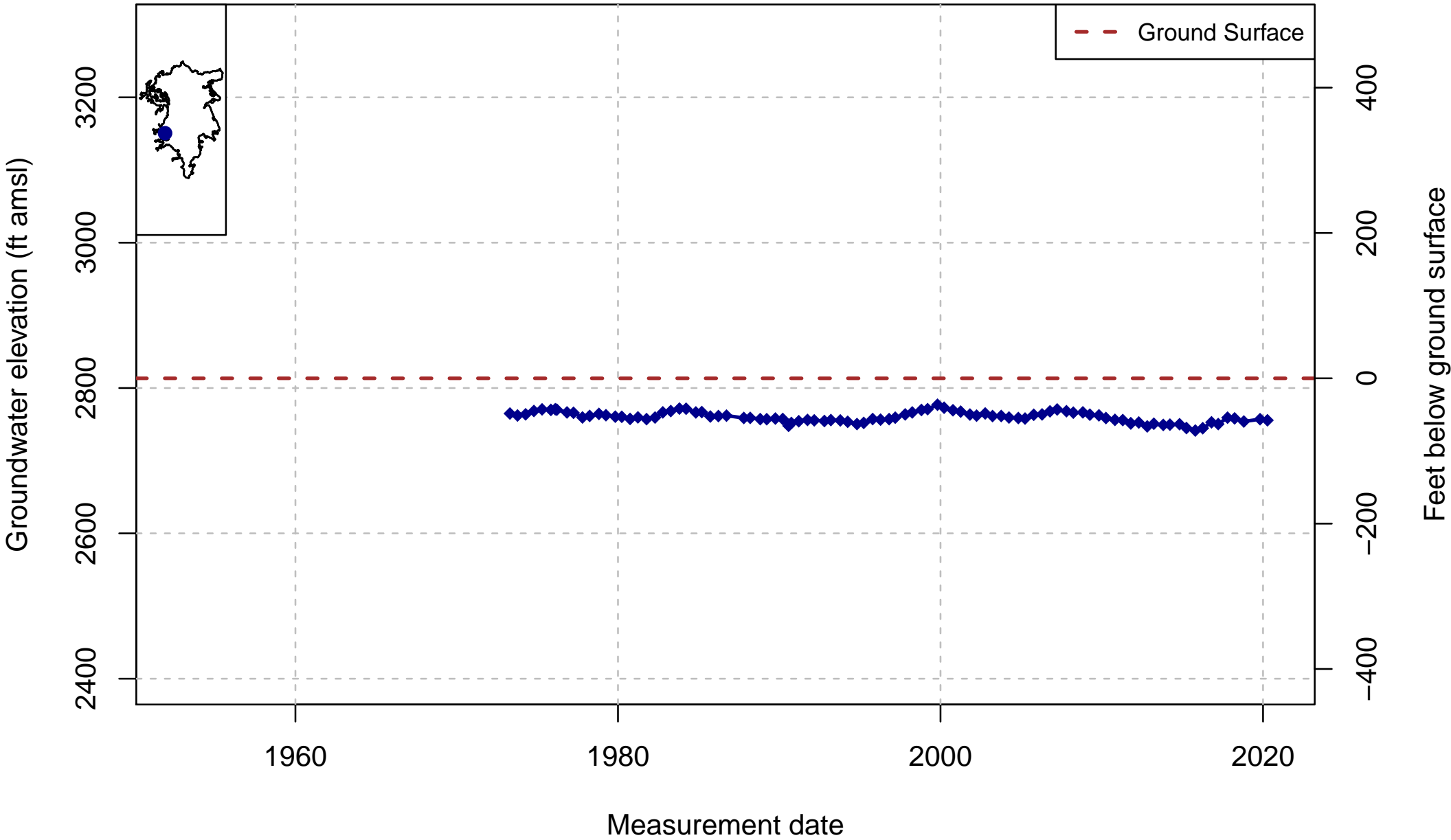
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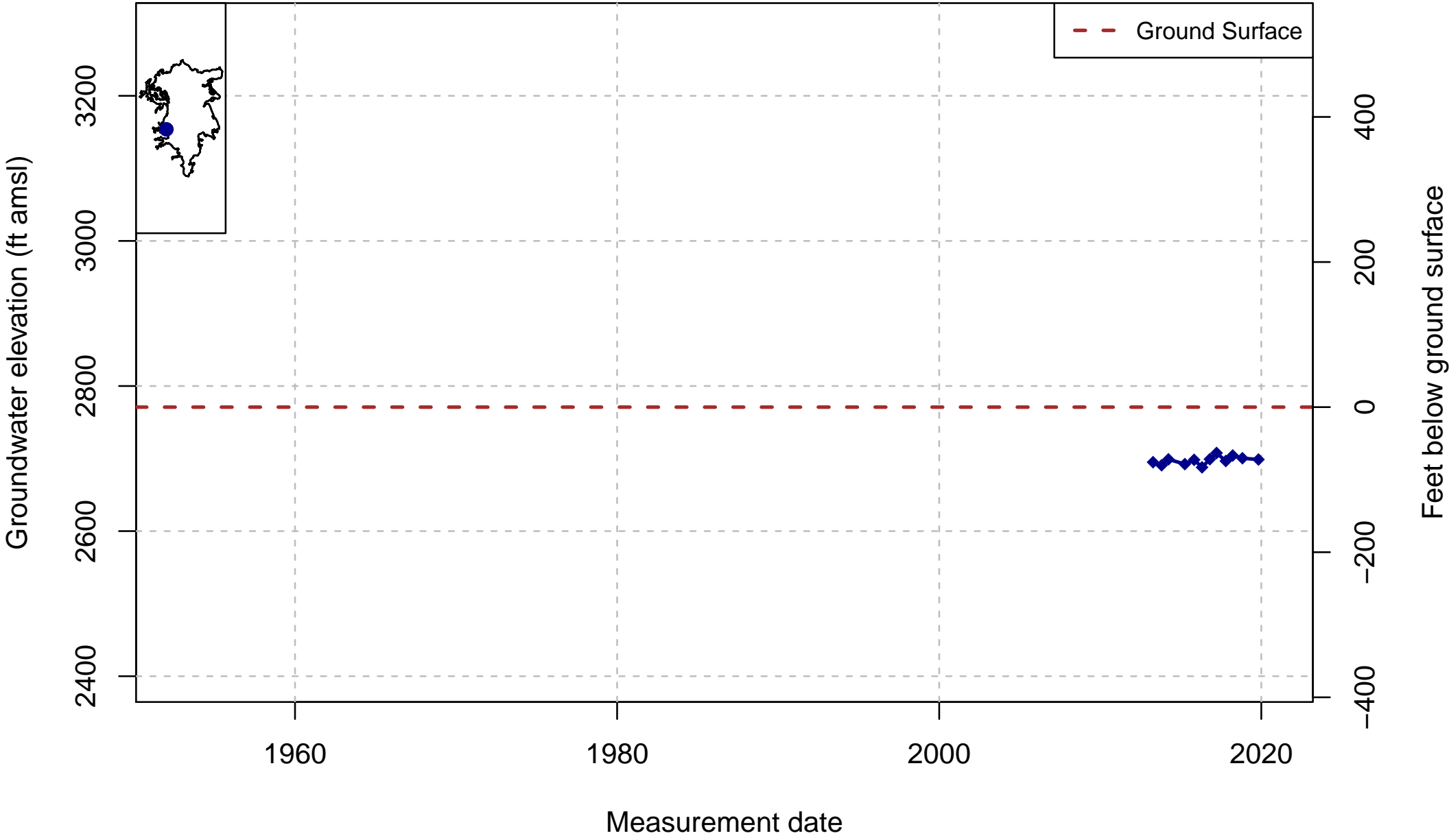
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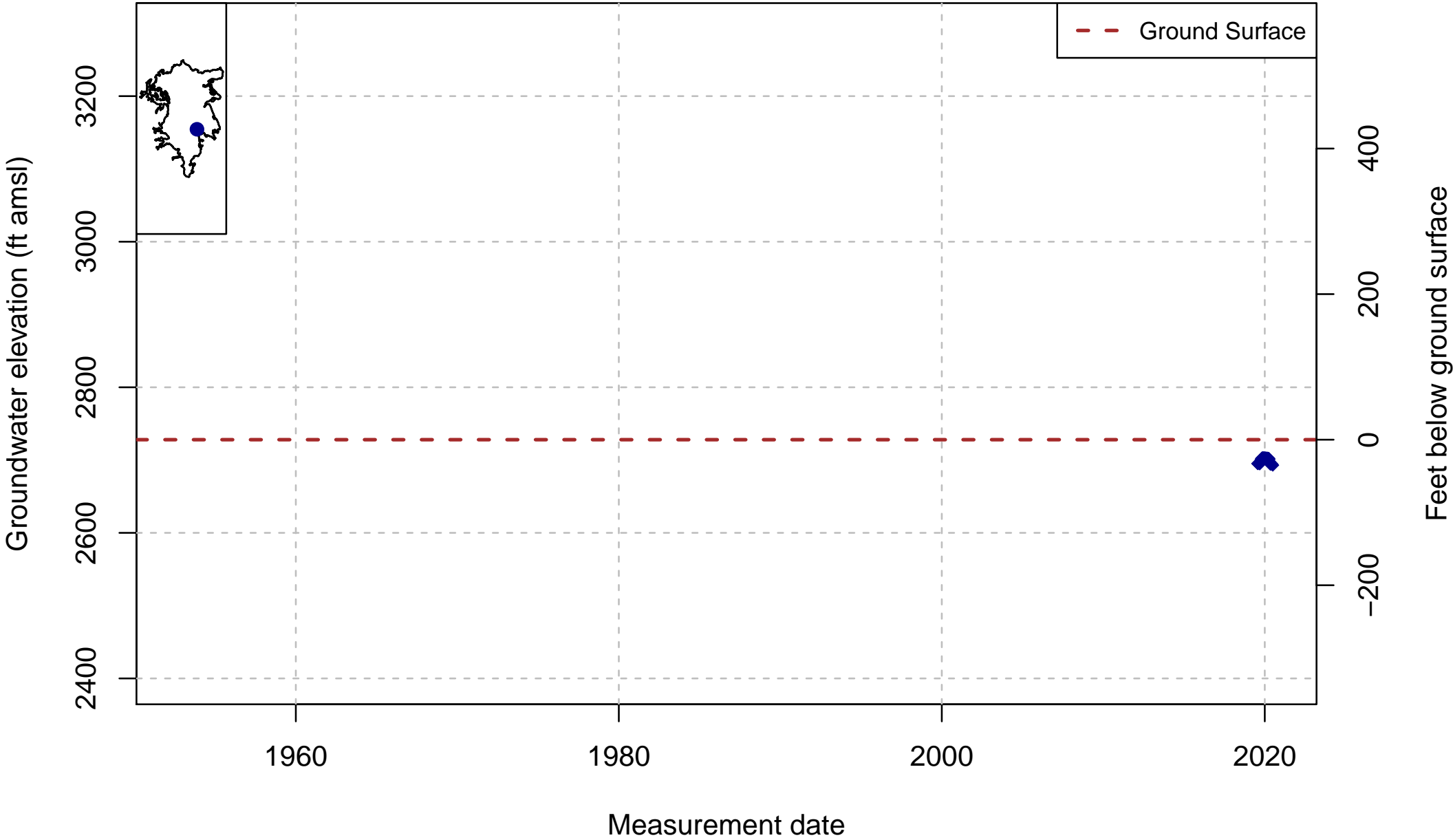
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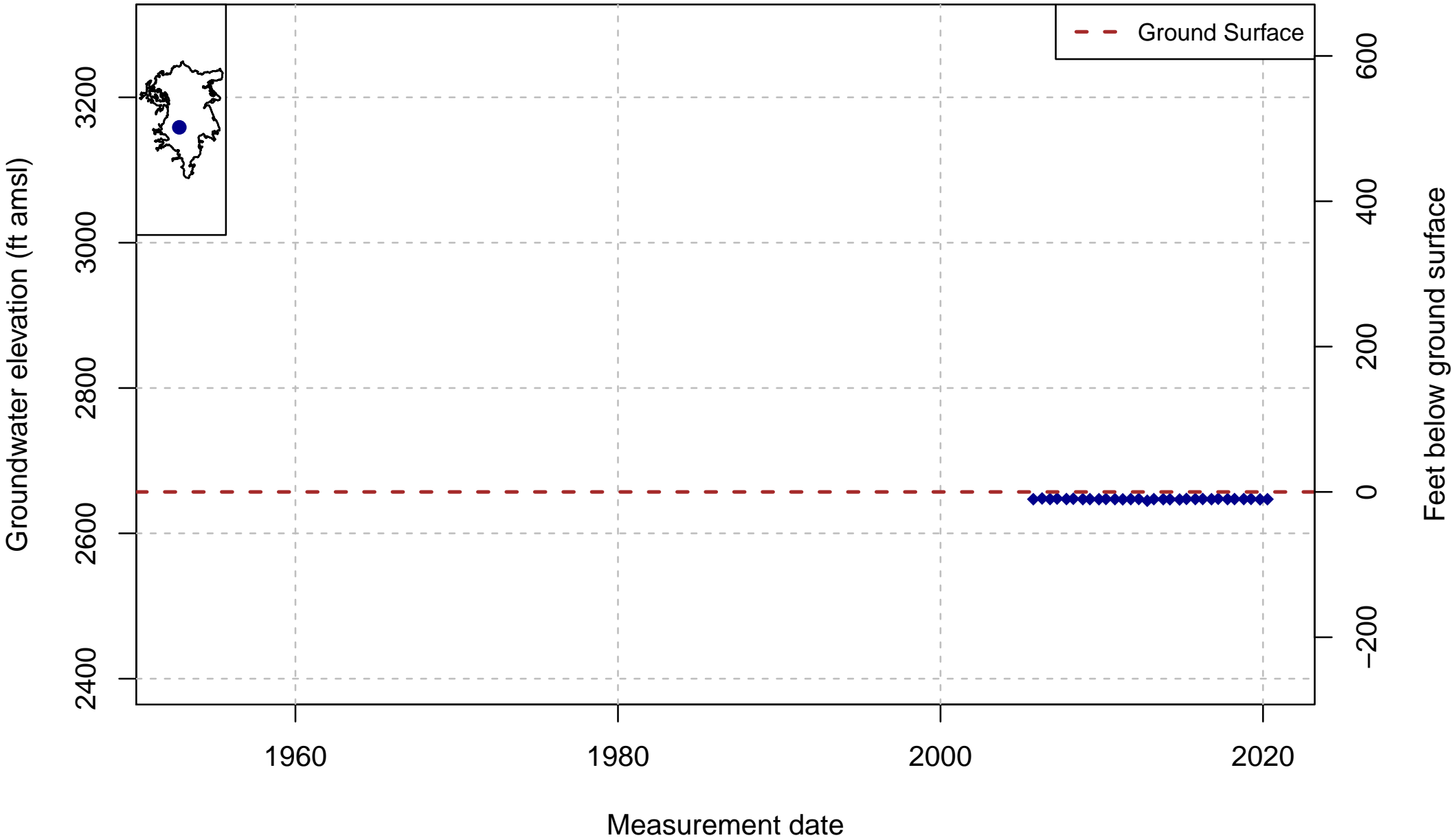
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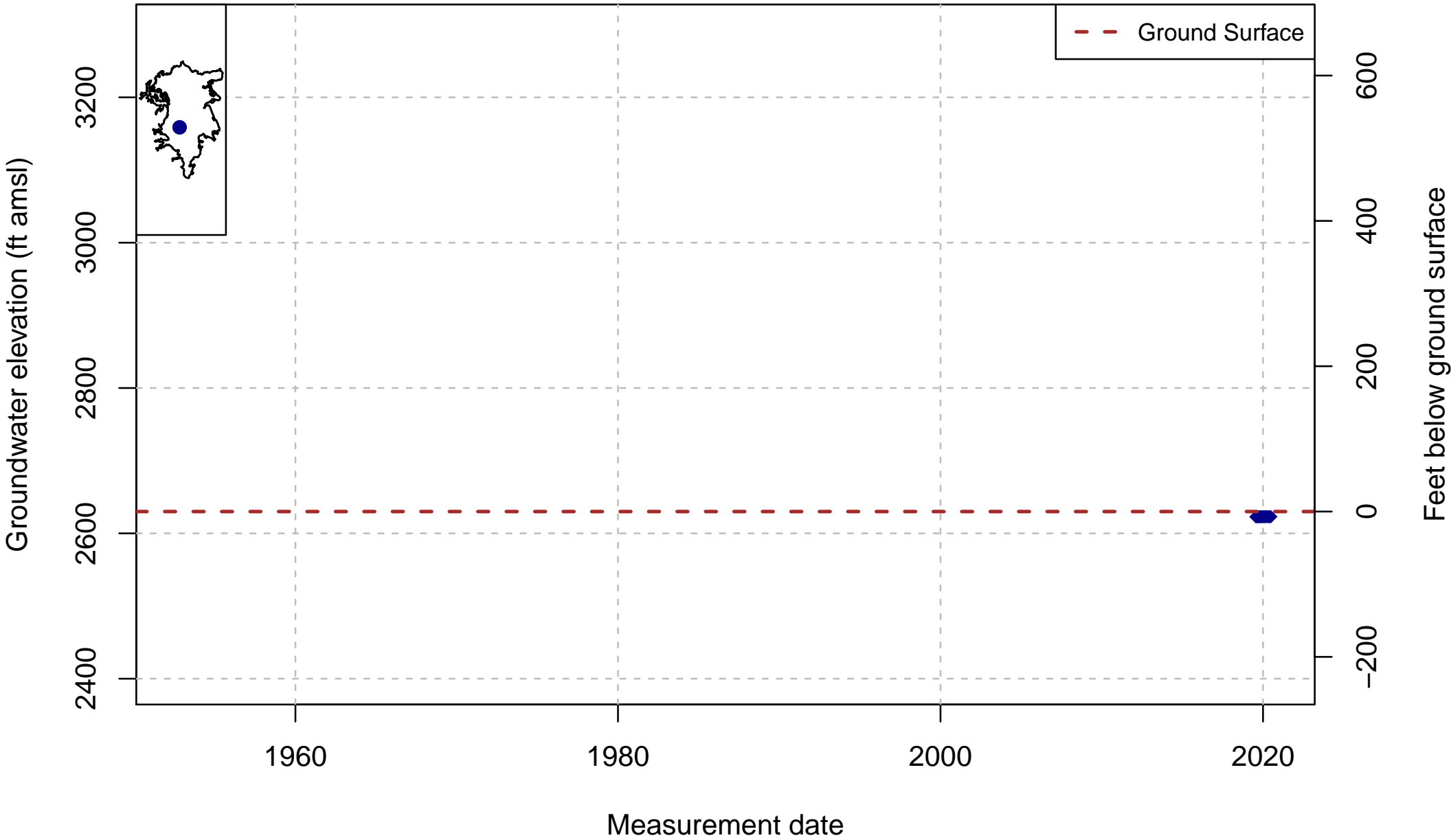
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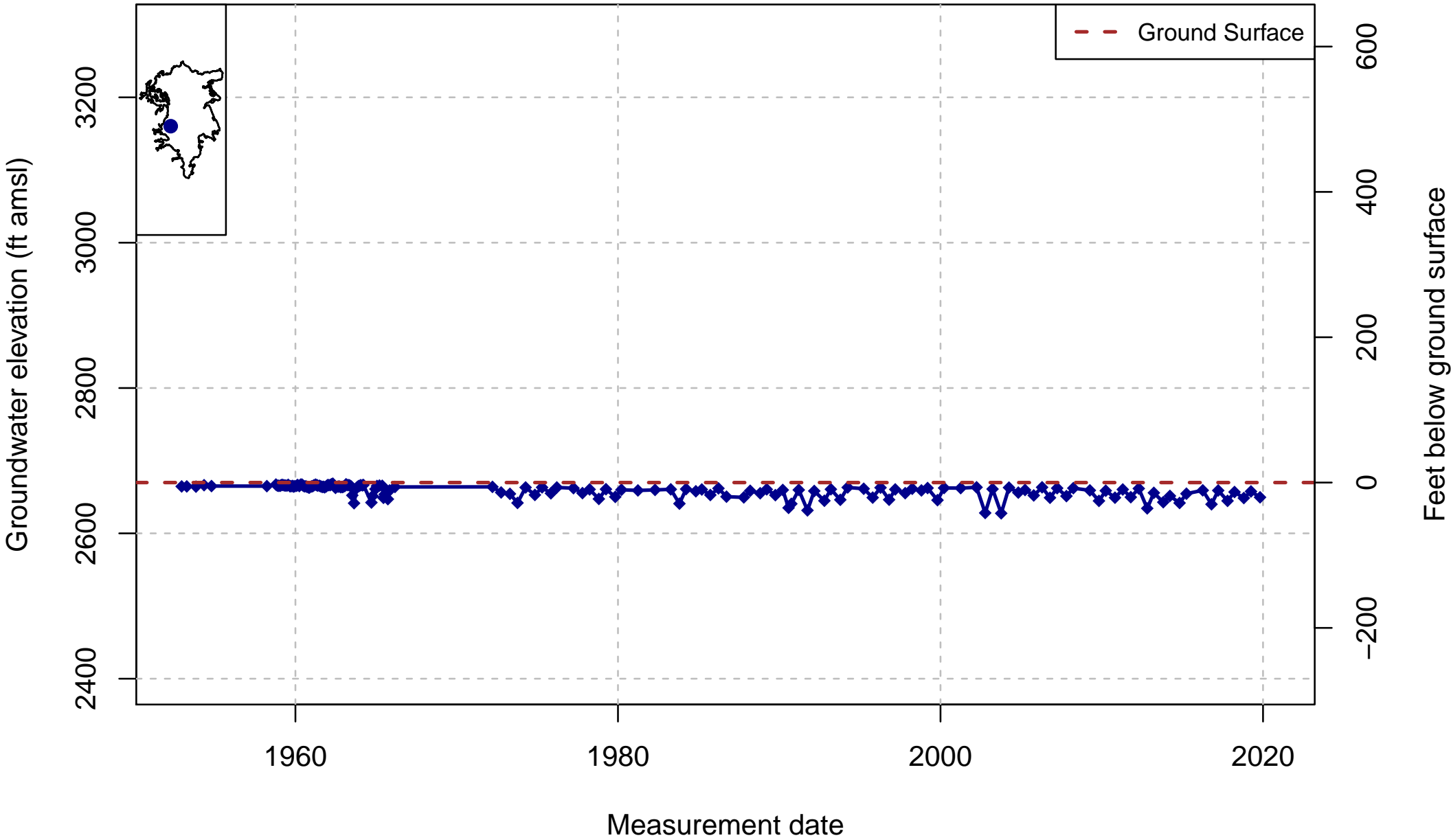
