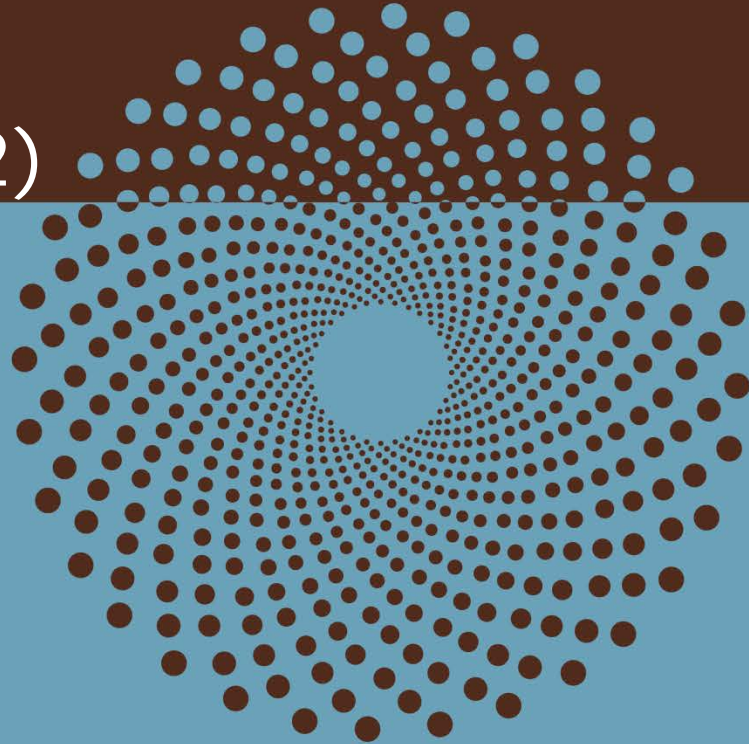


Appendix 1

Subsection 3.1.1 – 2)

Heave data



Ground heave: annual deformation

Annual Vertical Deformation:
September 18, 2016 to September 13, 2017

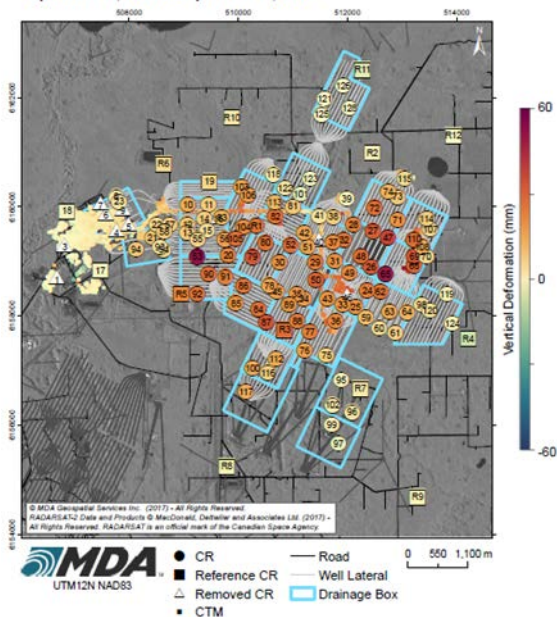


Figure 1: CR and CTM annual vertical deformation at Christina Lake. The deformation is calculated from September 18, 2016 to September 13, 2017.

Wide Area Vertical Deformation with Corner Reflectors:
November 5, 2016 to July 3, 2017

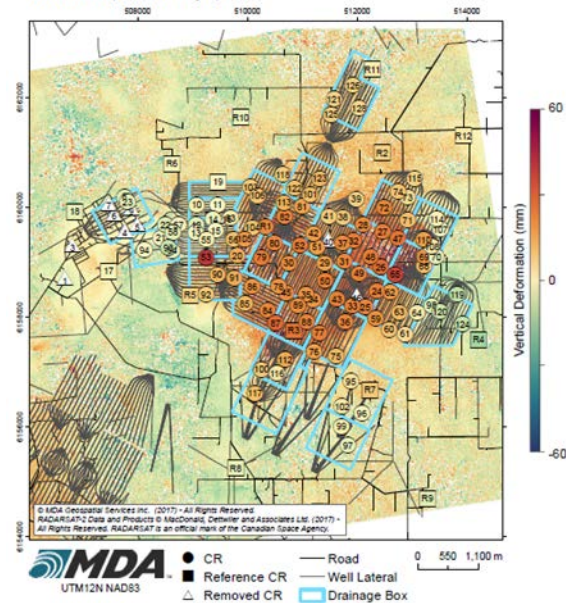


Figure 5: Conventional vertical deformation map with CRs for the image pair between November 5, 2016 to July 3, 2017.

Ground heave: 2017 reflector additions

- 5 corner reflectors added in 2017
- More additions planned for 2018 in anticipation of a handful of new pad startups

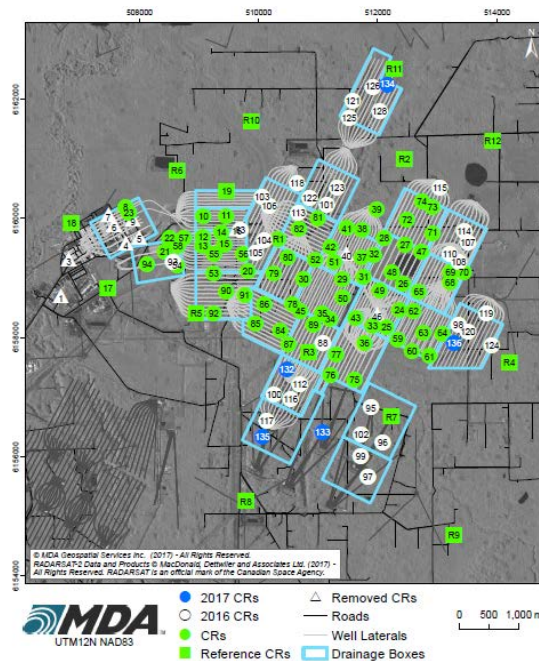


Figure 2: Corner reflector layout for Cenovus Christina Lake. Lateral well shapefiles provided by Cenovus in 2016.

Ground heave: CTMs

CTM: coherent target monitoring

- 'targets of opportunity', do not rely on corner reflectors
- dominantly monitors plant infrastructure, surface pipelines and well-headers
- discontinued monitoring of non-SAGD areas in 2017

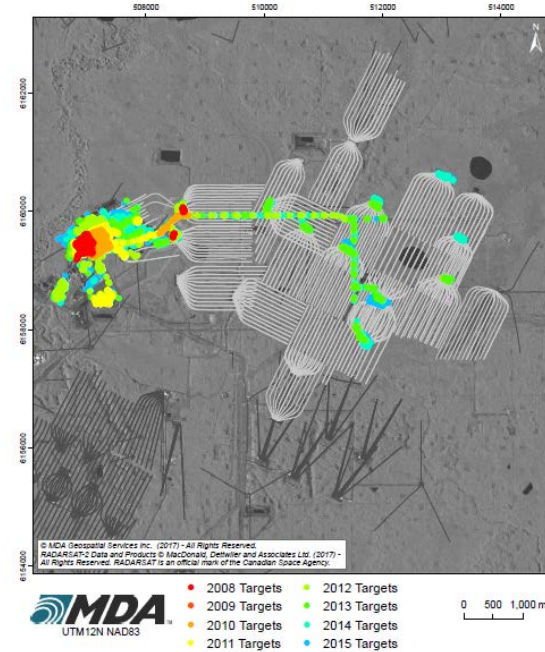


Figure 3: CTM point selection and plot areas: 2008, 2009, 2010, 2011, 2012, 2013, 2014, and 2015.

Ground heave: plant infrastructure

Deformation under the plant is minimal as the underlying A01 Pad is not currently being steamed

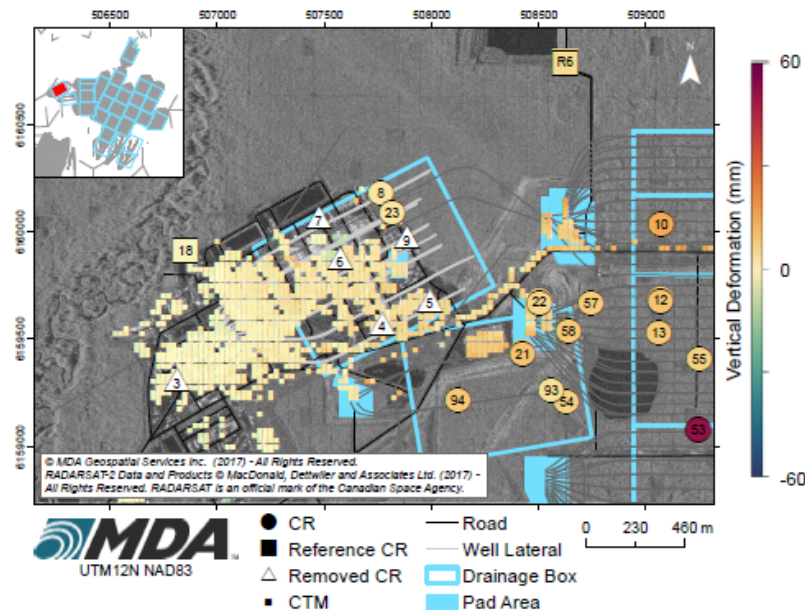
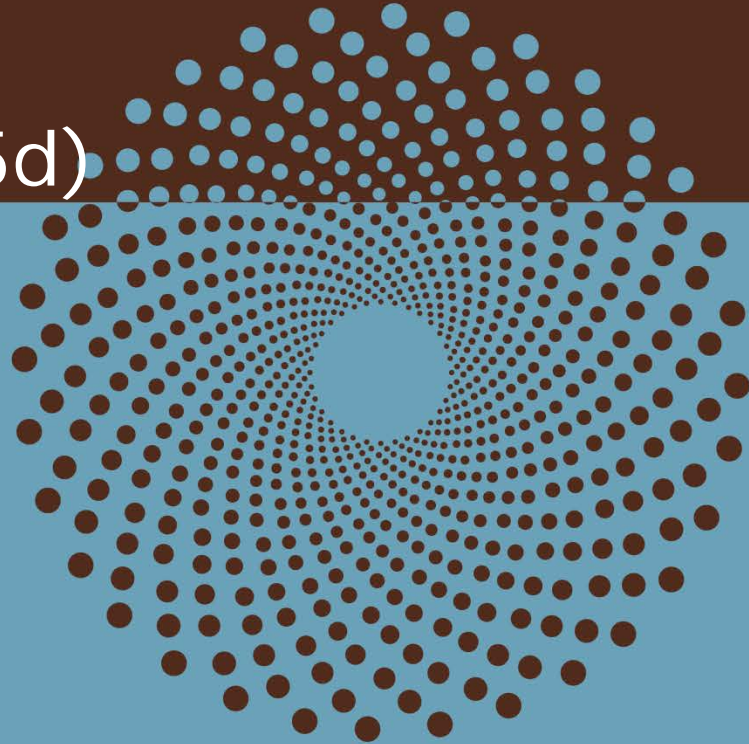


Figure 9: Annual CR and CTM point vertical deformation (mm) from September 18, 2016 to September 13, 2017 at Pad A01. For visualization purposes, the CTM points have been spatially averaged and resampled to a 25 m by 25 m grid.

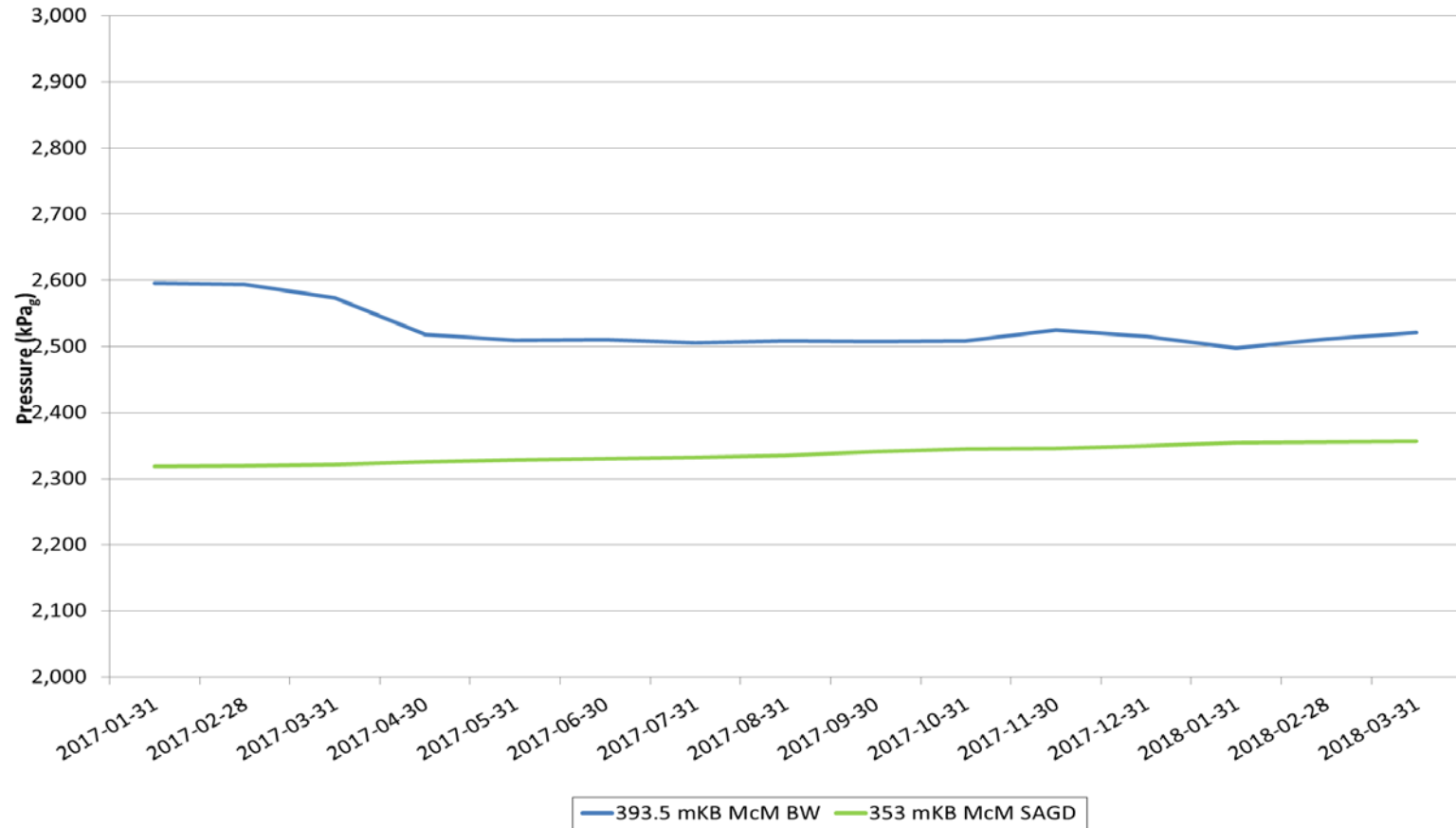
Appendix 2

Subsection 3.1.1 – 5d)

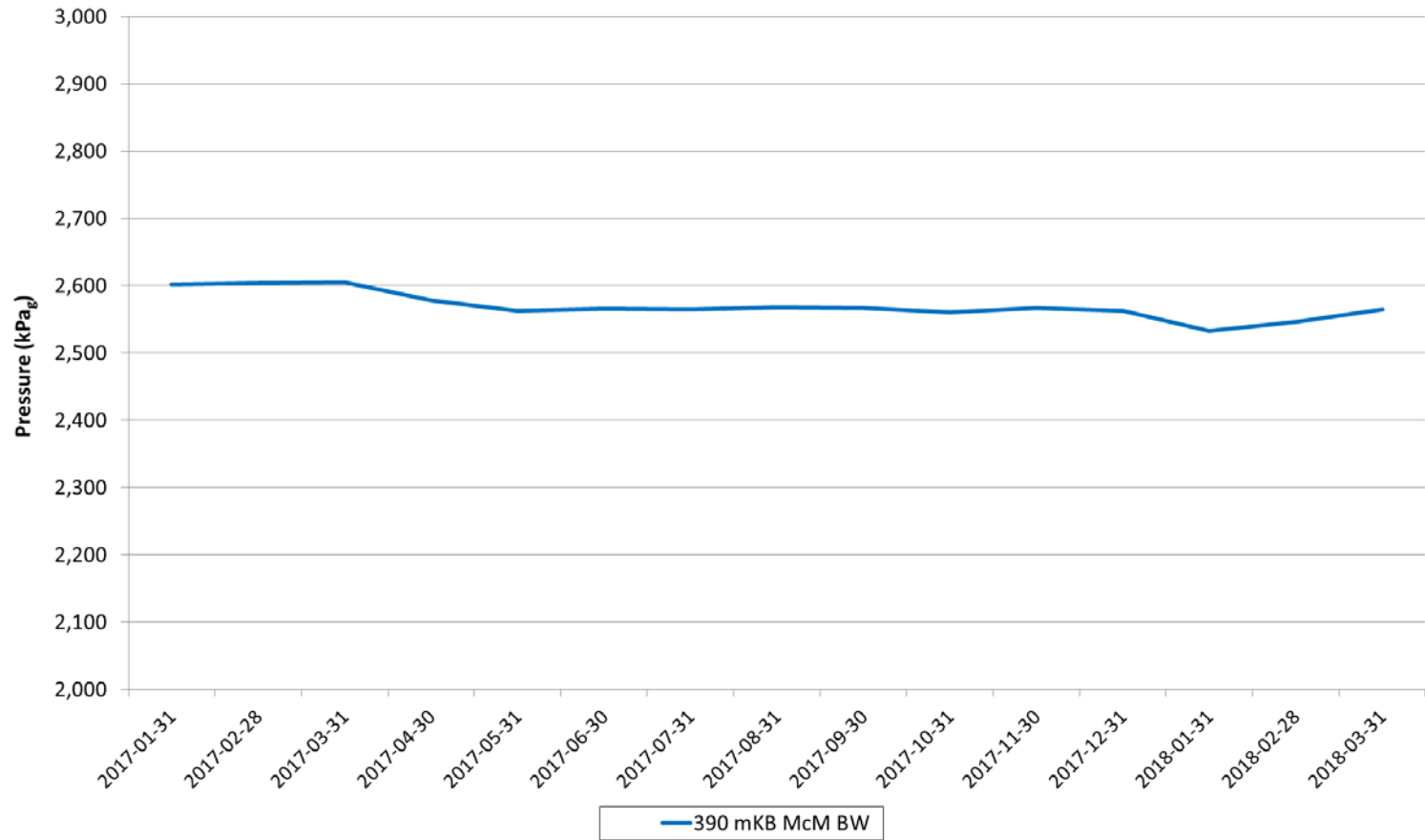
Piezometer data



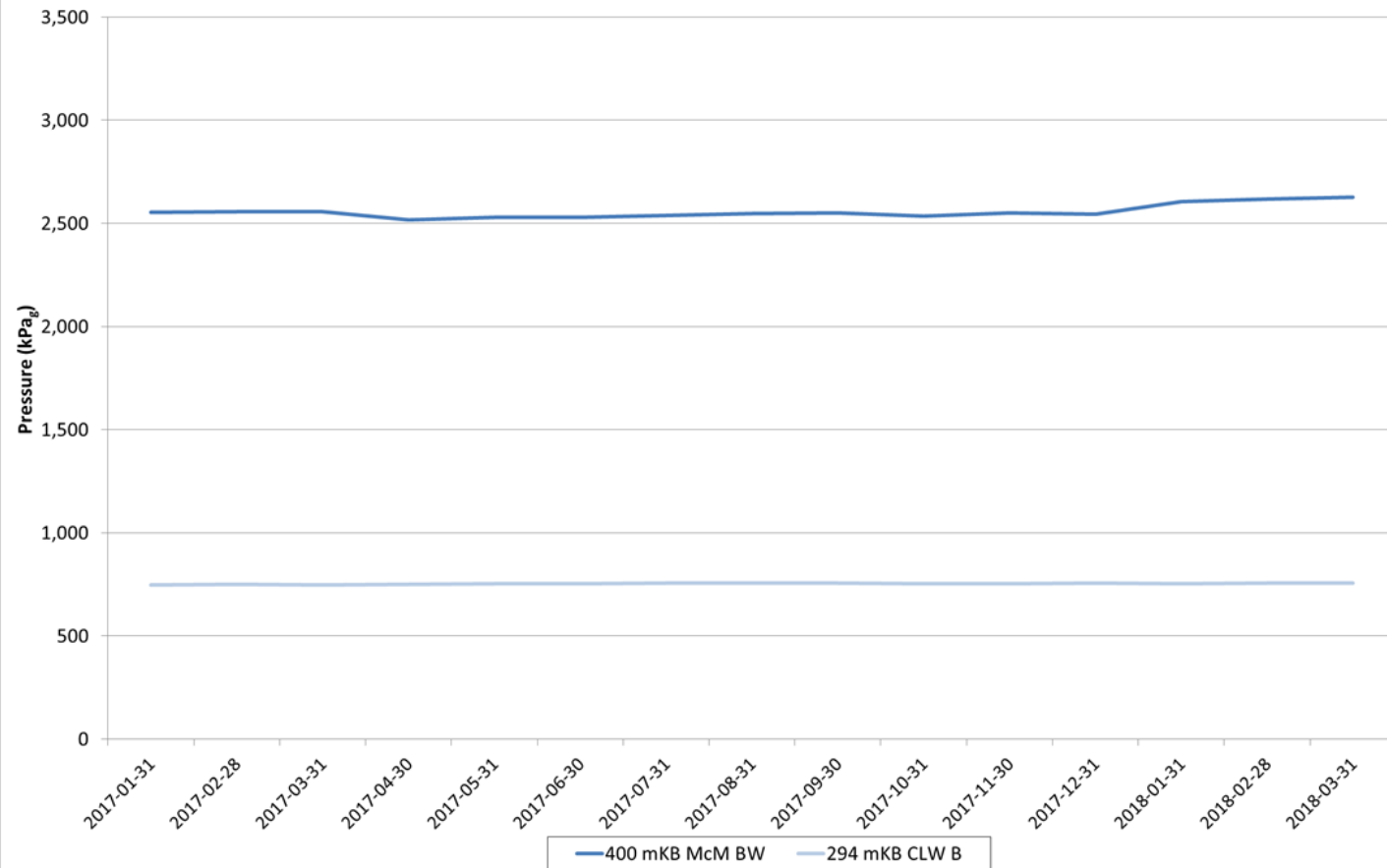
A6 LEISMER 6-21-76-6



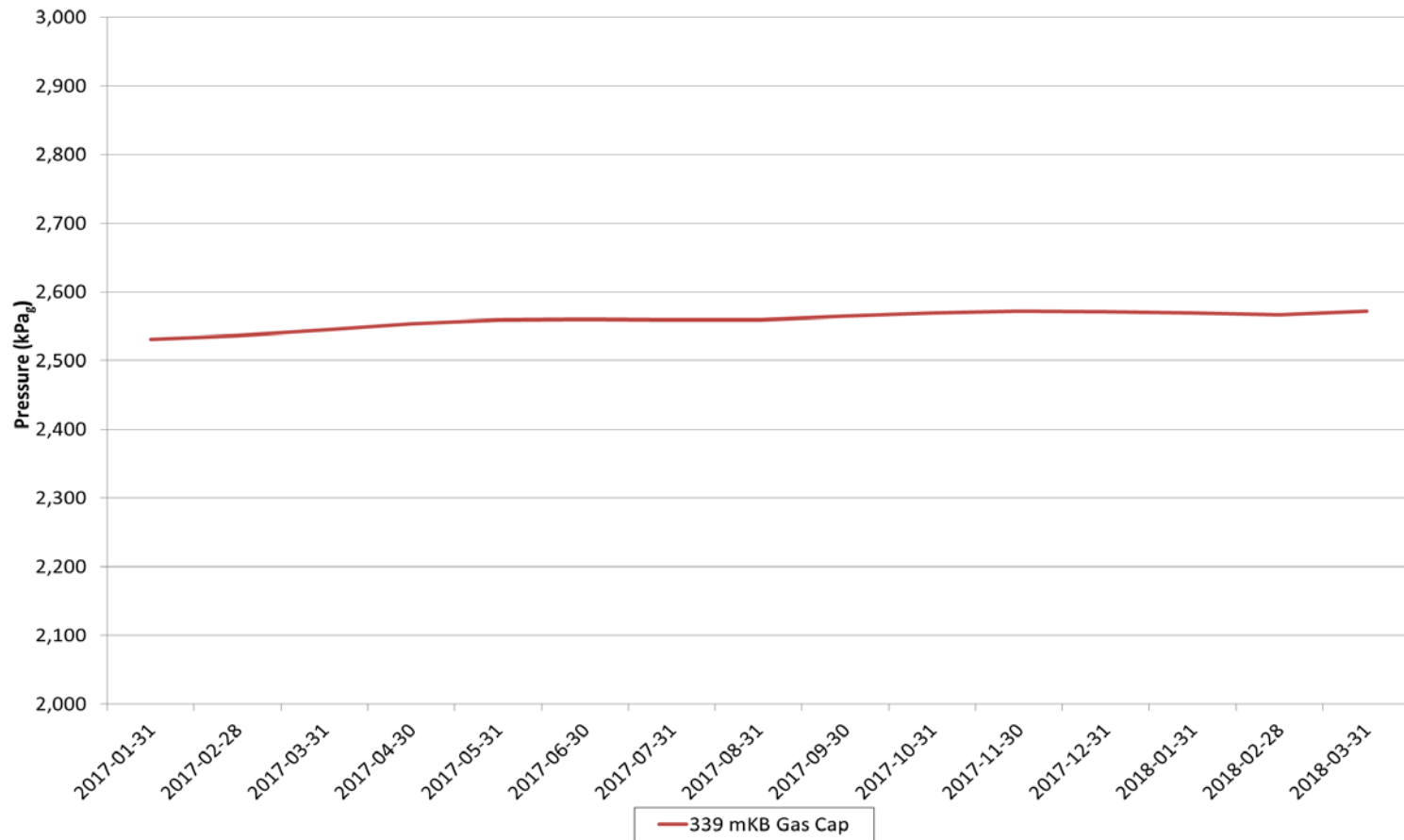
C13 LEISMER 13-22-76-6



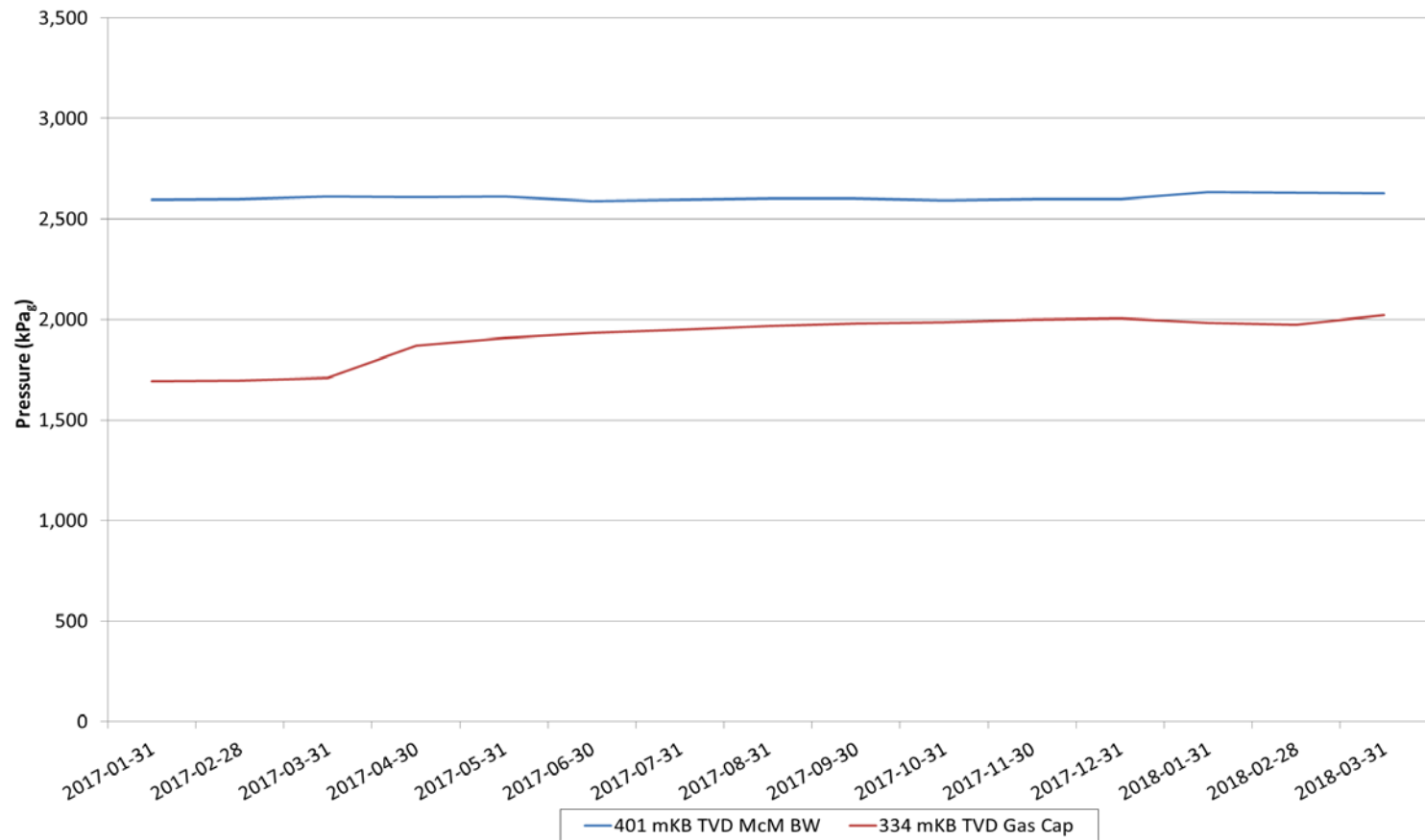
D11 LEISMER 11-23-76-6



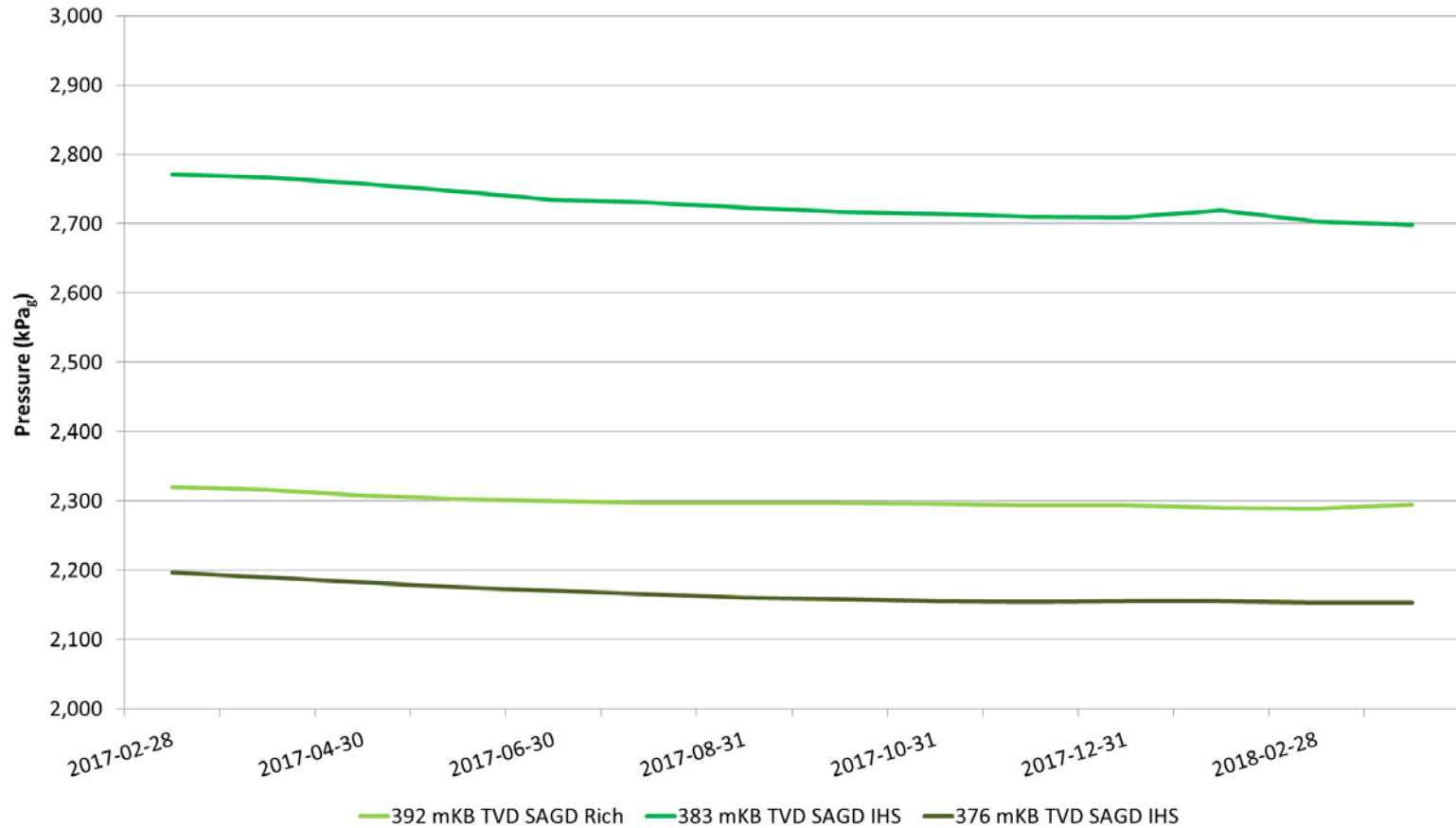
A2 HARDY 2-24-76-6



B15-24 D11 HARDY 11-24-76-6



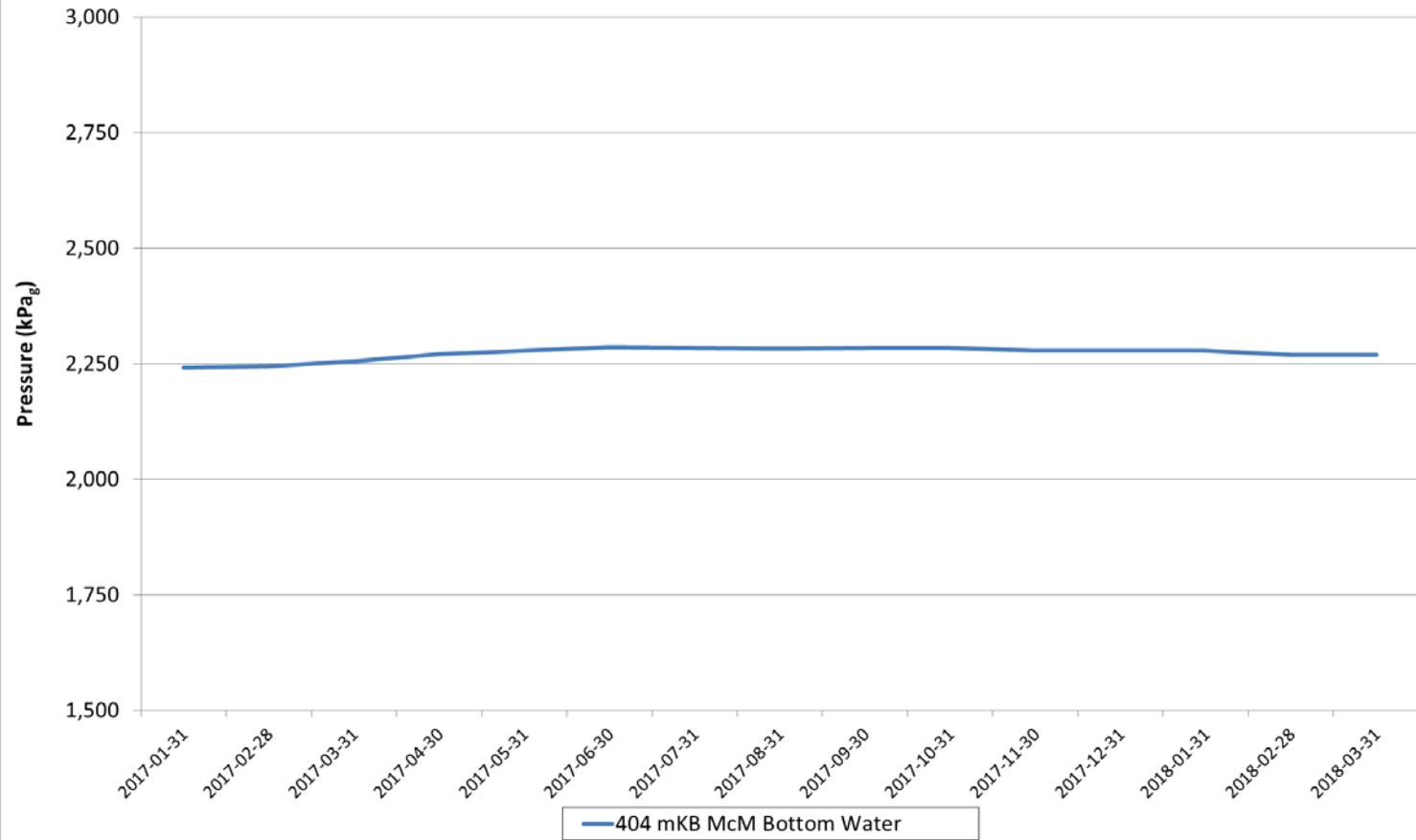
D8-22 C8 LEISMER 8-22-76-6



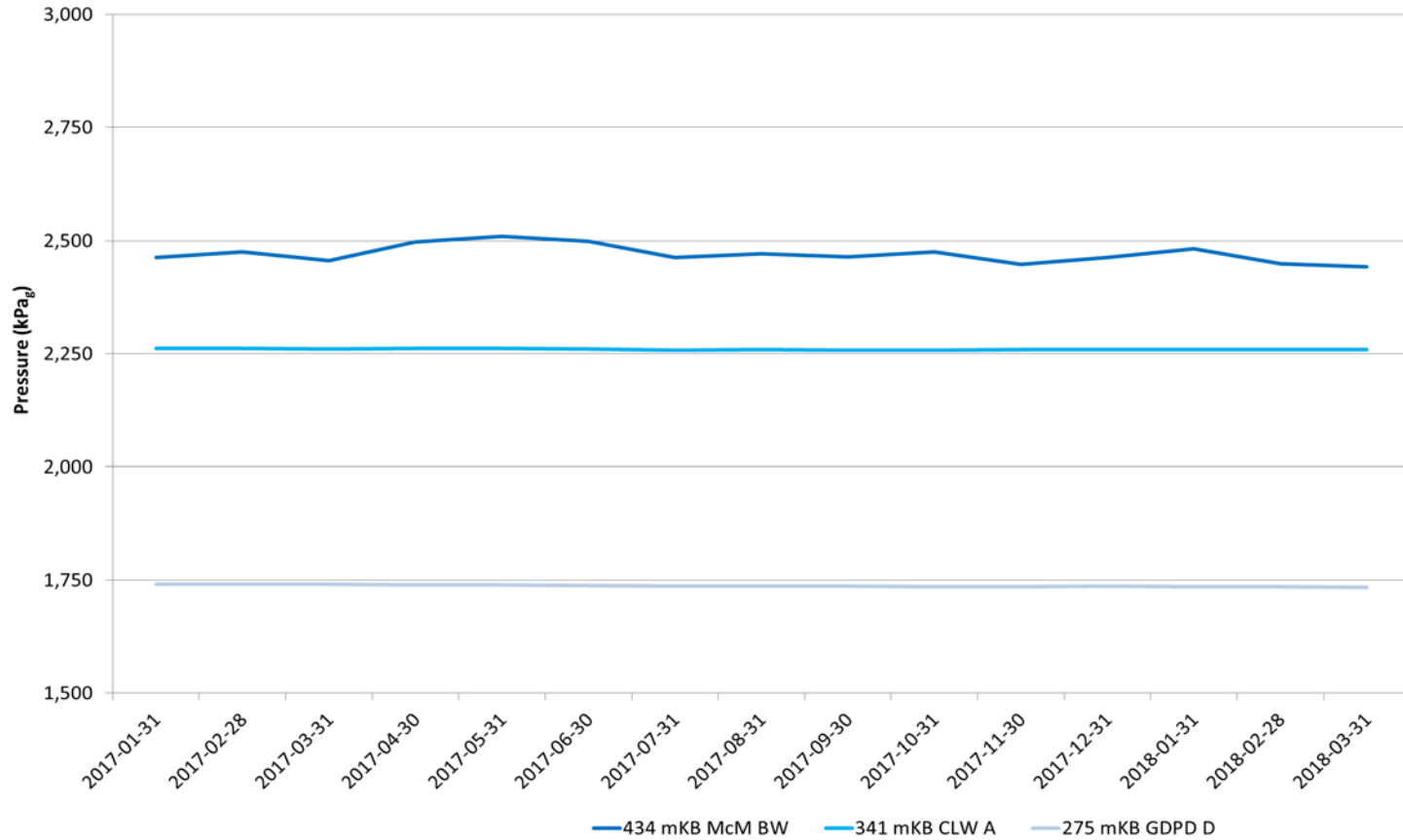
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Broken Downhole

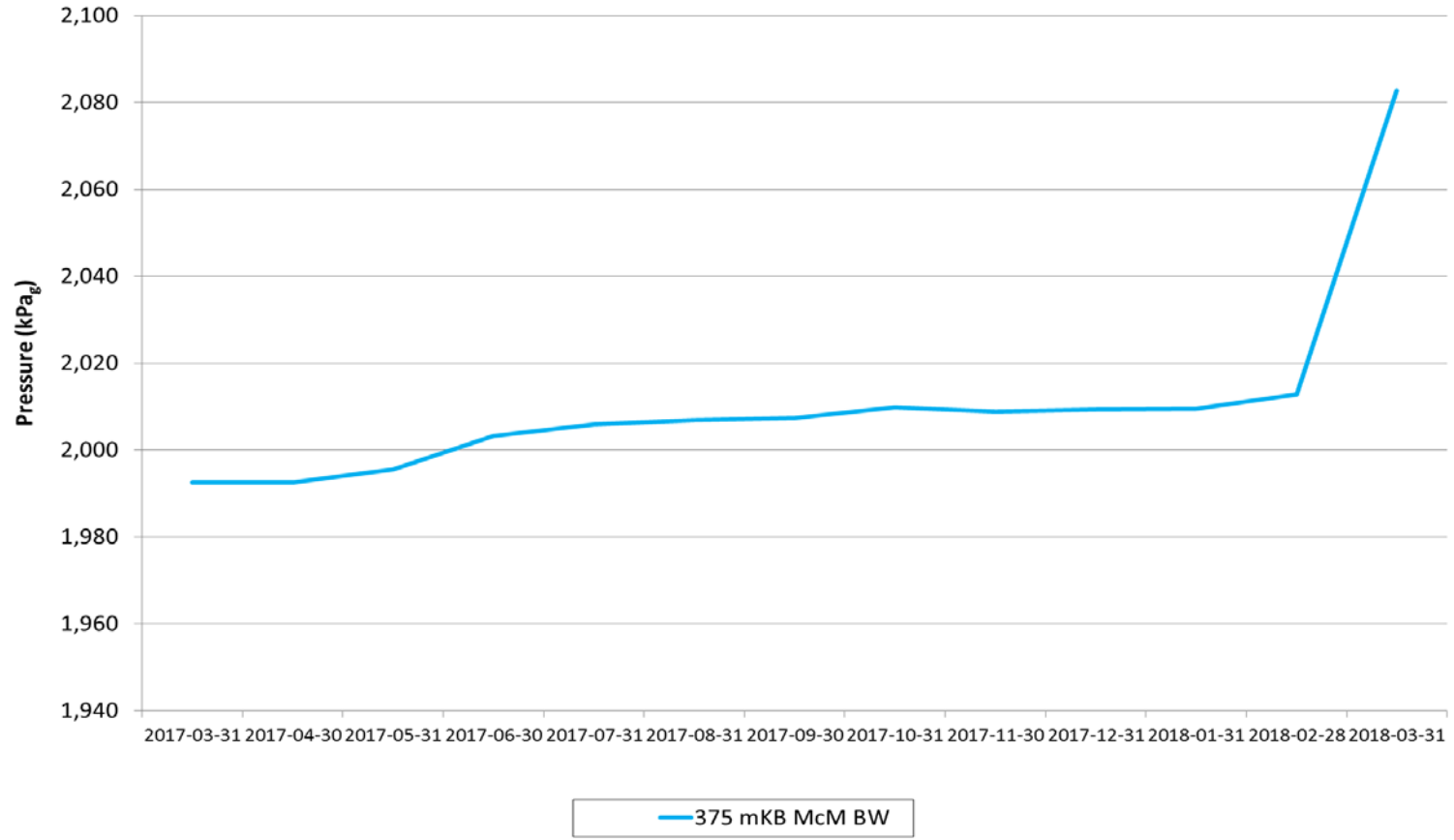
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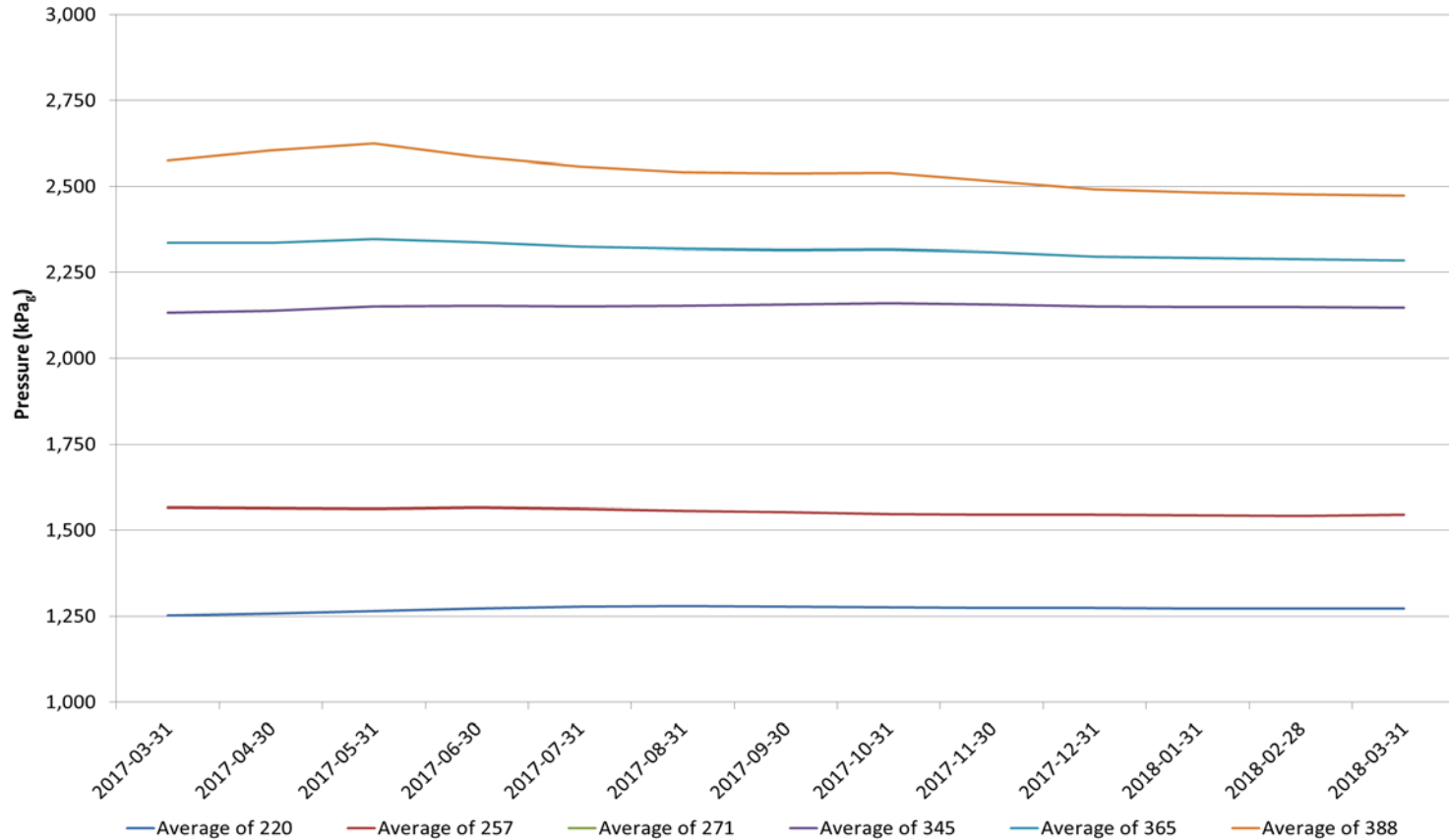
HARDY 13-34-76-3



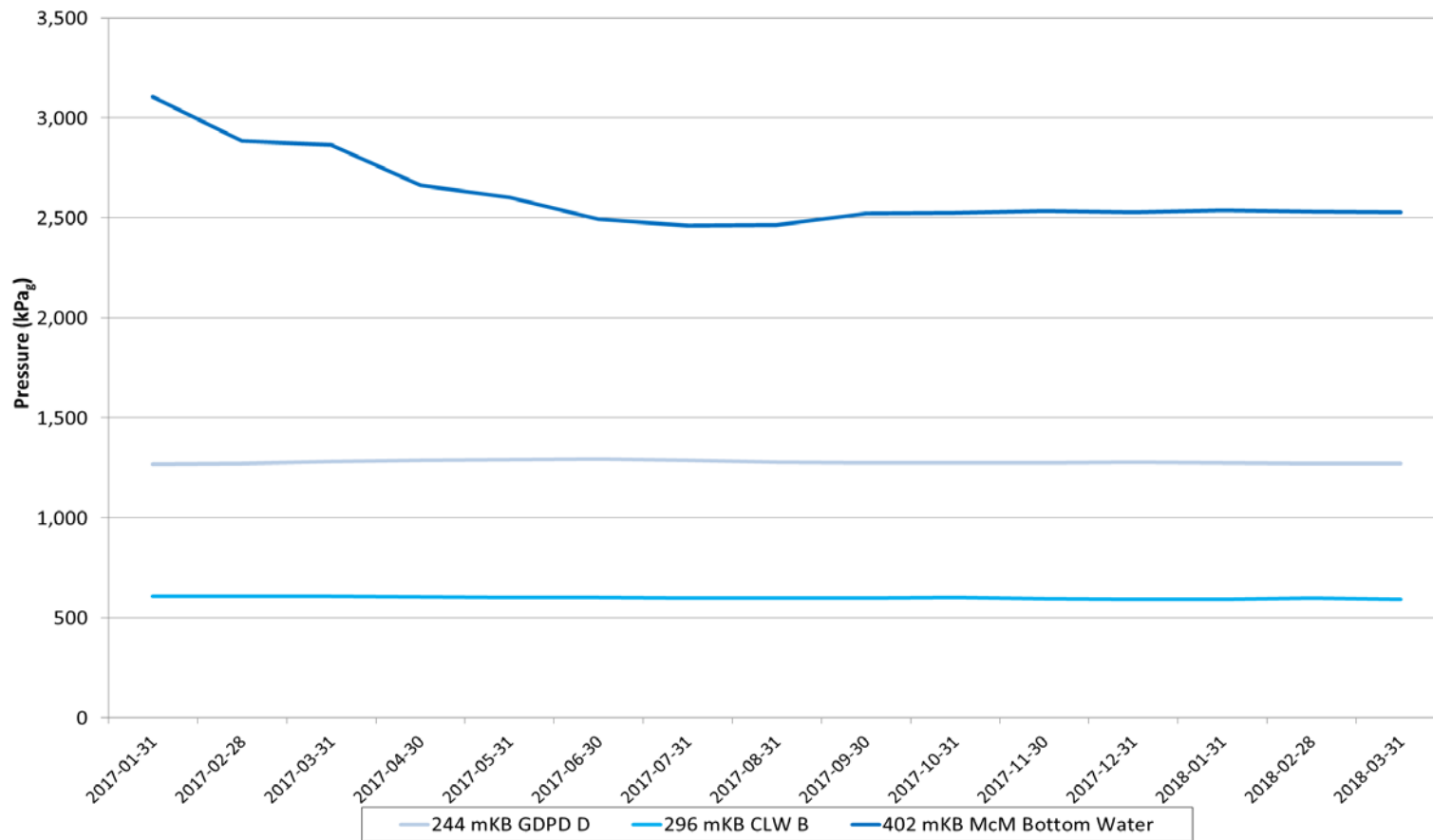
D16 HARDY 16-34-76-4



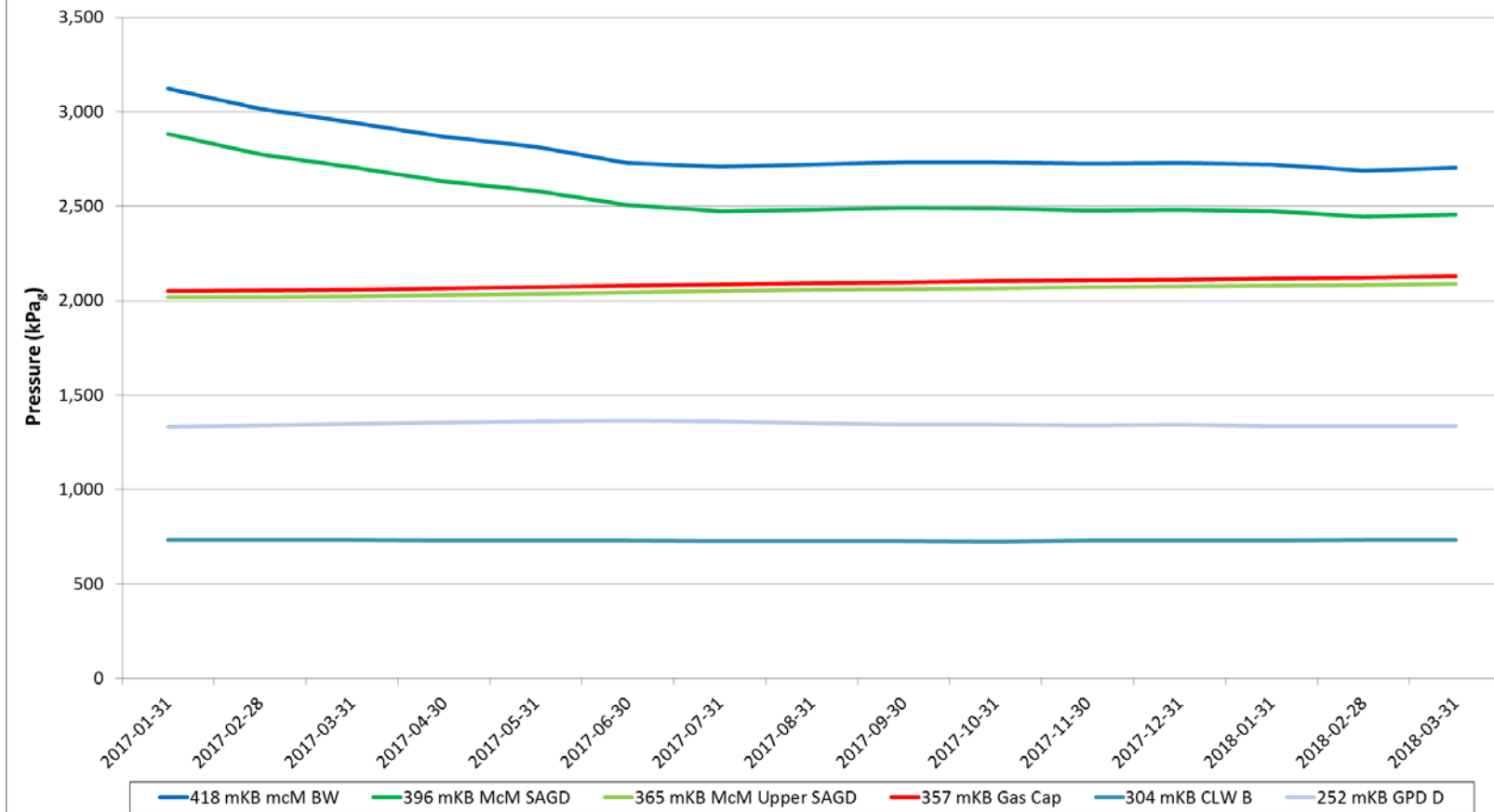
C9 HARDY 9-2-77-6



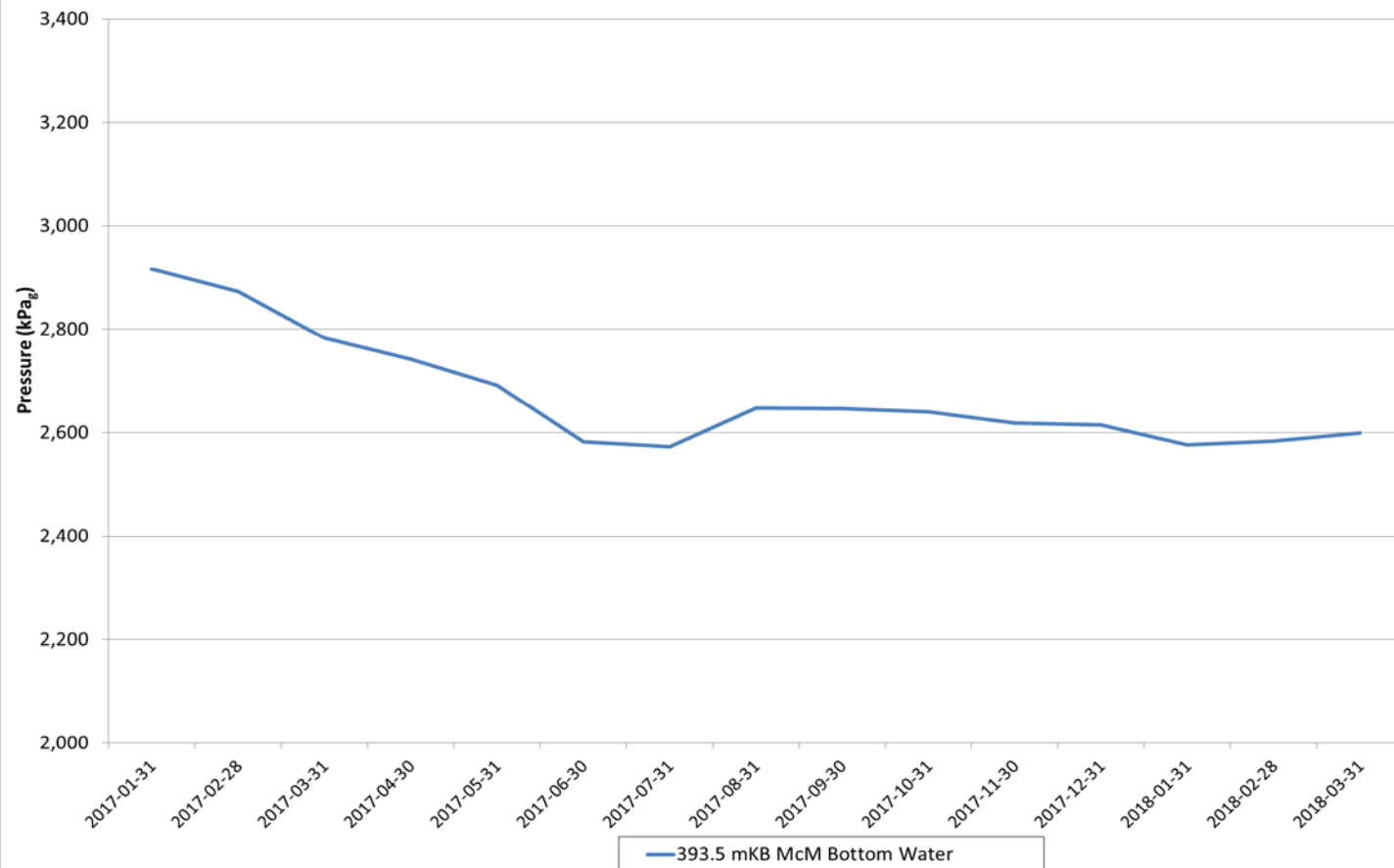
A1 LEISMER 1-10-76-6



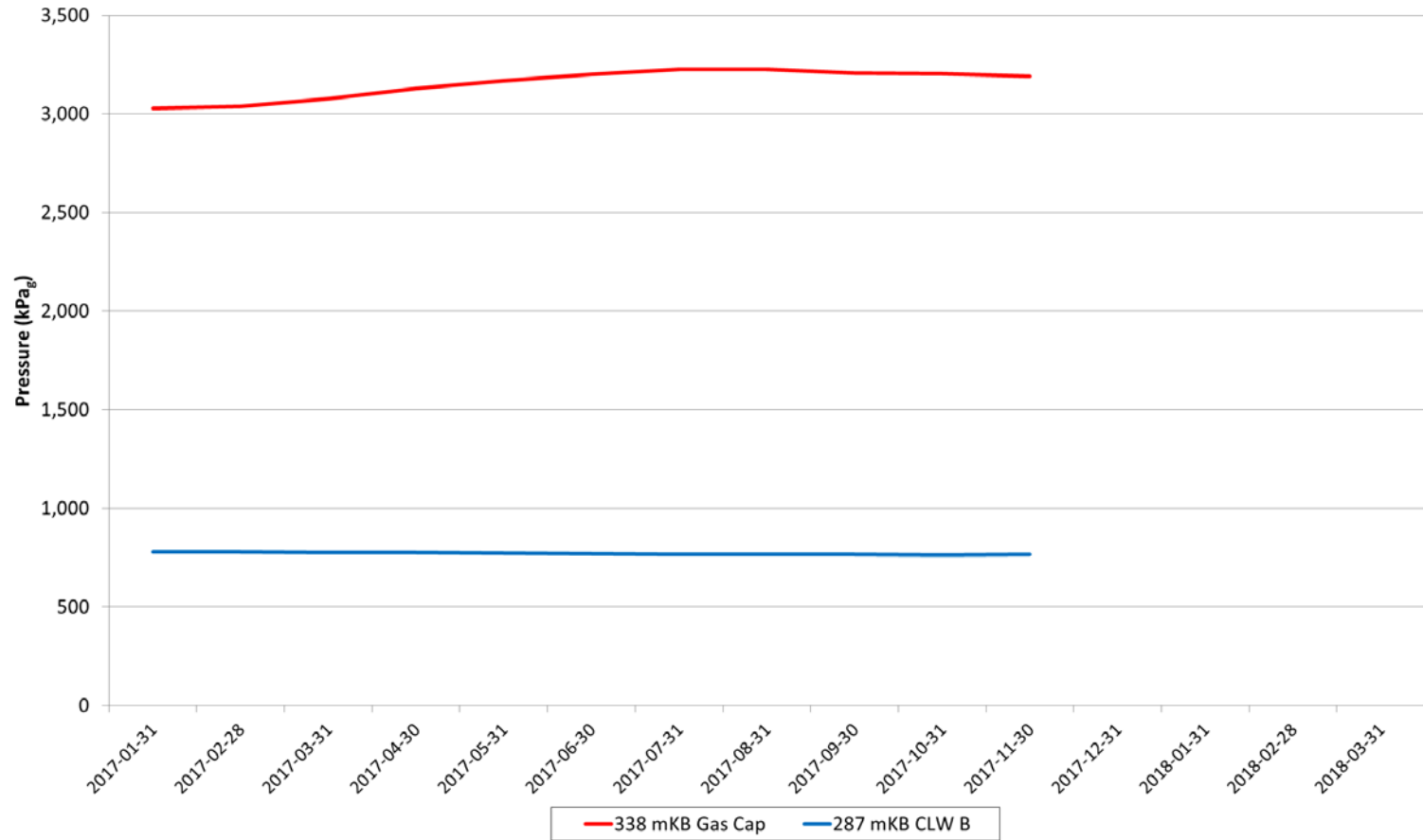
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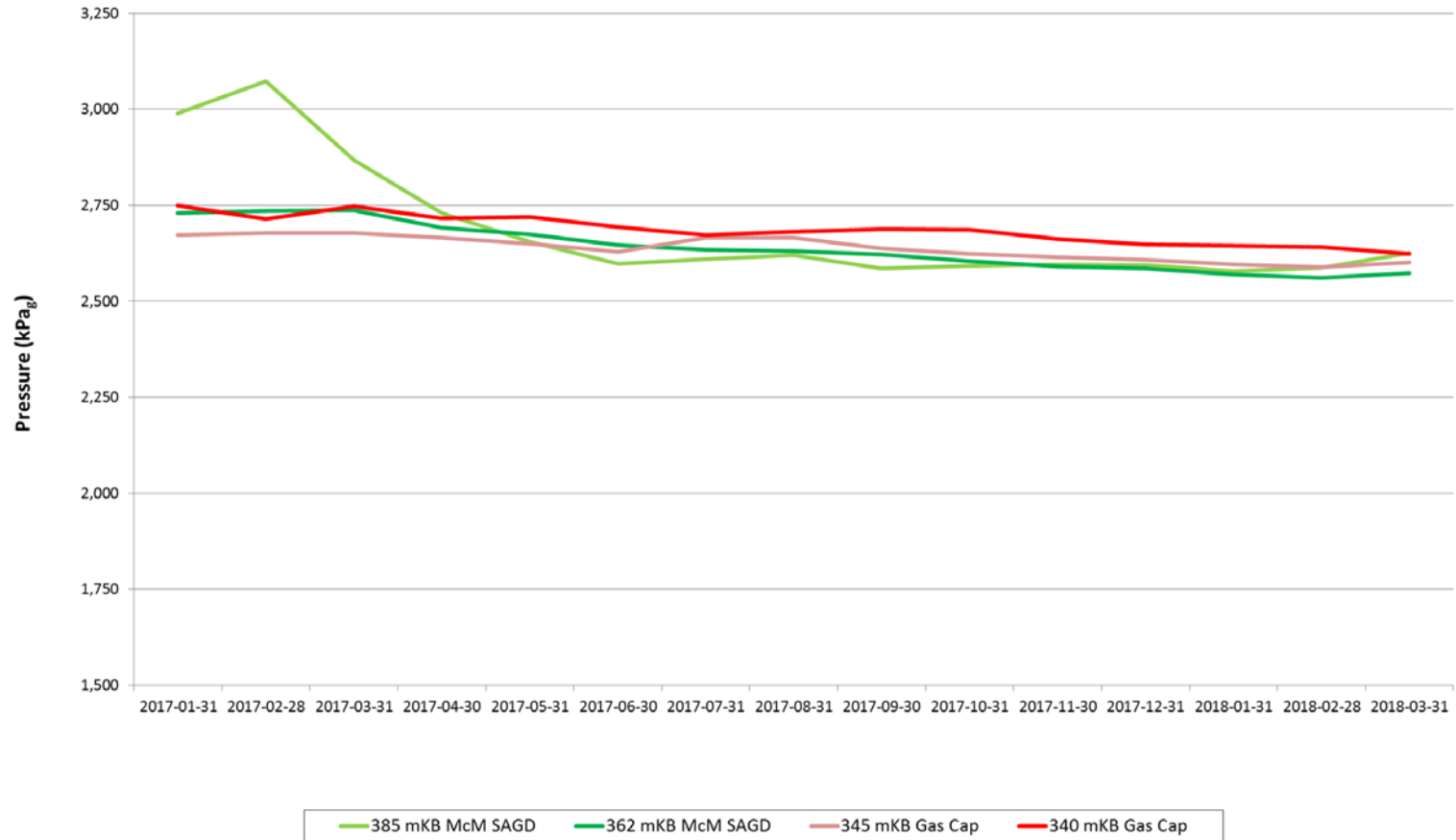
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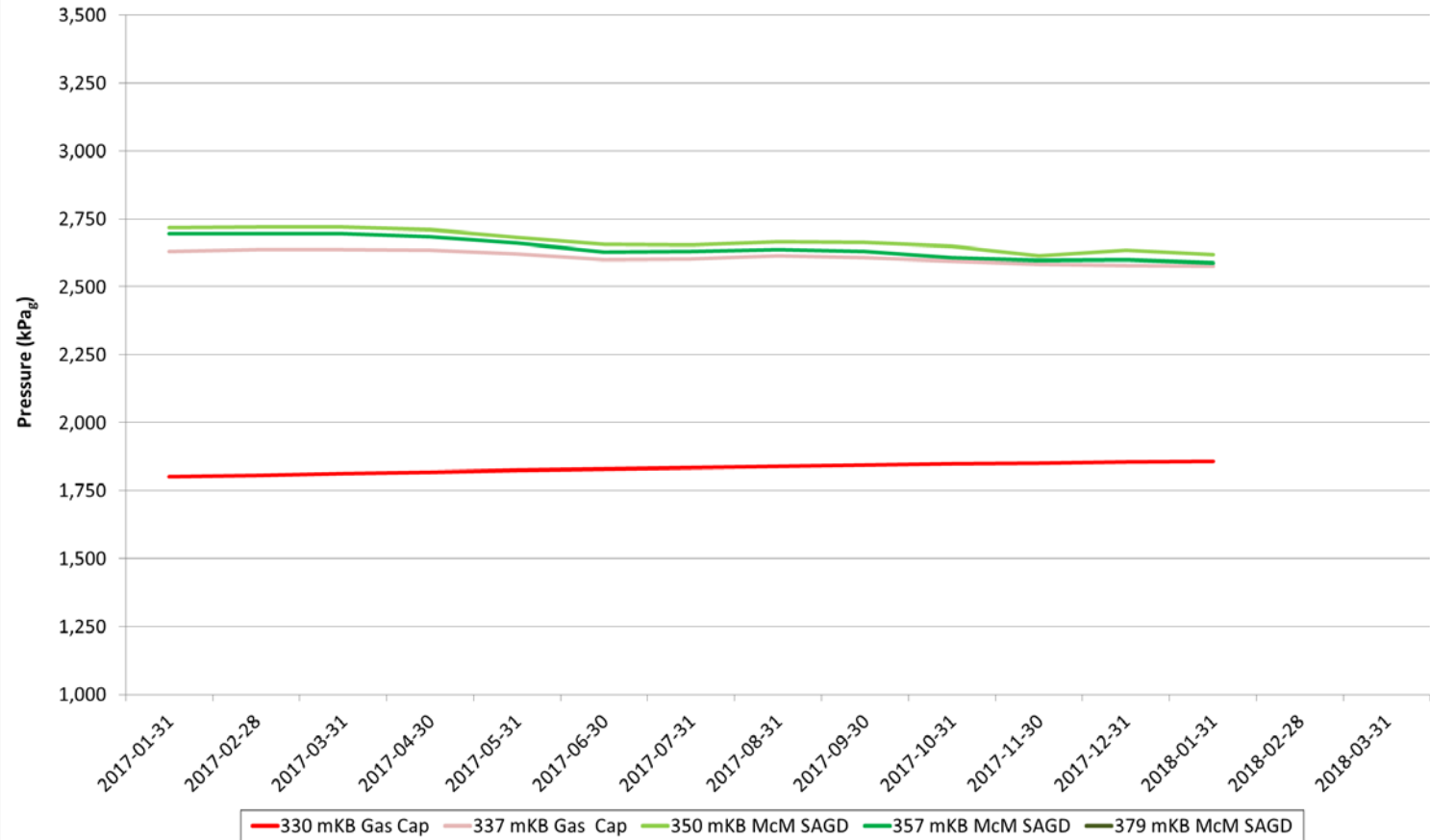
A8 LEISMER 8-11-76-6



