

Sequence X

ASTM D8729

Ford Chain Wear Test Surveillance Panel Meeting

June 25, 2020

Prepared By: Alfonso Lopez, S.P. Chairman

Sequence X SP Meeting Agenda

06/25/20

- Attendance – Roster attached
- Approval of the minutes of SP meeting 01/27/20
- Test Update
- Candidate Testing
- TMC Report
- New Items
 - Blowby Temperature – GS
- Hardware Status

Sequence X Test Update

- Four test labs conducting Chain Wear tests – 2 Calibrated
- Joint Surveillance Panel Meeting via Conference Call 01/27/20
 - Motion passed to allow multiple test type calibration of Sequence X stands - see TMC Information Letter 20-2
- Test Report Form 6 changed to add Mg to the list of elements in the used oil samples (07/09/20)
- Full Surveillance Panel Meeting via Web-Ex – June 25th
 - Industry control chart alarms (05/08/20 Mild Severity – Cleared 05/15/20)
 - Blowby Temperature - GS

Meeting Notes

- Industry Action alarm for mild severity. Test has shifted mild starting mid 2019 as seen on the cu-sum plot.
- Discussion of hardware
 - Labs to confirm BC pistons and ring batch. Any engine batch change should be noted.
 - Action Item: Jason Soto to report on the lower crank gear and crush washer. Have the parts changed?
- Todd Dvorack to plot reference data – plots generated during the meeting. Panel to review and comment.
- George Szappanos presented temperature plots of the blowby gas and possible condensation influence on the measurement. Panel agreed to revise blowby stack plumbing to include two 45 degree elbows to prevent condensation from touching the thermocouple. Motion to revise procedure drawing to follow.

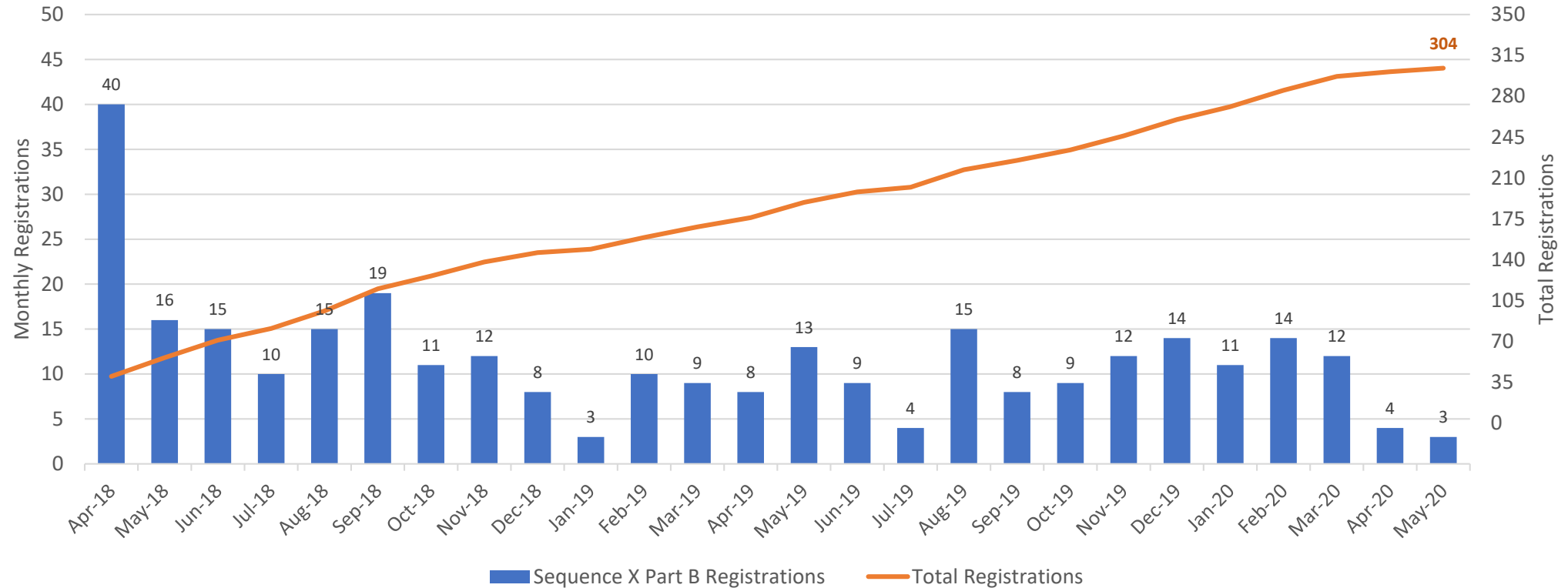
Motion List 06/25/20

- Motion 1 Approval of the SP Meeting minutes from 01/27/20
 - Rich Grundza
 - Second Christian Porter
 - Passed - Unanimous
- Motion 2
 - Reconfigure the blowby fittings above the heat exchanger with 2, 45 degree elbows to prevent condensation from contacting t/c
 - Motion will be e-balloted after drawing update and discussion by lab group

Sequence X S.P. Report Candidate Test Activity

Sequence X Part B Registrations through 20200531

Registration began on April 2, 2018 with retroactive registration March 19, 2016 - April 2, 2018



Sequence X TMC Activity

October 2019 to April, 2020

Sequence X Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	8
Statistically Unacceptable Calibration Test	OC	1
Operationally Invalid Calibration Test (Lab determination)	LC	3
Total Number of Tests		12

Sequence X - Failed Tests

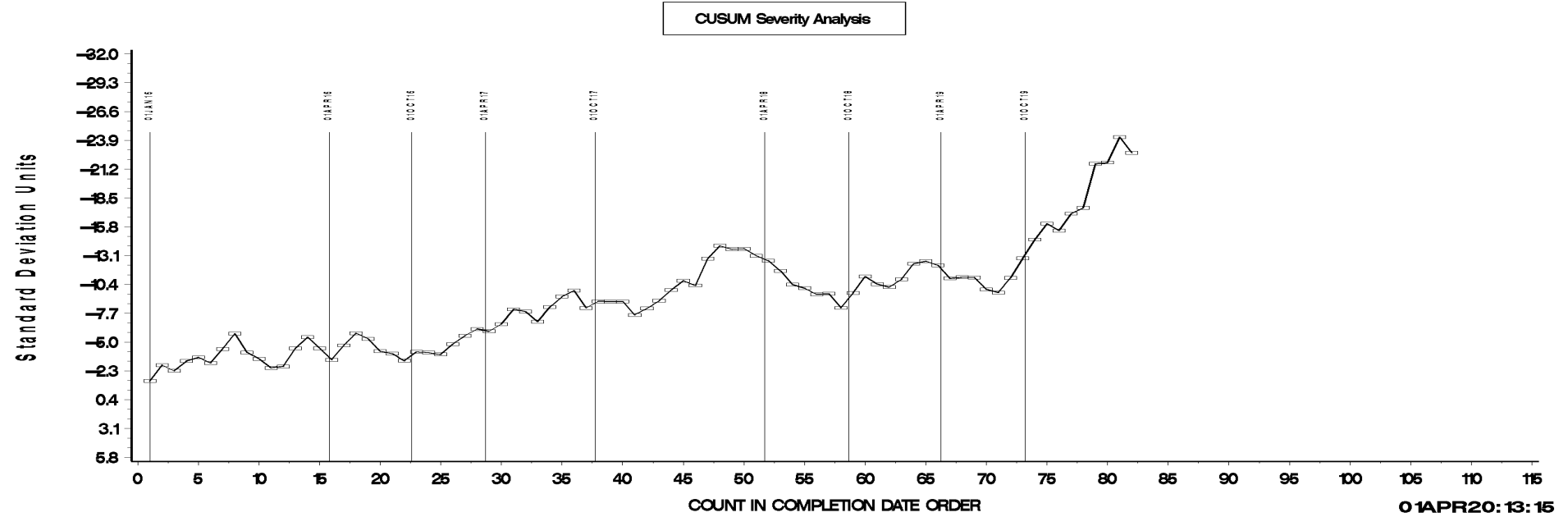
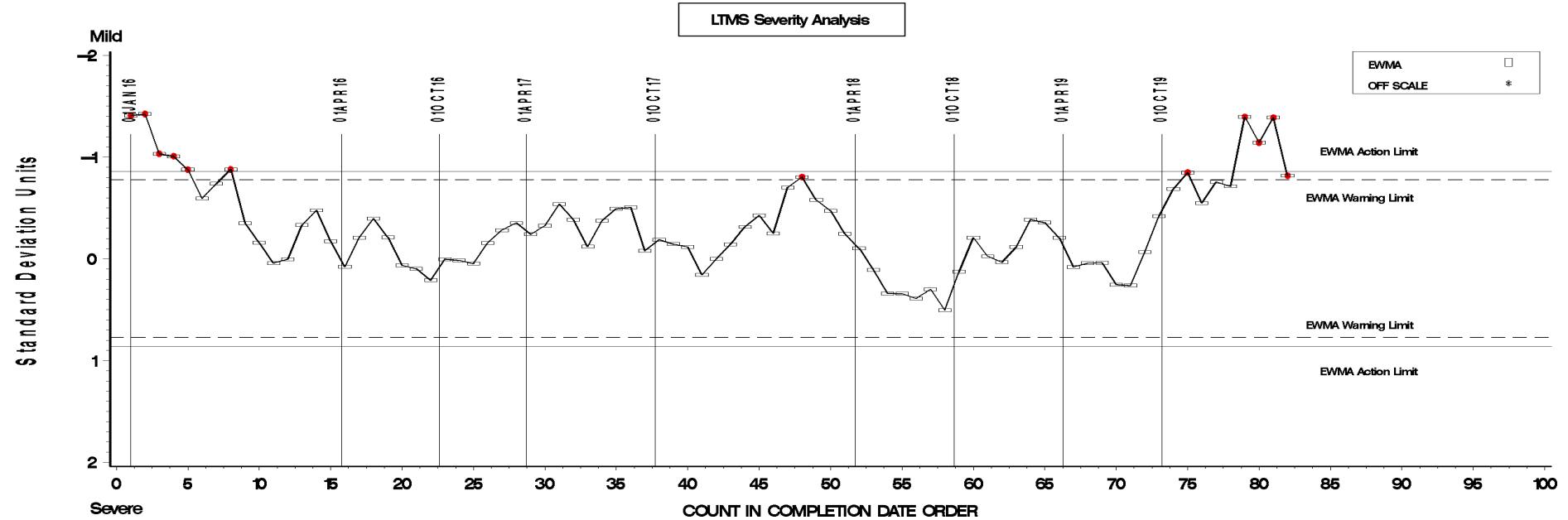
Test Status	Number of Tests
CHST Ei Level 3 alarm	1
Total	1

Sequence X - Lost Tests*

Test Status	Cause	#
Invalid	Air Charge Temperature control issues, negative Qi	1
Invalid	Fuel pump failure	1
Invalid	Broken clutch spring	1
Totals		3

*Invalid and aborted tests

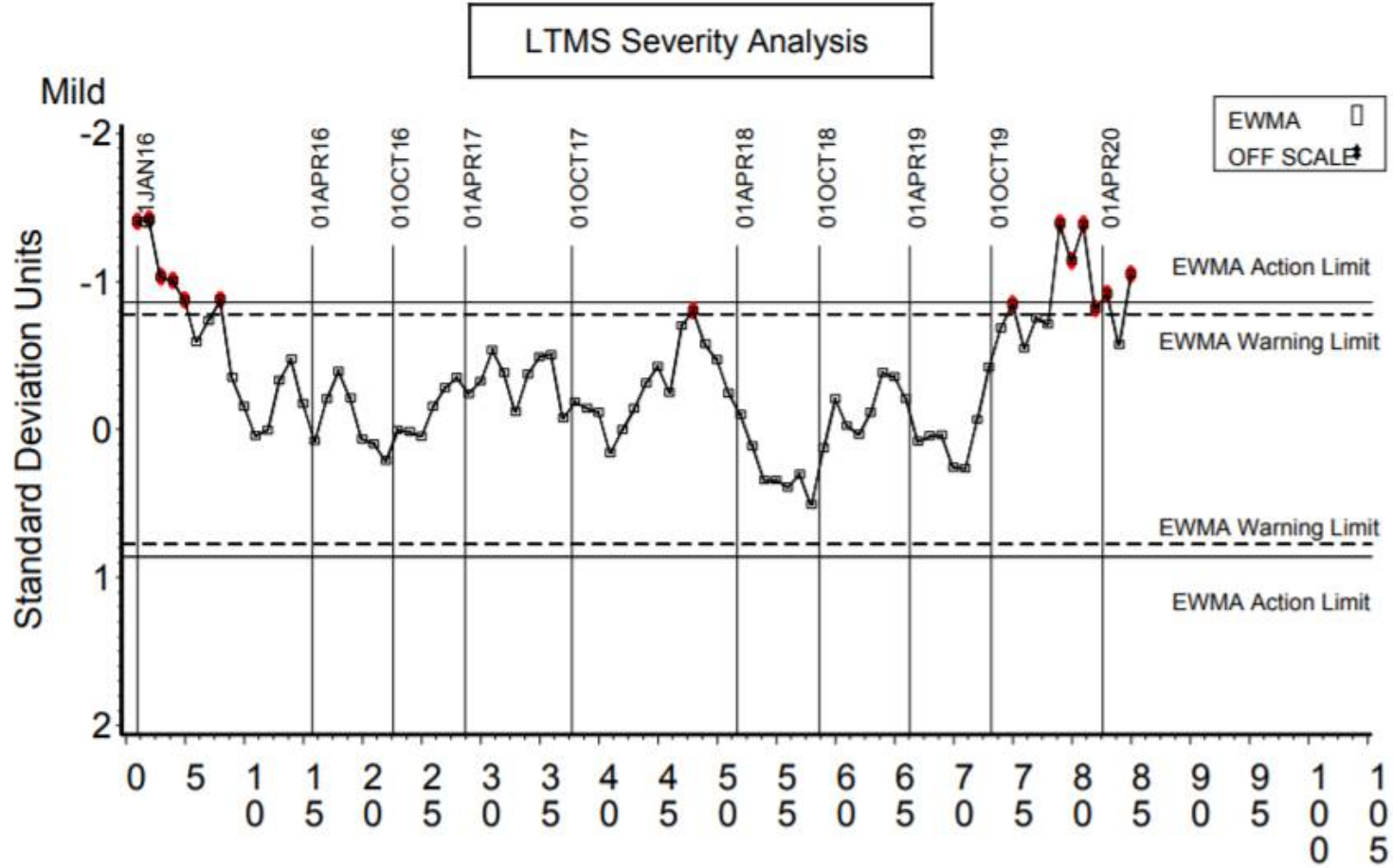
END OF TEST CHAIN WEAR FINAL RESULT



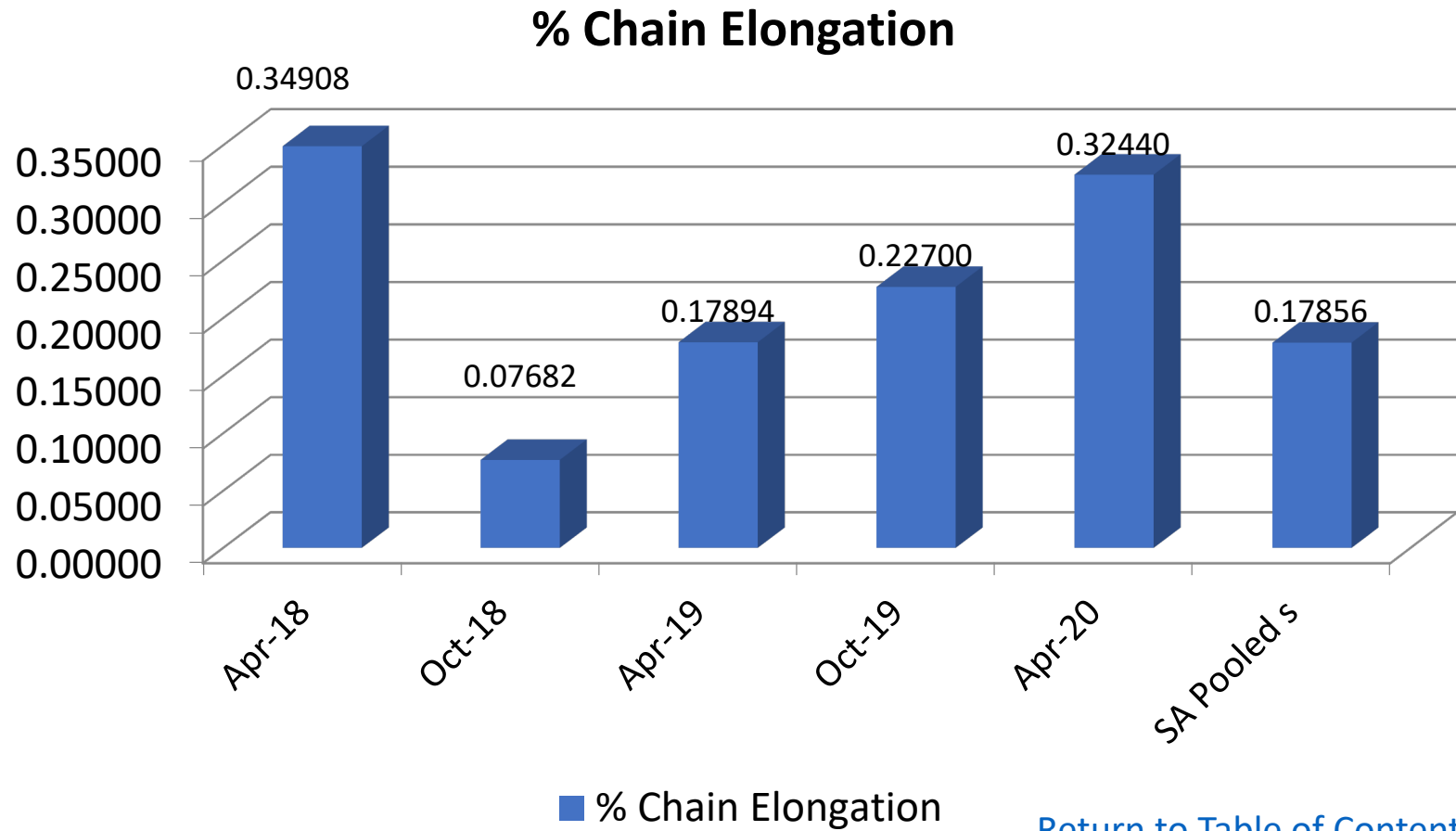
SEQUENCE X INDUSTRY OPERATIONALLY VALID DATA



END OF TEST CHAIN WEAR FINAL RESULT



Sequence X Precision Estimates

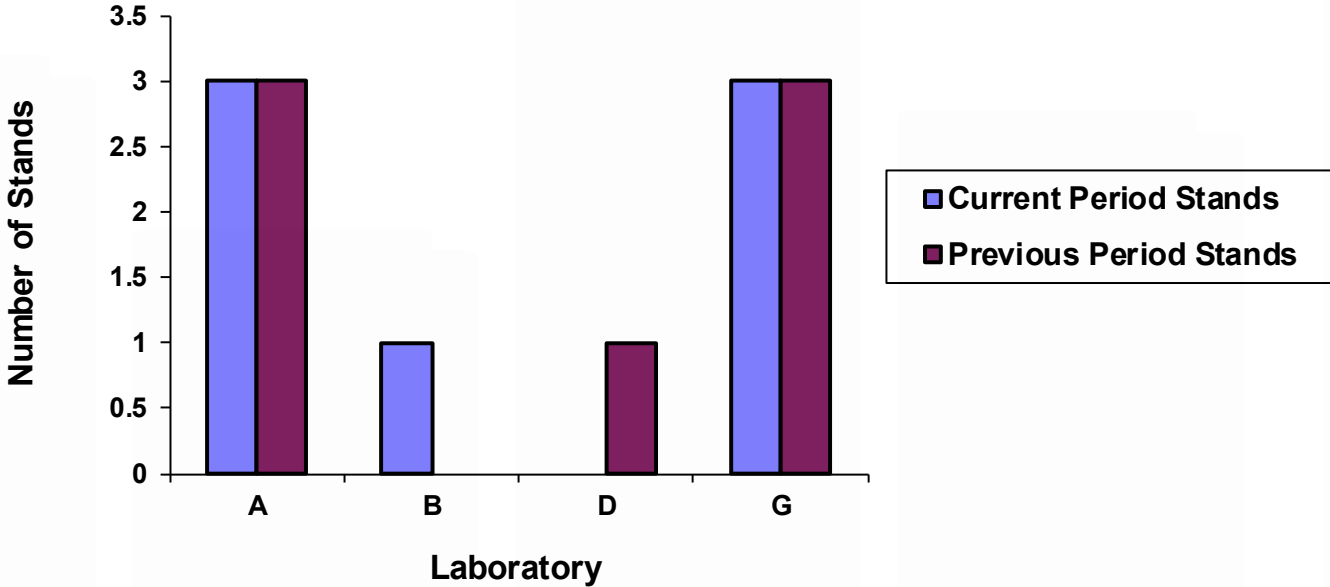


Sequence X S.P. Report

LTMS Laboratory/Stand Distribution

	Reporting Data	Calibrated as of 3/31/20
Number of Laboratories	3	3
Number of Stands	8	7

Laboratory/Stand Distribution



Sequence X S.P. Report Reference Oils Status

- 271 SAE 5W-30 passing reference oil (5yr)
- 1011 SAE 0W-16 (1yr) Reblend available
- 270 SAE 5W-30 failing reference oil (5yr)

Blowby Temperature

- **From:** Szappanos, George <George.Szappanos@lubrizol.com>
- Following up on this... we struggled getting the BB temp to follow the ramp. Theoretically, it shouldn't be hard since the original ramps were done without any control at all.
- We did discover that during the ramp to stage 2 there's a ton of condensate that runs down the piping and drips onto the TC causing the thermocouple to not read the actual gas temperature. Relocation/orientation of the TC is the trick, and not getting it right can lead to VERY incorrect blowby temps

Sequence X

Hardware Status

- 7-8 Year inventory of test engines with BC pistons
 - Non-critical parts are being purchased from the dealerships
 - Industry order planned for non-critical parts
- 2017 Ring Batch – EJ7Z6148A
- 6 tests per engine
- 1100 tests at independent labs (as of 11/01/19)
- Survey sent to labs for hardware needs