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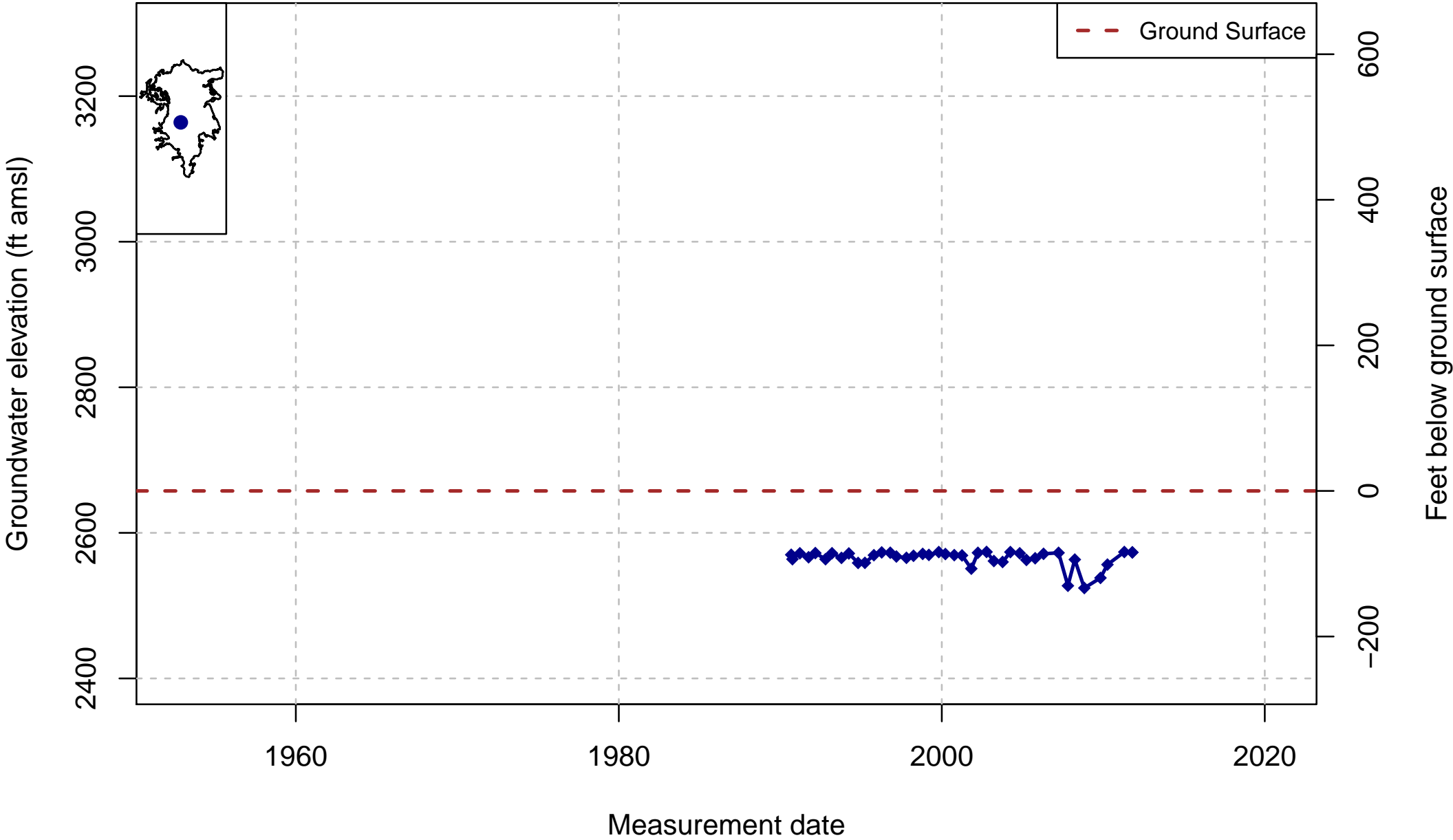
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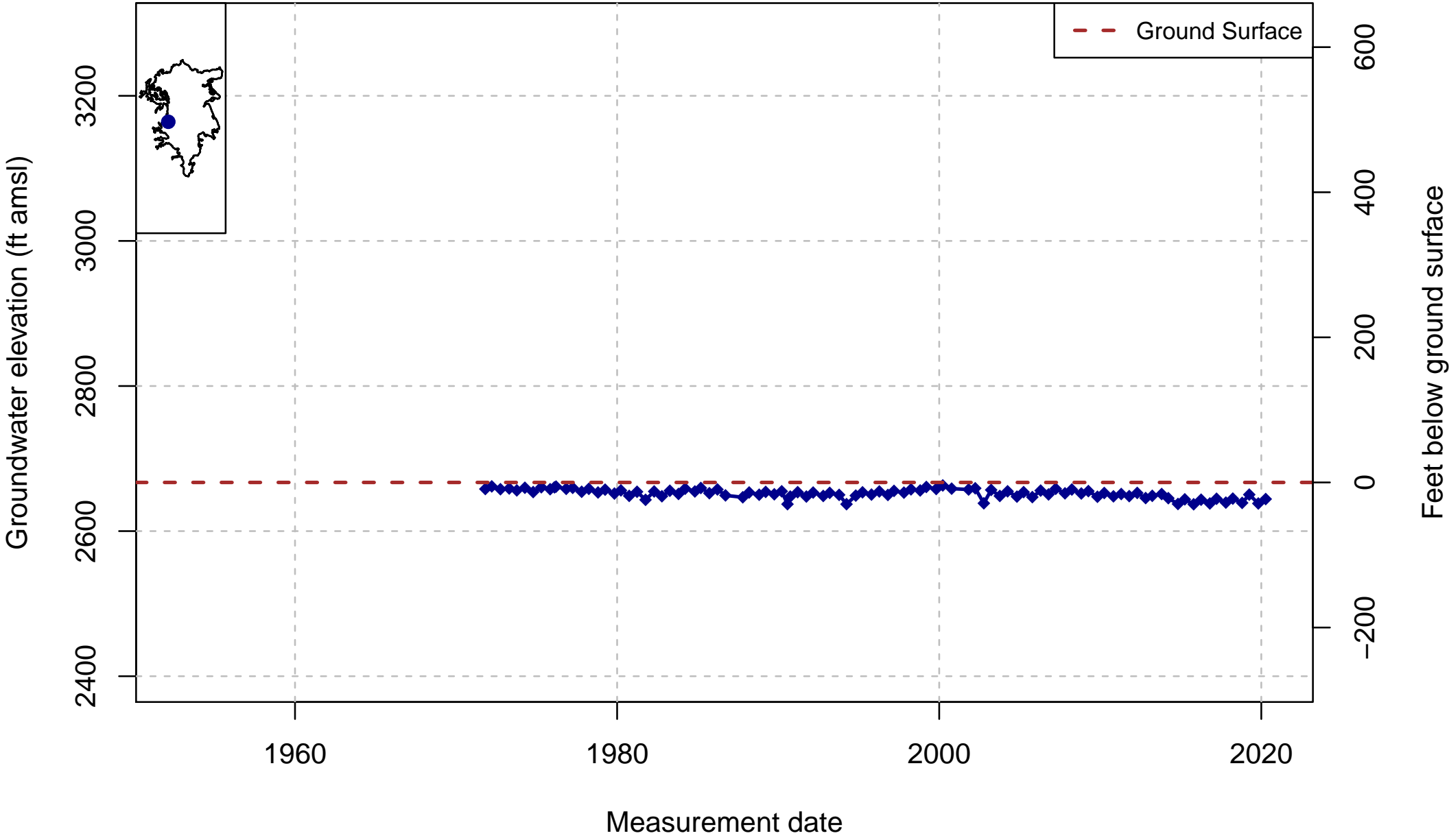
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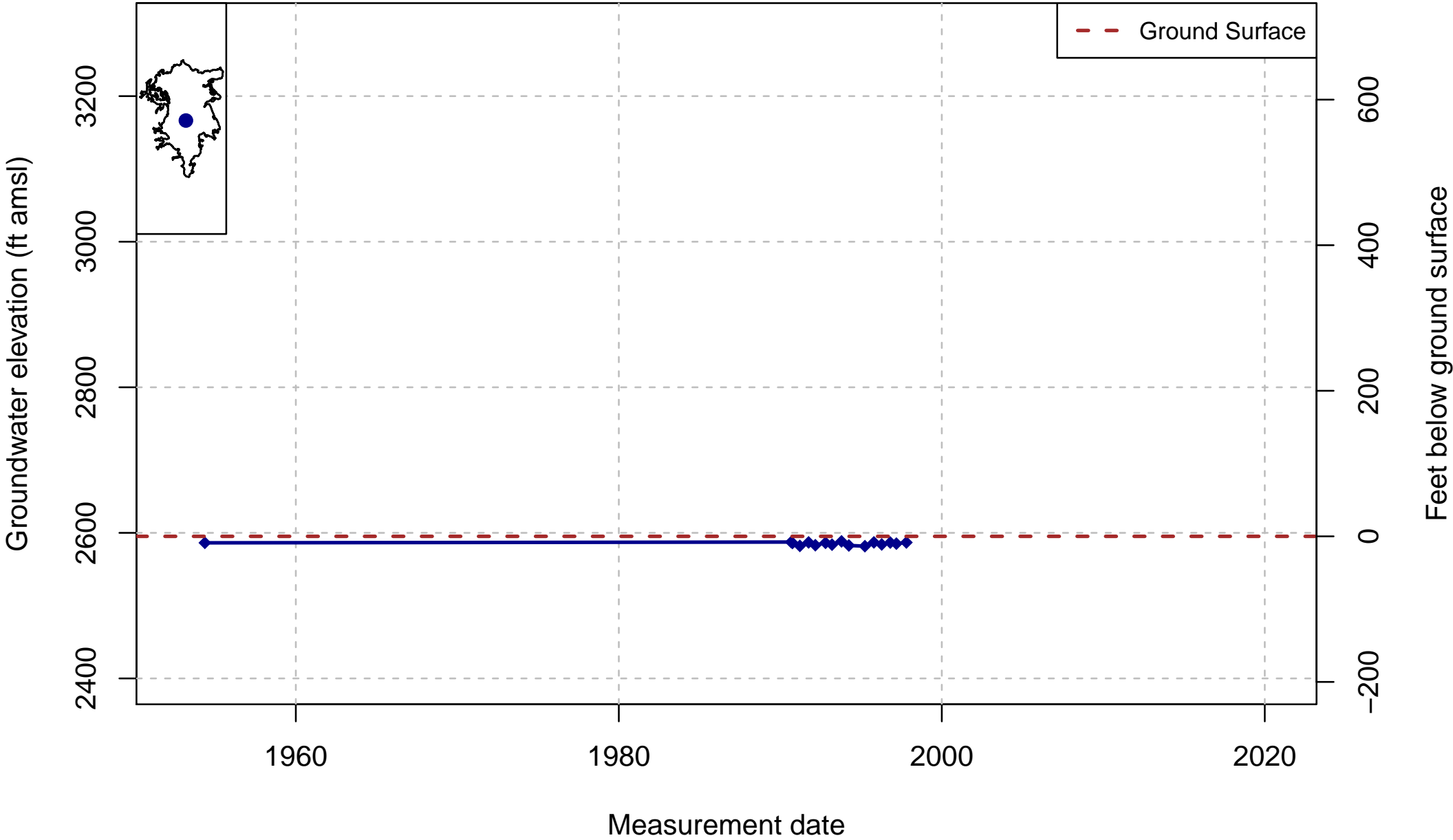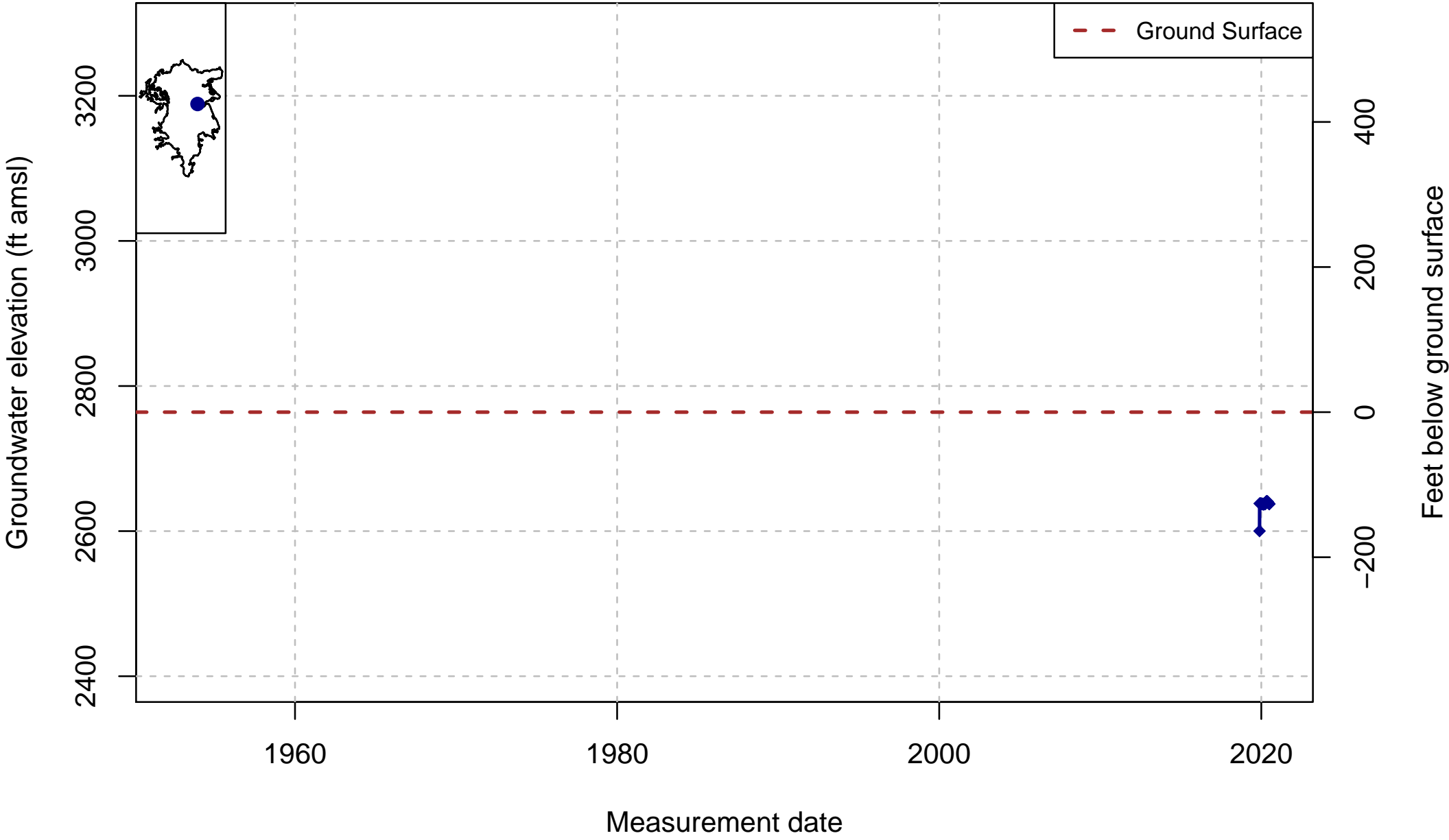
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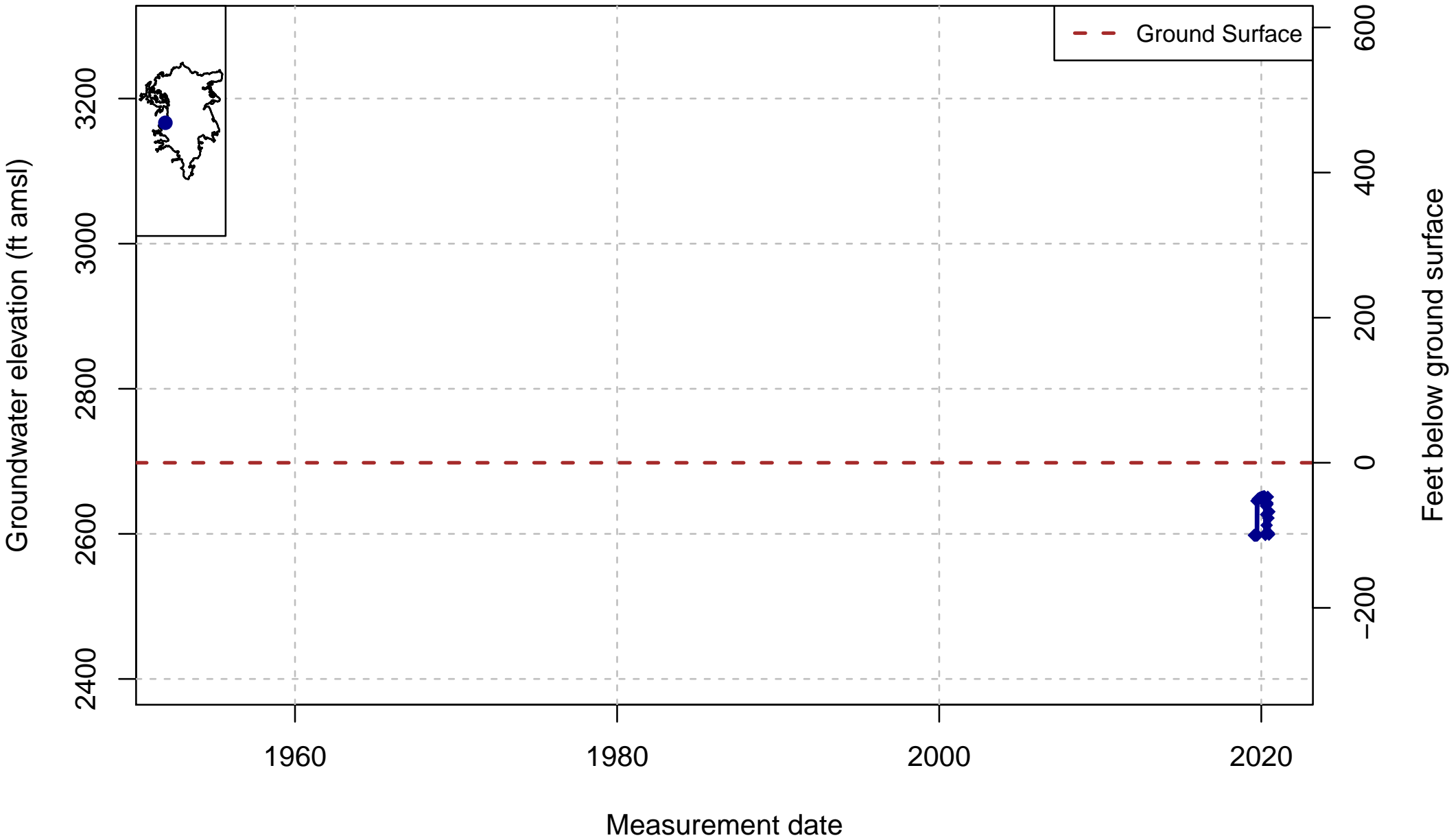
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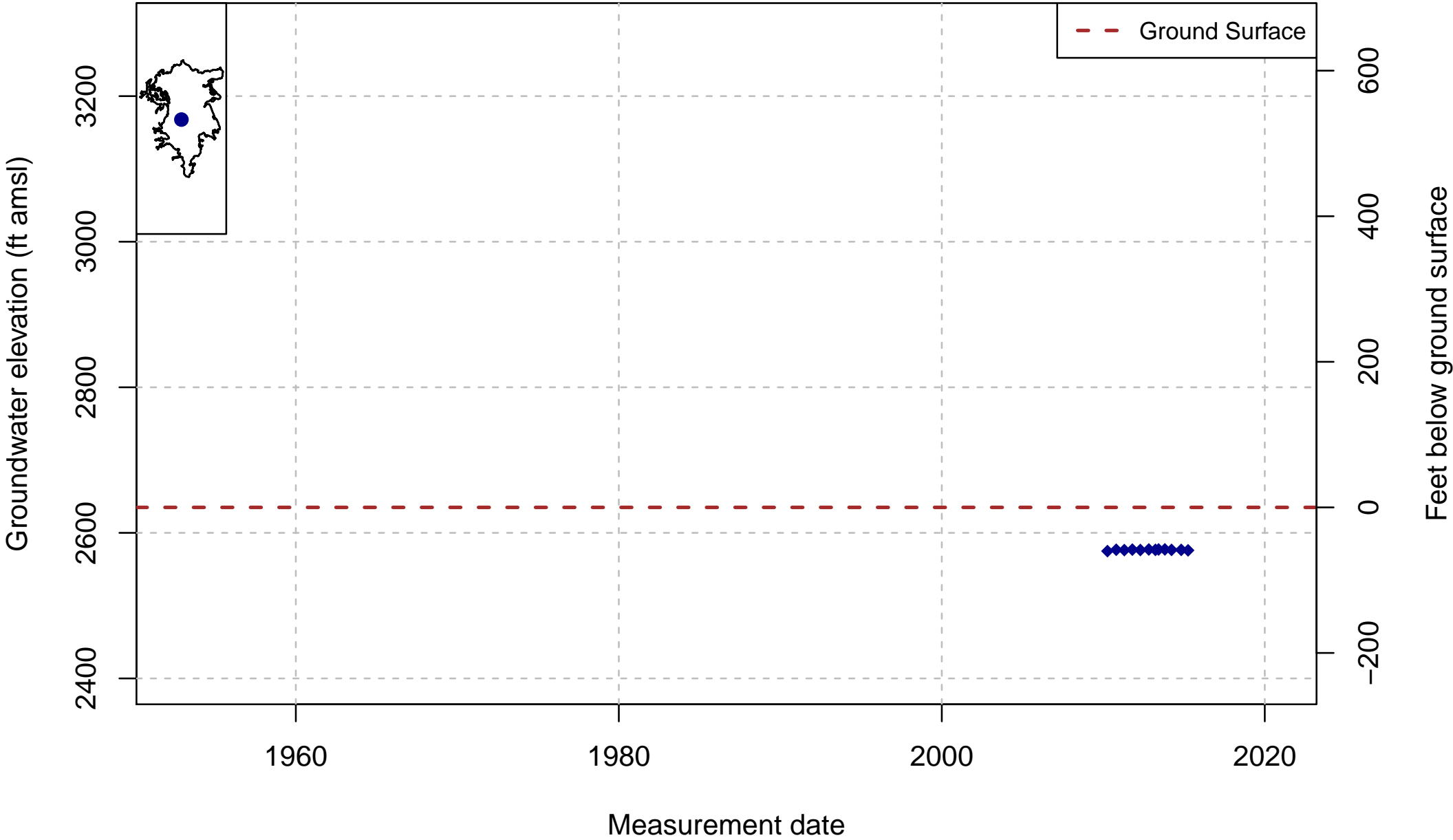