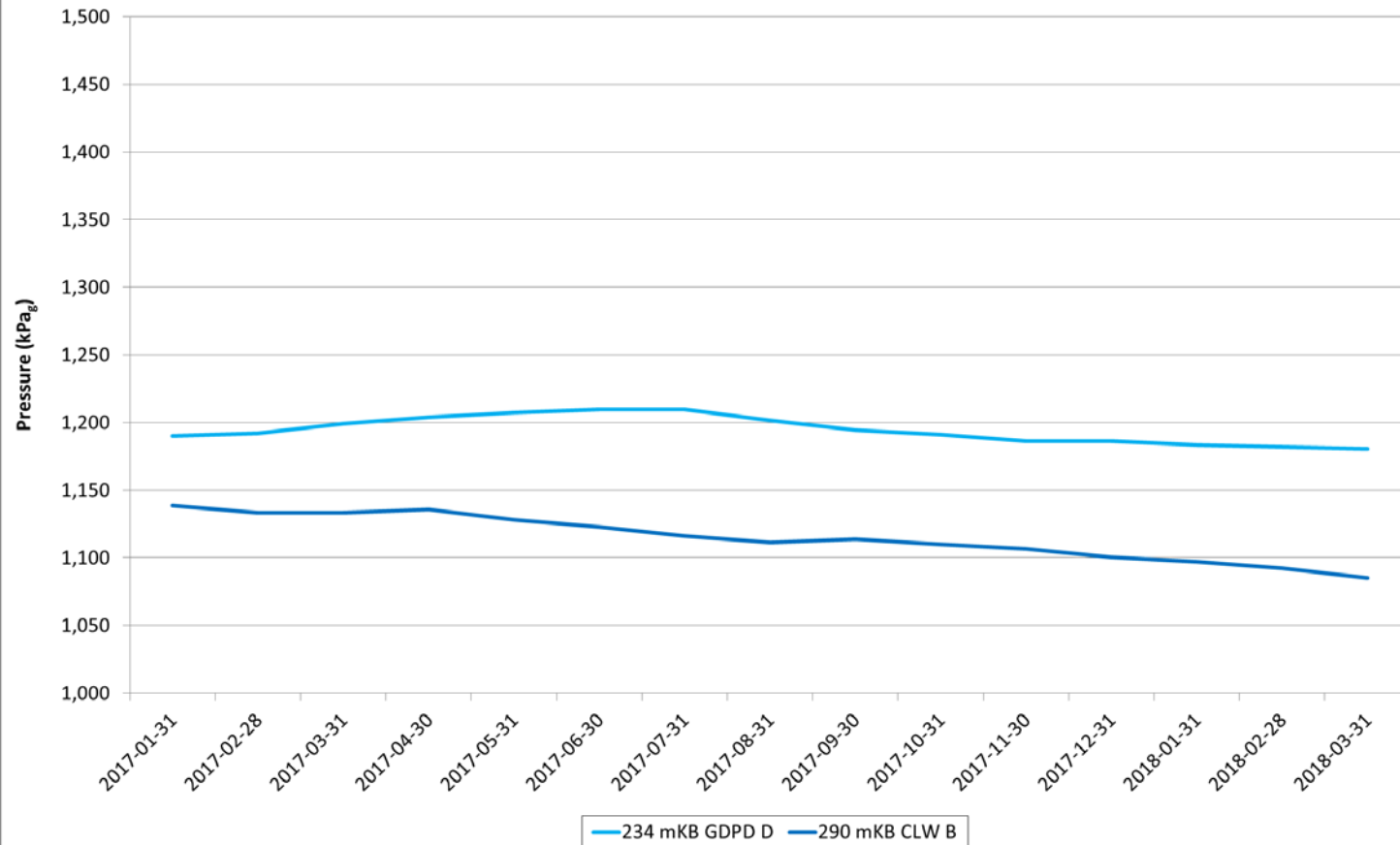
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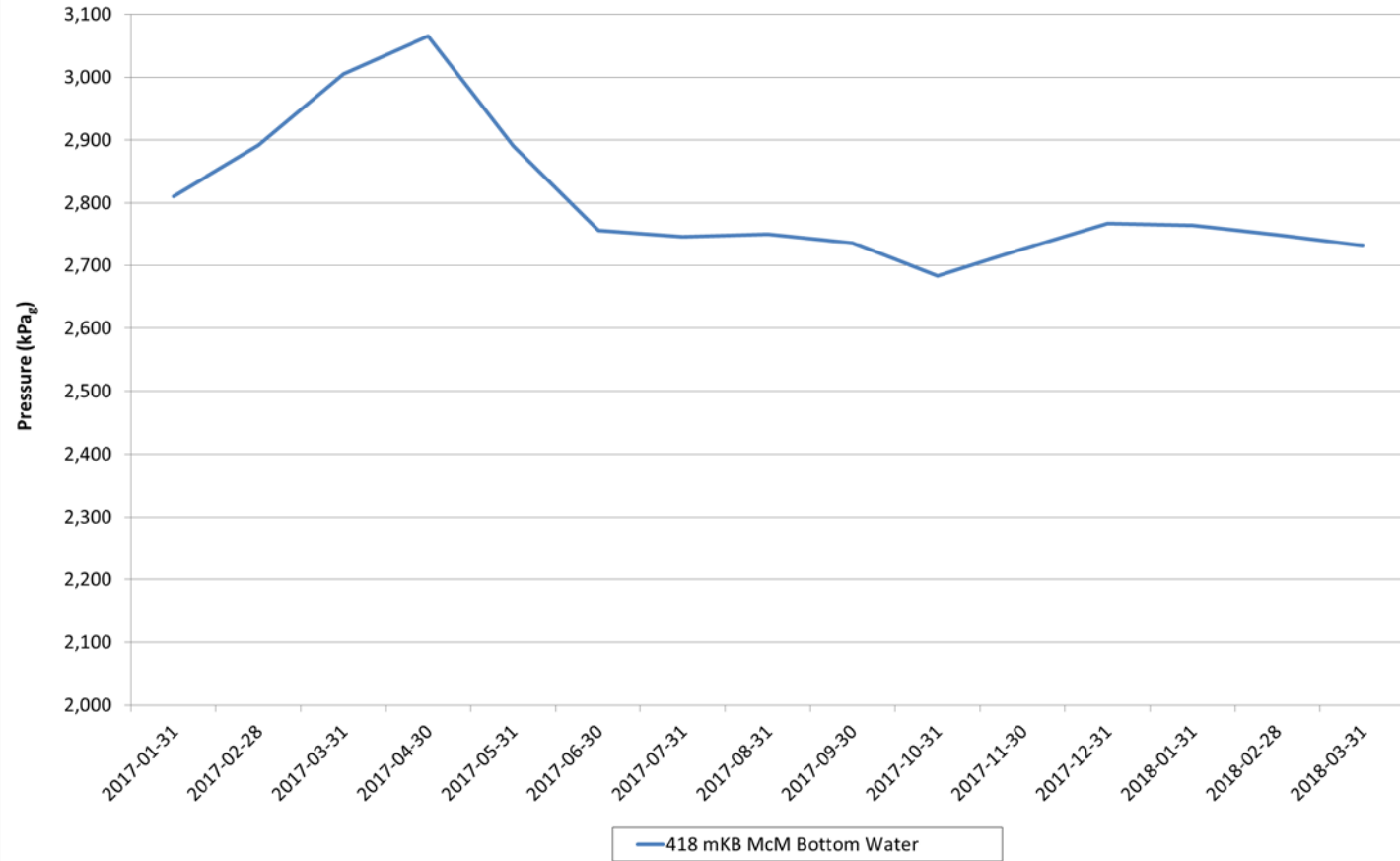
LEISMER 13-11-76-6



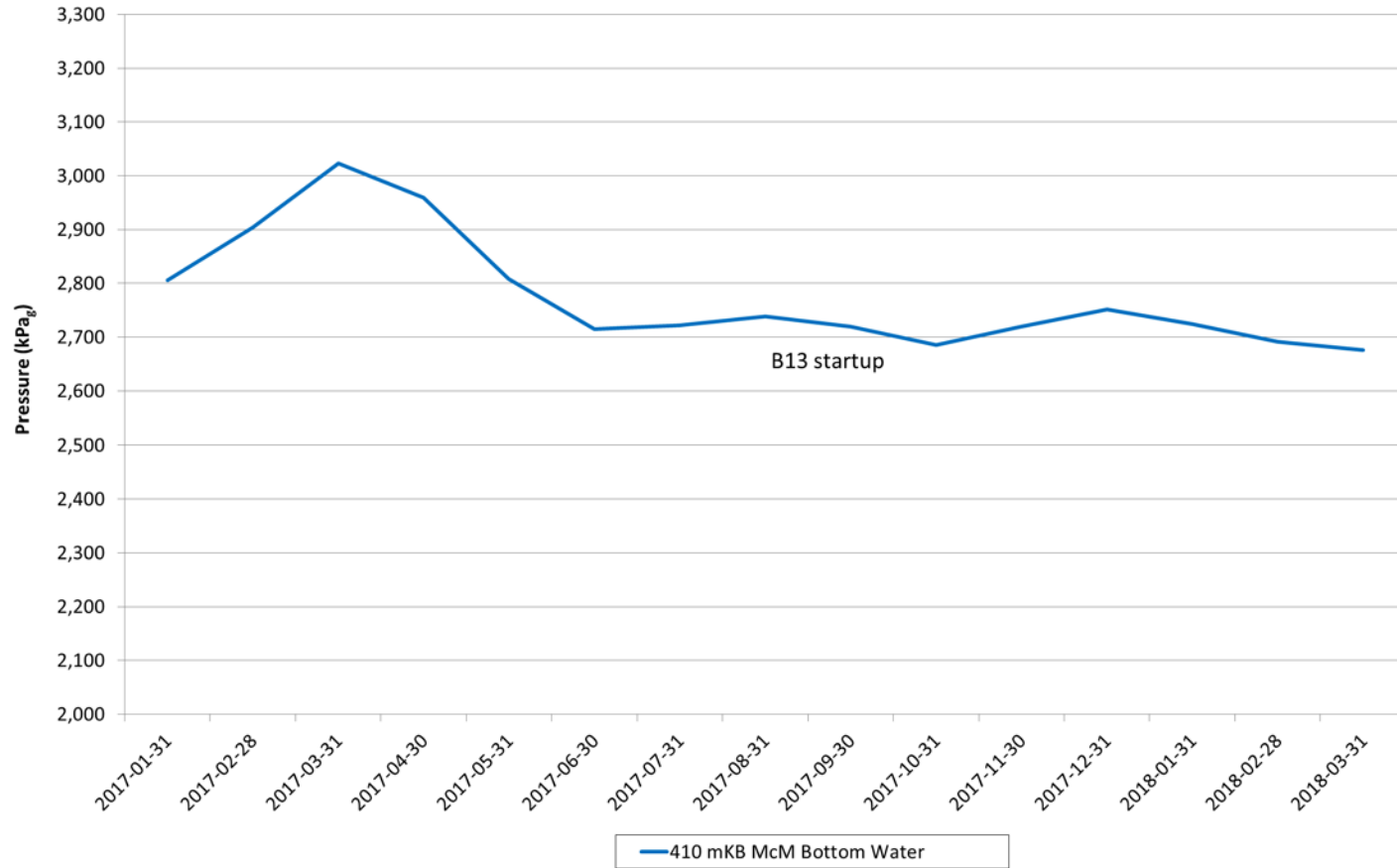
B16 LEISMER 16-11-76-6



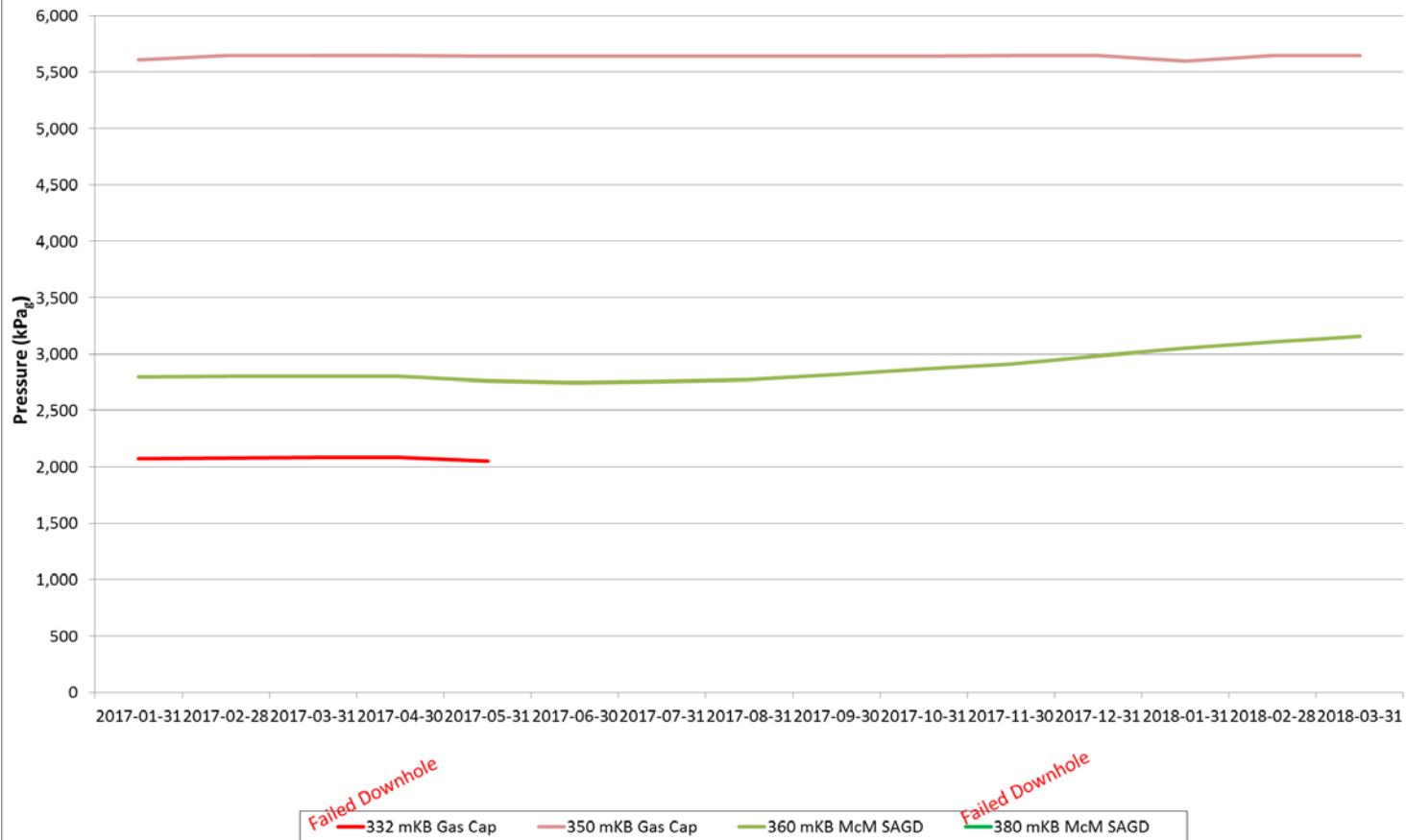
D1 LEISMER 1-12-76-6



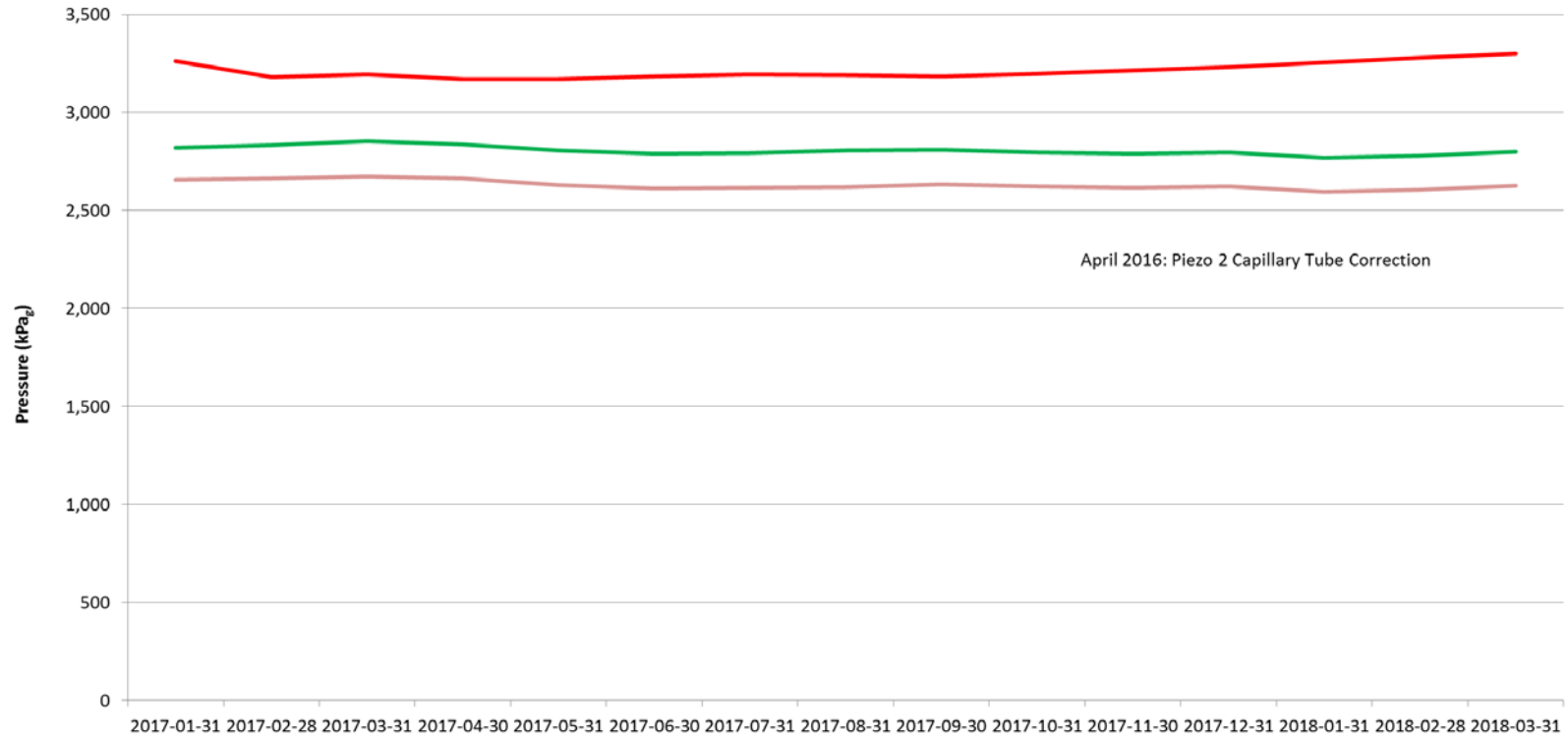
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B13 LEISMER 13-12-76-6

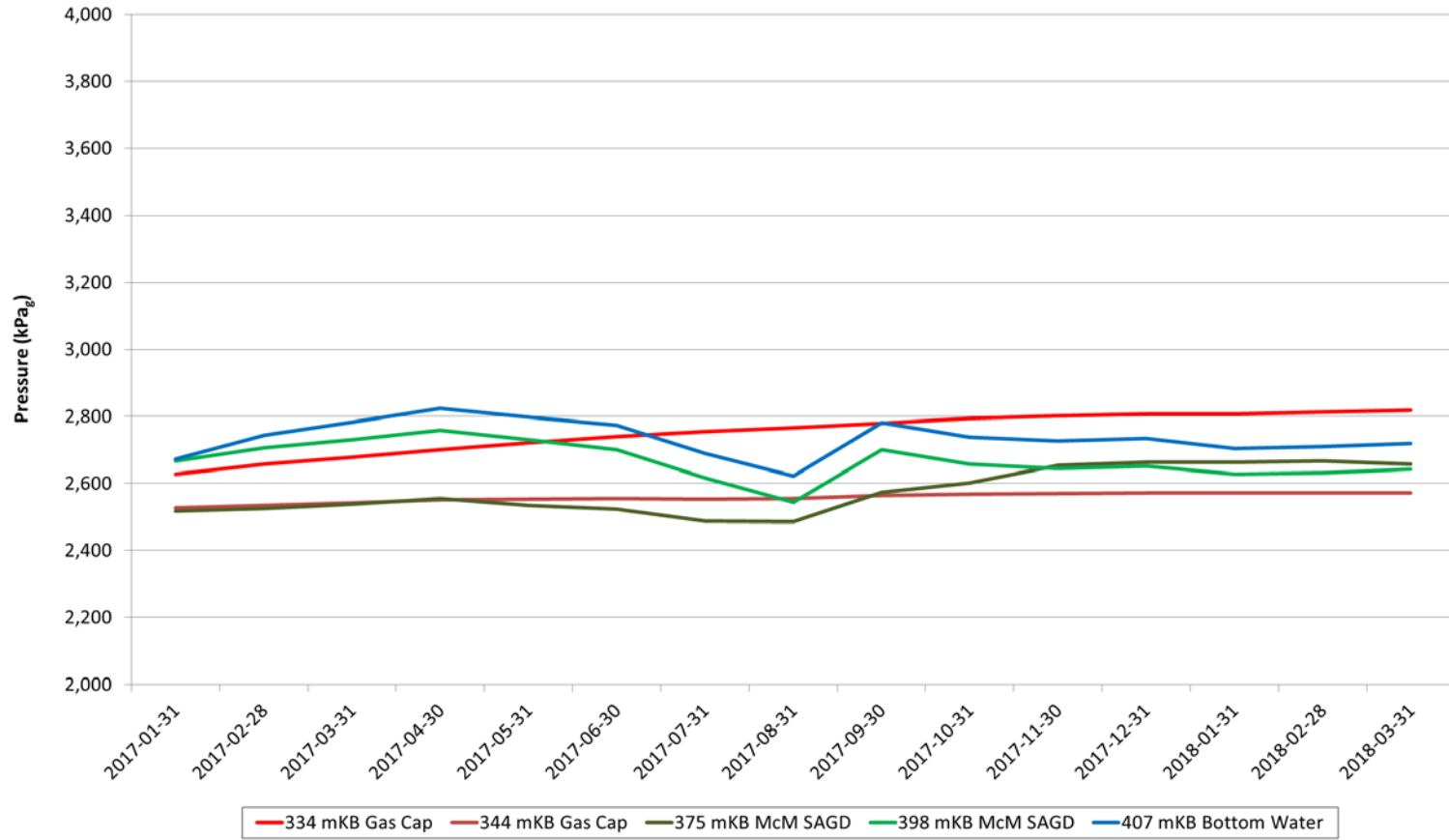


LEISMER 5-13-76-6

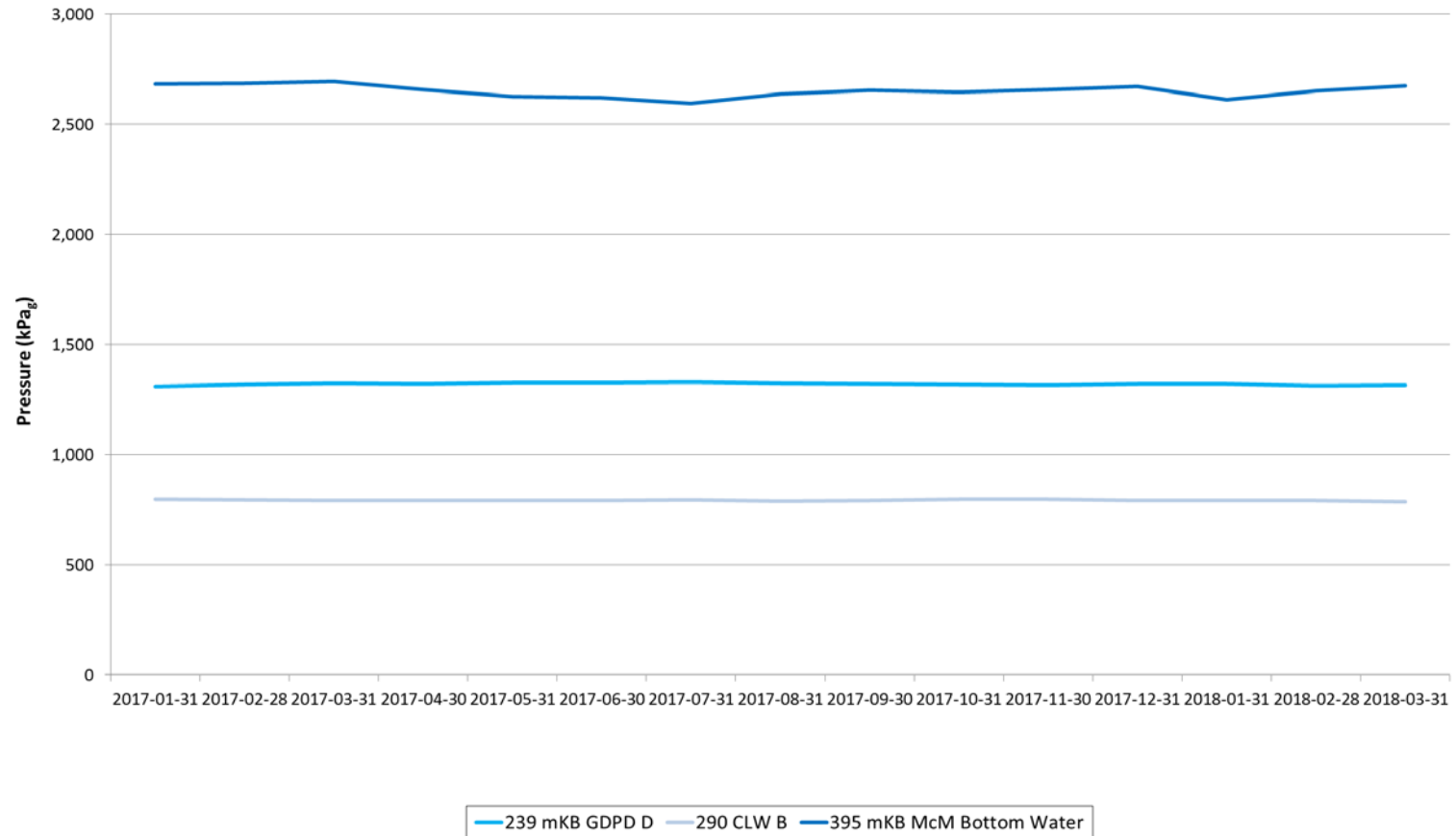


— 335 mKB Gas Cap
 — 346 mKB Gas Cap
 — 358 mKB McM SAGD Broken Downhole
— 368 mKB McM SAGD
 — 383 mKB McM SAGD Broken Downhole

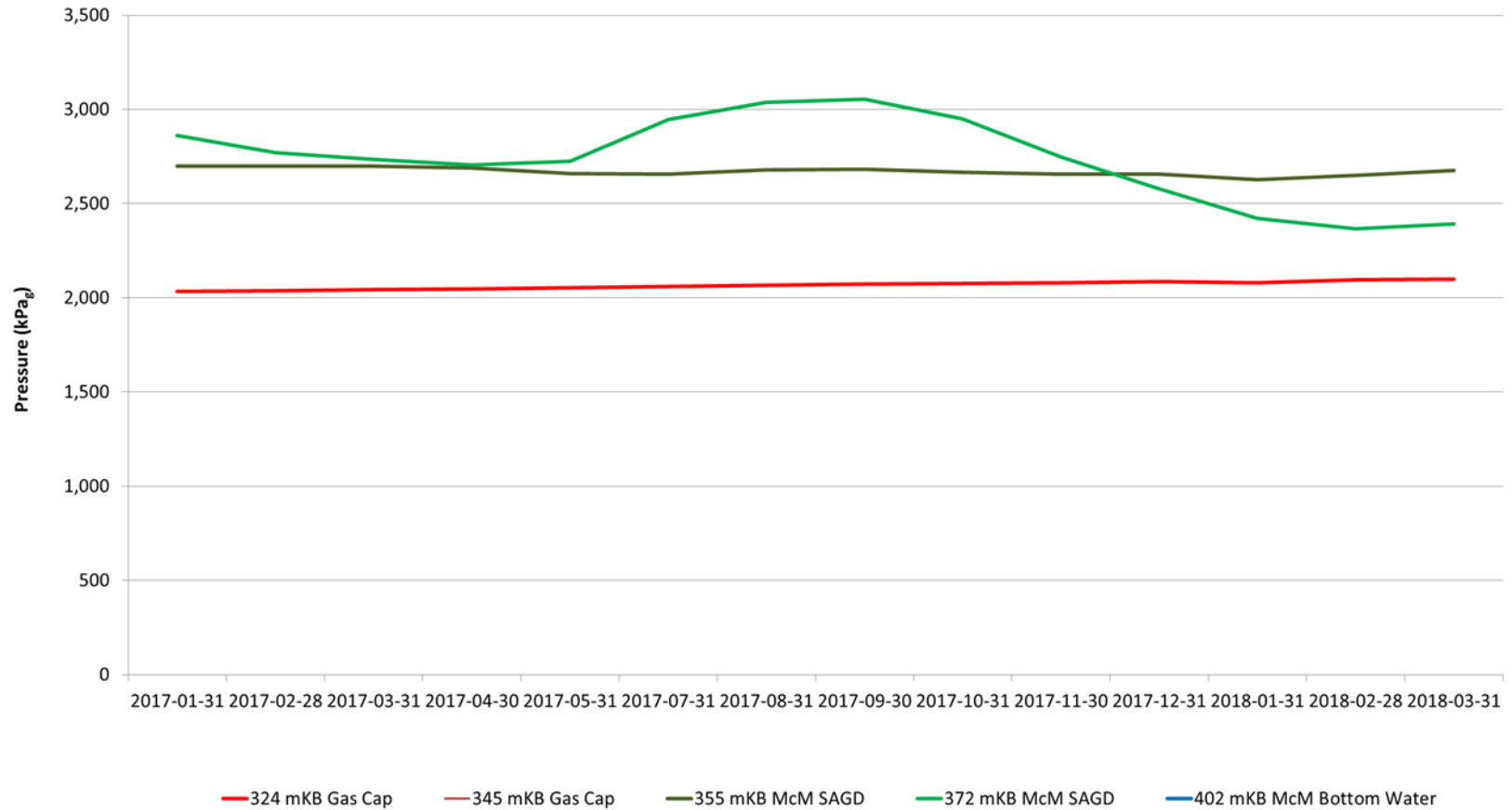
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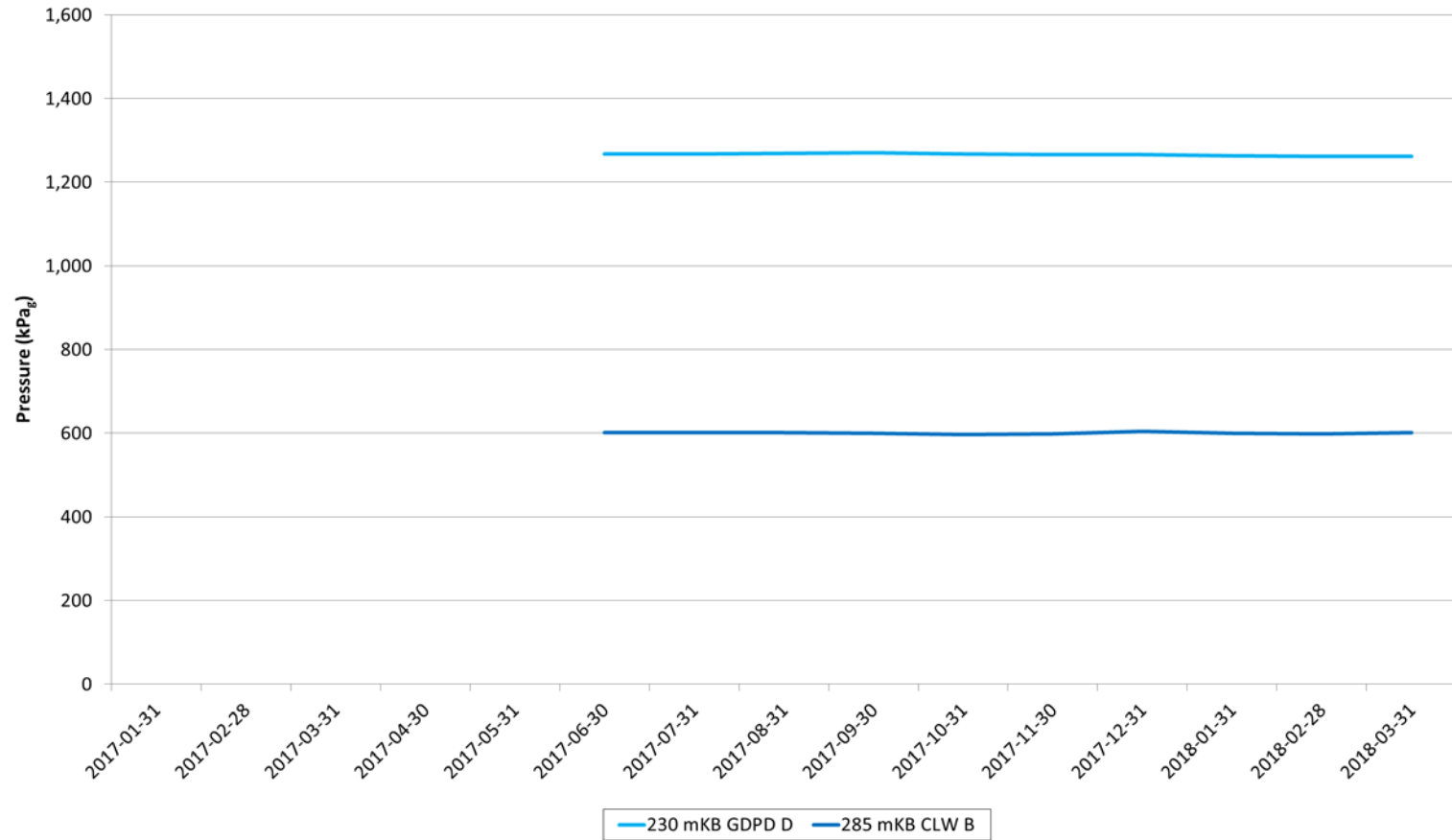
B13 HARDY 13-13-76-6



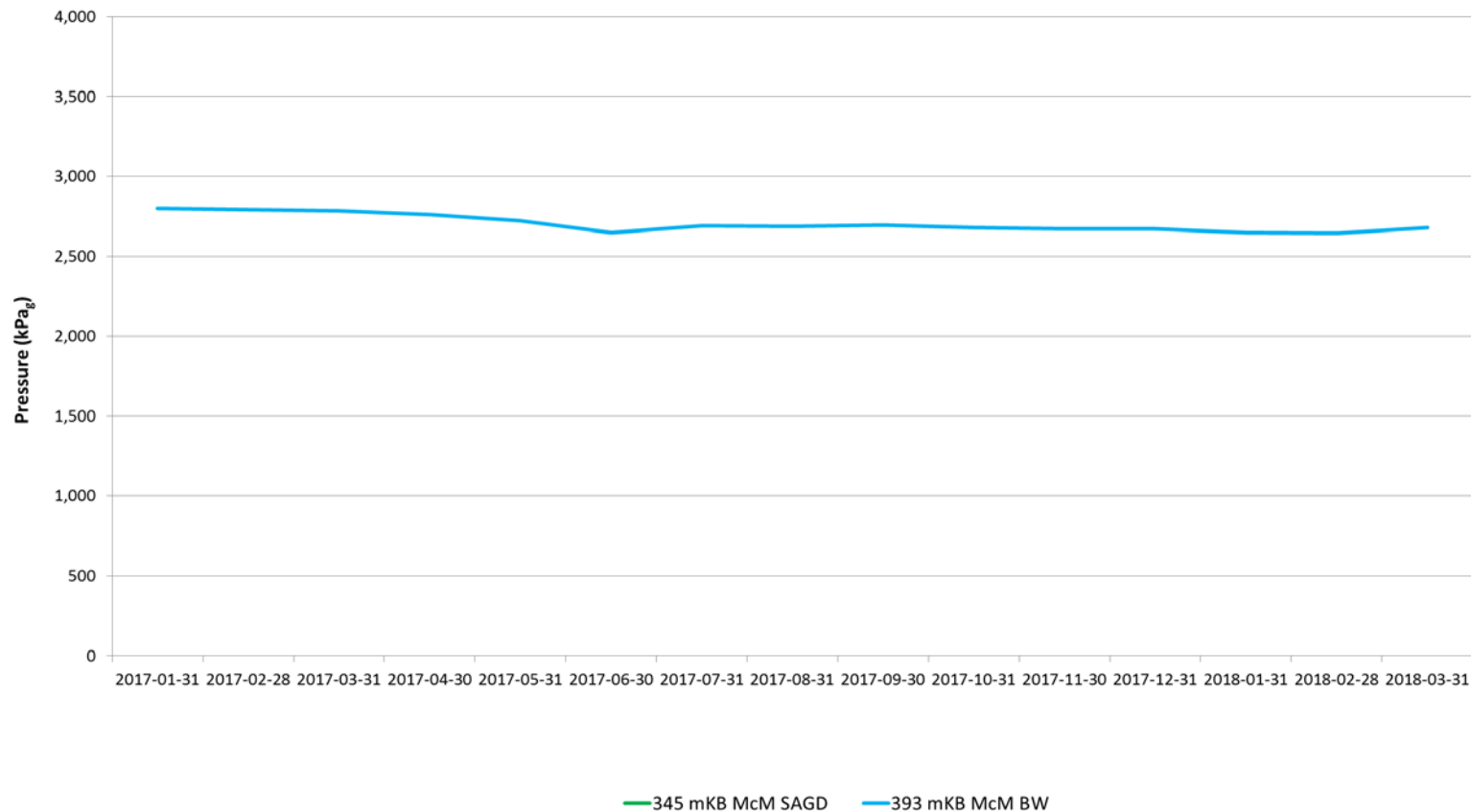
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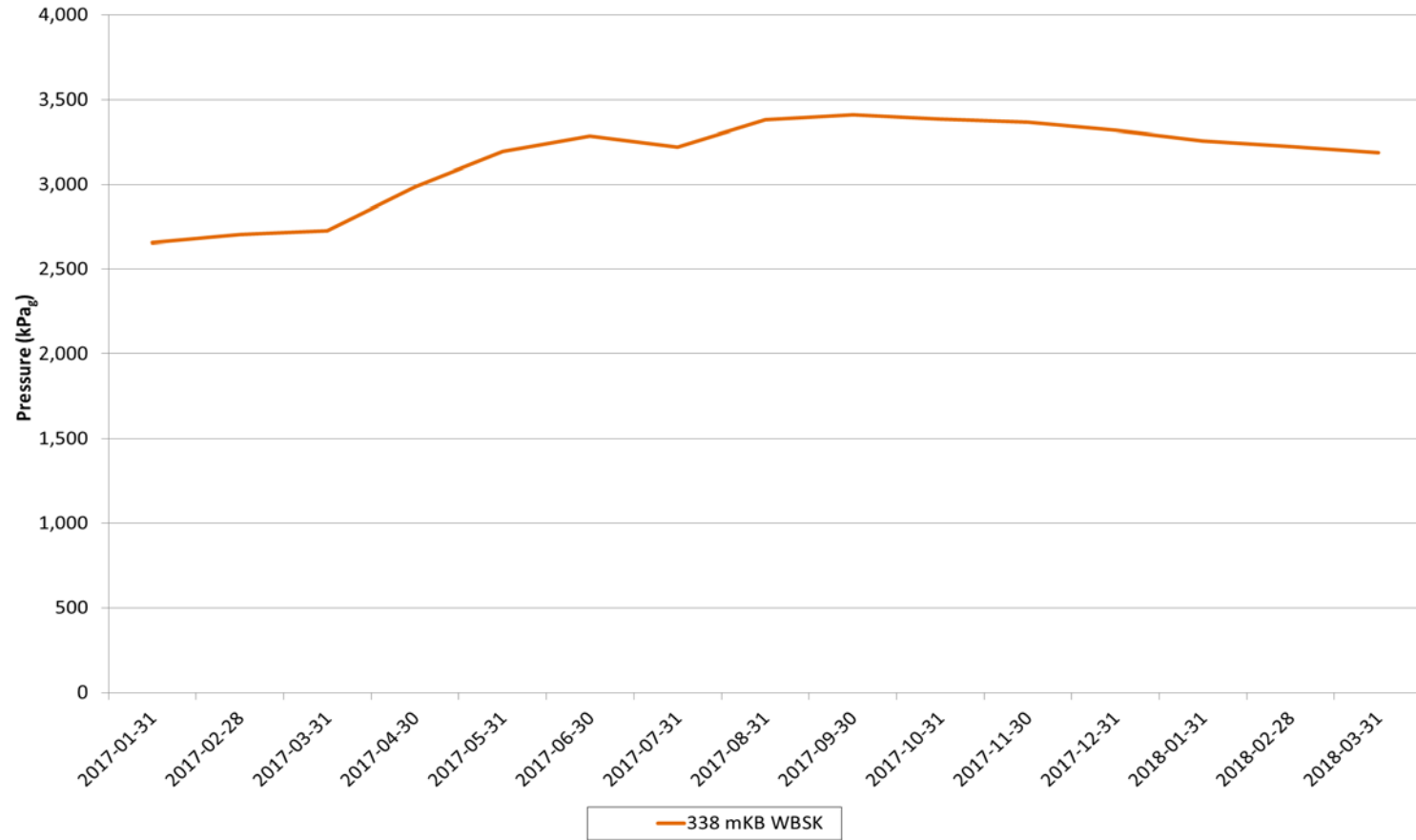
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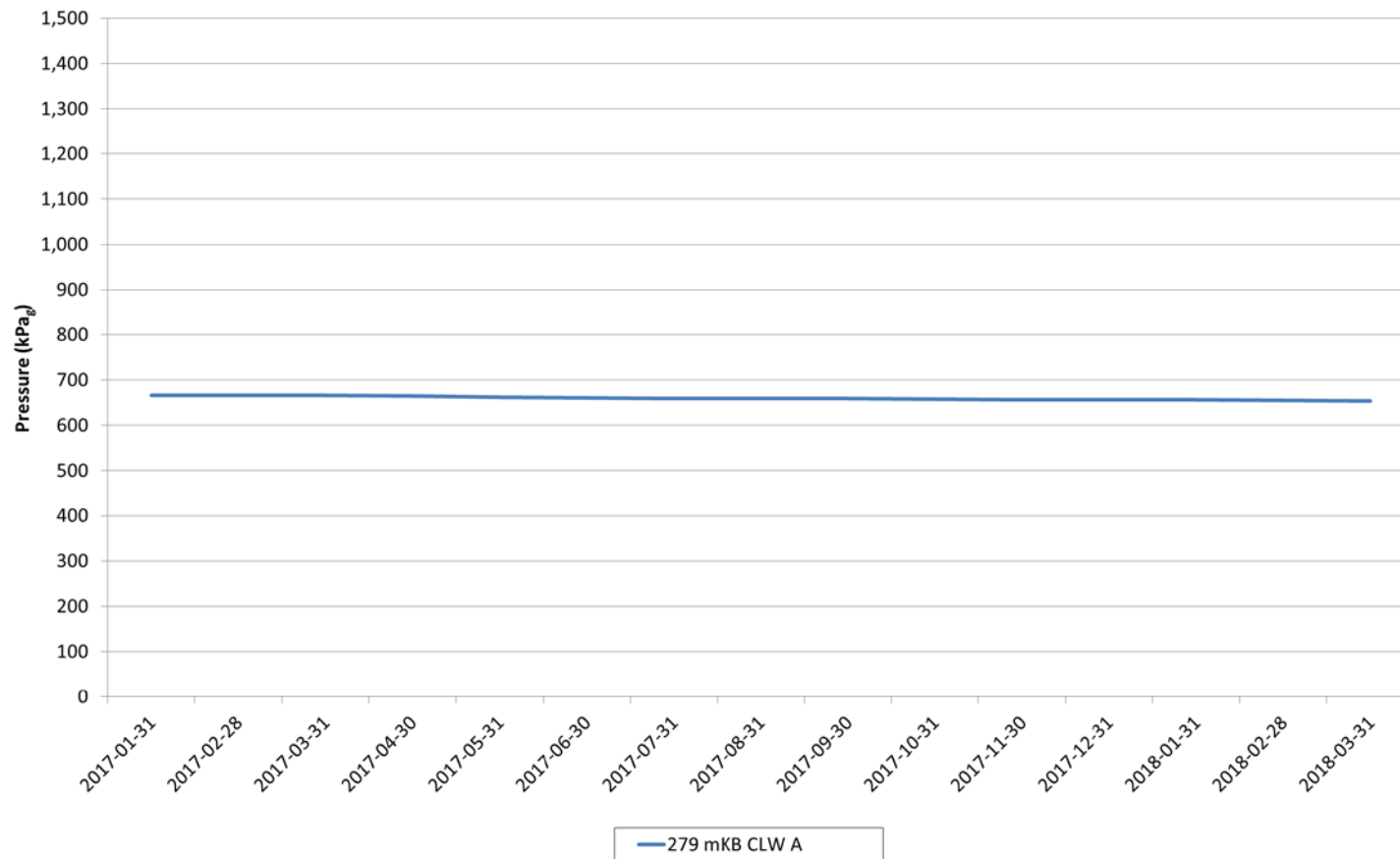
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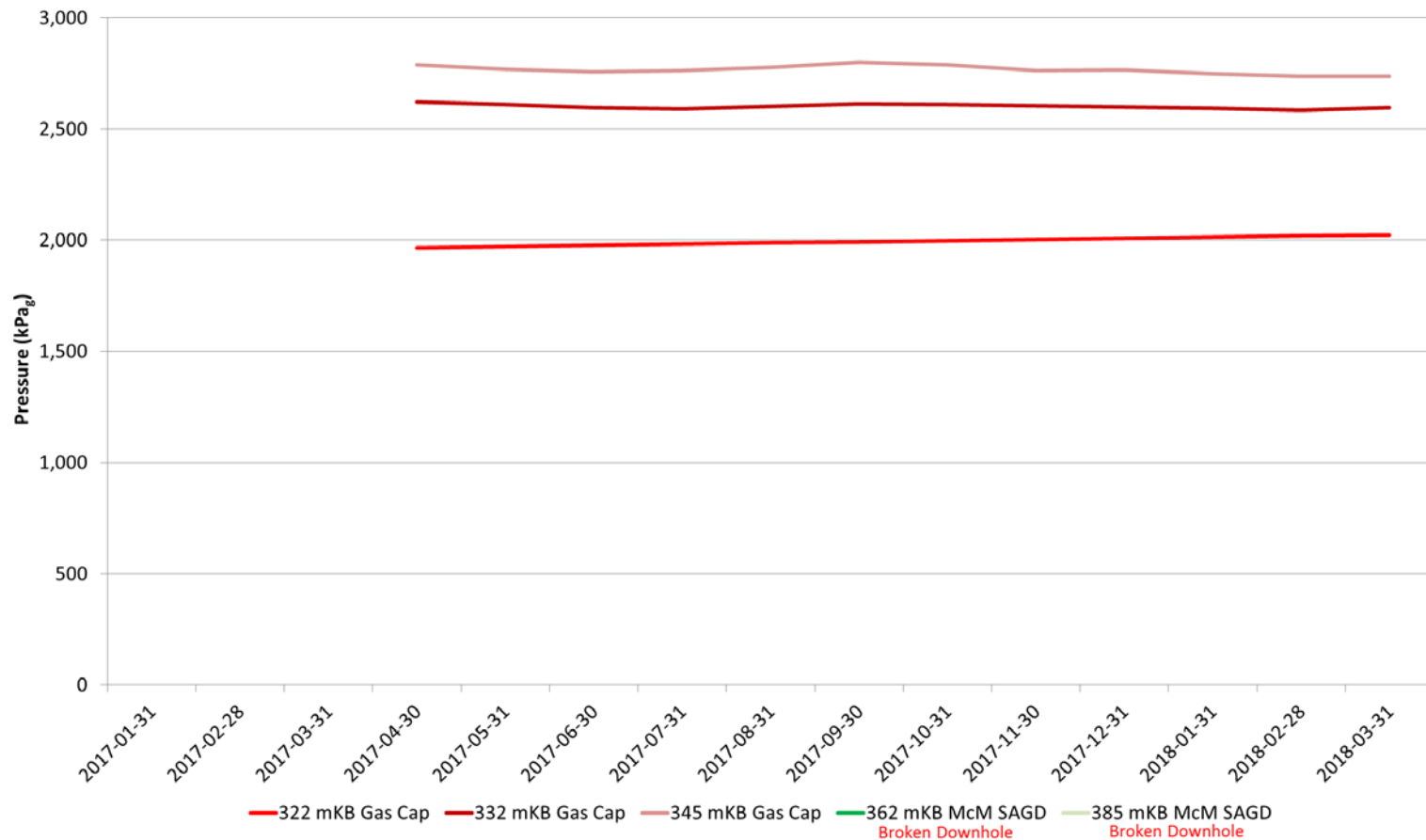
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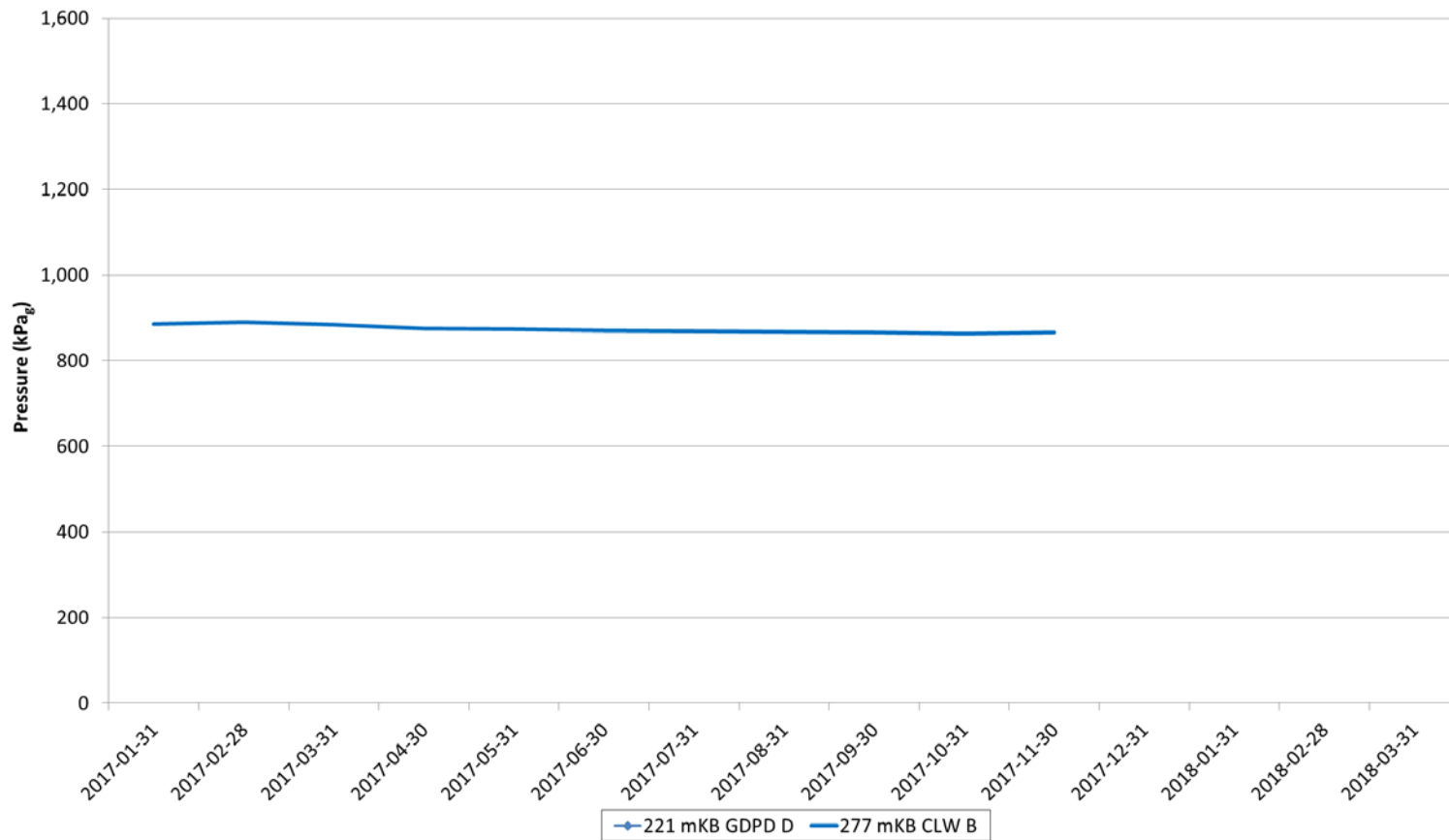
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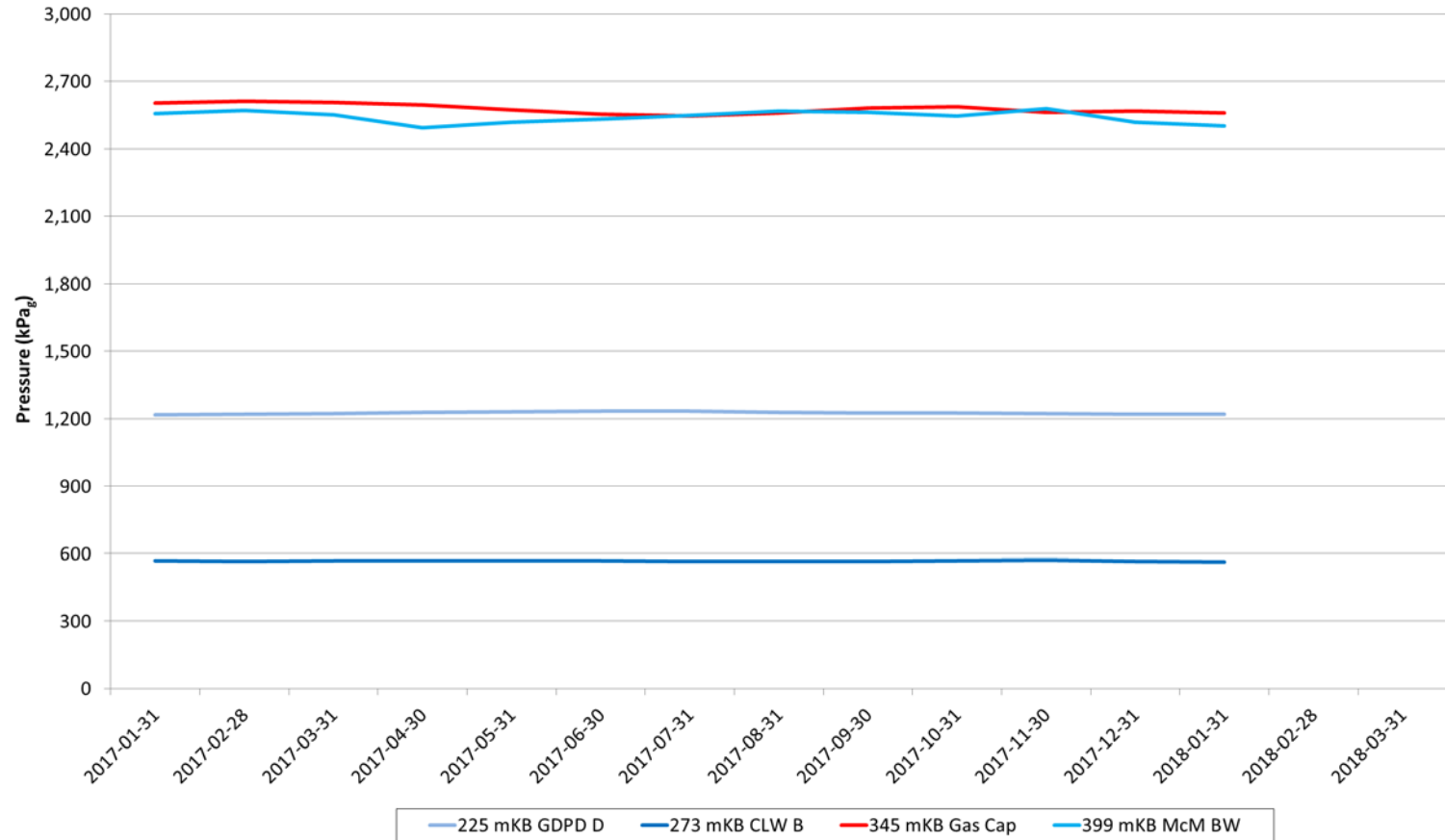
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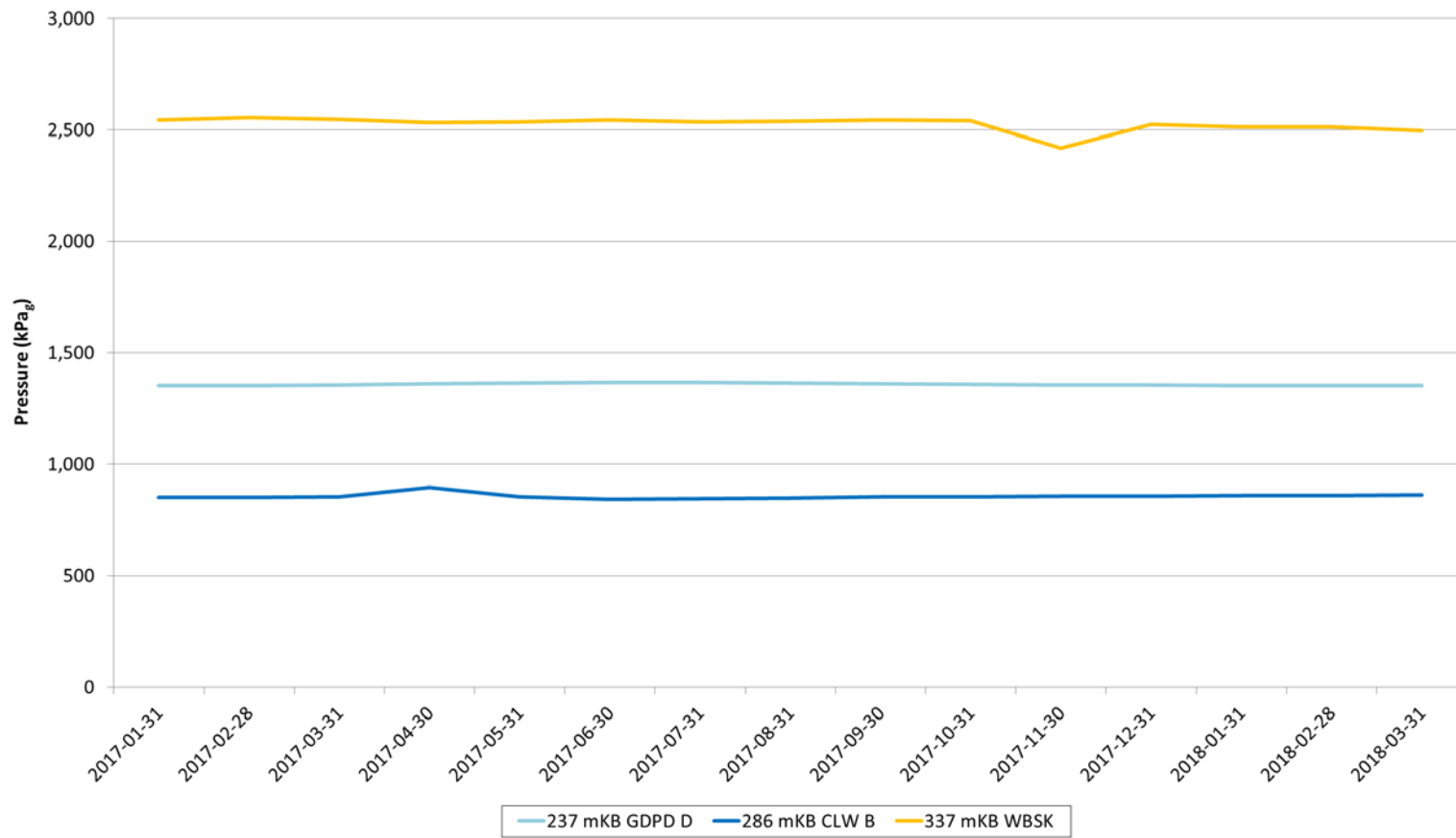
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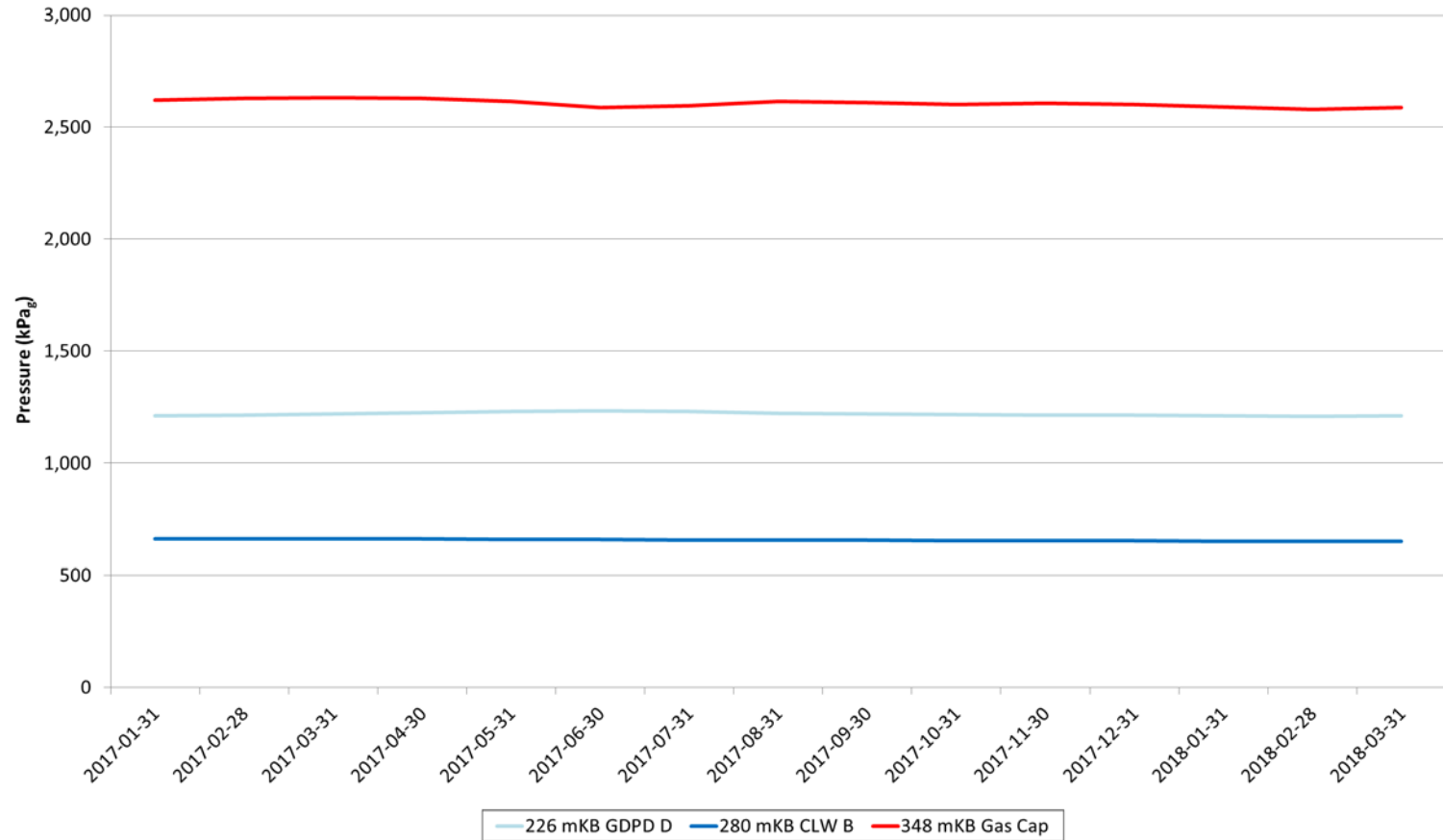
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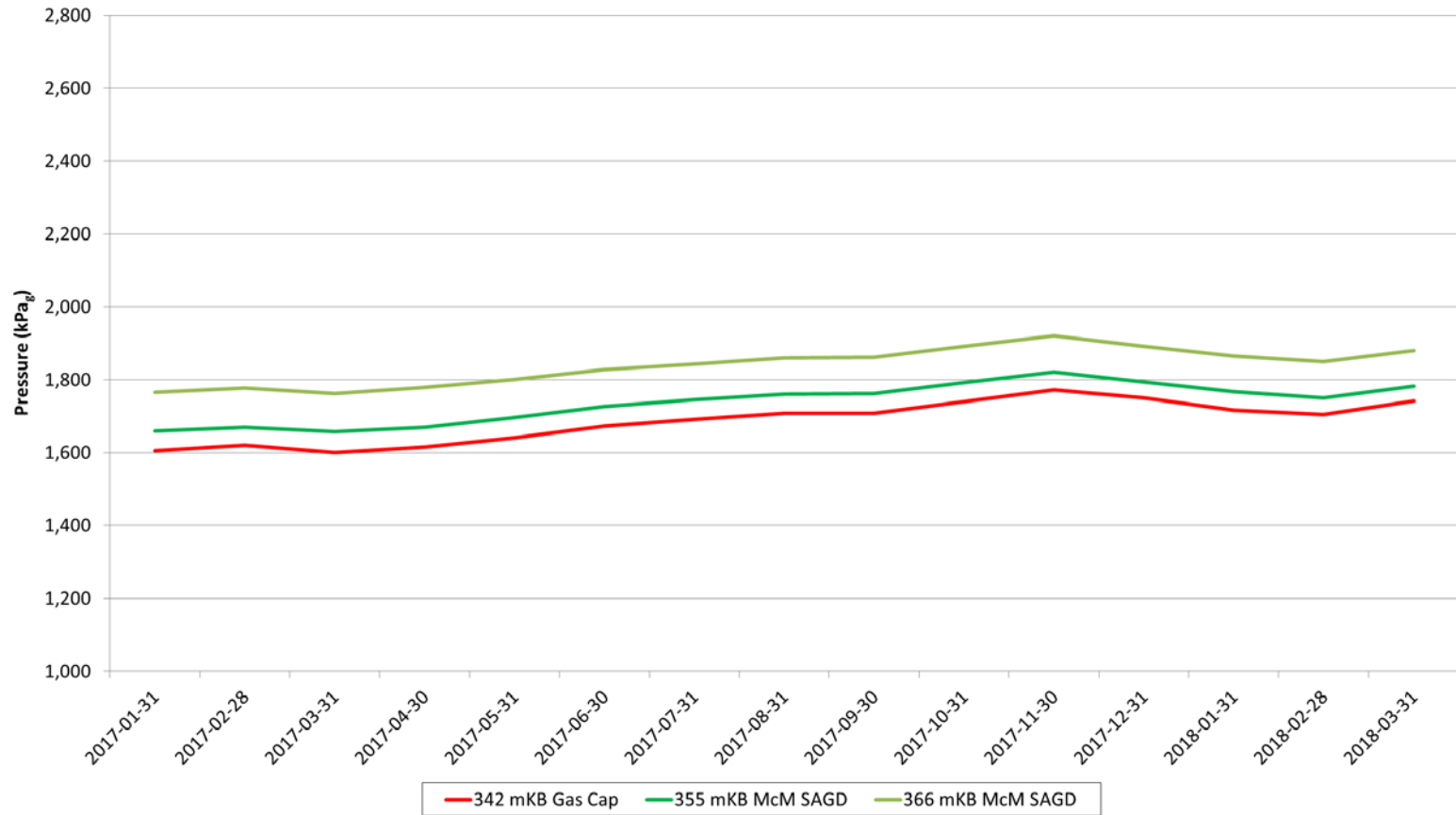
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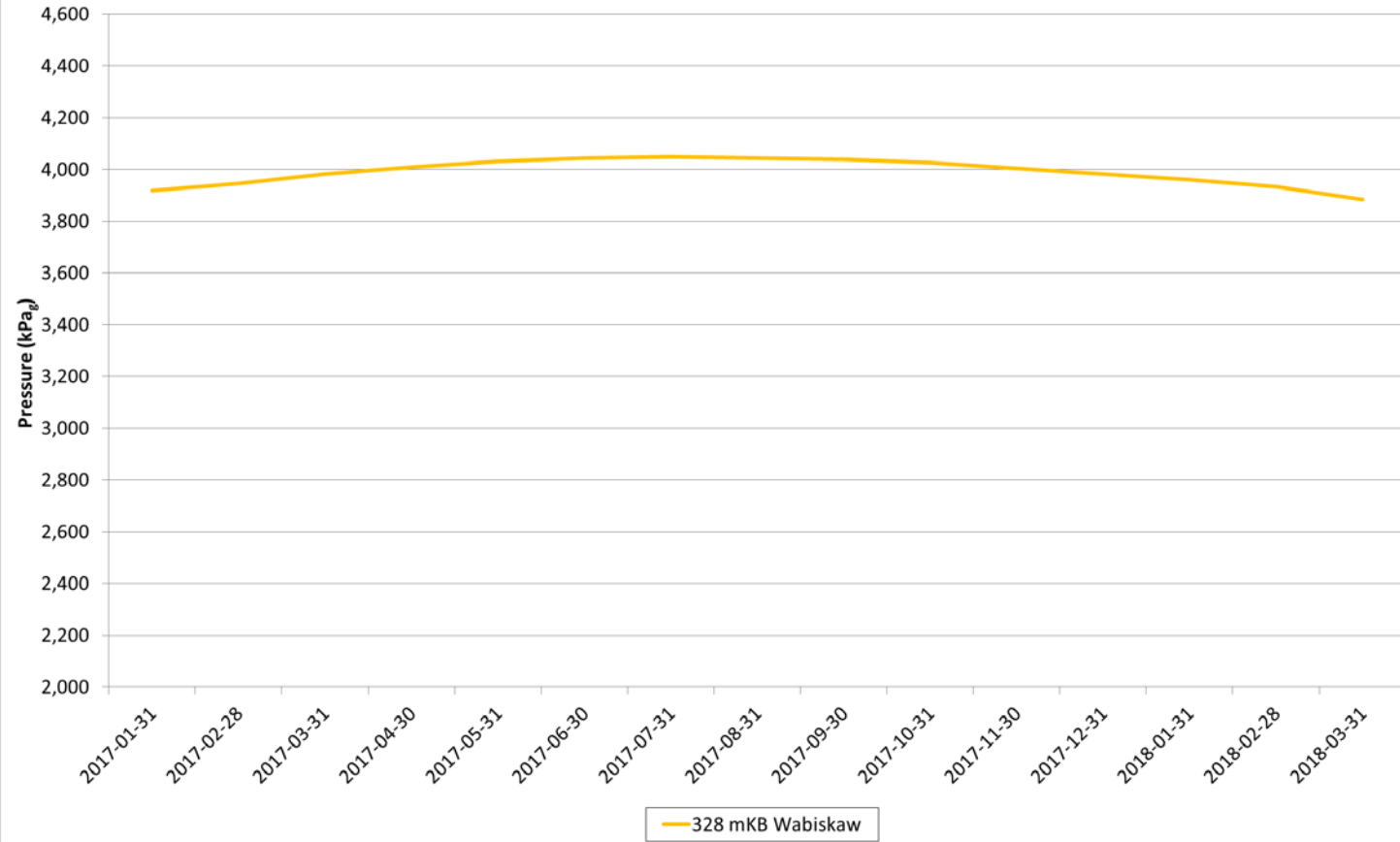
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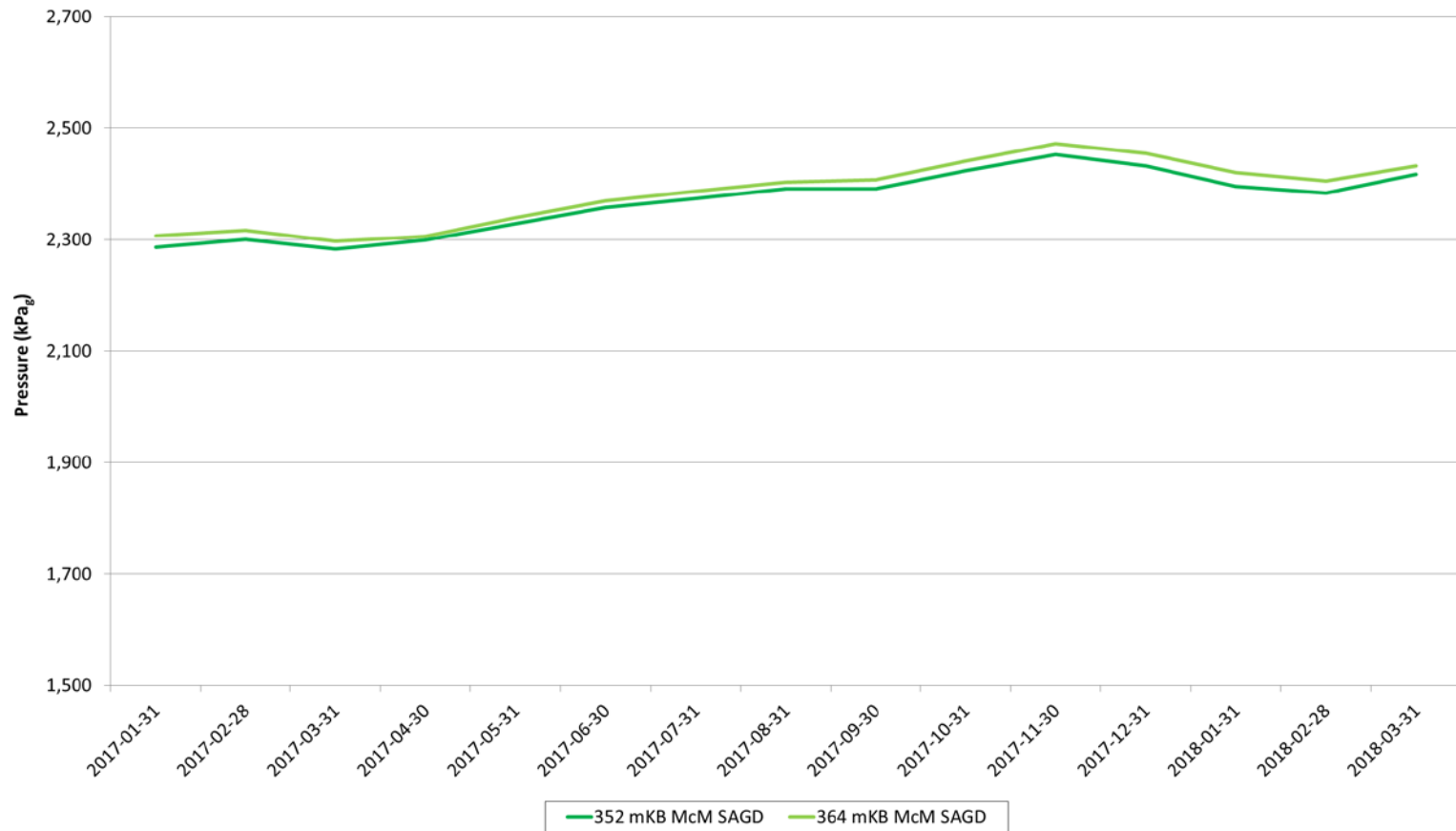
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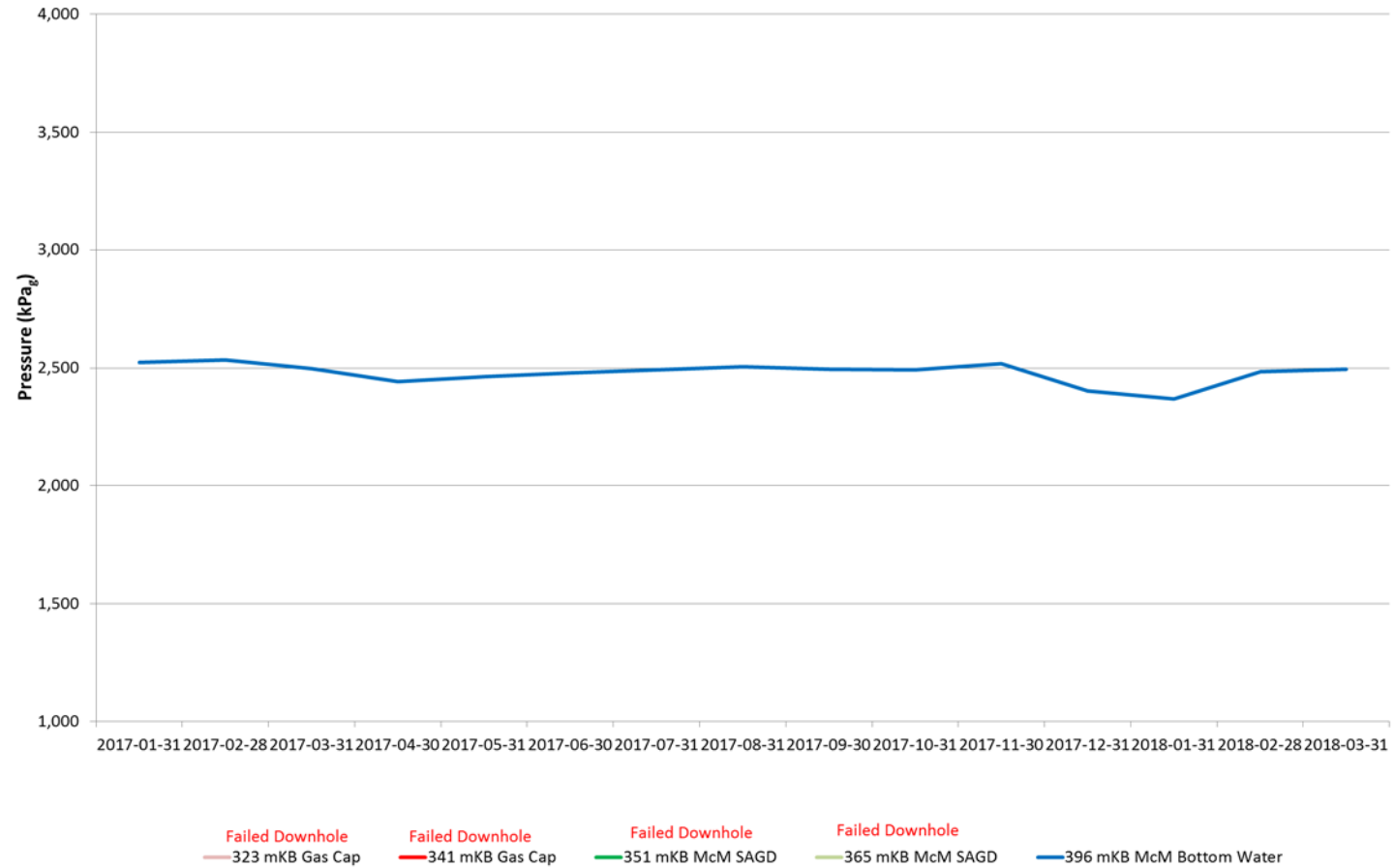
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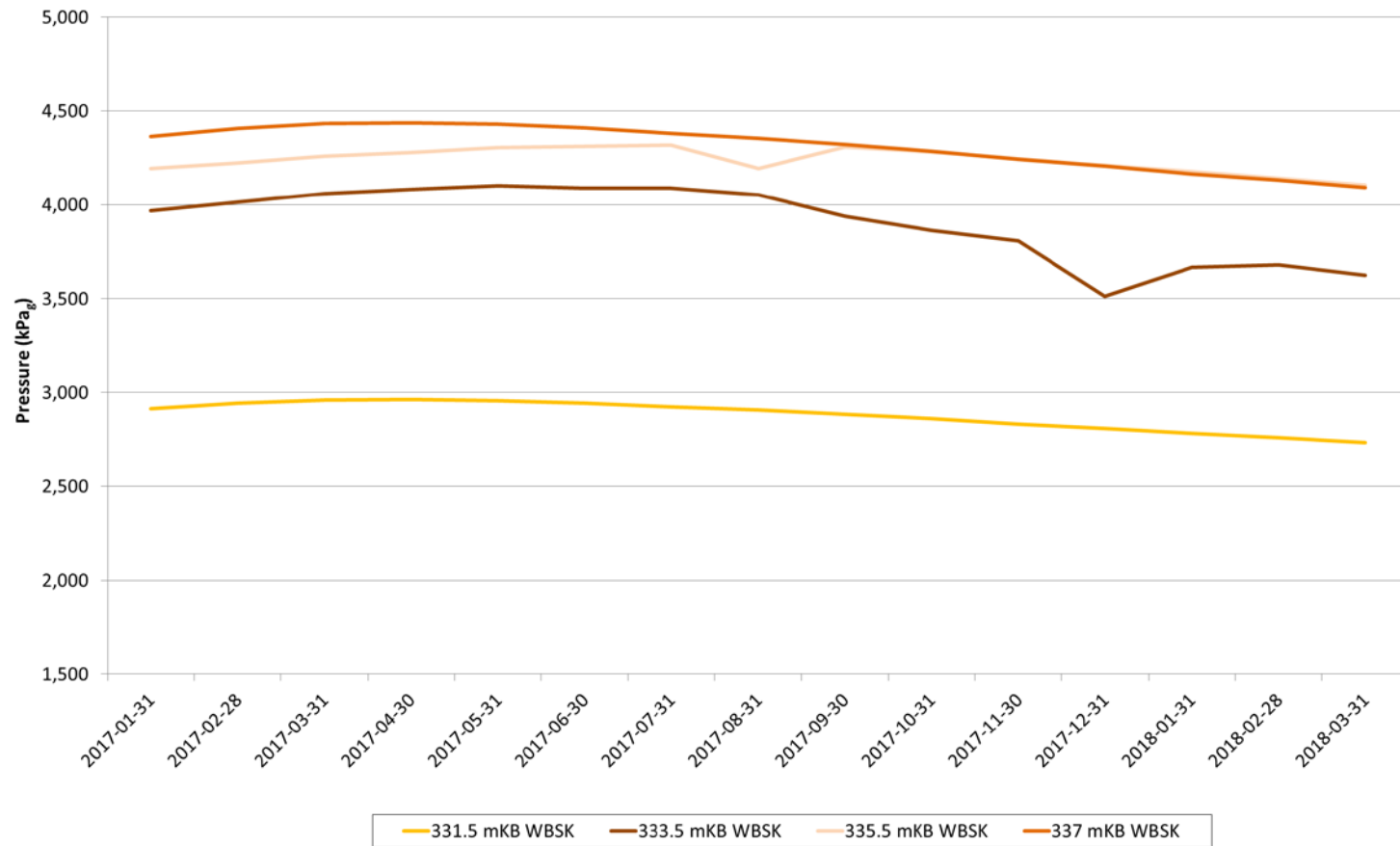
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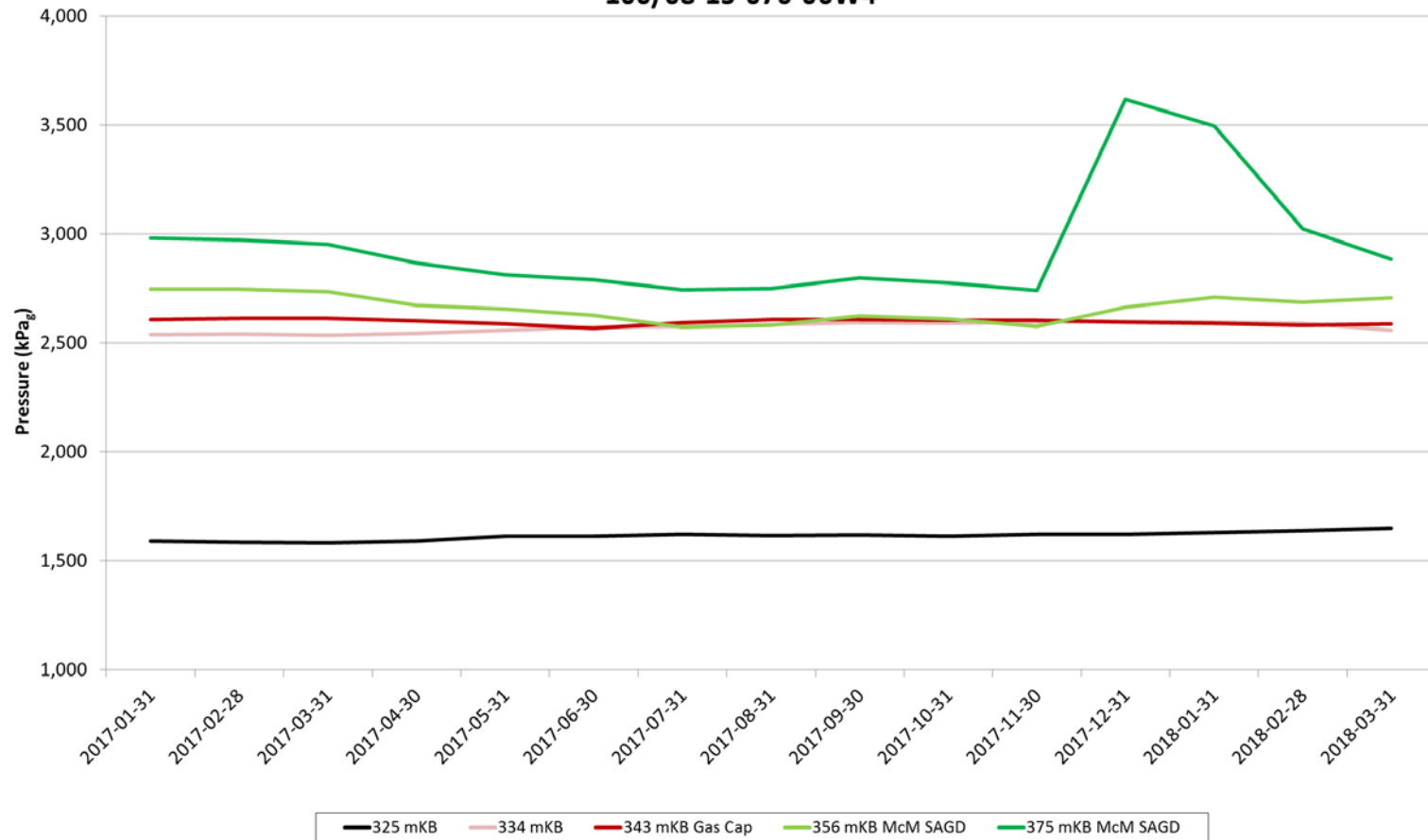
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108/06-15-076-06W4