Sequence X History

Sequence X Milestones	
1/1/2012	Start of Chain Wear Test Development
12/7/2017	AOAP Approval for GF6
4/2/2018	Live Registration (03/19/16 Retro - Registration)
2/20/2019	Surveillance Panel Procedure Acceptance Vote
4/4/2019	Subcommittee B Ballot
6/16/2019	Main Committee D02 Ballot - ASTM Procedure D8279
11/7/2019	Memorandum 19-043 Use of Calibrated Sequence X Stands to Generate Used Oil Samples for Seq IX (LSPI)
11/20/2020	Information Letter 20-1 Procedure Edits / Drive Shaft Spec
1/27/2020	Information Letter 20-2 Criteria for Multiple Test Type Calibration

Attendance List

Sequence X Surveillance Panel Meeting		
June 25, 2020		
	Attendance	Voting Member
Porter, Christian <Christian.Porter@AftonChemical.com>	x	Afton
Todd Dvorak <Todd.Dvorak@AftonChemical.com>	x	
Martin Chadwick Intertek <martin.chadwick@intertek.com>		
Dan Lanctot <DLanctot@tei-net.com>	x	TEI
Romano, Ron (R.) <rromano@ford.com>	x	Ford
Jason Bowden <jhbowden@OHTech.com>	x	OHT
'Rich Grundza' (reg@astmtmc.cmu.edu)	x	TMC
Mahboob.Hosseini@chevron.com		Chevron
Jason Soto Intertek <jason.soto@intertek.com>	x	
doyle.boese@infineum.com	x	
Martinez, Jo G. (jogm) <JoMartinez@chevron.com>		Chevron
J.Hsu@shell.com	x	Shell
Gleason, Joseph <Joseph.Gleason@lubrizol.com>	x	
Dingwell, Lisa (Lisa.Dingwell@AftonChemical.com)		
Kostan, Travis G. <travis.kostan@swri.org>	x	
ptumati@jhaltermann.com	x	Haltermann
George Szappanos	x	
Khaled , Zreik Khaled.zreik@gm.com	x	GM
Chiappelli, Maria <Maria.Chiappelli@Infineum.com>		Infineum
Montufar, Ashley <ashley.montufar@exxonmobil.com>	x	ExxonMobil
Charlie Leverett <charlie.leverett@yahoo.com>		
Amol C Savant <ACSavant@valvoline.com>	x	Valvoline
Eickstead, Christine M. <christine.eickstead@swri.org>	x	SWRI
Brys, Jerome <Jerome.Brys@lubrizol.com>		Lubrizol
'Bob.Campbell@aftonchemical.com'		
Patrick M. Lang <patrick.lang@swri.org>	x	
Stockwell, Robert T (Robert.Stockwell@chevron.com)	x	
Bill Buscher Intertek <william.buscher@intertek.com>		
Ritchie, Andrew <Andrew.Ritchie@Infineum.com>		
Rais, Khaled <khaled.rais@swri.org>	x	
Stevens, Andrew <Andrew.Stevens@Lubrizol.com>		
Matthews, Tim <Tim.Matthews@uk.bp.com>	x	BP
Lopez, Alfonso <al.lopez@intertek.com>	x	Intertek
Deegan, Michael (M.D.) <mdeegan@ford.com>	x	
Lochte, Michael D. <michael.lochte@swri.org>		
joshua cooley valvoline		
George Szappanos	x	
Khaled , Zreik Khaled.zreik@gm.com		
Timothy Cushing <timothy.cushing@gm.com>	x	GM
Wingert, Dean (D.) <dwingert@ford.com>	x	



Seq. X – Chainwear Data Plots

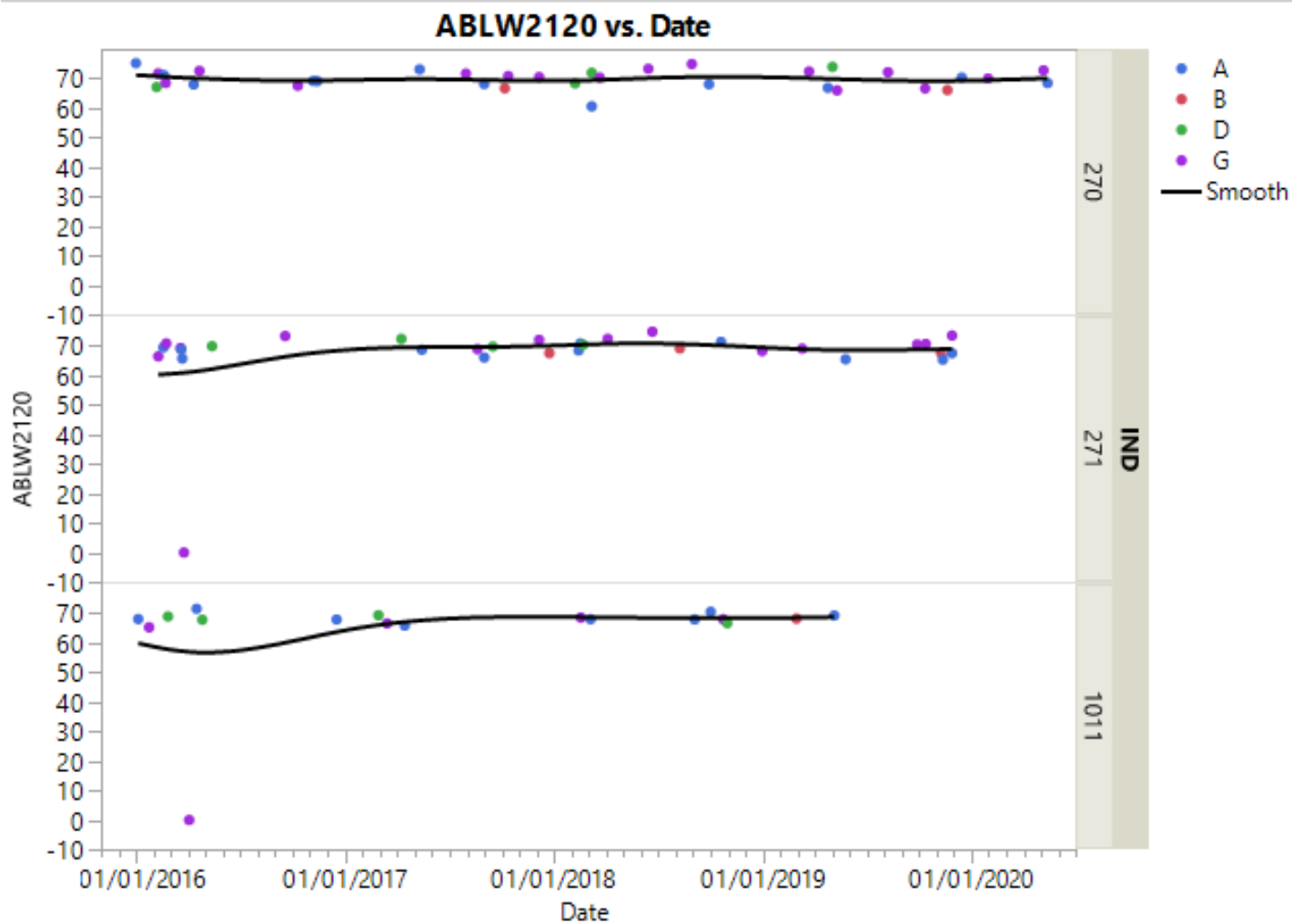
Chartable data Exclusively - Plotted by Date

Todd Dvorak

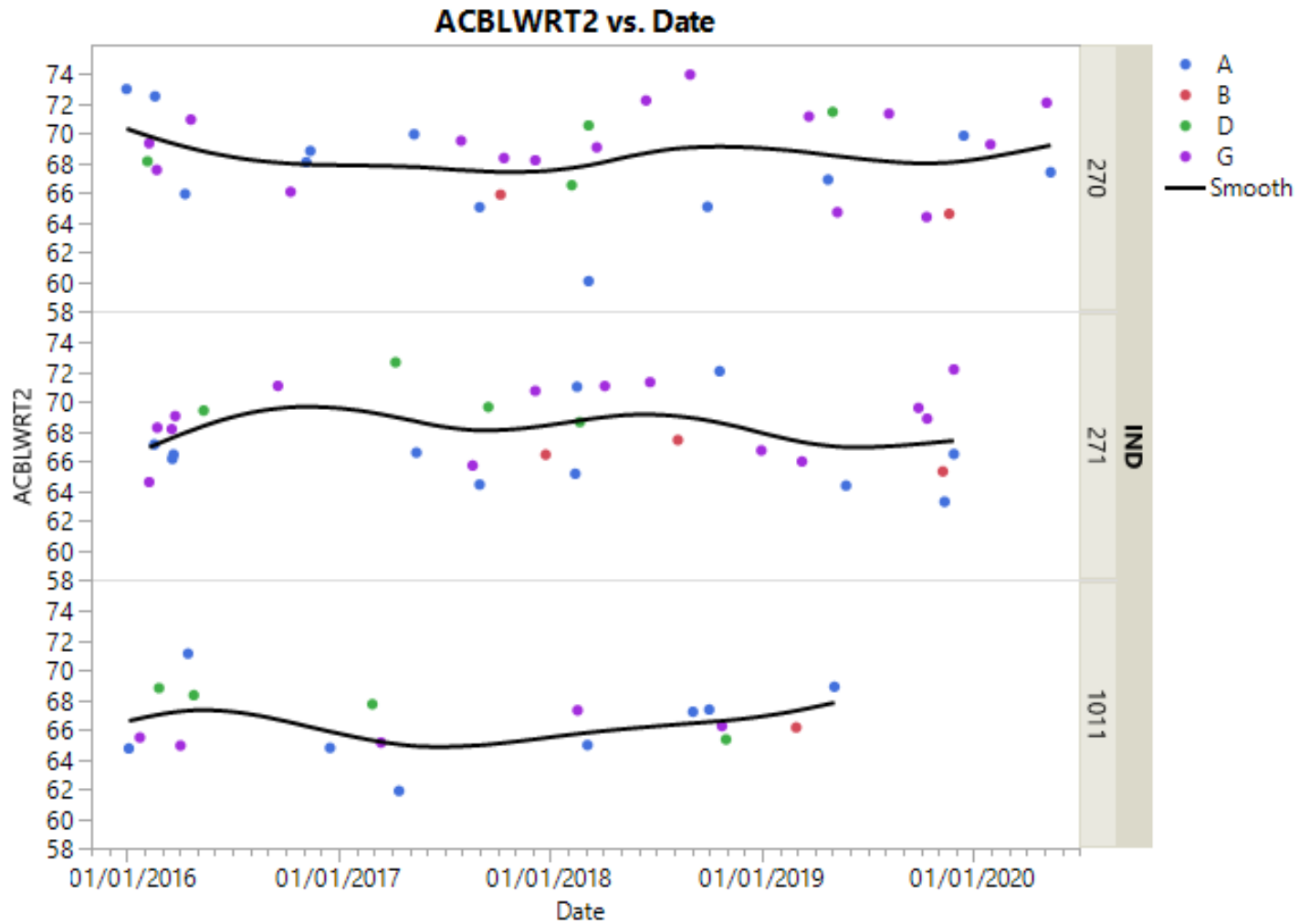
June 25, 2020

Passion for Solutions®

Graph Builder

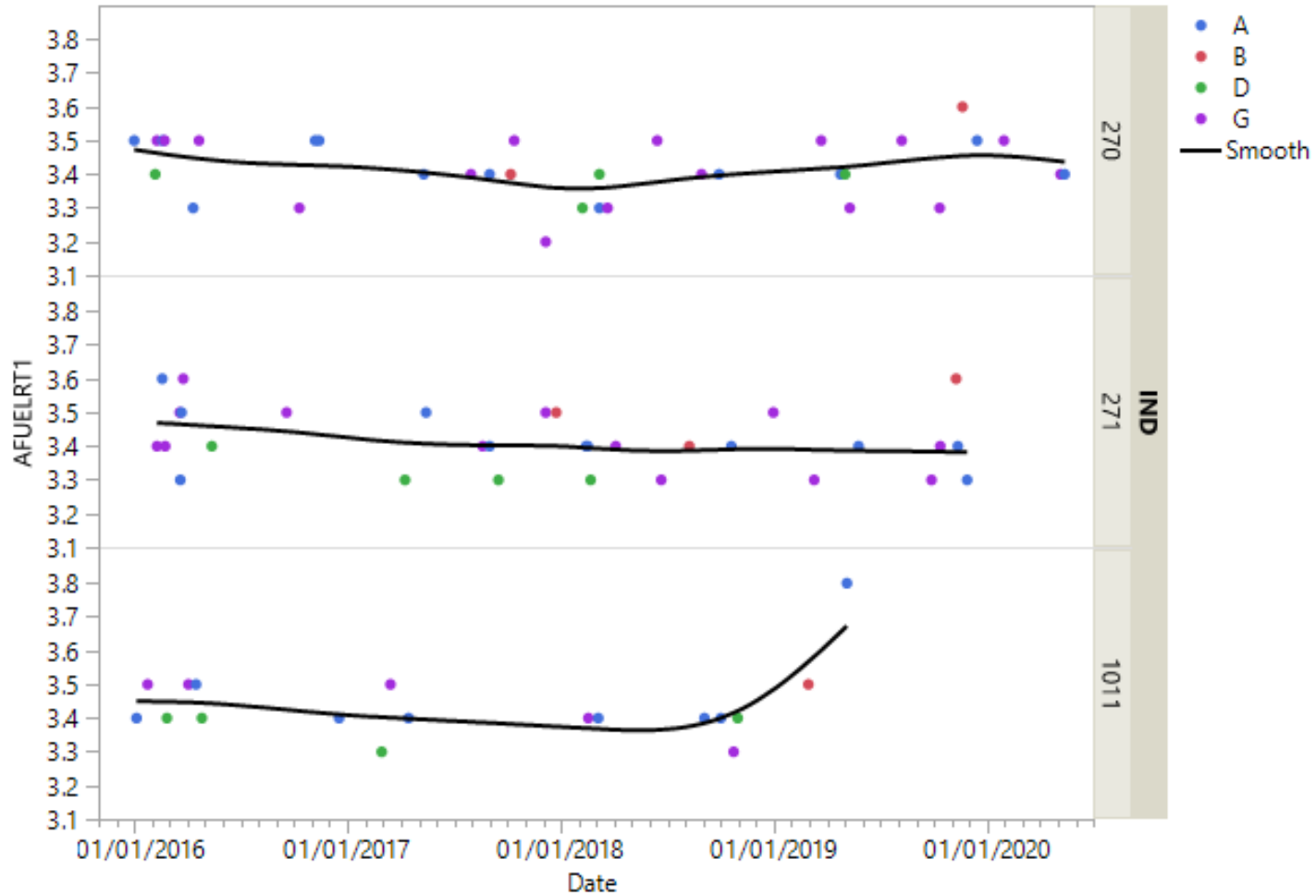


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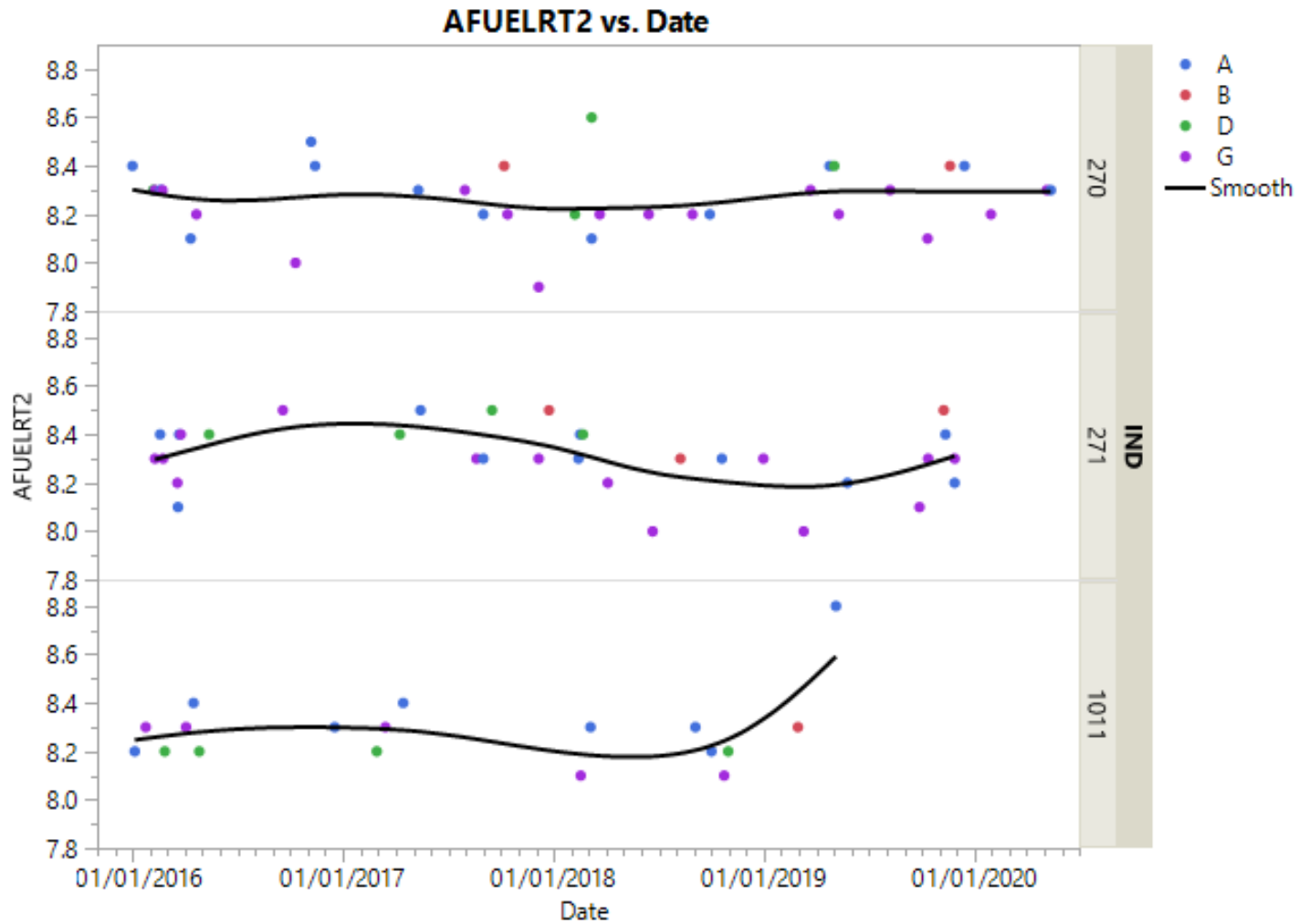


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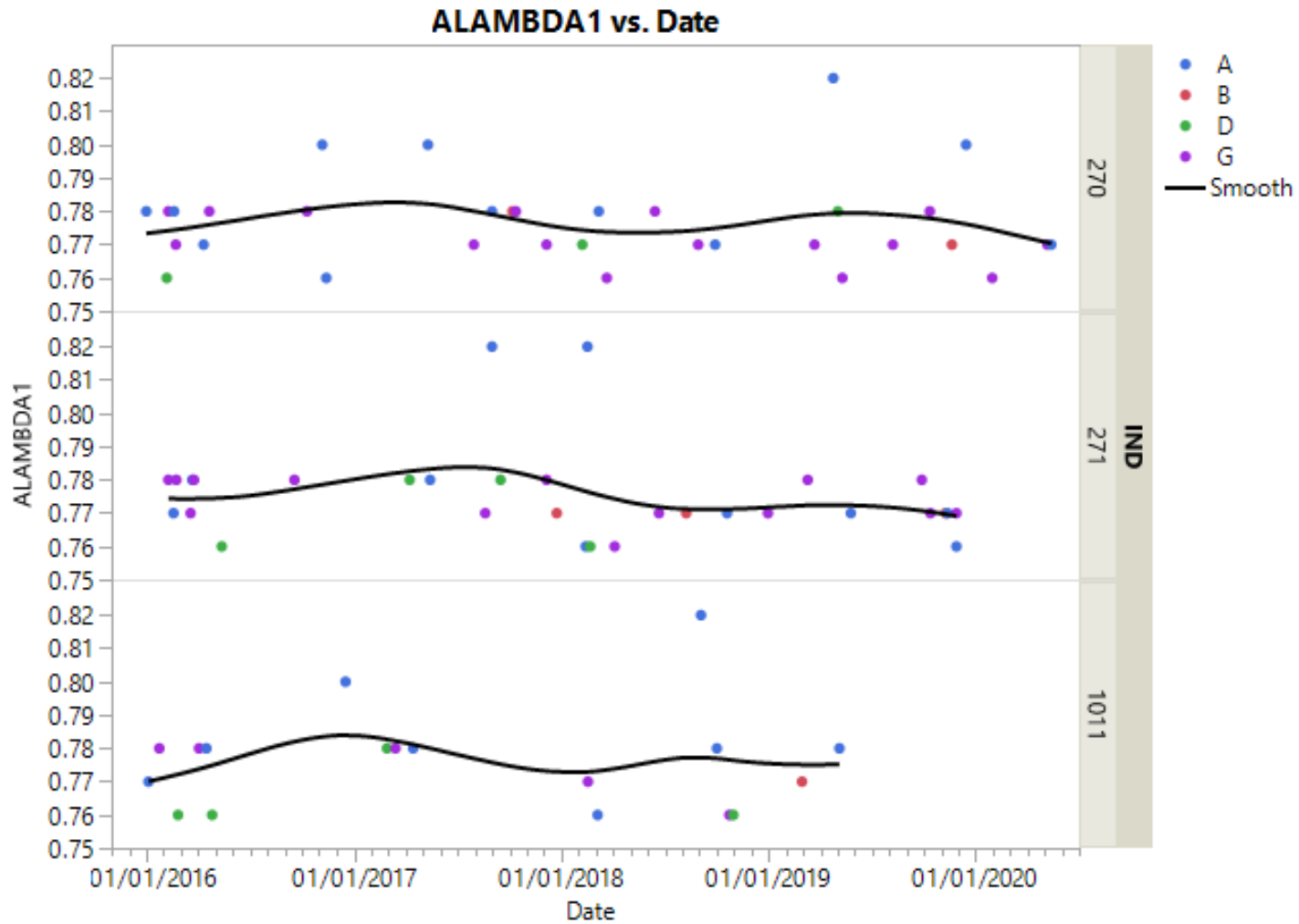
AFUELRT1 vs. Date