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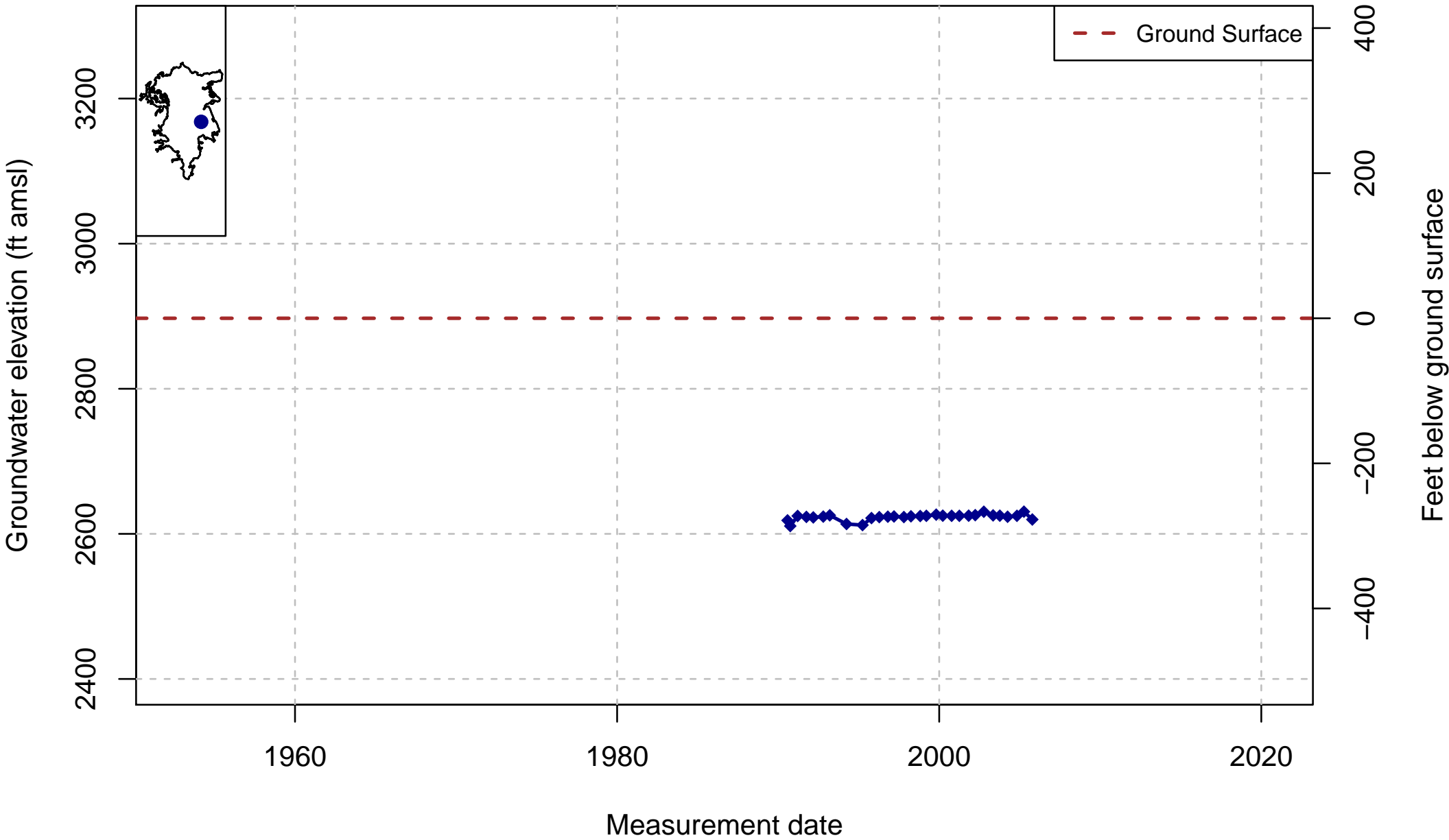
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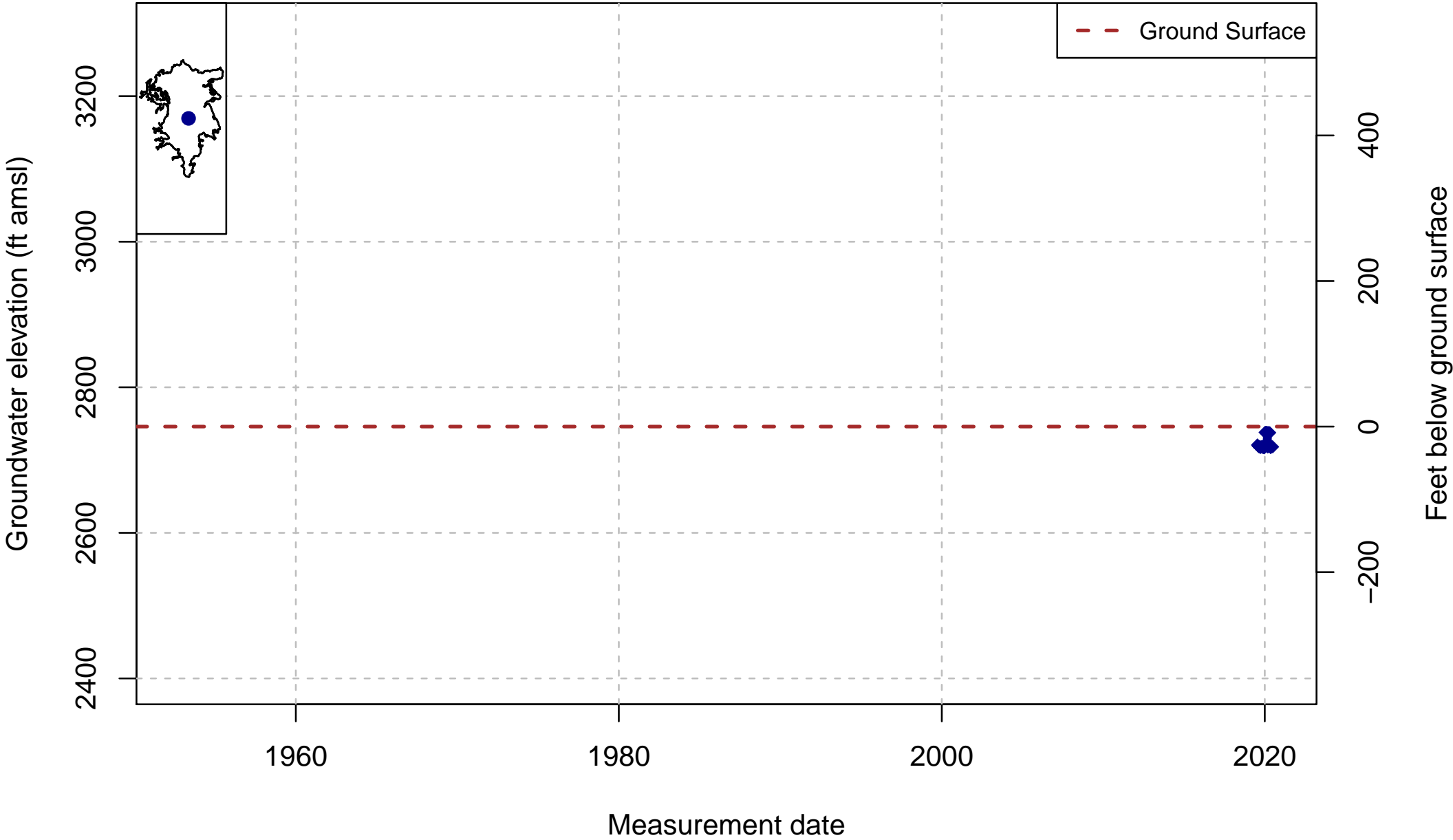
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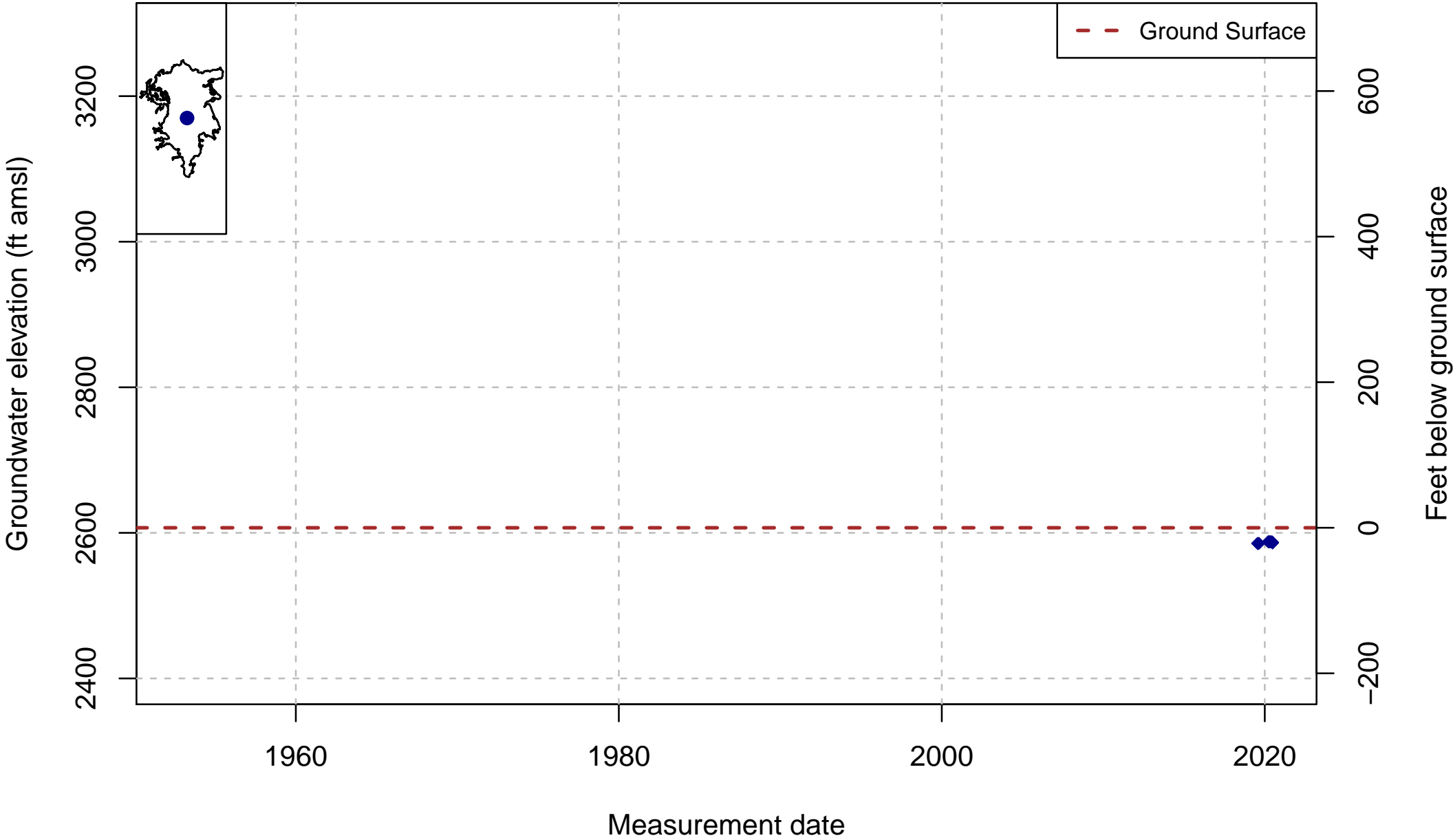
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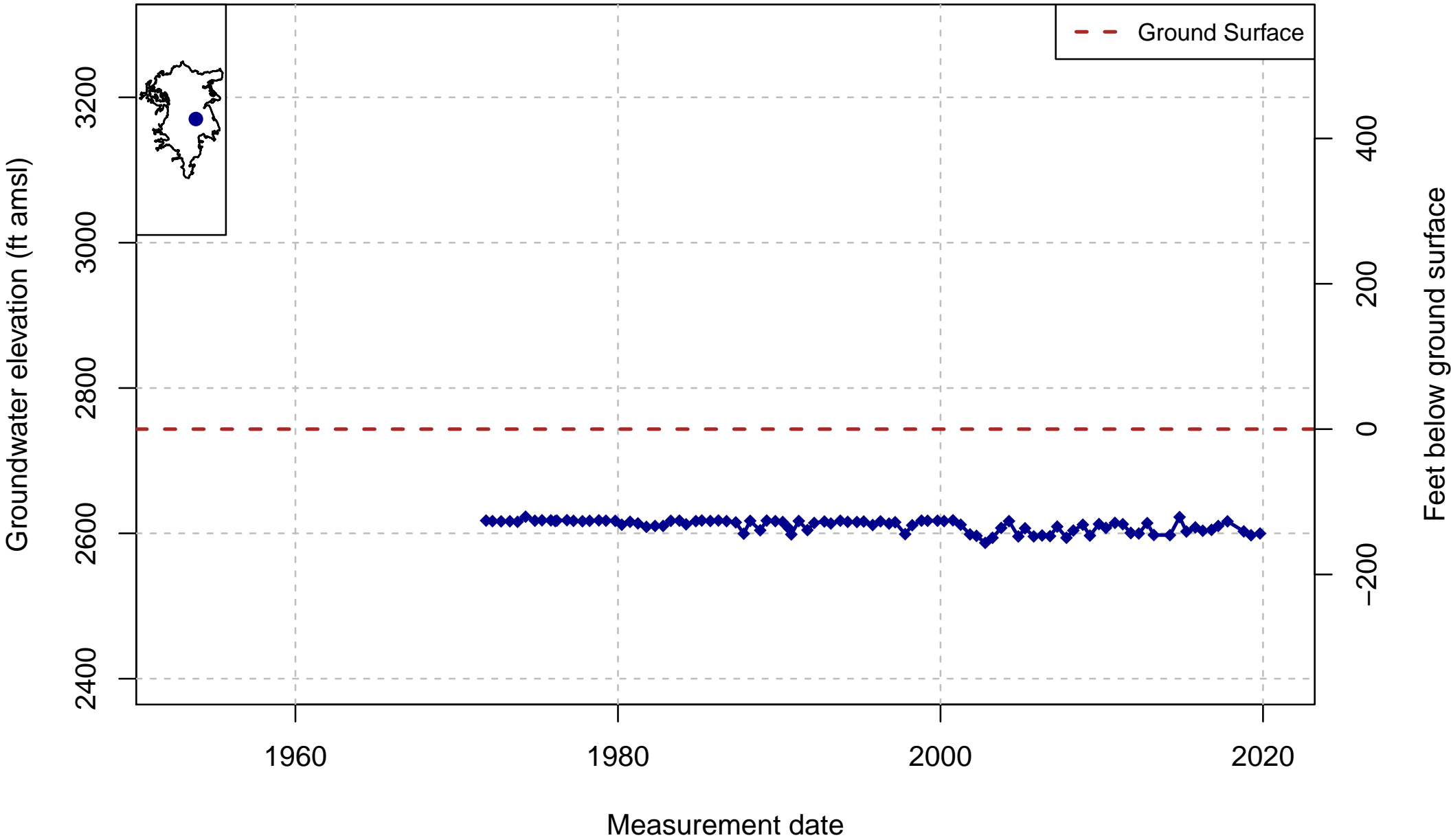
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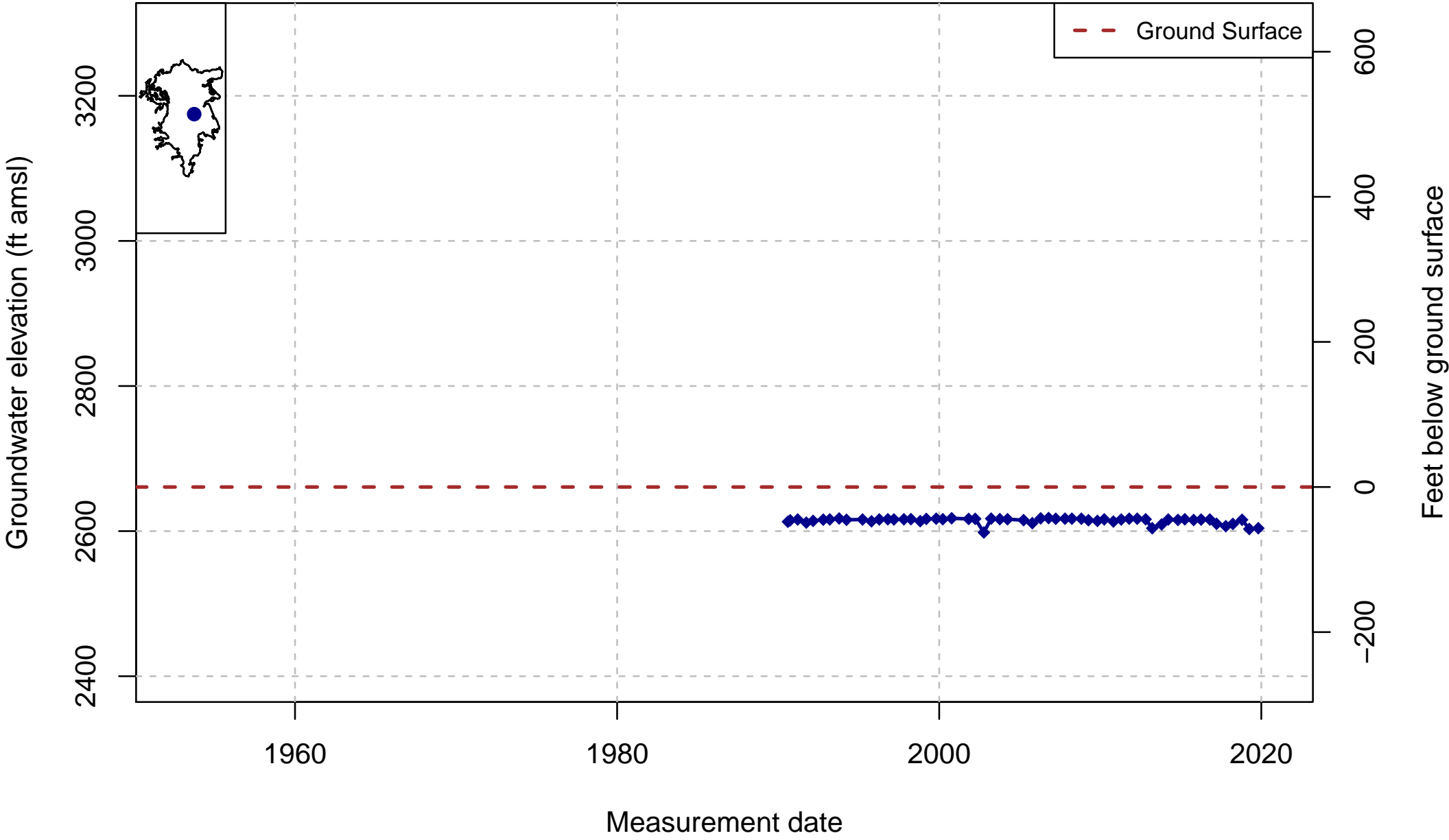
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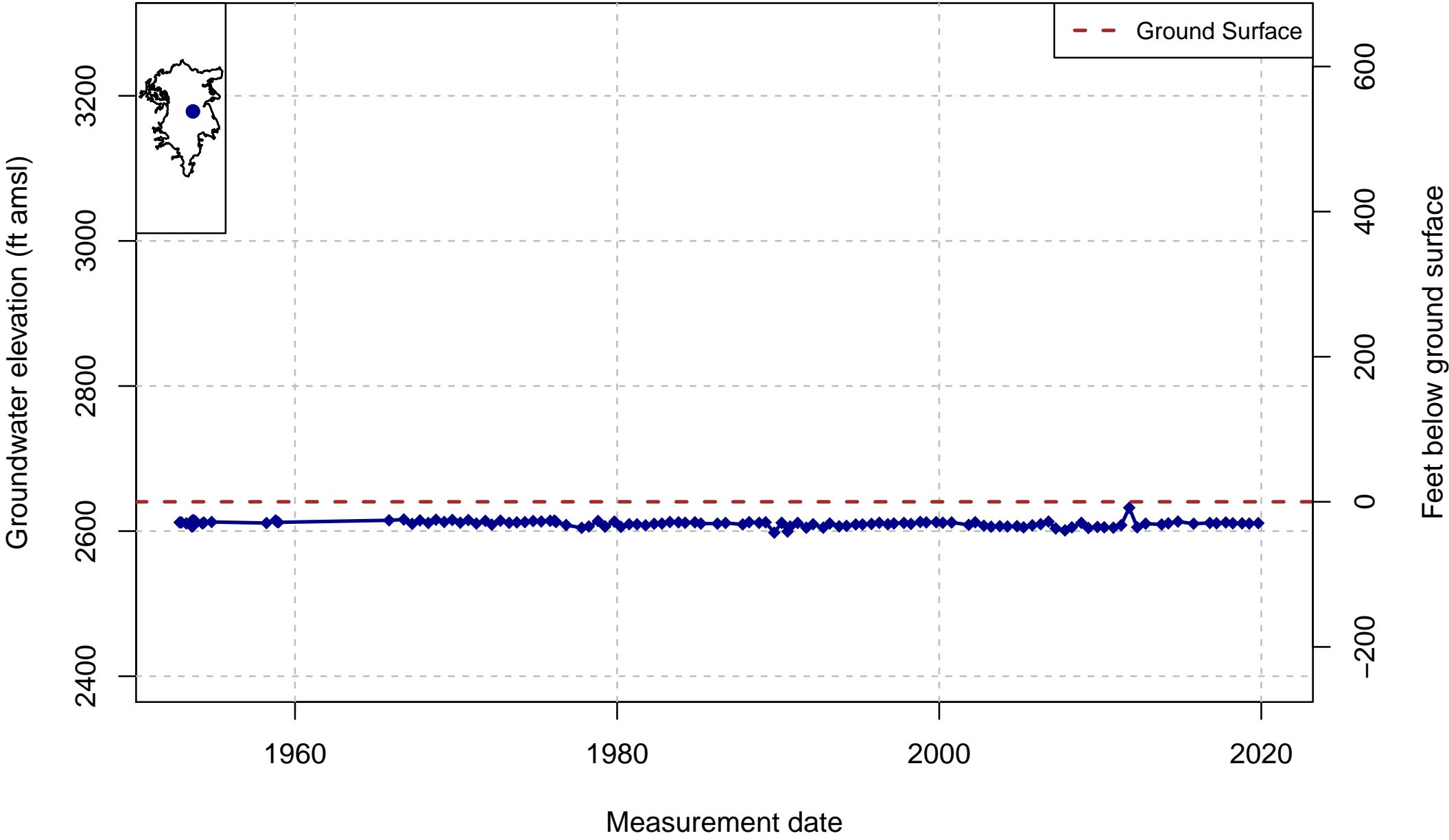