100/08-15-076-06W4

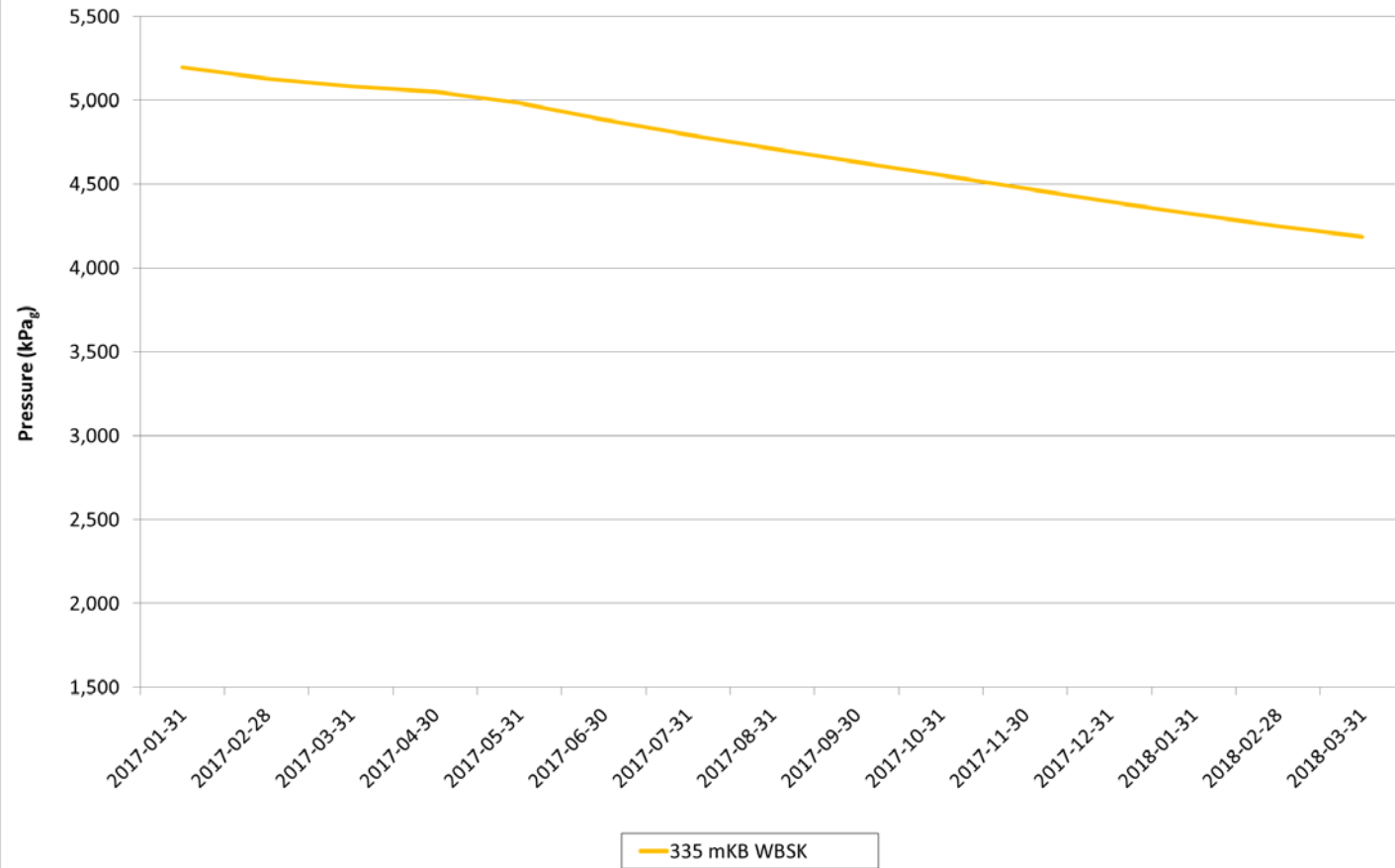


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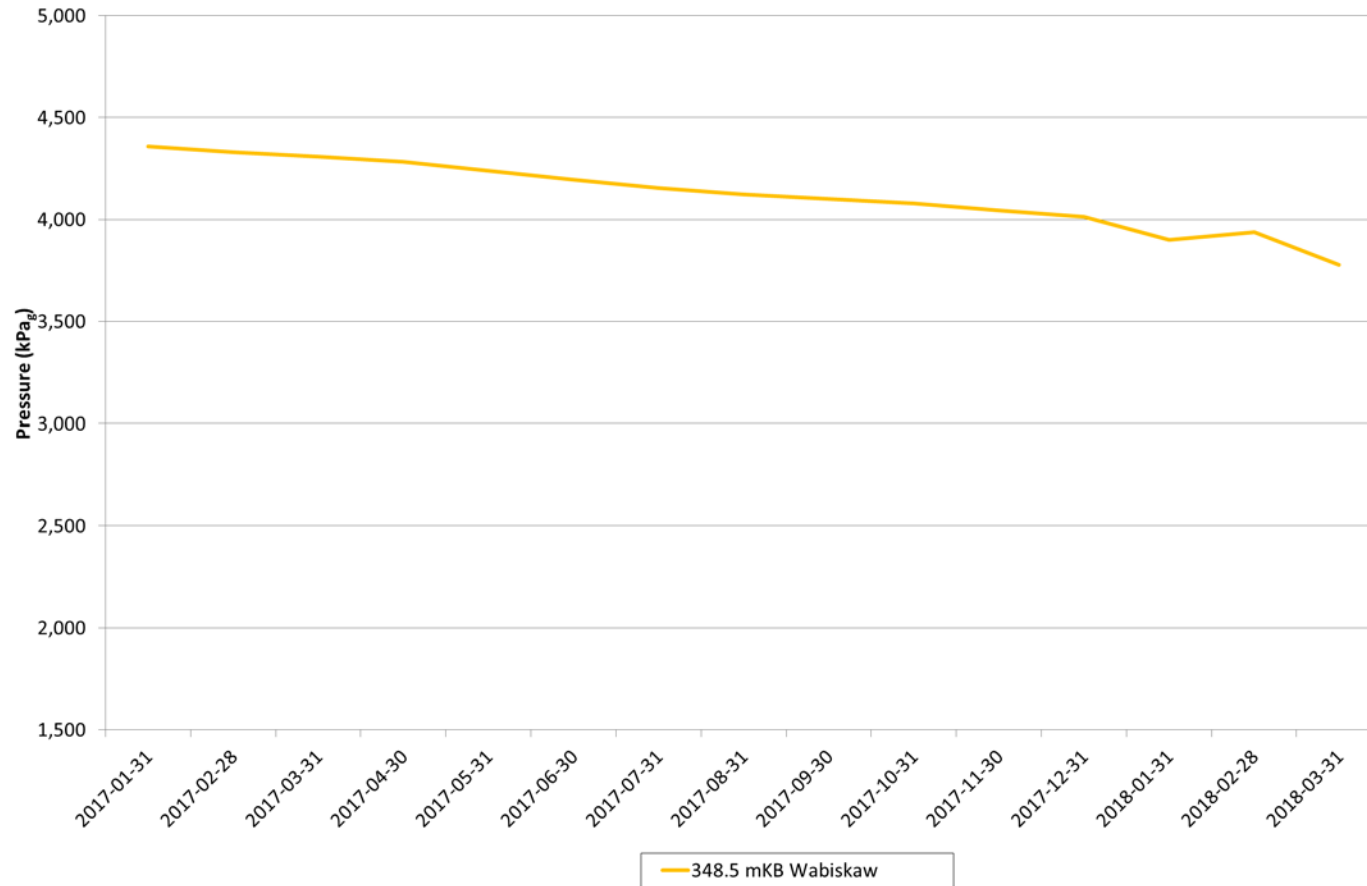
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Failed Downhole

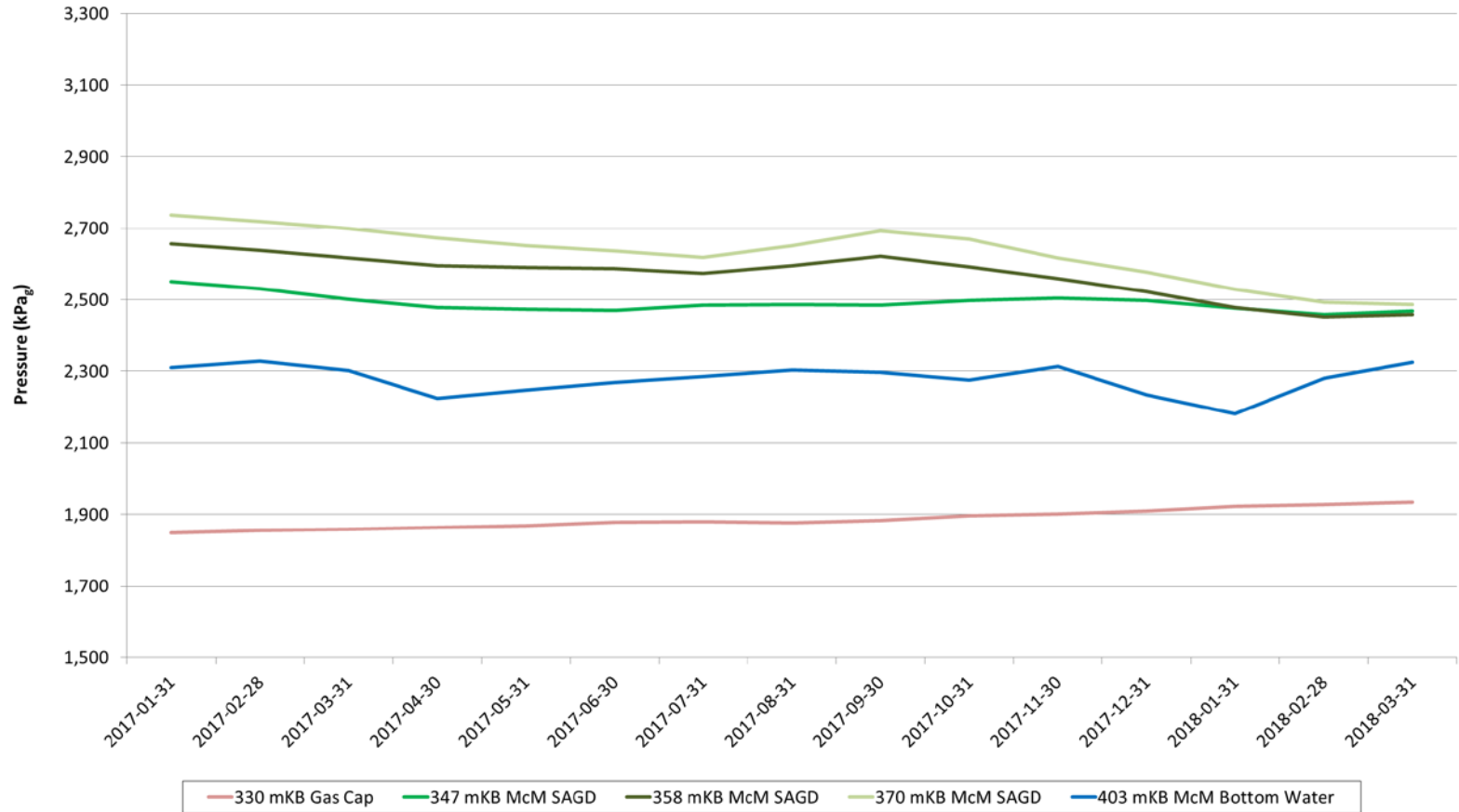
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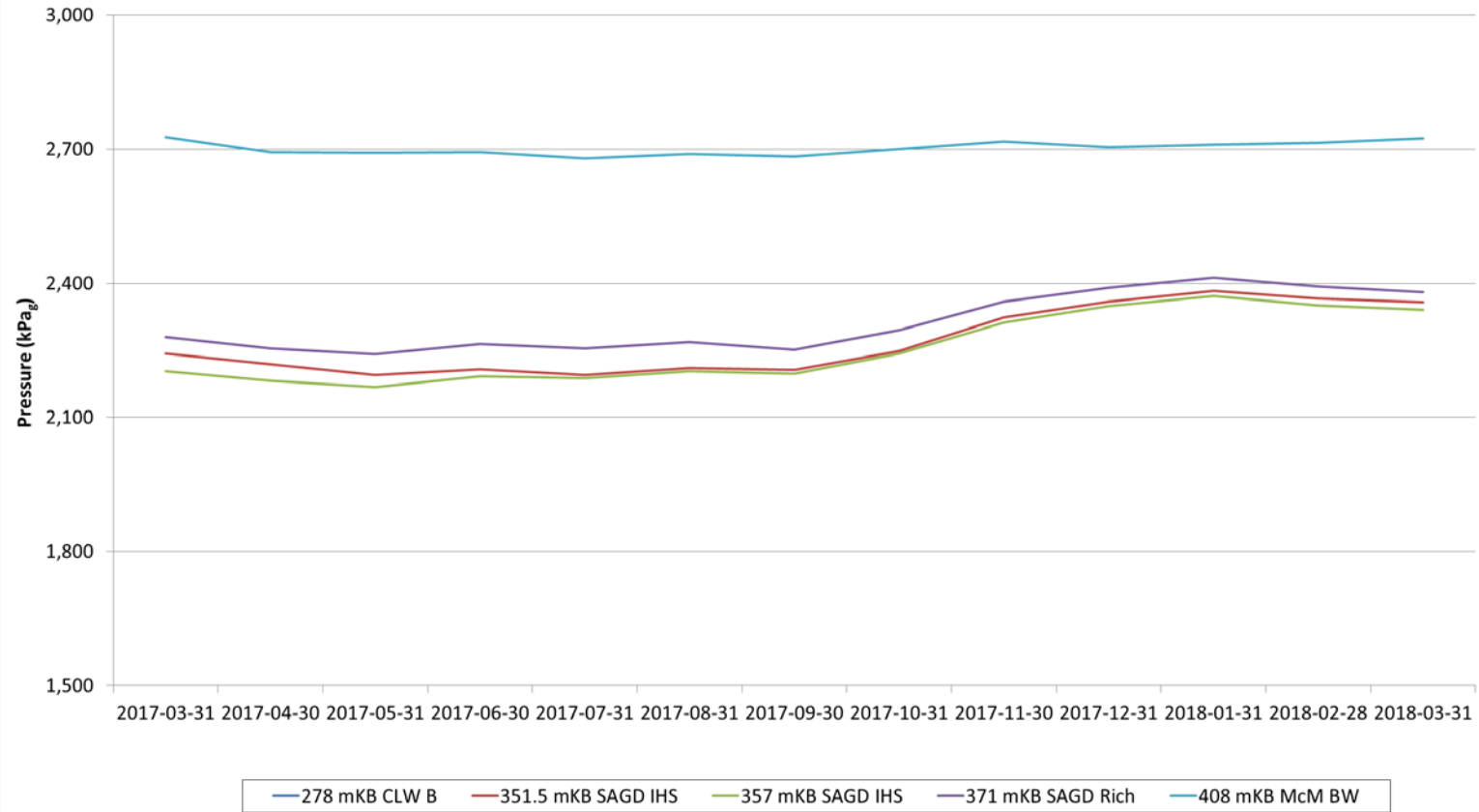
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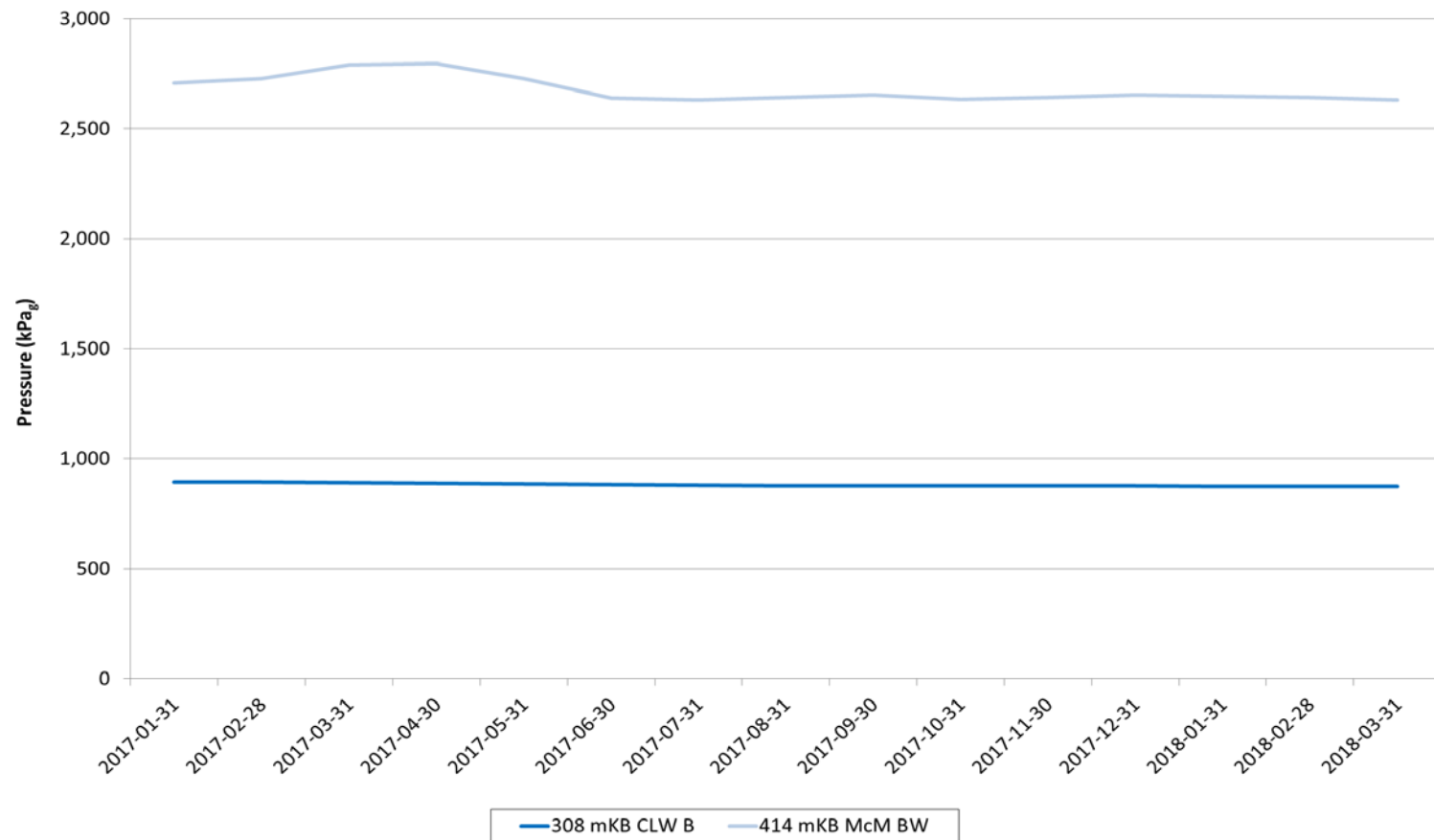
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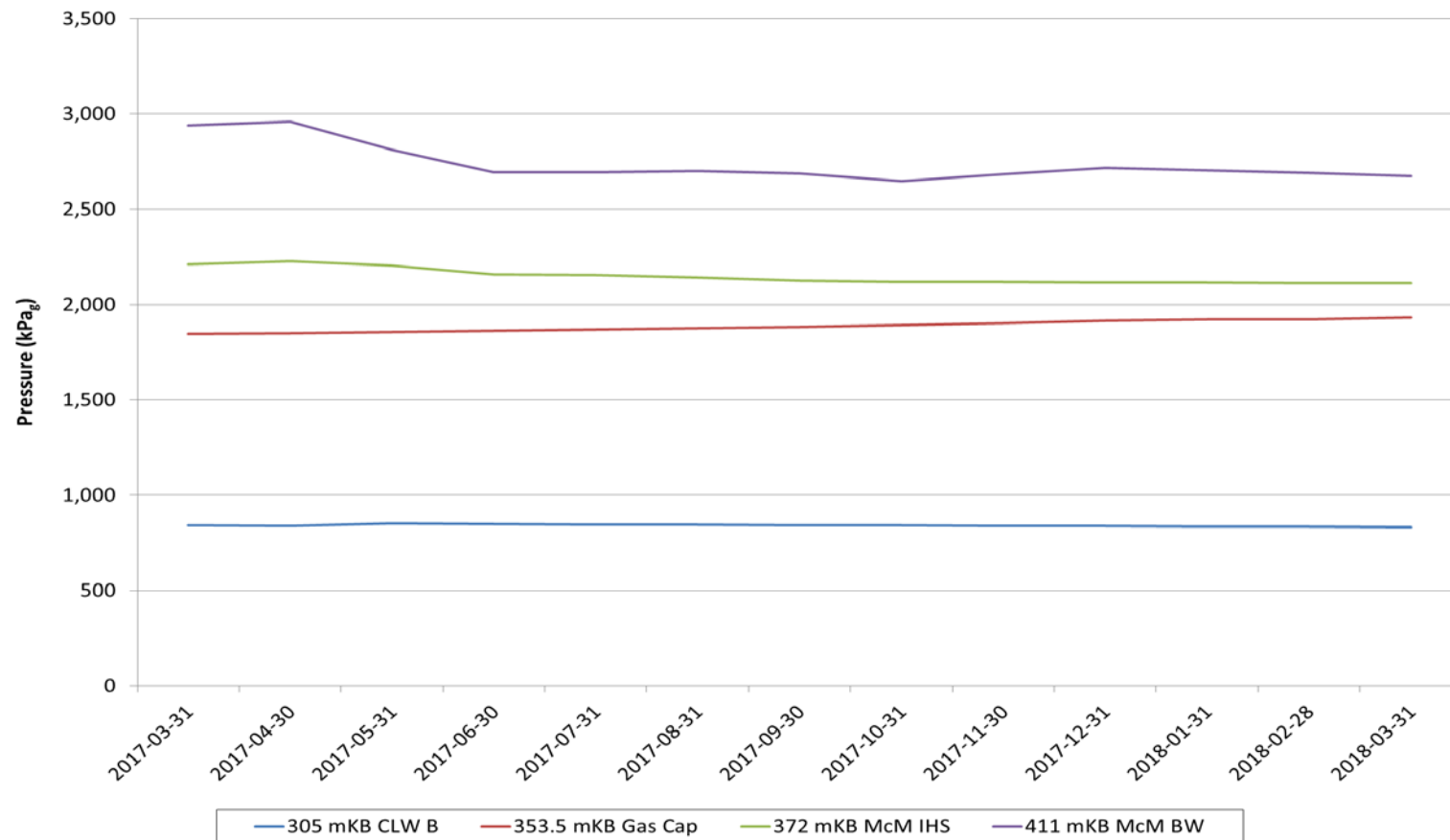
B10-16 D6 LEISMER 6-16-76-6



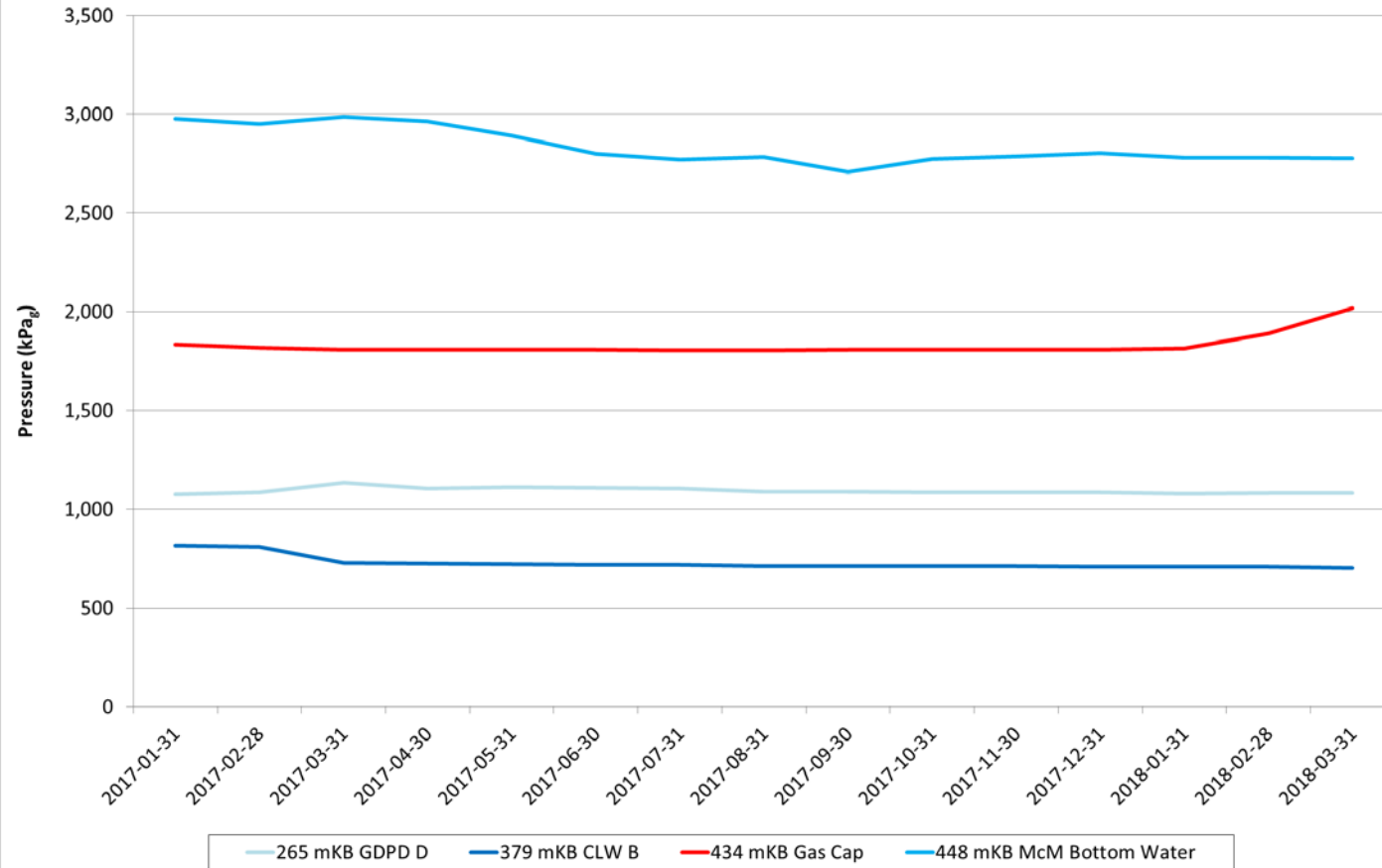
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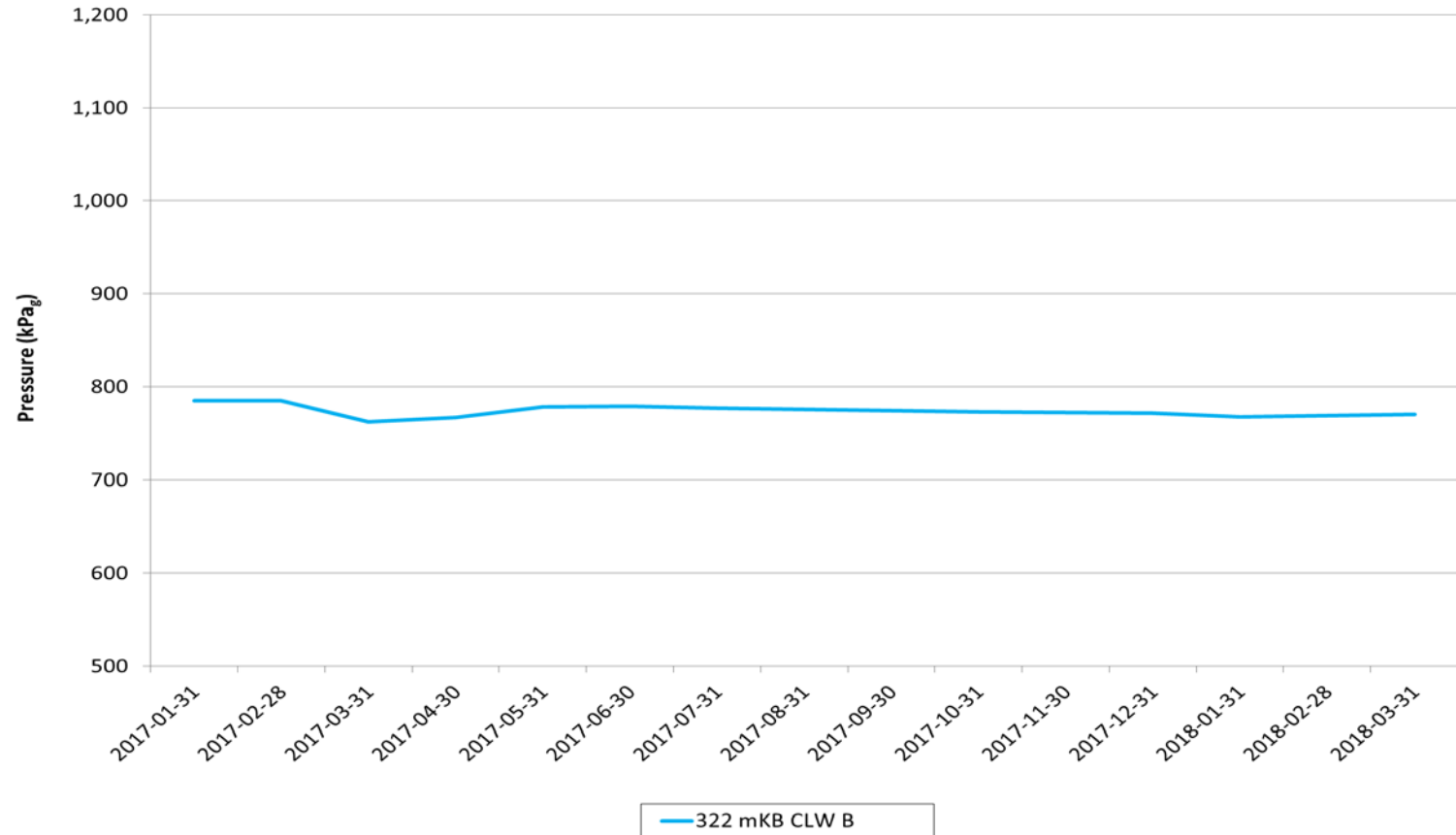
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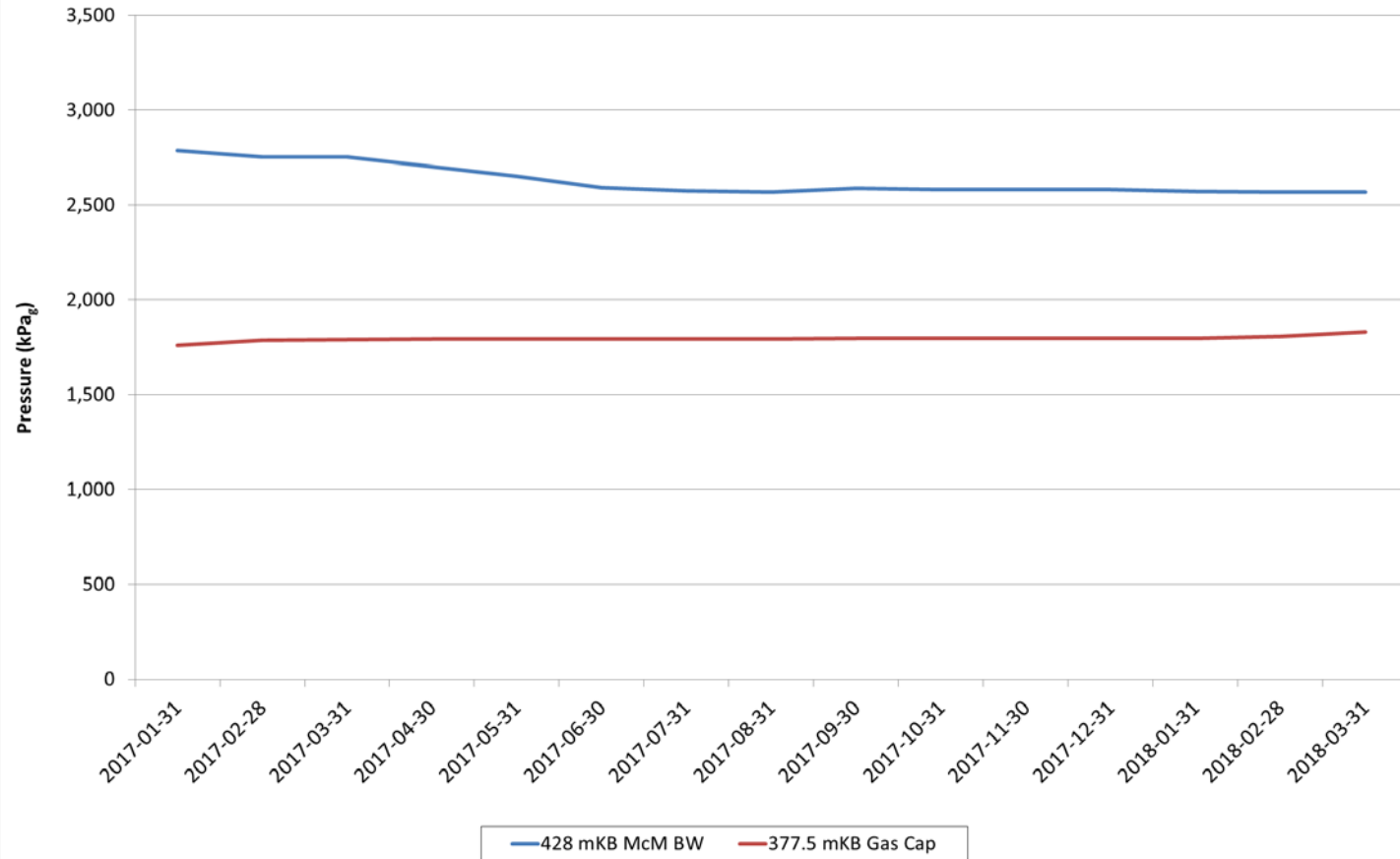
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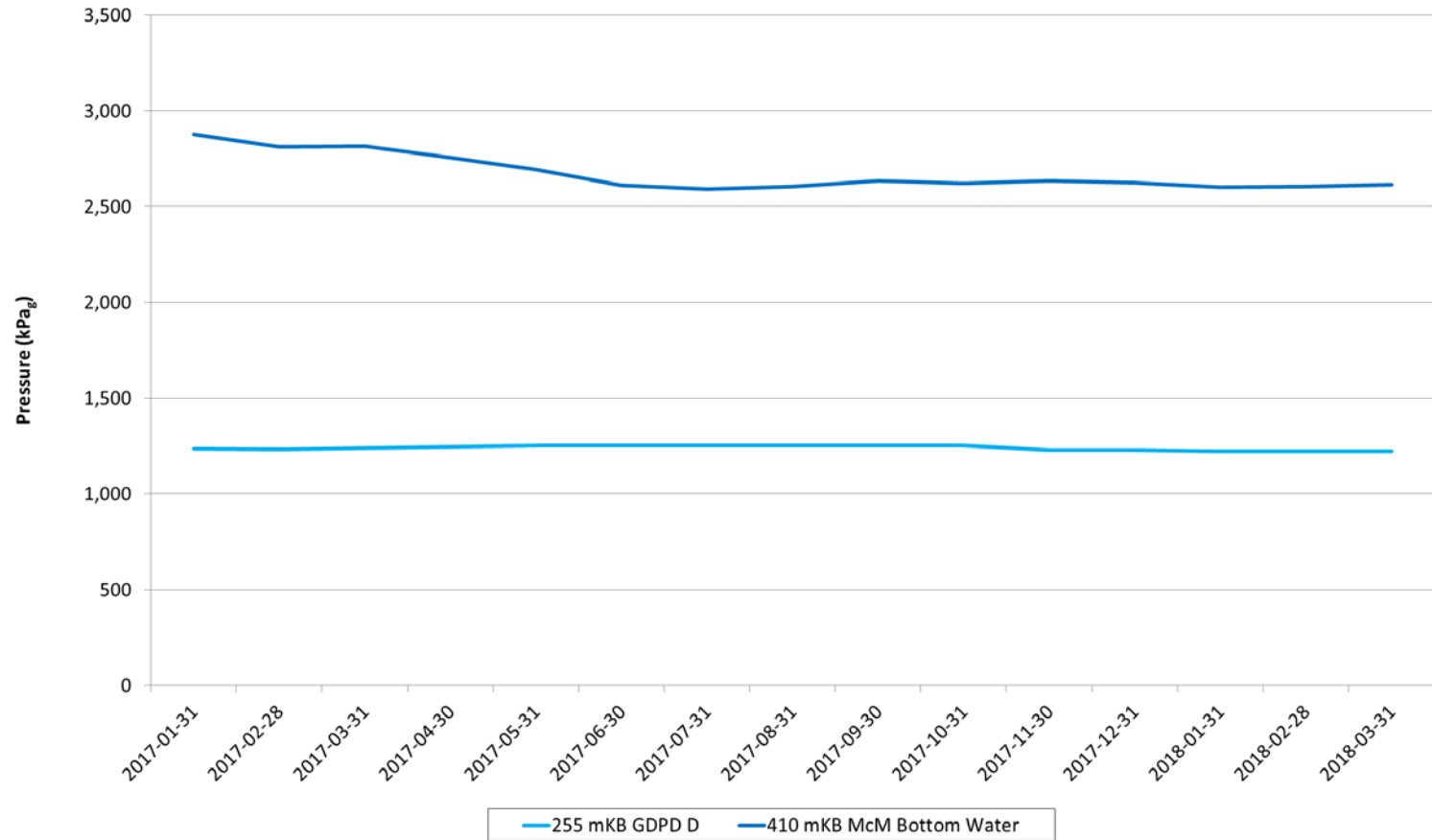
102/03-02-076-06



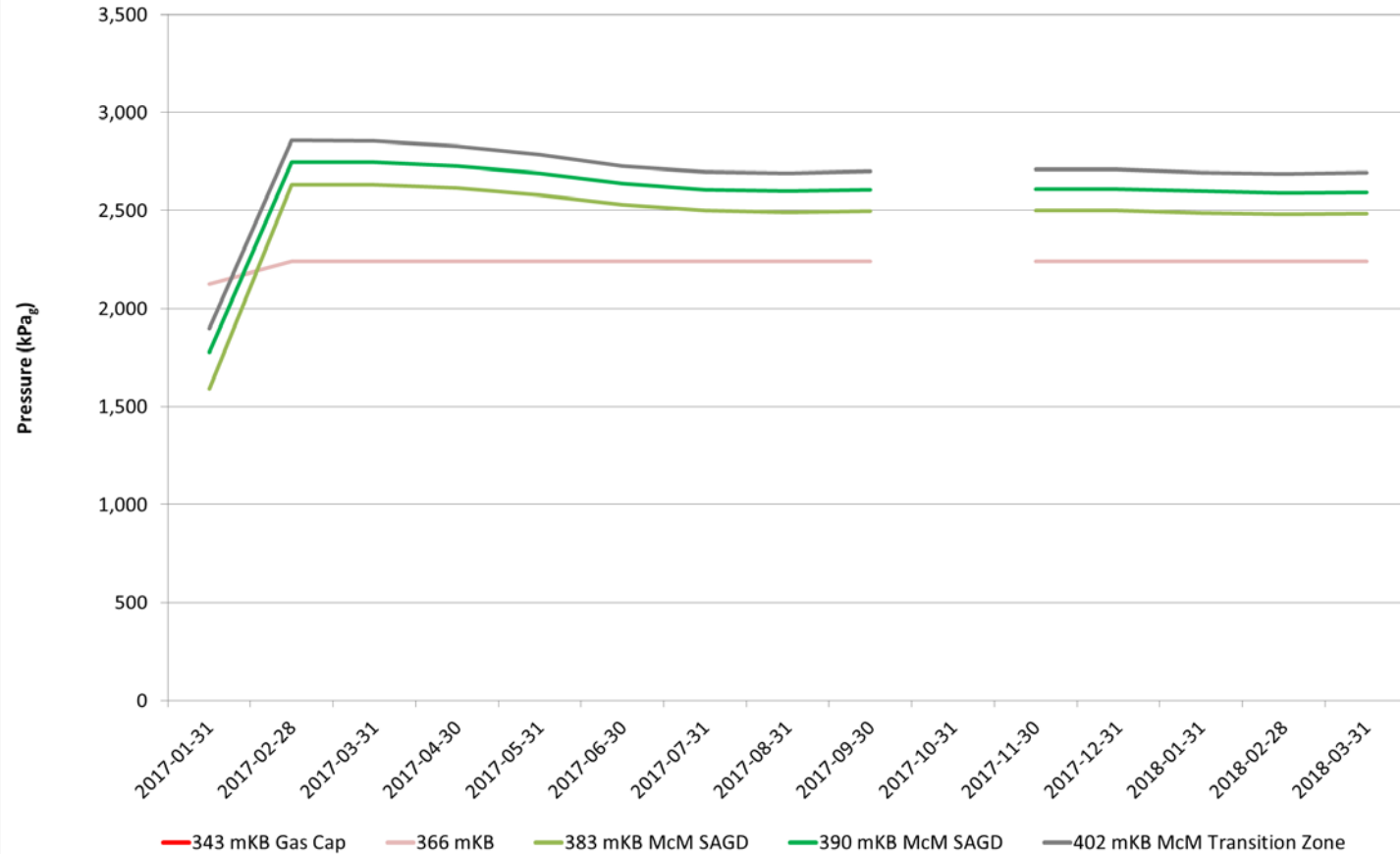
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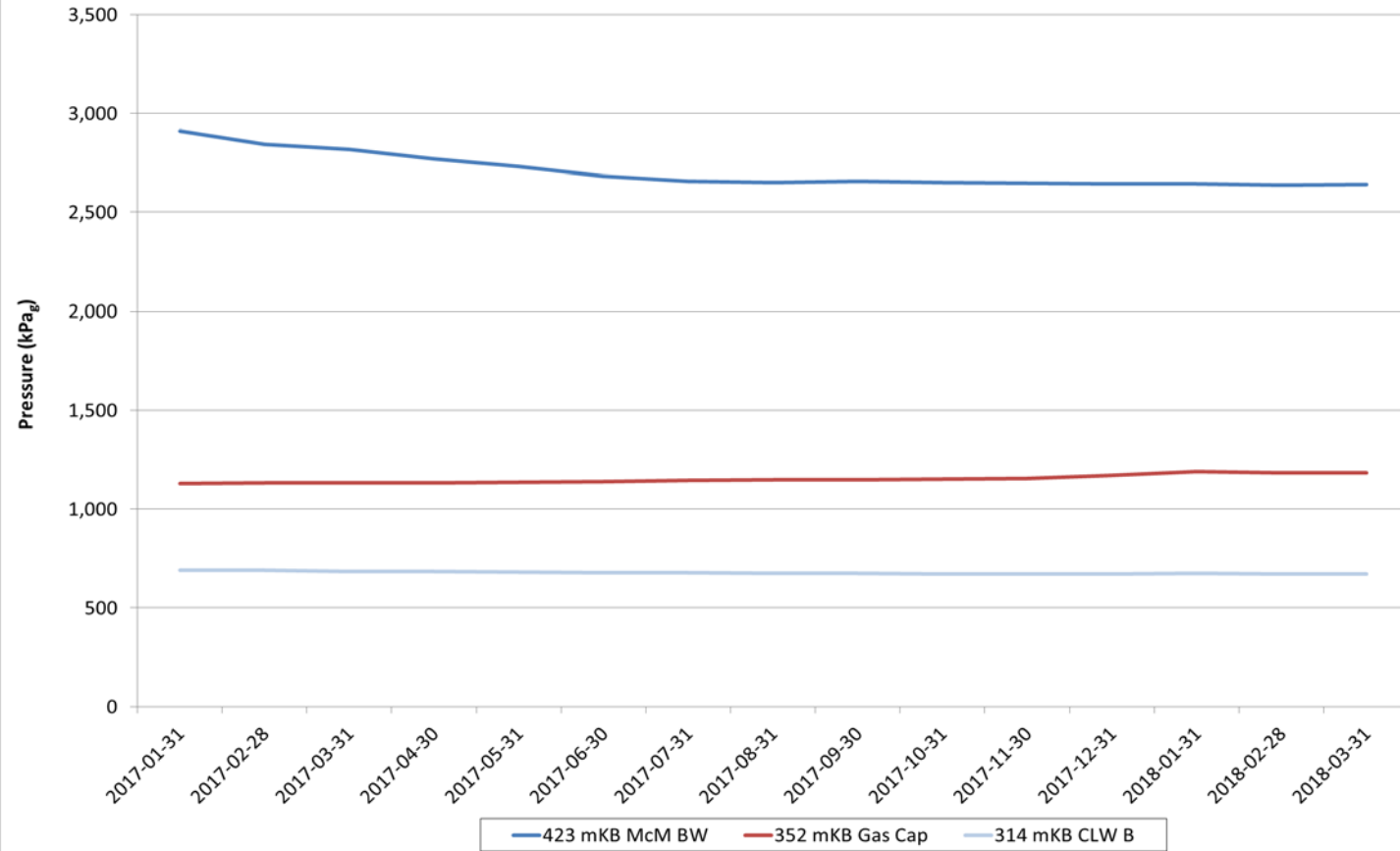
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117/06-02-076-06W4



1AC/02-03-076-06

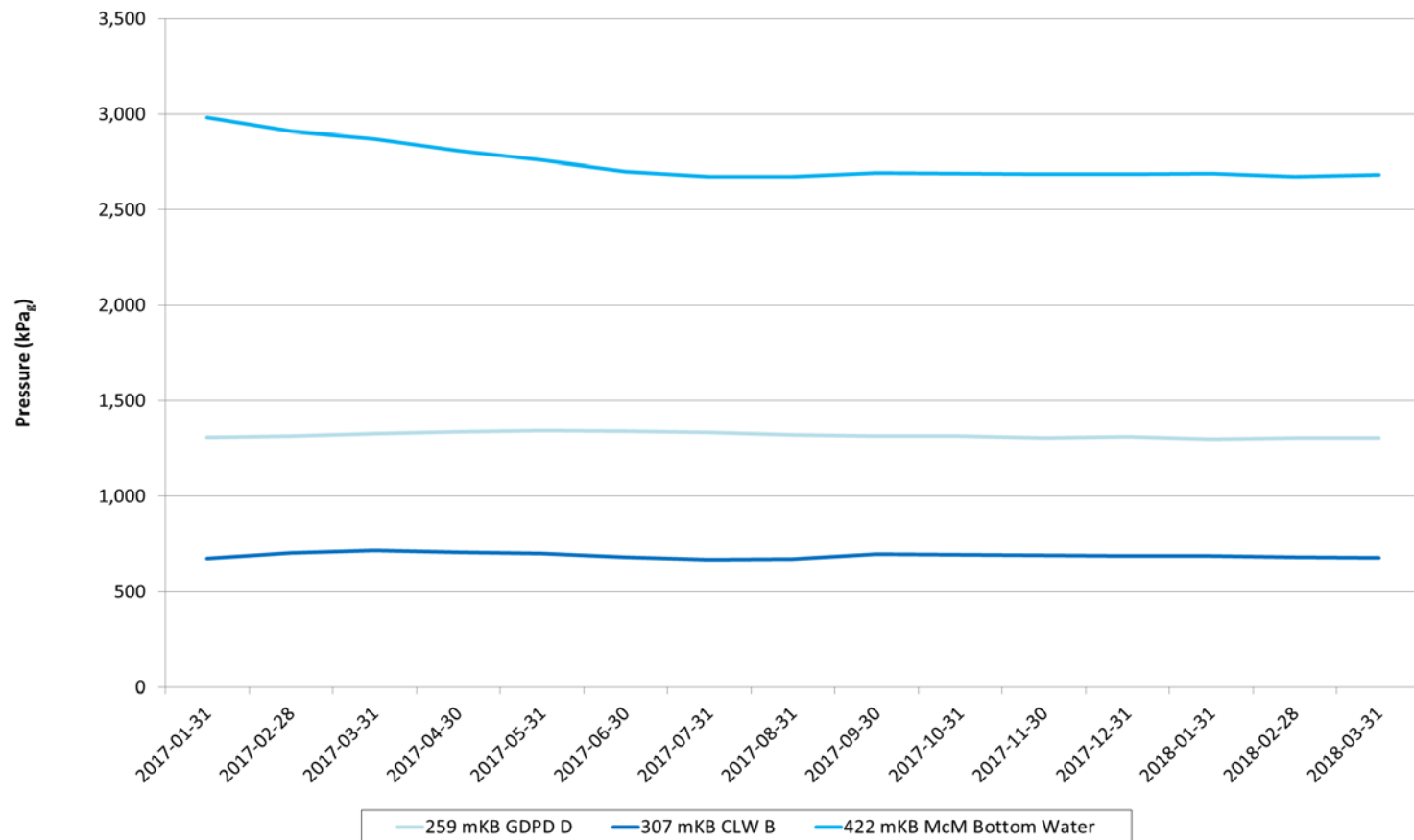


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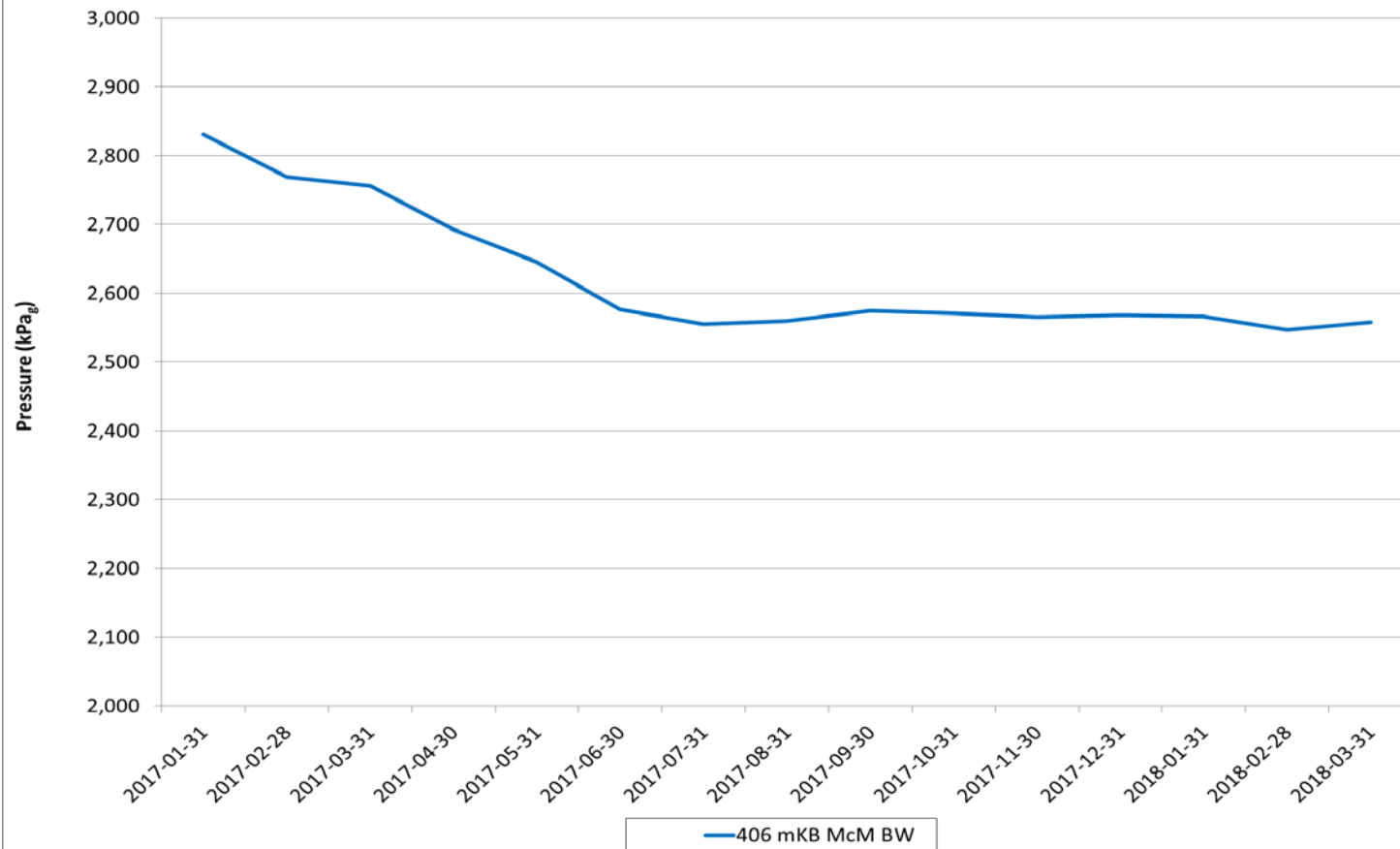
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Failed Downhole