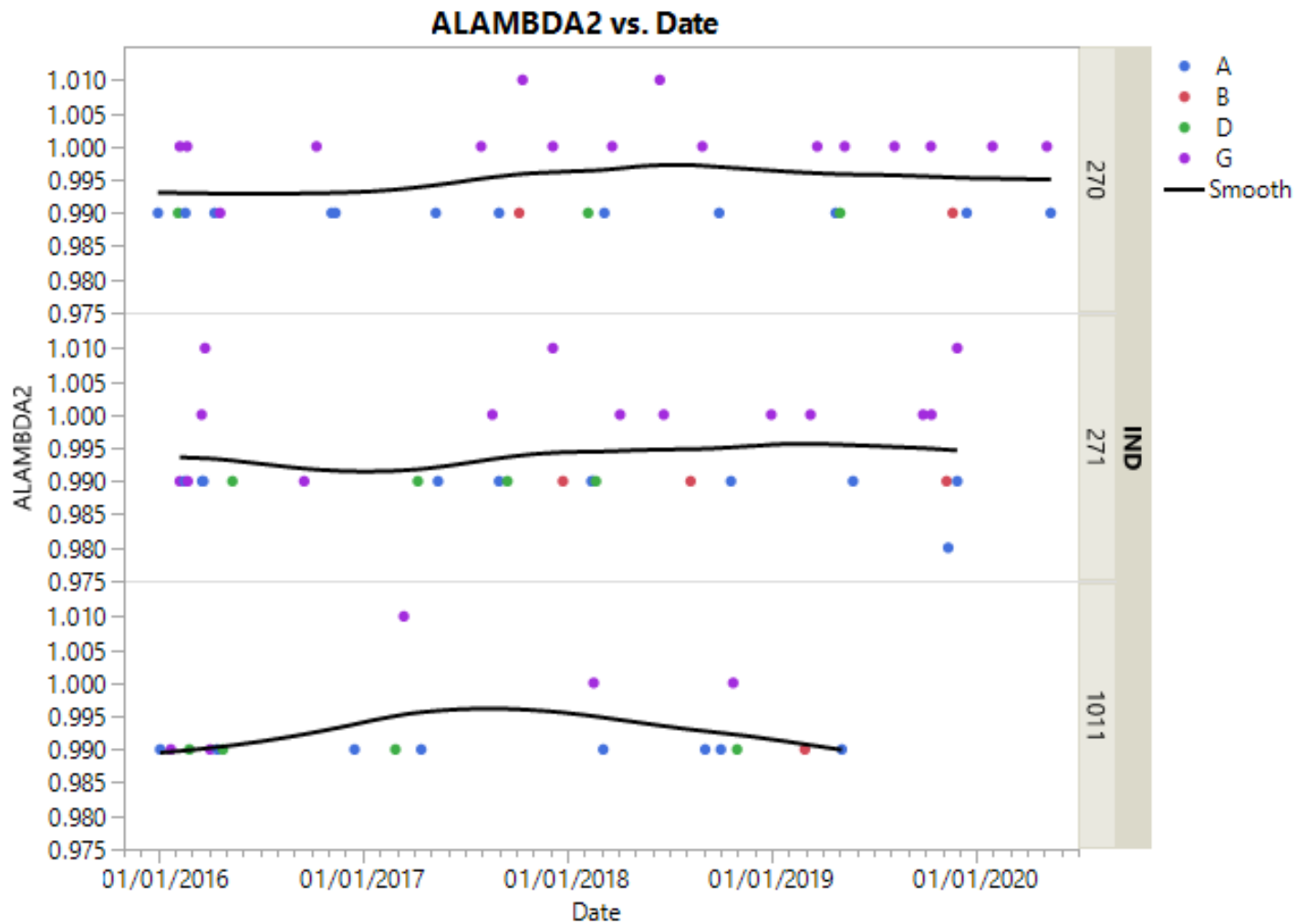
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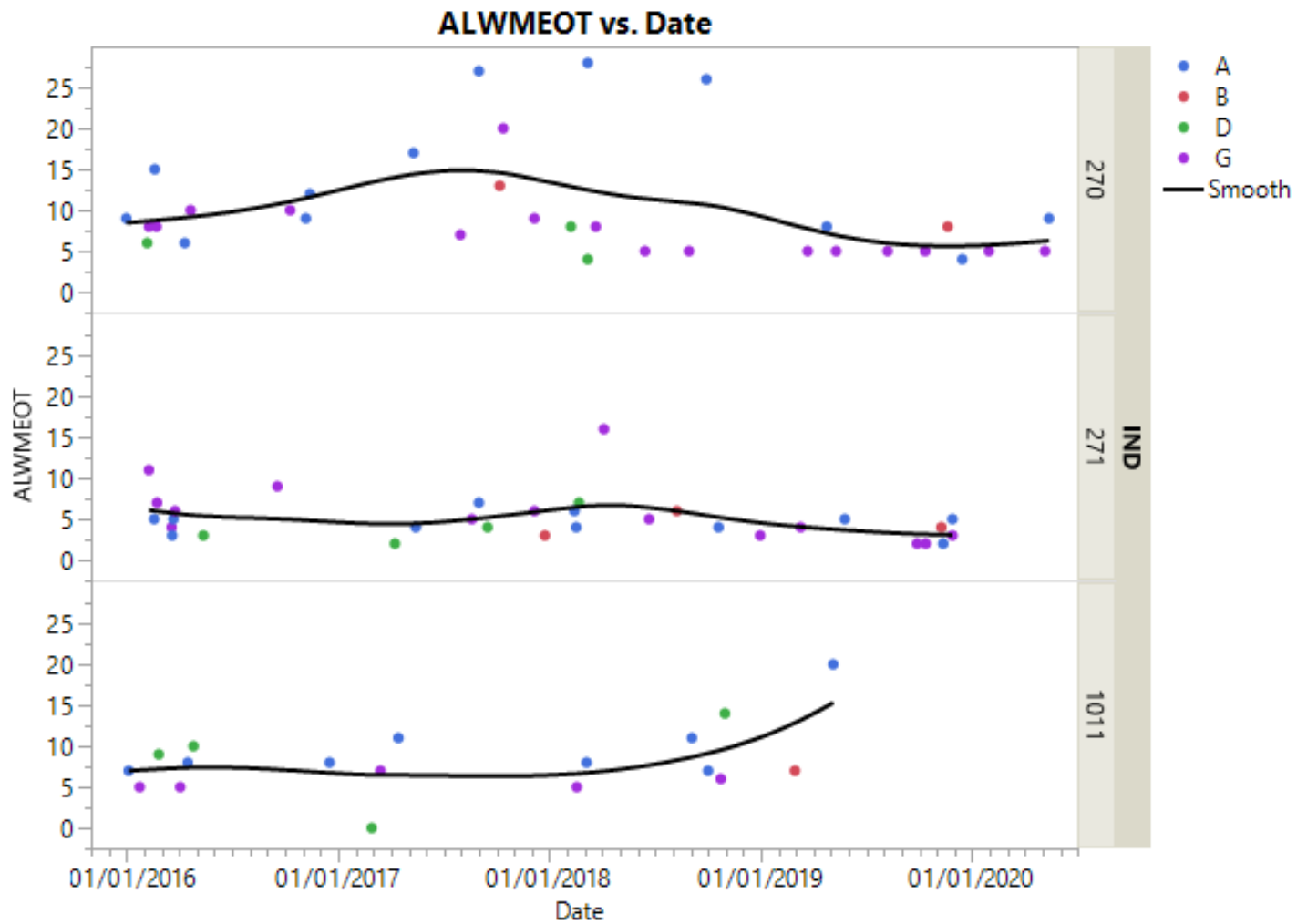
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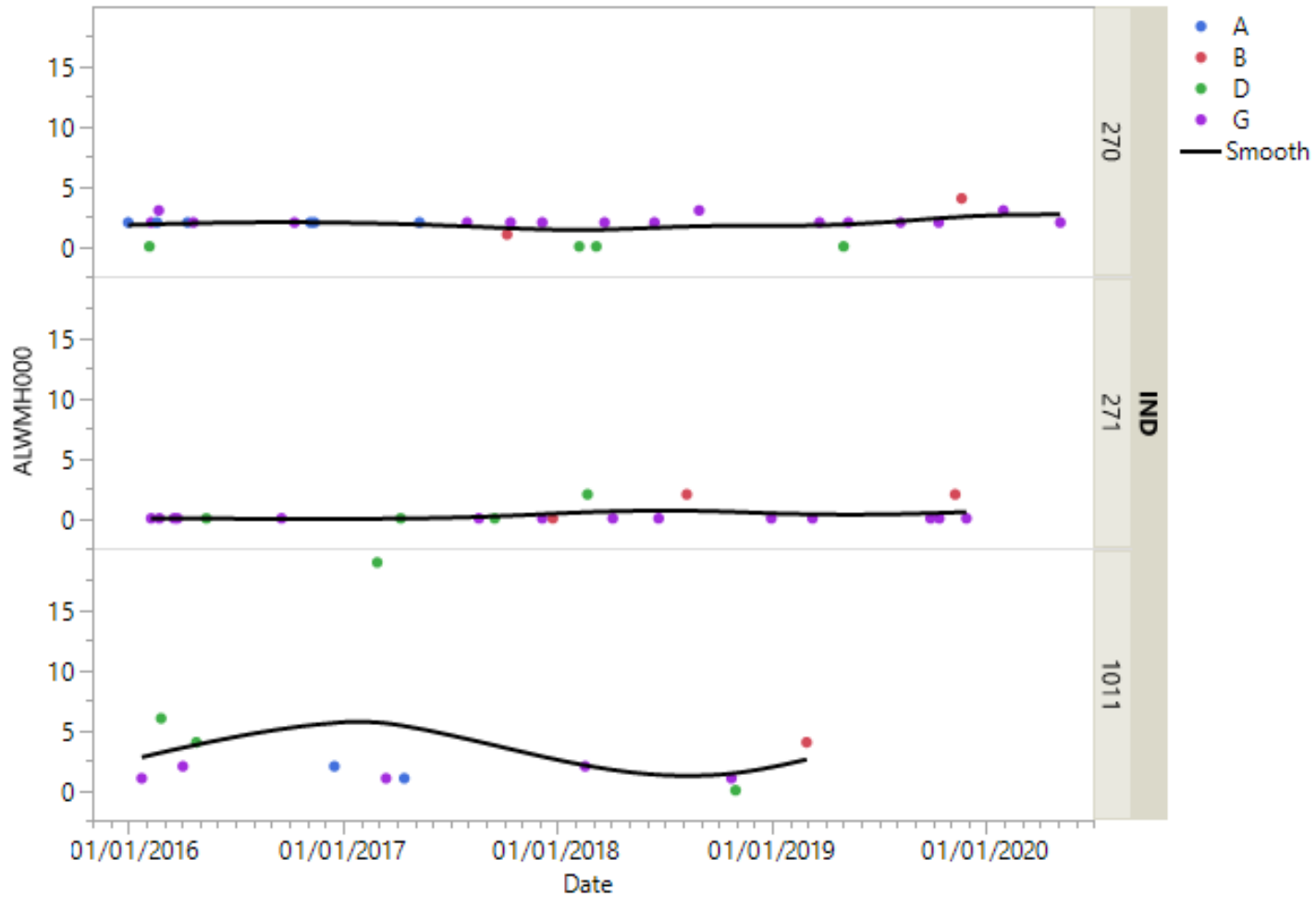


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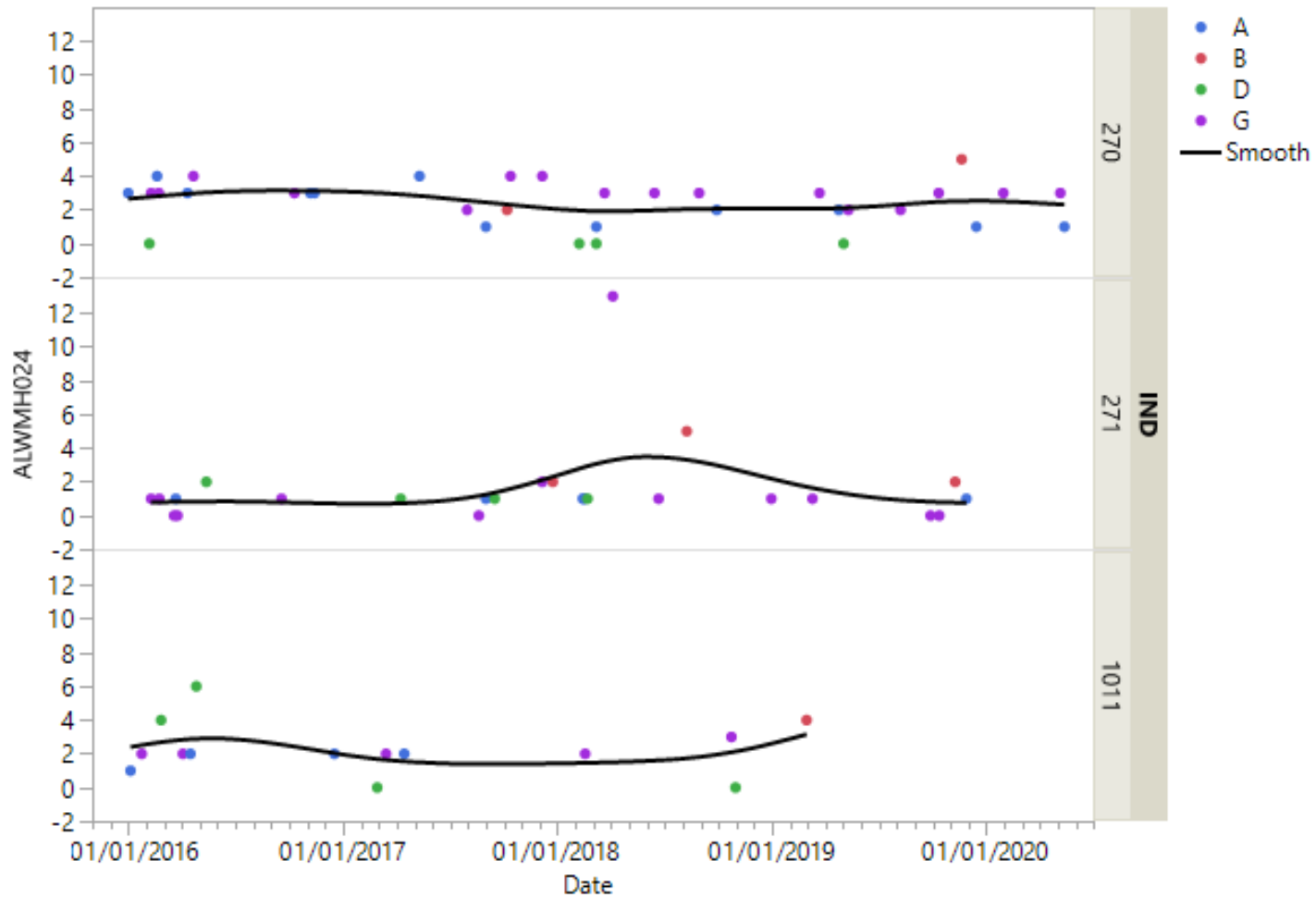
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ALWMH000 vs. Date

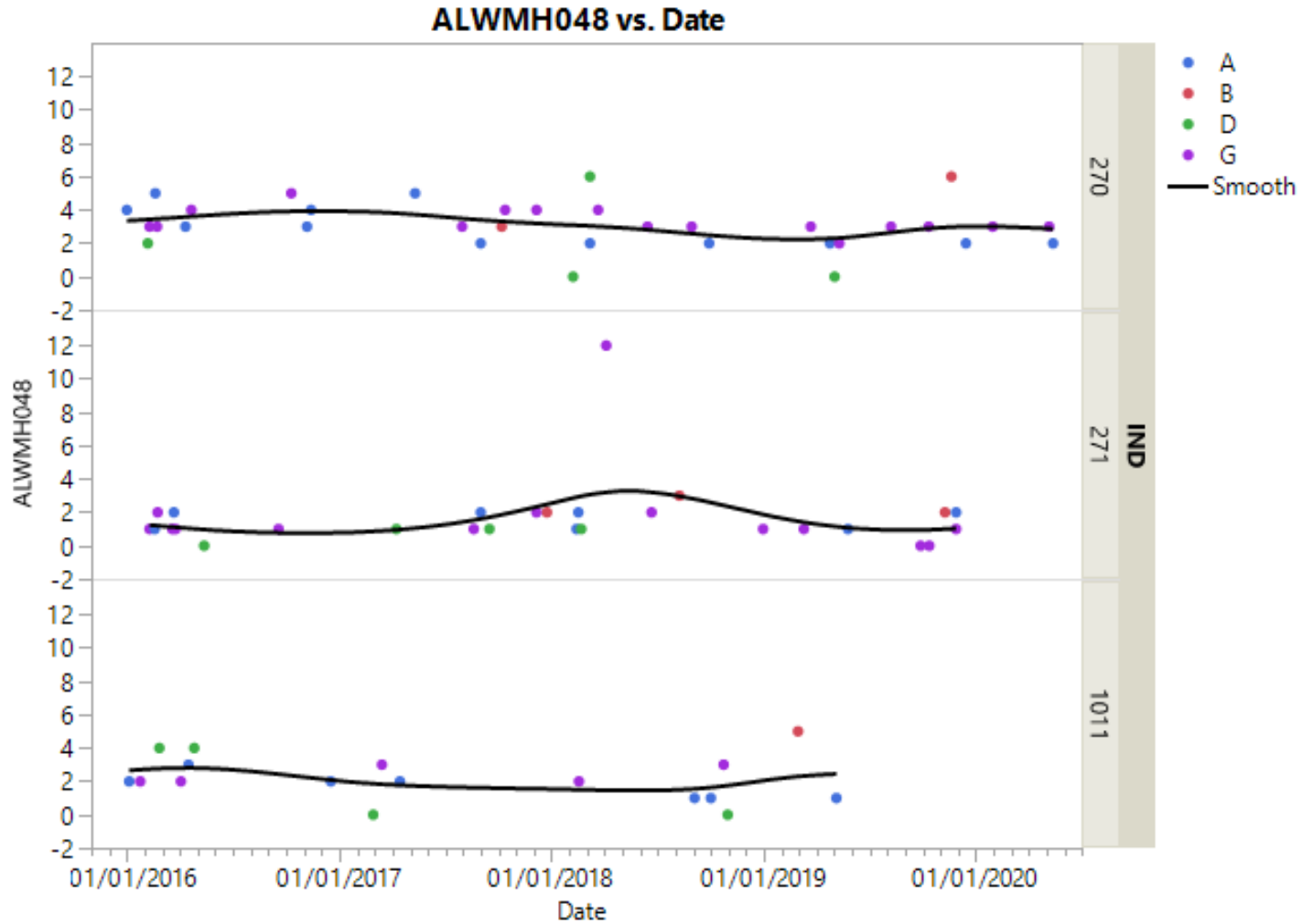


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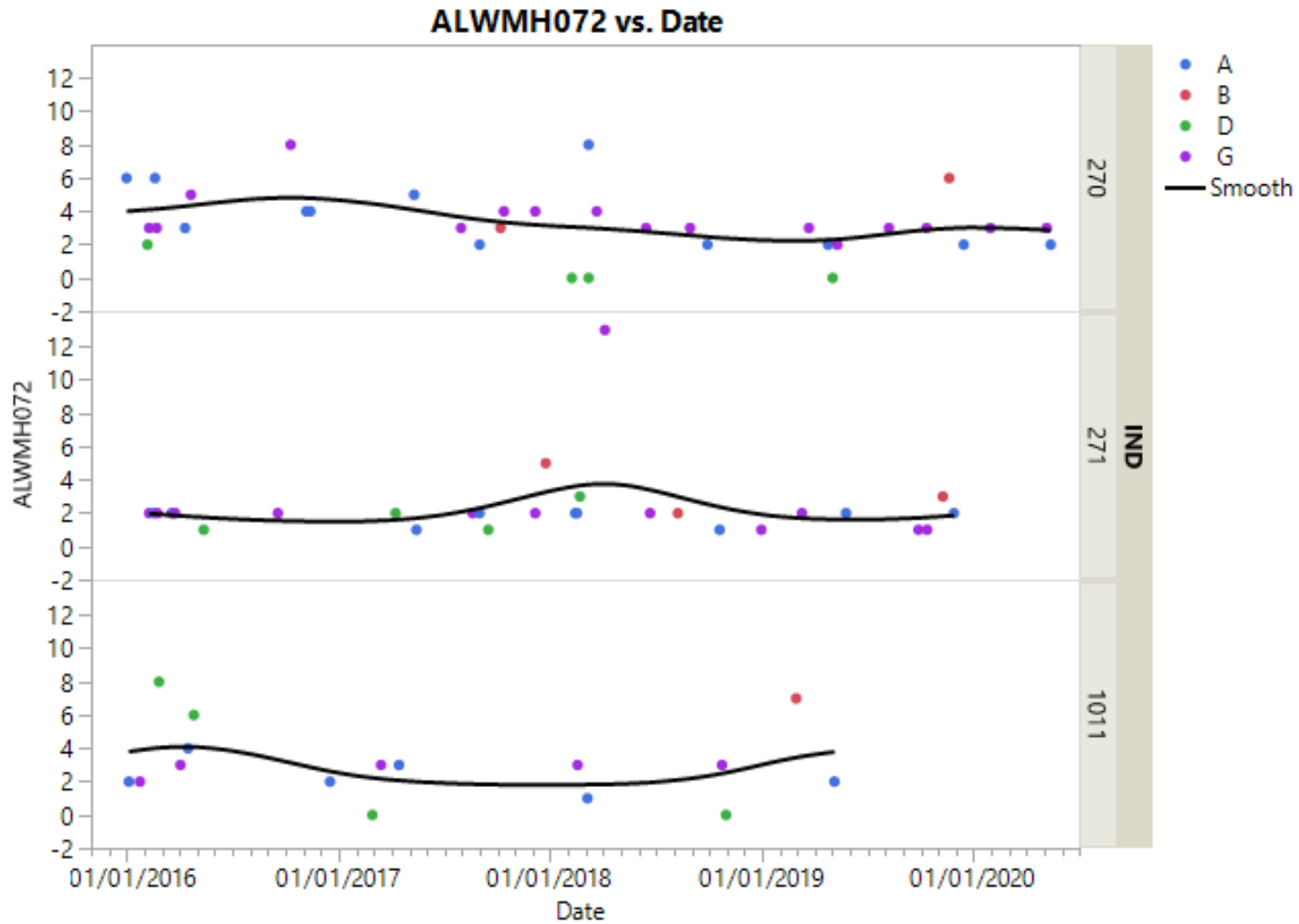
ALWMH024 vs. Date