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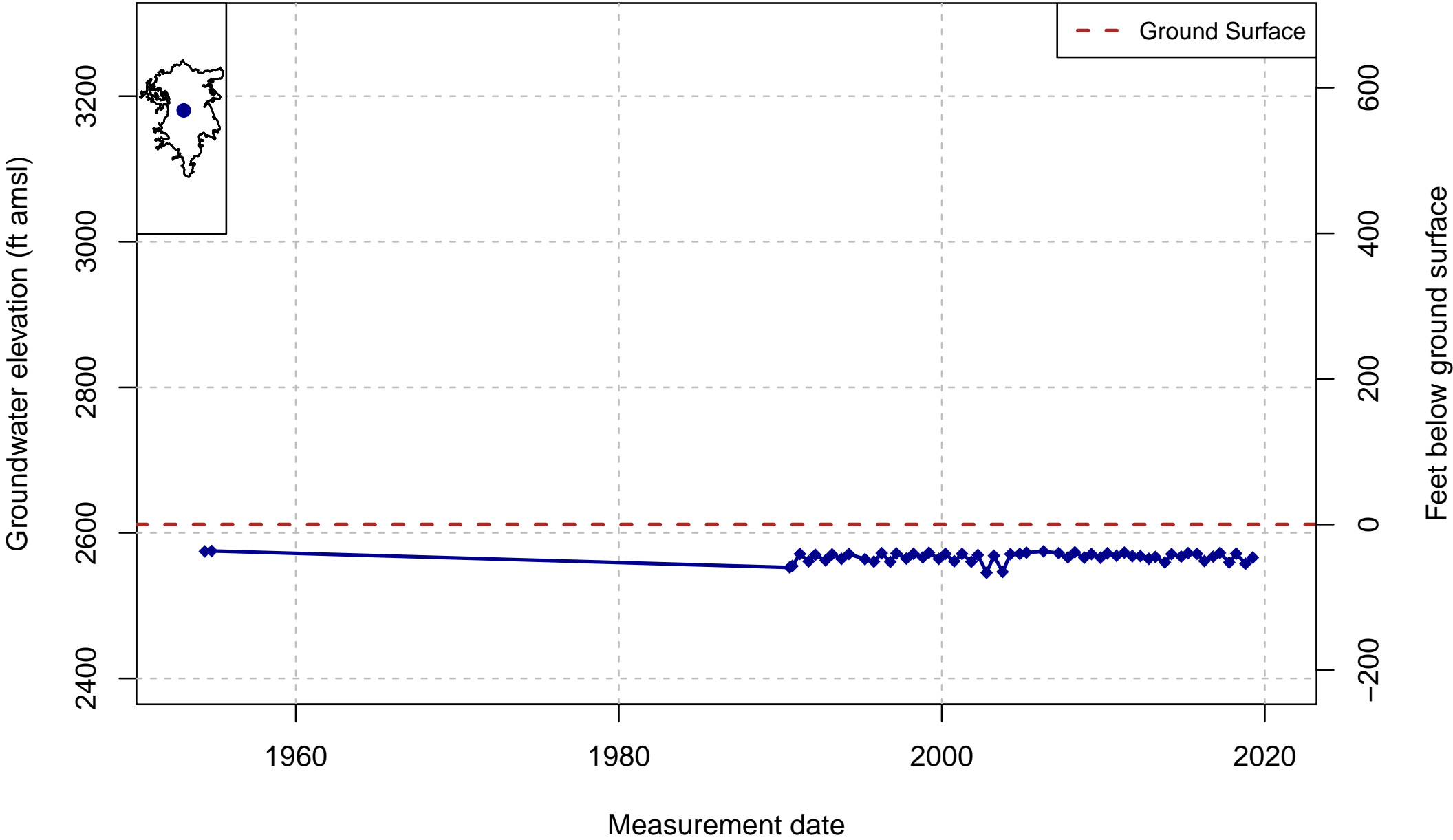
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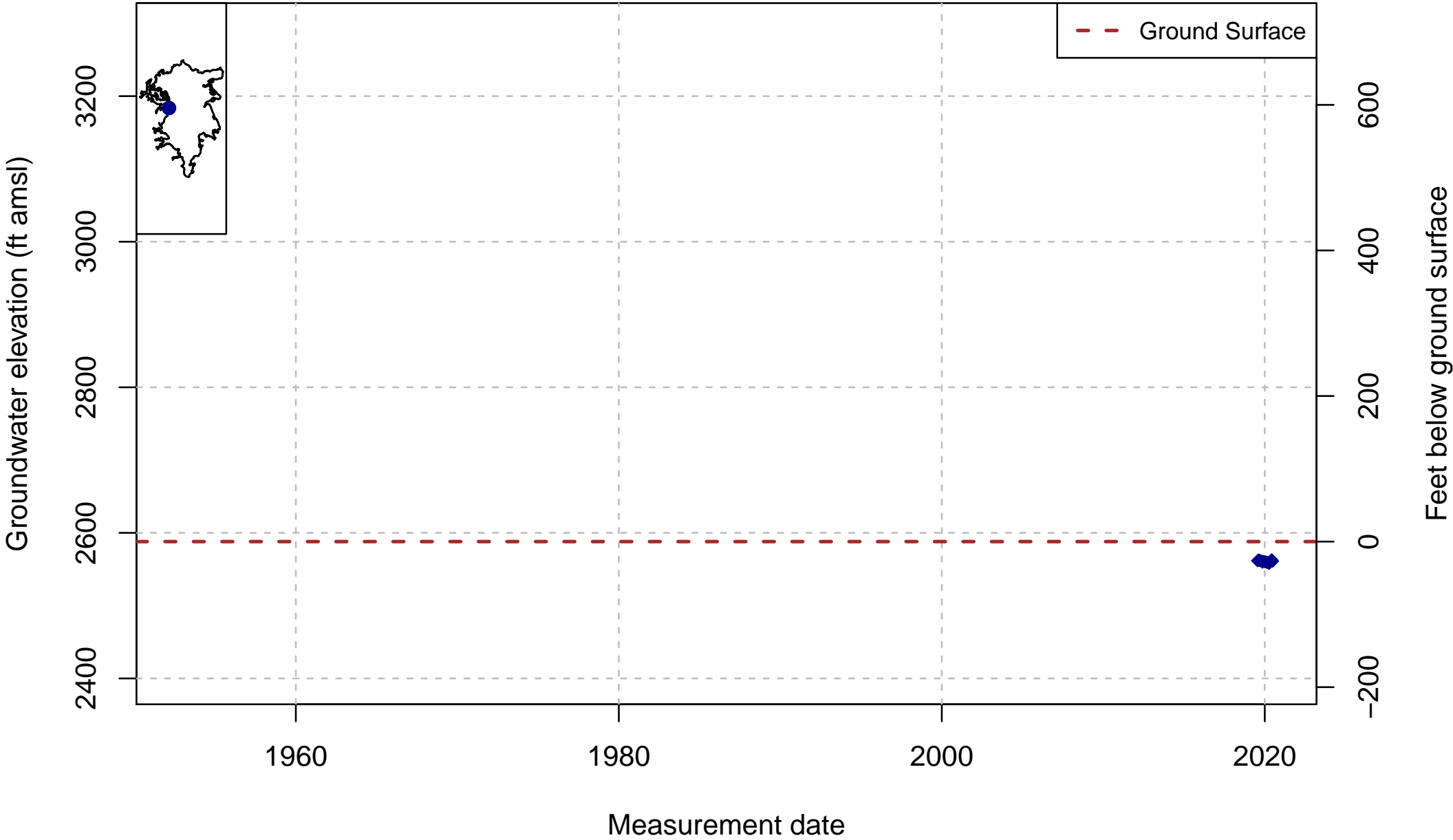
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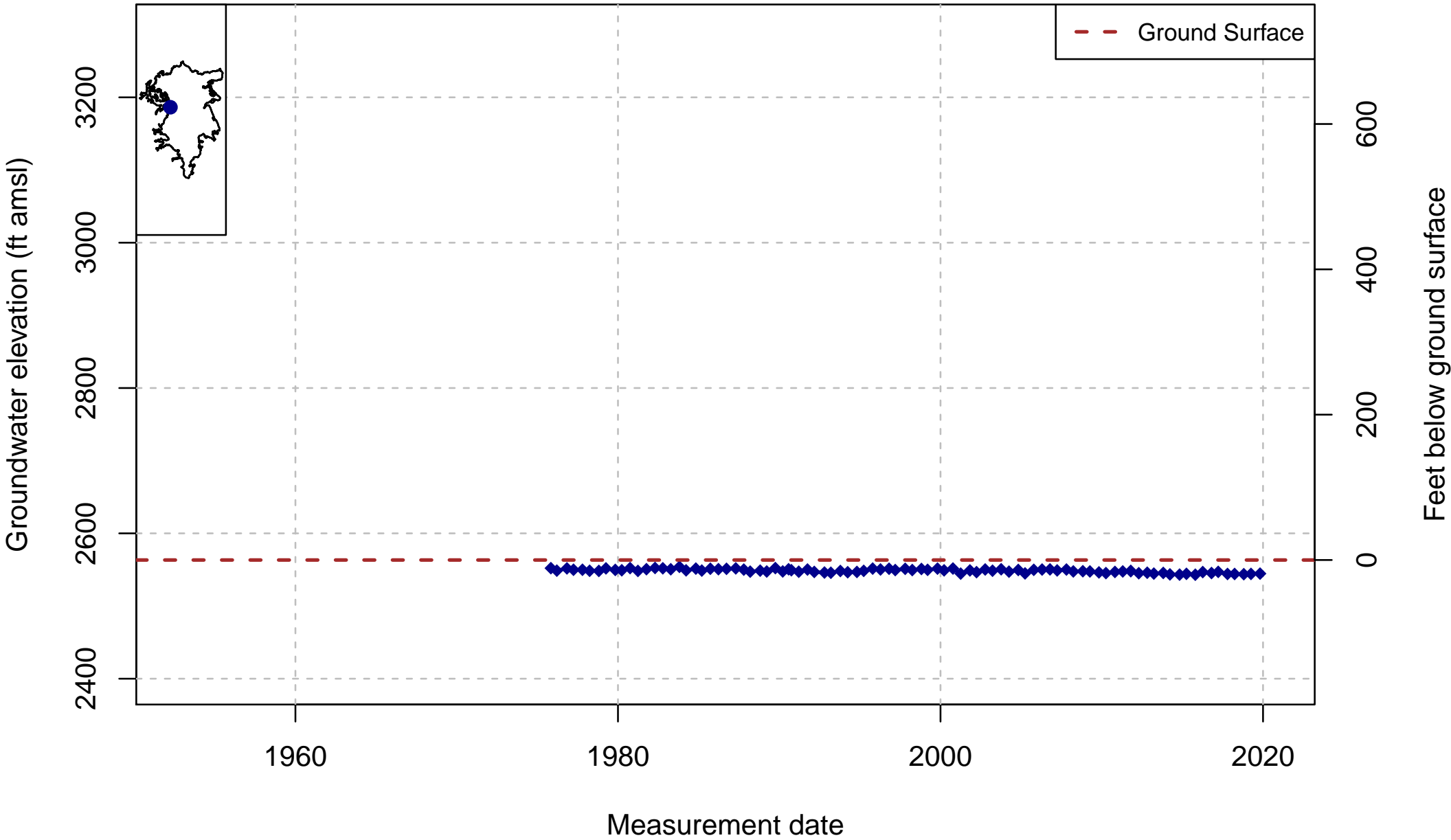
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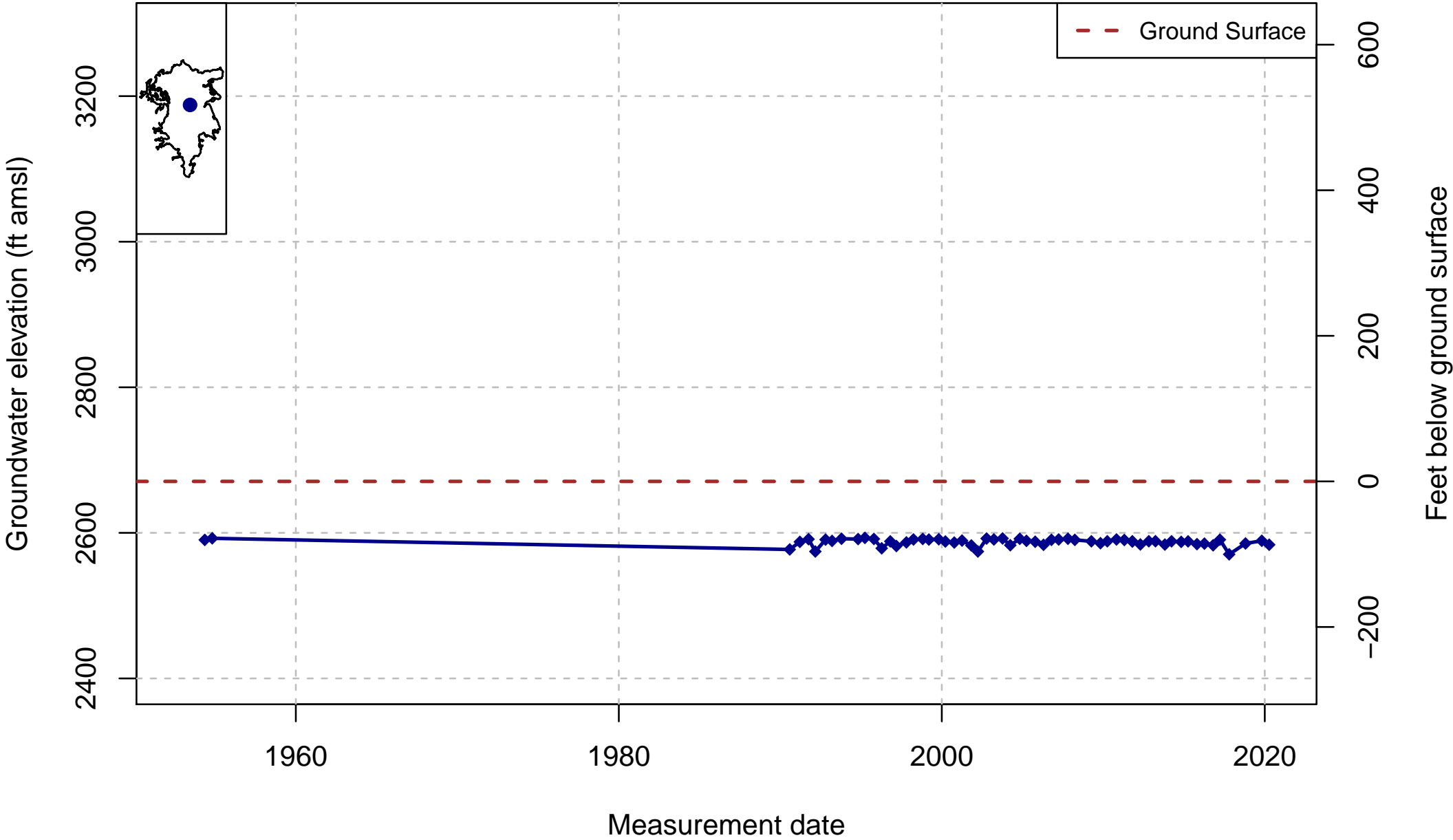
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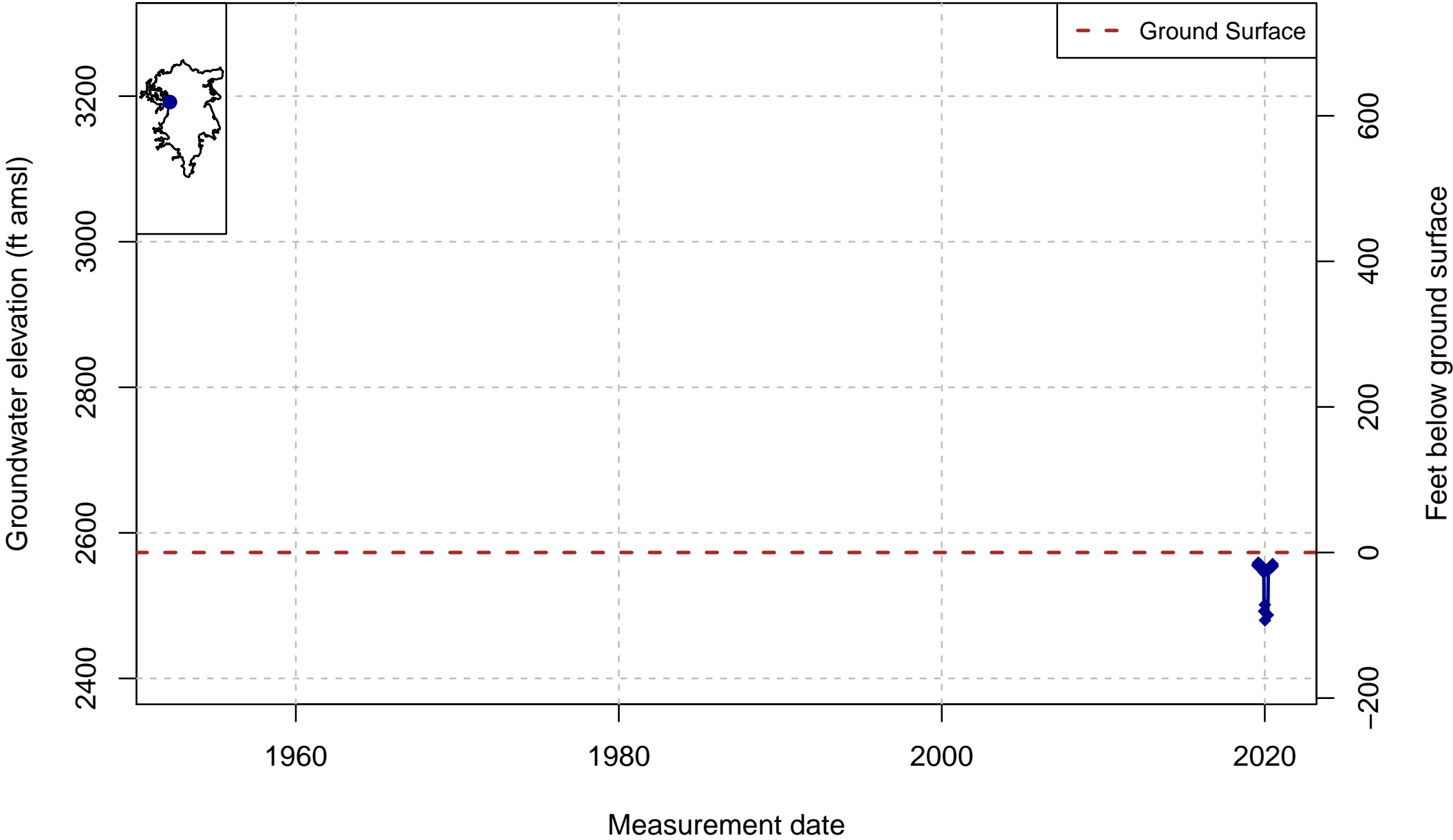