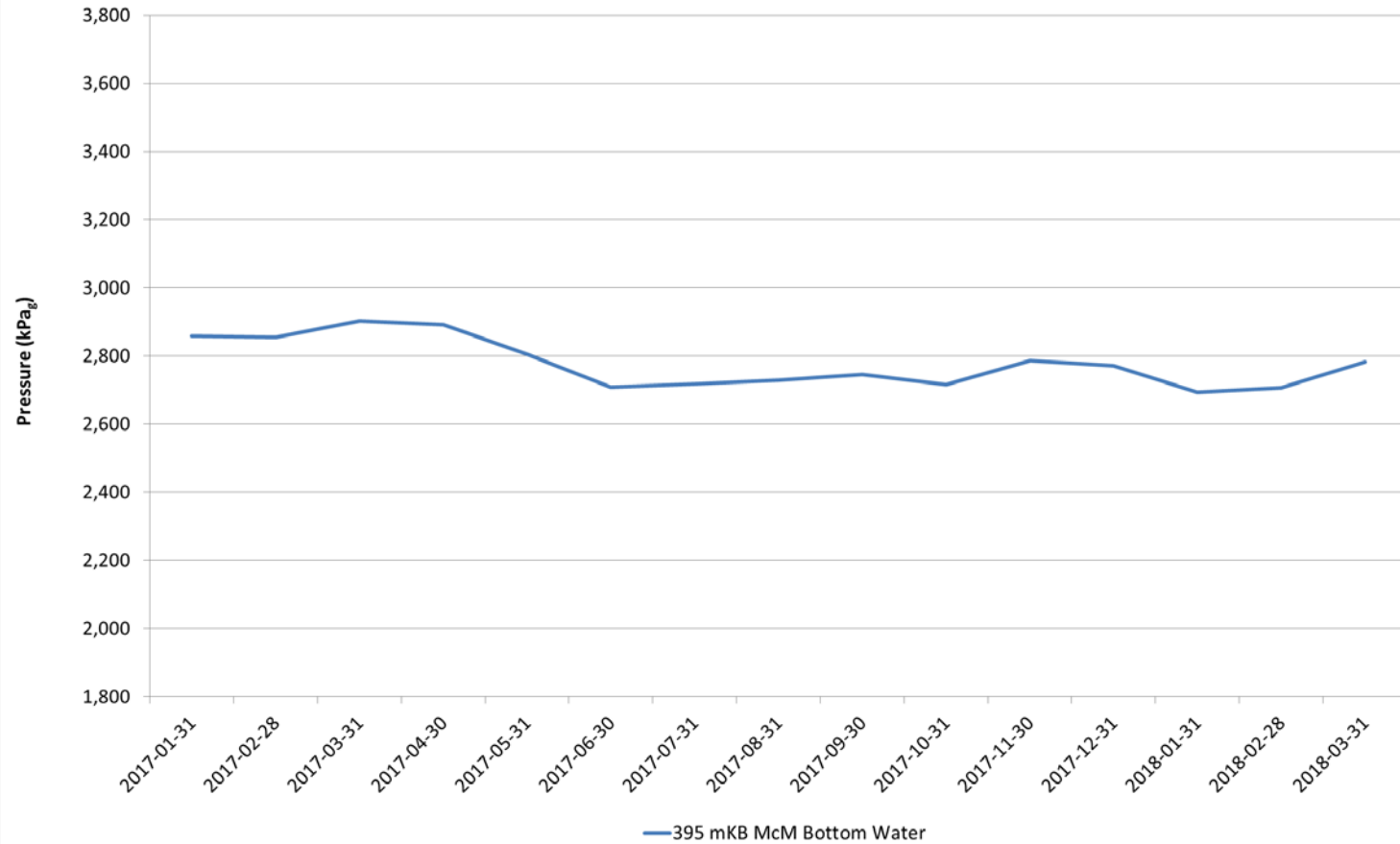
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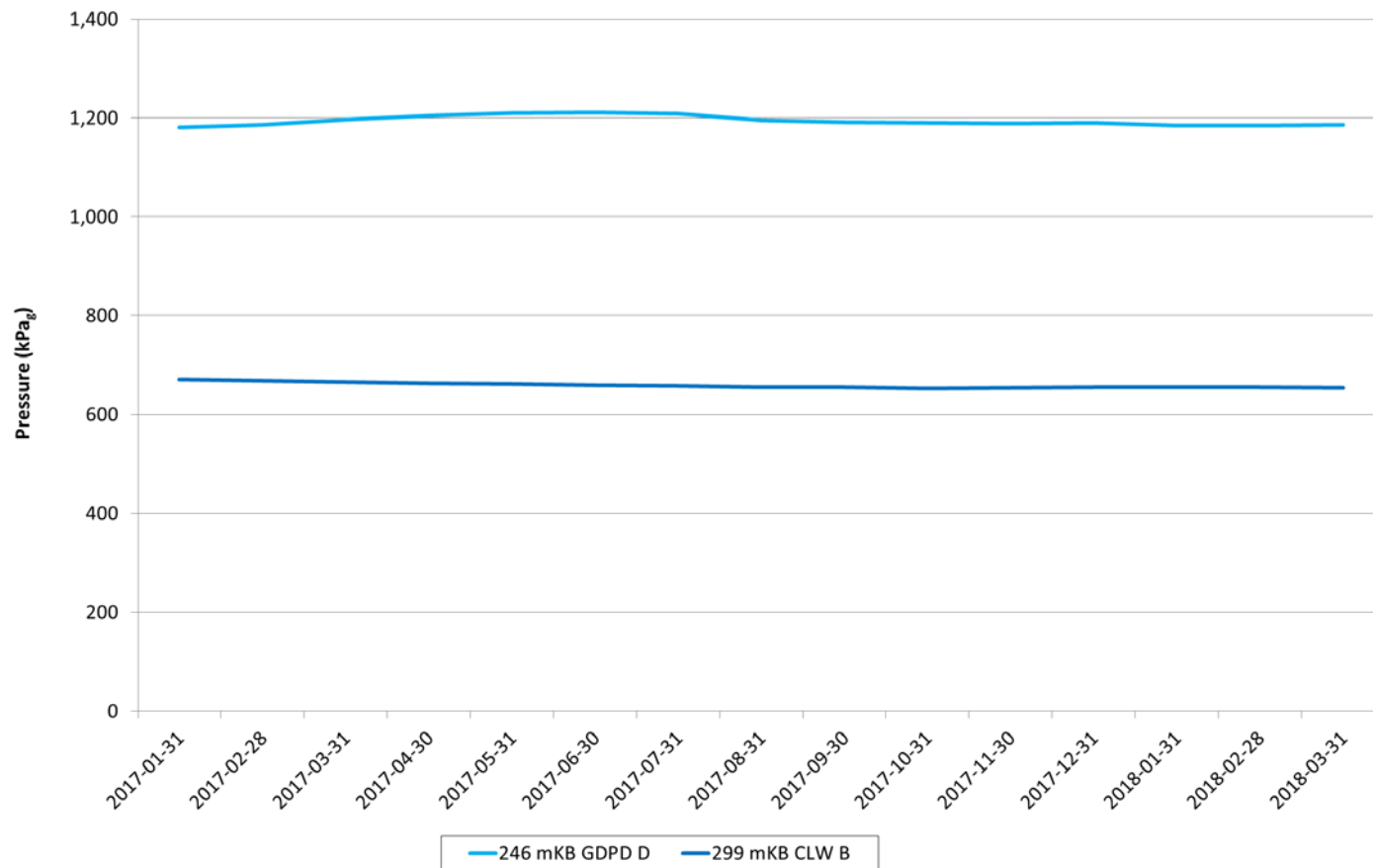
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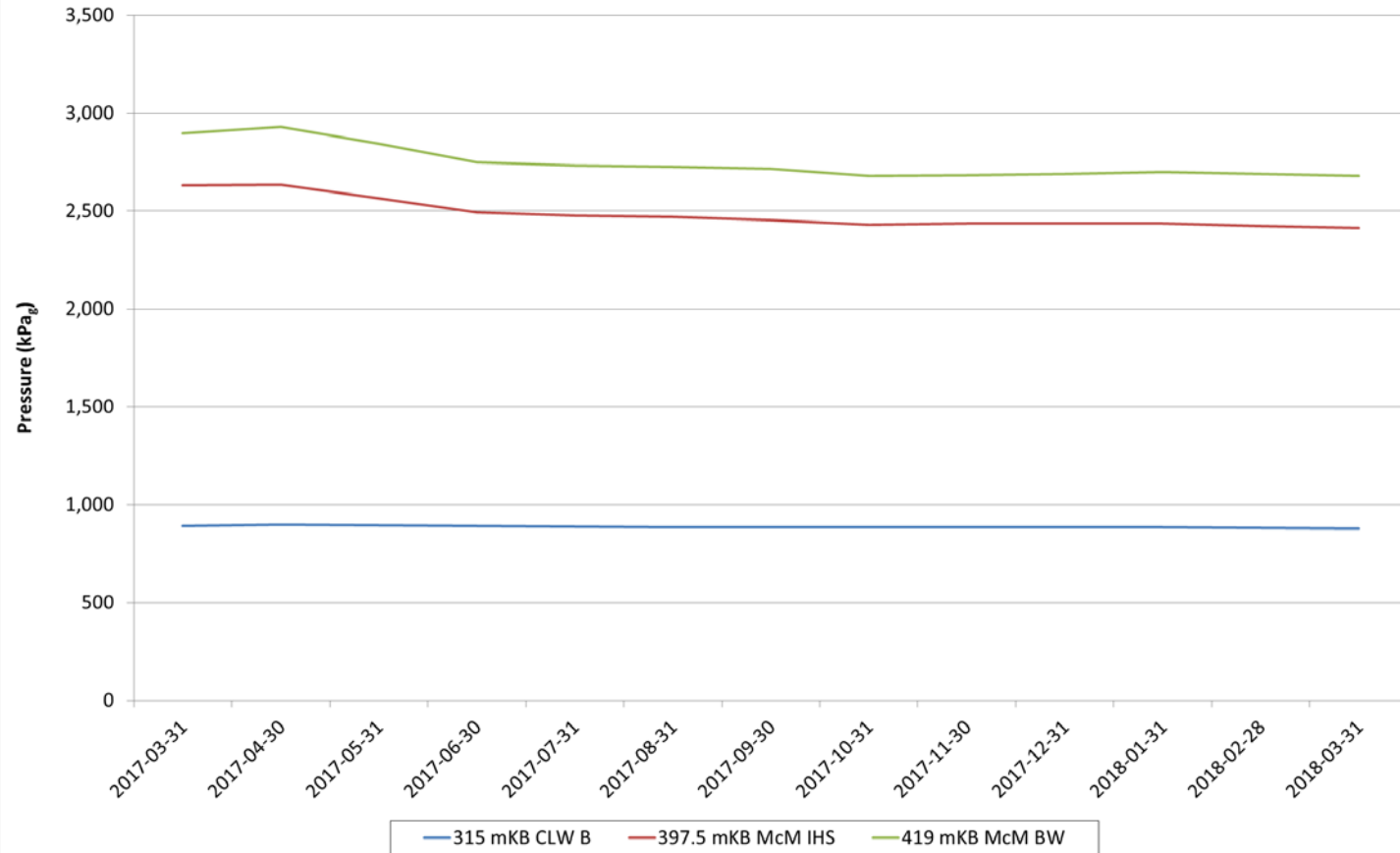
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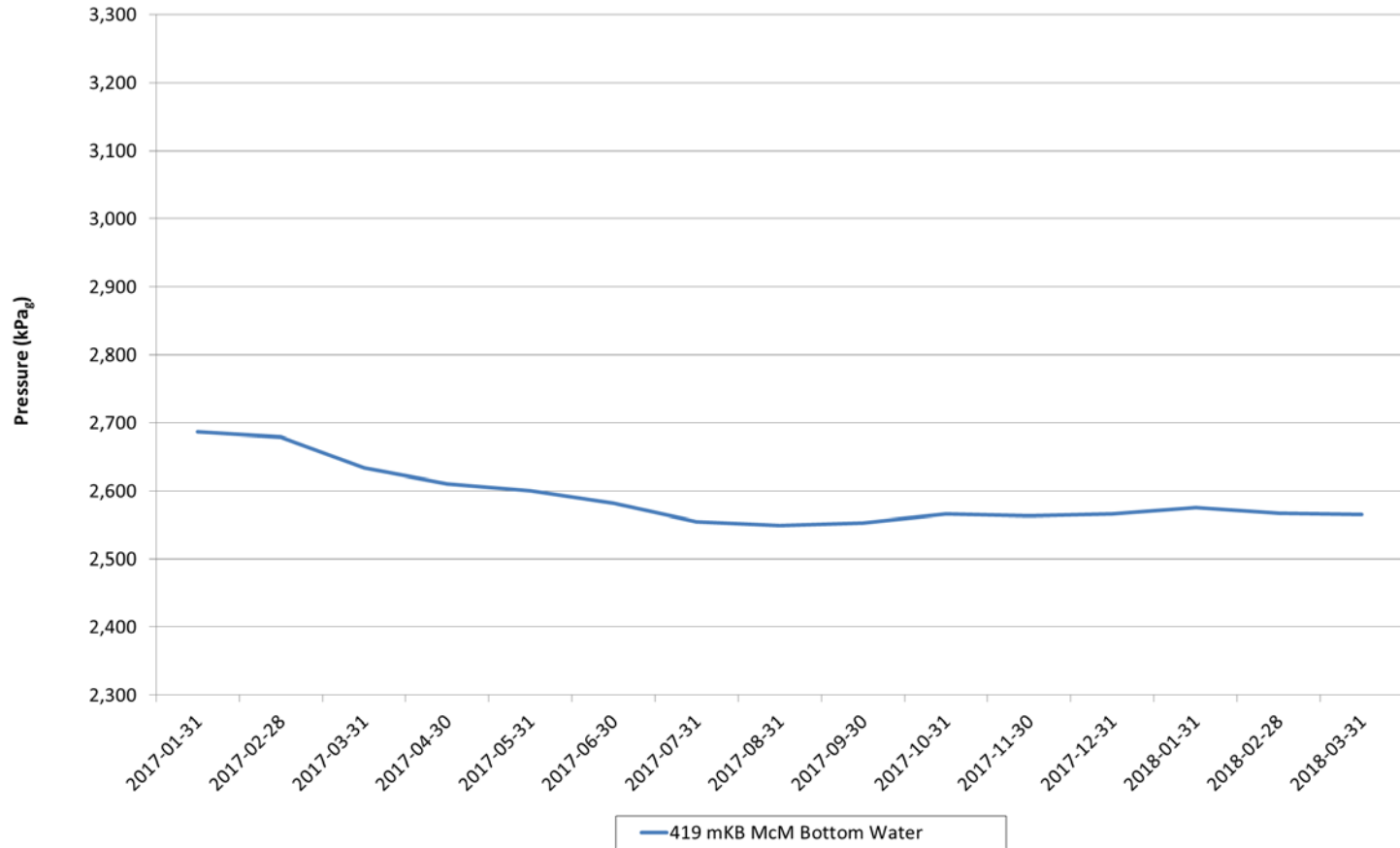
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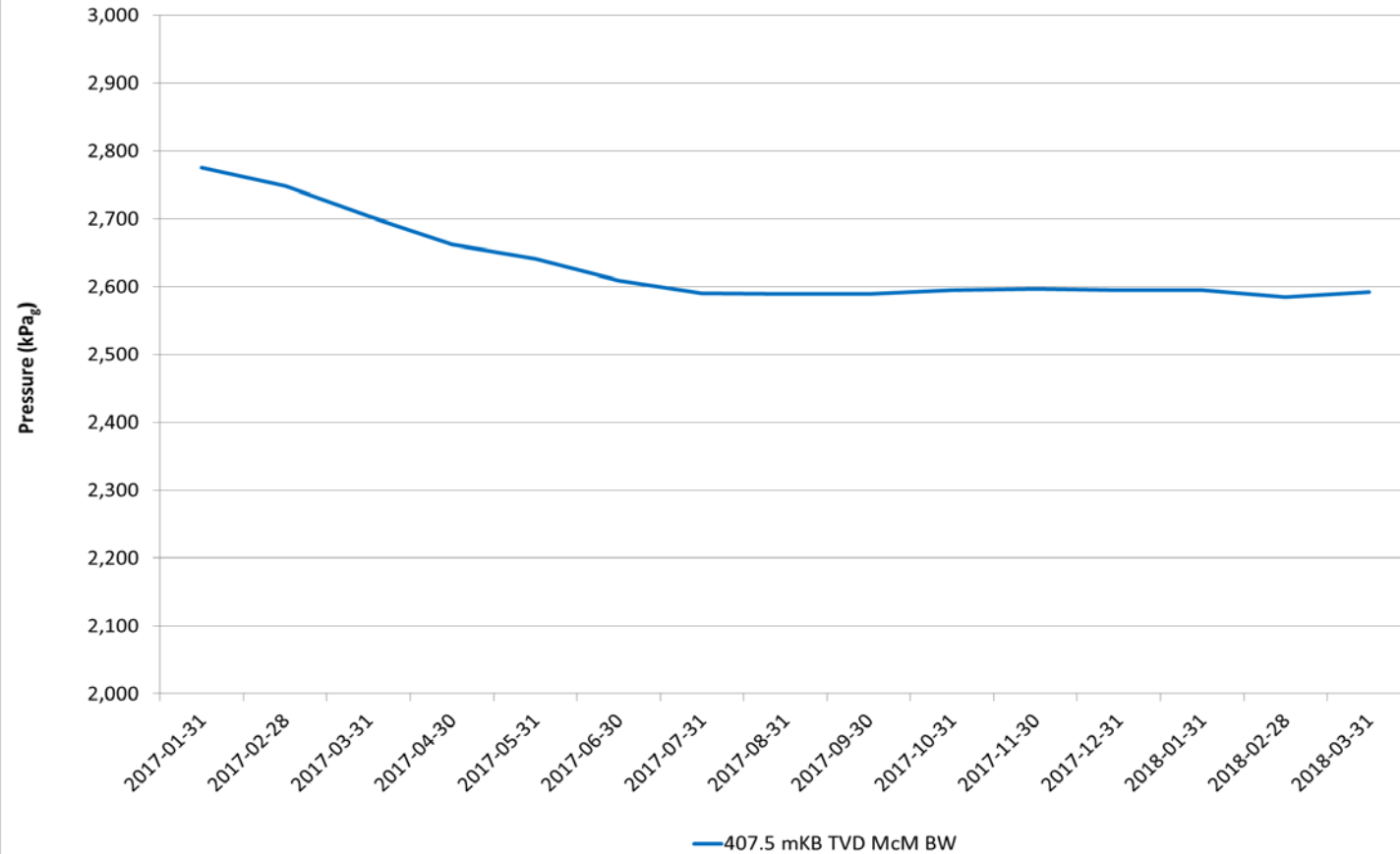
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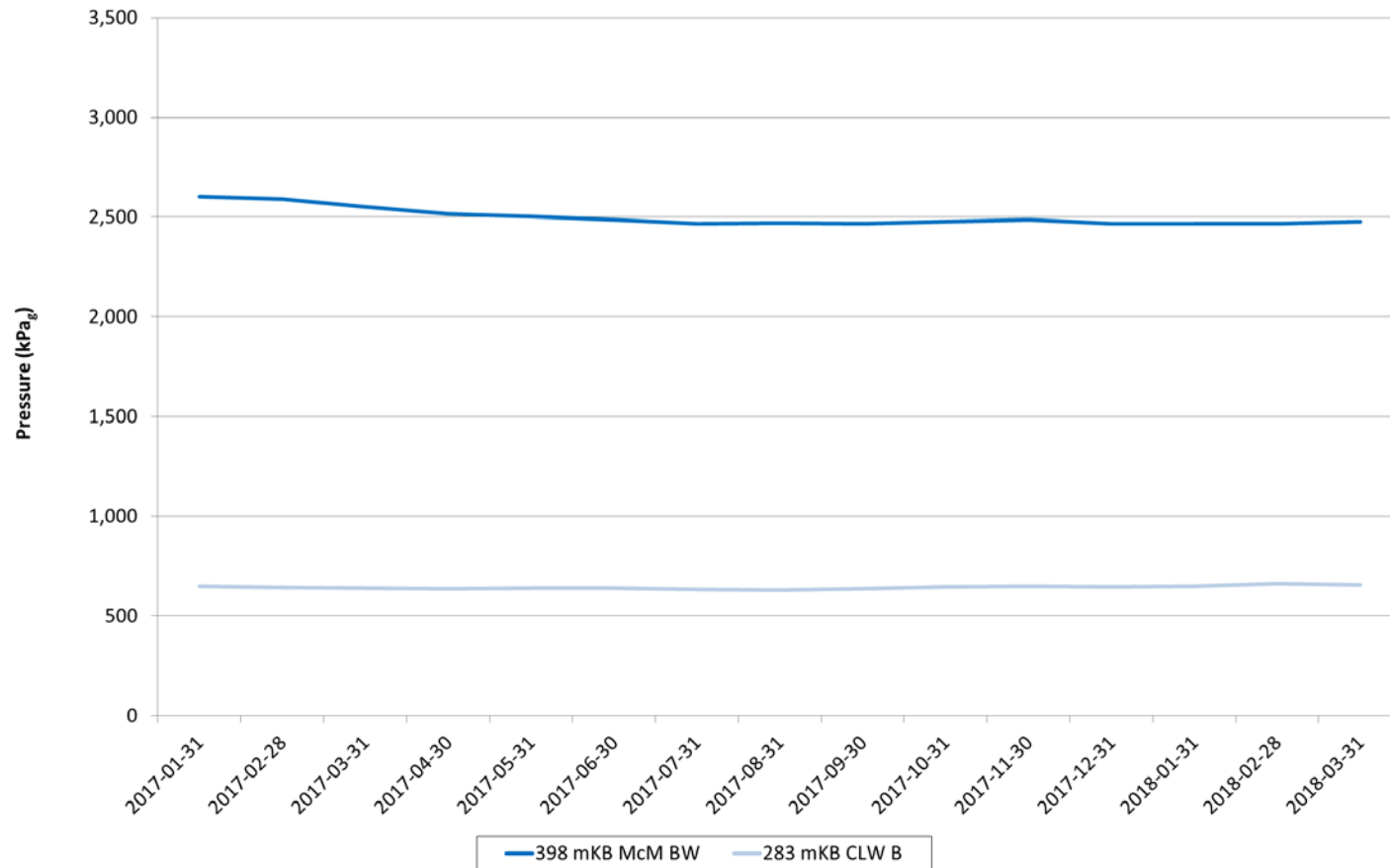
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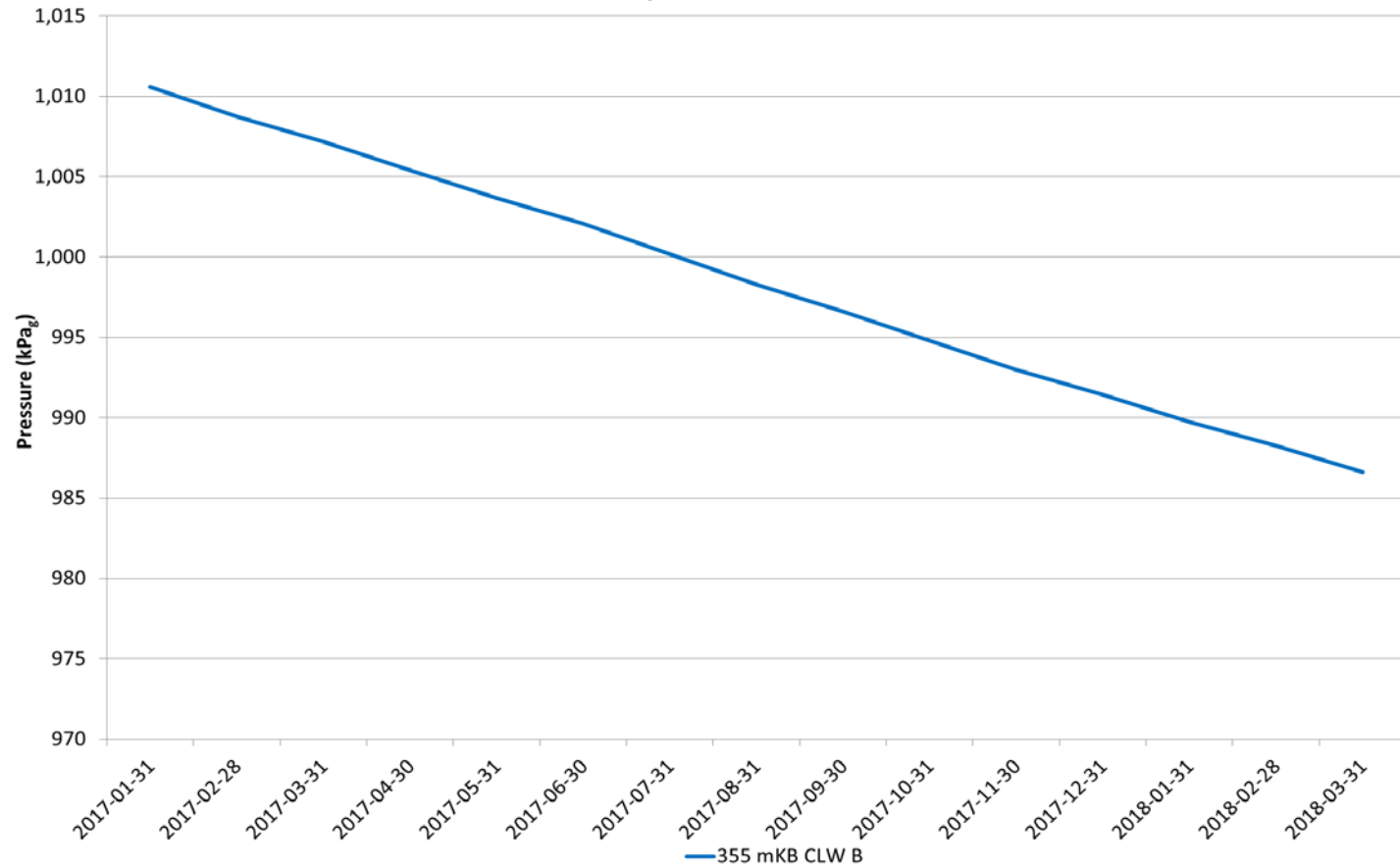
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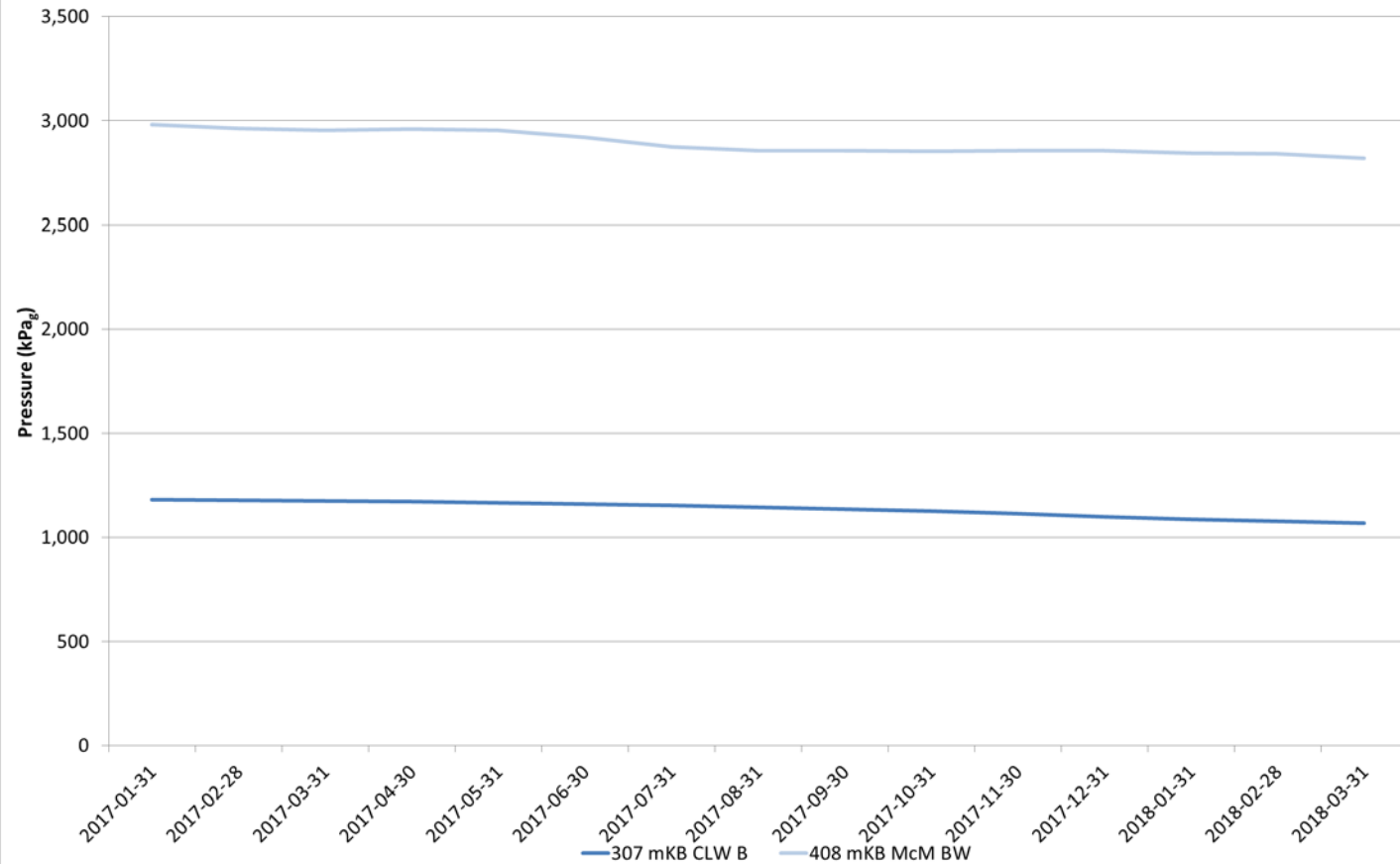
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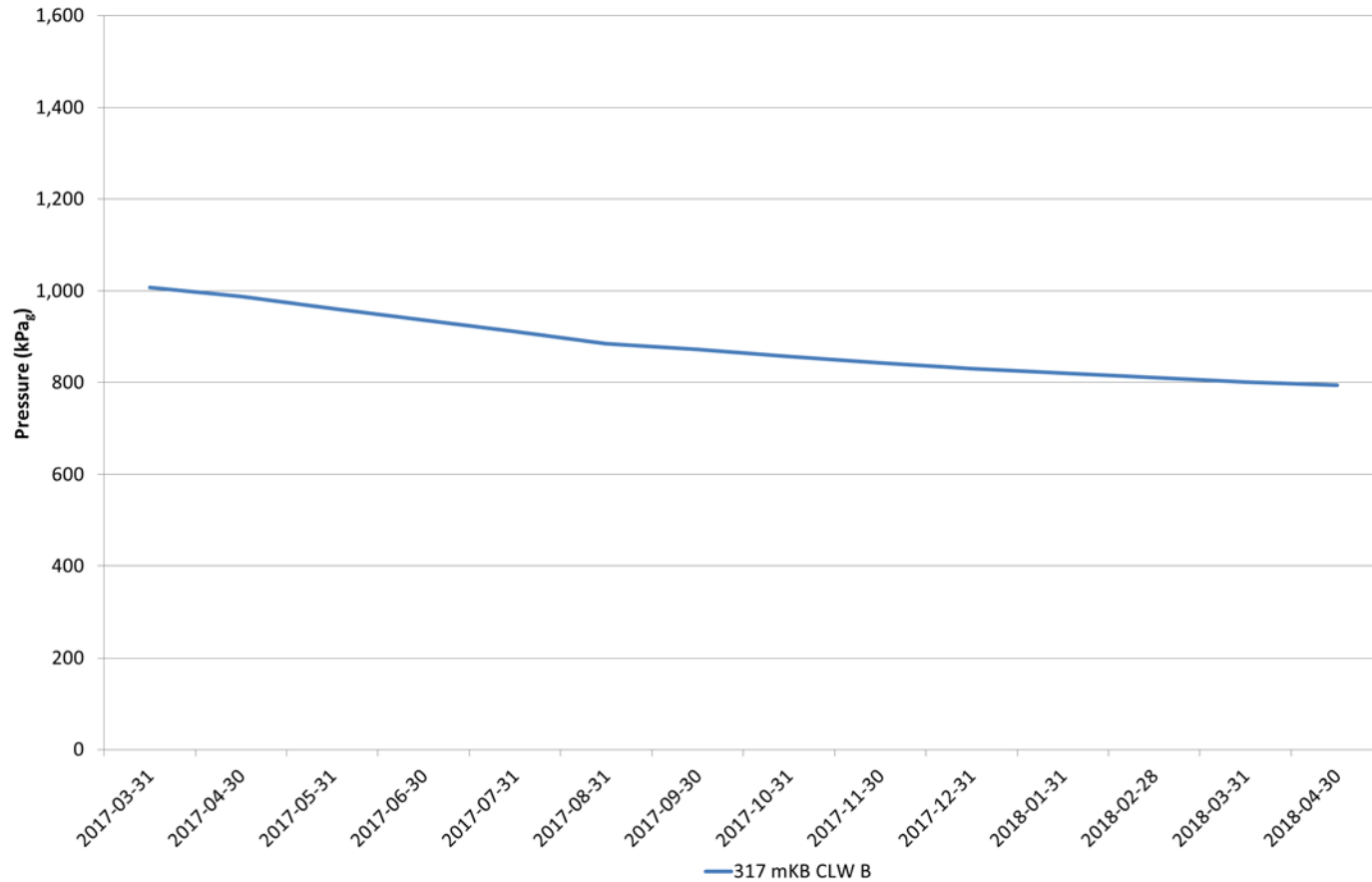
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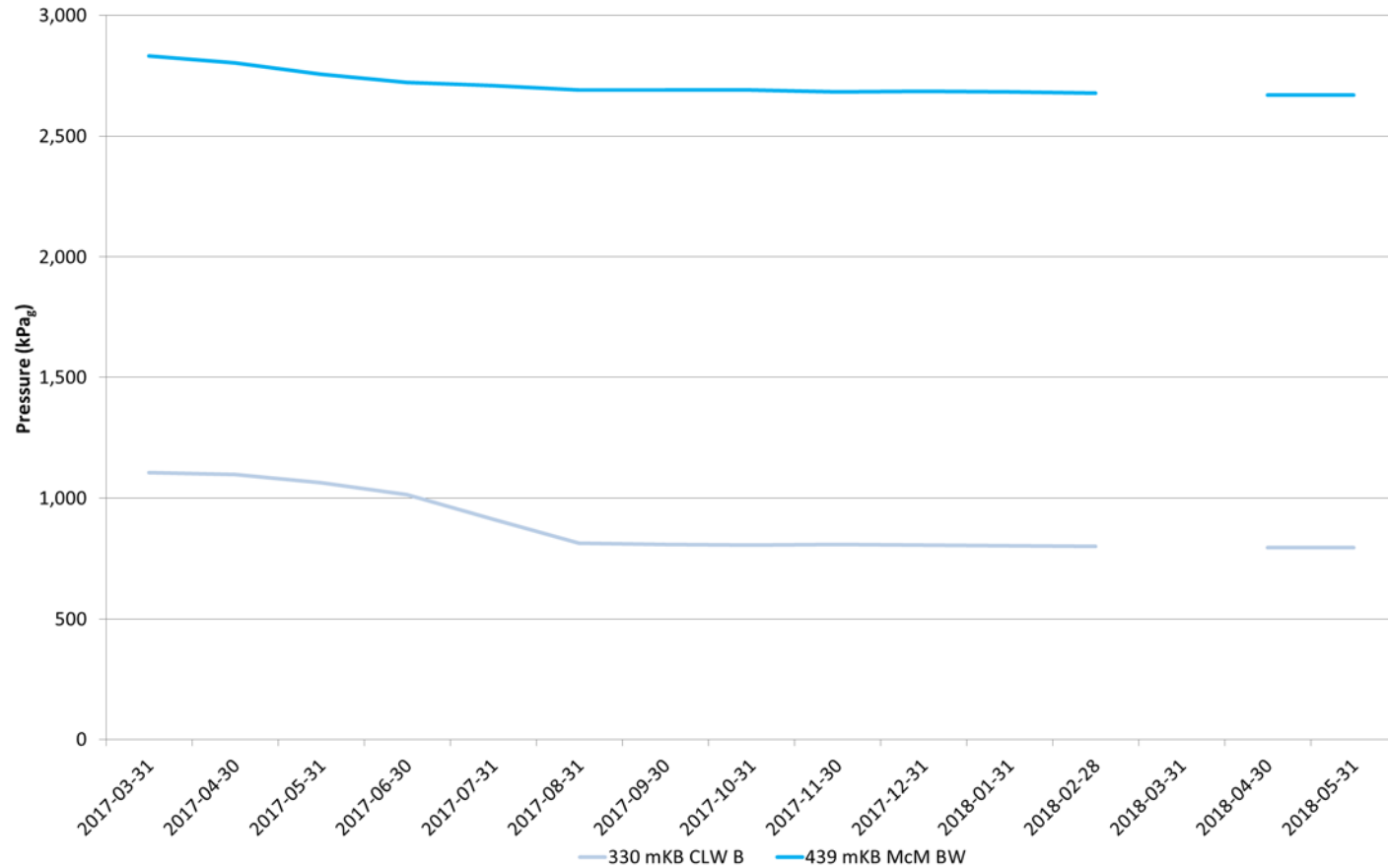
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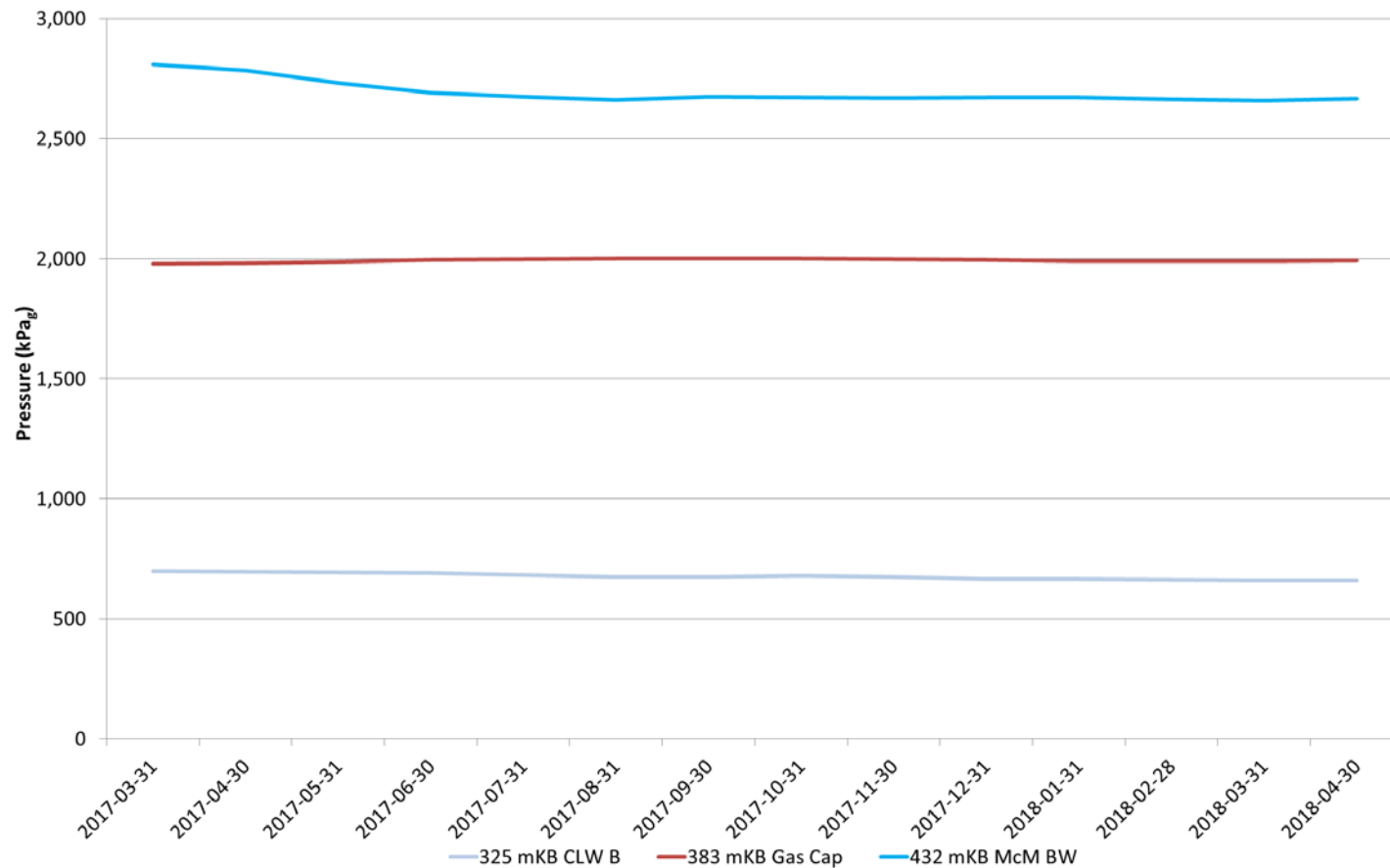
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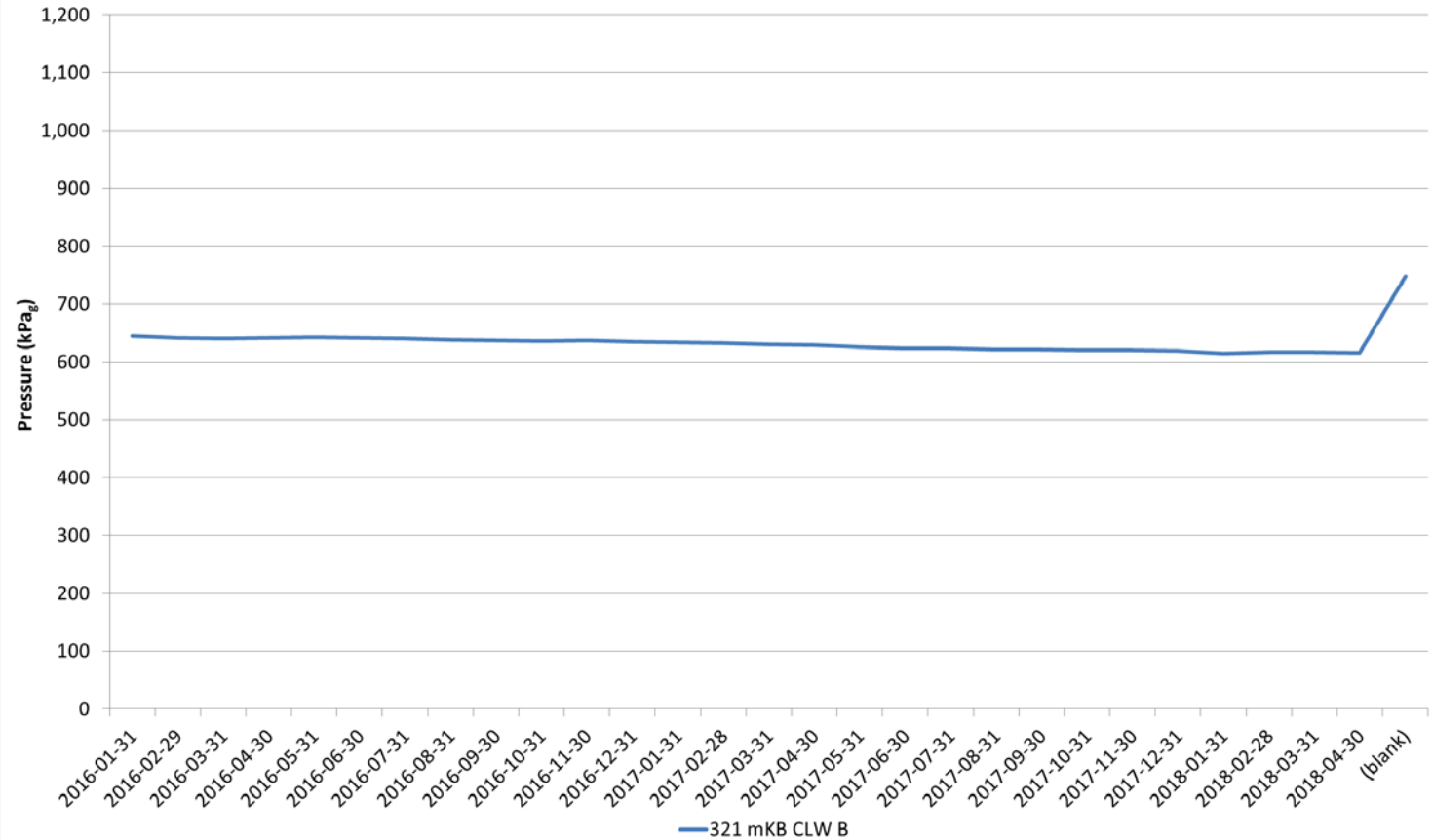
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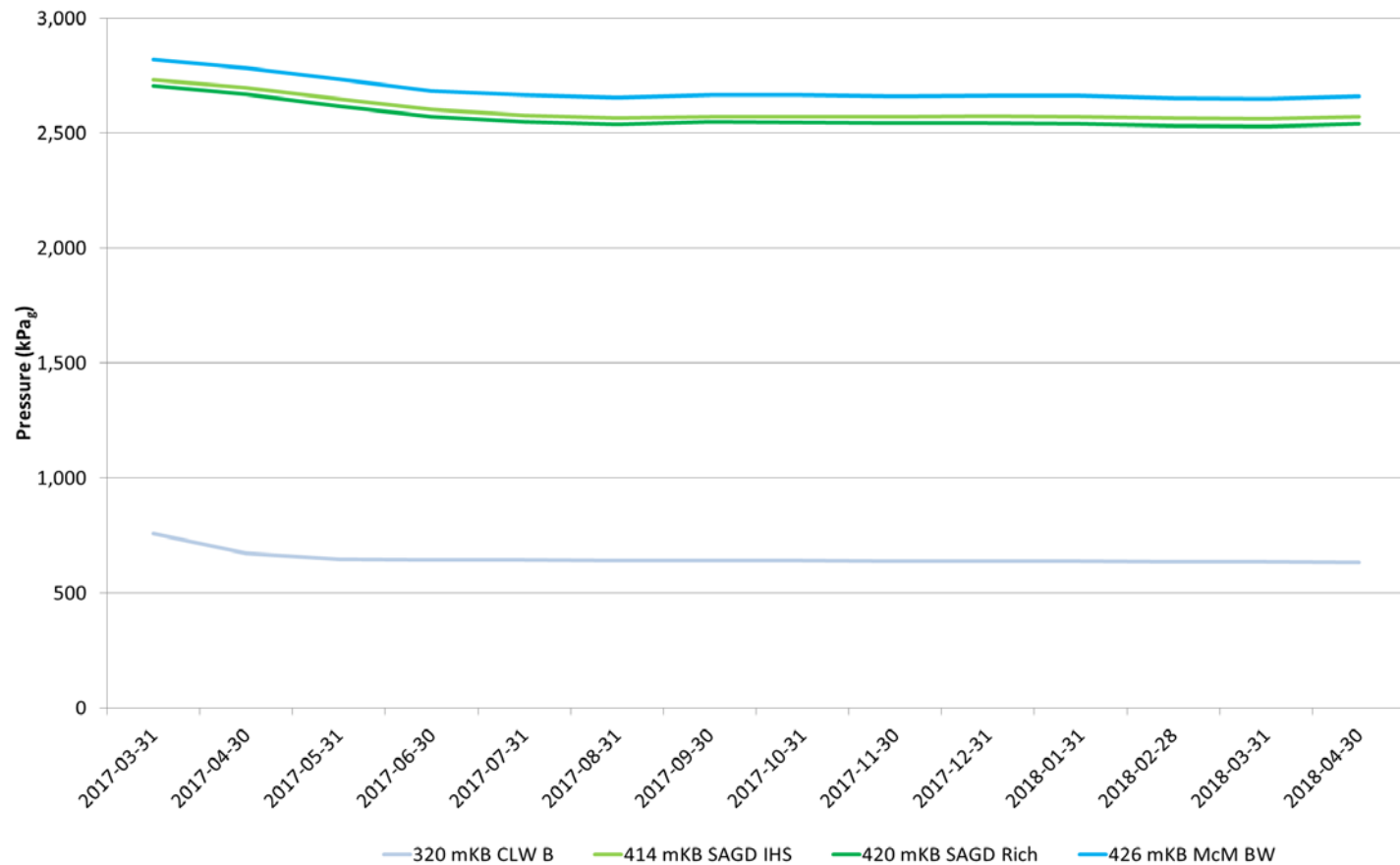
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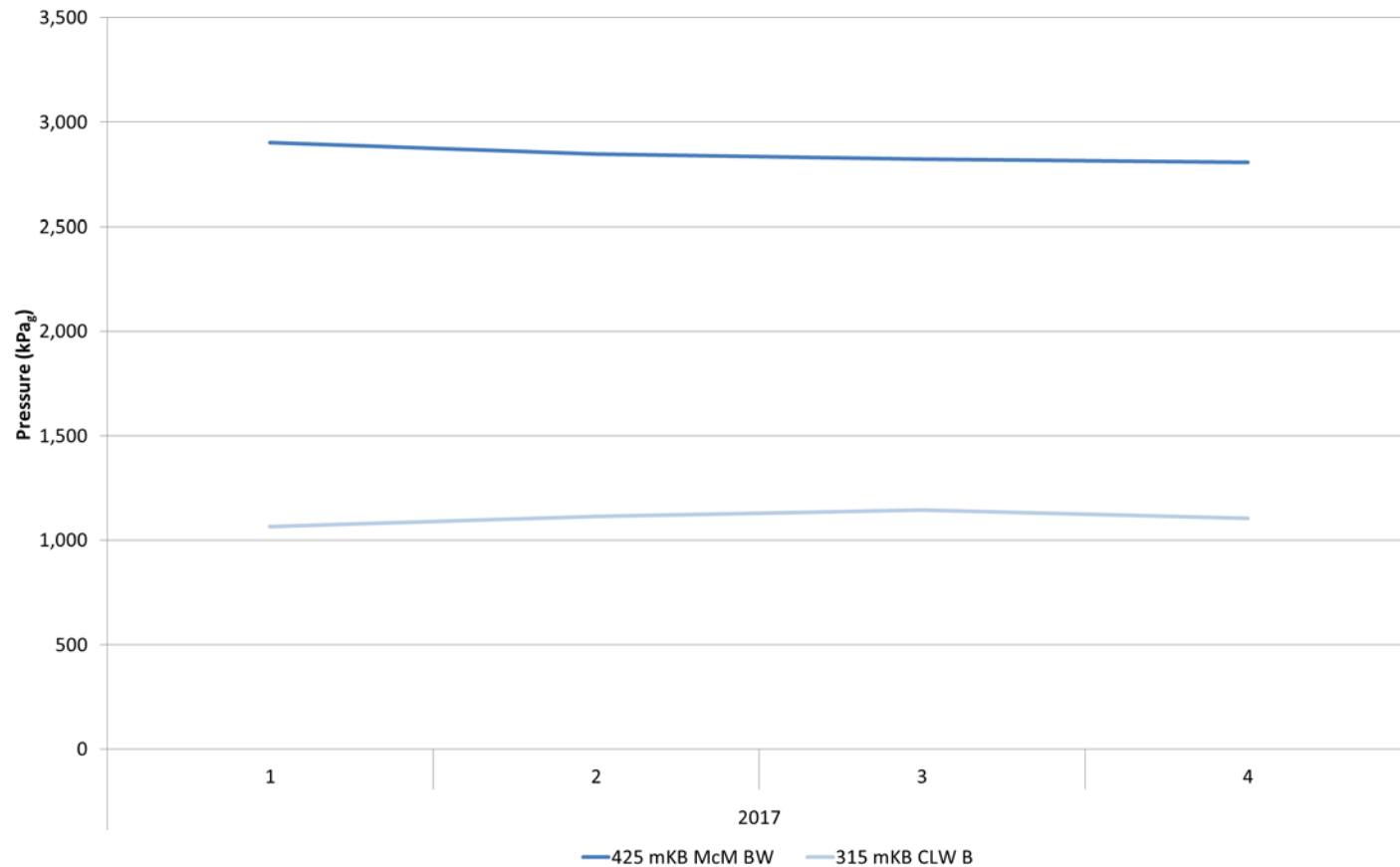
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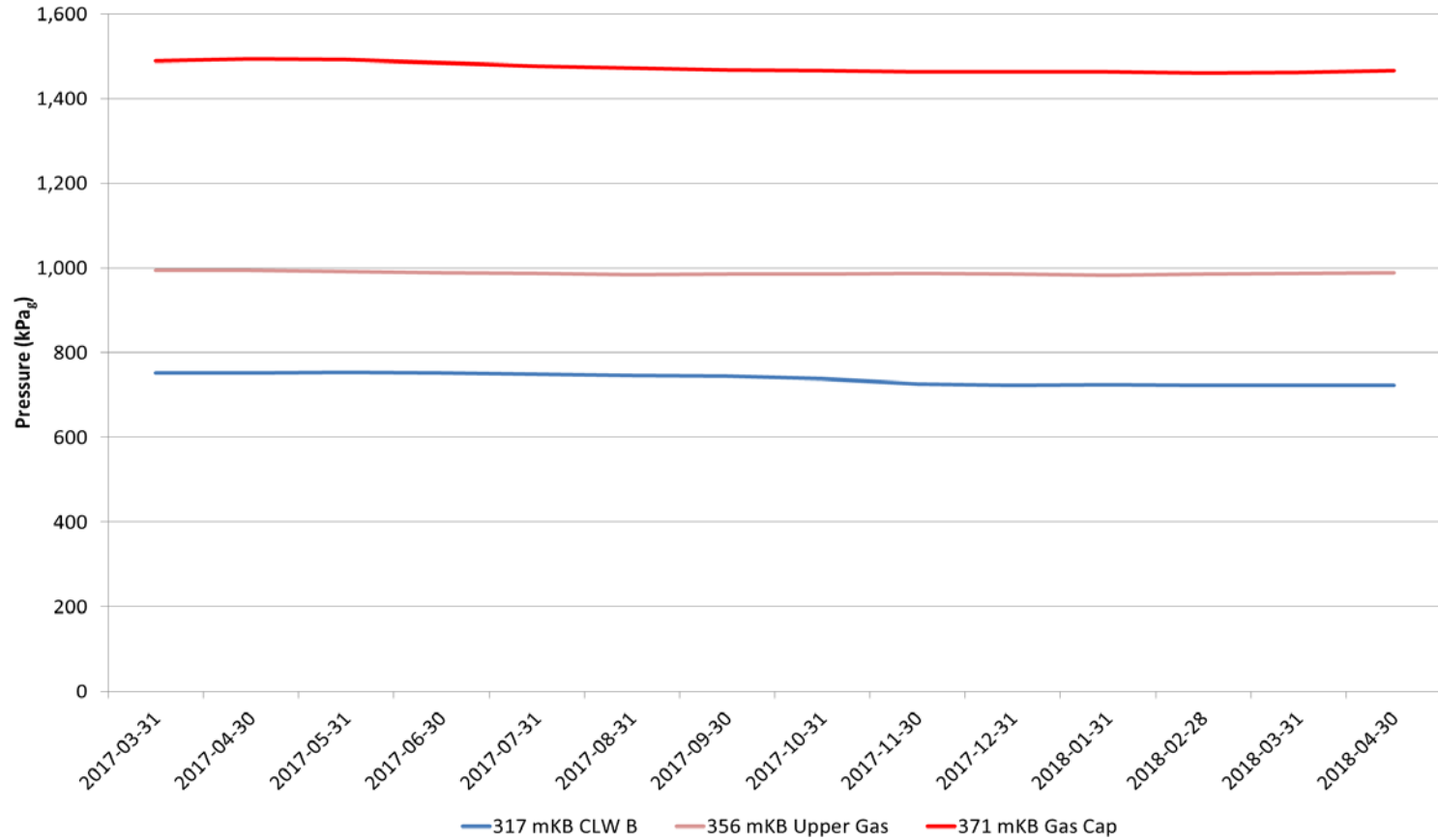
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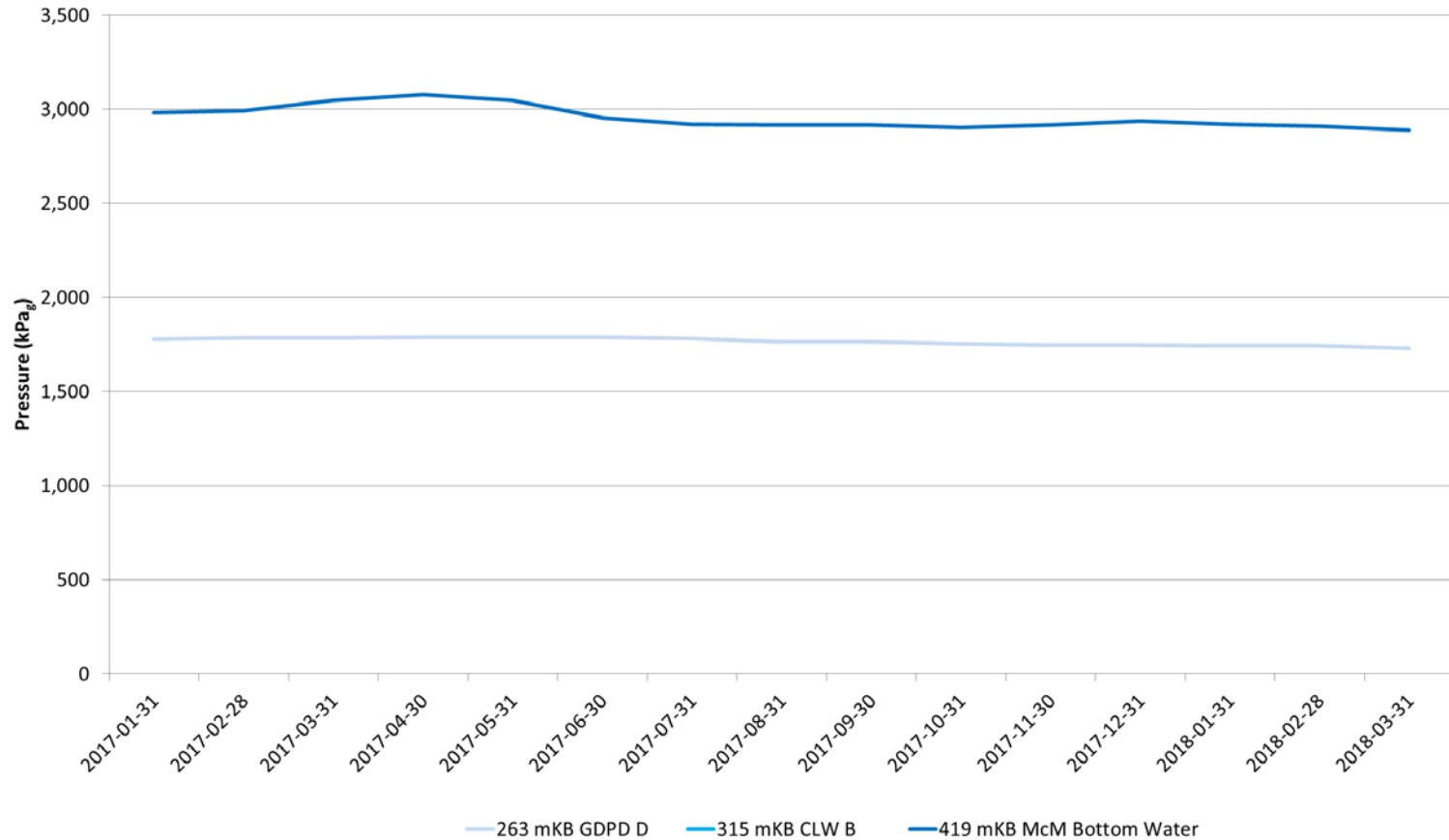
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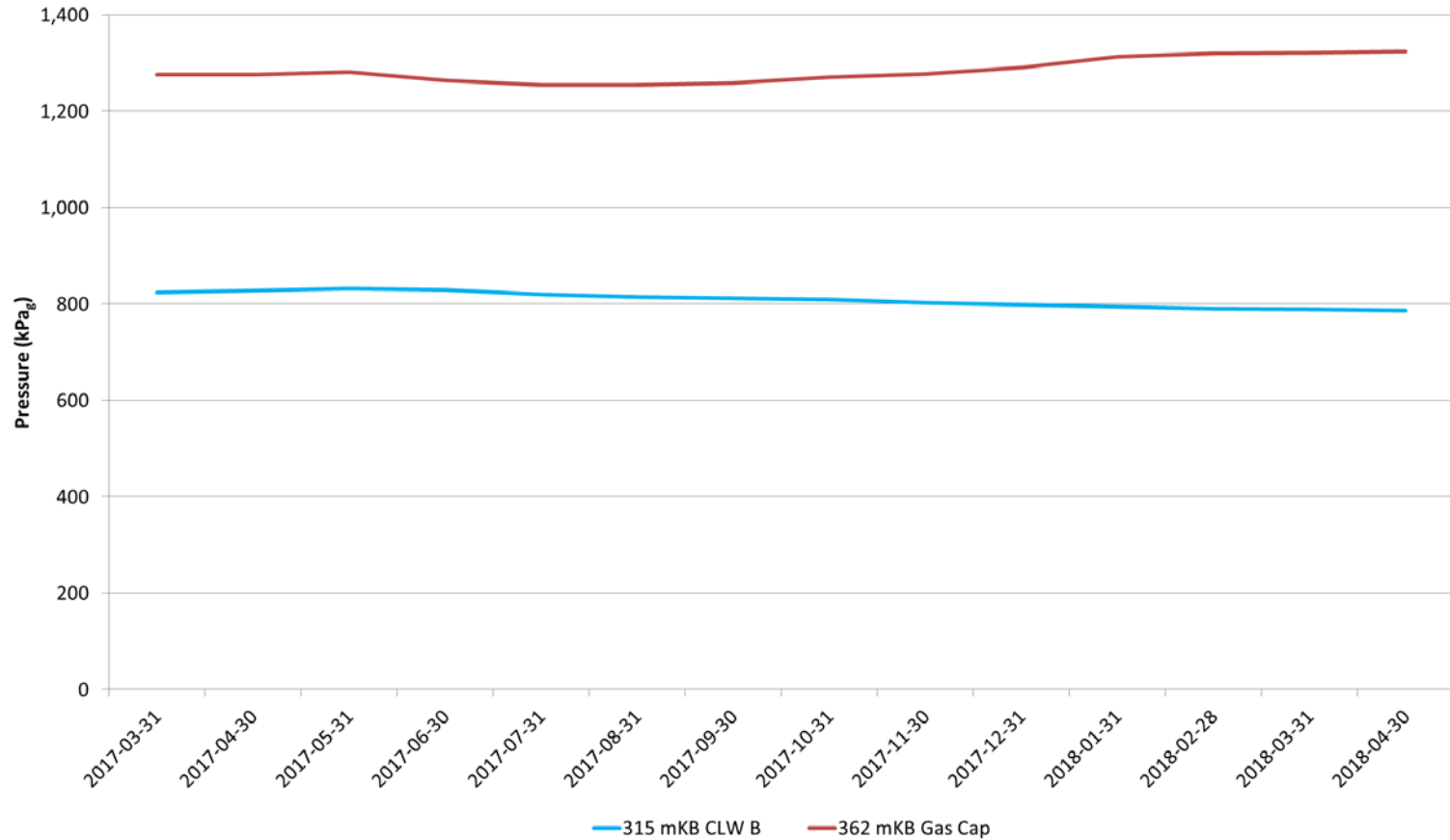
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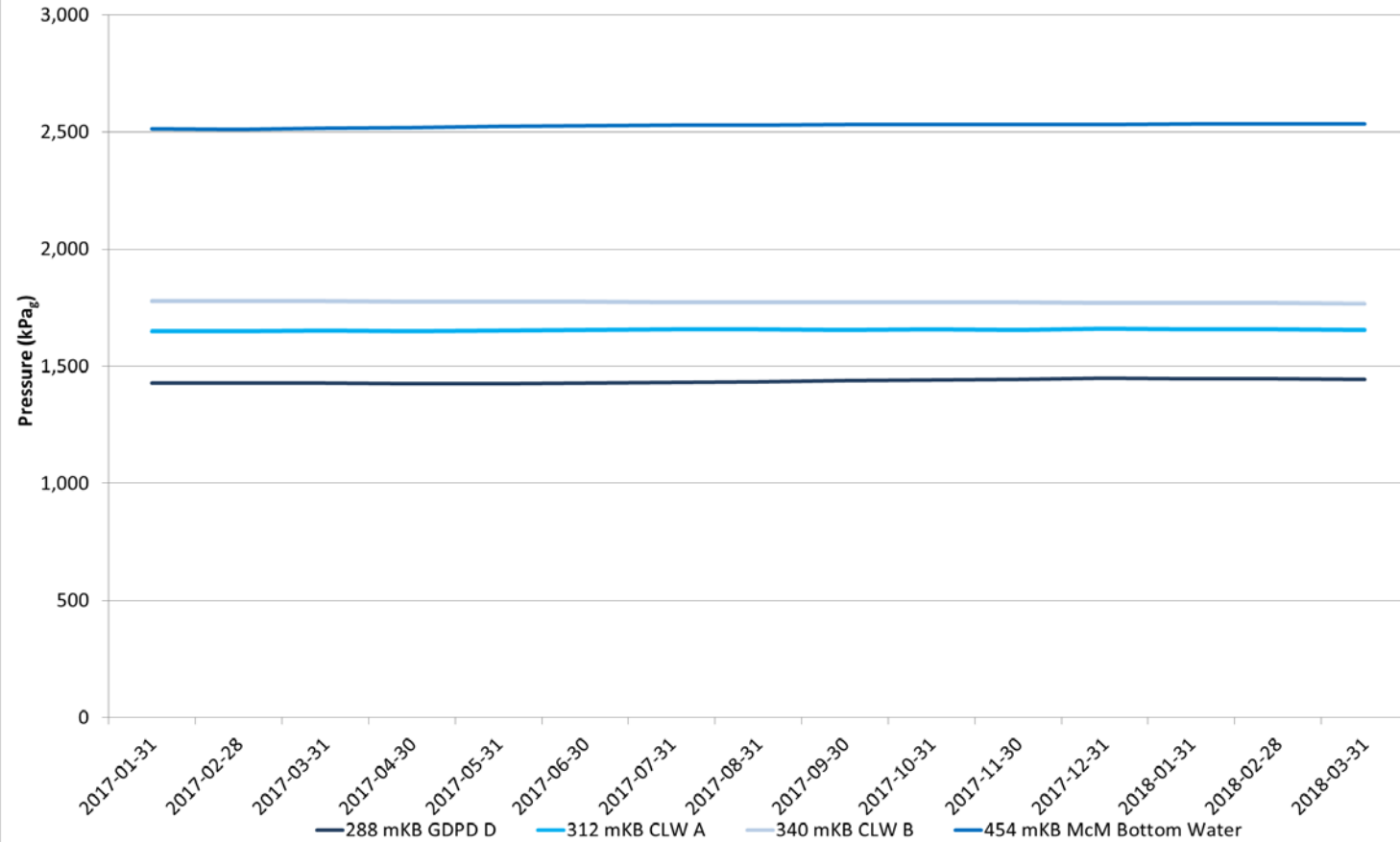
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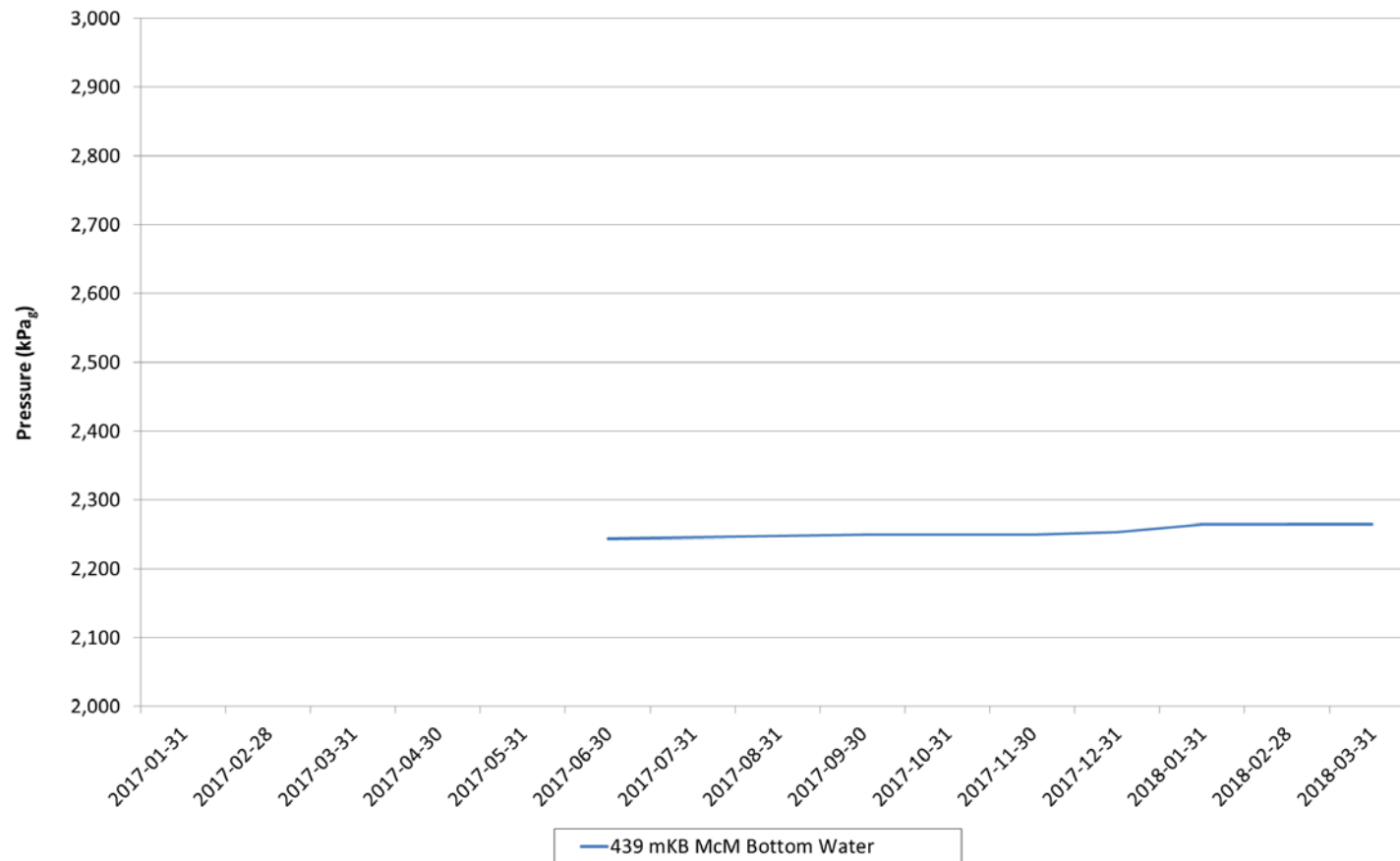
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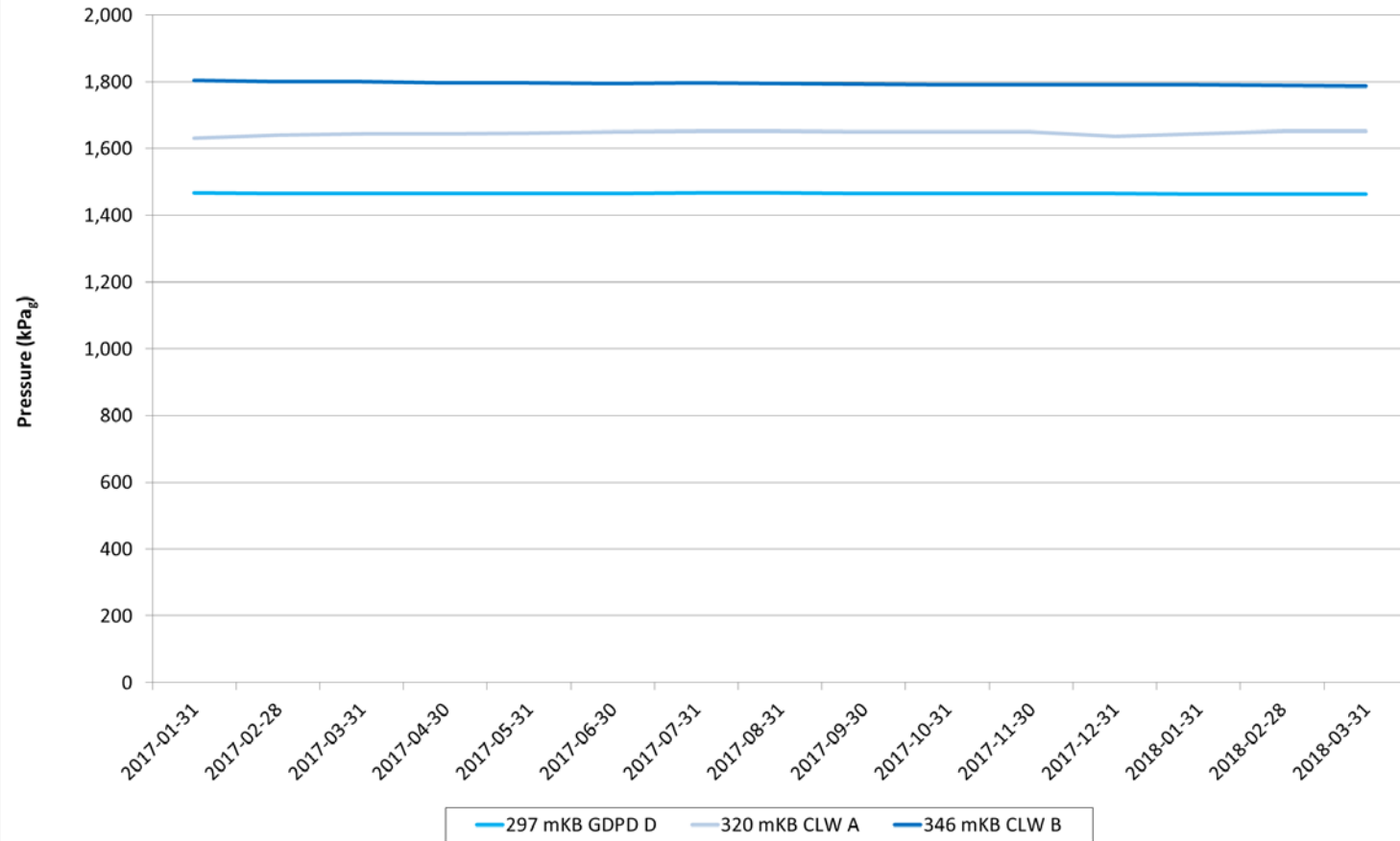
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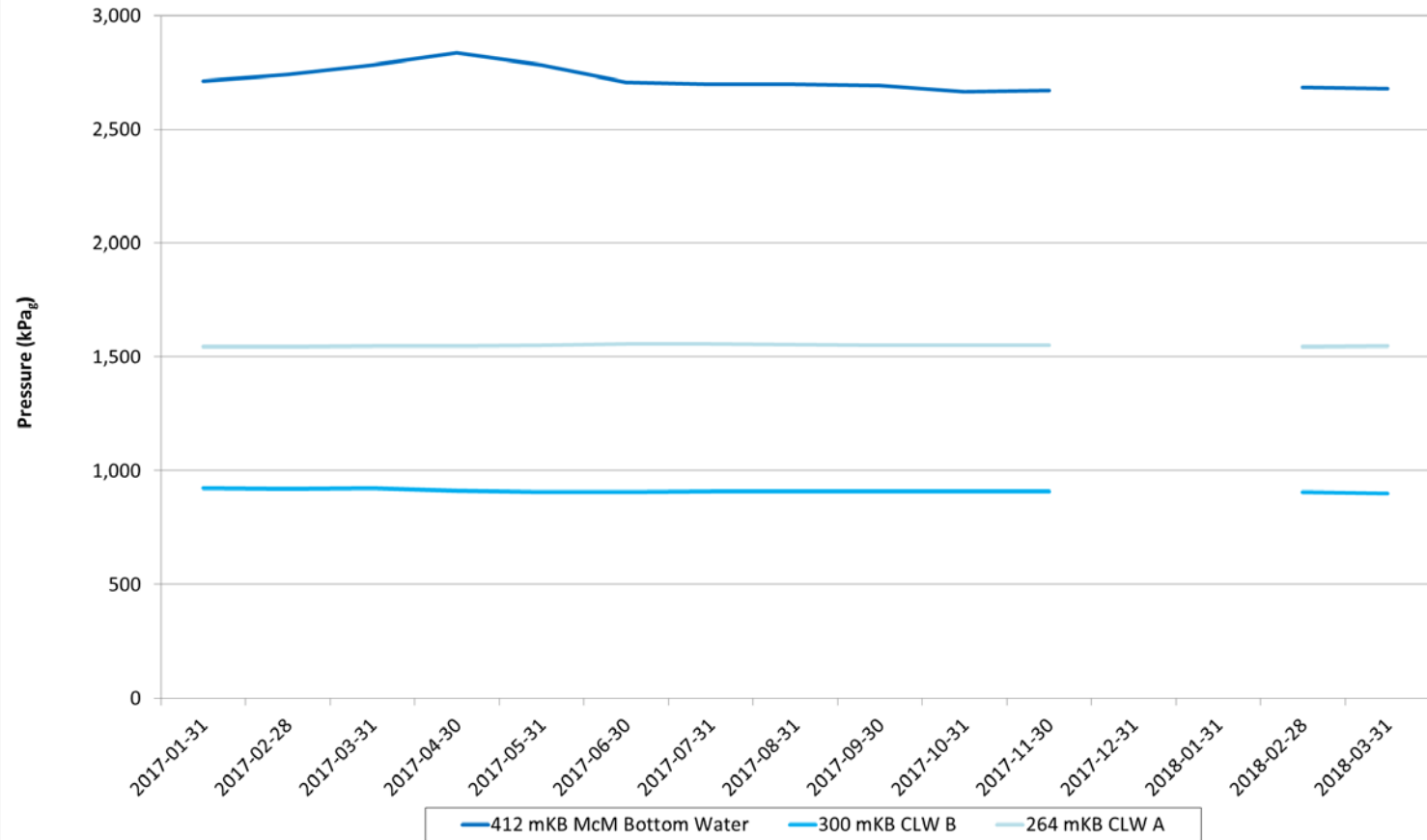
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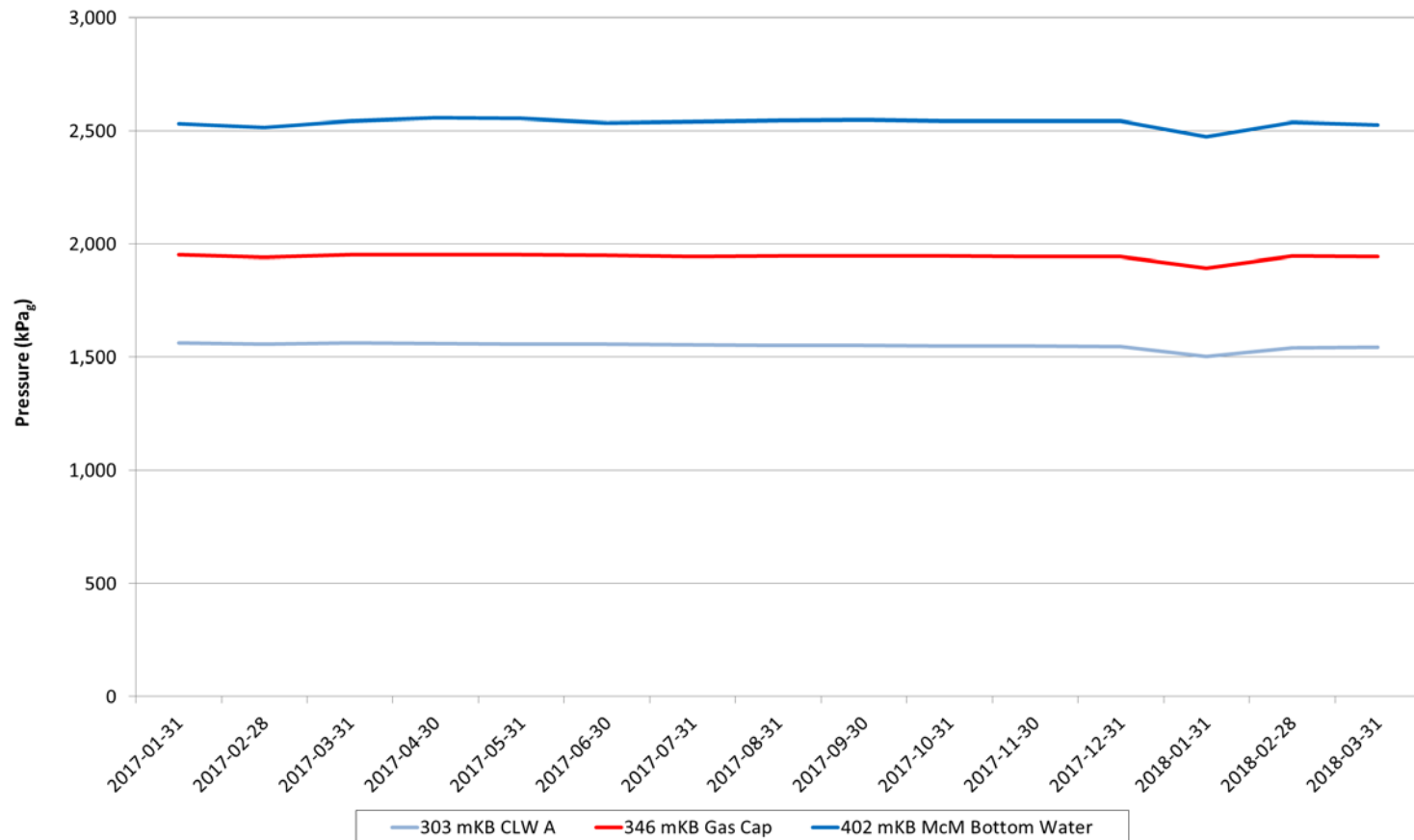
102/04-14-076-05W4