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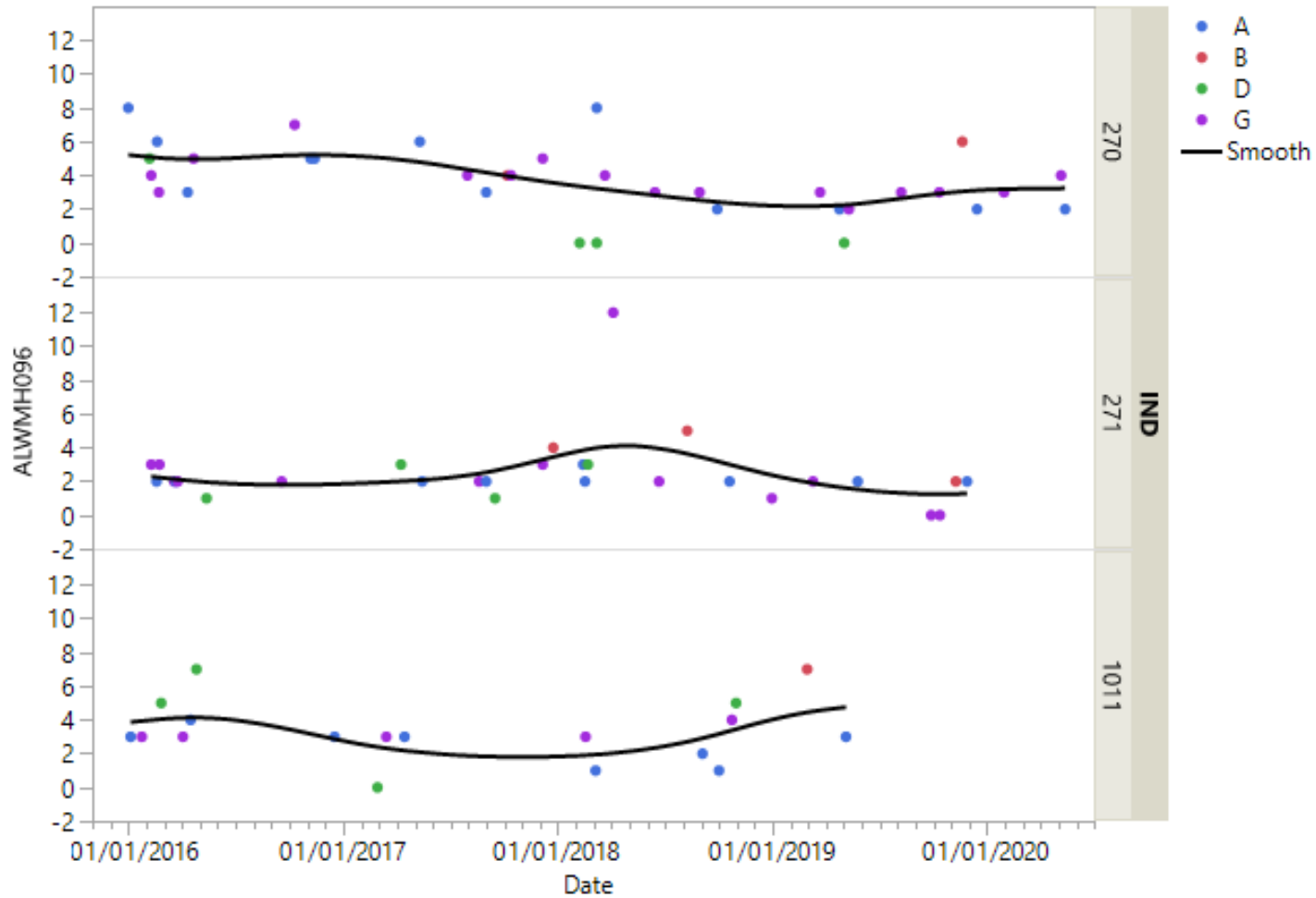


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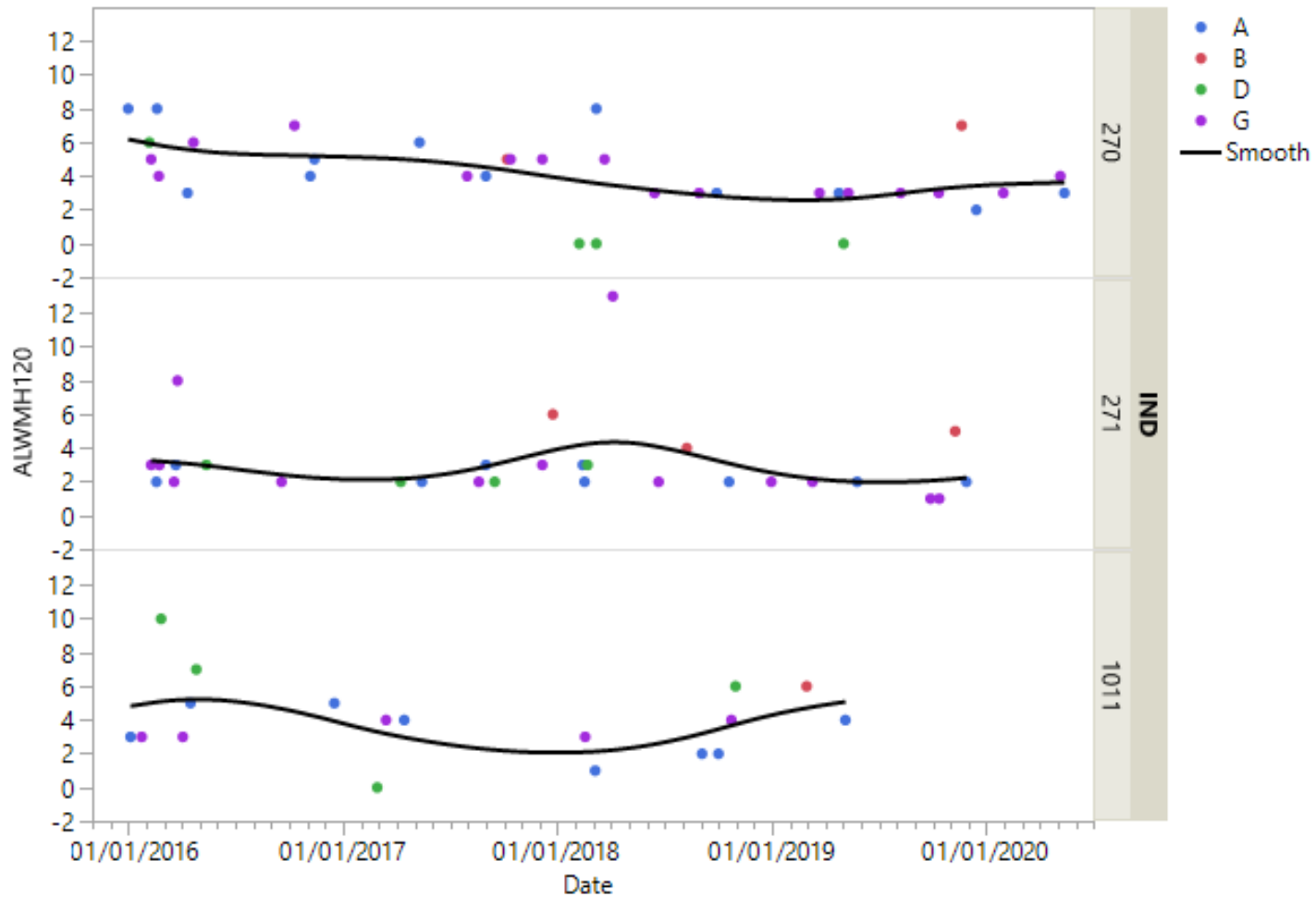
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ALWMH096 vs. Date

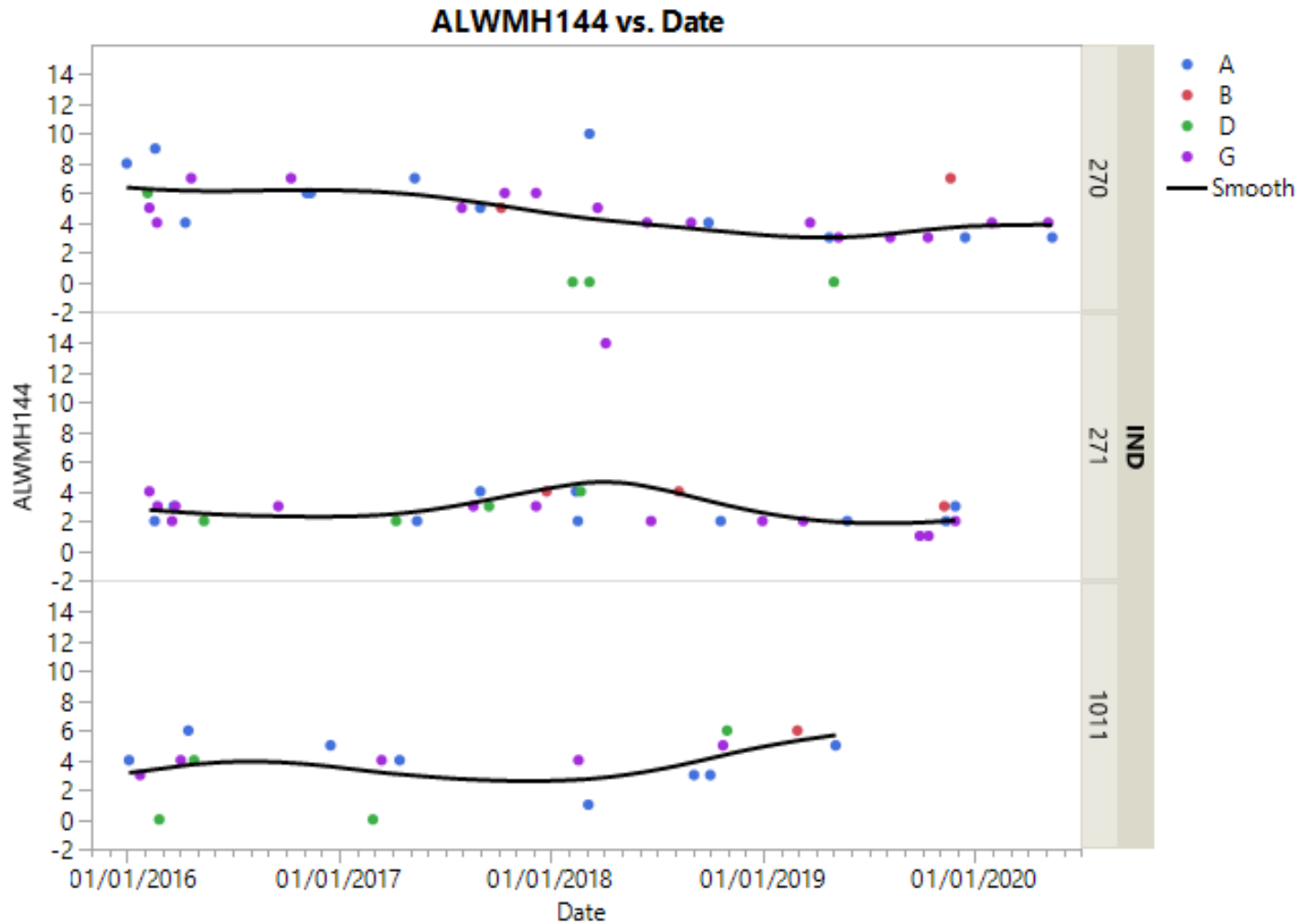


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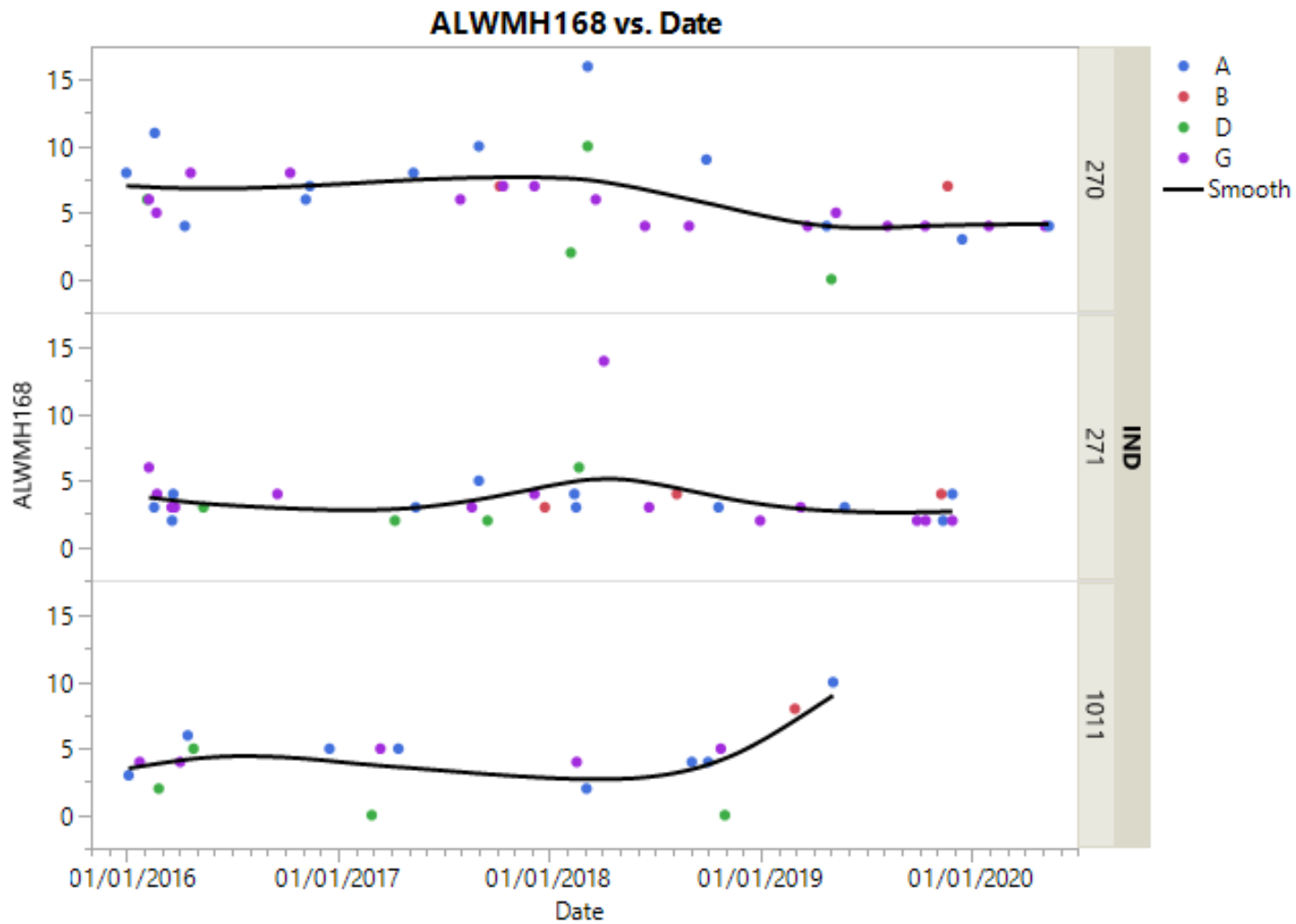
ALWMH120 vs. Date