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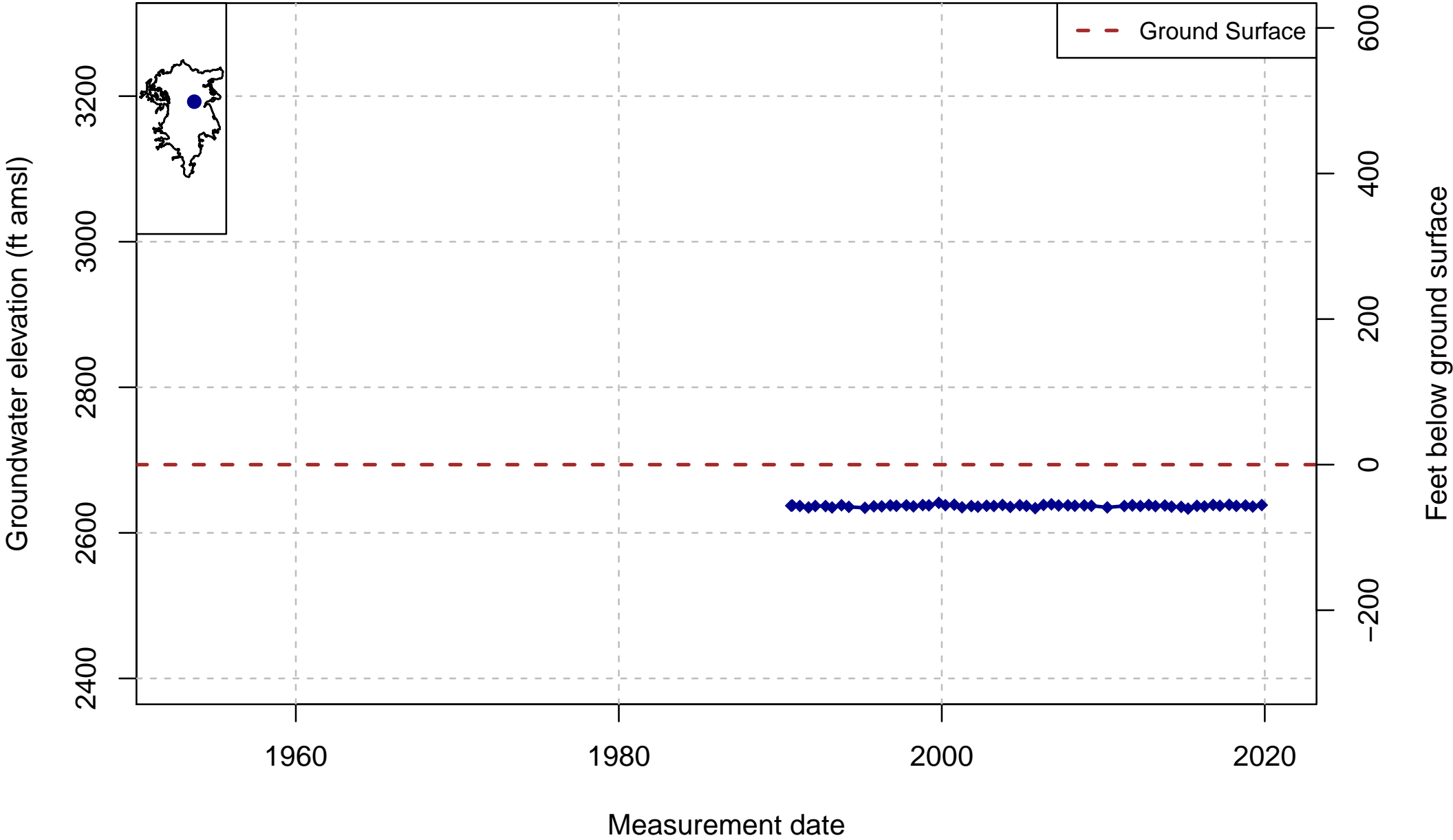
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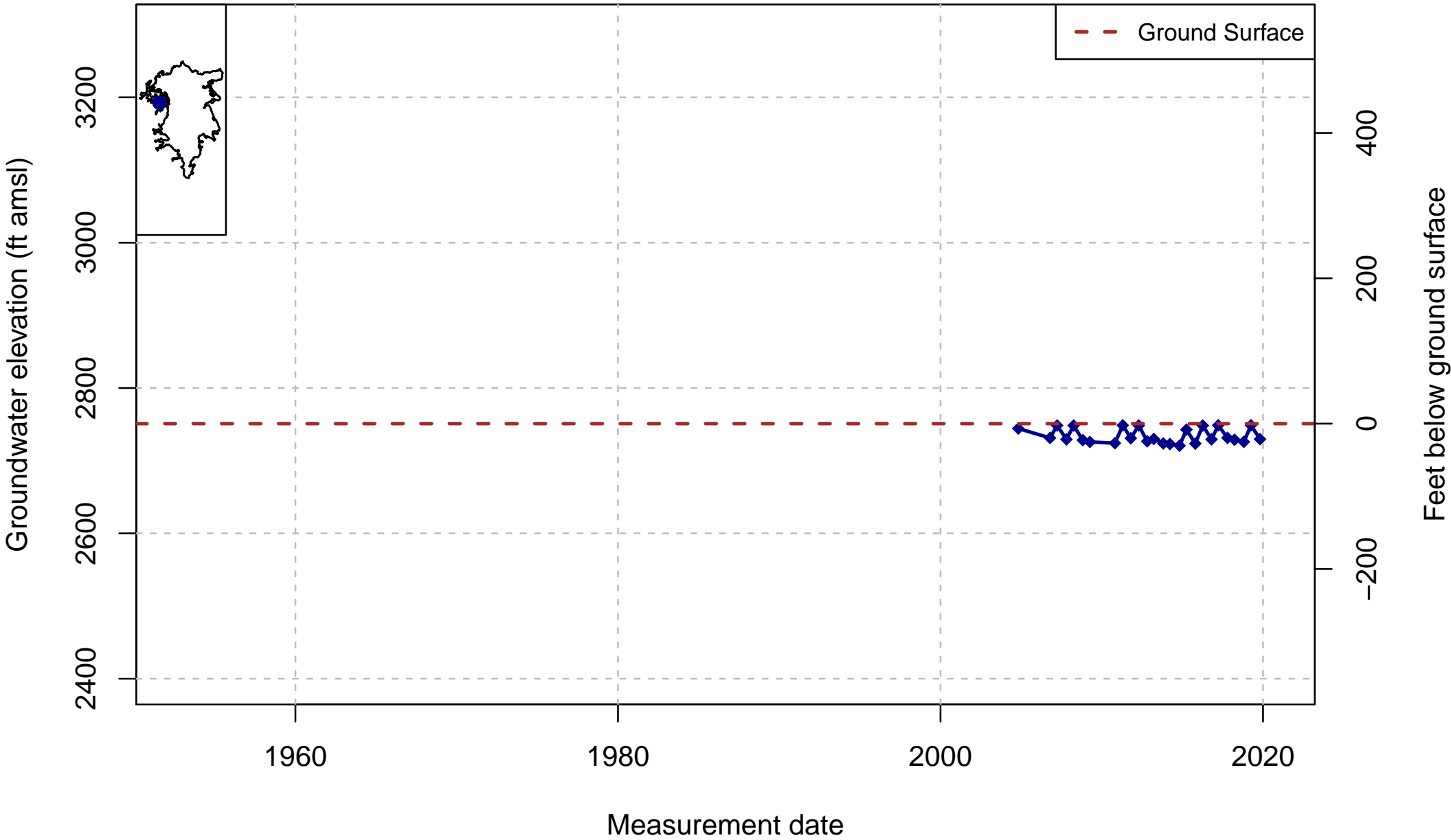
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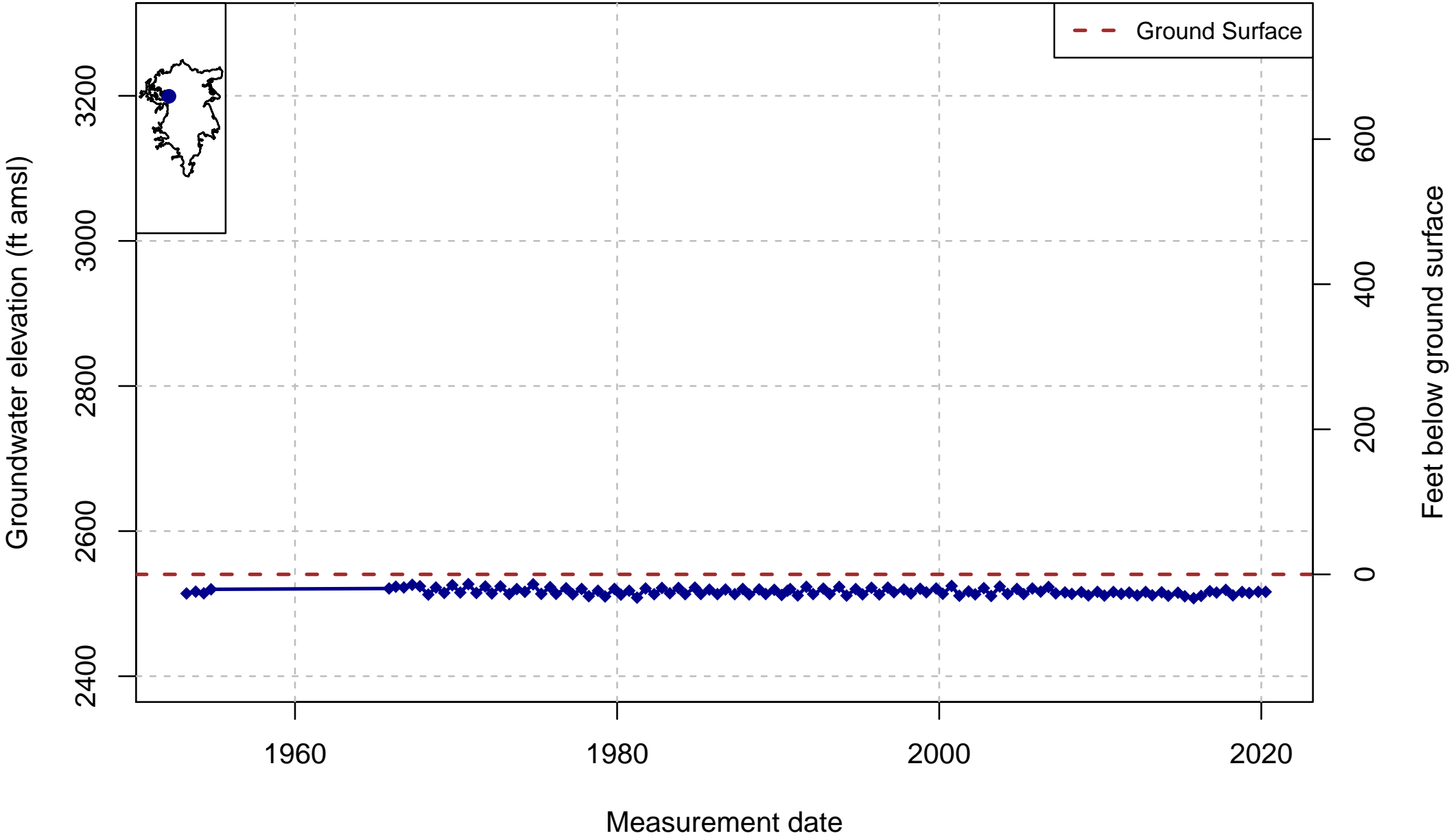
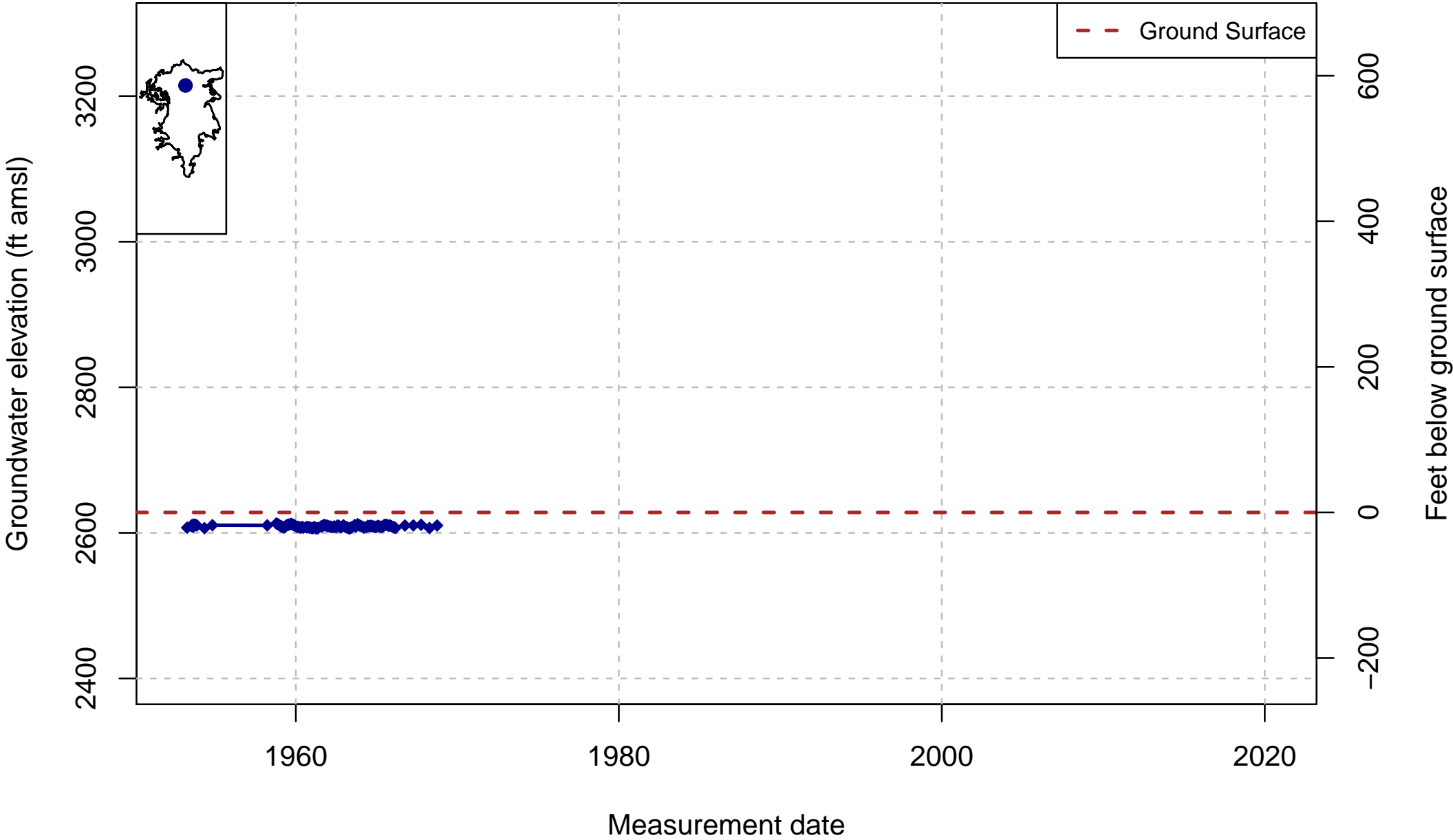**DWR Stn_ID: NA; well_code: SHA_10; well_name: Blair Hart; well_swn: NA**
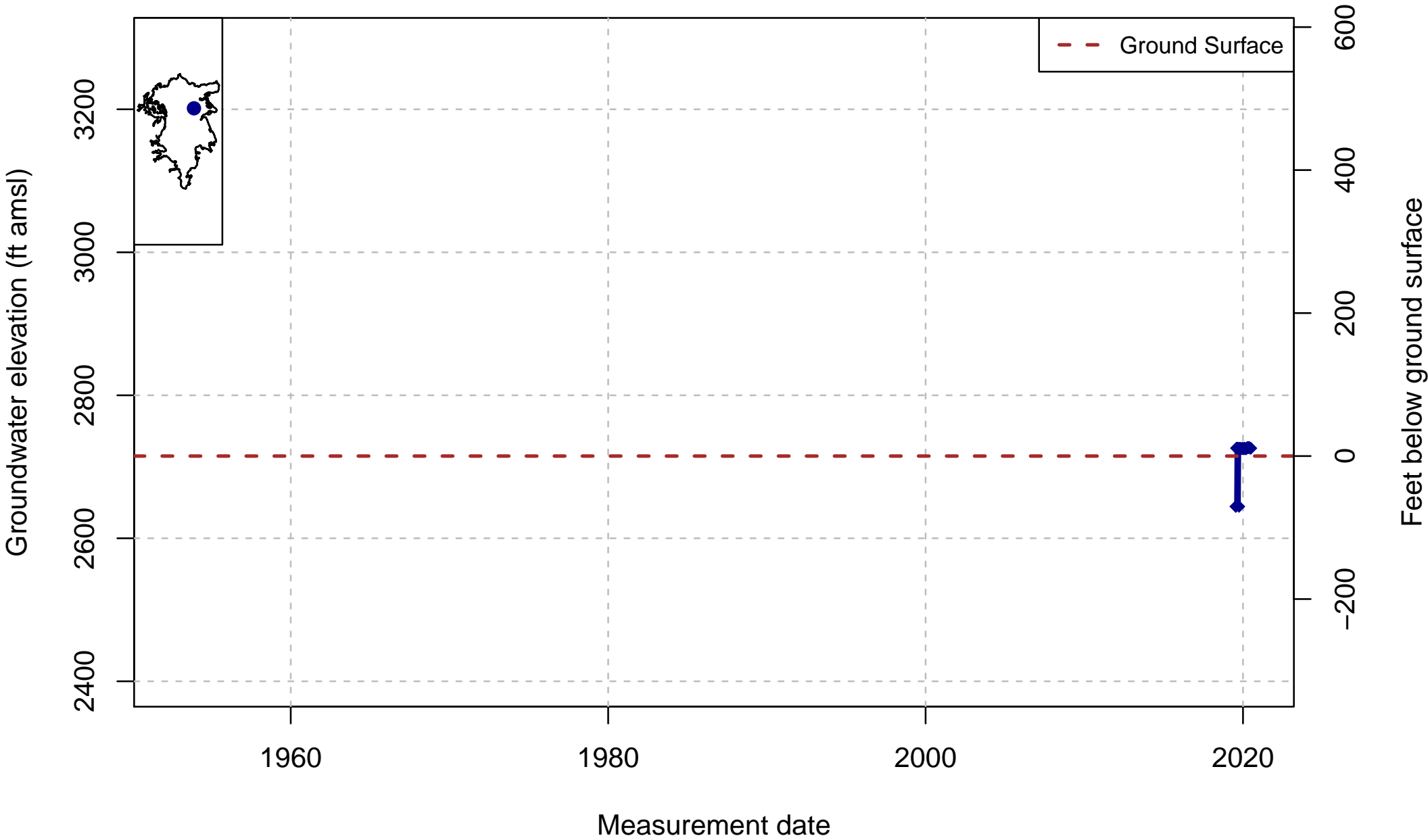
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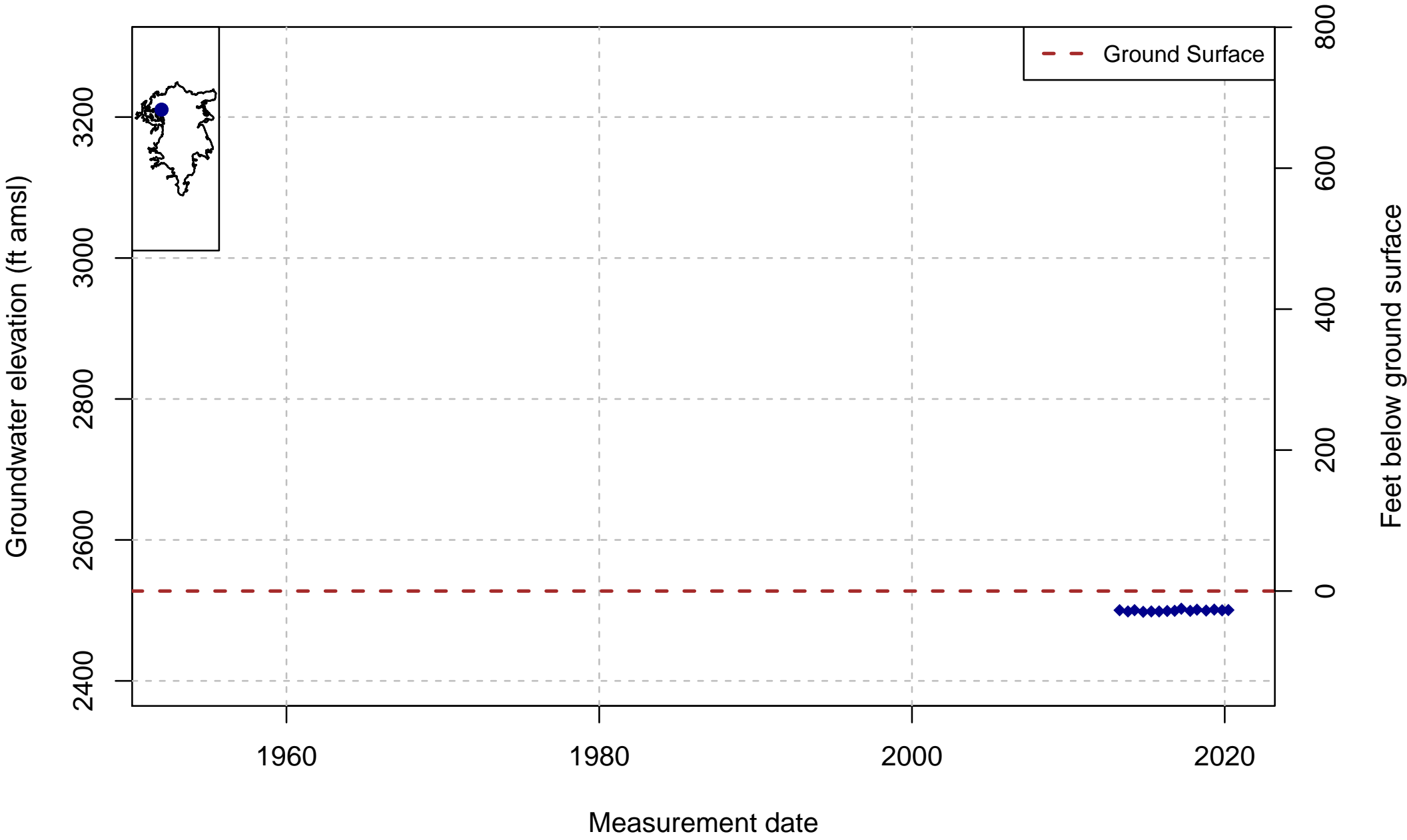