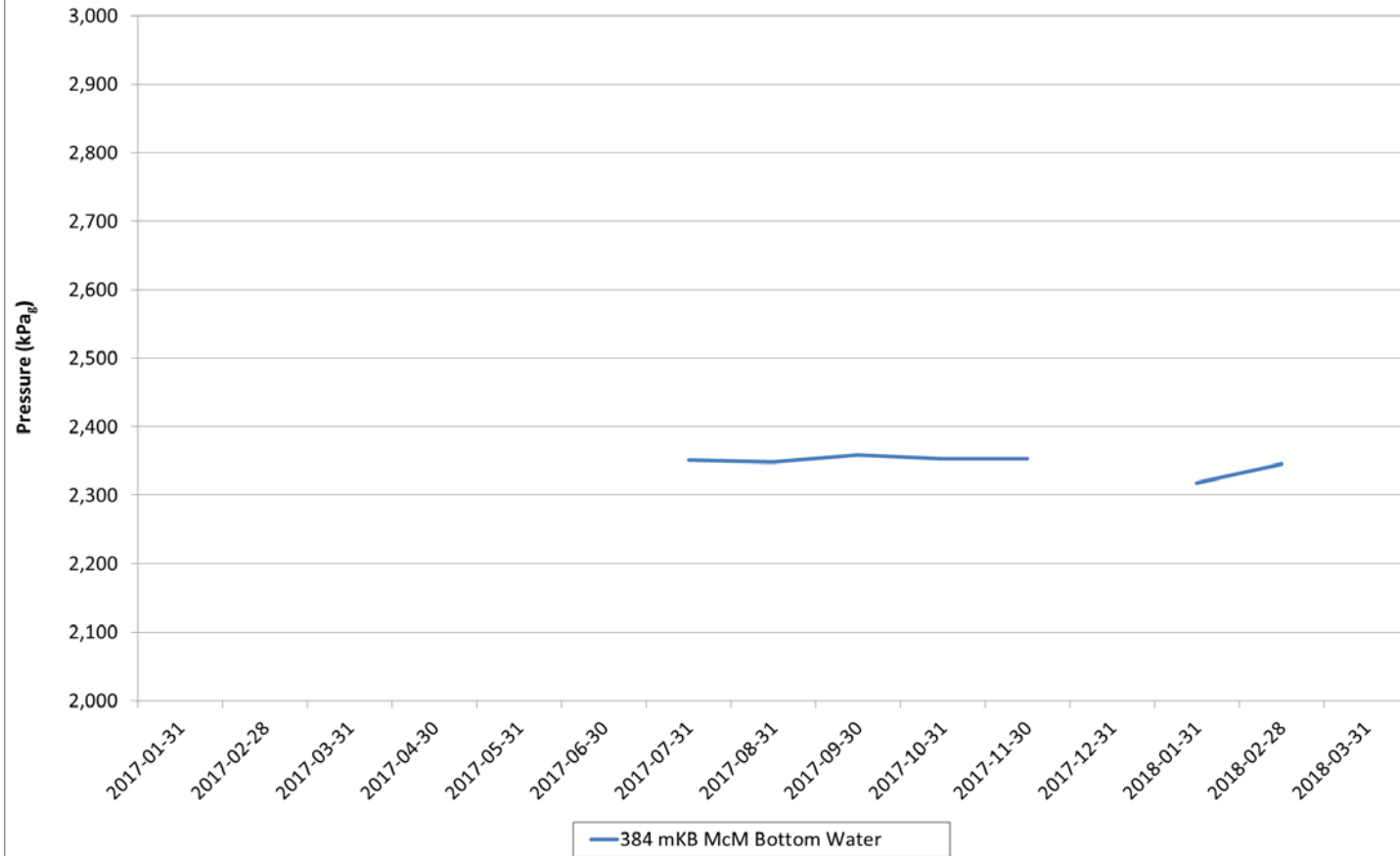
100/12-18-076-05W4



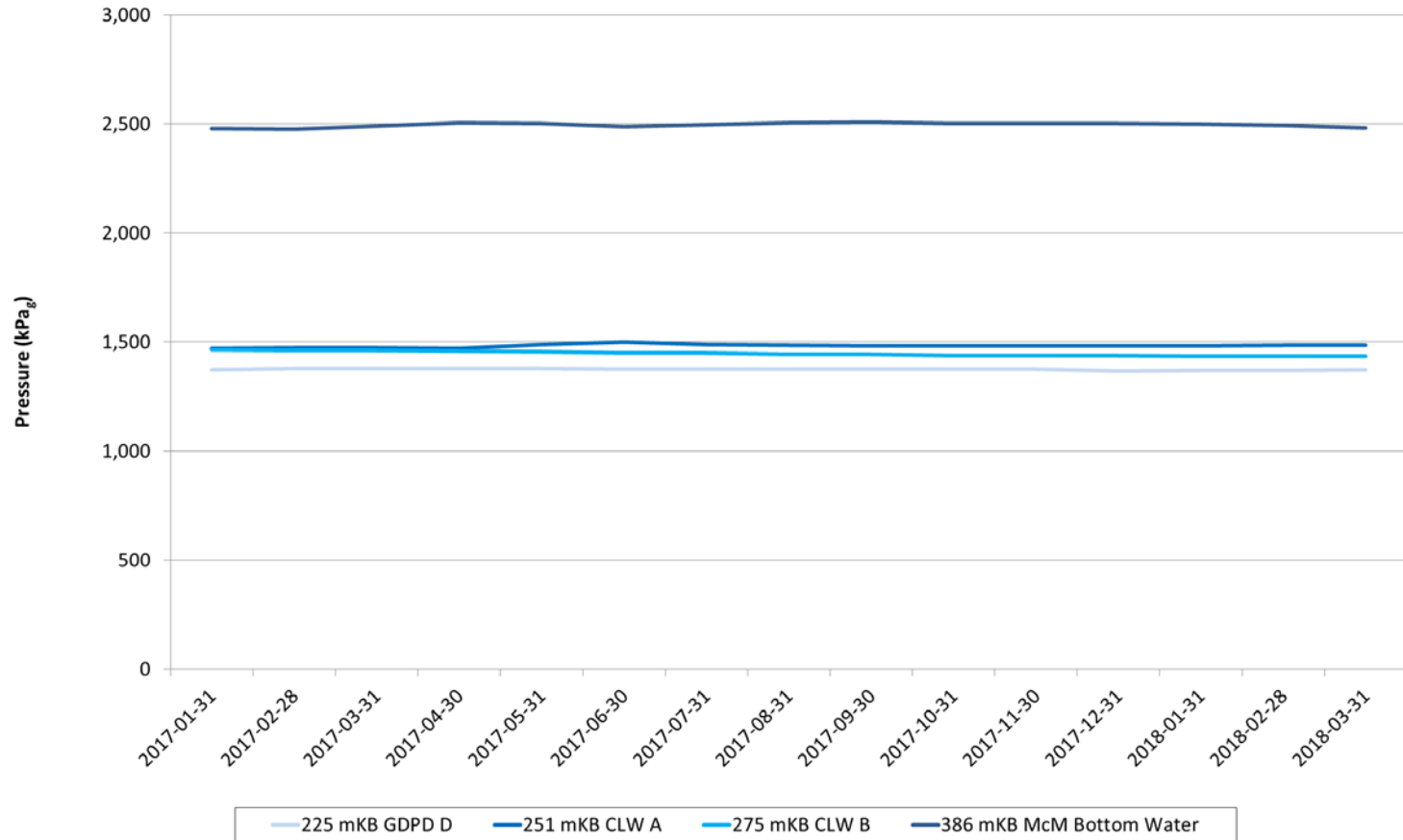
1AB/11-21-076-05W4



100/06-29-076-05W4



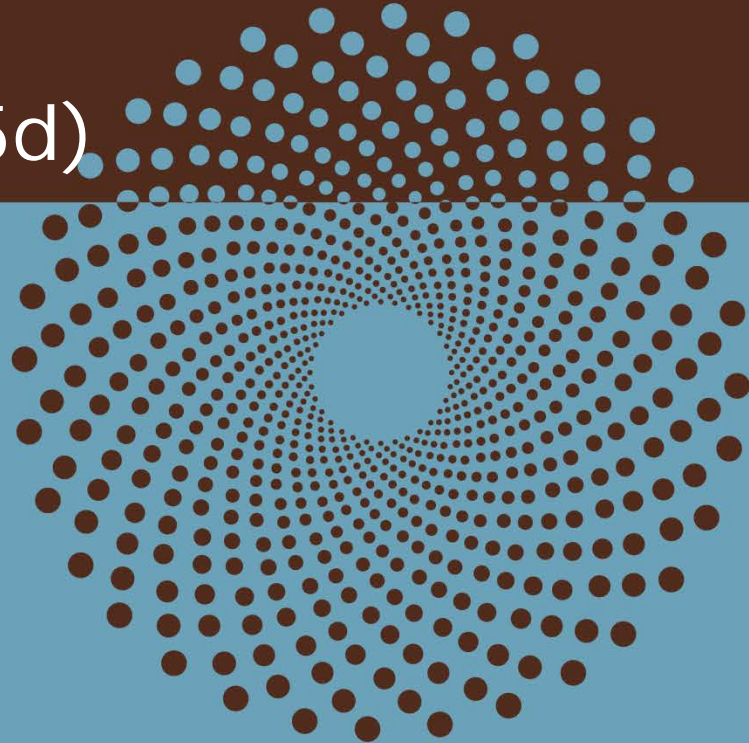
102/16-29-076-05W4



Appendix 3

Subsection 3.1.1 – 5d)

Observation Well Temperature Data

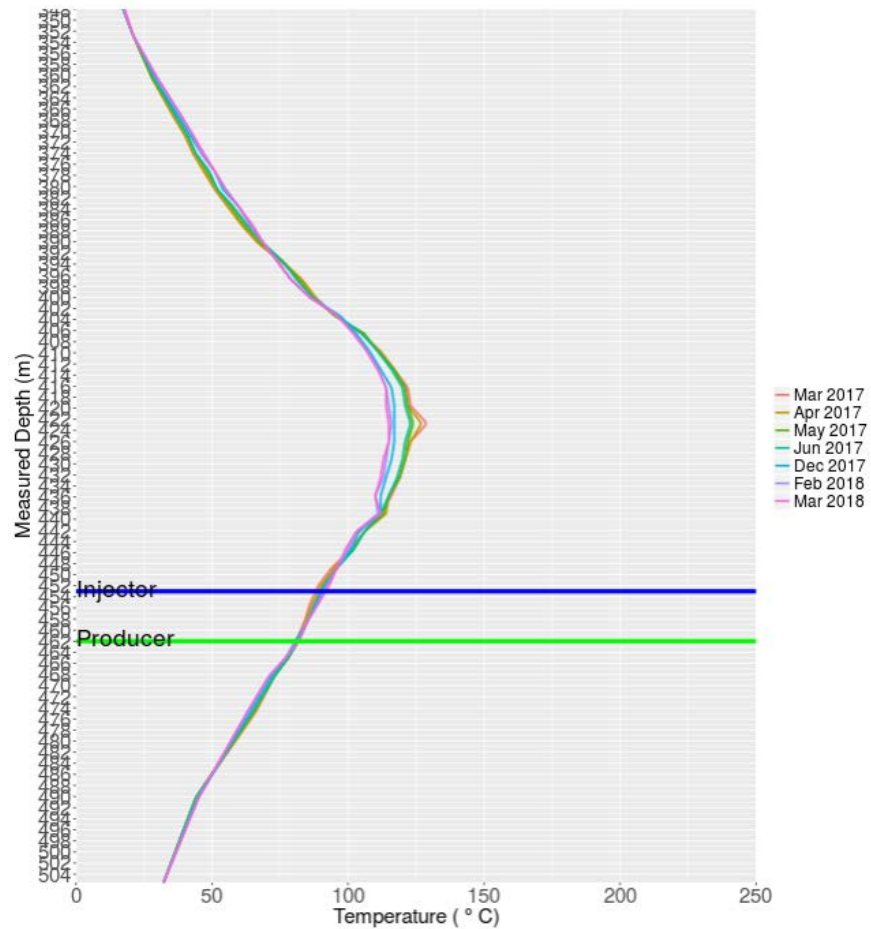


Thermocouple data and display

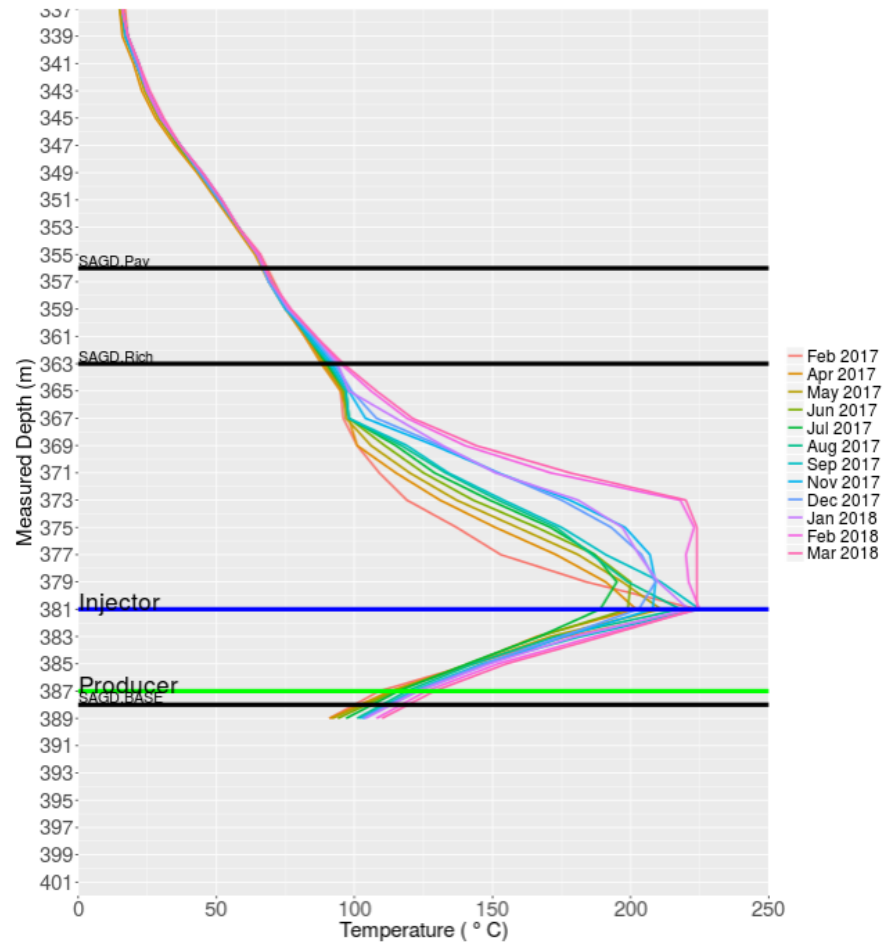
Curves are reporting monthly average temperature readings from Jan 2017 through March 2018. Some months are absent for several reasons:

- TC not yet installed
- TC pulled for servicing
- TC reading incorrectly and data has been culled