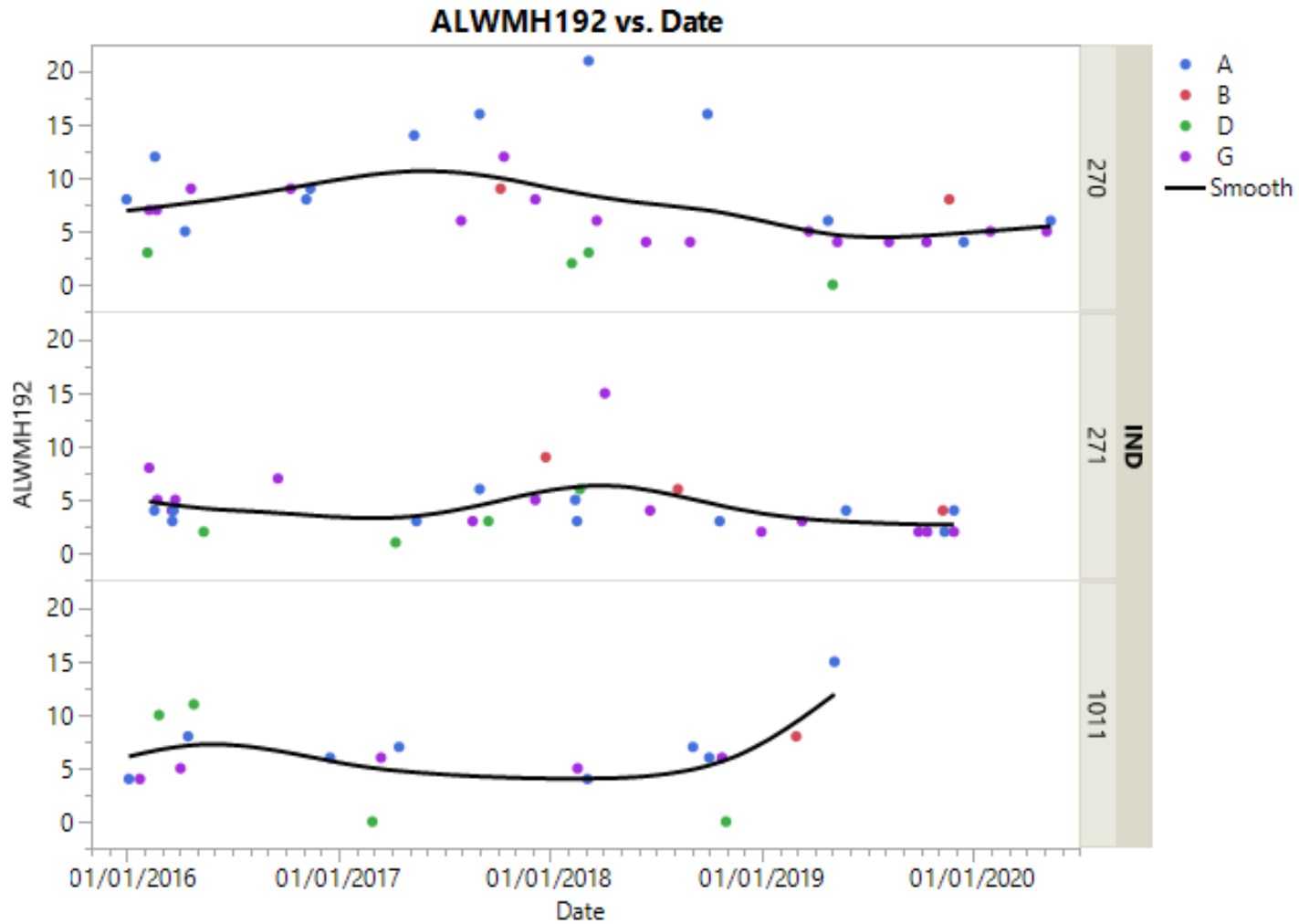
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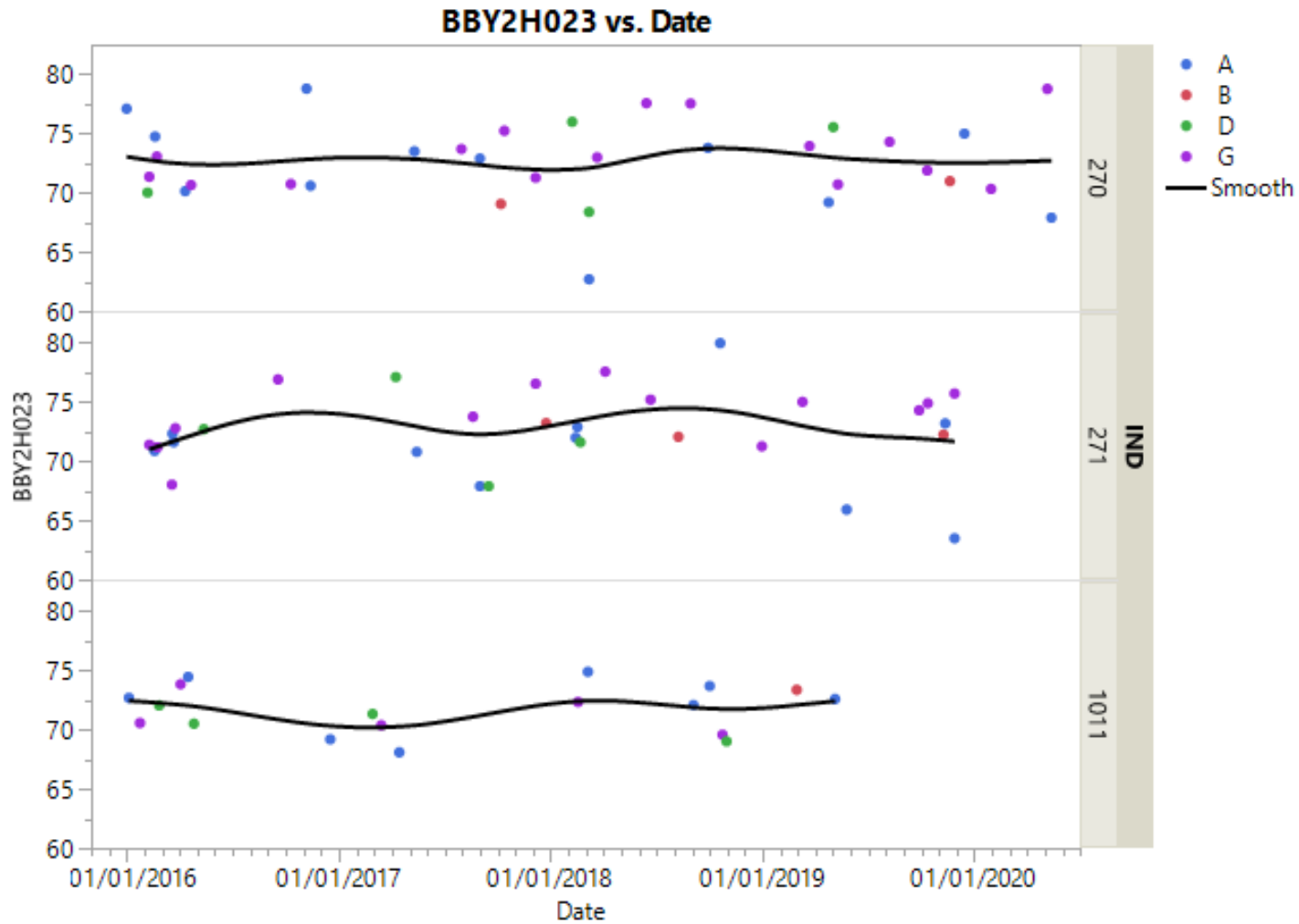
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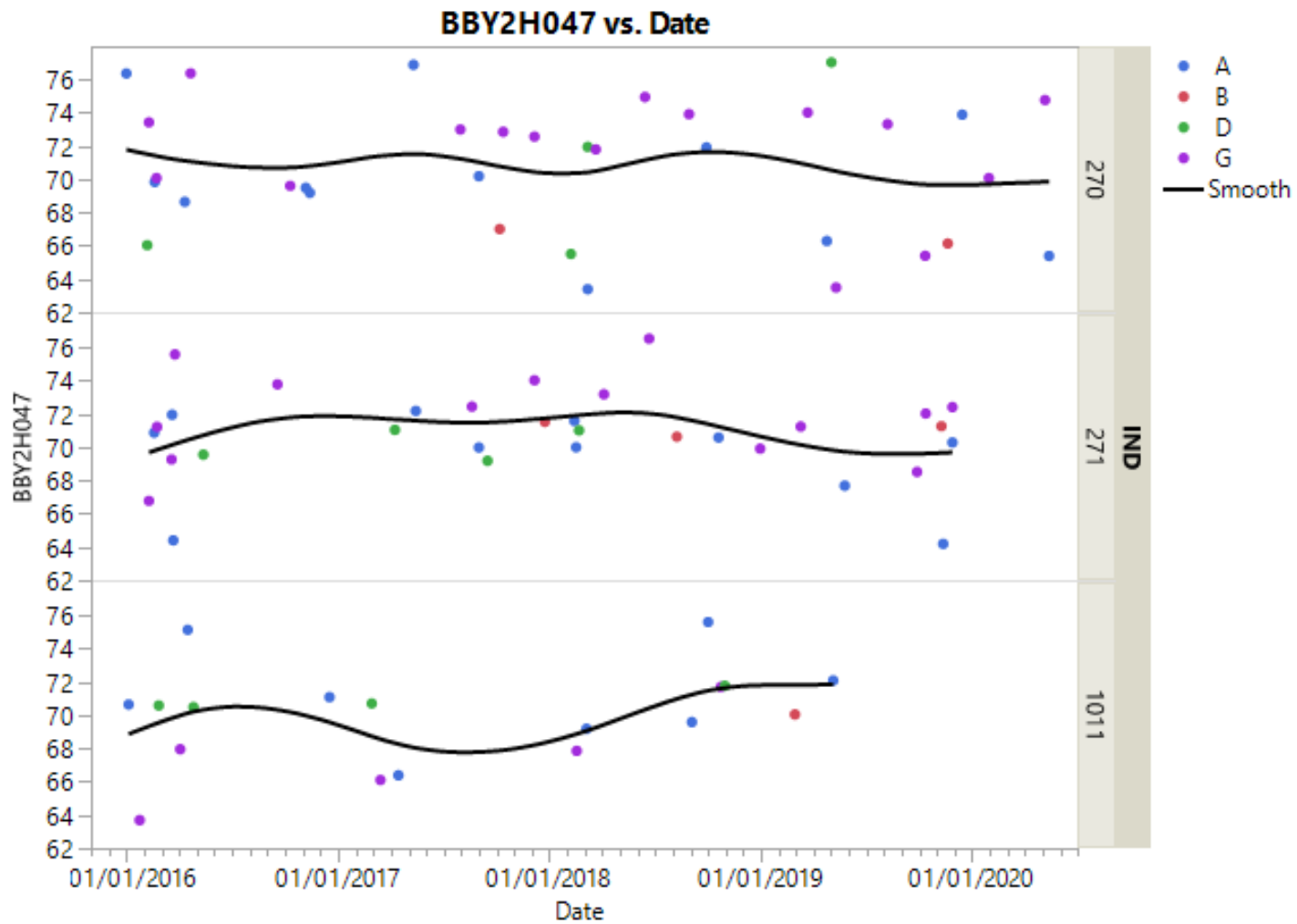
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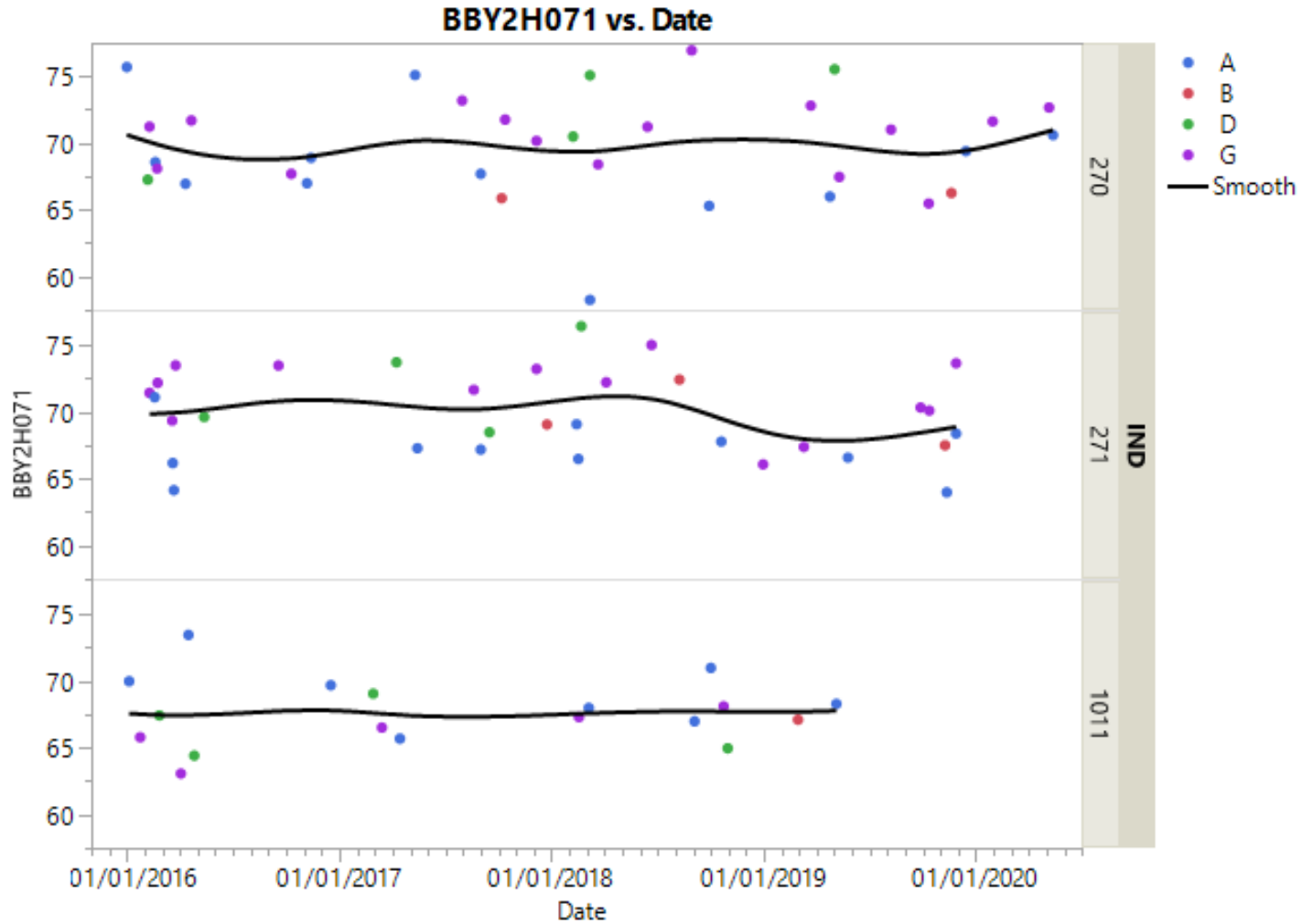
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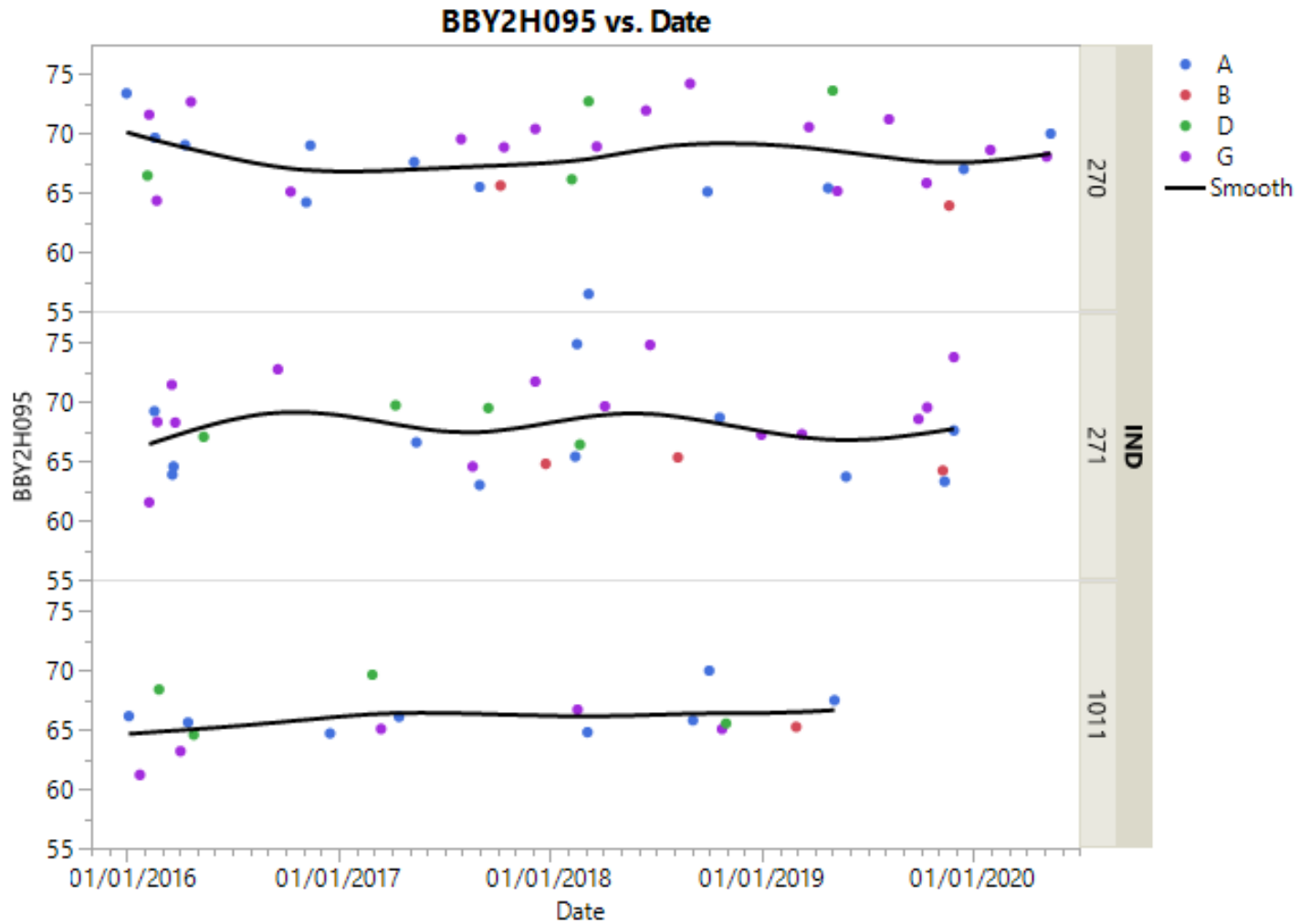
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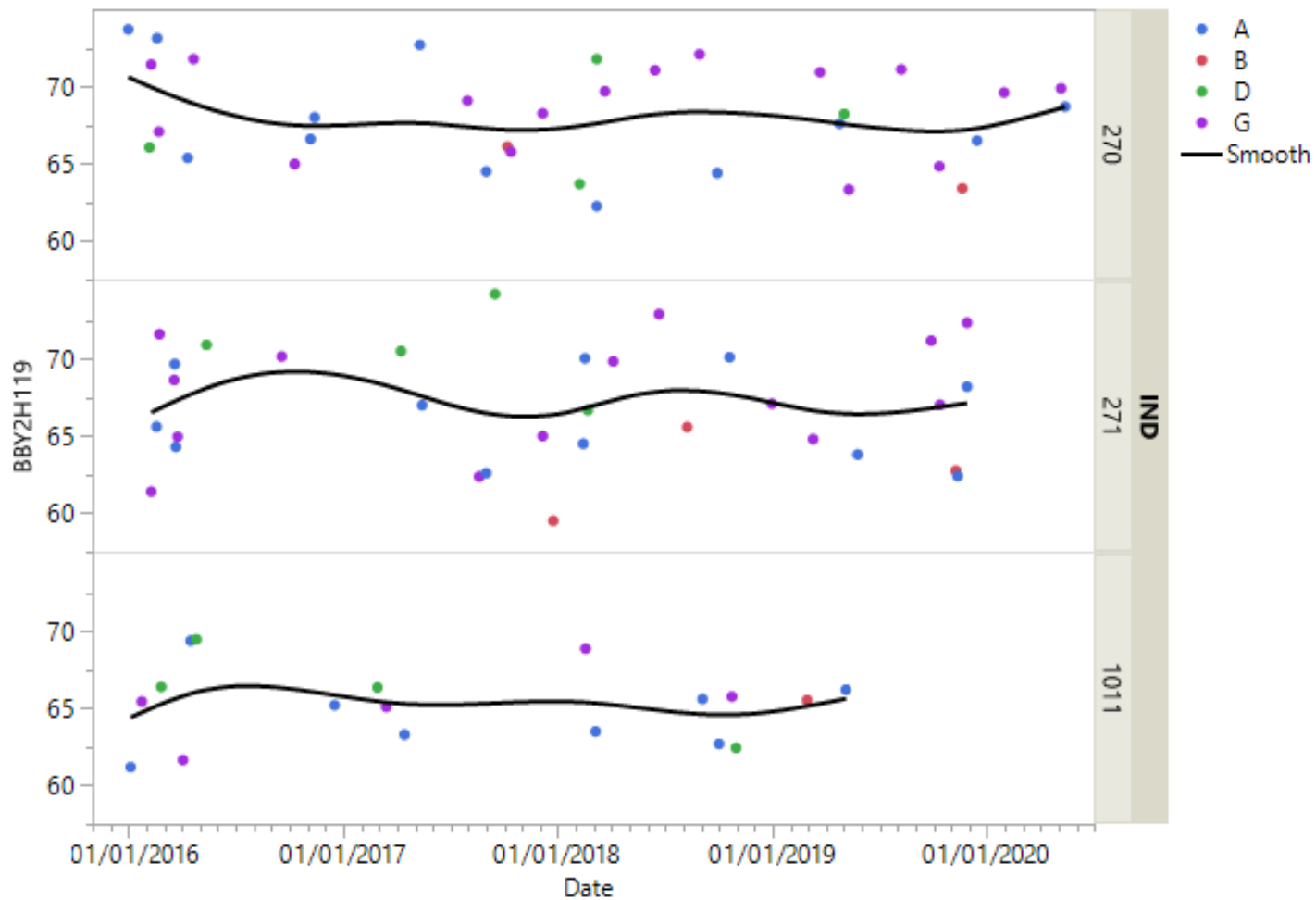


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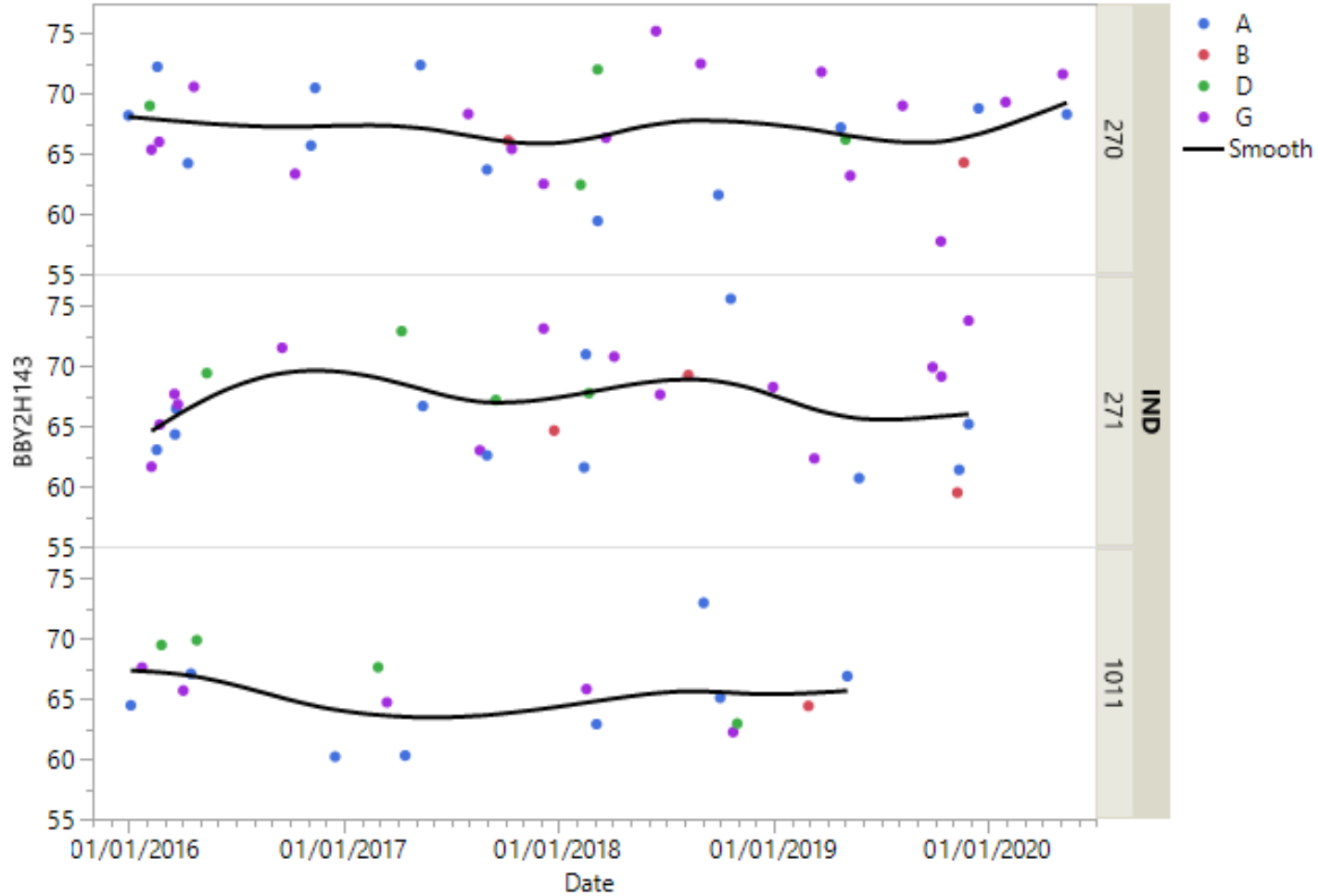
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BBY2H119 vs. Date