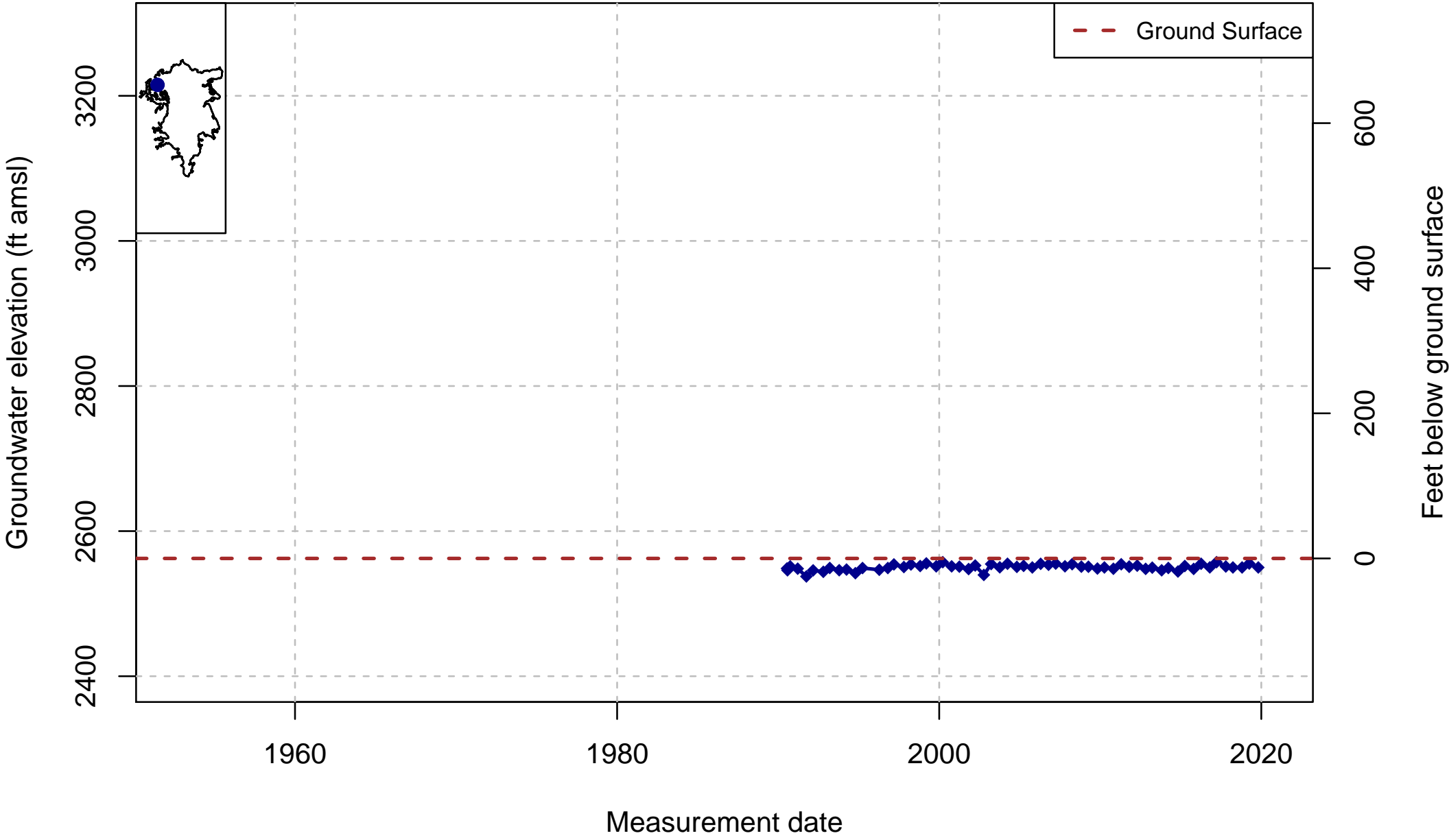**DWR Stn_ID: NA; well_code: SHA_04; well_name: OberlinRd; well_swn: NA**
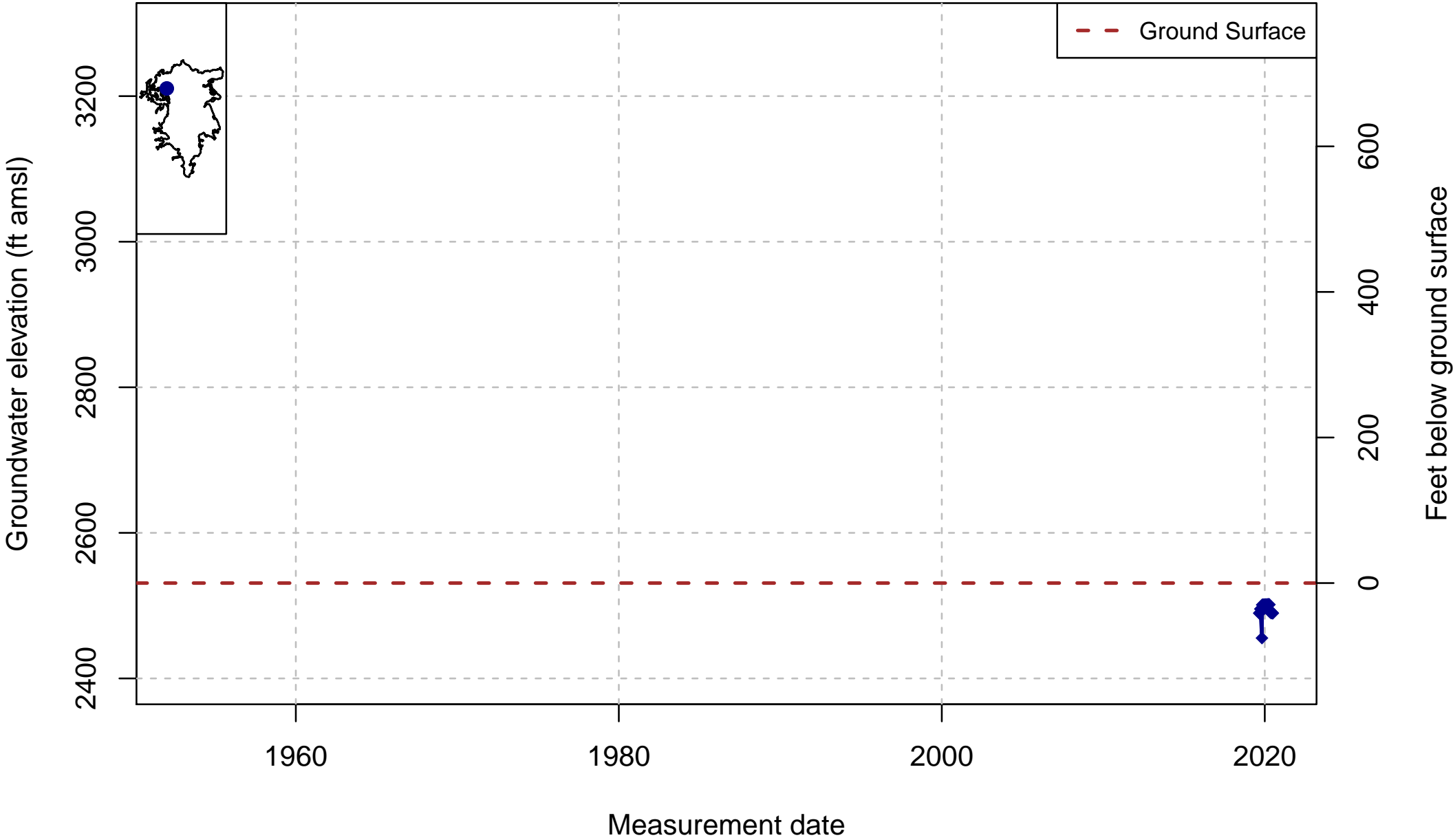
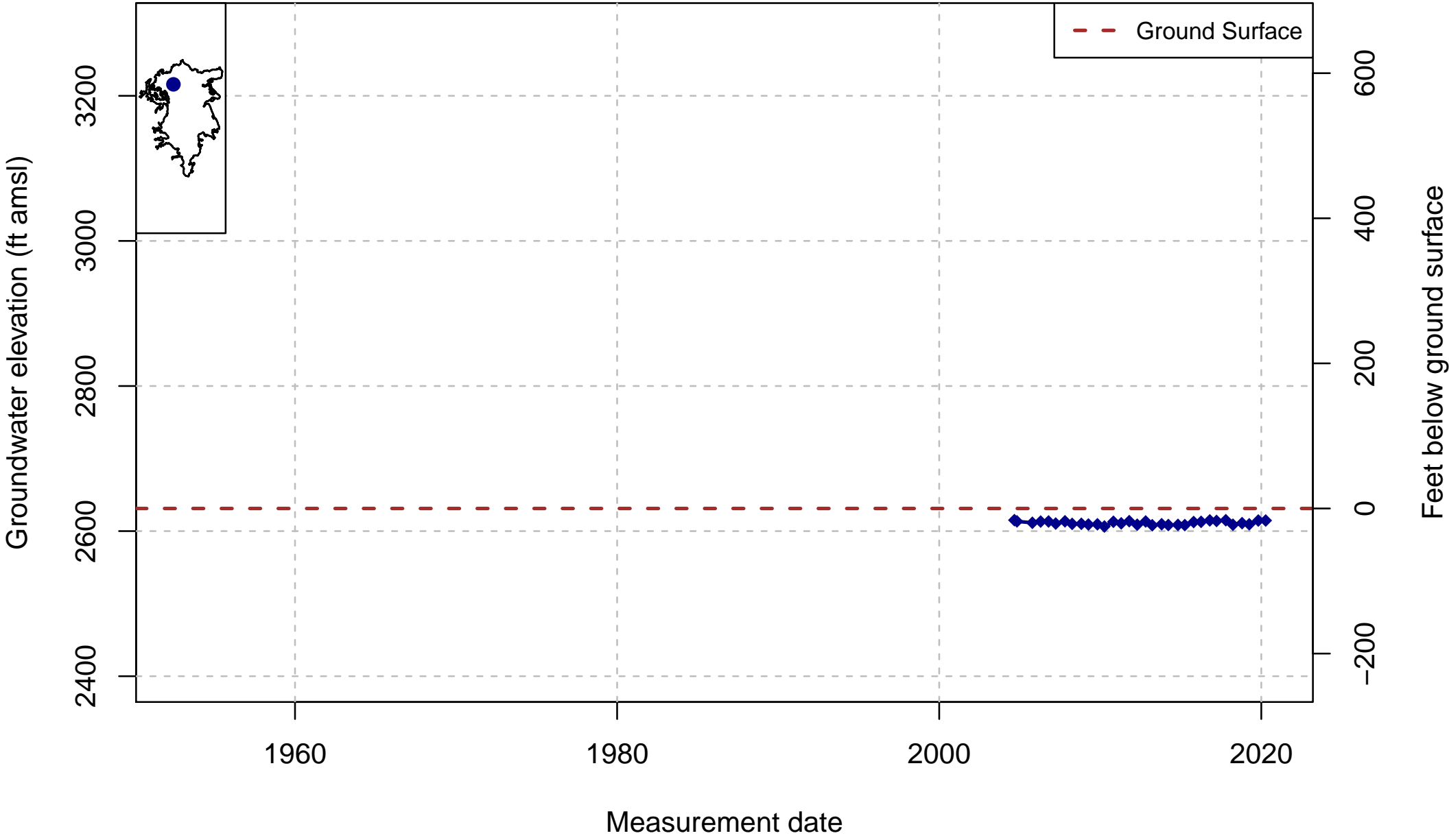**DWR Stn_ID: 24046; well_code: 417236N1224461W001; well_name: NA; well_swn: 45N05W29B001M**

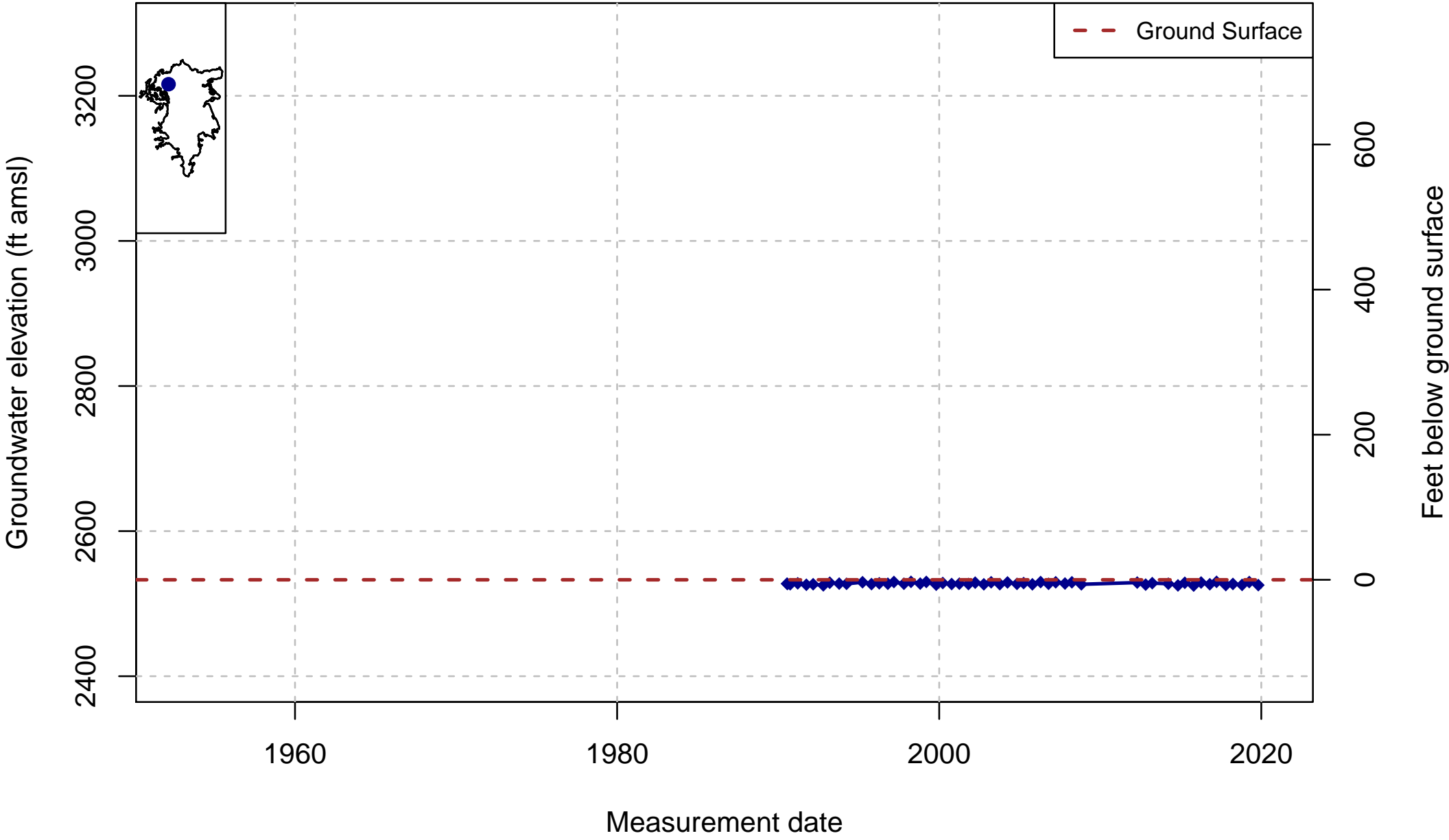**DWR Stn_ID: 24065; well_code: 417242N1224453W001; well_name: NA; well_swn: 45N05W29B003M**
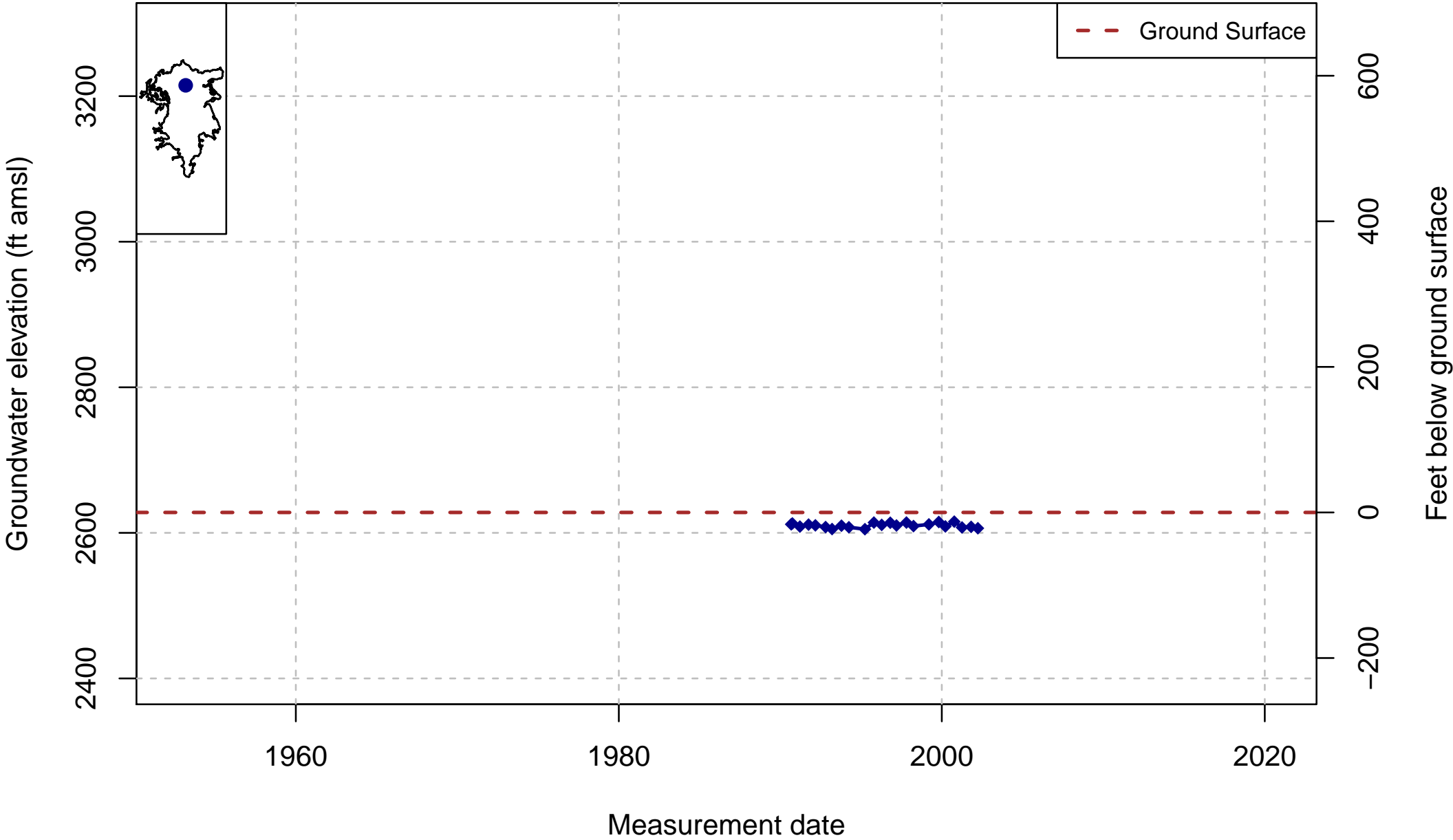
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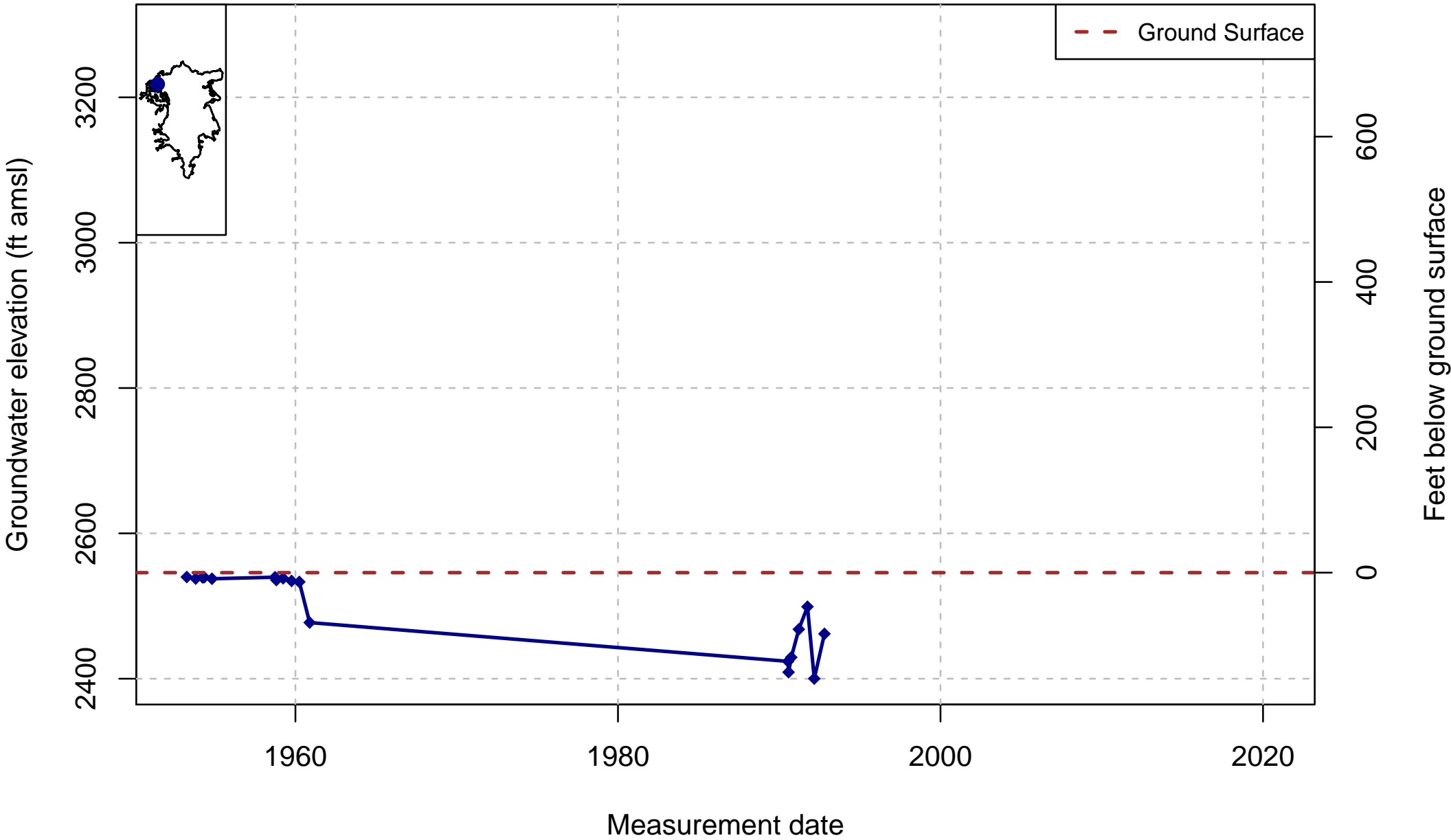