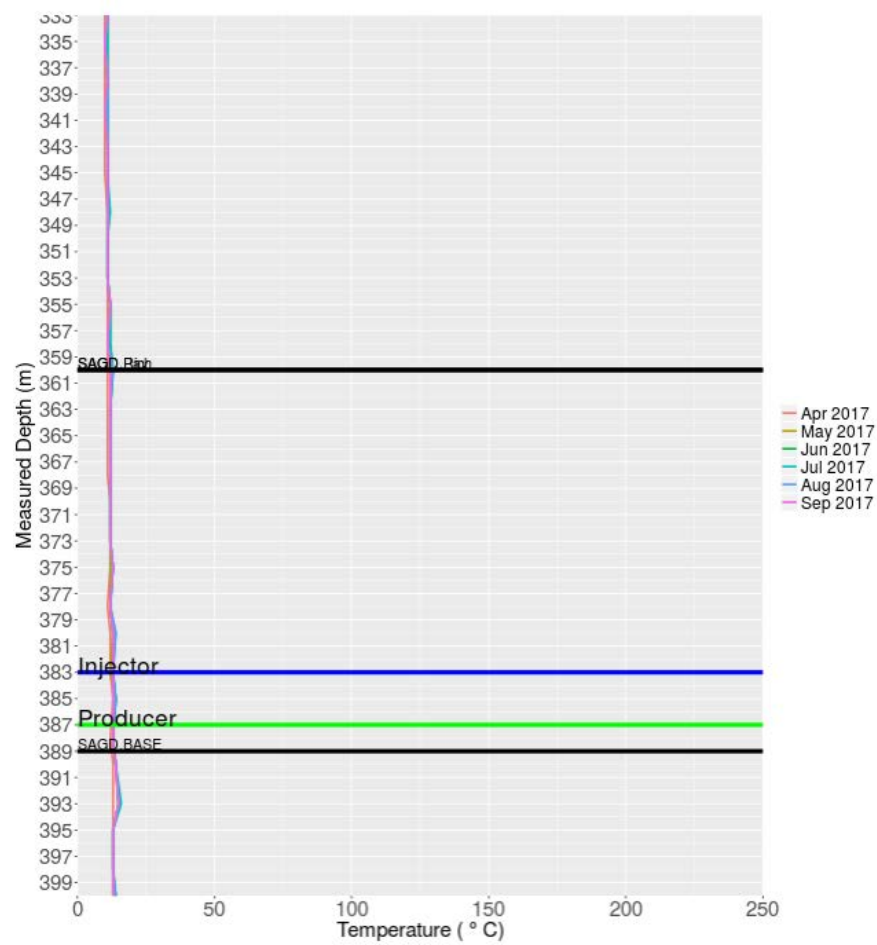
A01: 105061607606W400



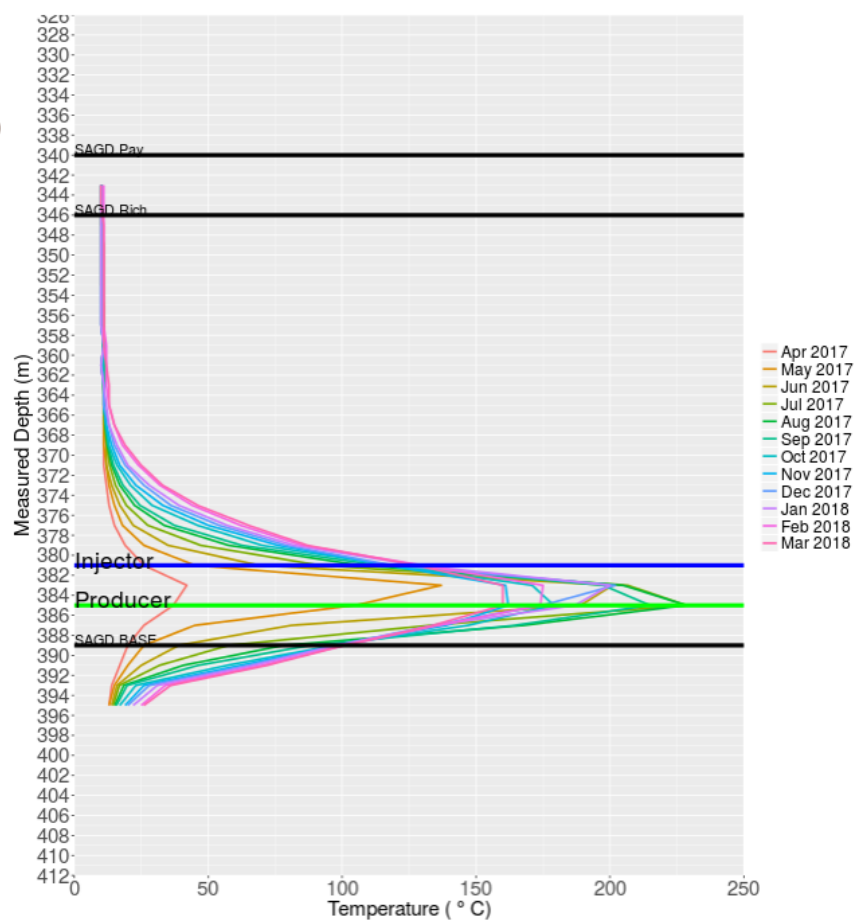
A02: 104031607606W400



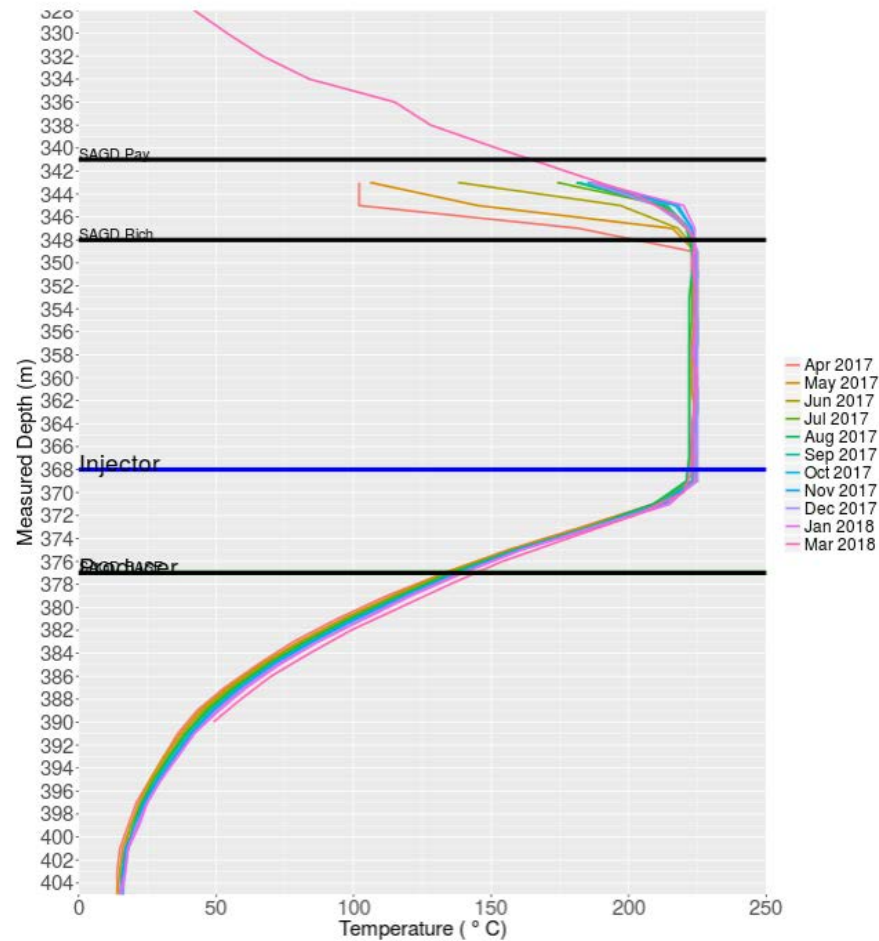
A02: 100021607606W400



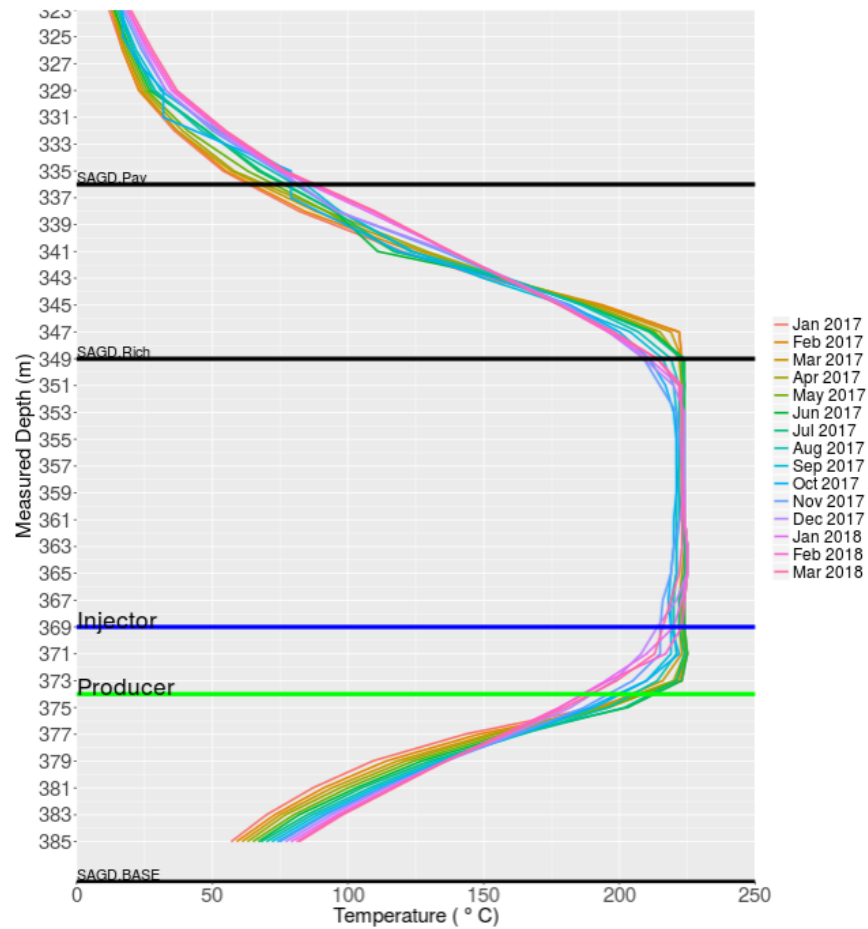
A02: 100011607606W400



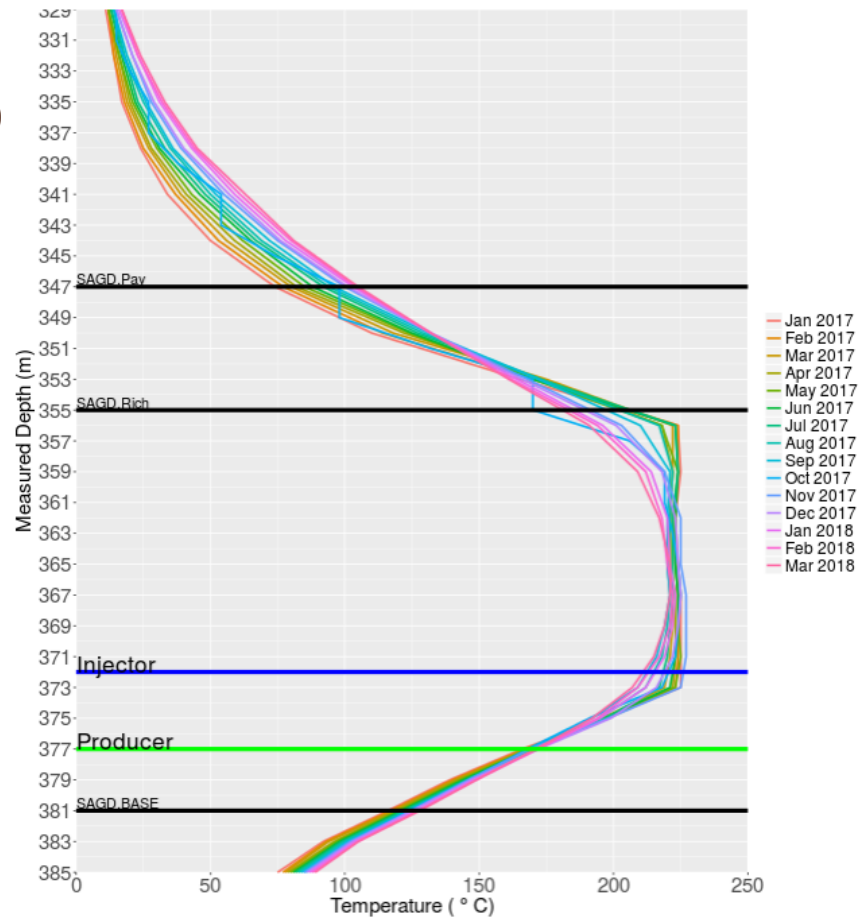
B02C: 100131507606W400



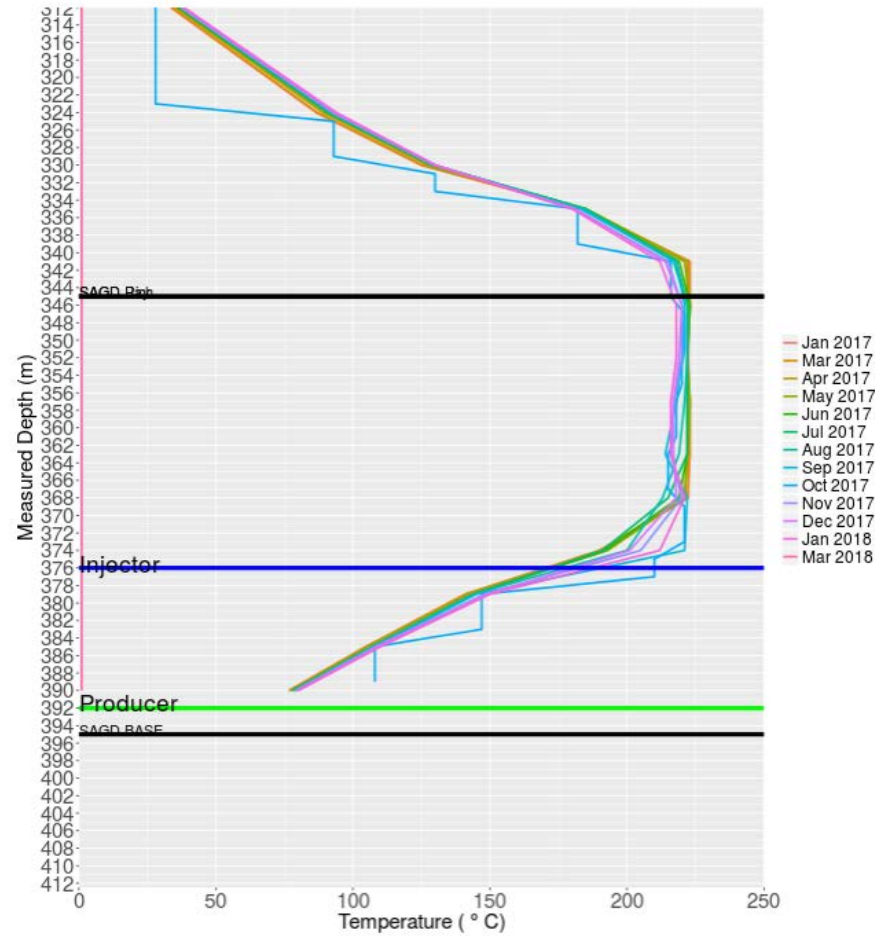
B02C: 100121507606W400



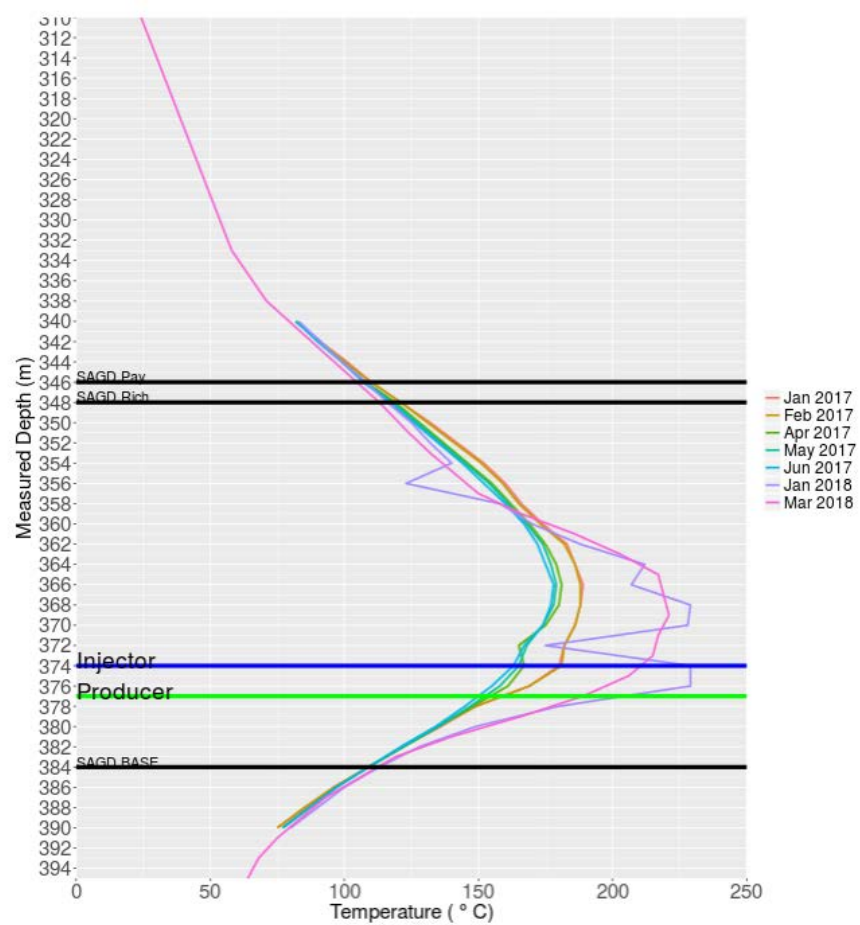
B02C: 110151507606W400



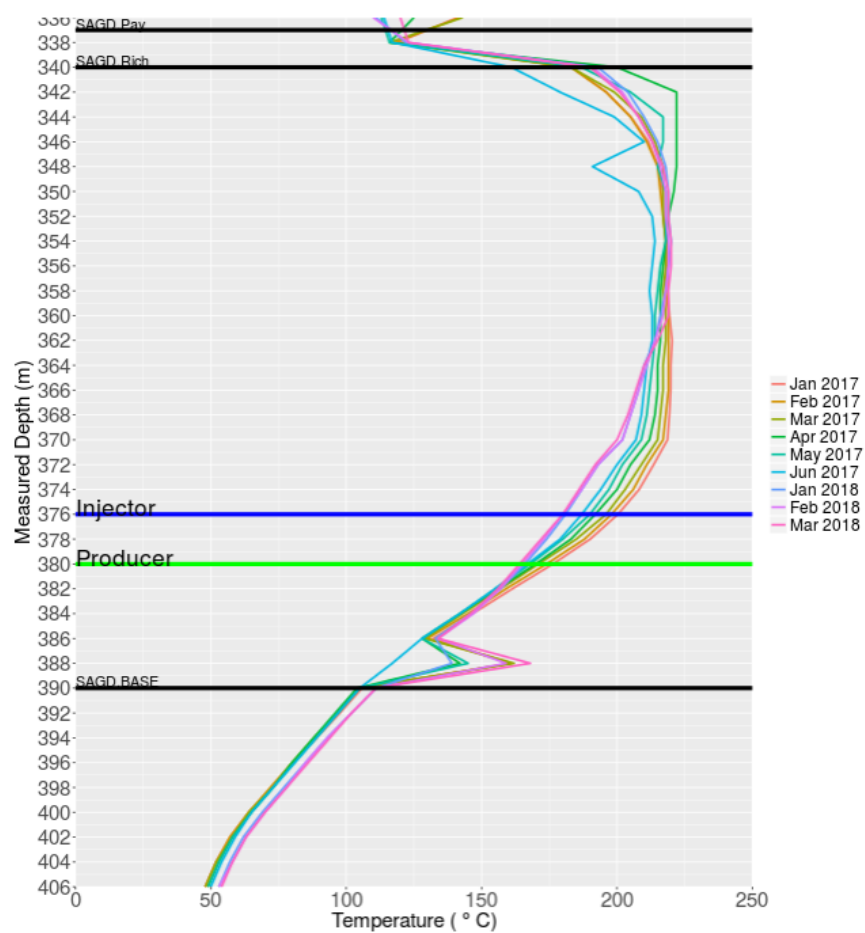
B02: 102121507606W400



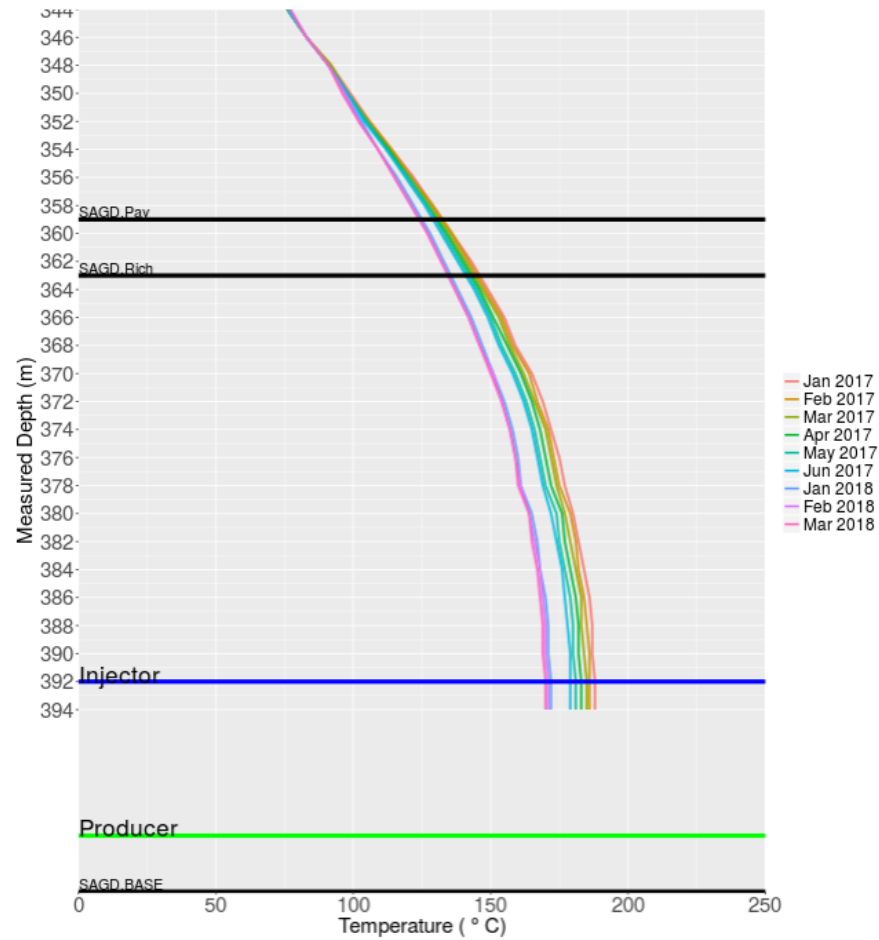
B01: 102061507606W400



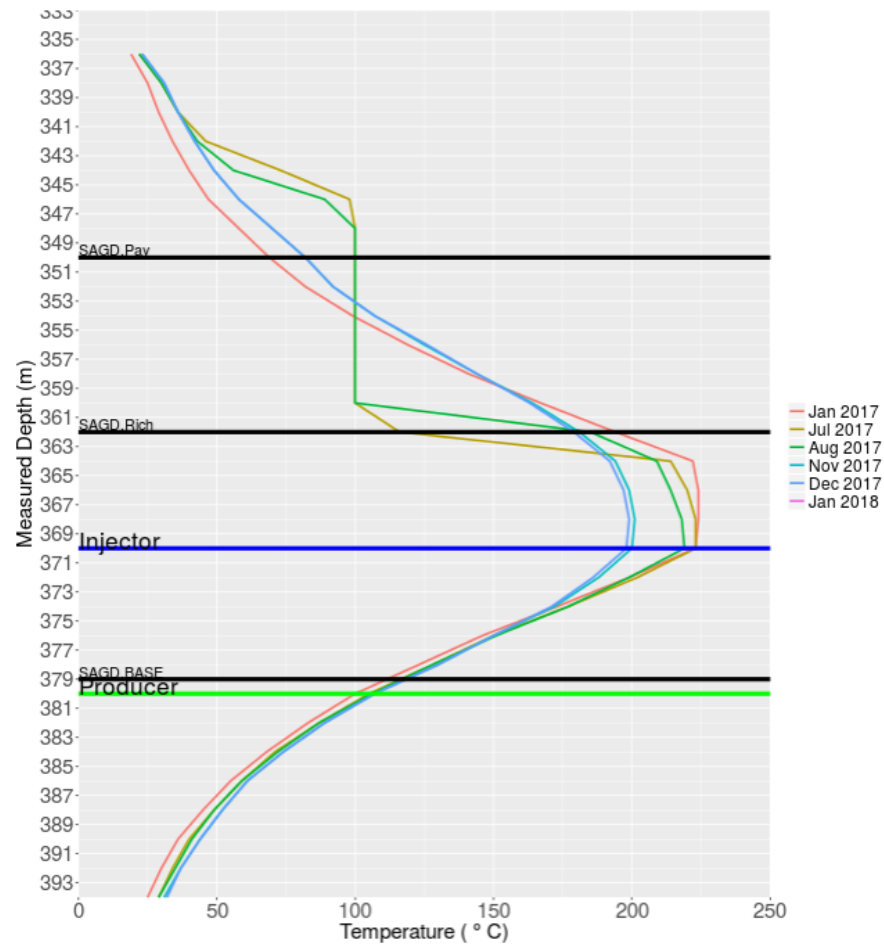
B01: 102051507606W400



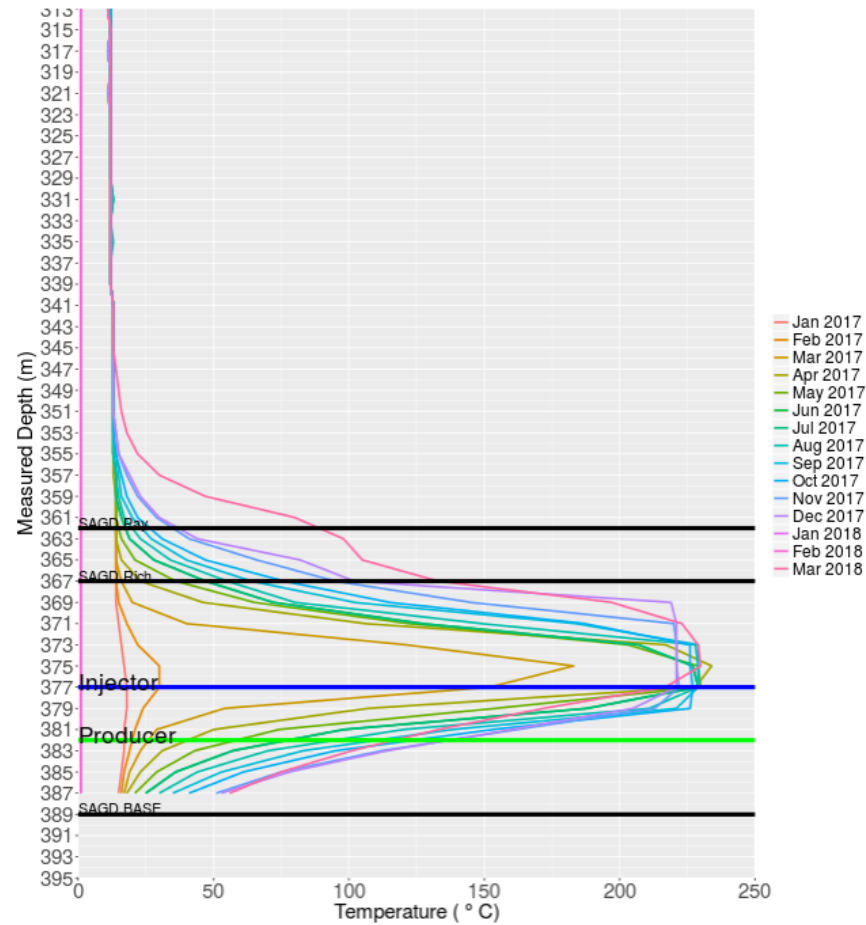
B01: 104061507606W400



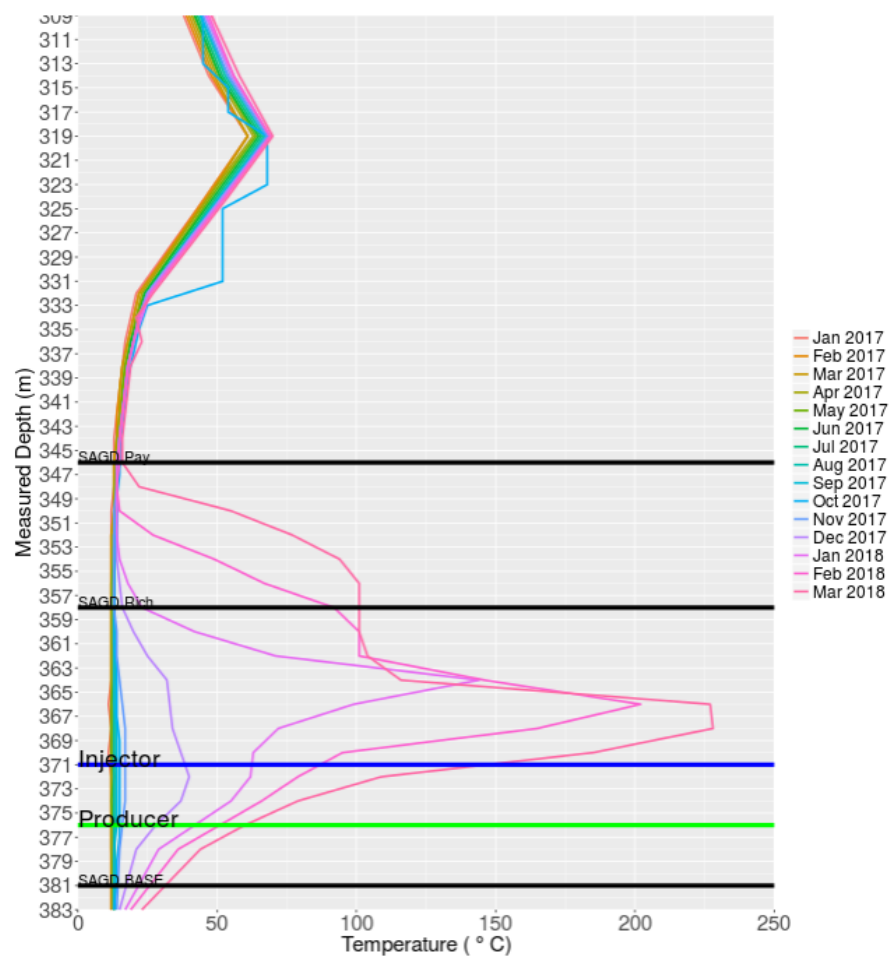
B01: 102041507606W400



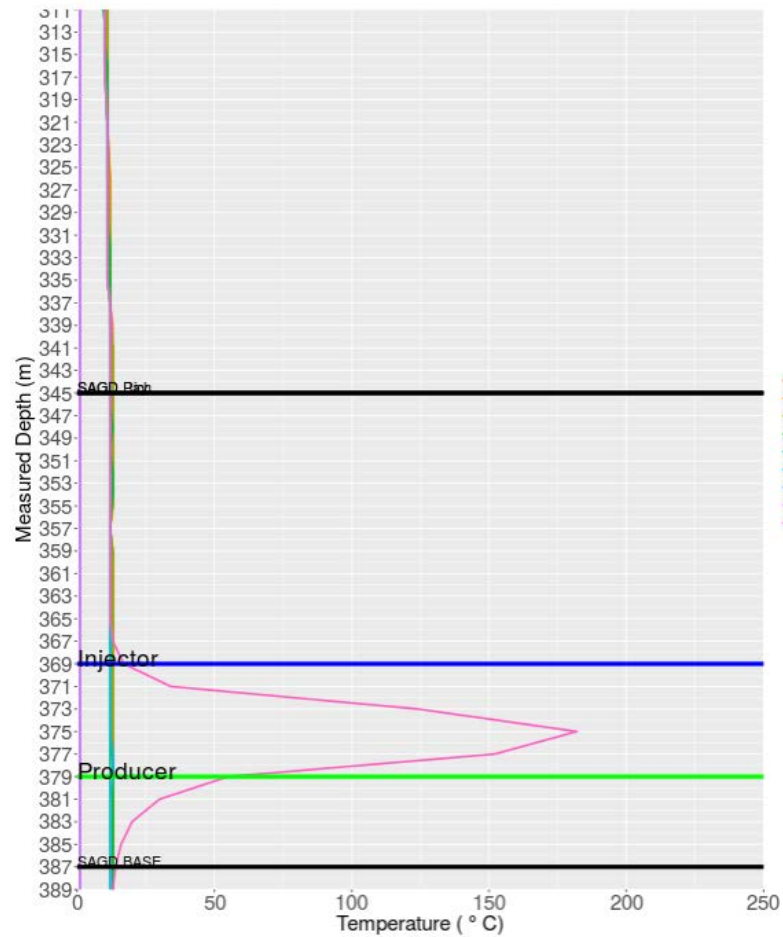
H01: 100141007606W400



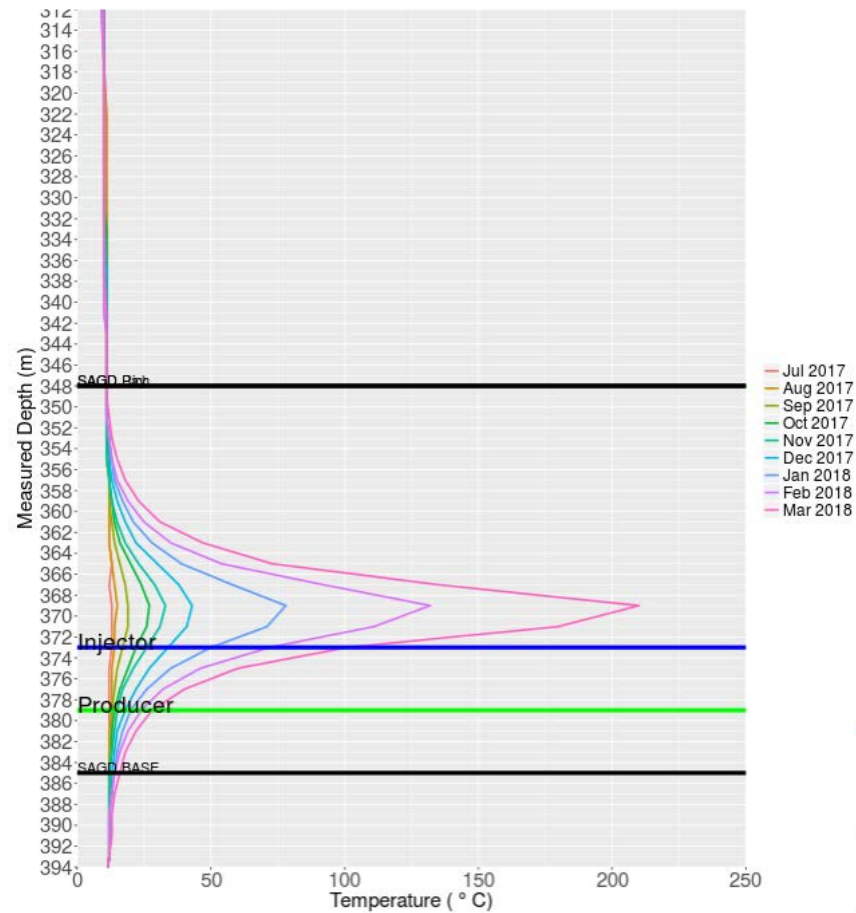
L03: 100091507606W400



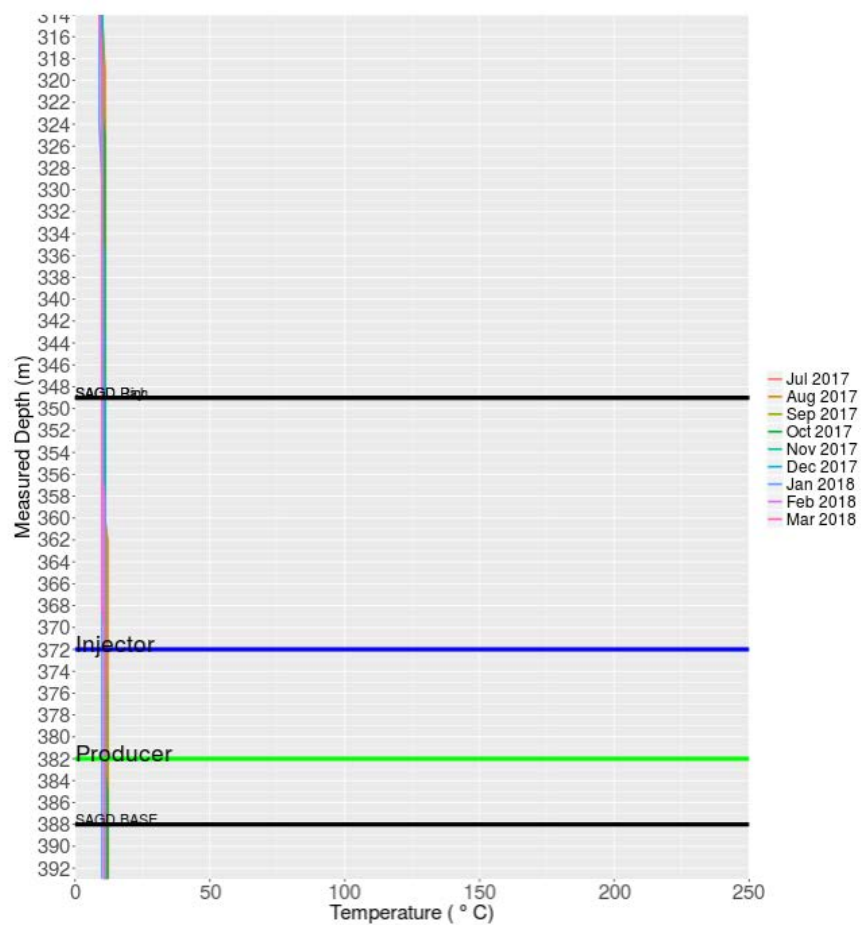
L03: 100081507606W400



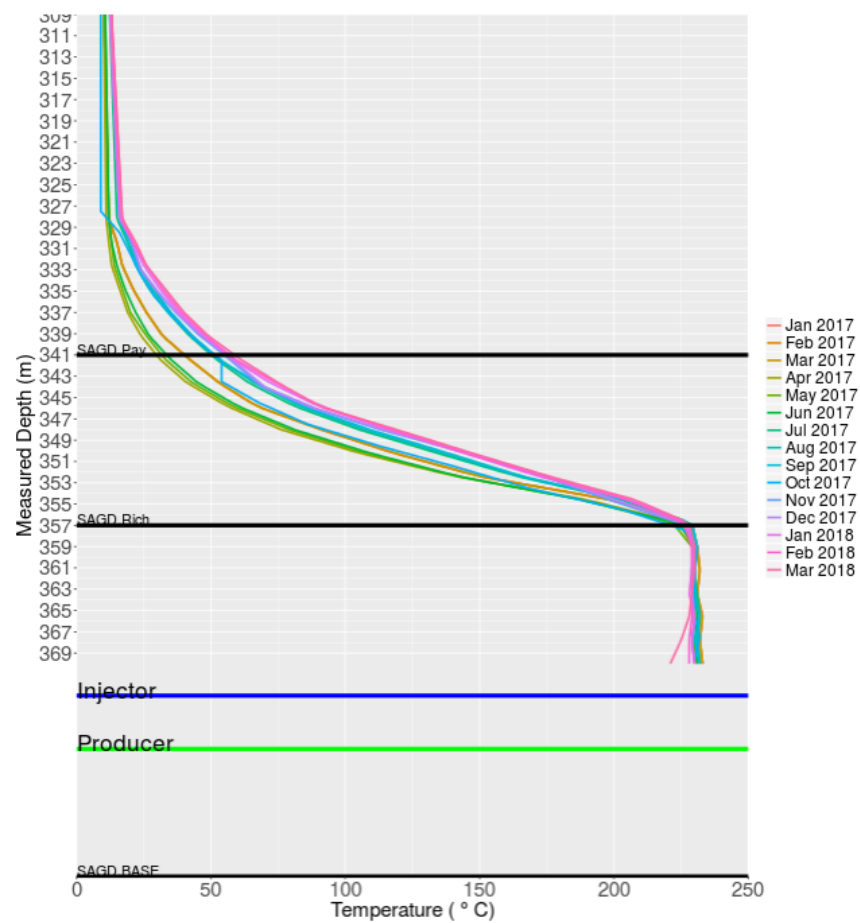
L03: 111021507606W400



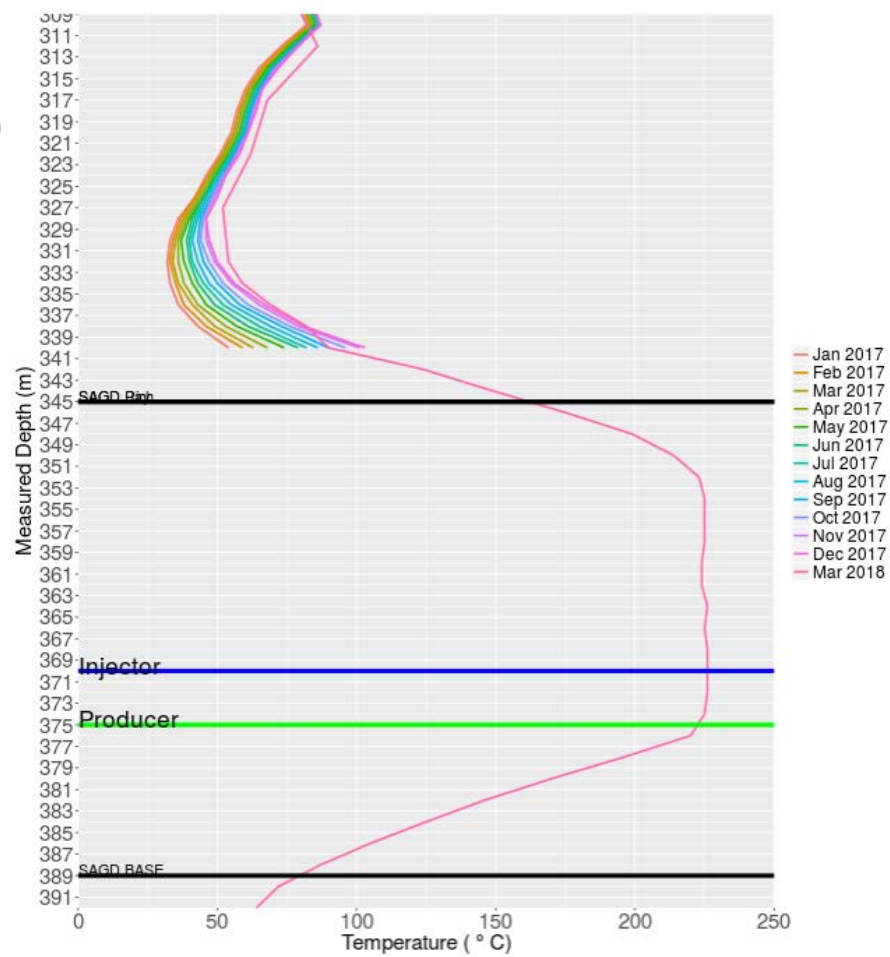
L03: 112021507606W400



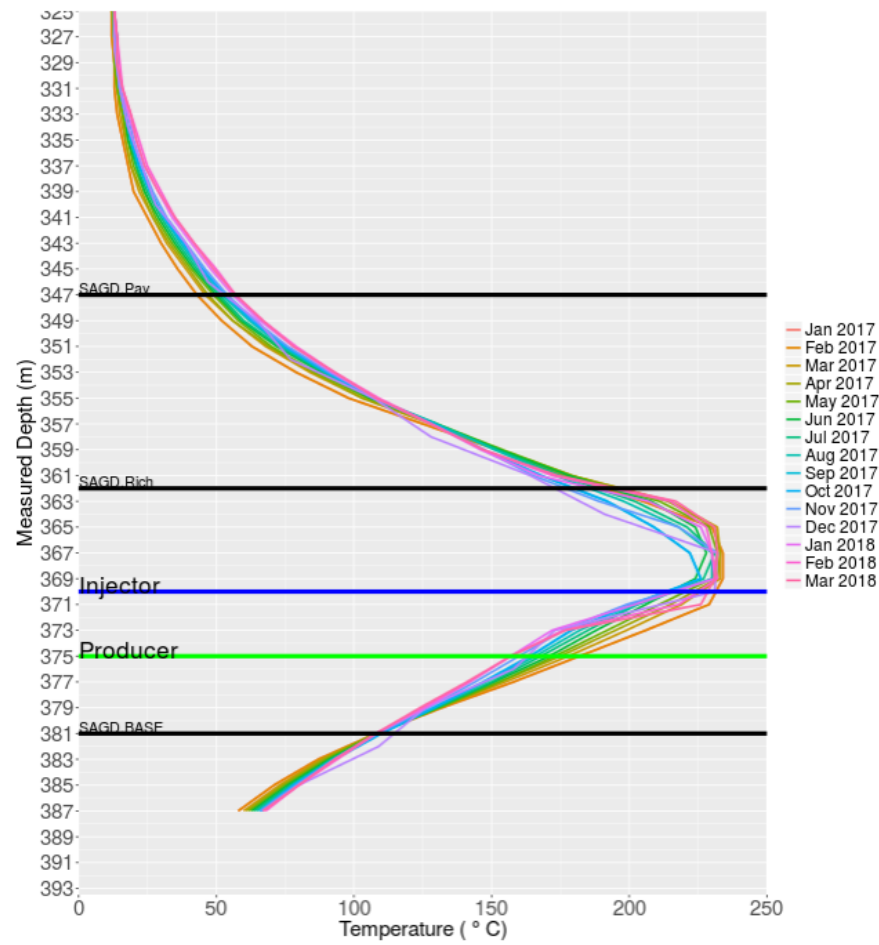
B11: 102111407606W400



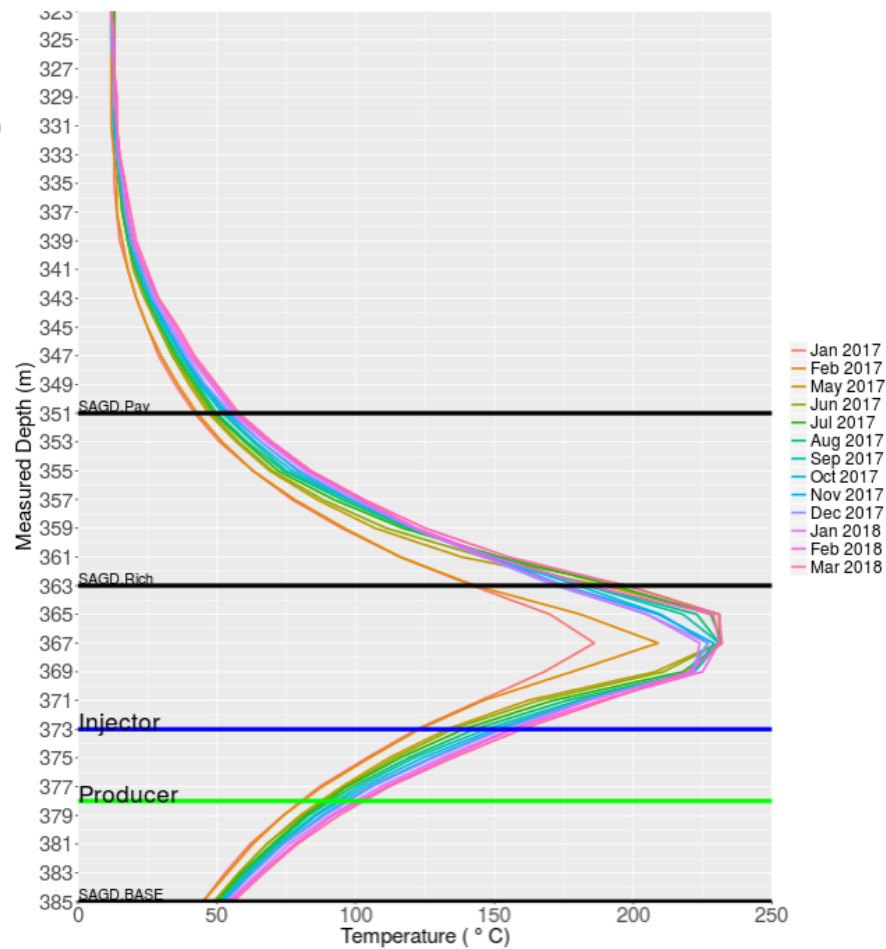
B11: 103051407606W400



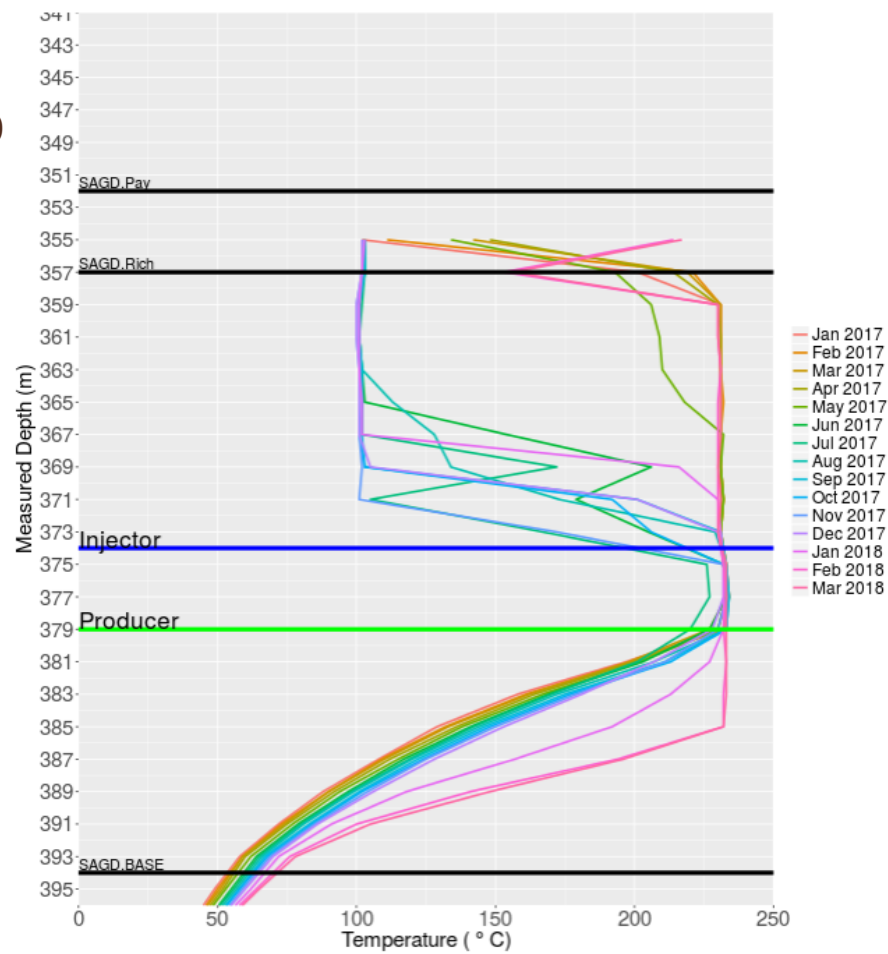
B08: 100011507606W400



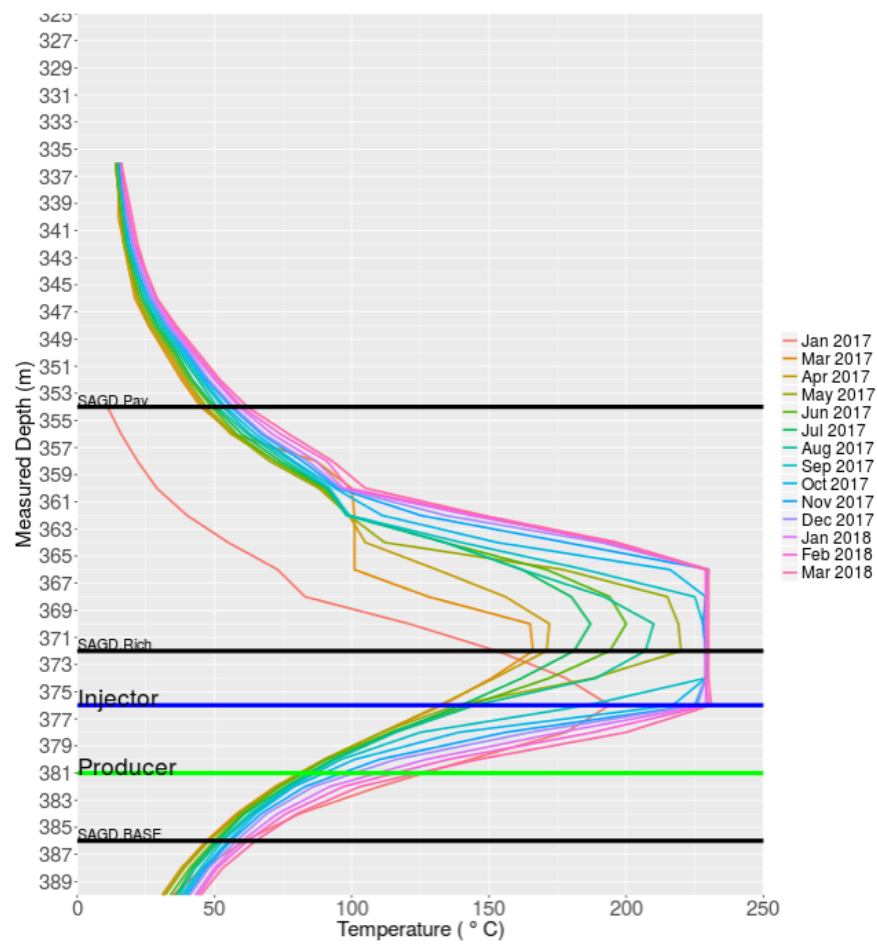
B08: 102011507606W400



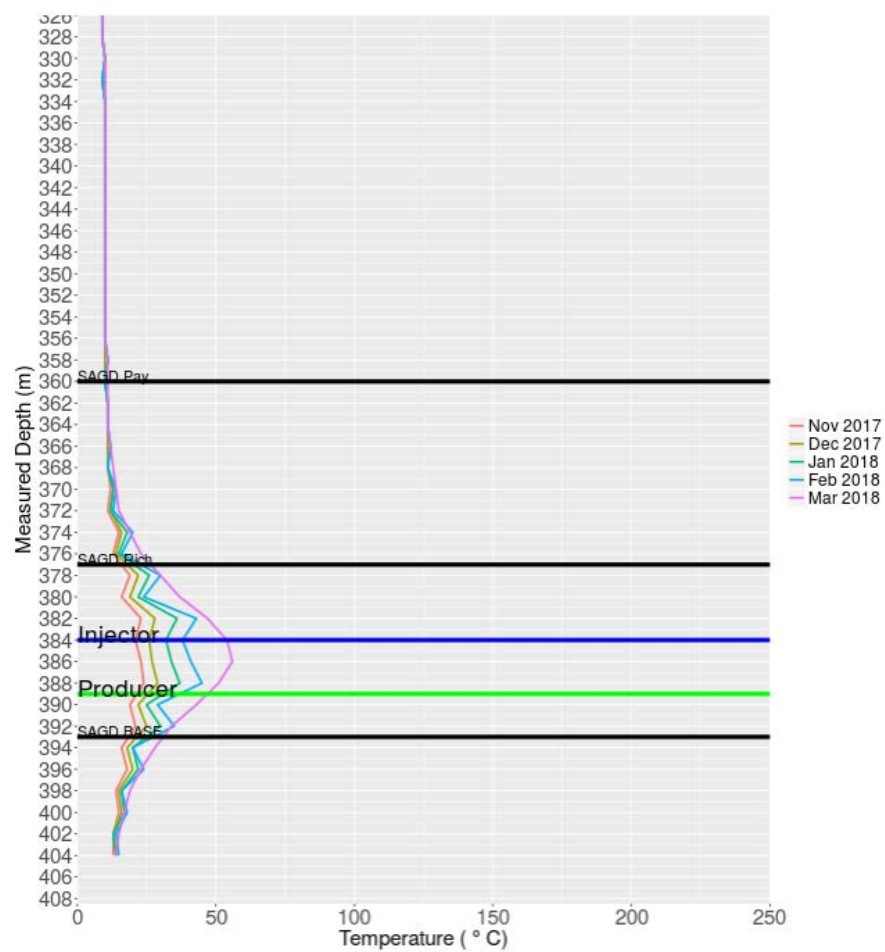
B08: 100131107606W400



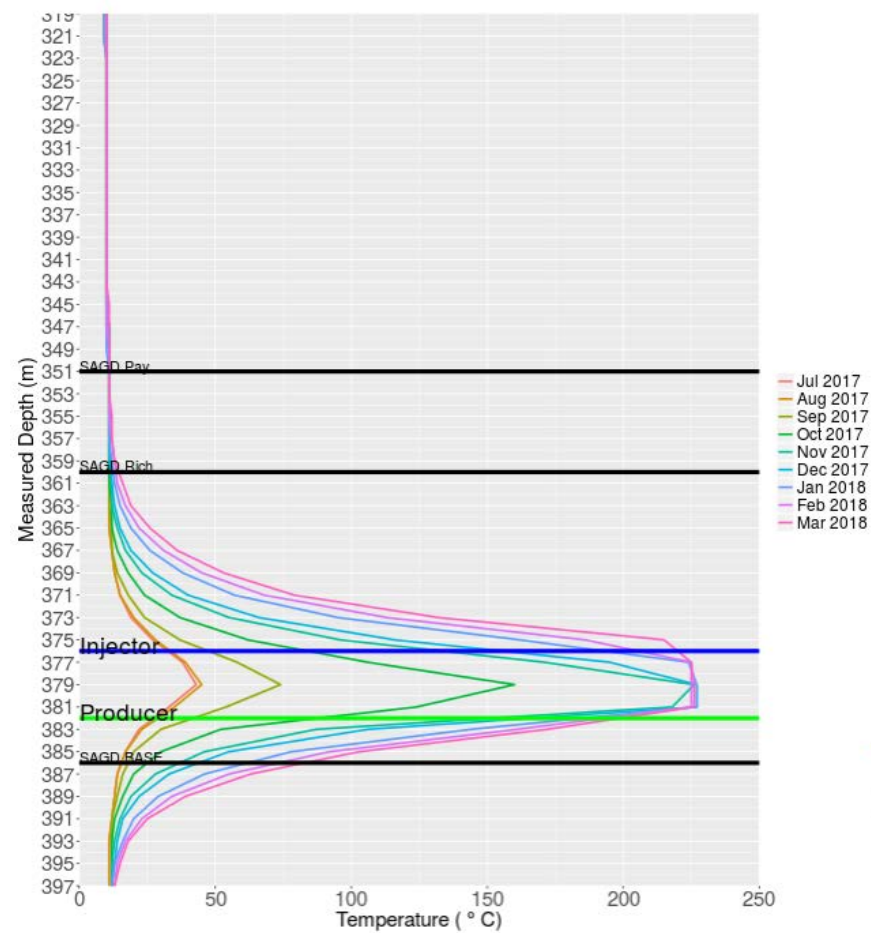
B08: 108121107606W400



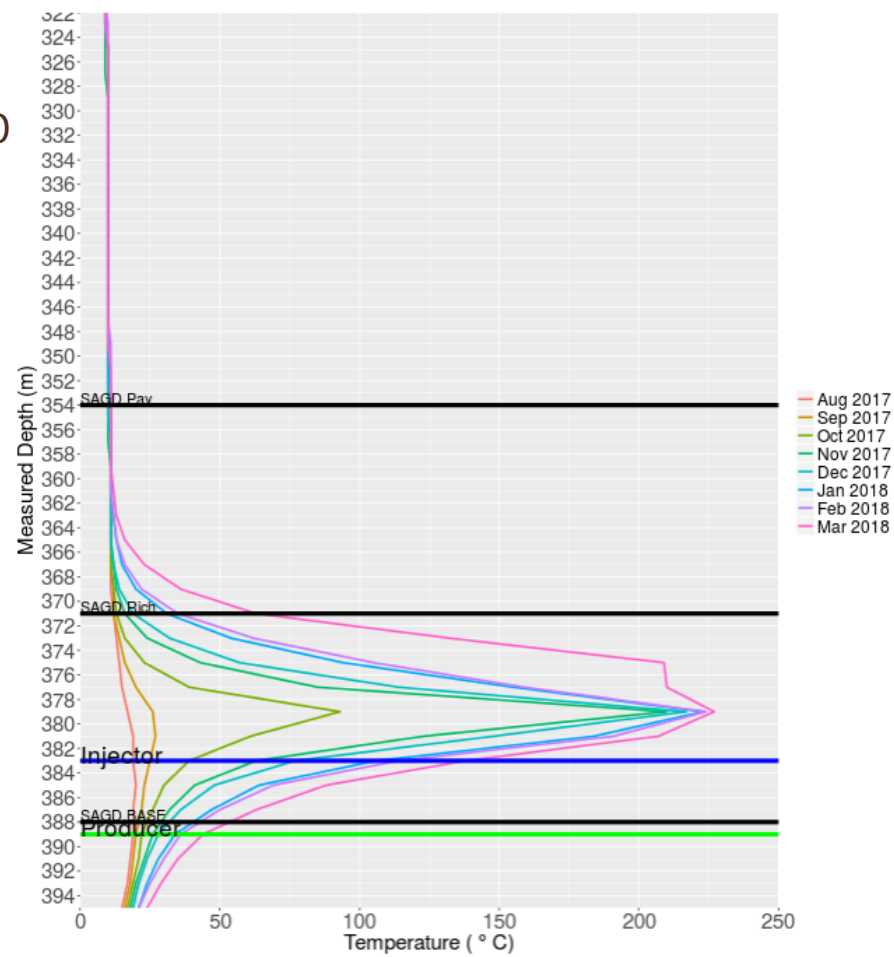
H03: 102081007606W400



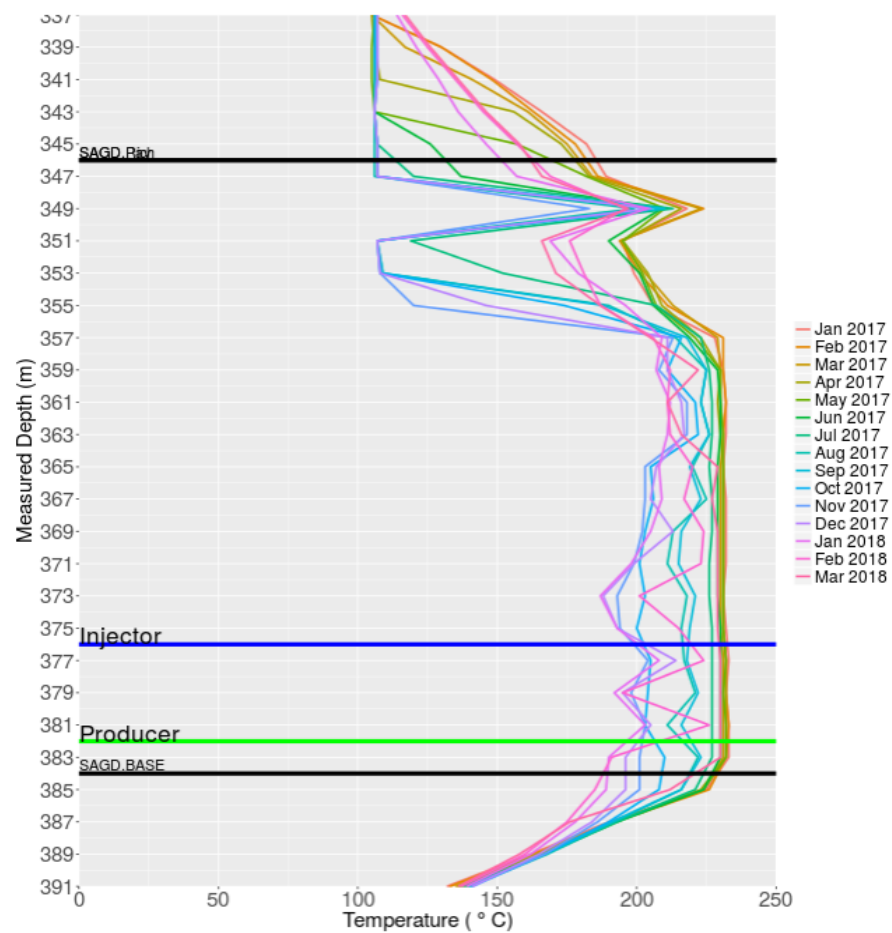
H03: 105091007606W400



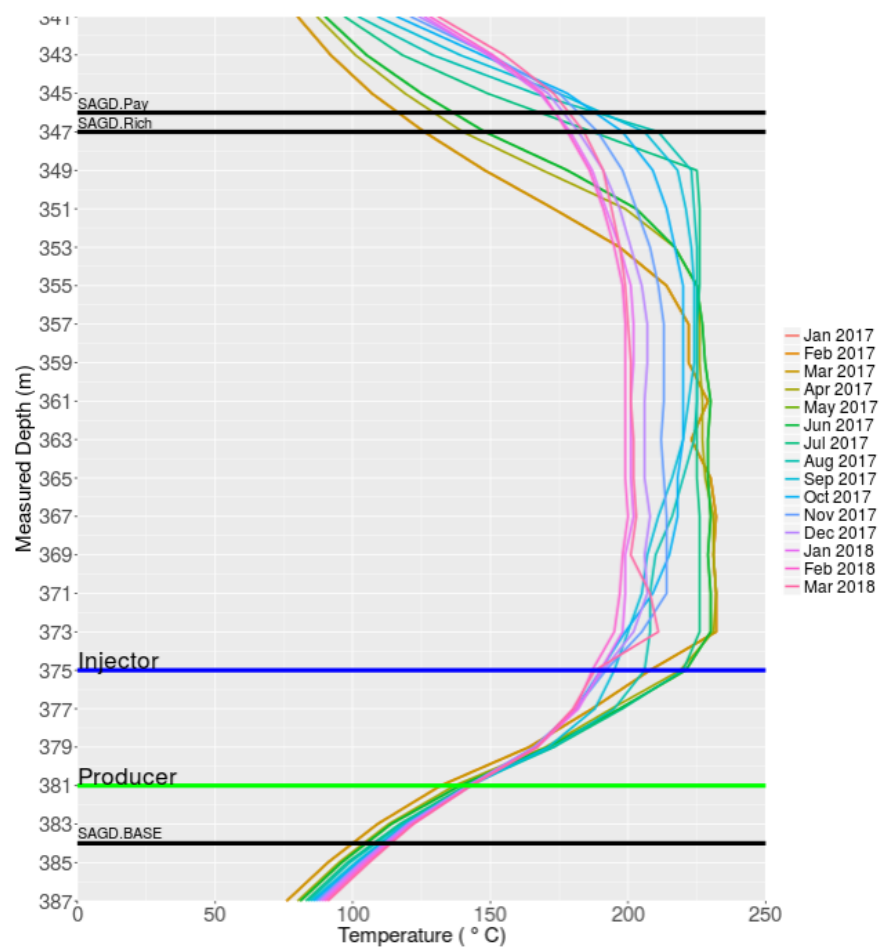
H03: 100071007606W400



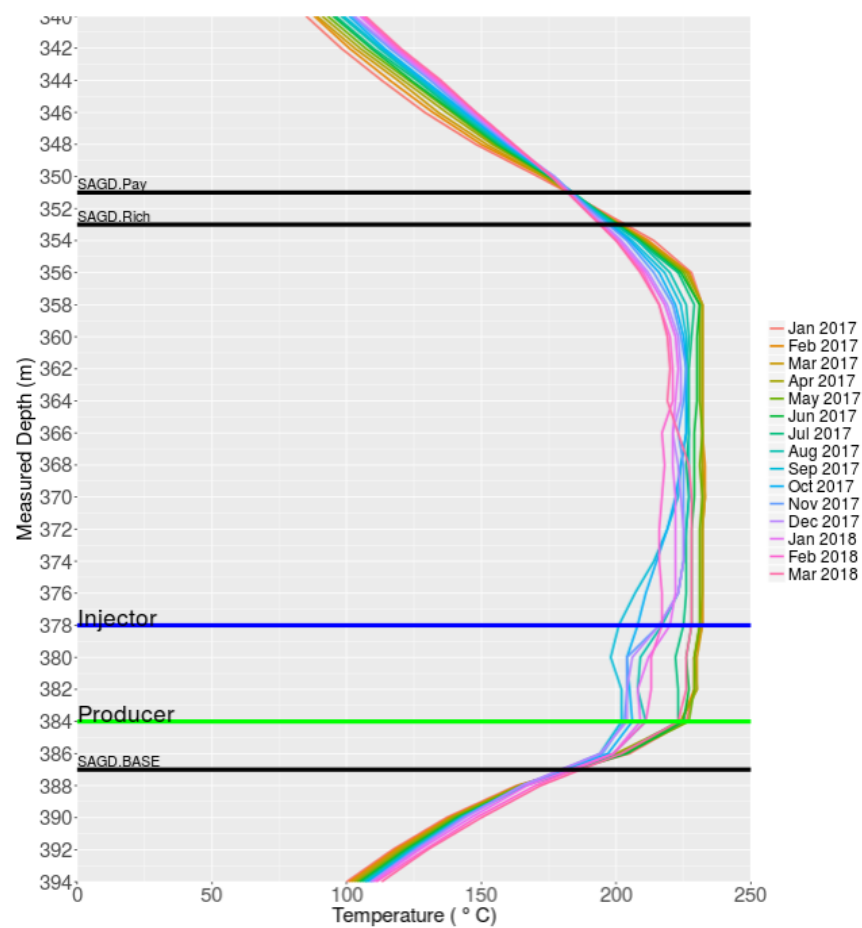
B04: 102071407606W400



B04: 100011407606W400

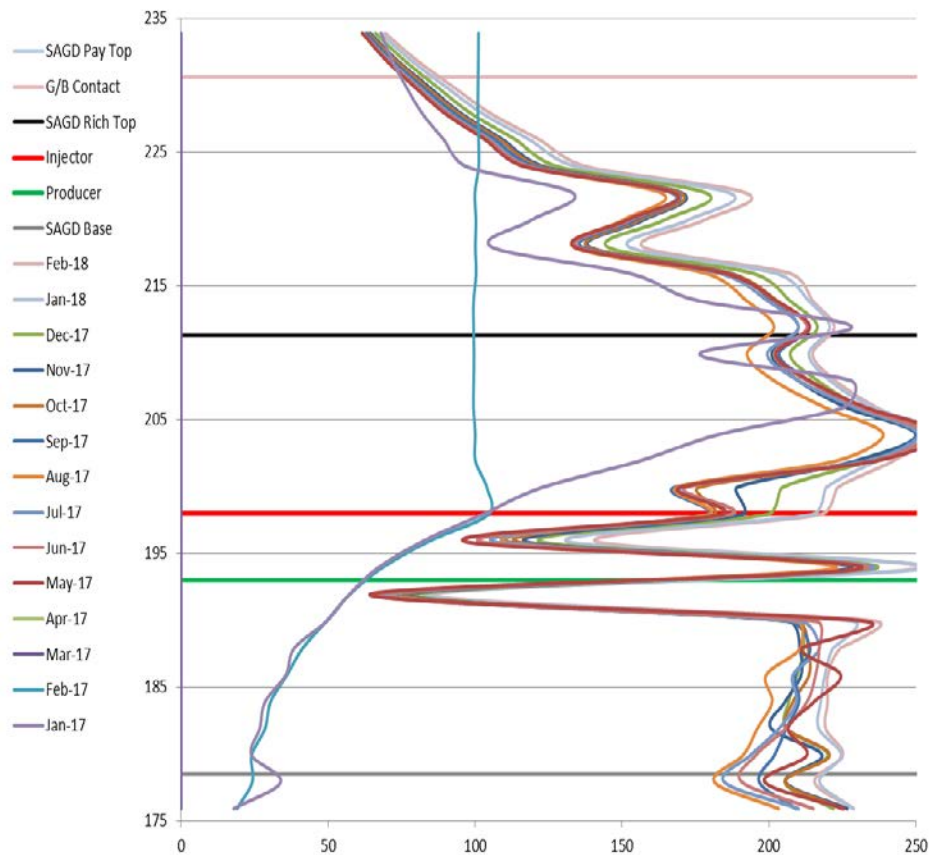


B04: 100021407606W400

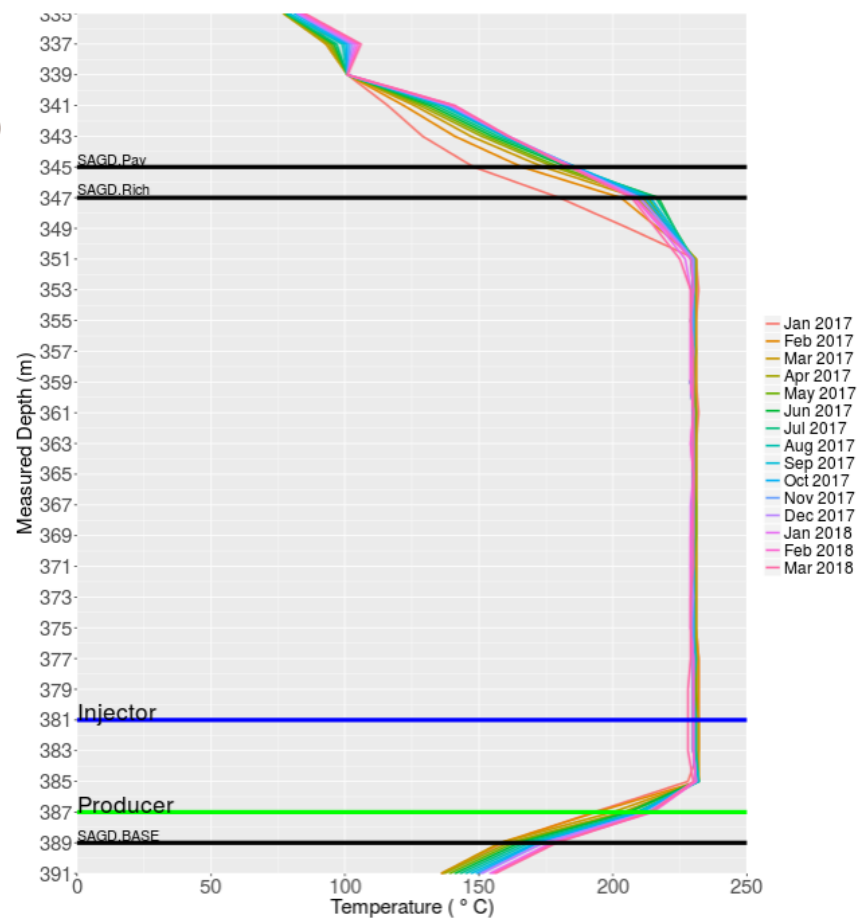


B05: 102141107606W400

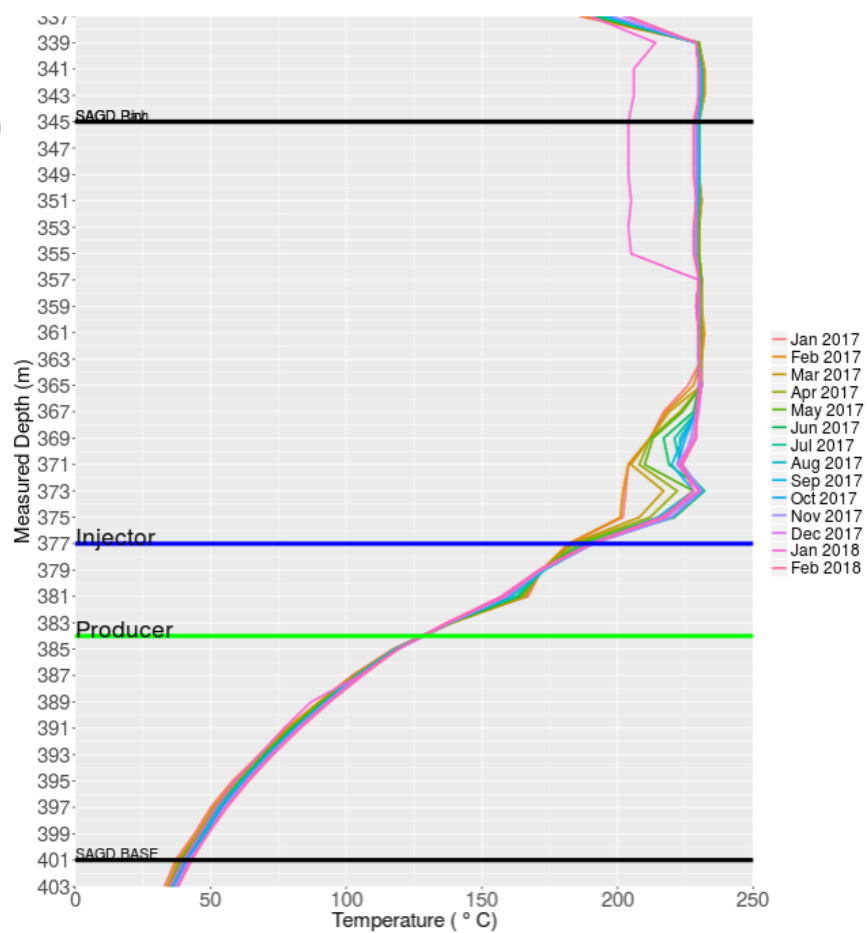
B05-8 Heel 102/14-11-076-06W4/0



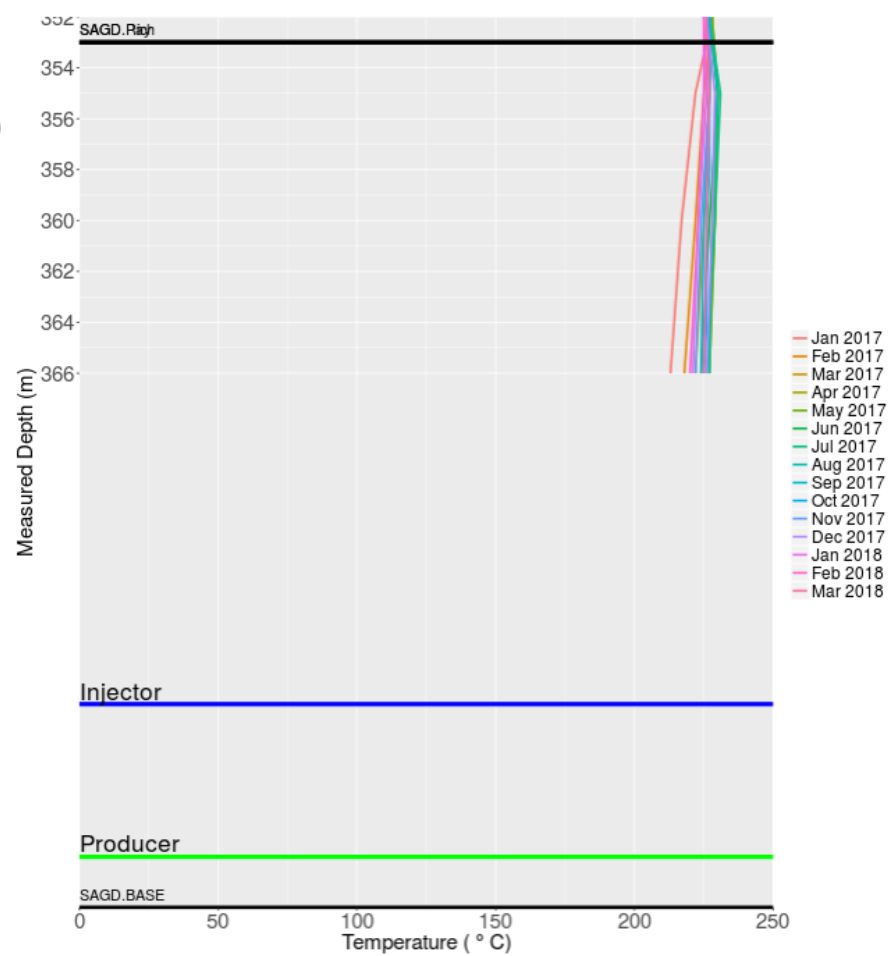
B05: 100111107606W400



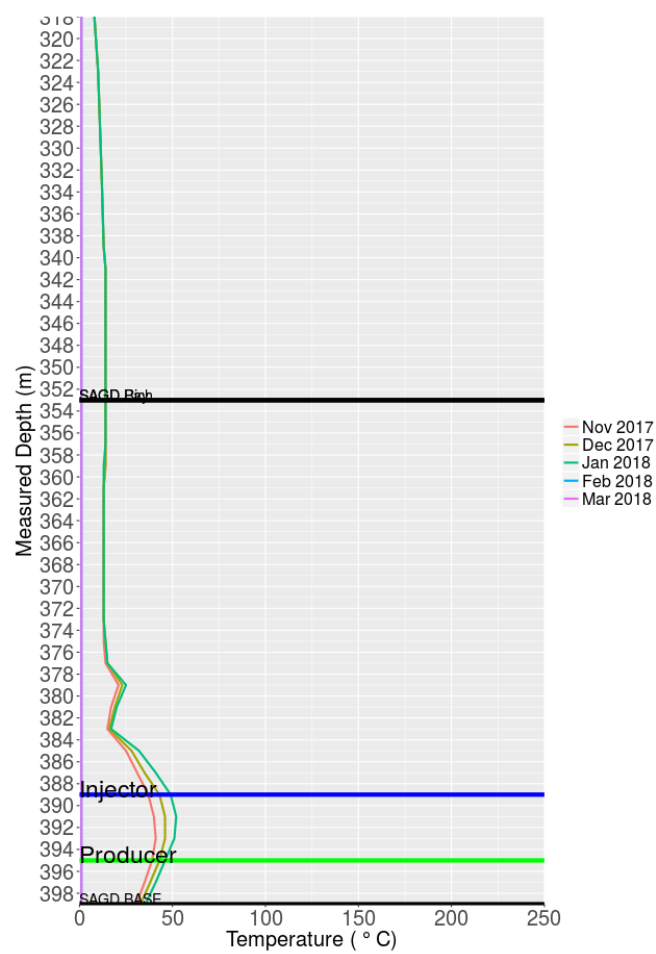
B05: 102151107606W400



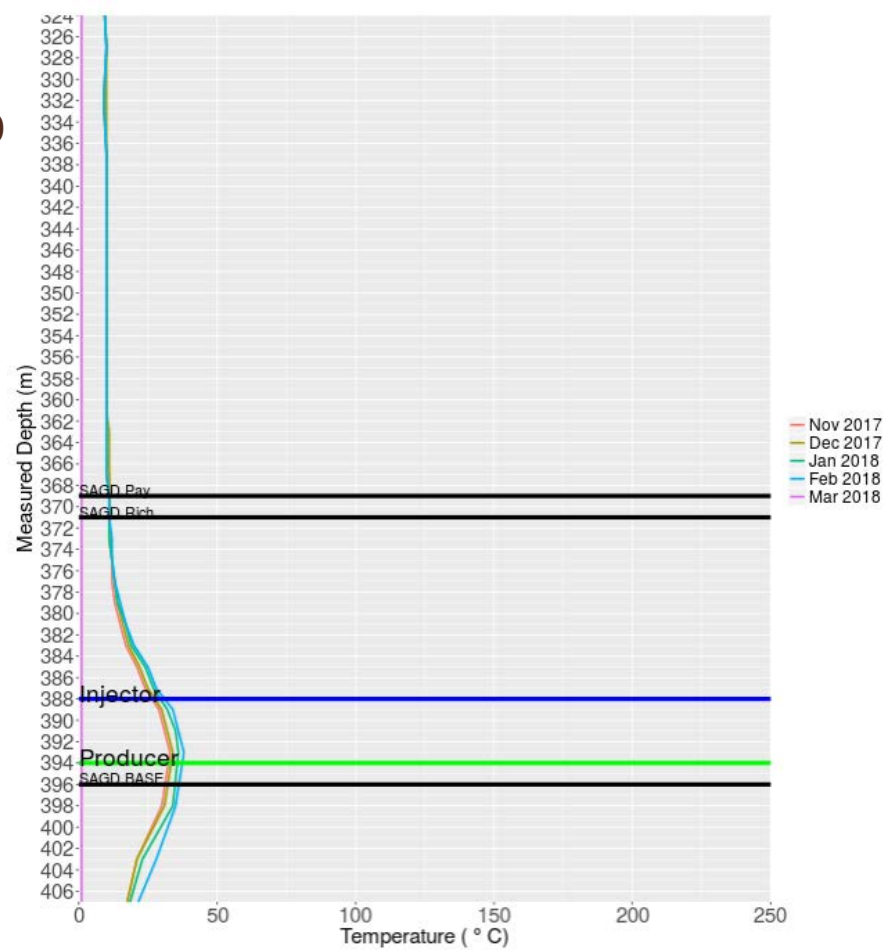
B05: 100151107606W400



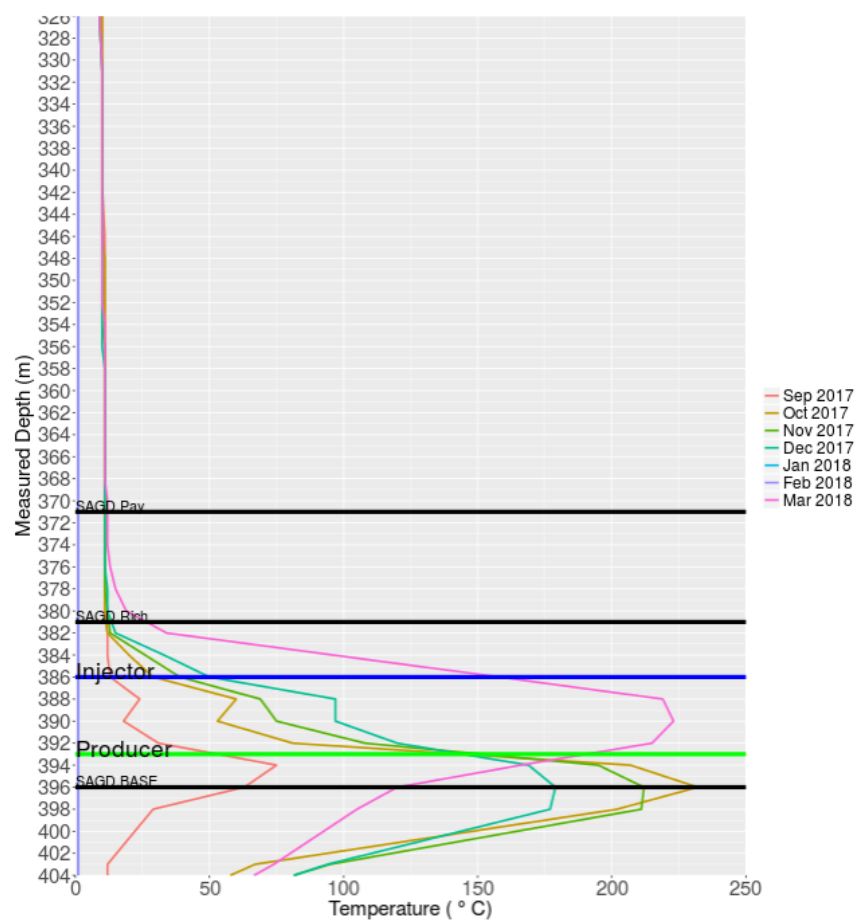
J03: 100121107606W400