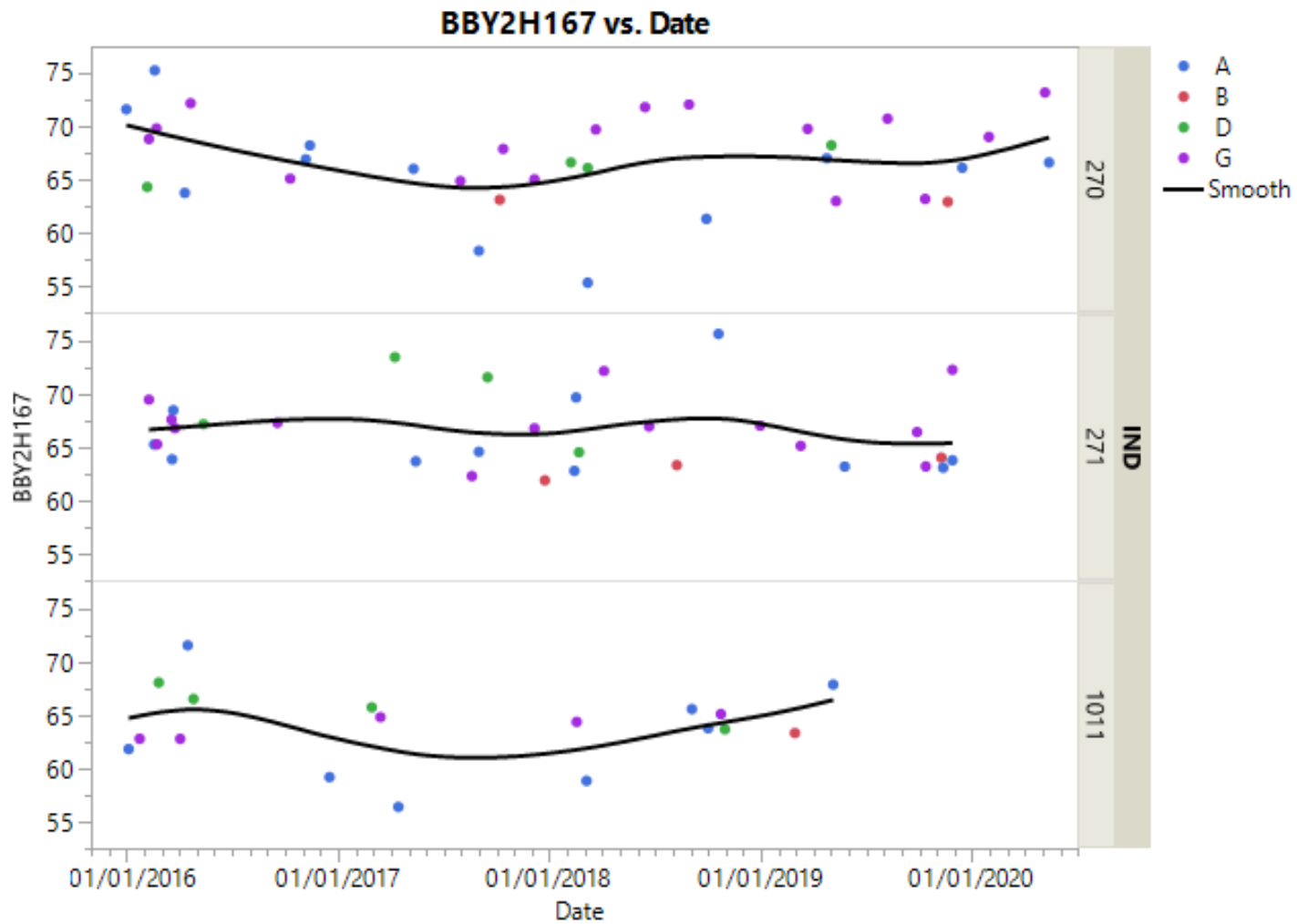


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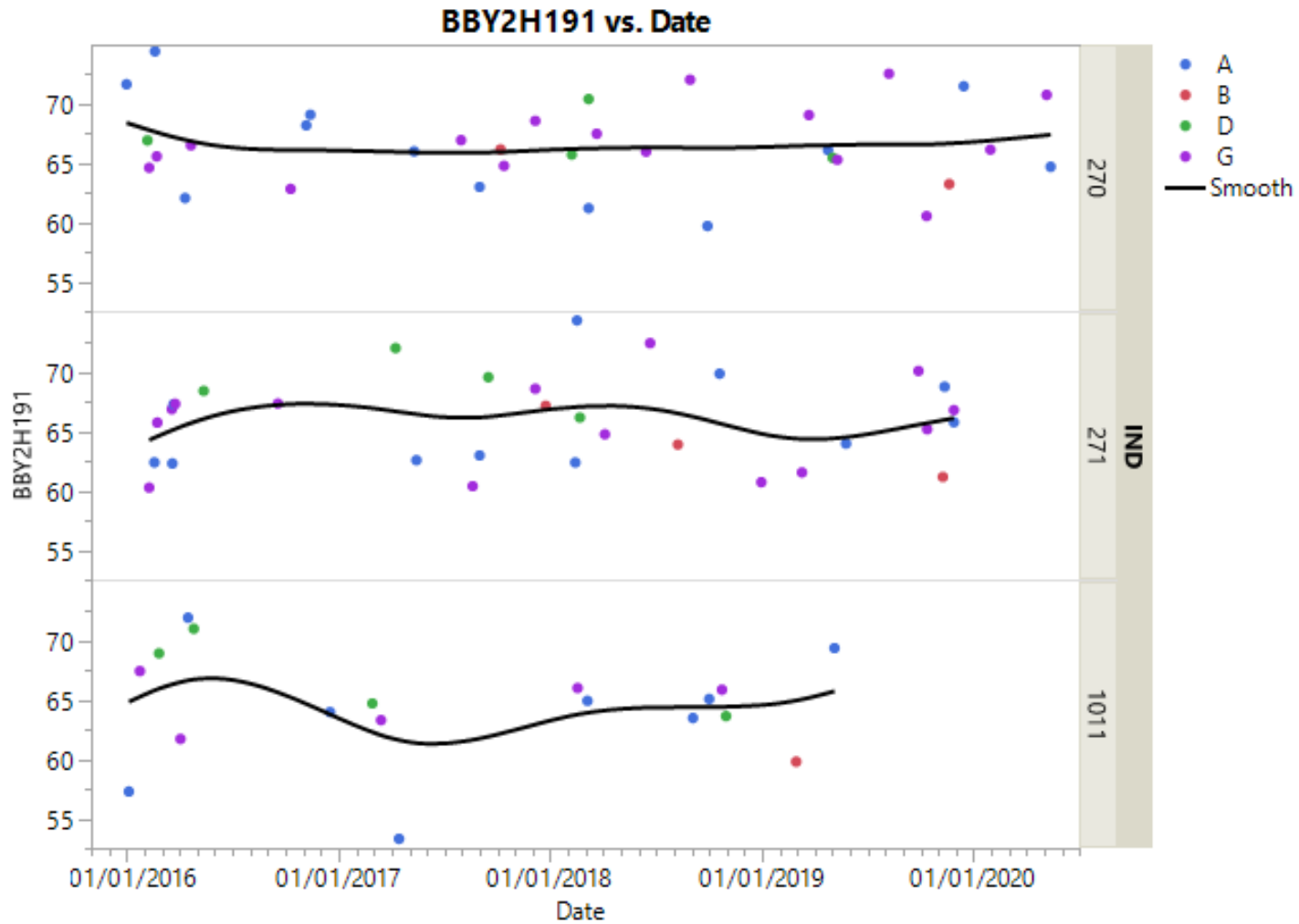
BBY2H143 vs. Date