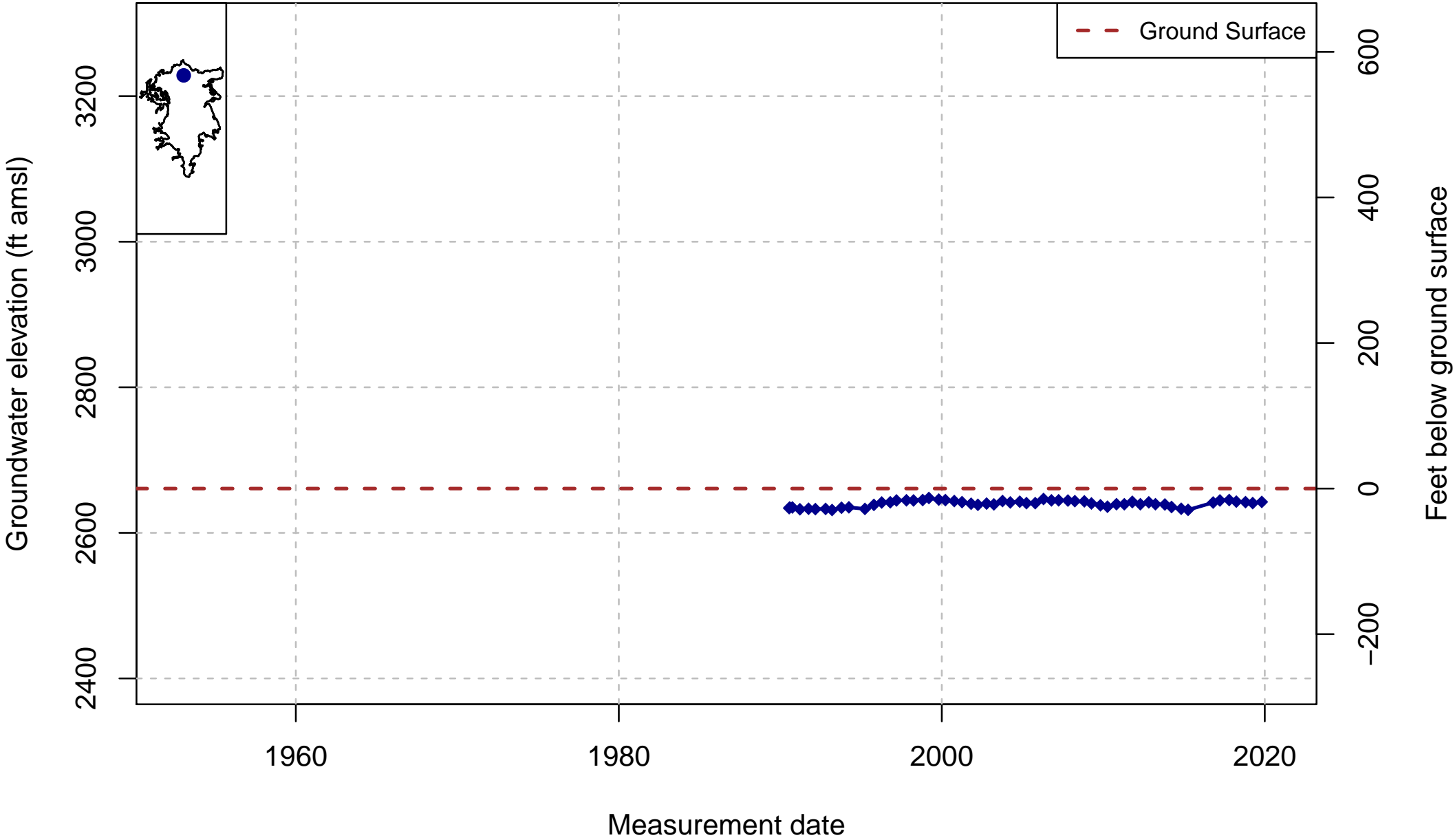**DWR Stn_ID: 24067; well_code: 417258N1225337W001; well_name: 27D002M; well_swn: 45N06W27D002M**

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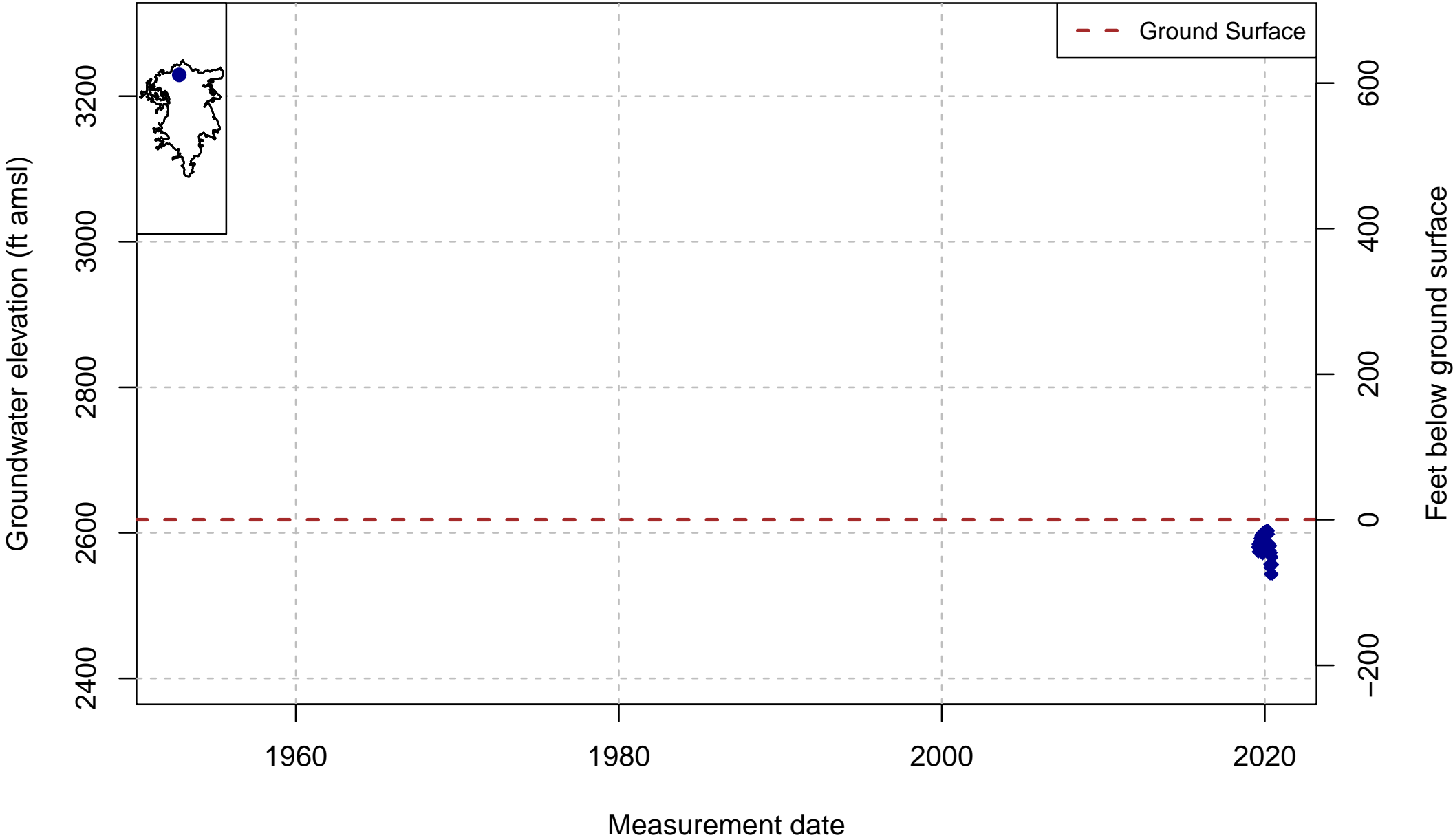
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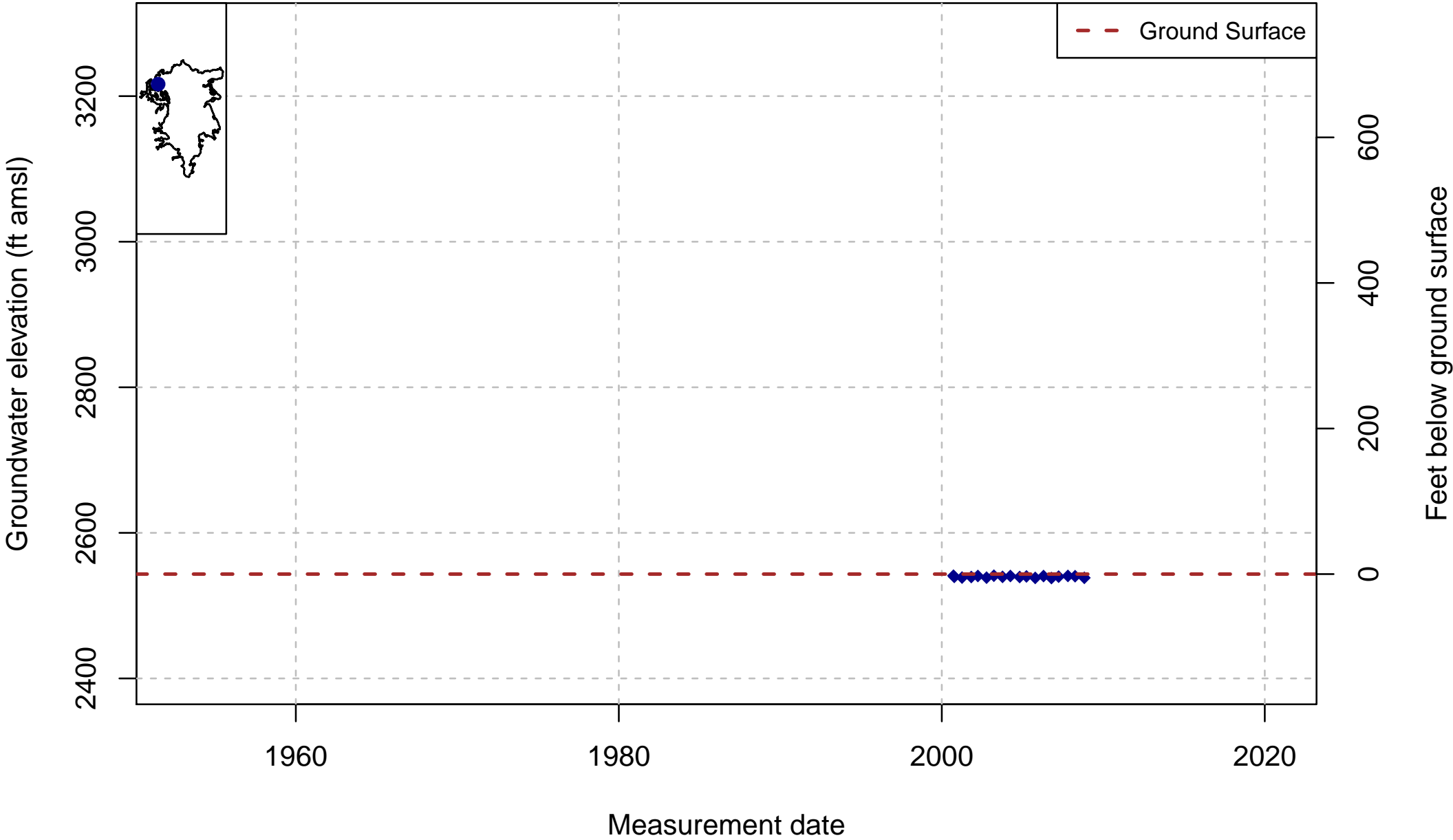
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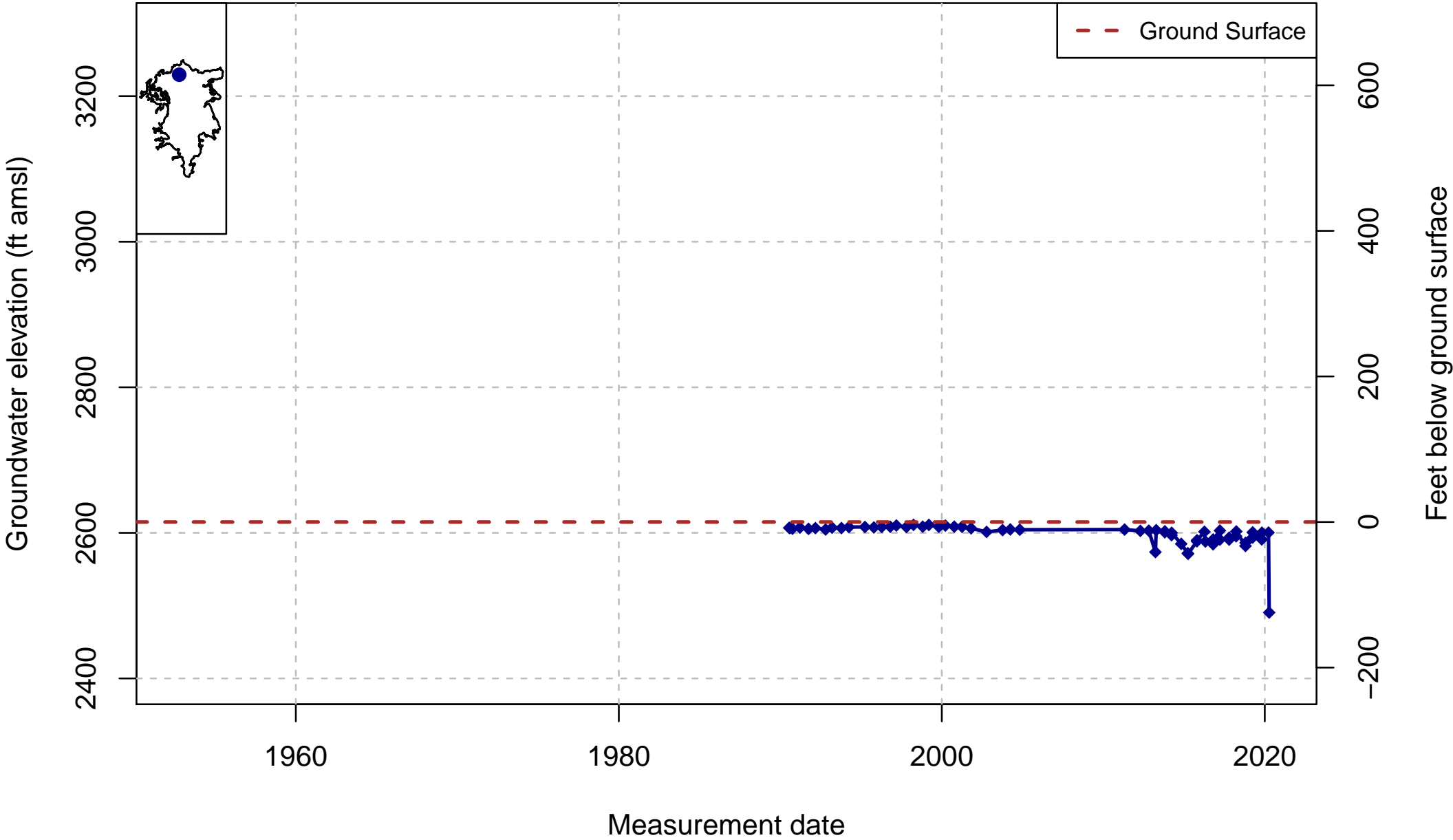
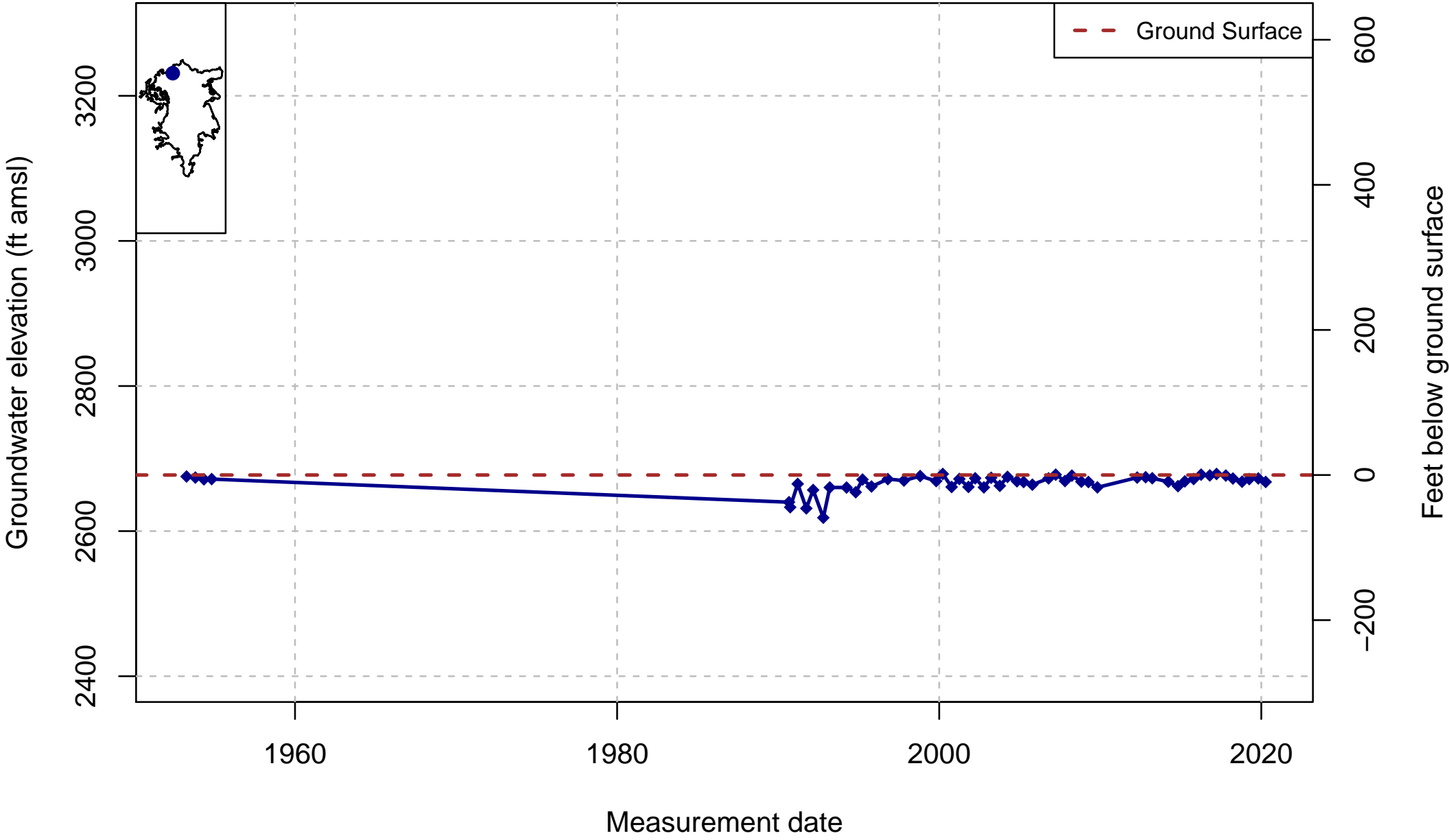**DWR Stn_ID: 24045; well_code: 417638N1224574W001; well_name: 45N05W07H002M; well_swn: 45N05W07H002M**