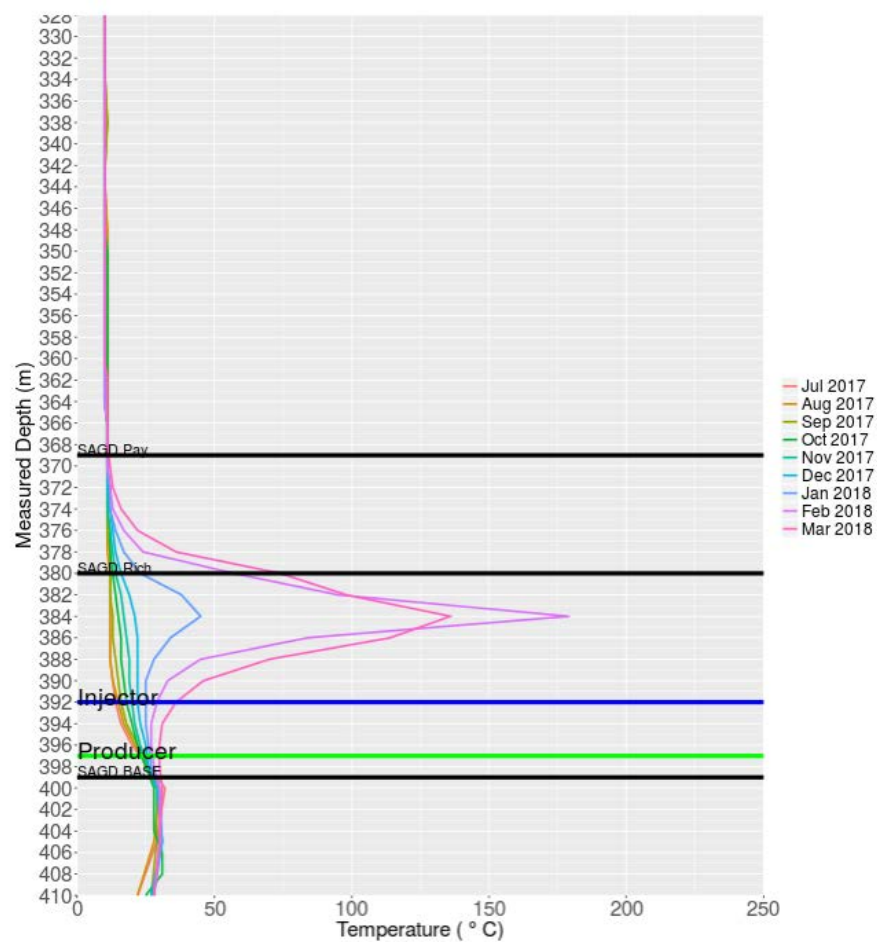
J03: 100081007606W400



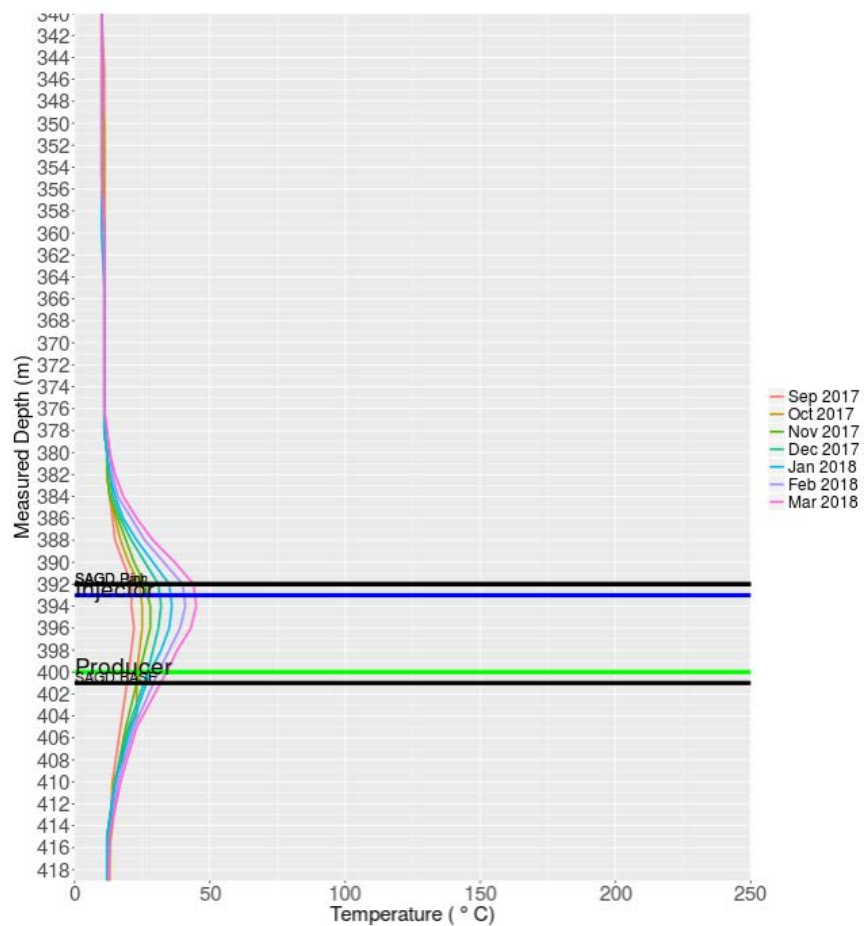
J01: 1AB130207606W400



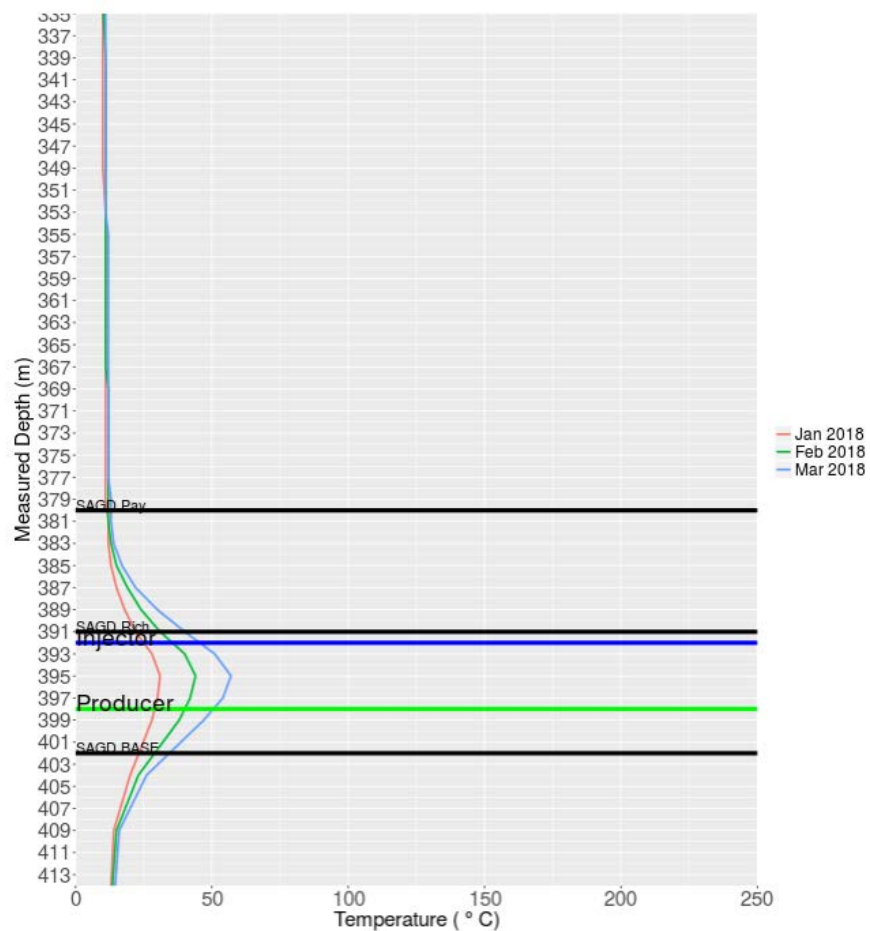
J01: 1AB011007606W400



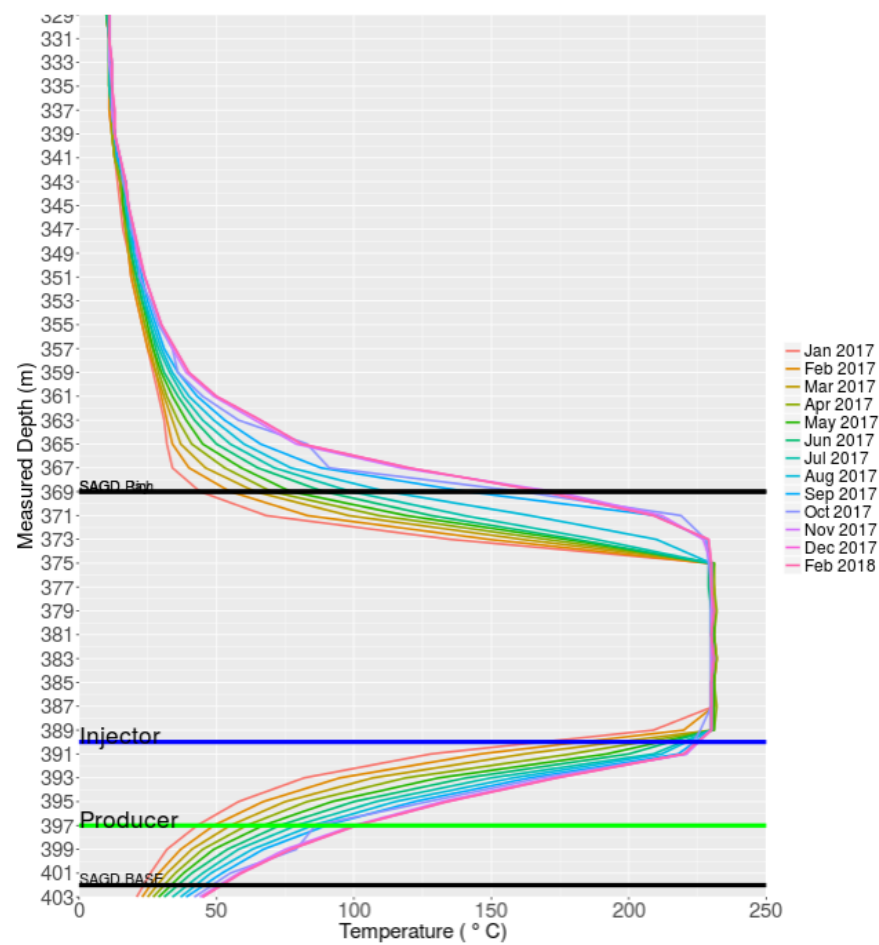
J01: 1AB090307606W400



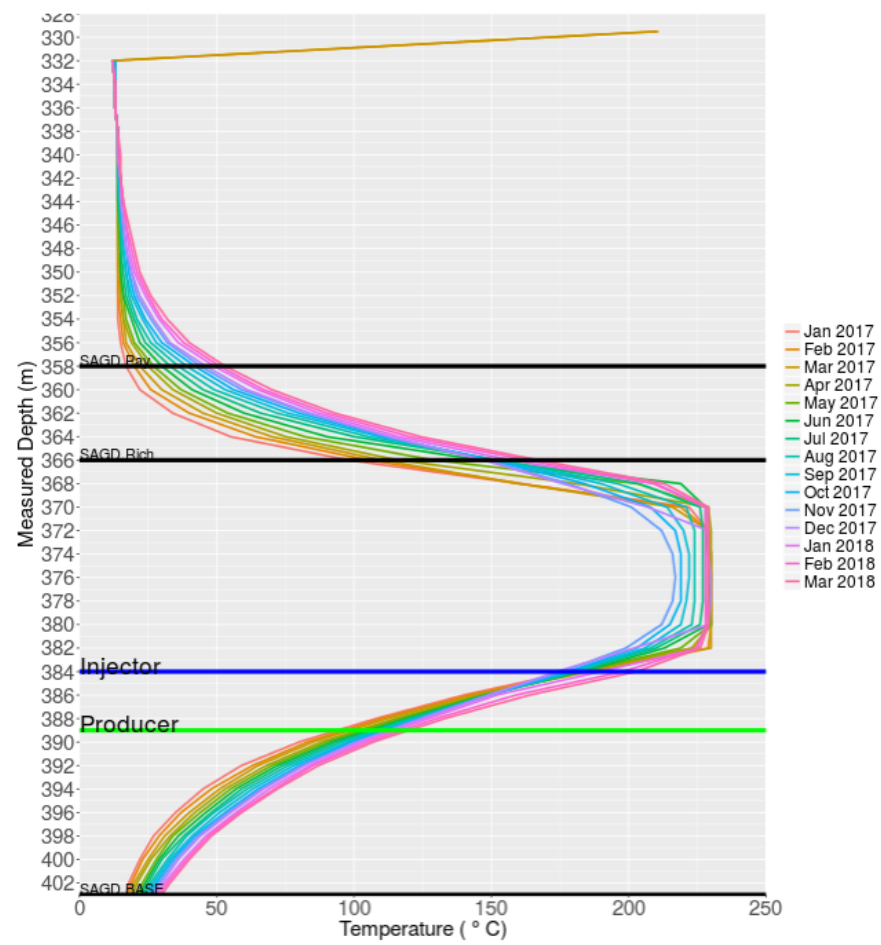
J01: 100120207606W400



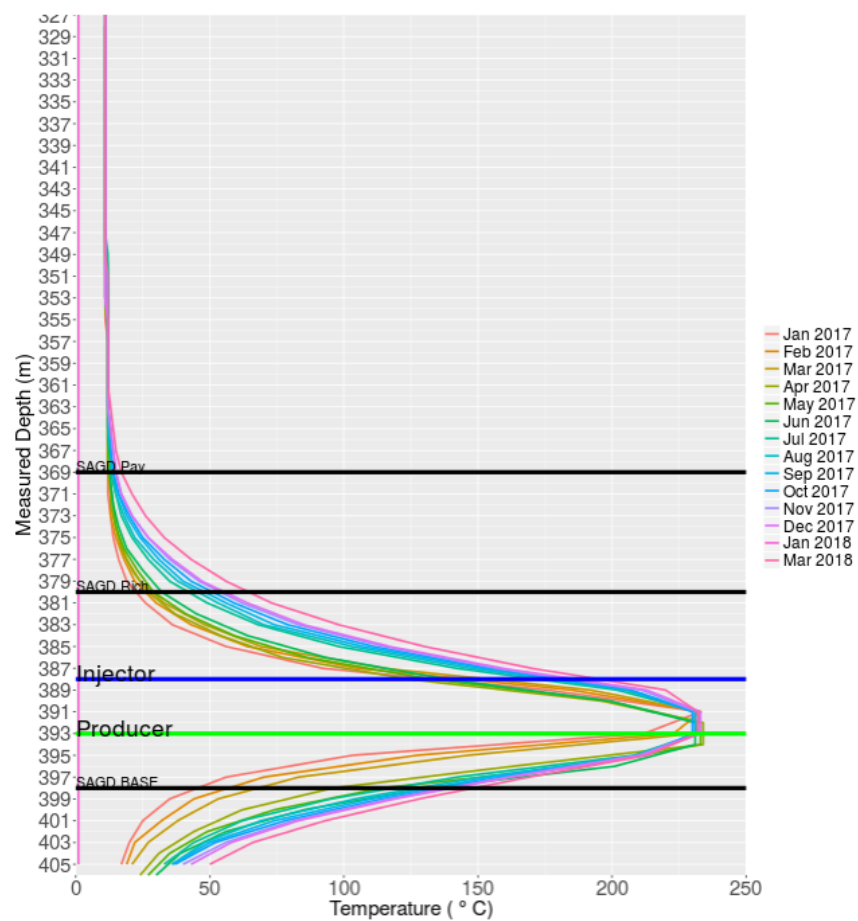
B07b: 102081107606W400



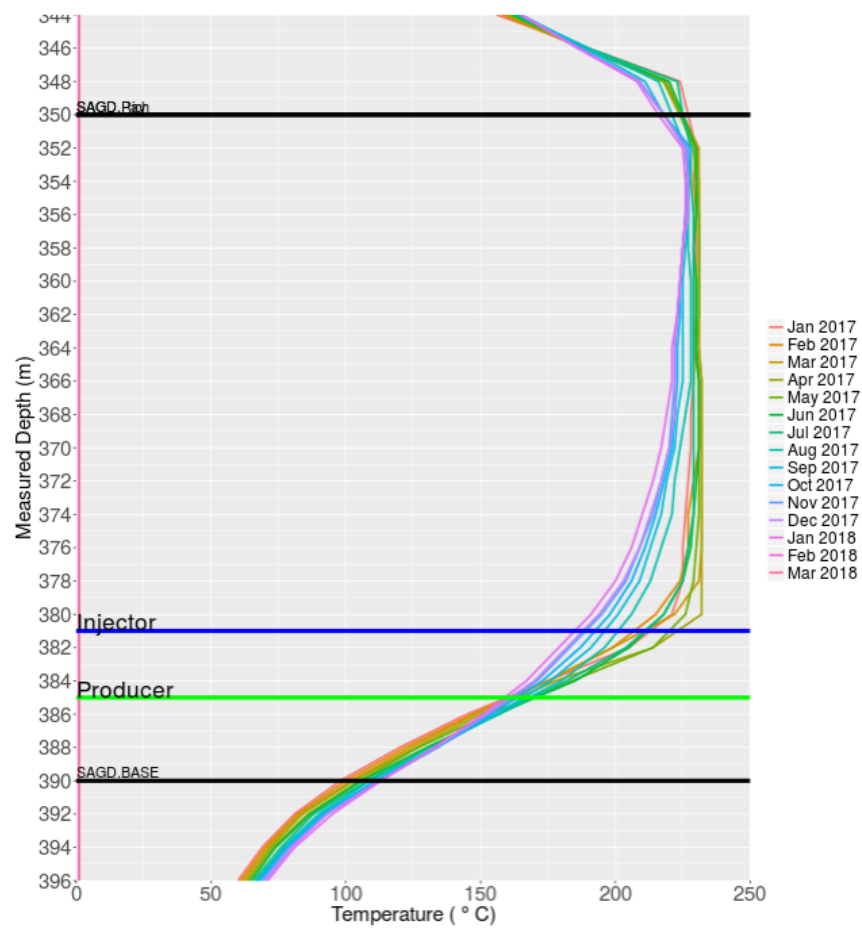
B07b: 100031107606W400



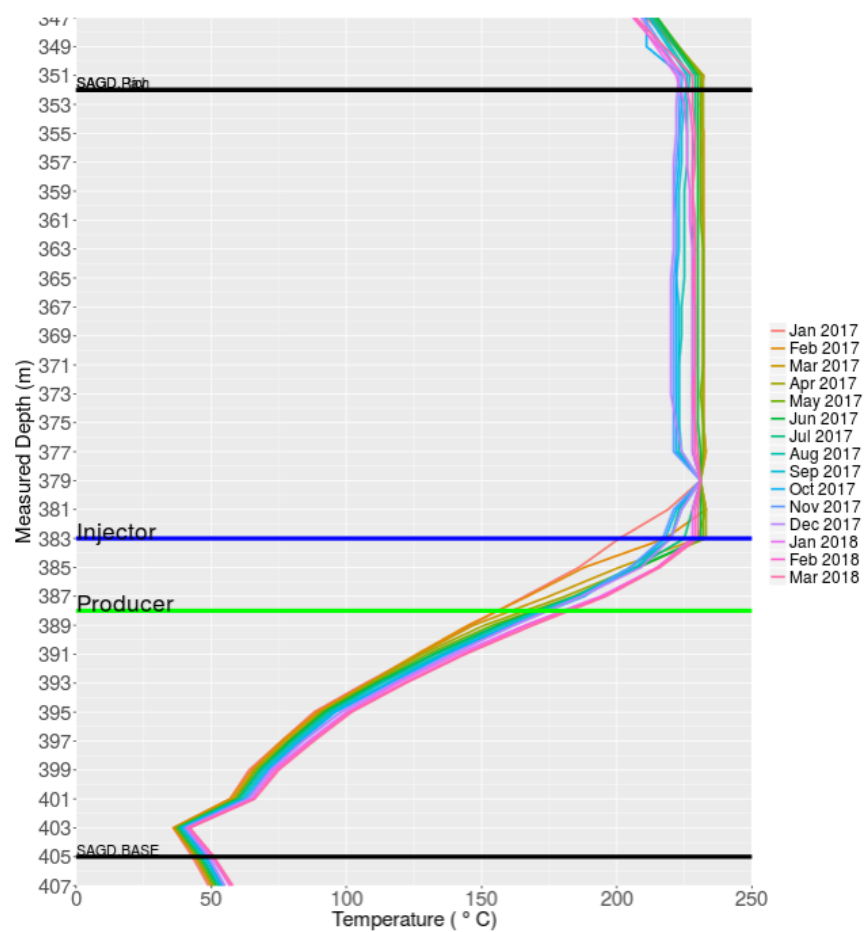
B07b: 102150207606W400



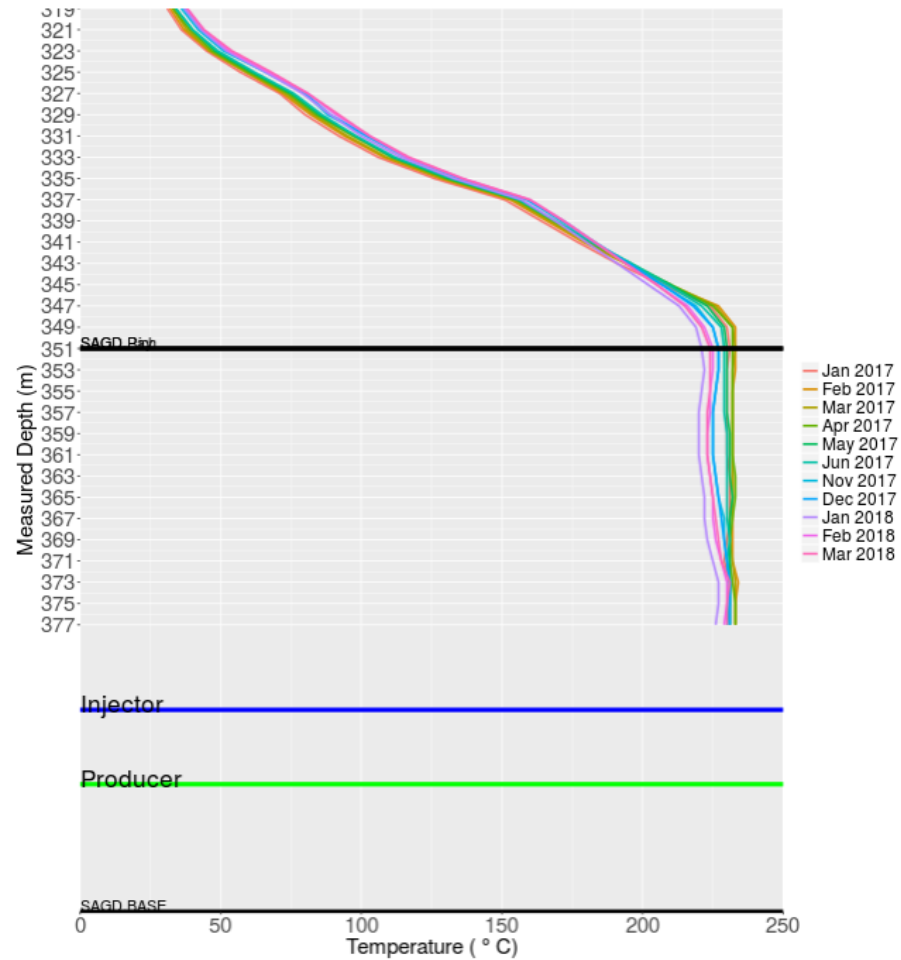
B03: 102101107606W400



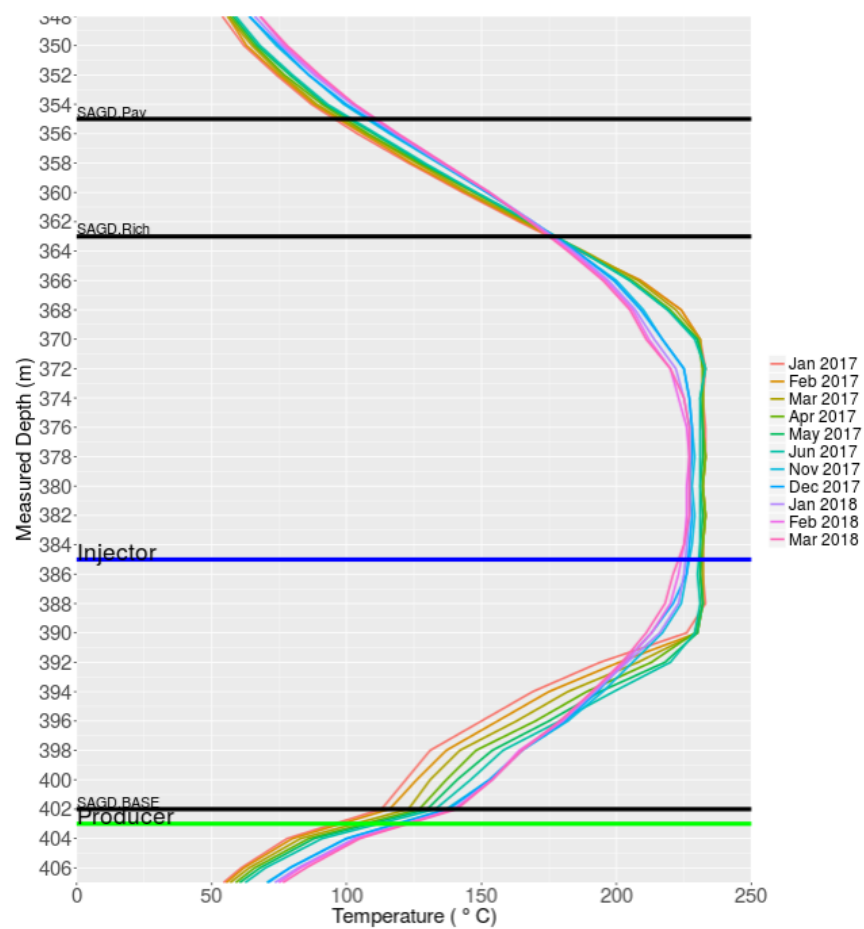
B03: 100161107606W400



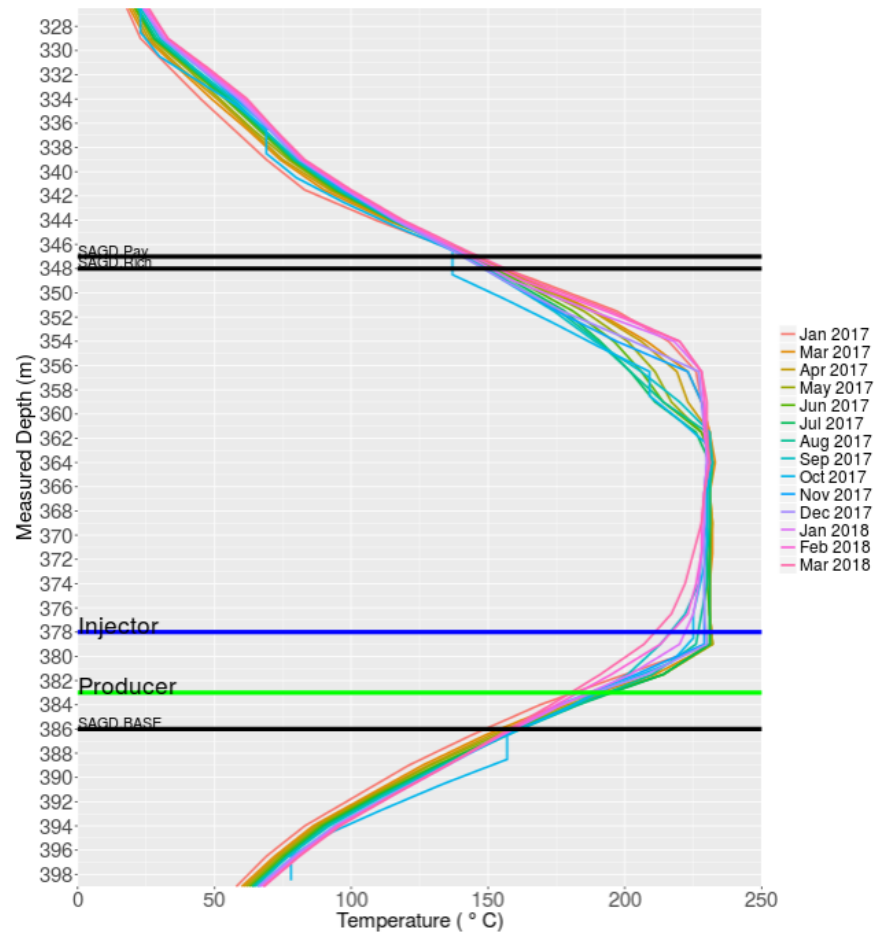
B03: 100131207606W400



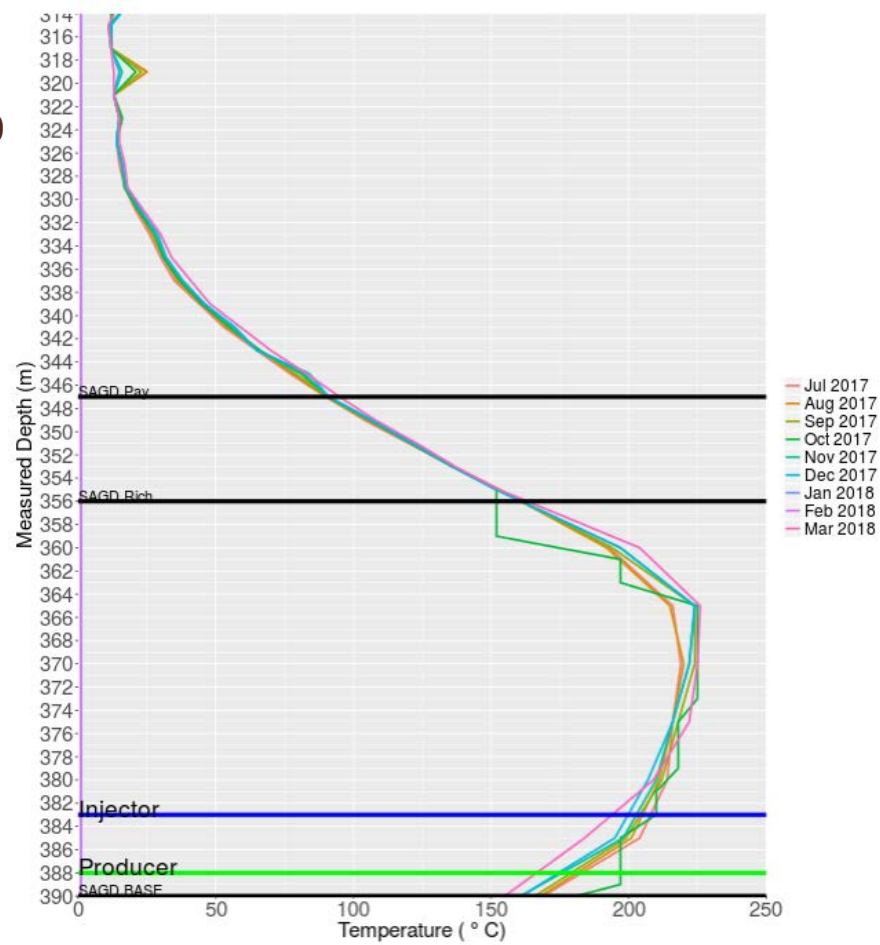
B03: 100091107606W400



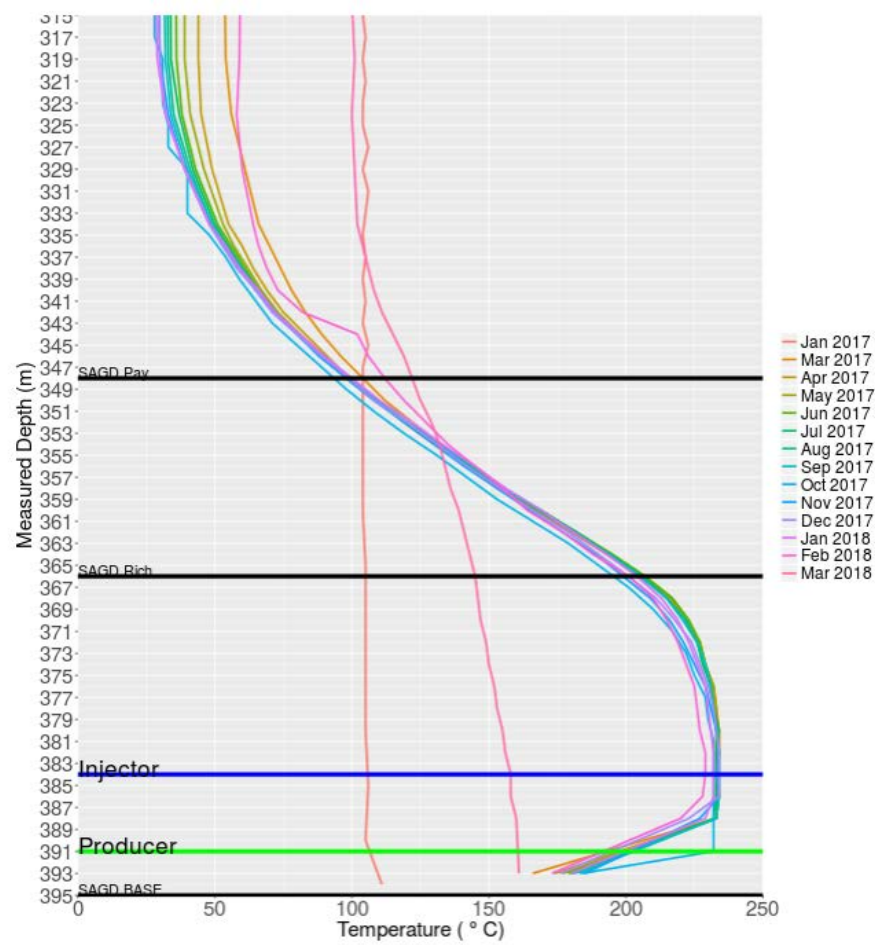
B07: 100051307606W400



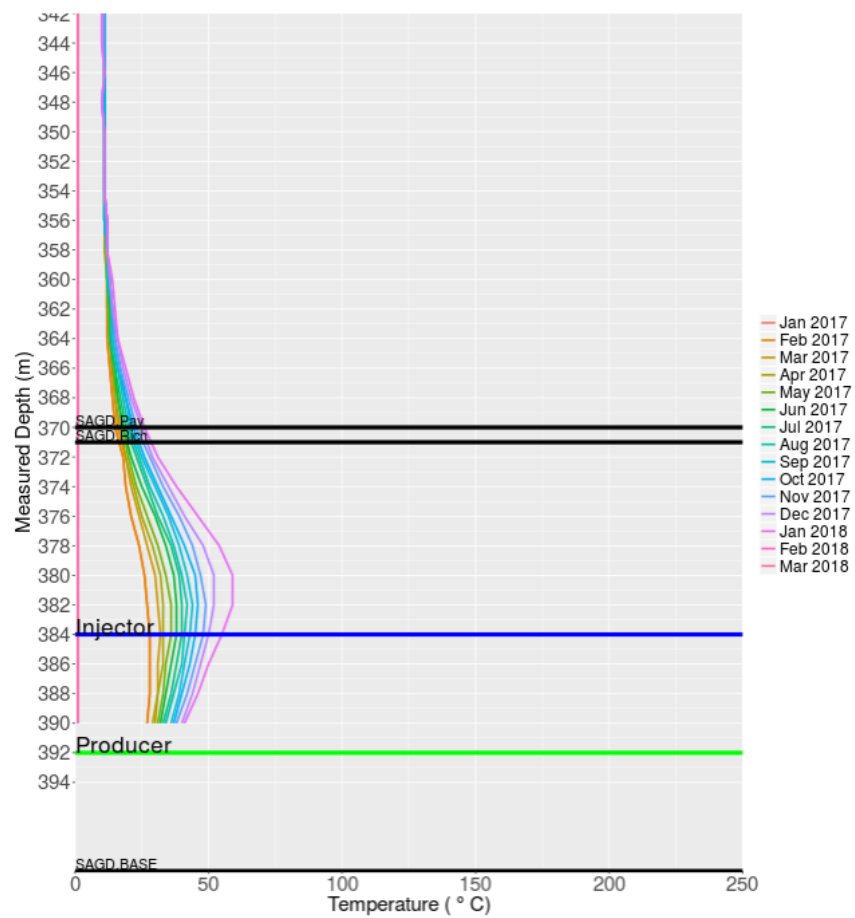
B07: 1AA051307606W400



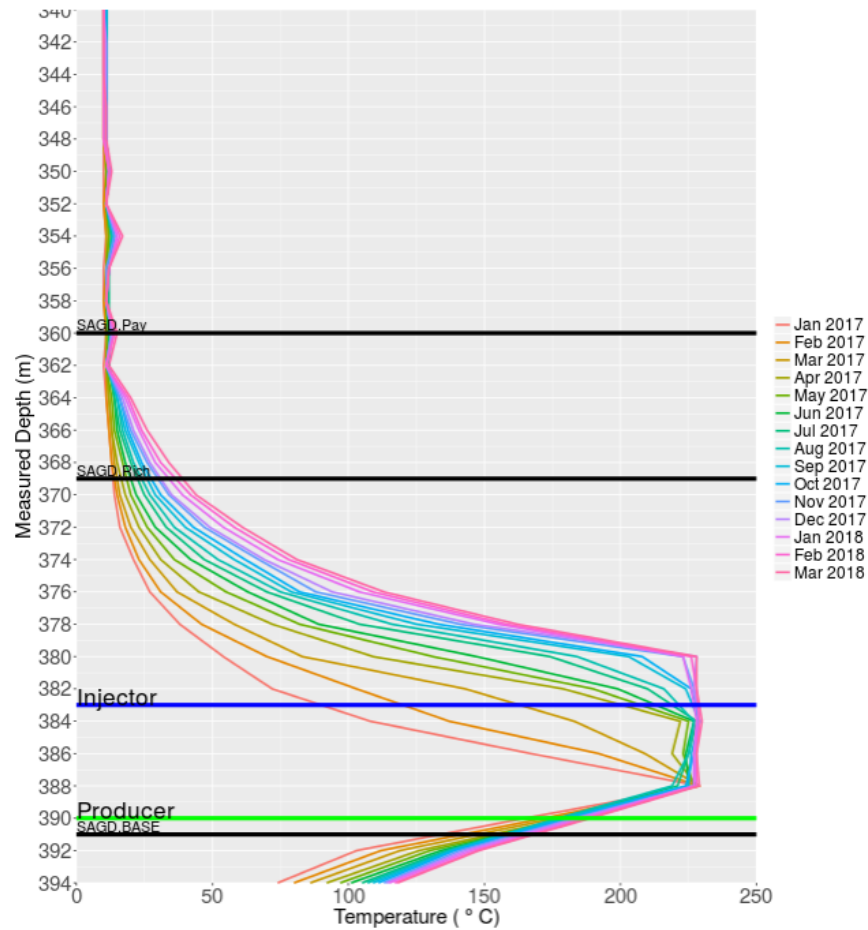
B07: 100061307606W400



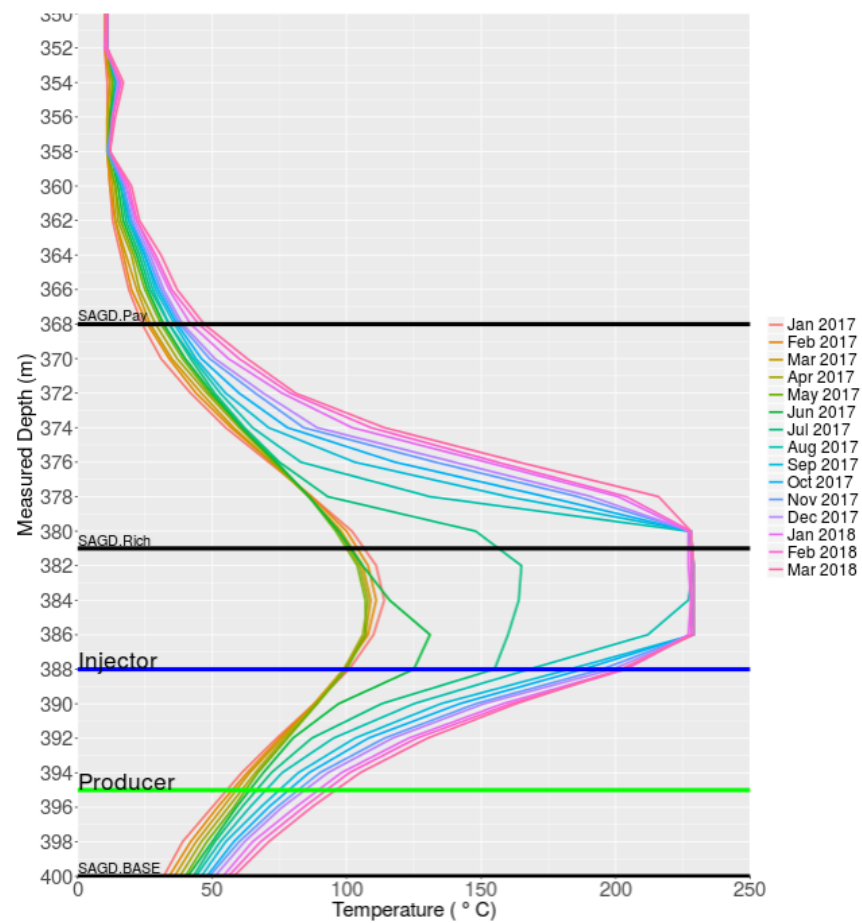
F01: 100121307606W400



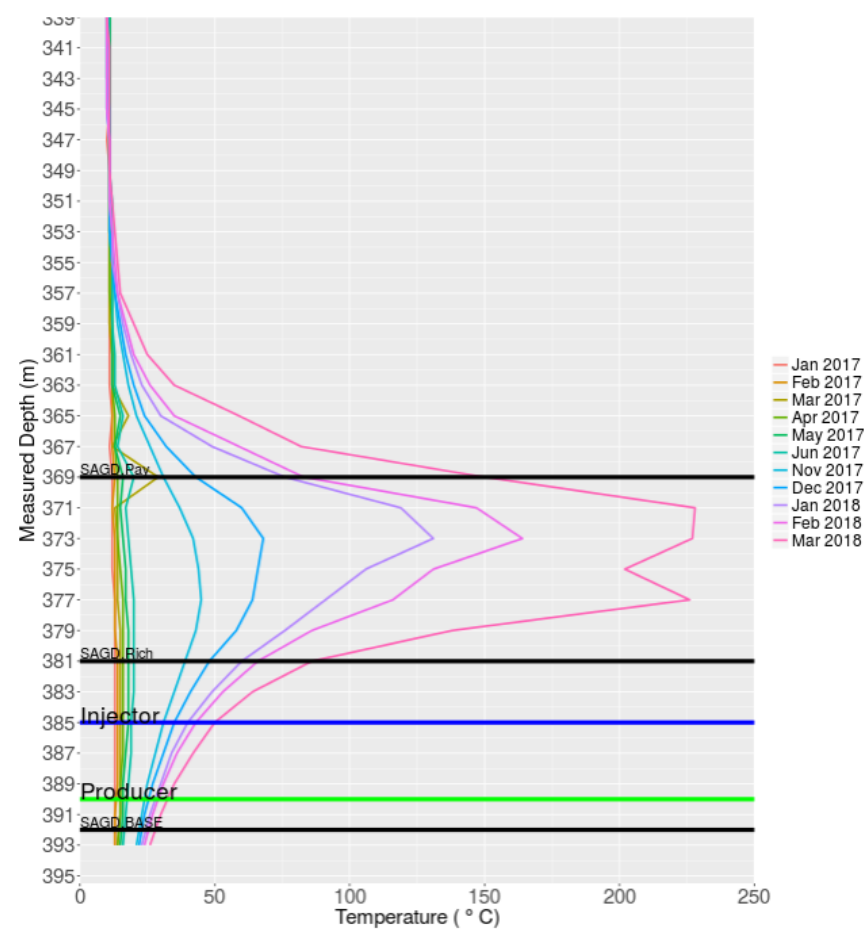
F01: 100141307606W400



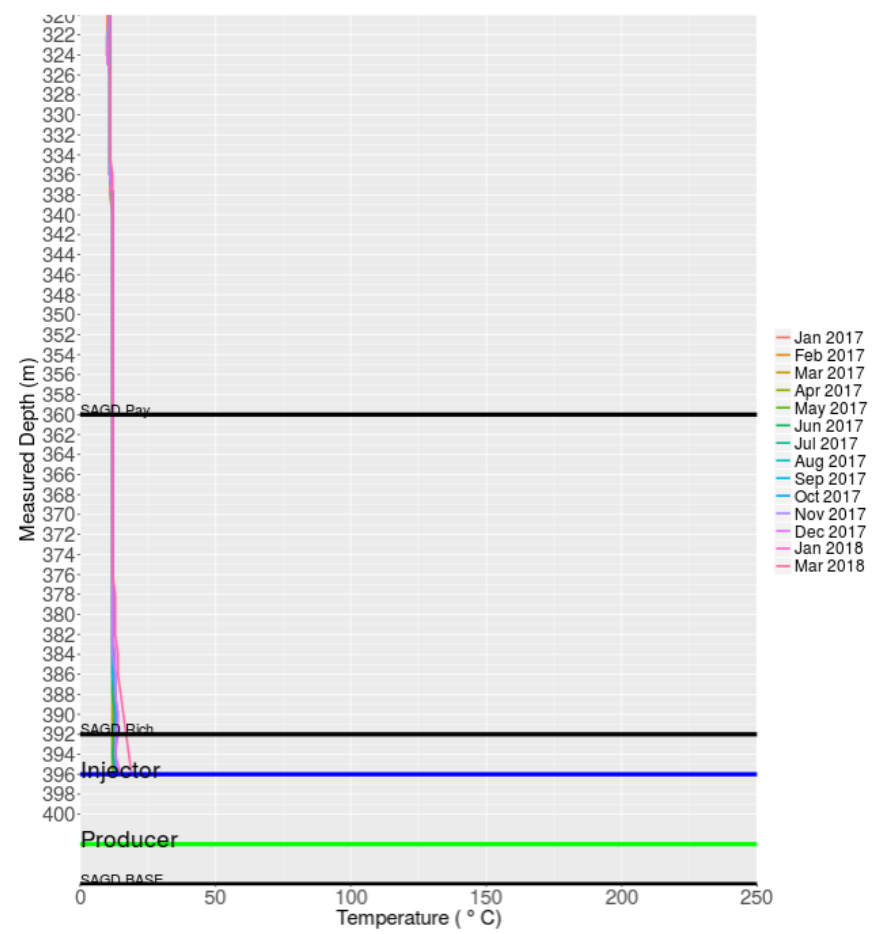
F01: 100111307606W400



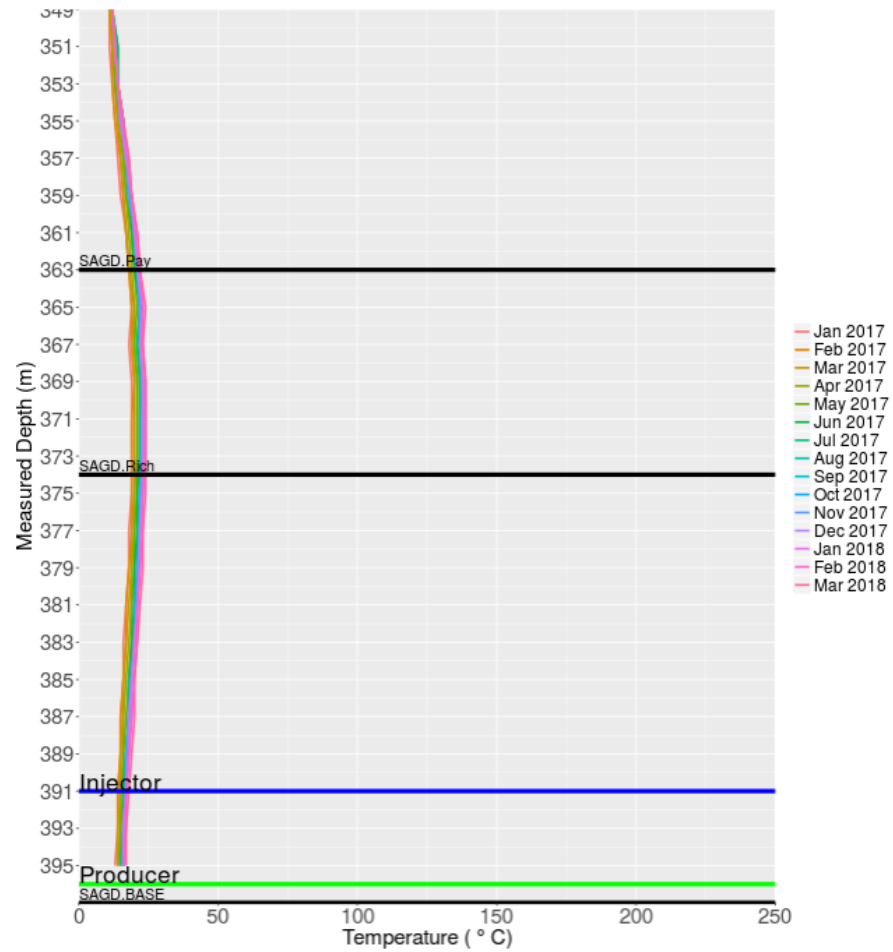
F01: 108061307606W400



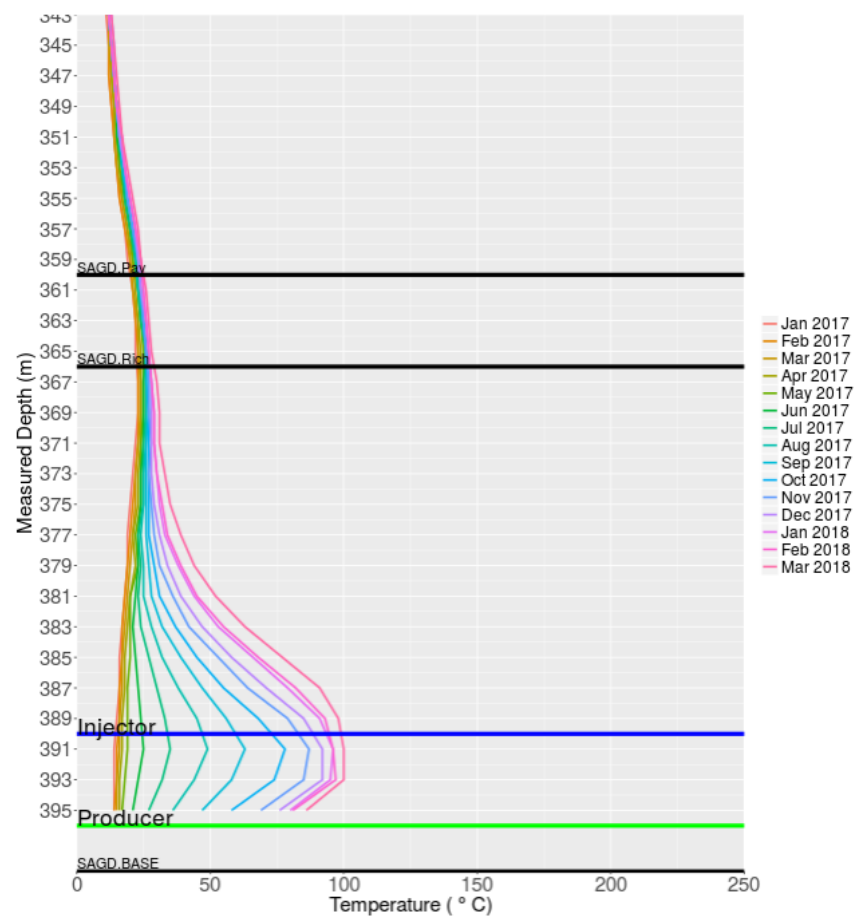
B10: 100091307606W400



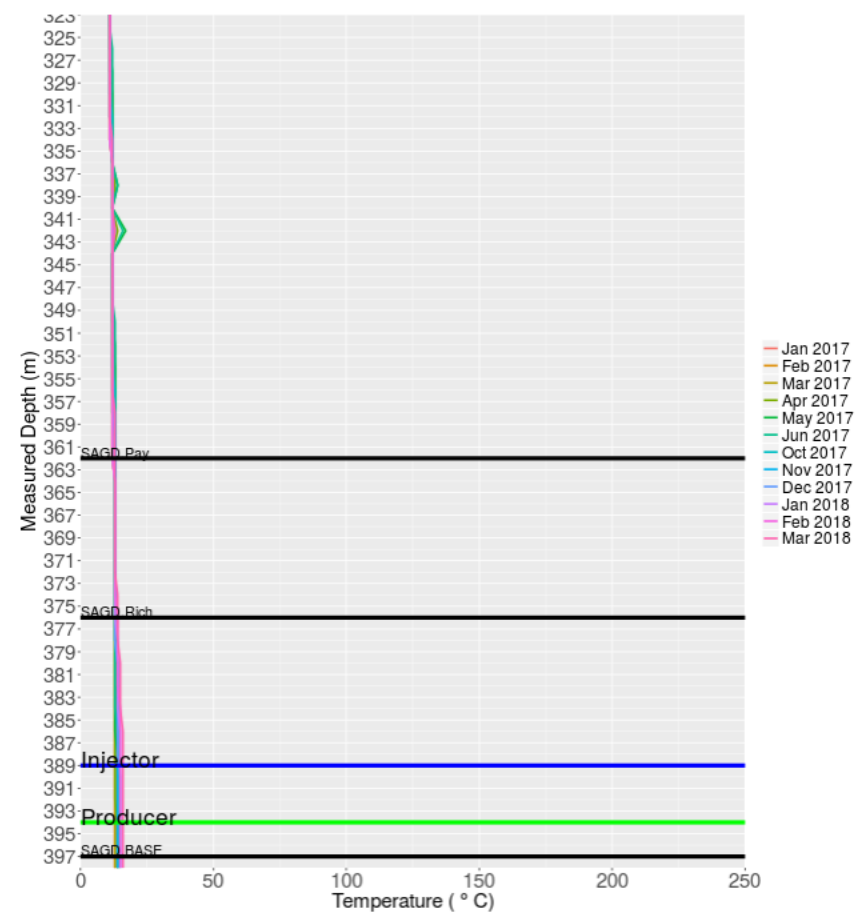
B10: 100071307606W400



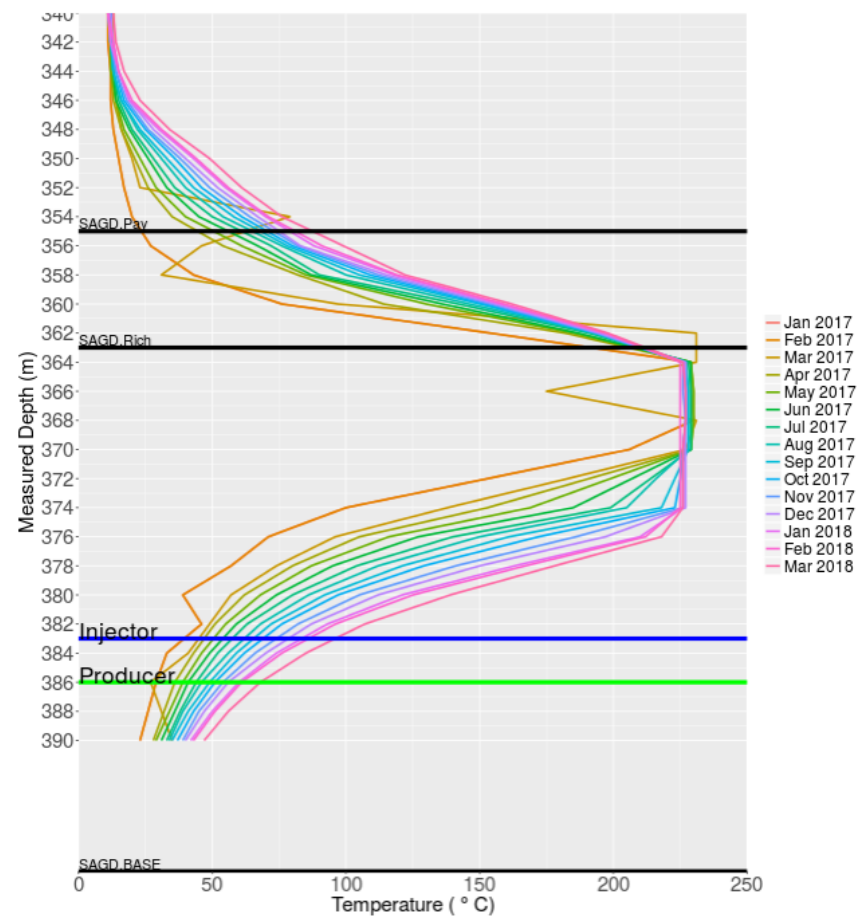
B10: 102021307606W400



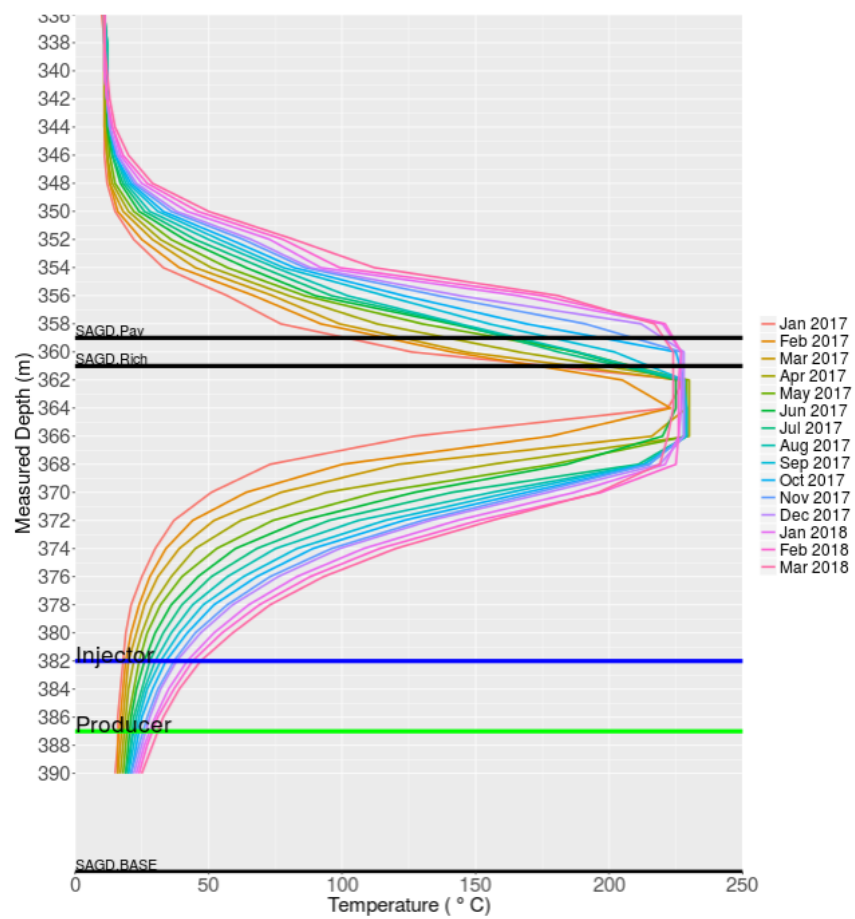
B10: 102081307606W400



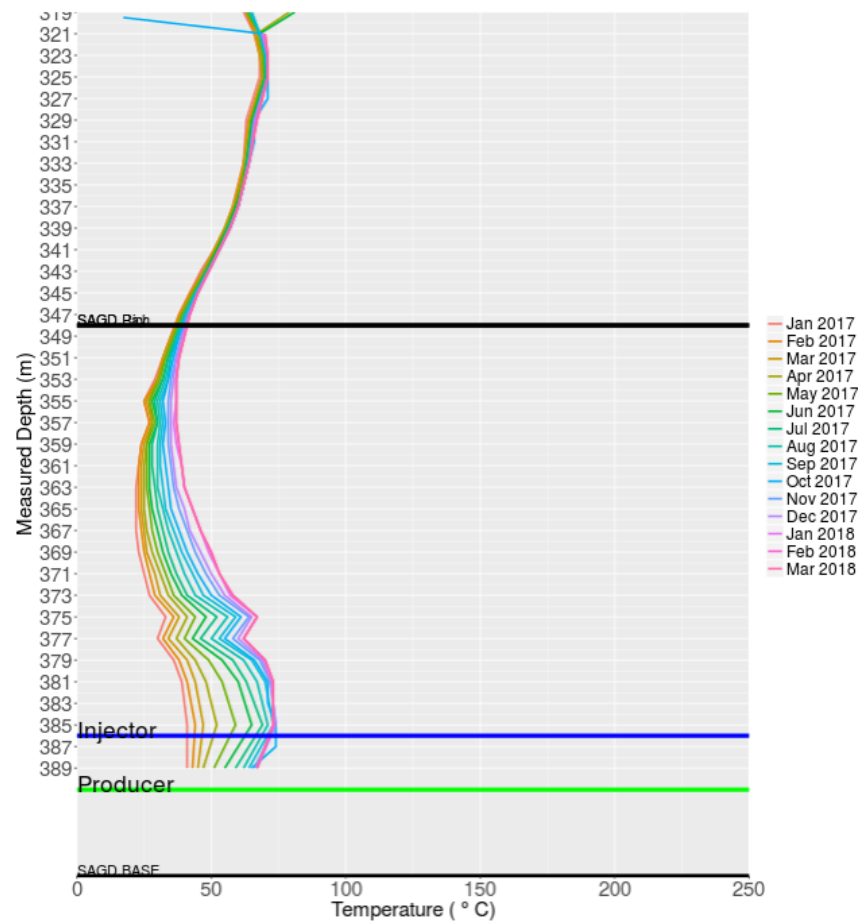
B09: 102011307606W400



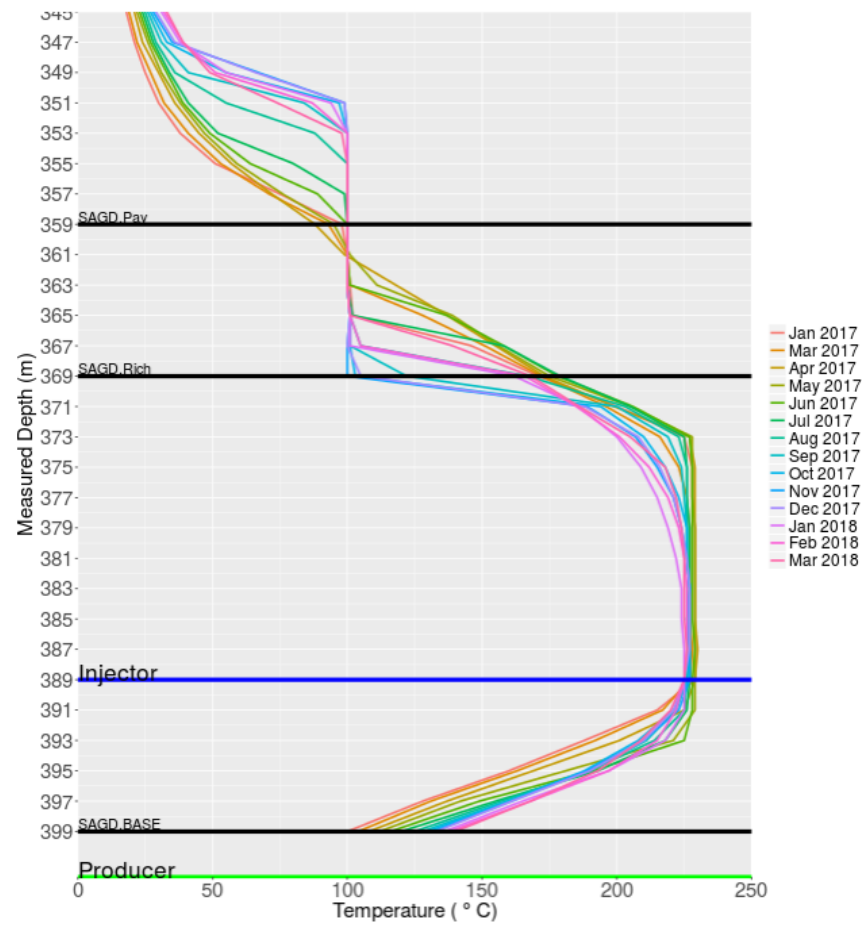
B09: 100021307606W400



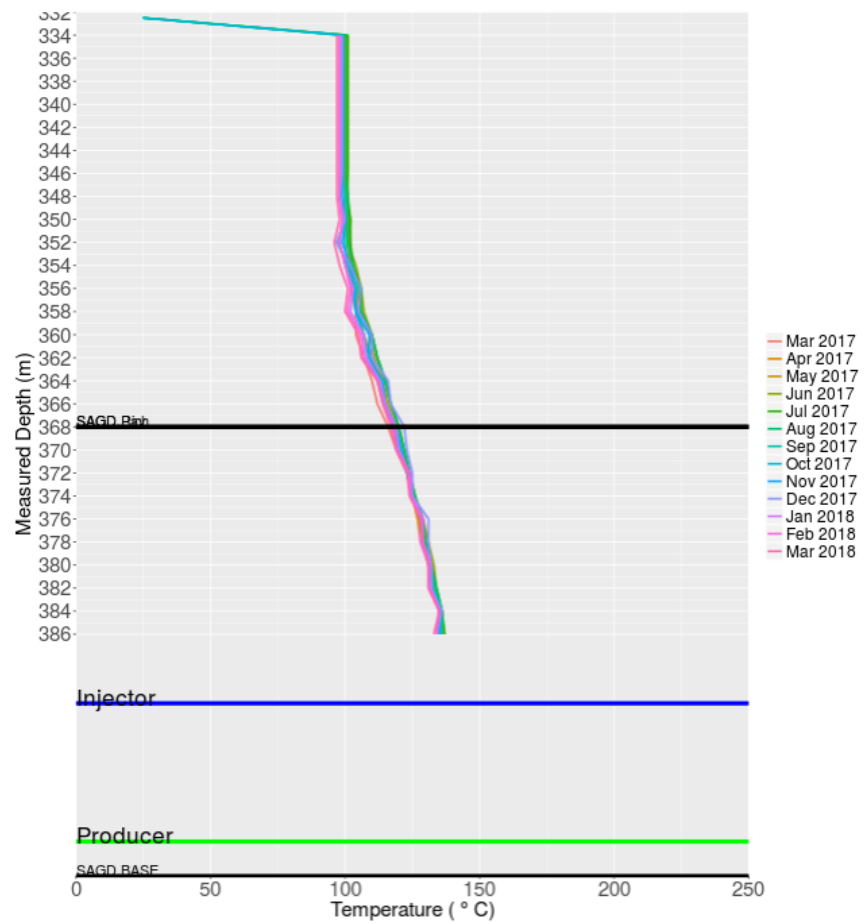
B09: 102151207606W400



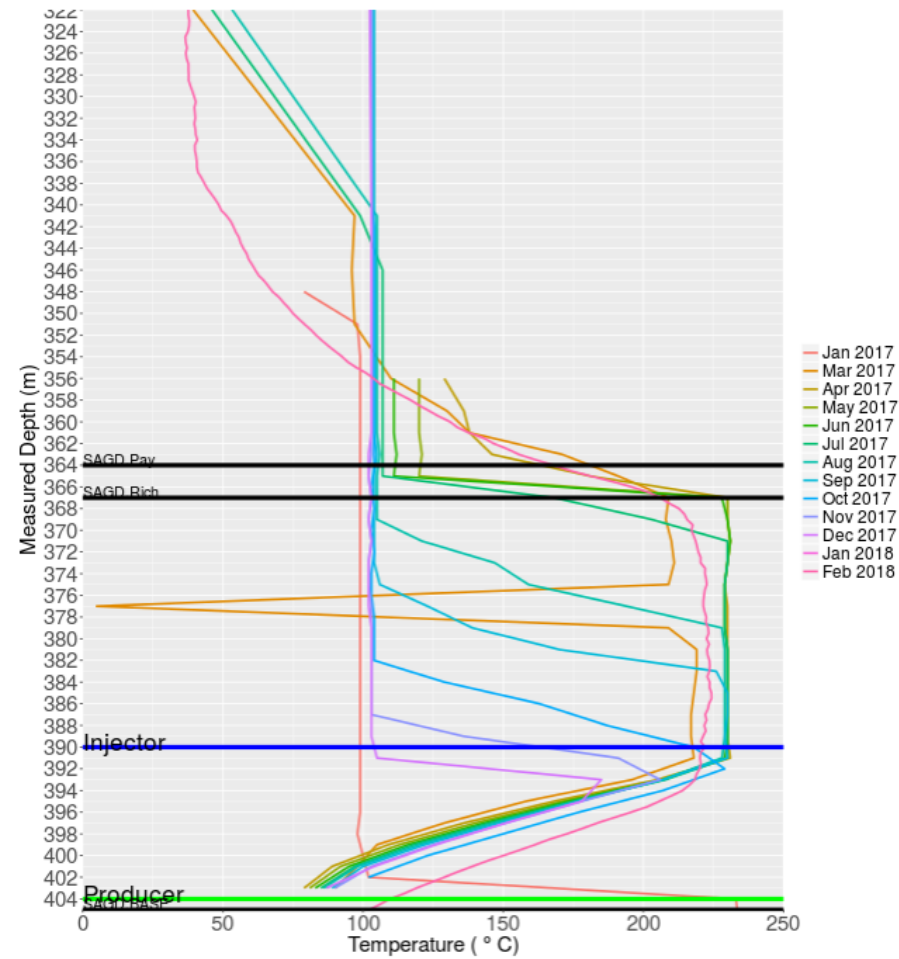
B06: 100111207606W400



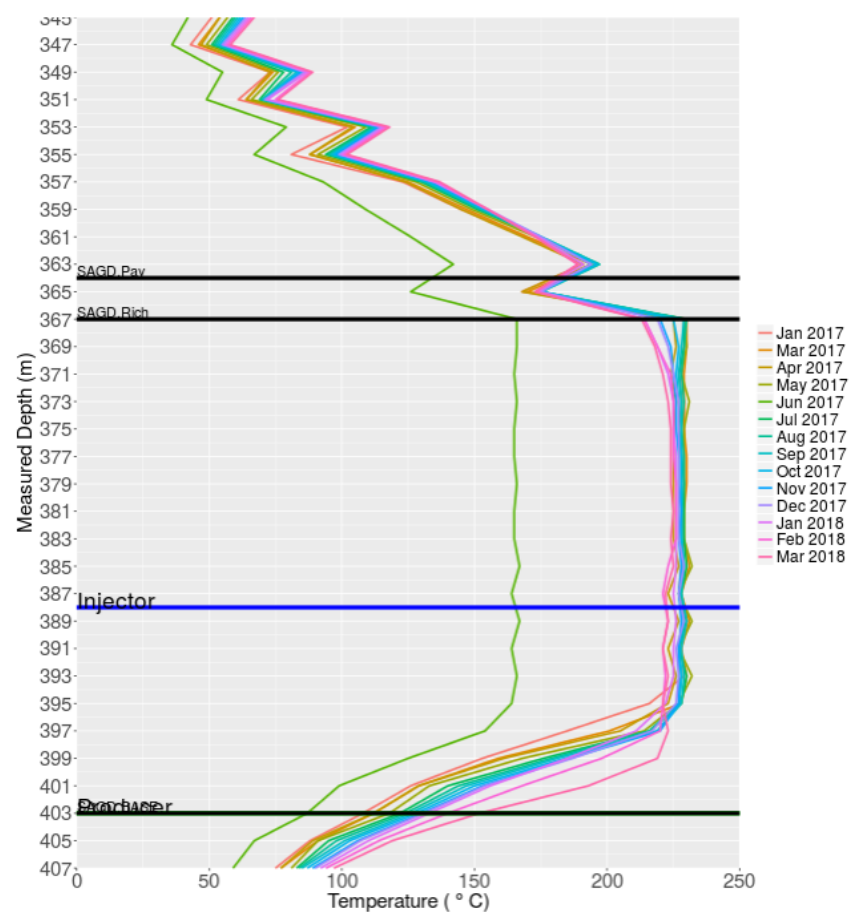
B06: 100051207606W400



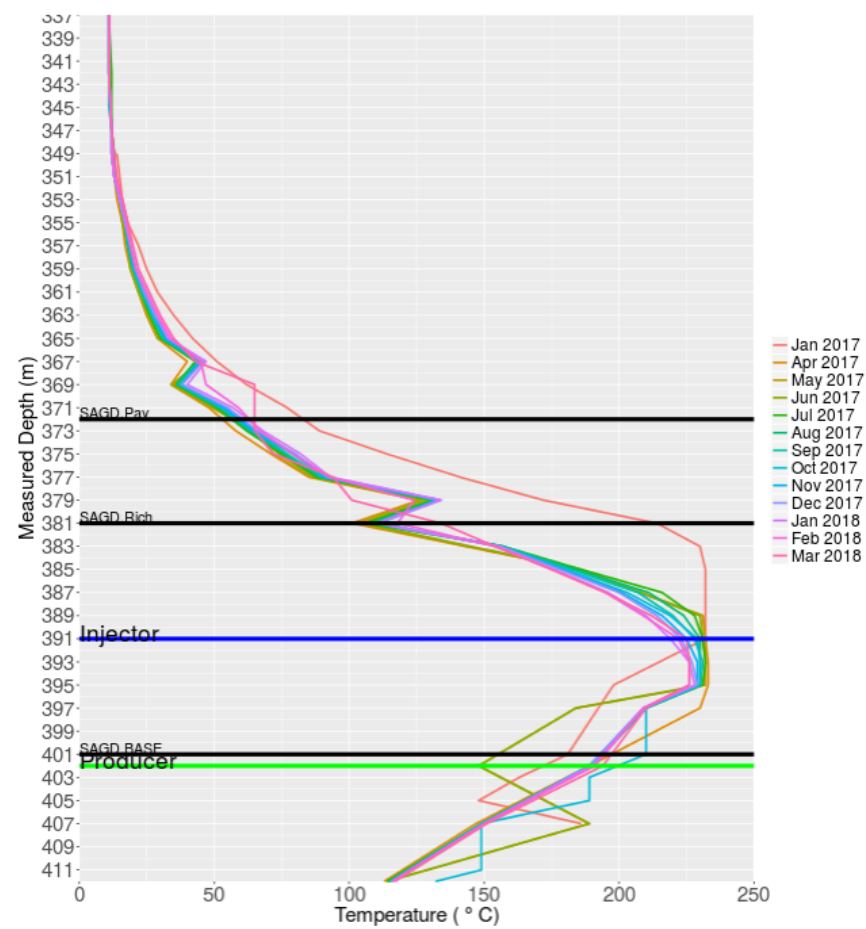
B06: 102051207606W400



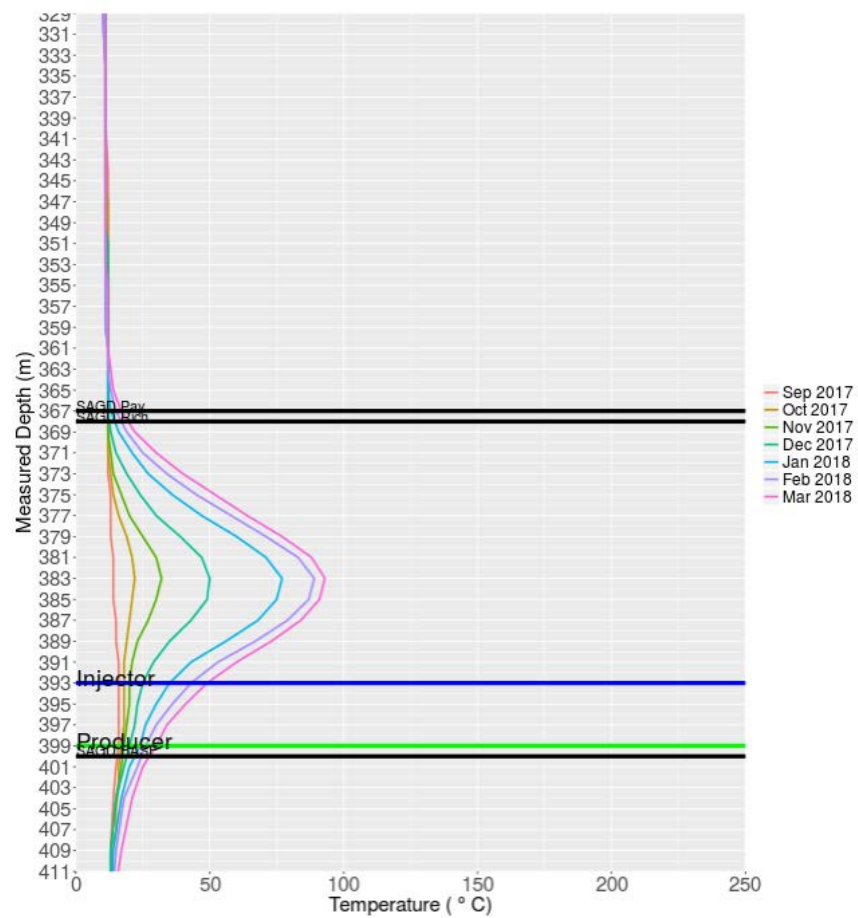
B06: 102061207606W400



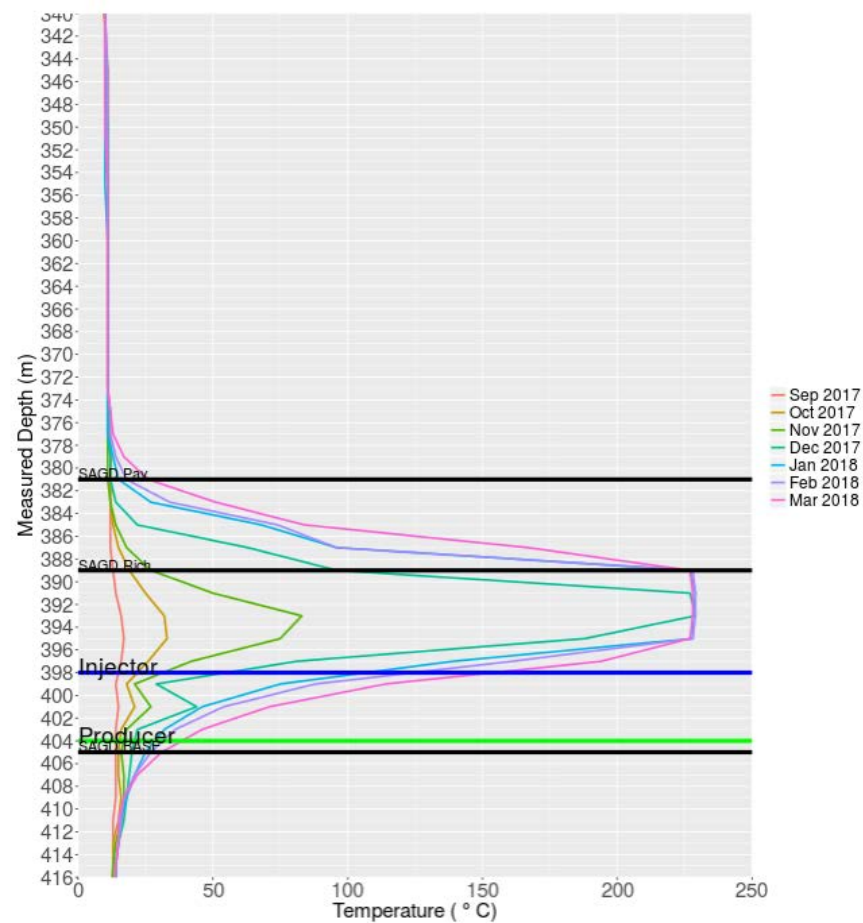
B06: 103061207606W400



B13: 1AC071207606W400



B13: 103071207606W400



B13: 100120707605W400

Virgin Reservoir Conditions

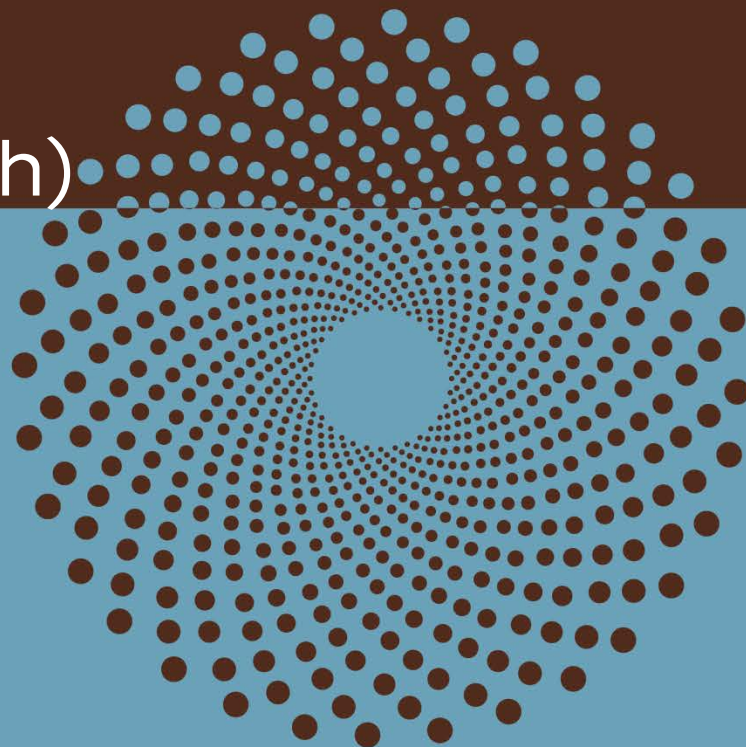
B13: 1AB011207606W400

Virgin Reservoir Conditions

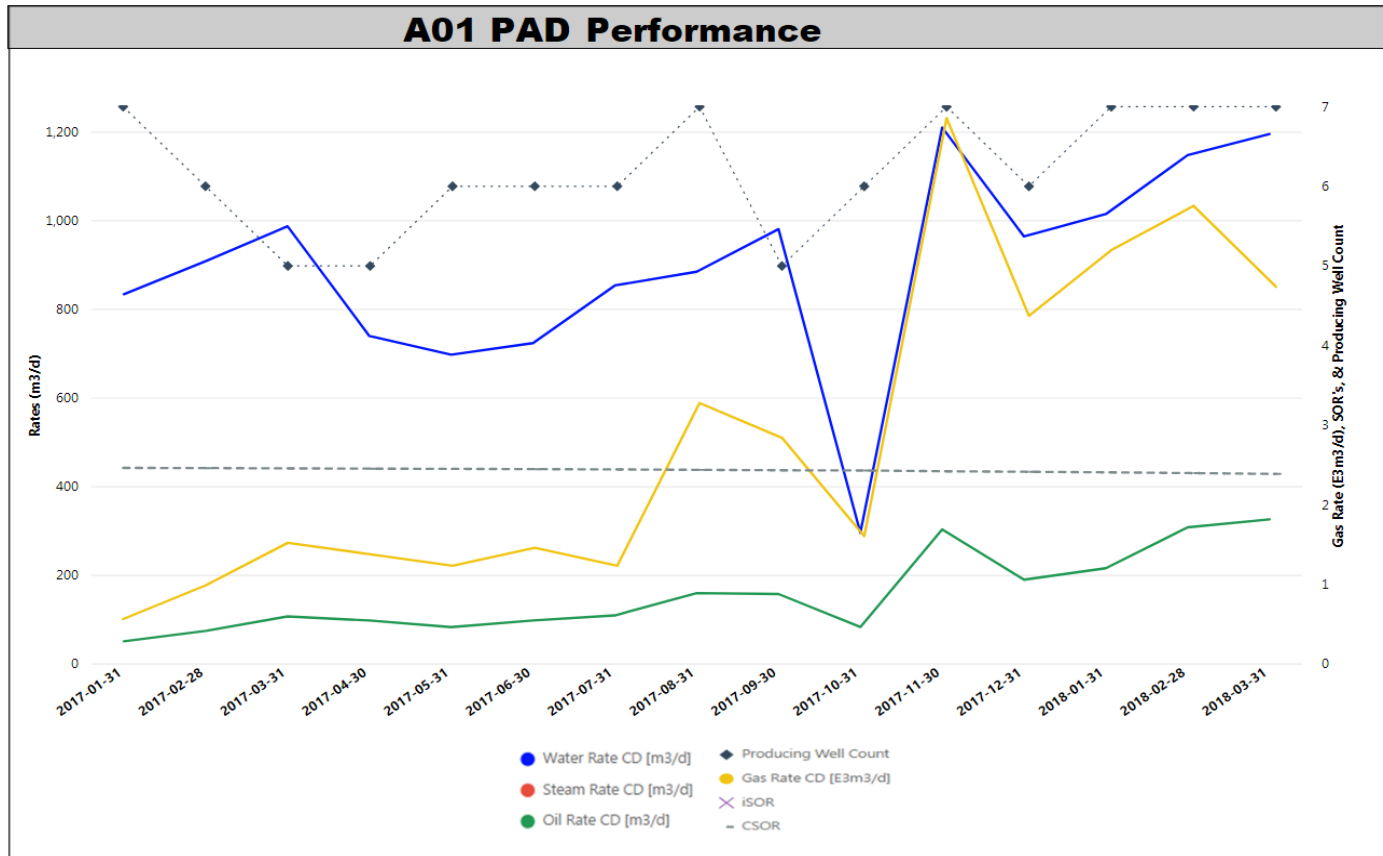
Appendix 4

Subsection 3.1.1 – 7h)