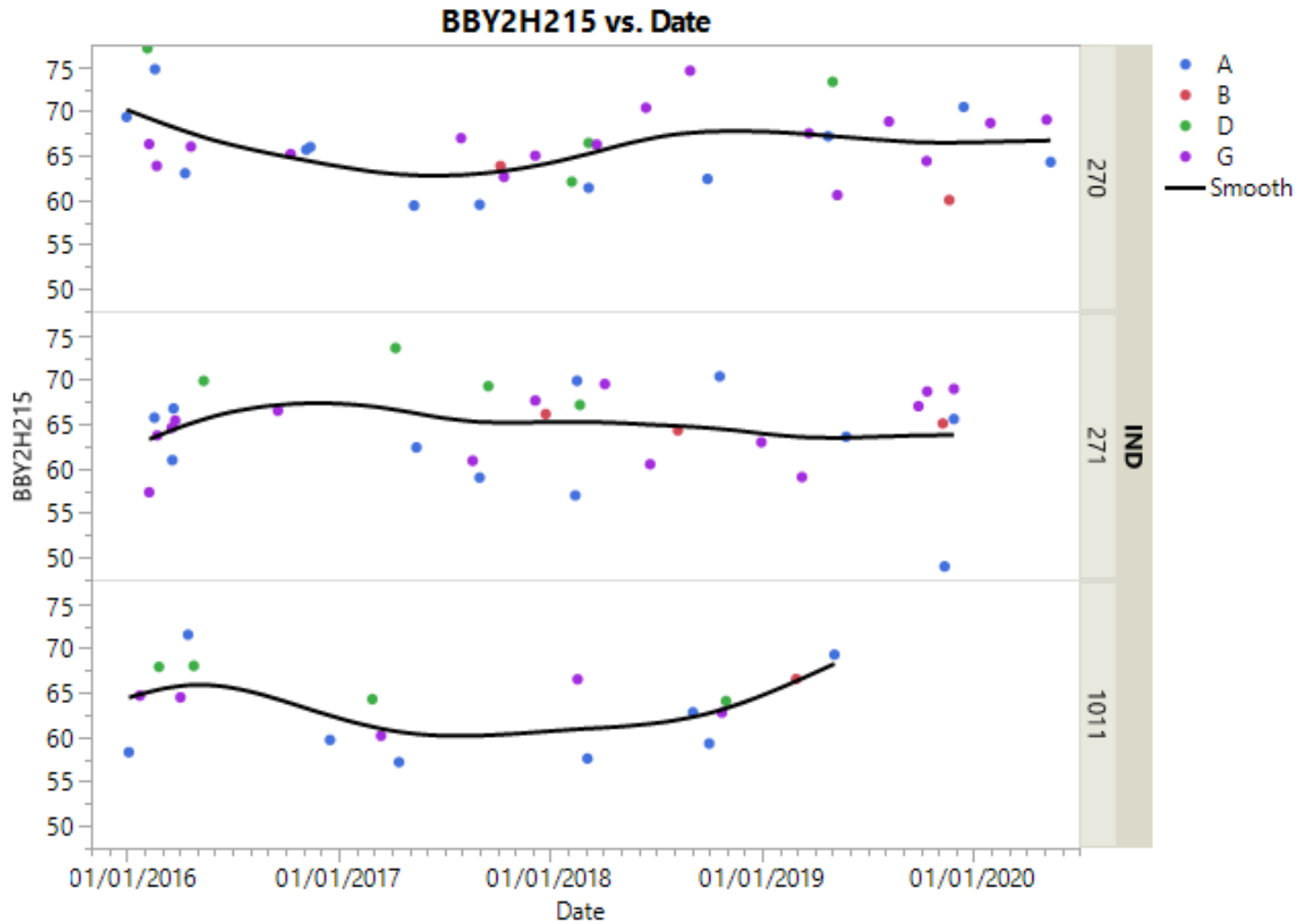
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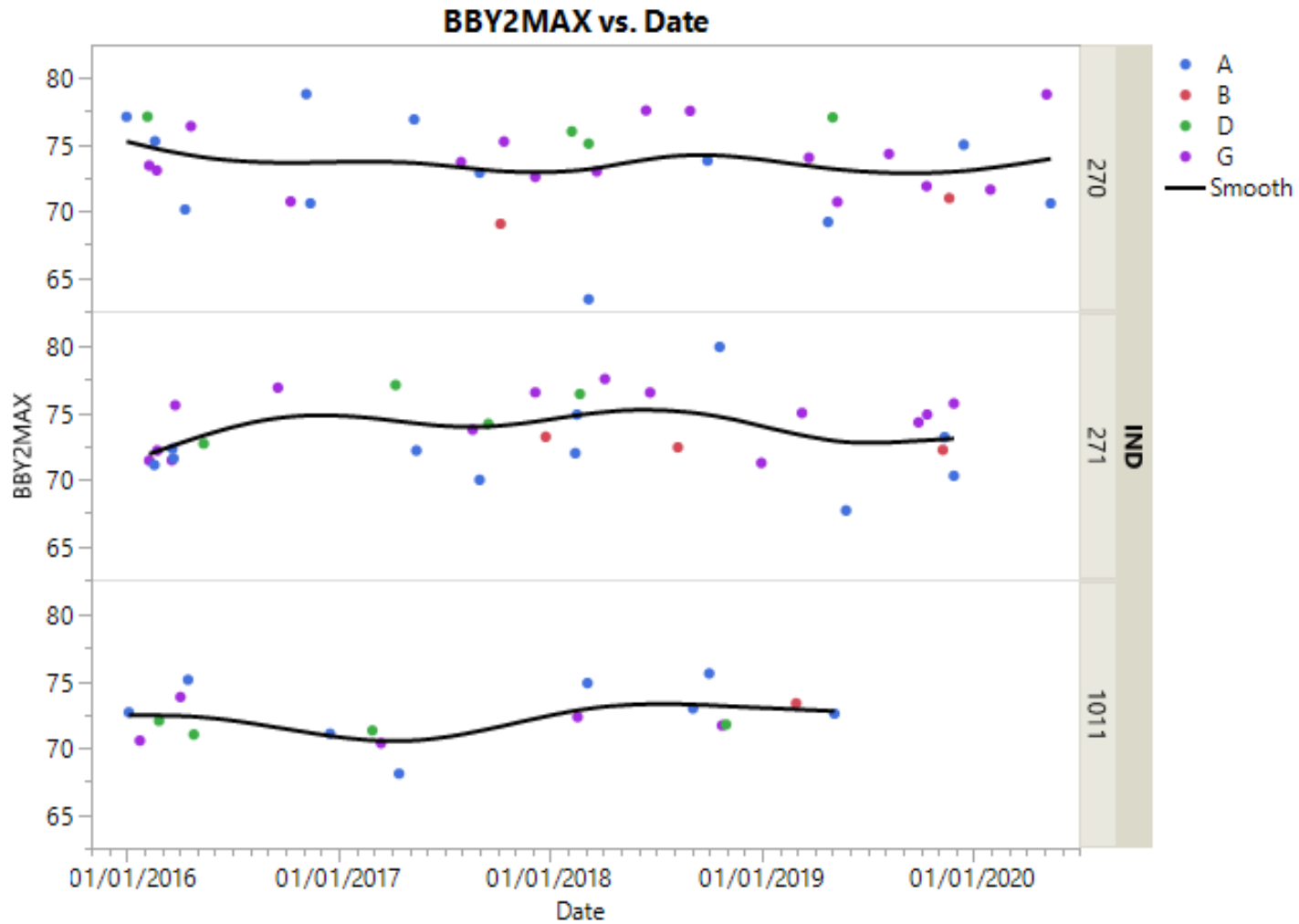
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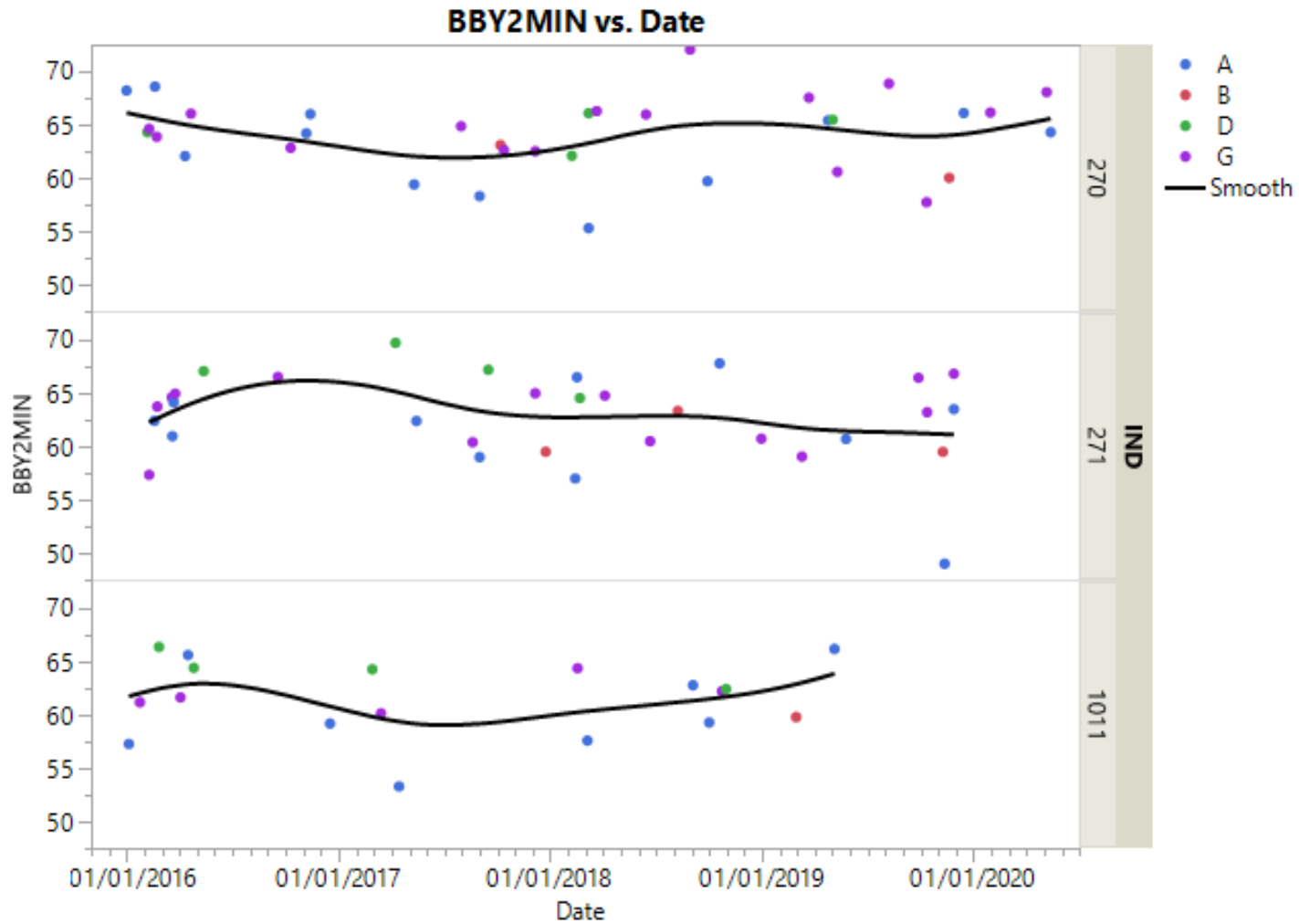
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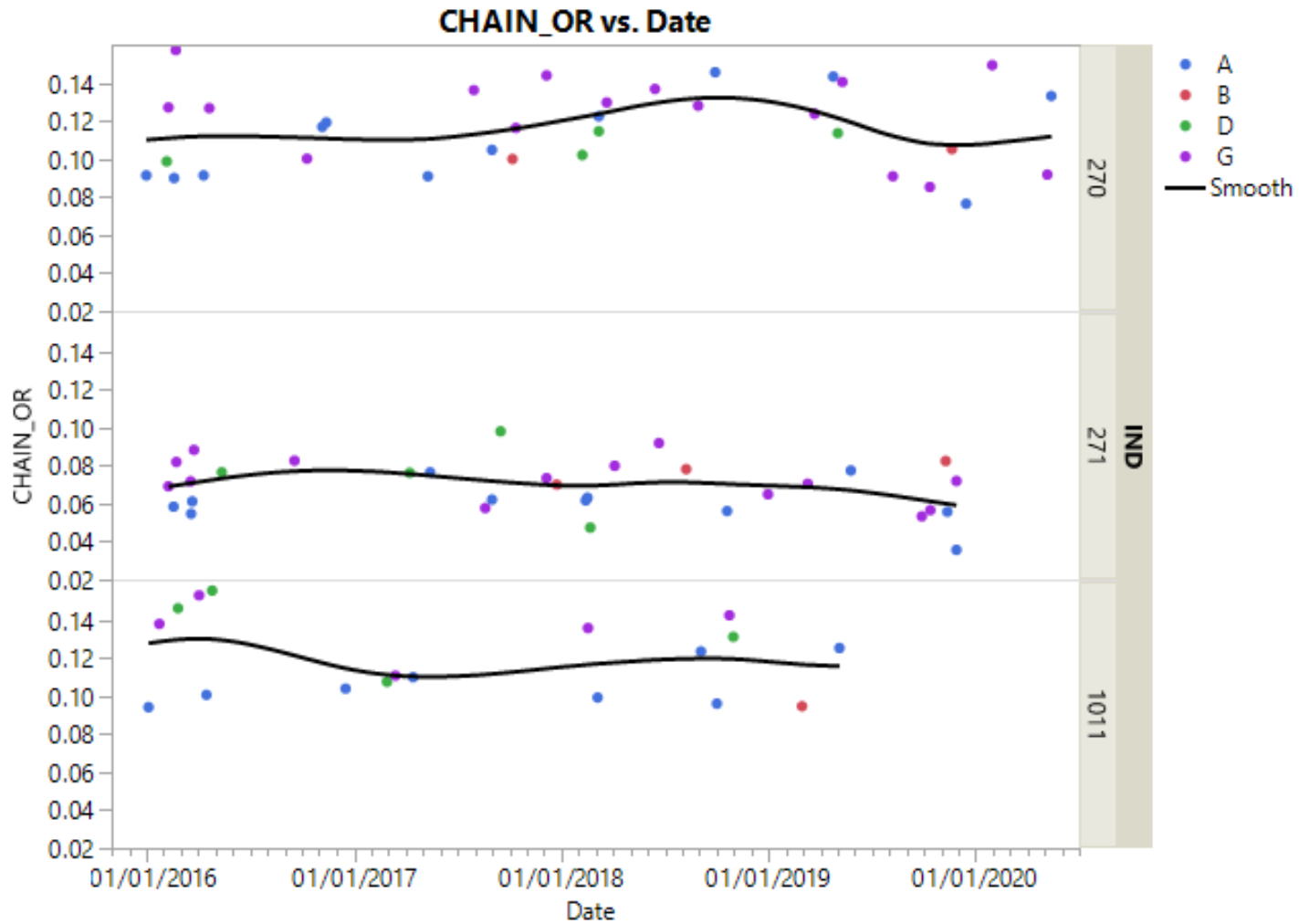
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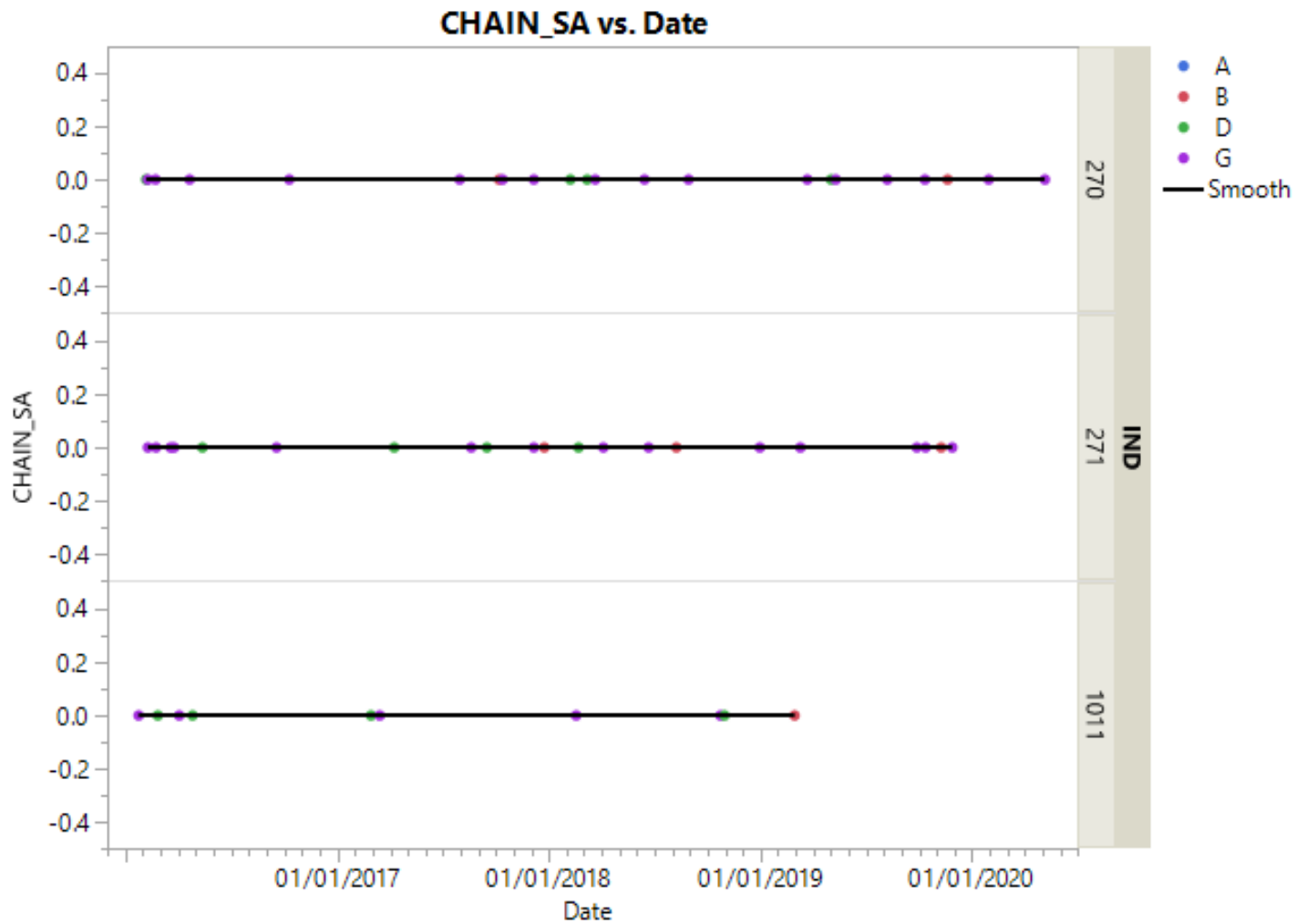
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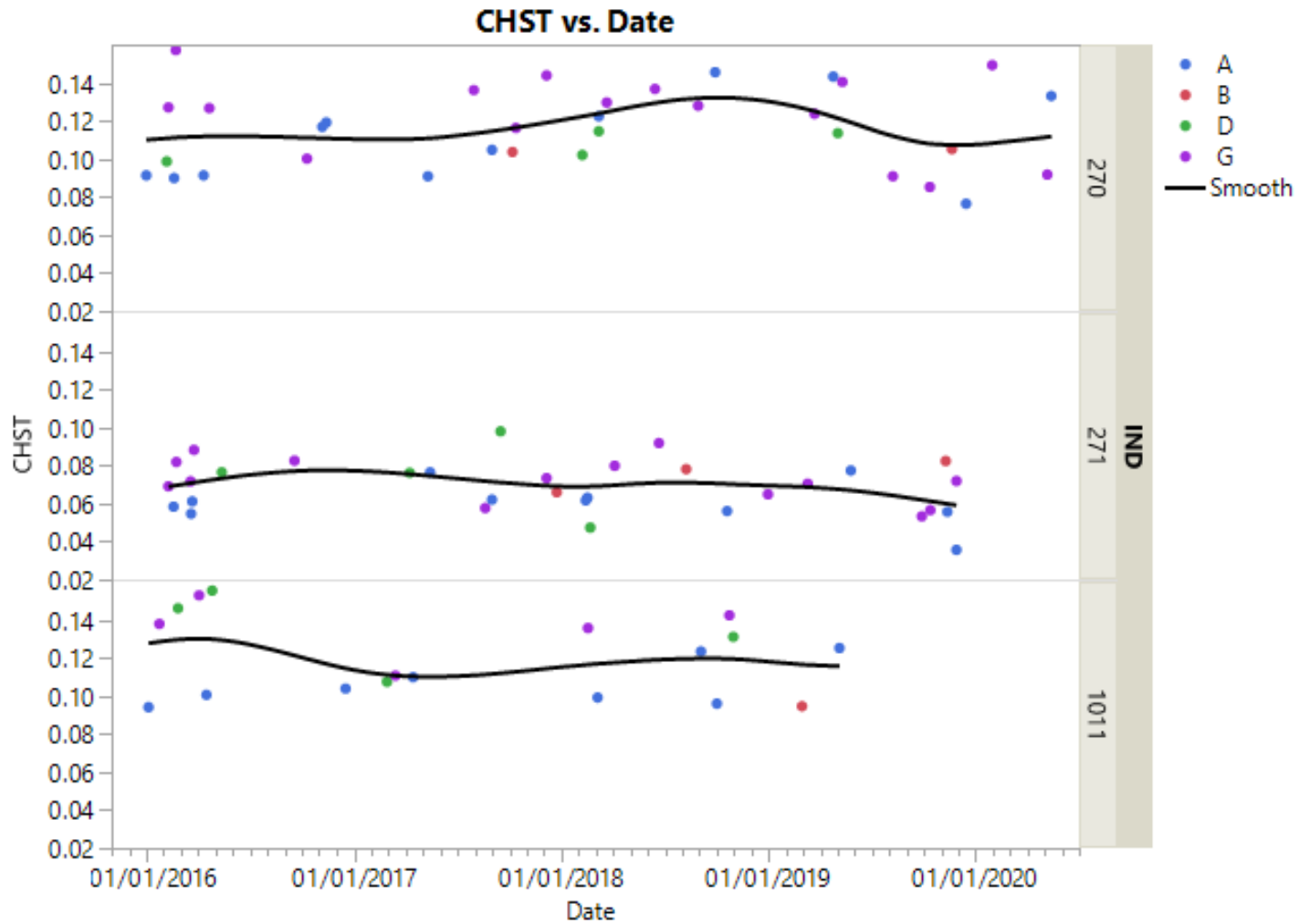
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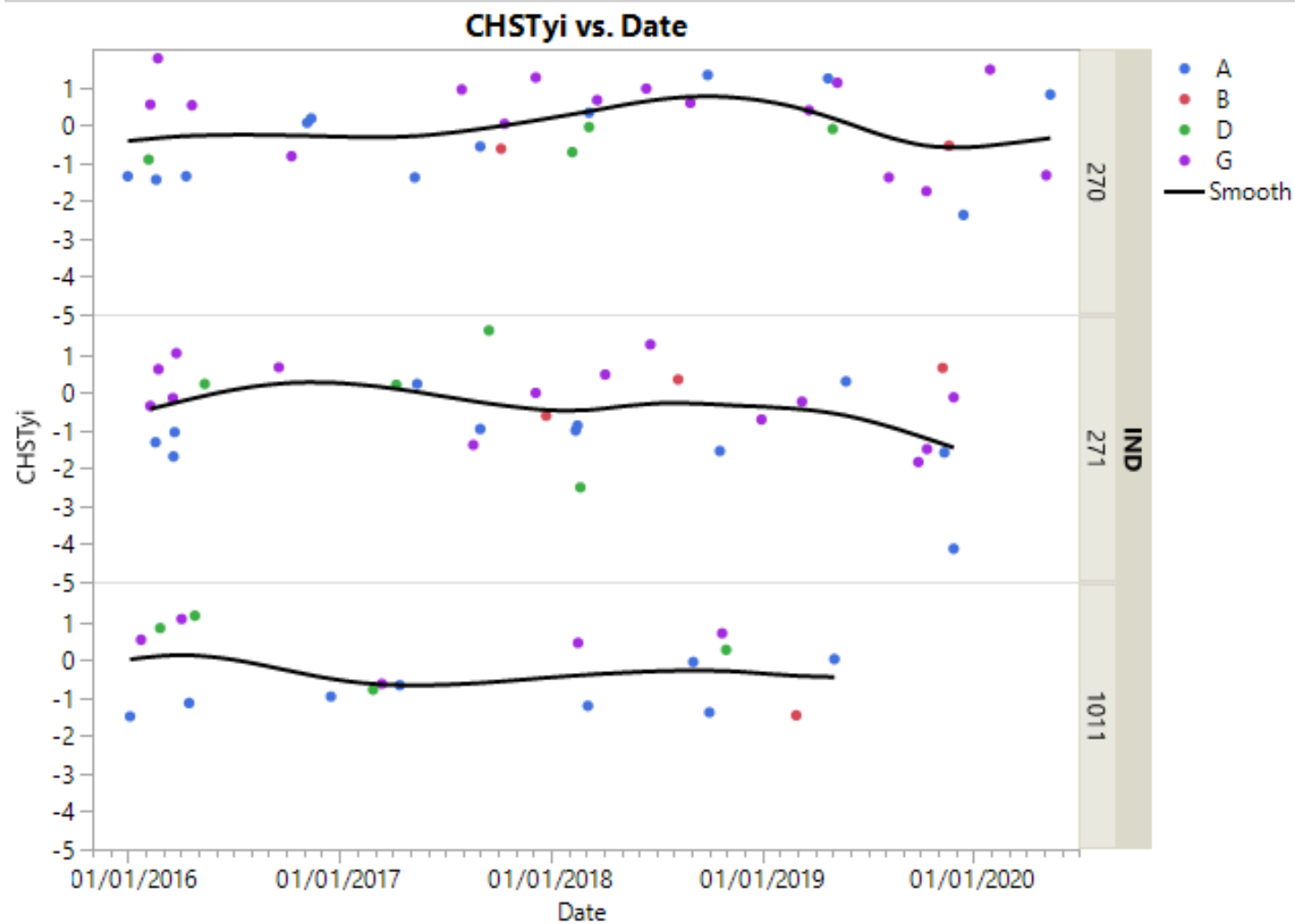
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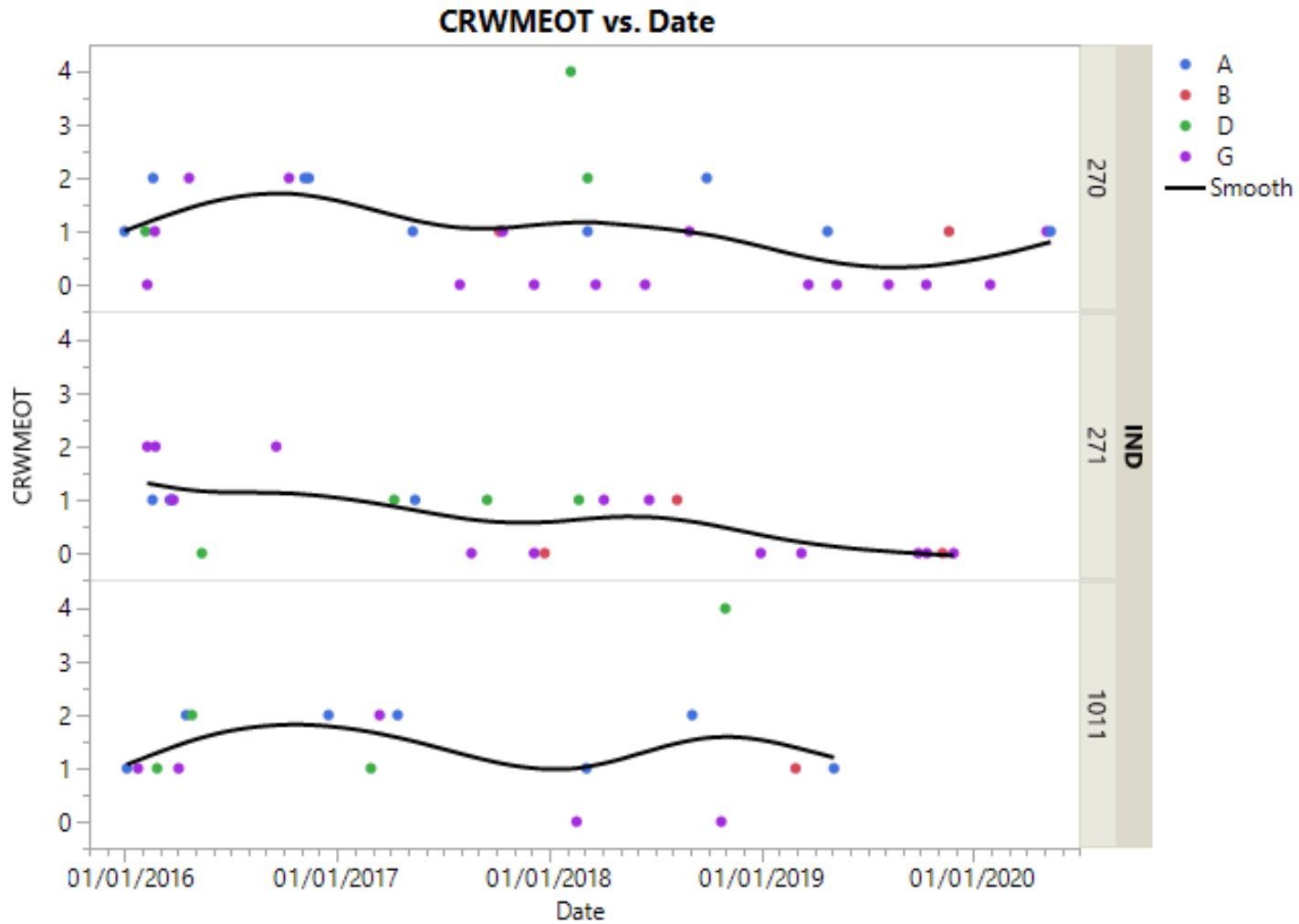
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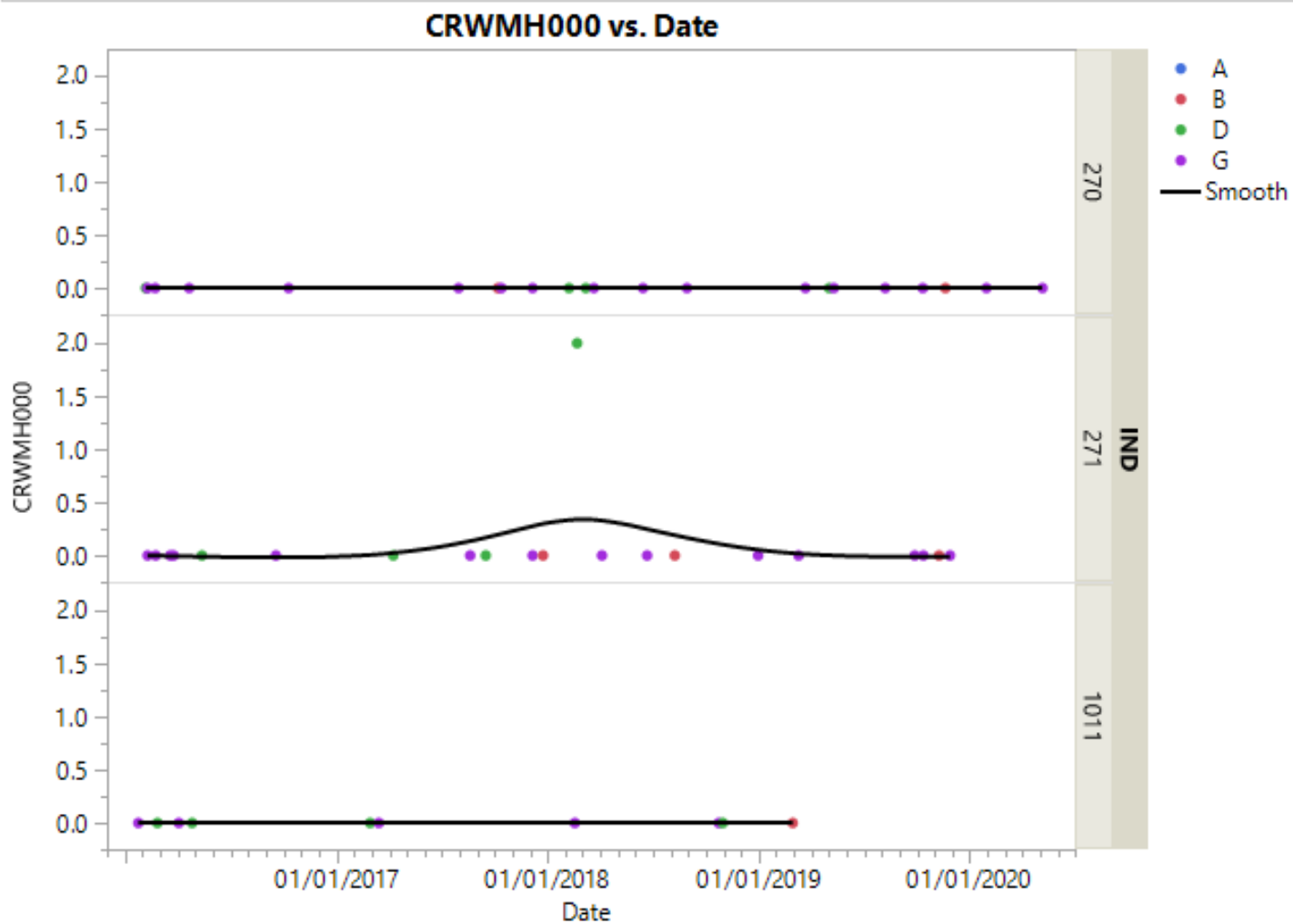
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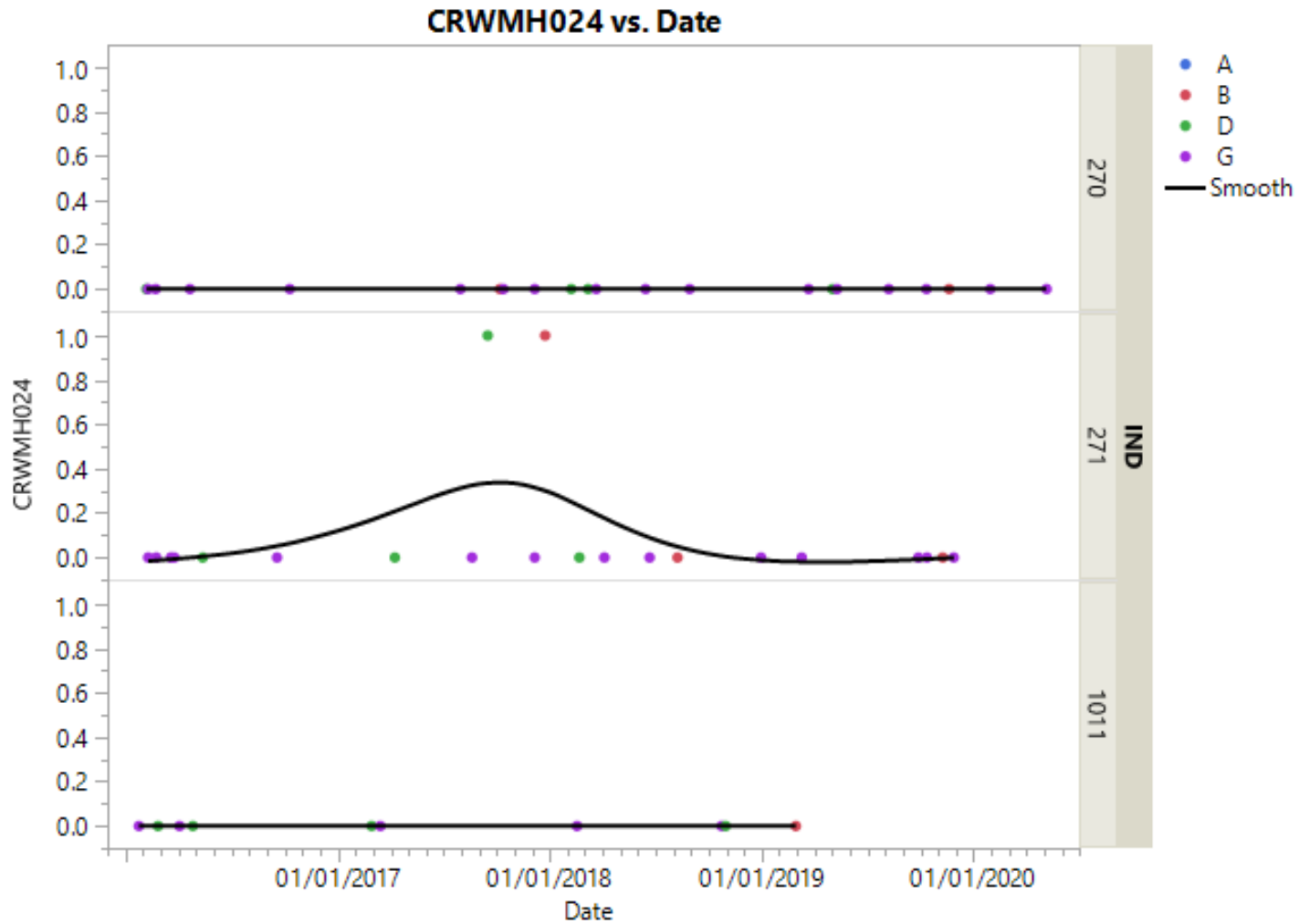
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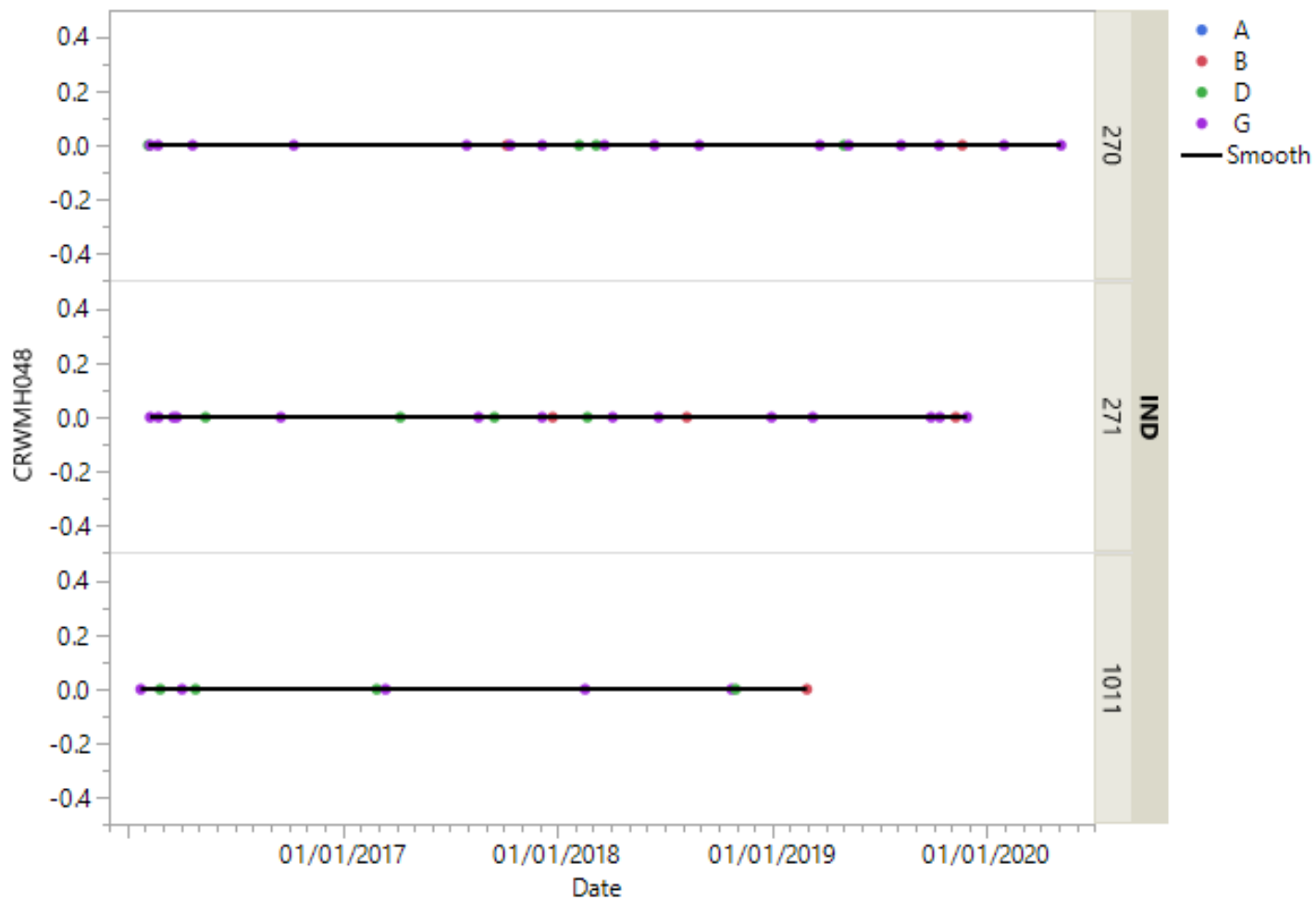