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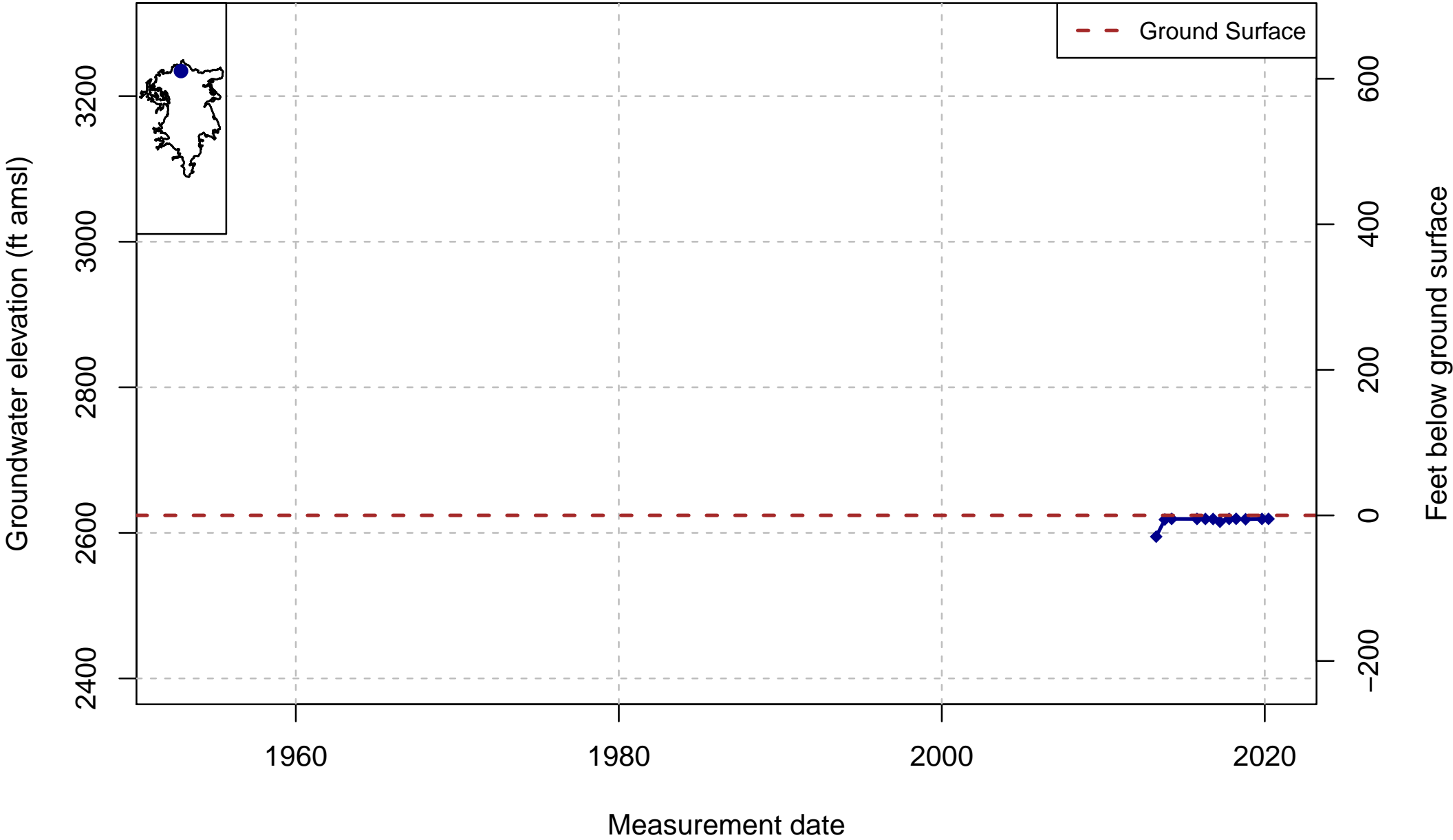
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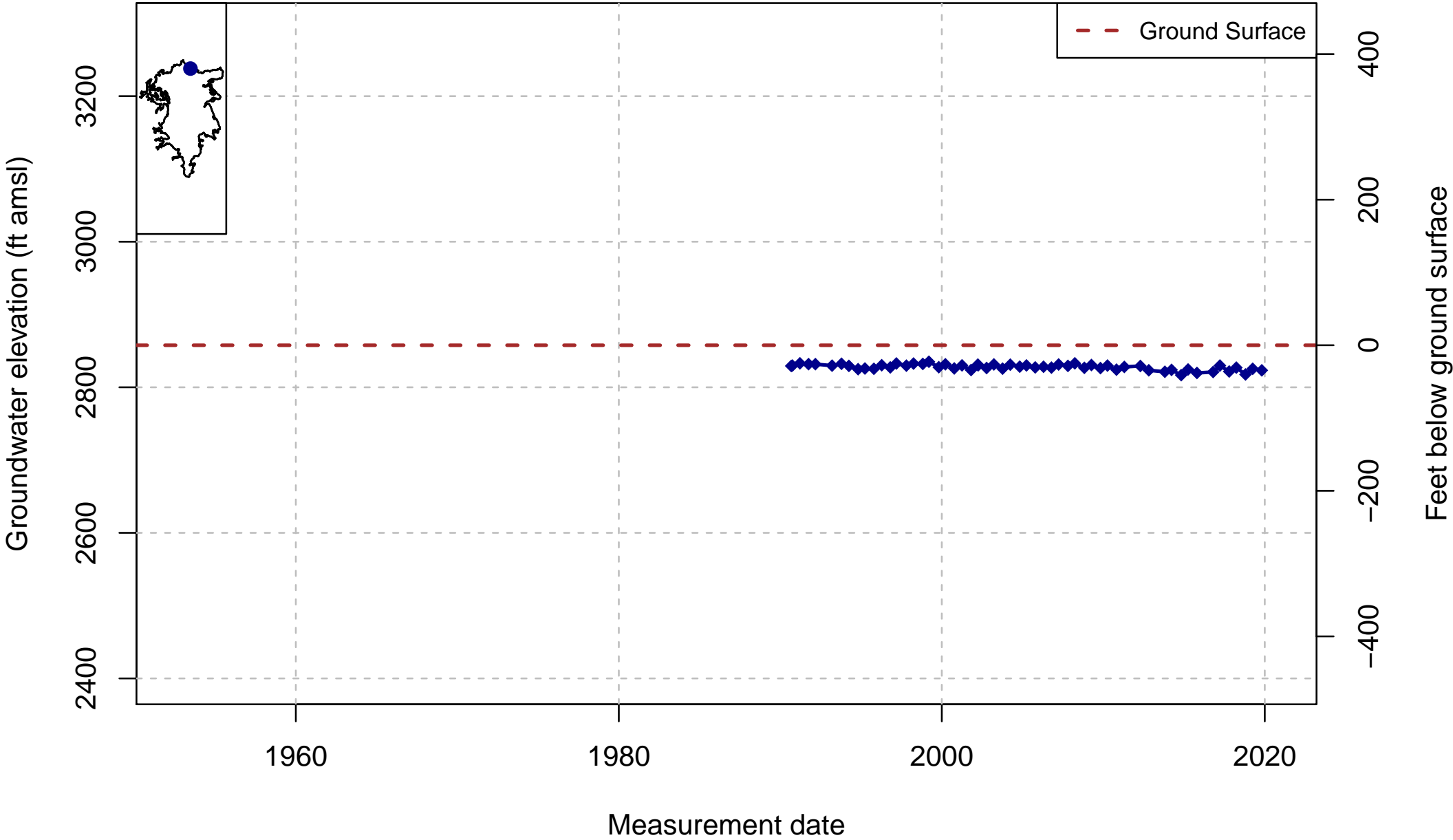
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DWR Stn_ID: 48791; well_code: 414686N1222830W001; well_name: SV04; well_swn: NA

DWR Stn_ID: 36892; well_code: 417916N1224217W001; well_name: 46N05W33J001M; well_swn: 46N05W33J001M

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