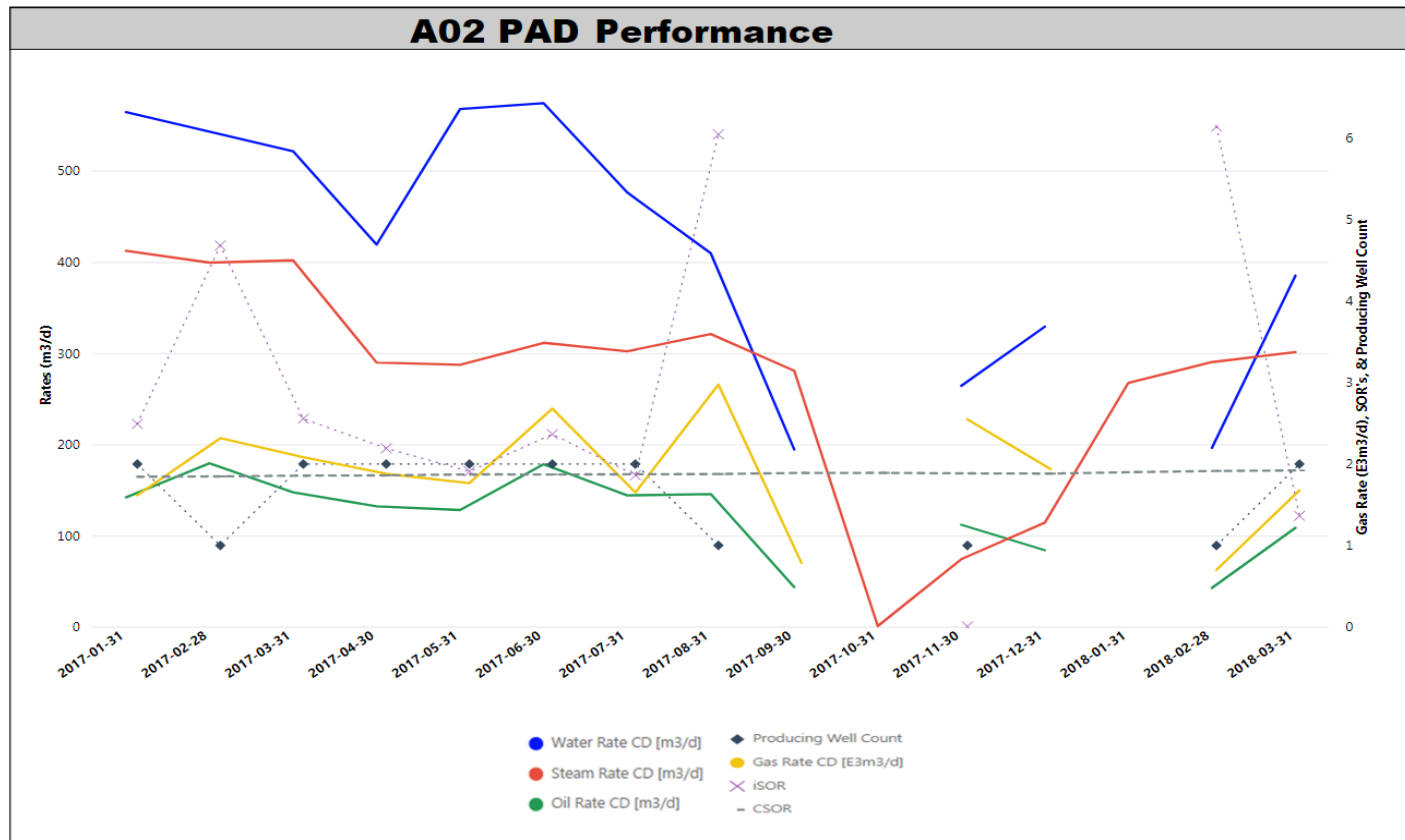
Pad Production Data



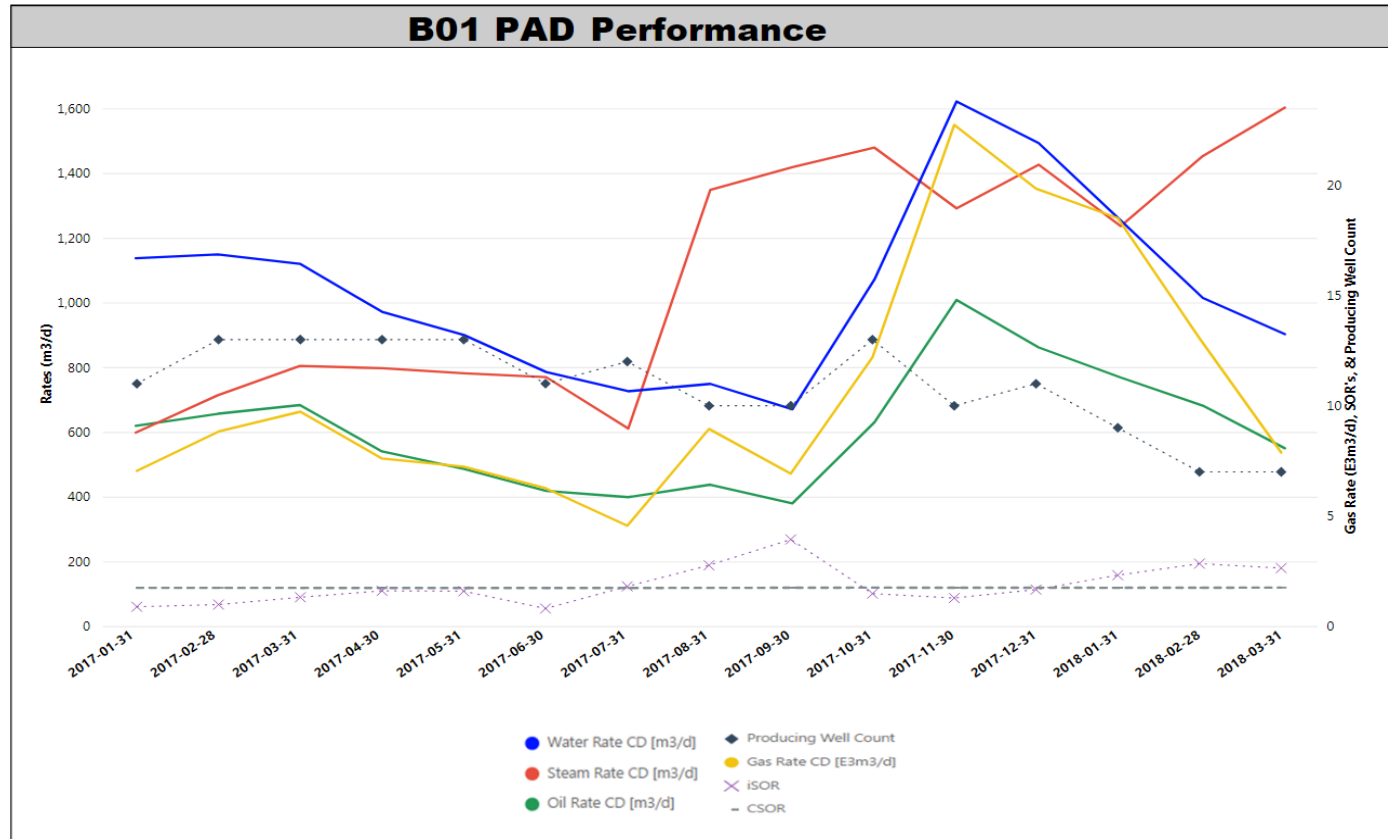
A01 Pad



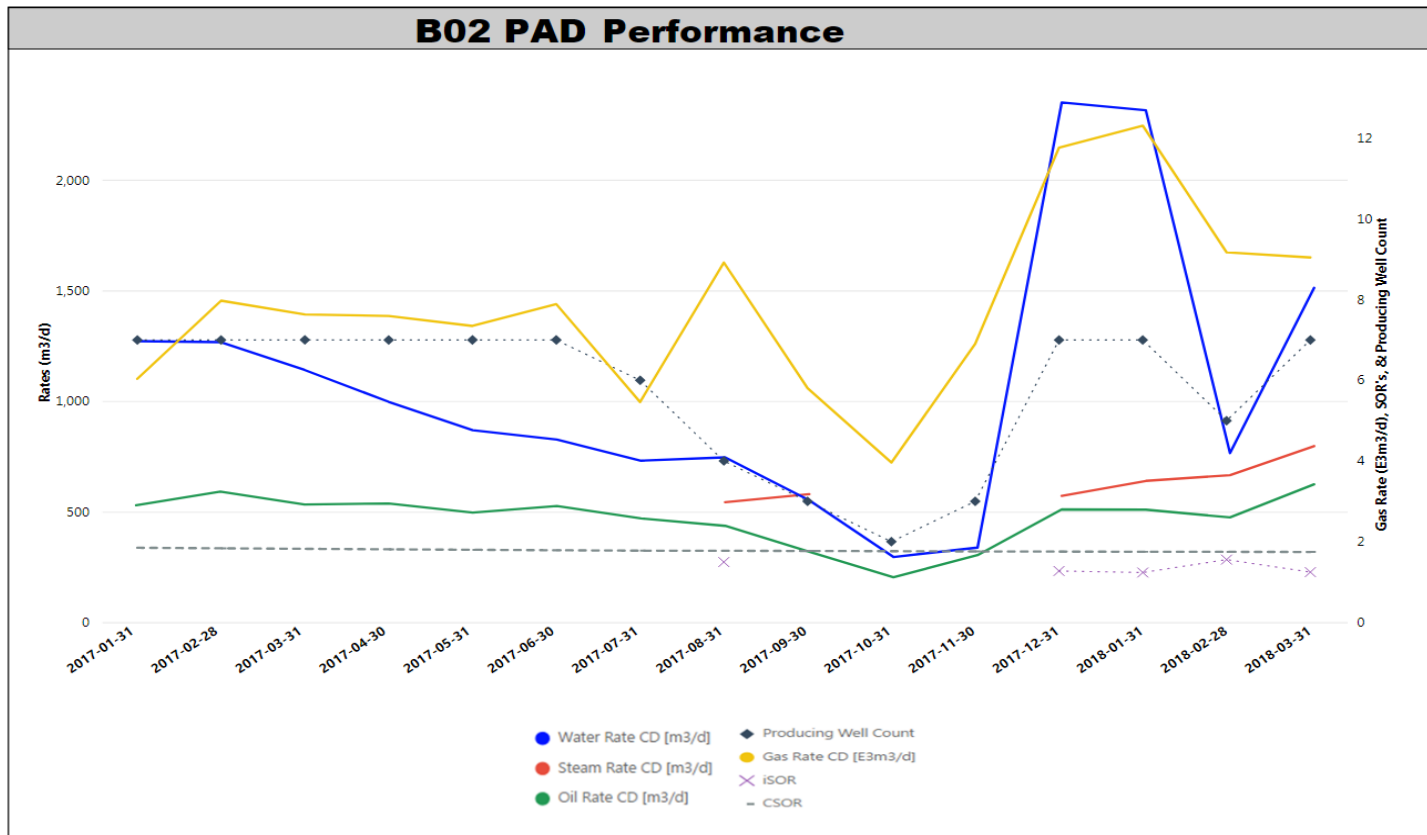
A02 Pad



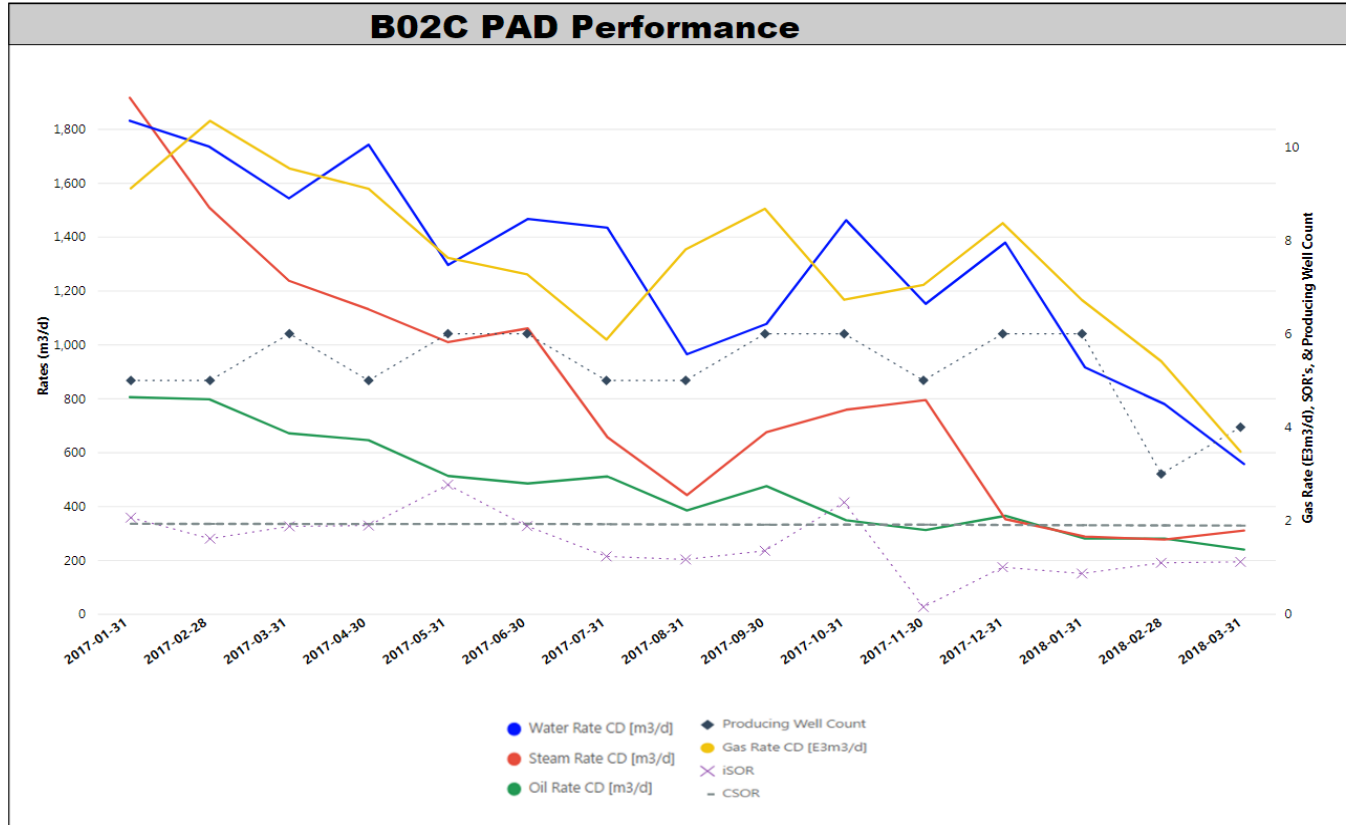
B01 Pad



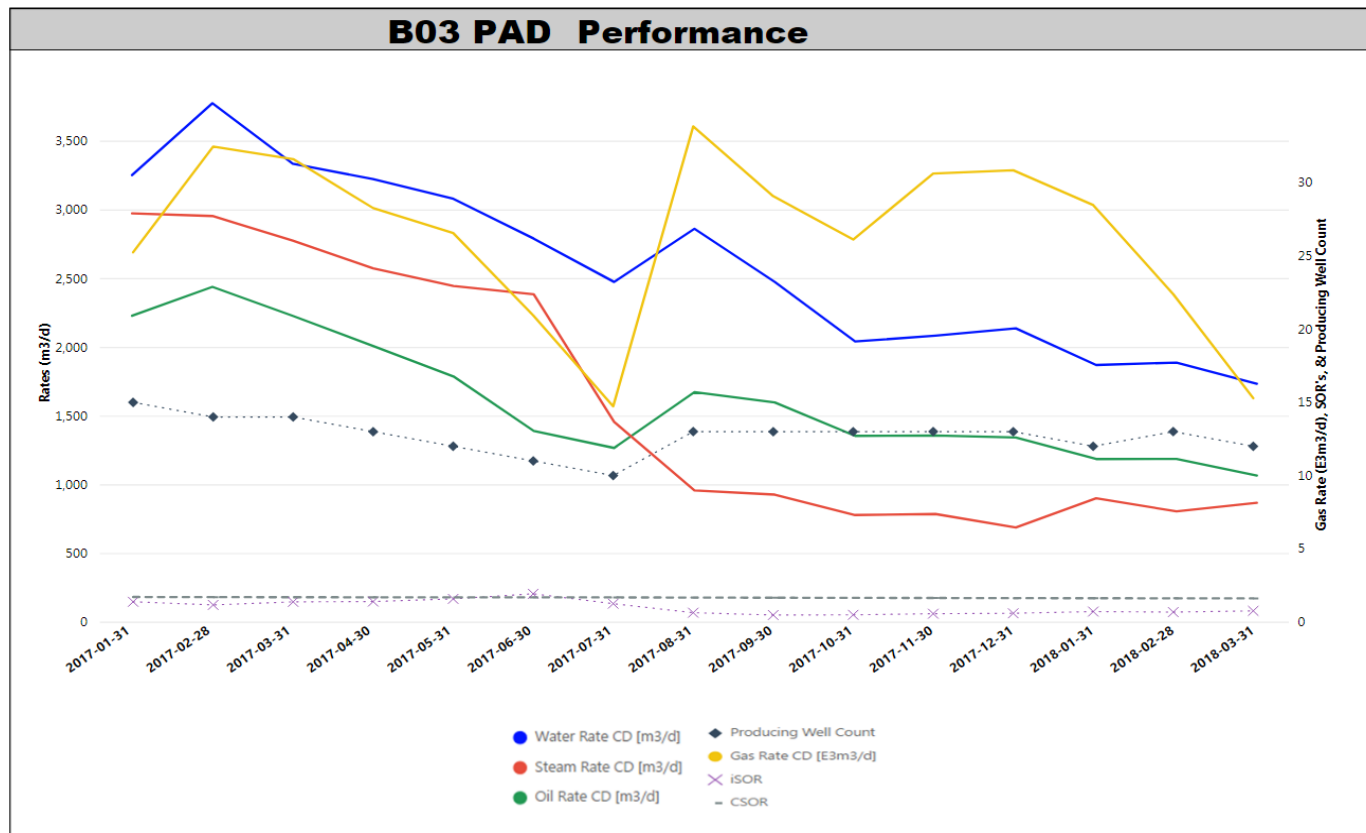
B02 Pad



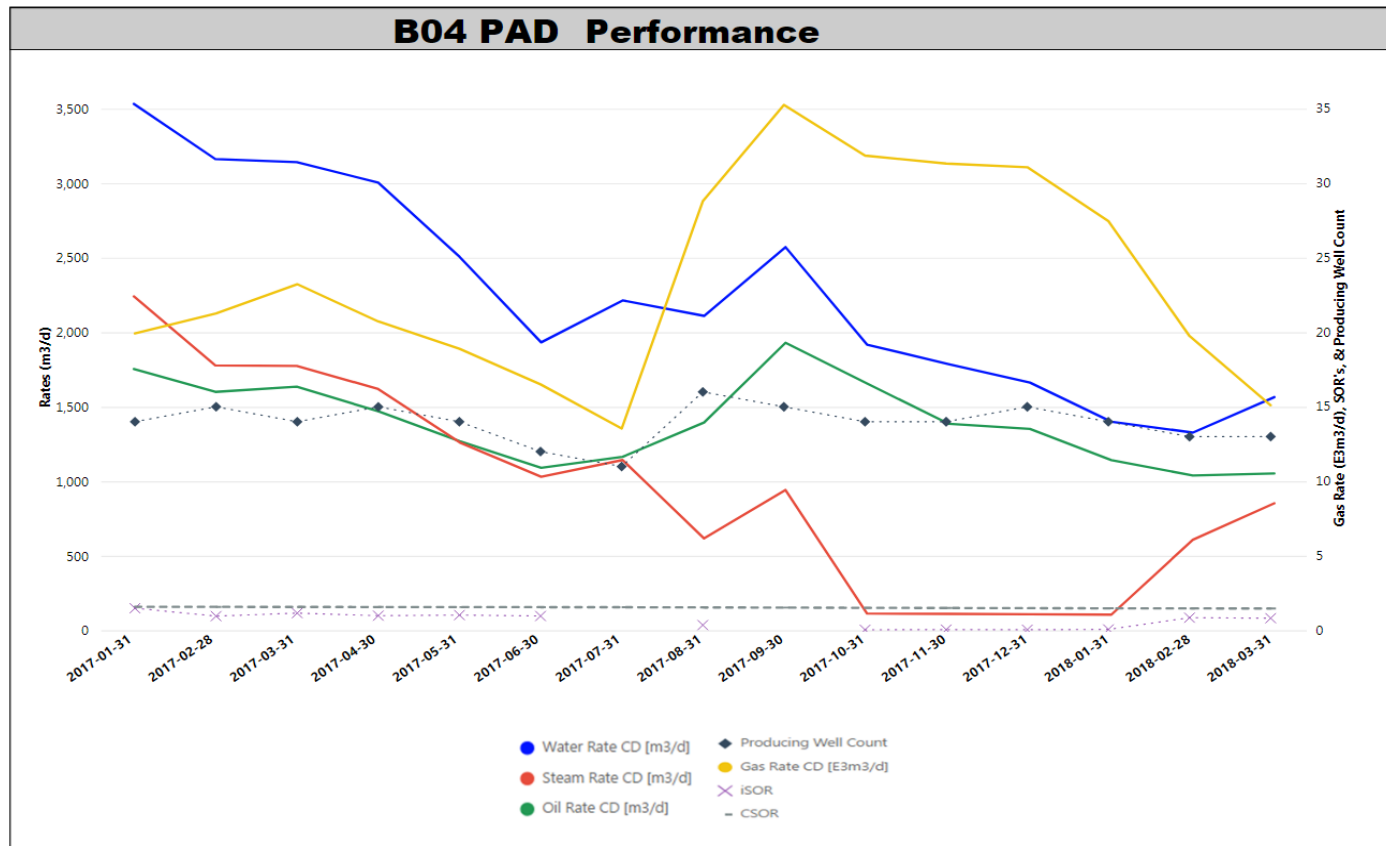
B02C Pad



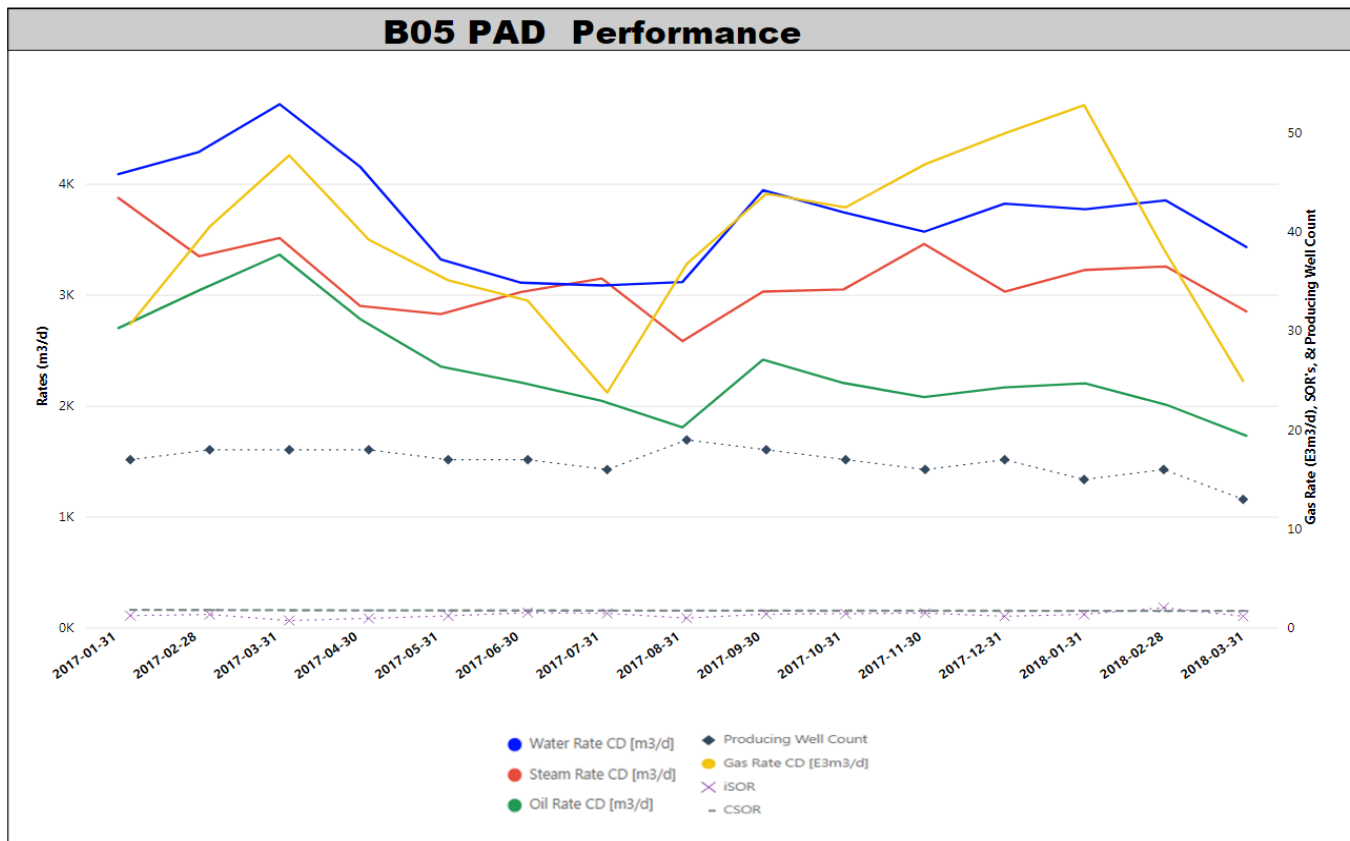
B03 Pad



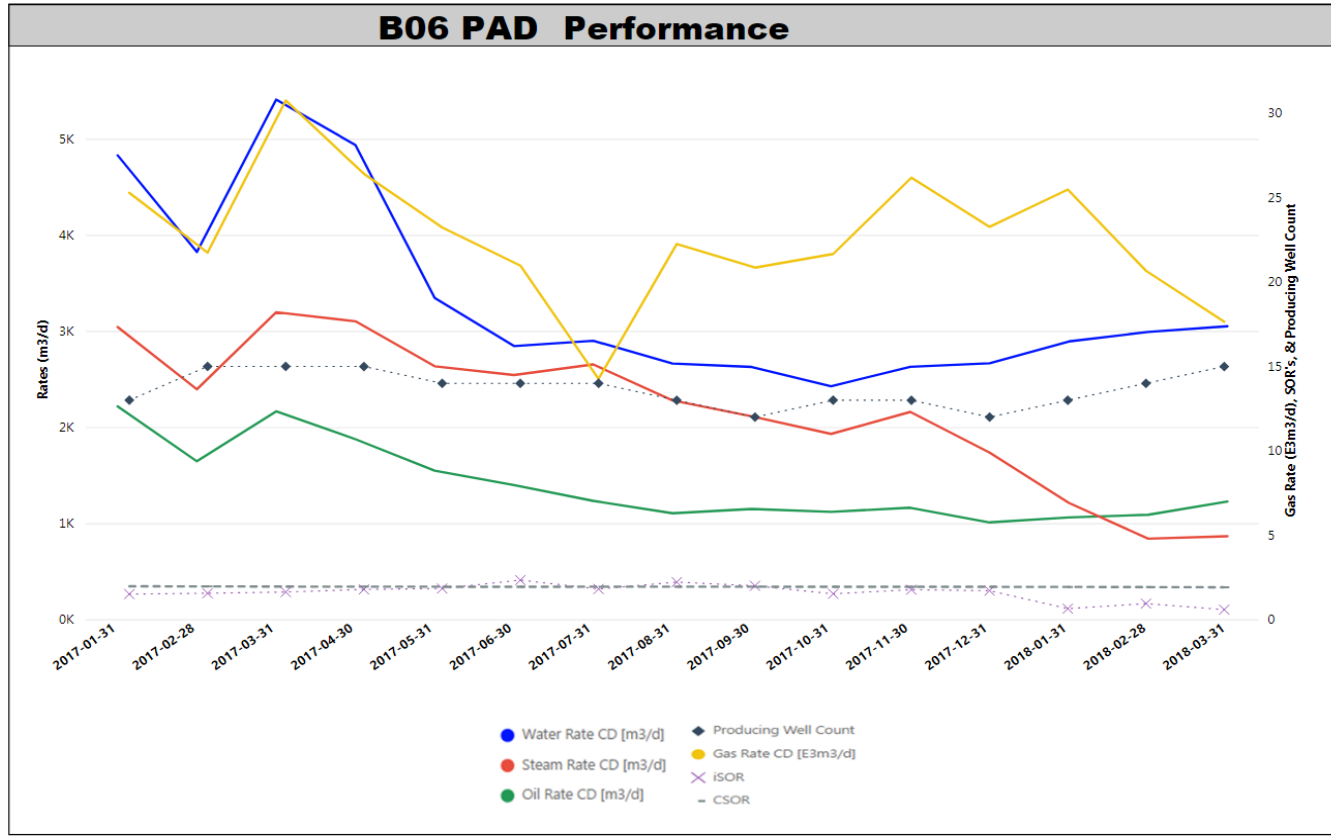
B04 Pad



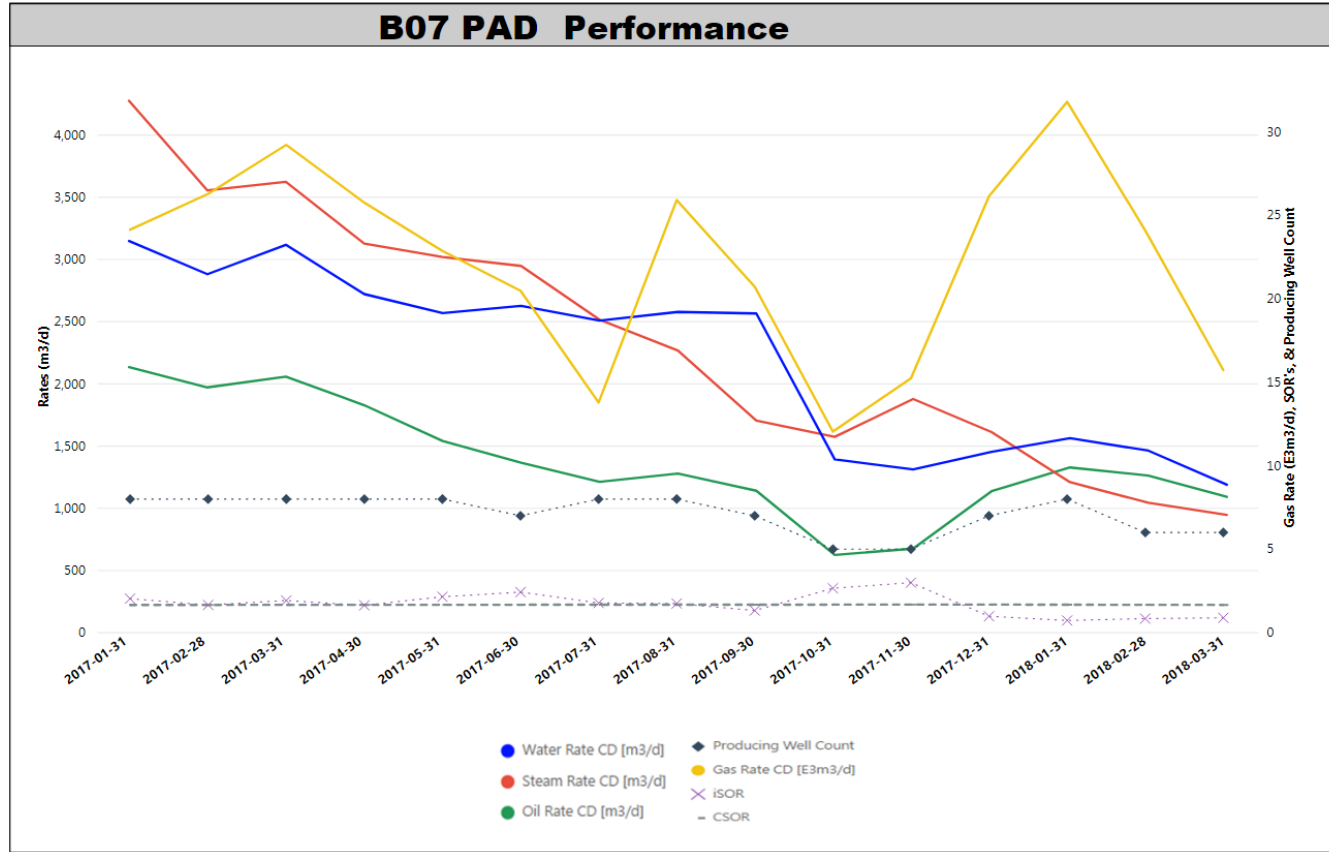
B05 Pad



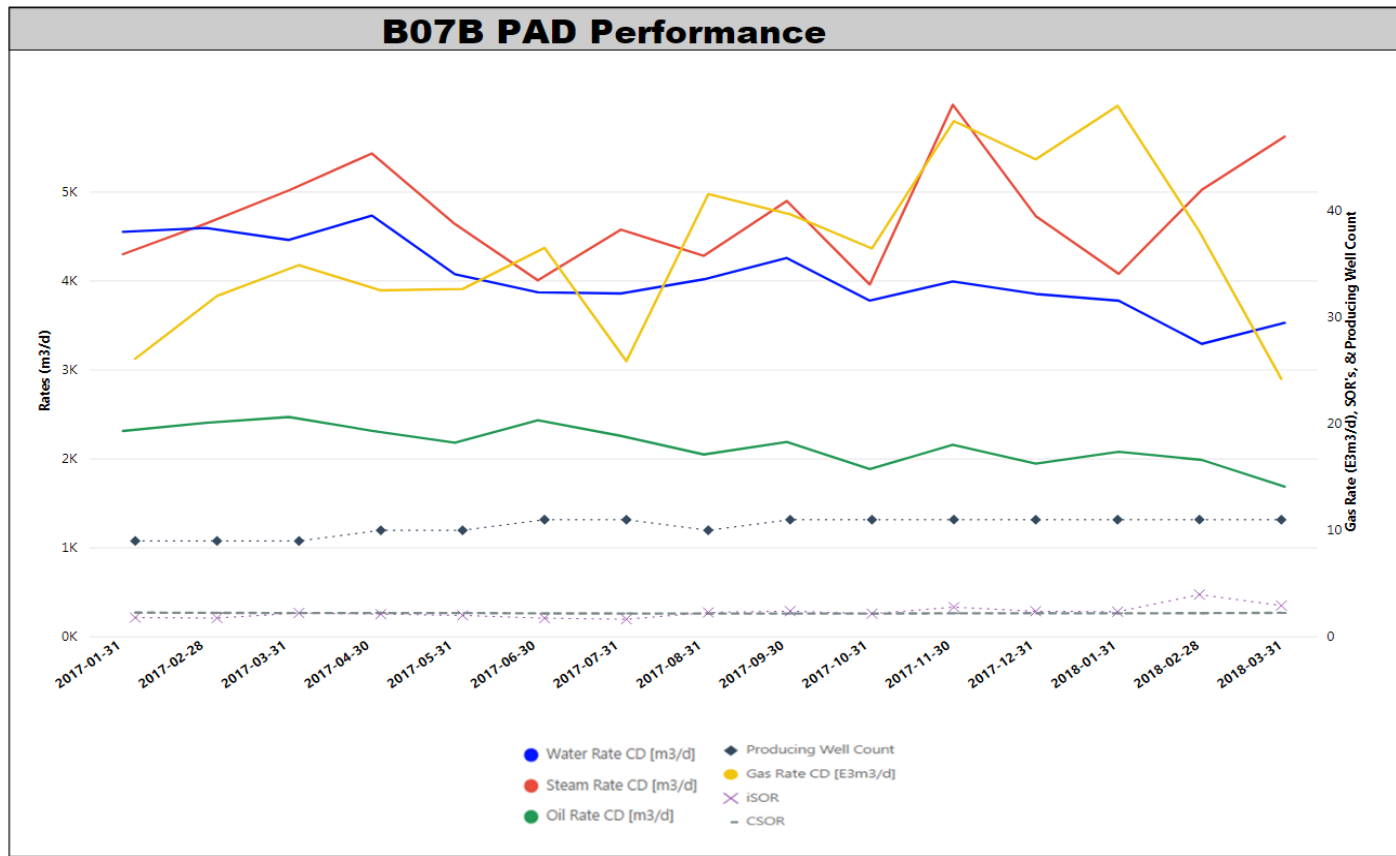
B06 Pad

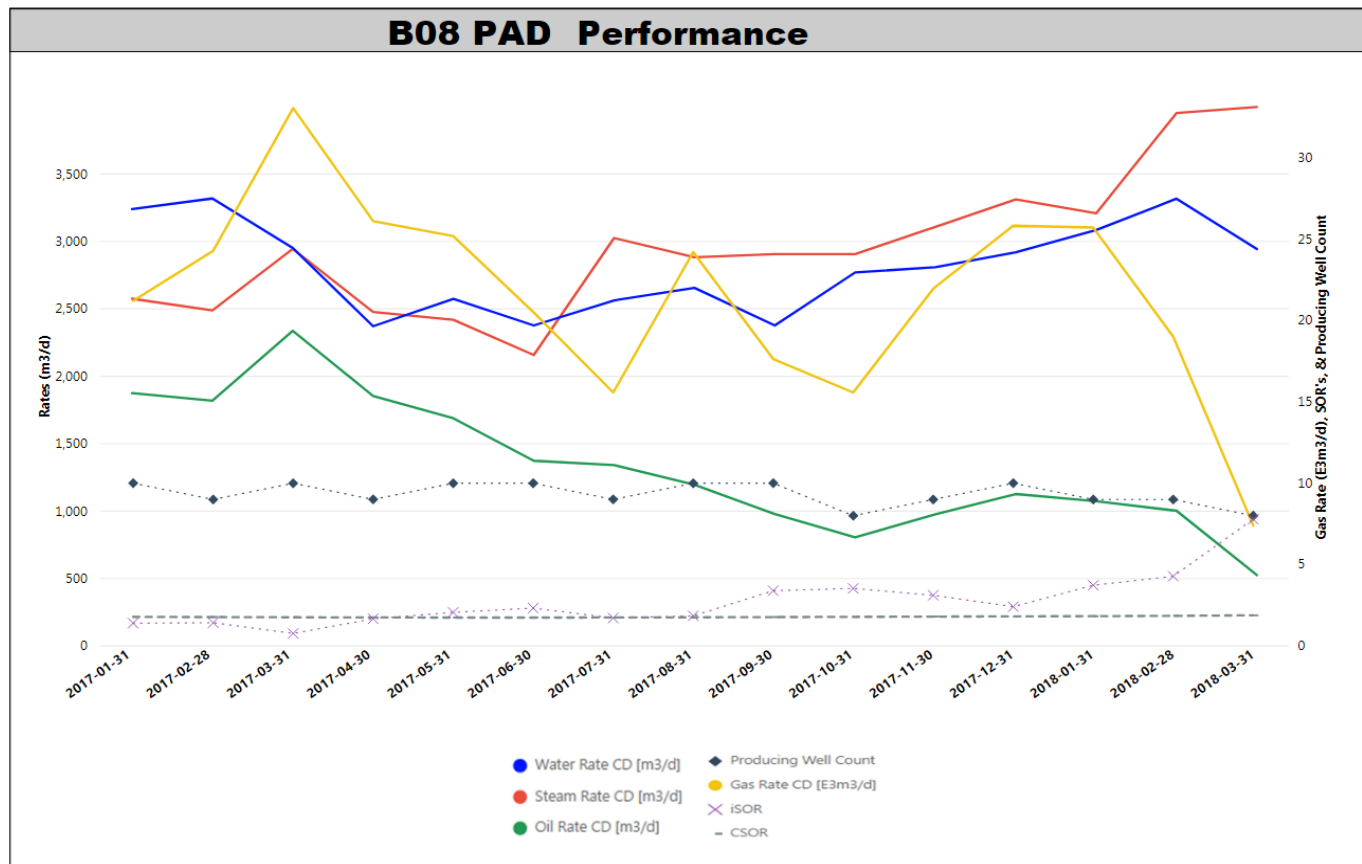


B07 Pad

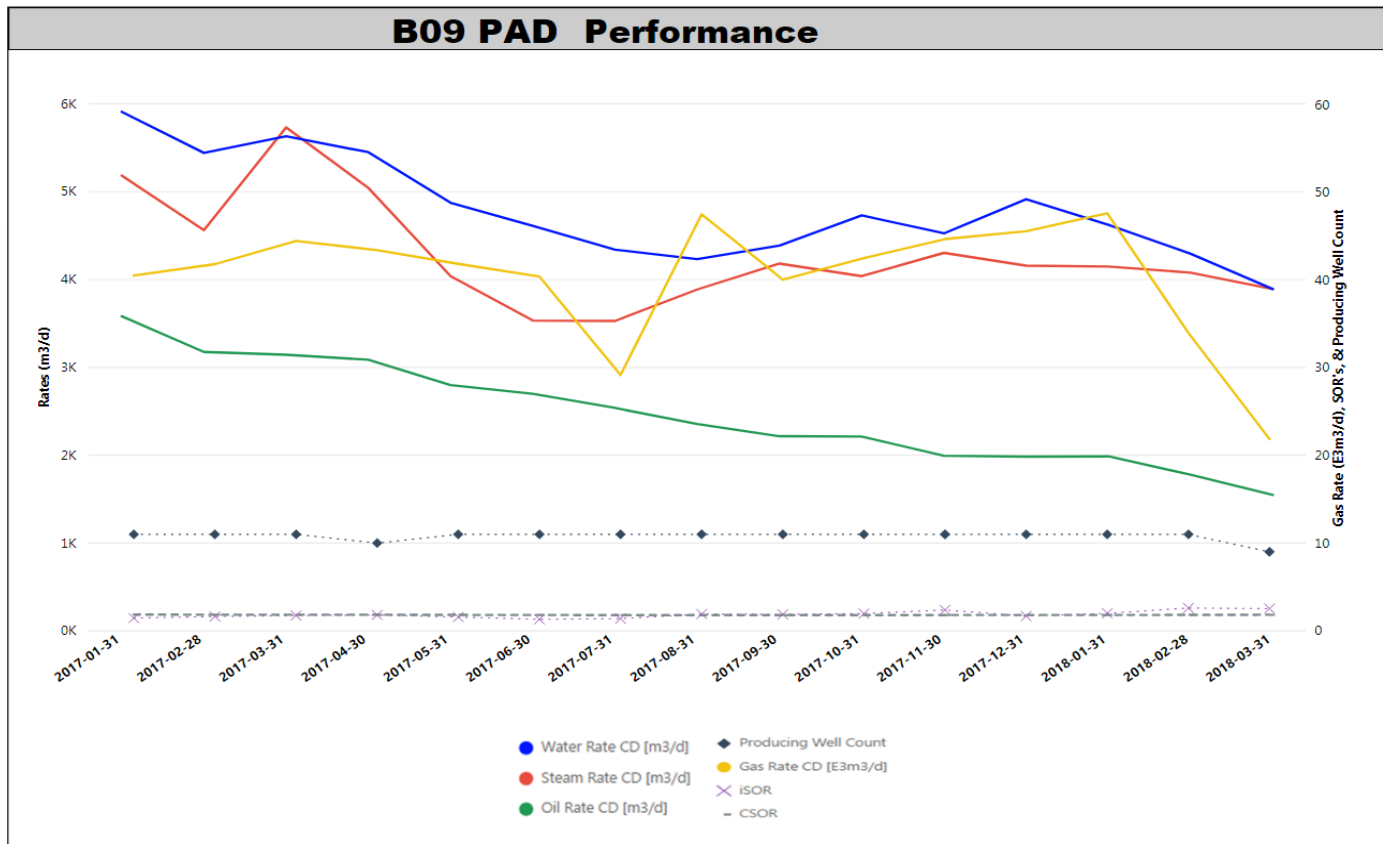


B07B Pad

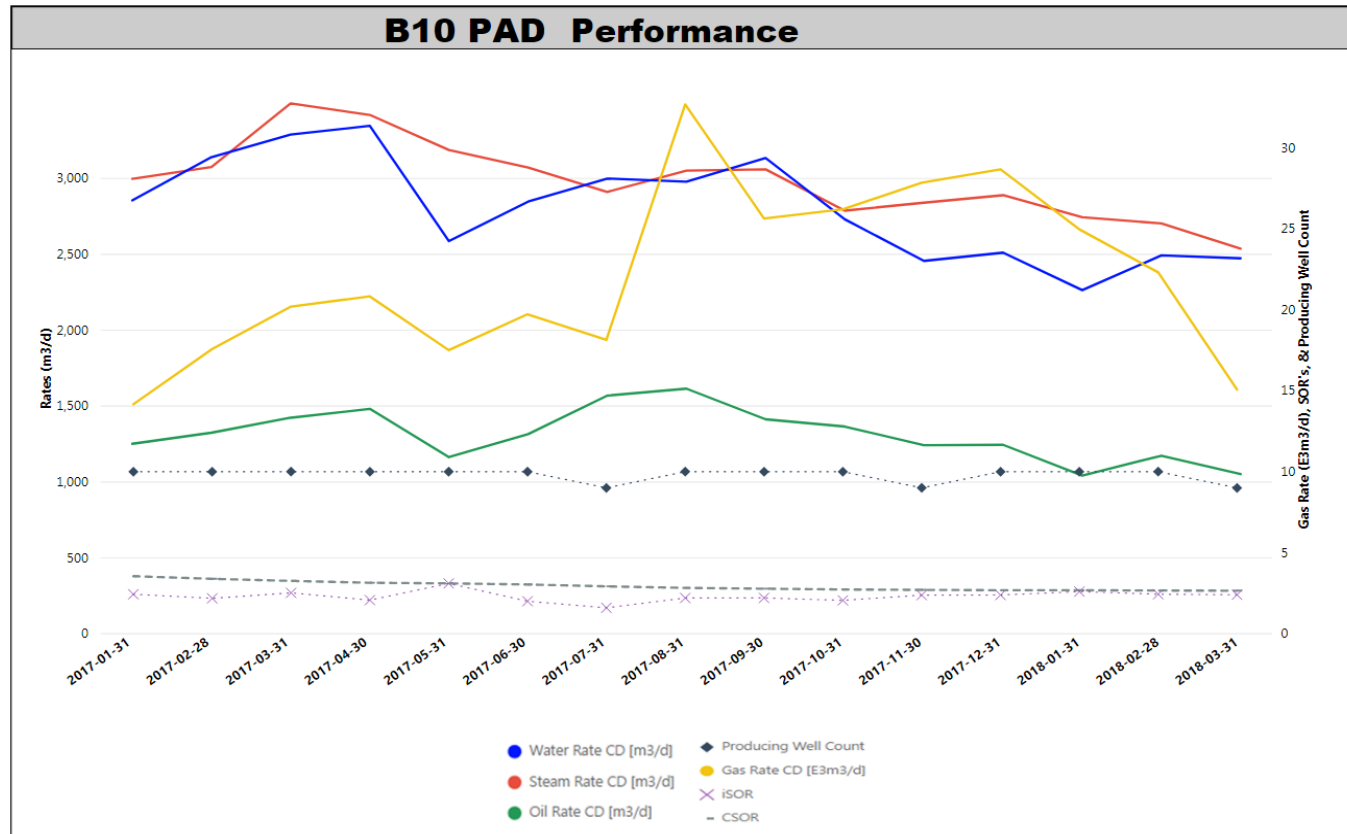




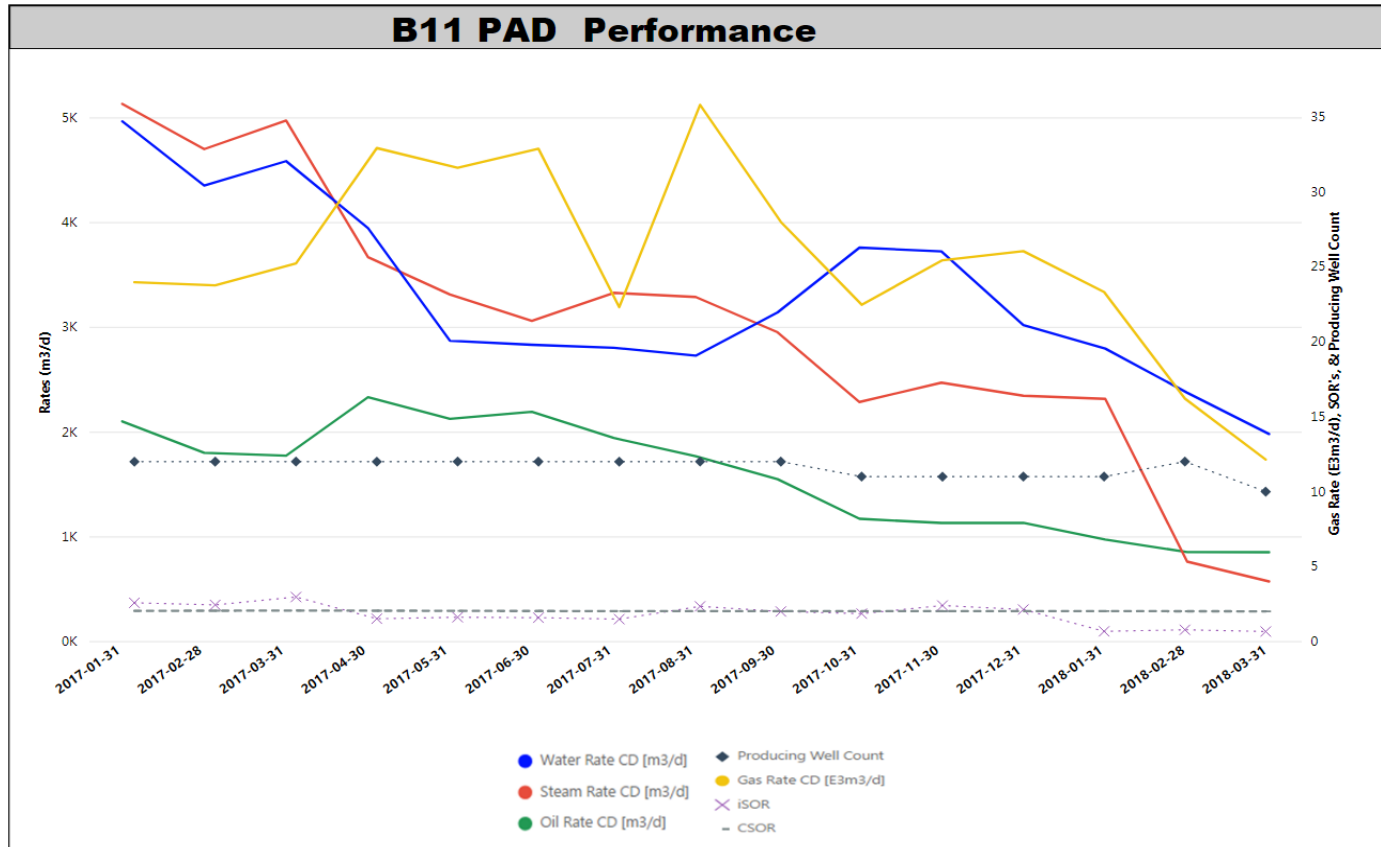
B09 Pad



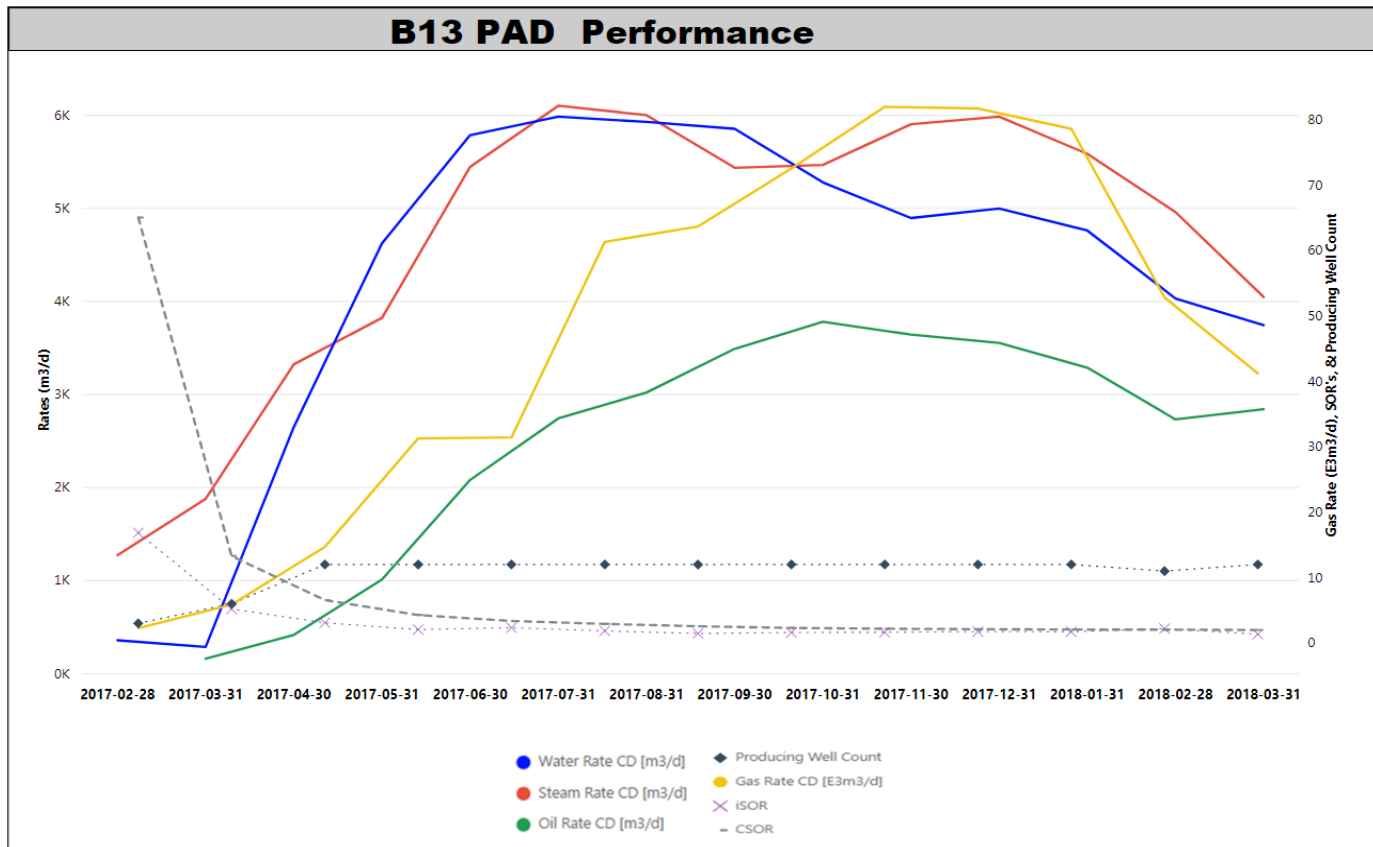
B10 Pad



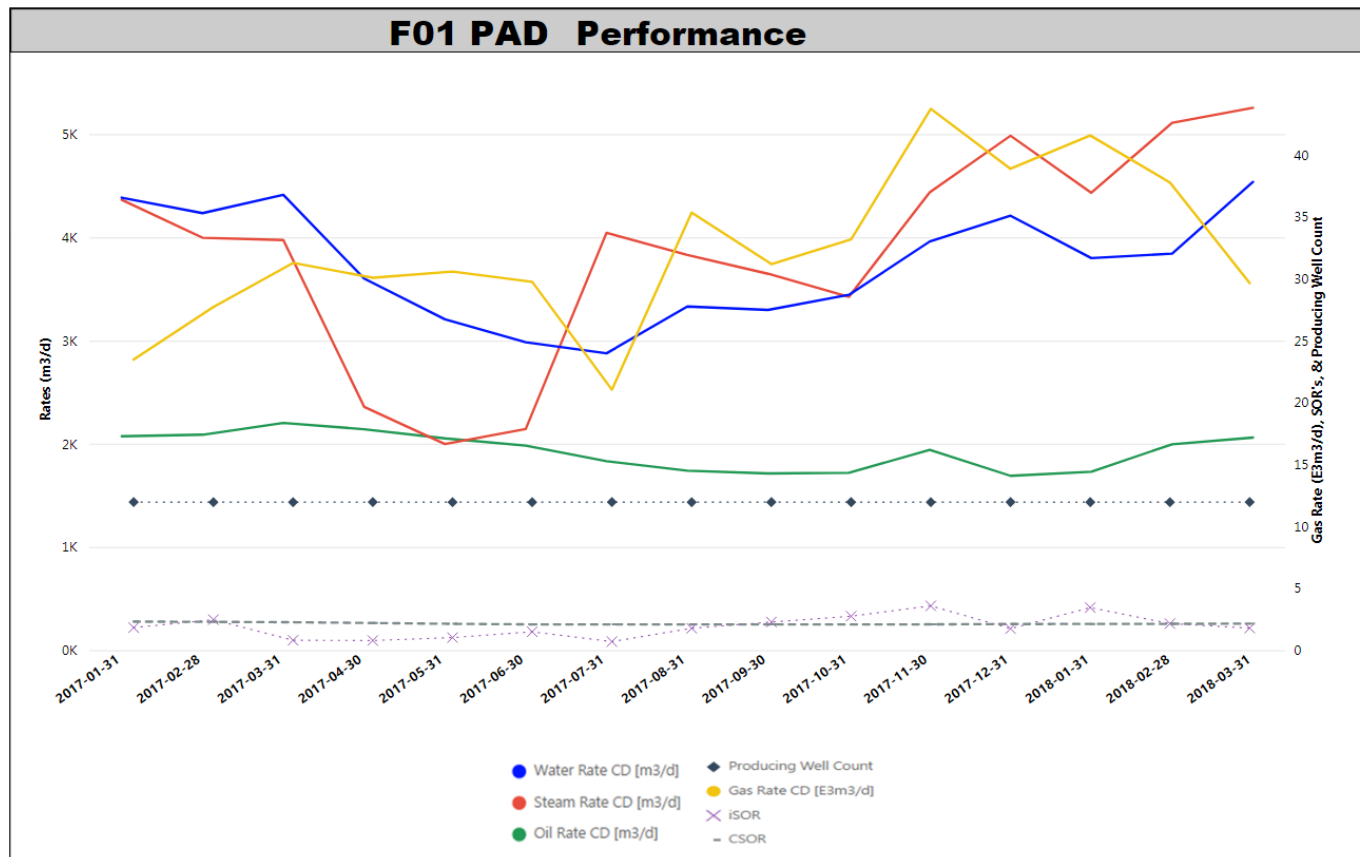
B11 Pad



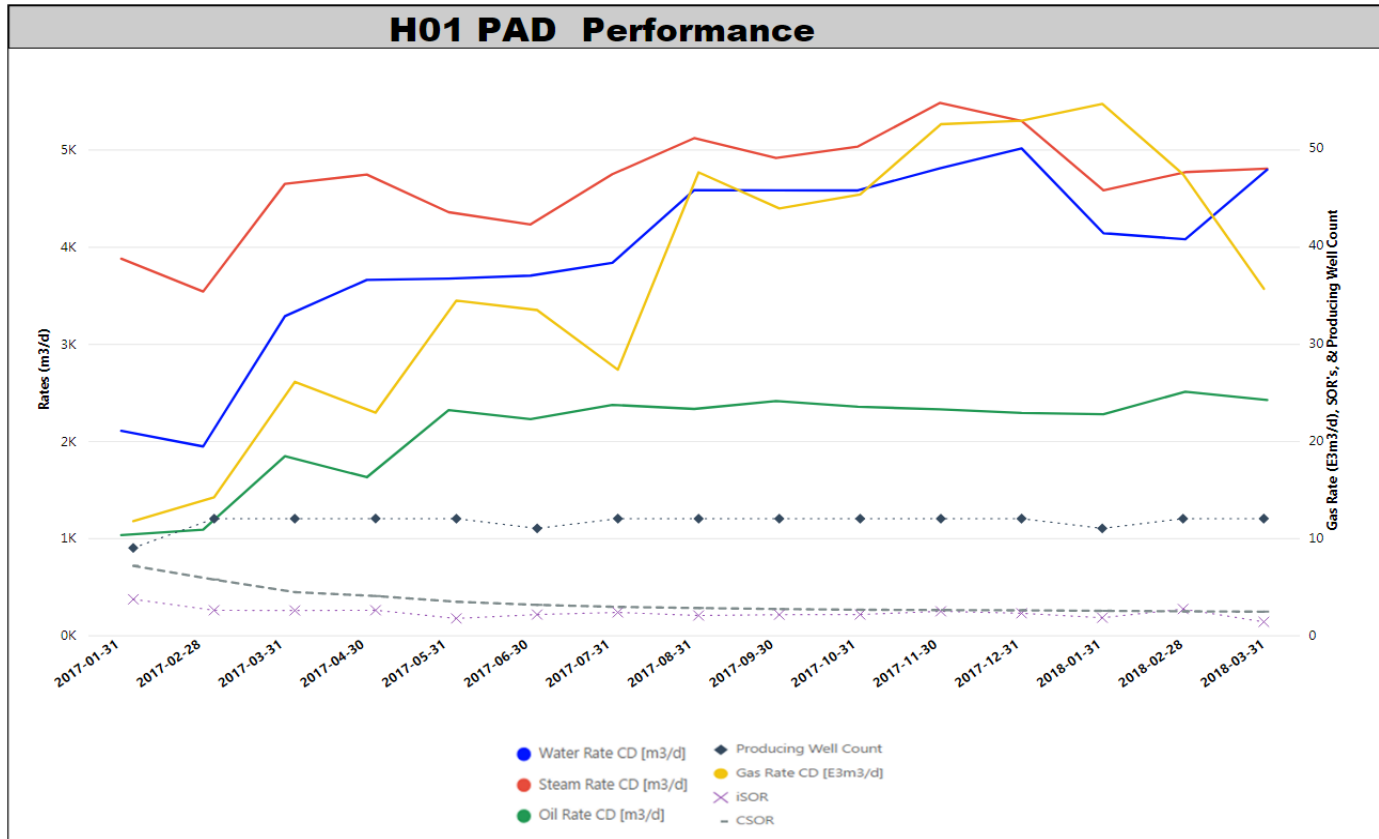
B13 Pad



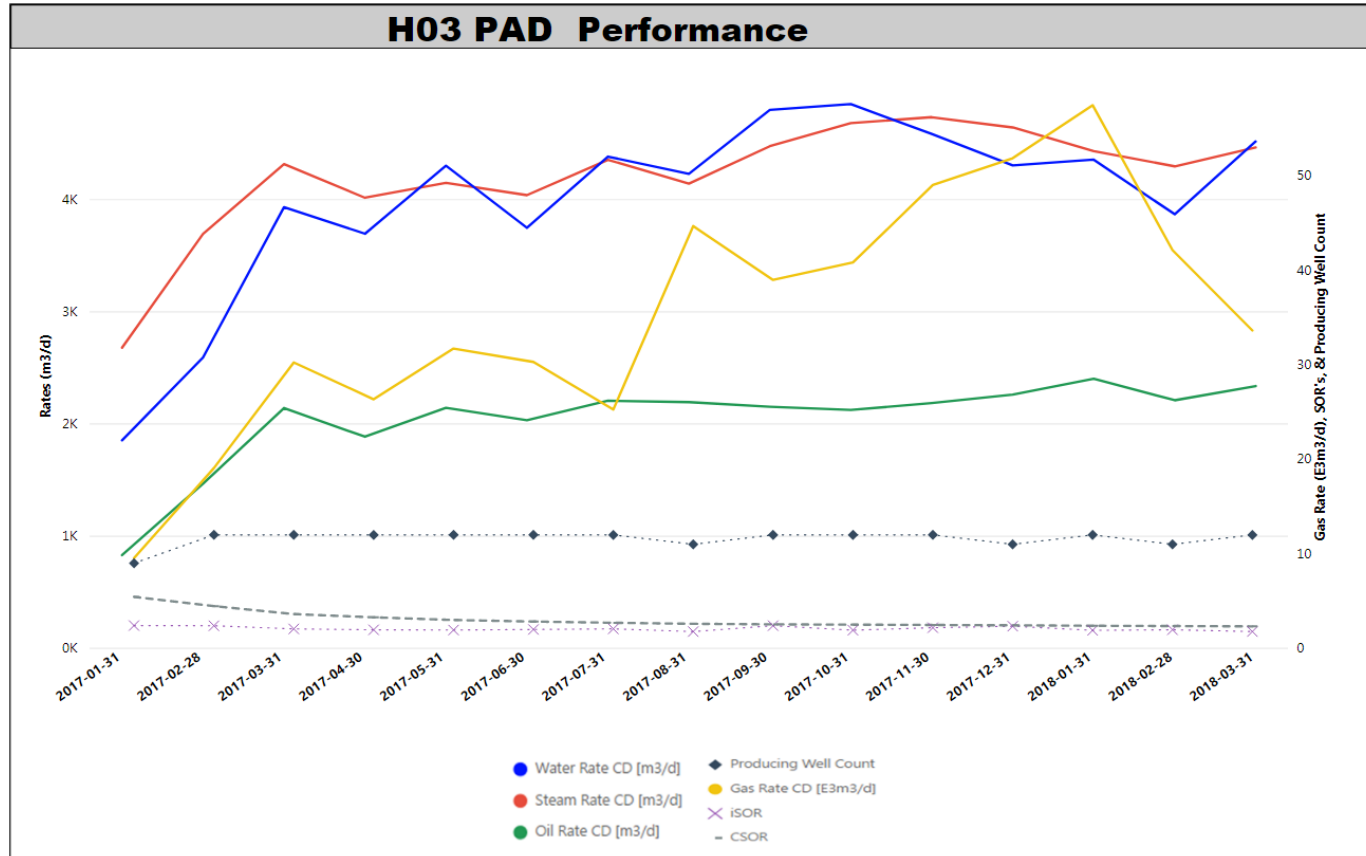
F01 Pad



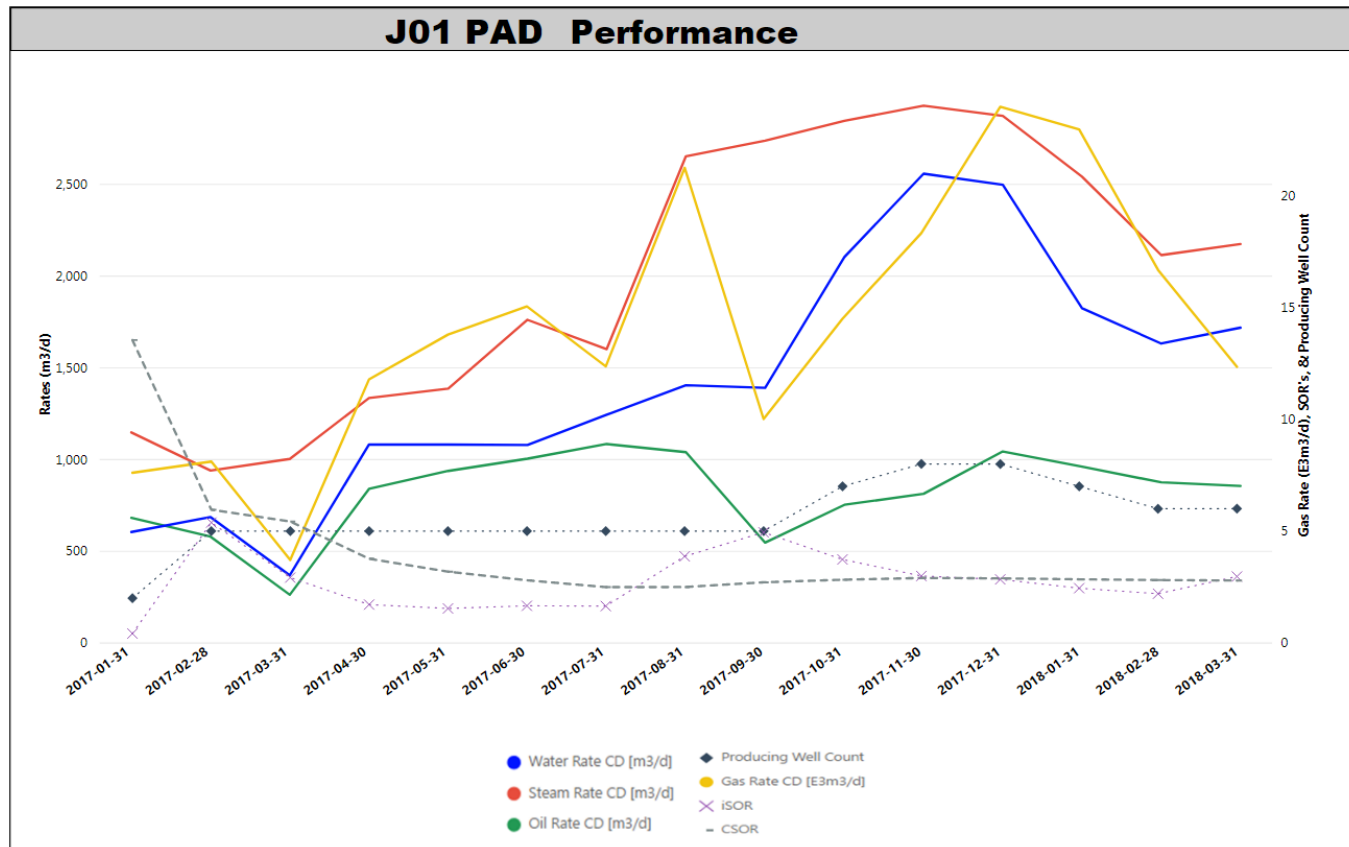
H01 Pad



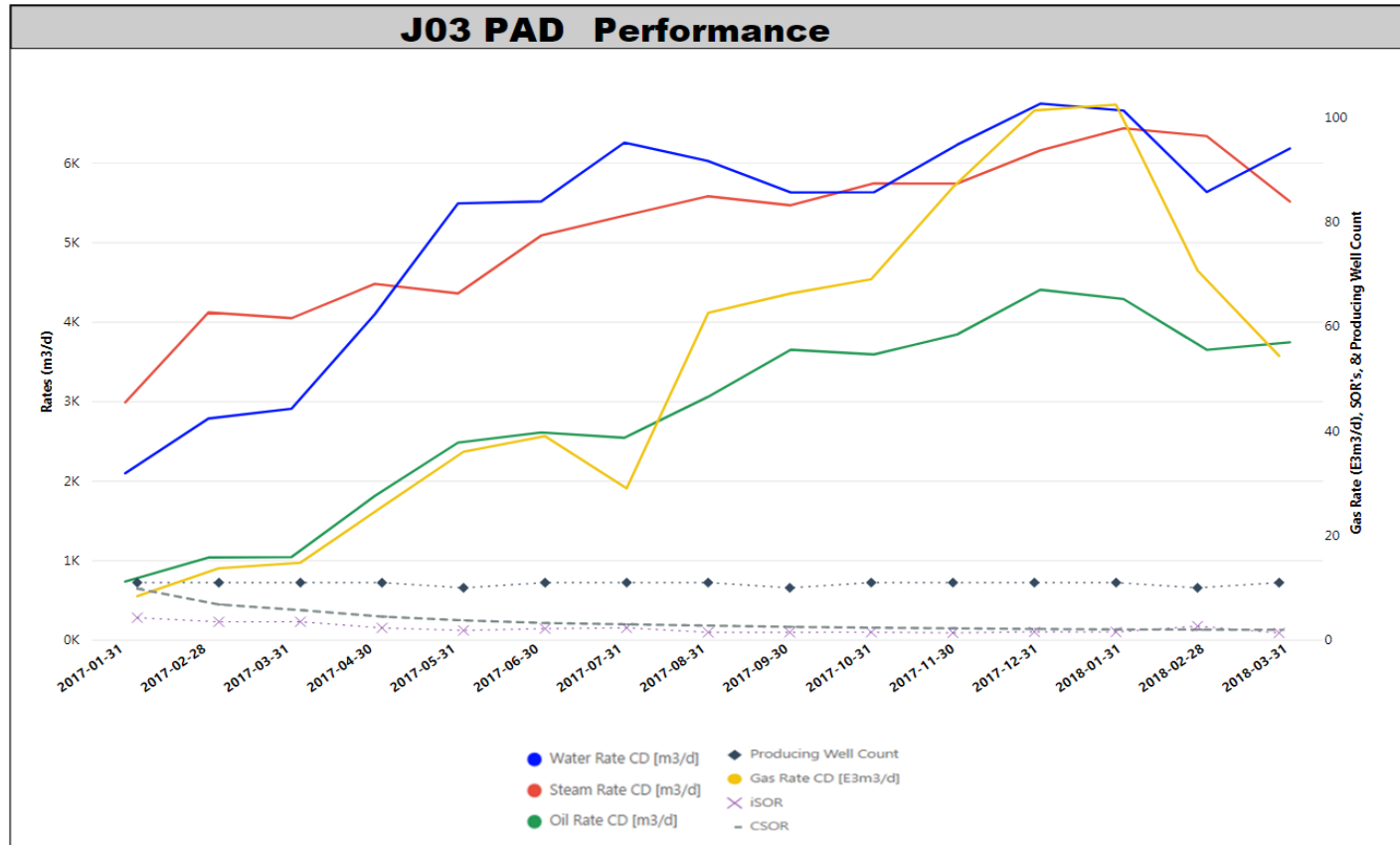
H03 Pad



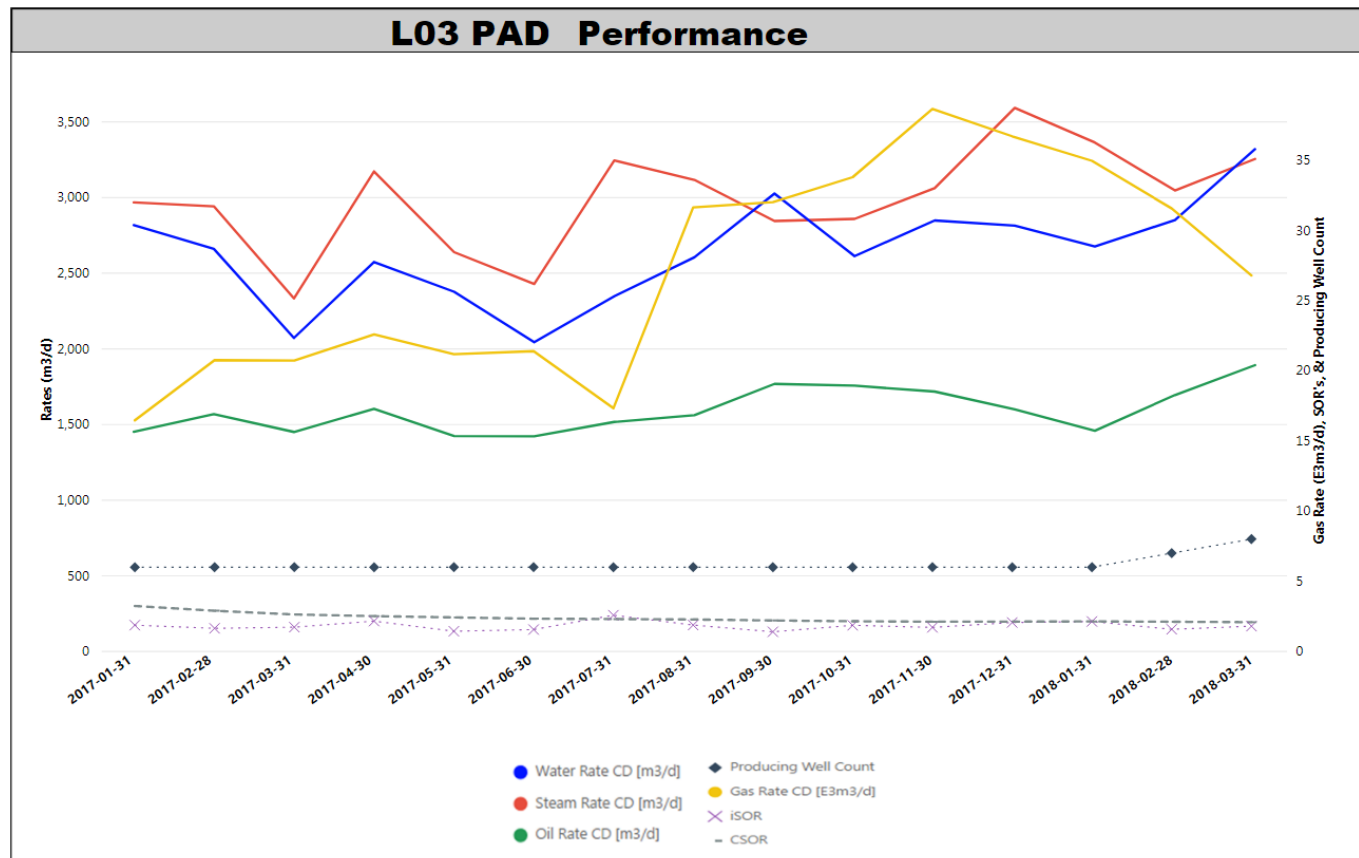
J01 Pad



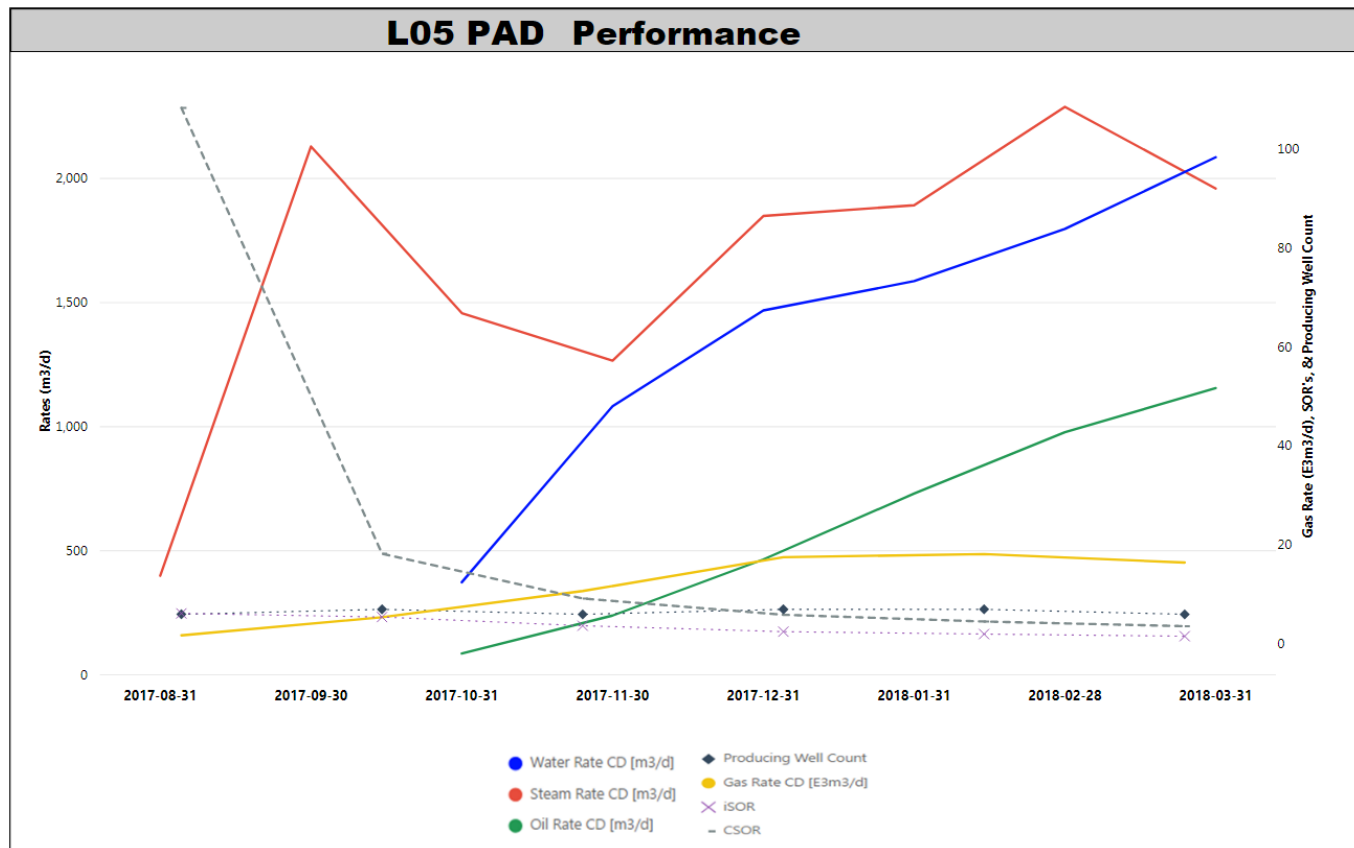
J03 Pad



L03 Pad



L05 Pad



L09 Pad