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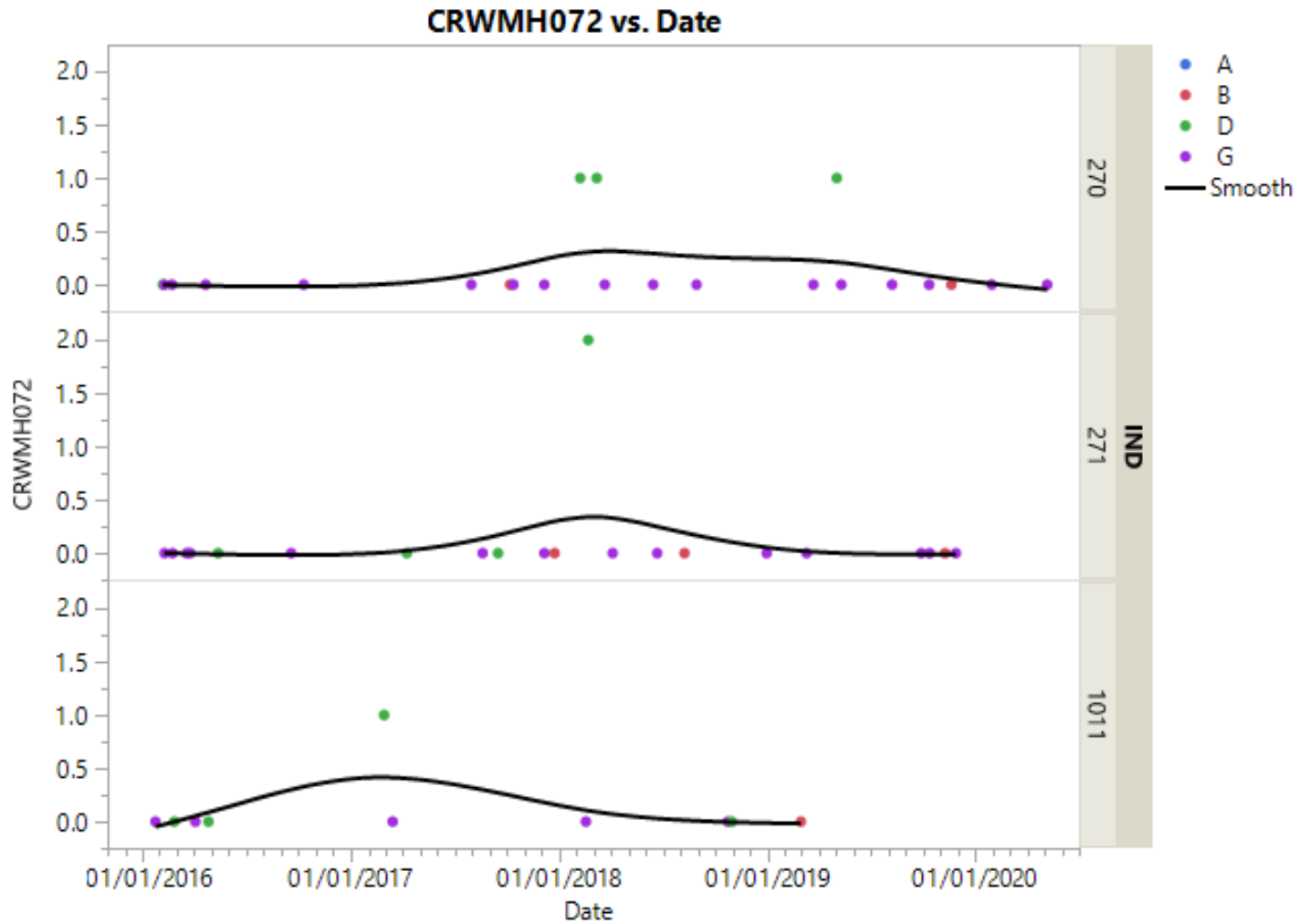


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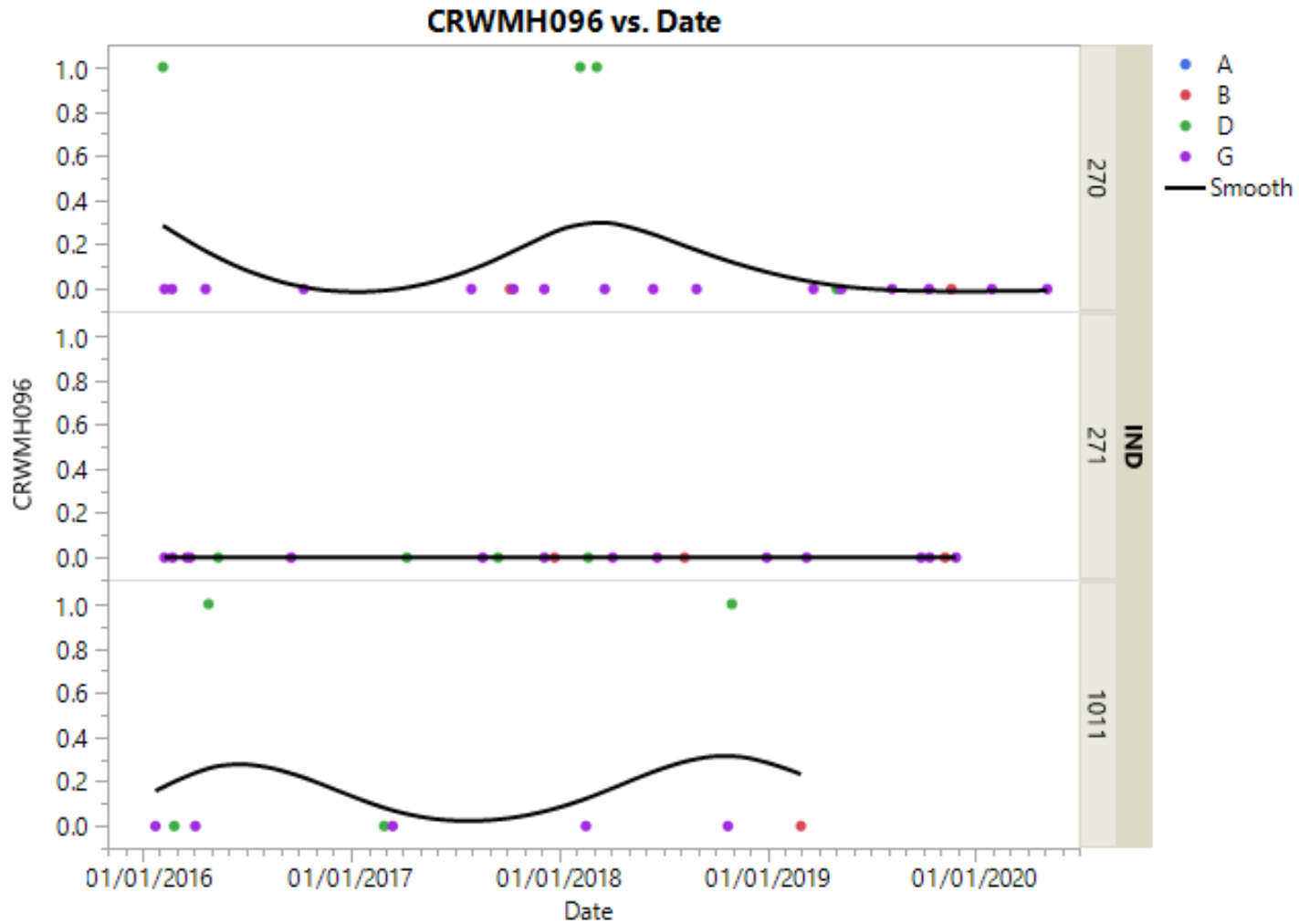
CRWMH048 vs. Date



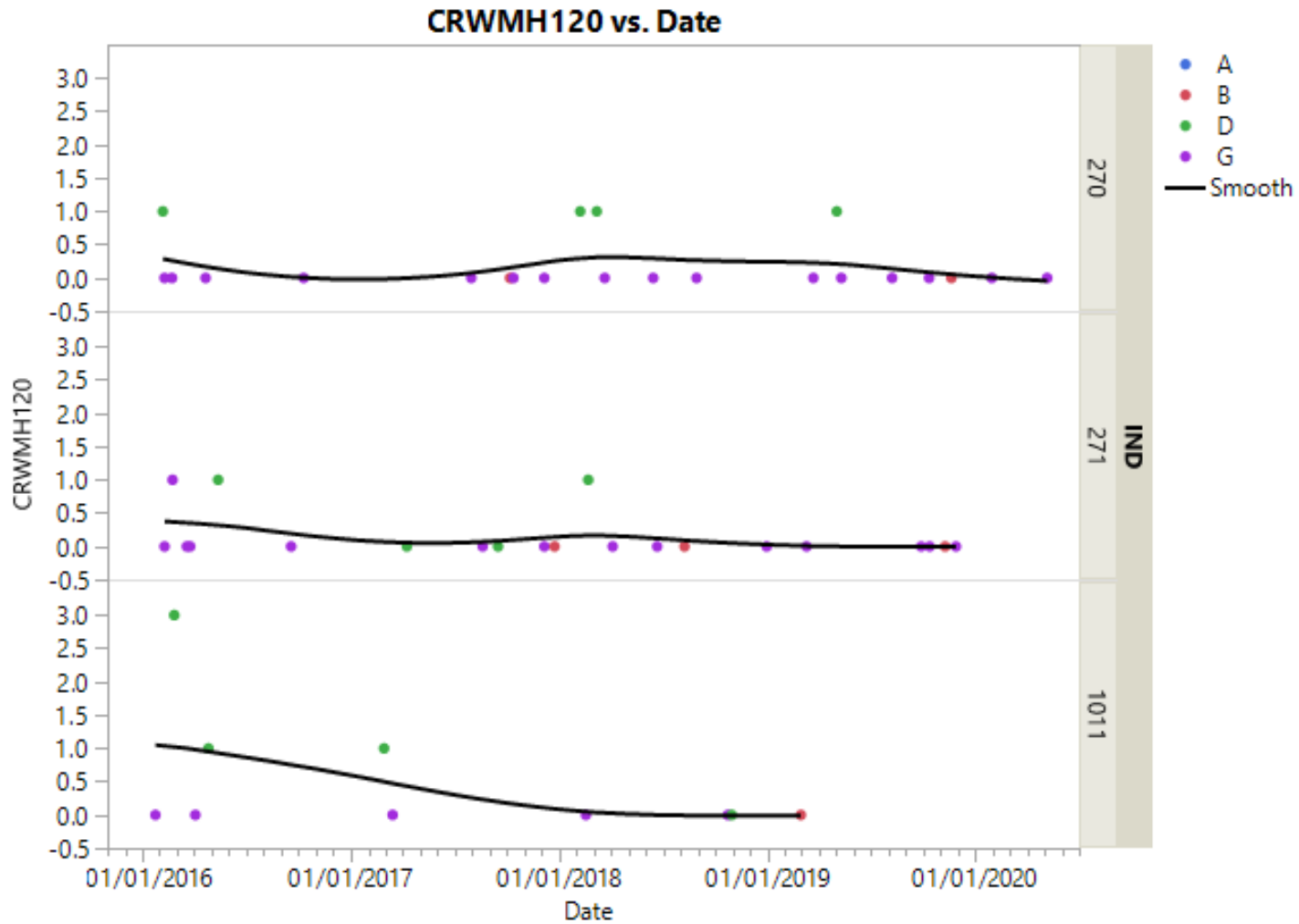
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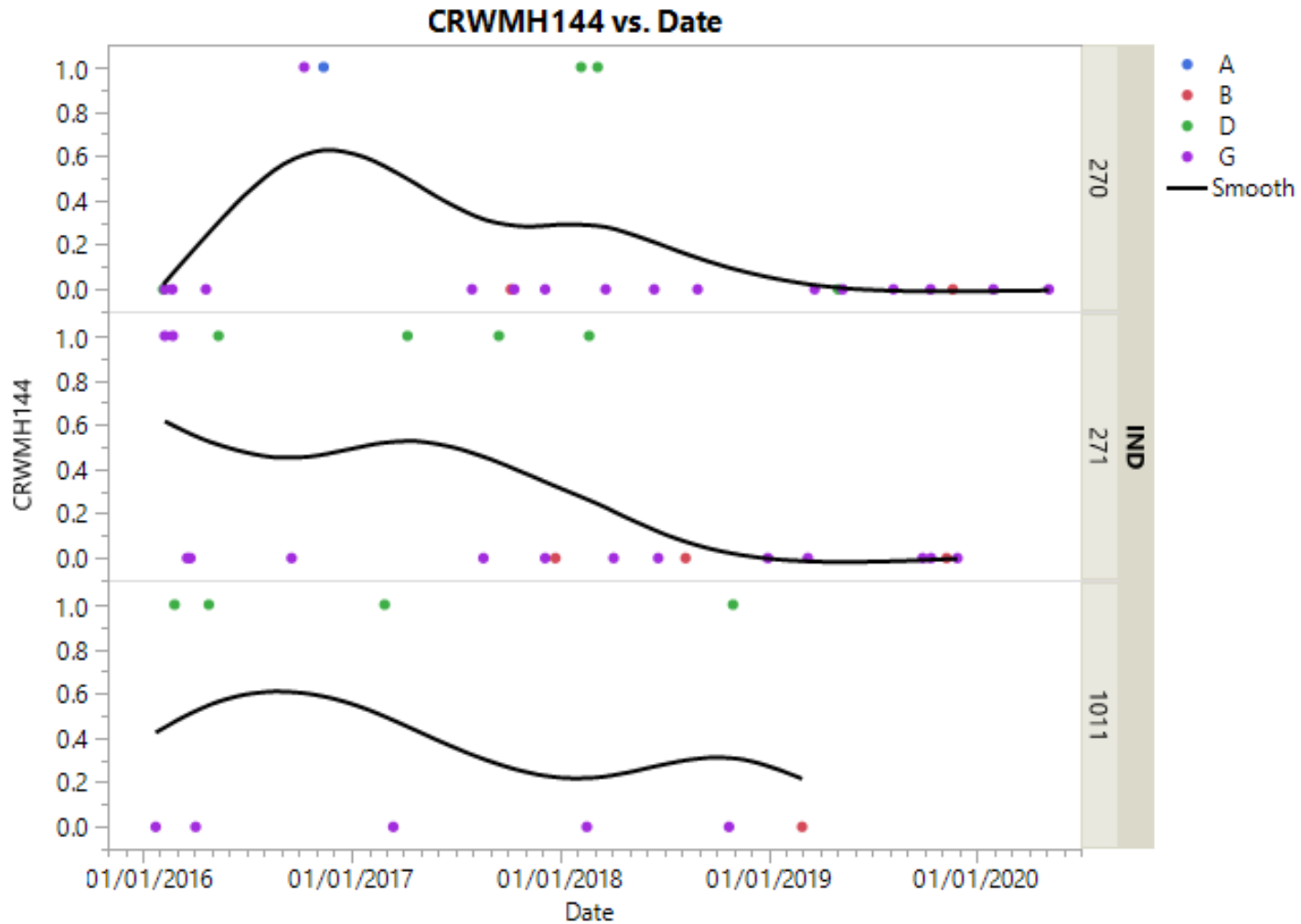
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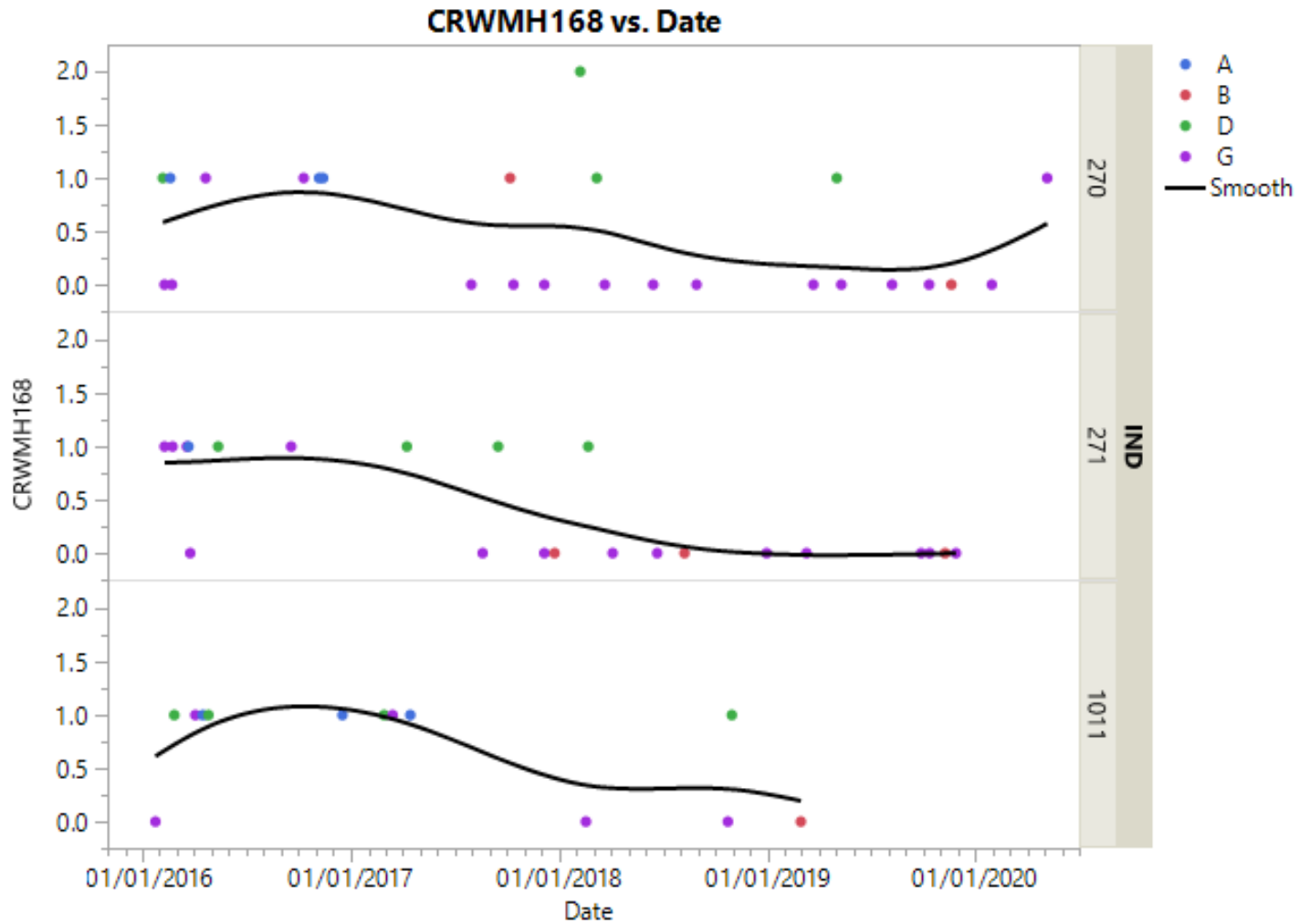
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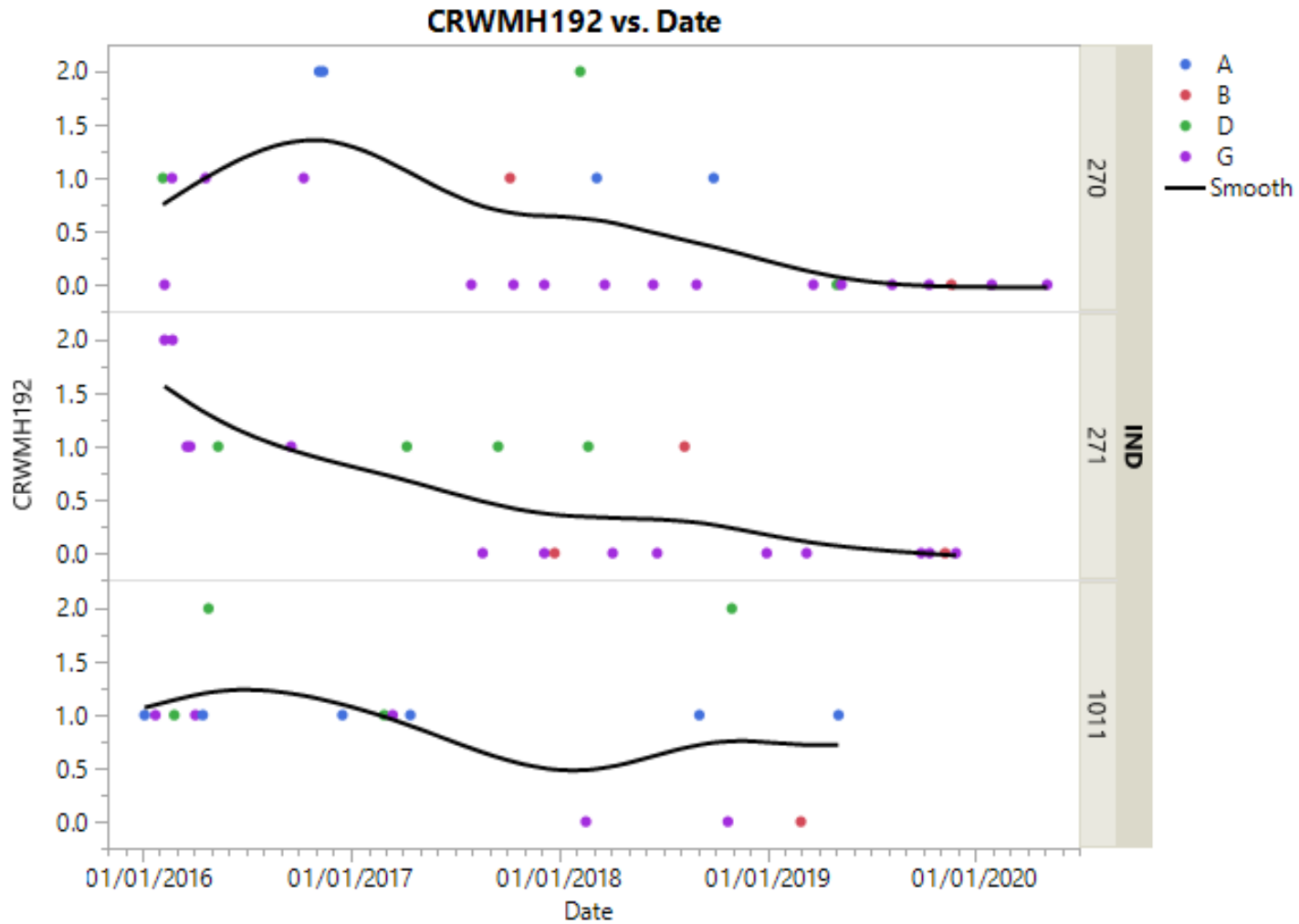
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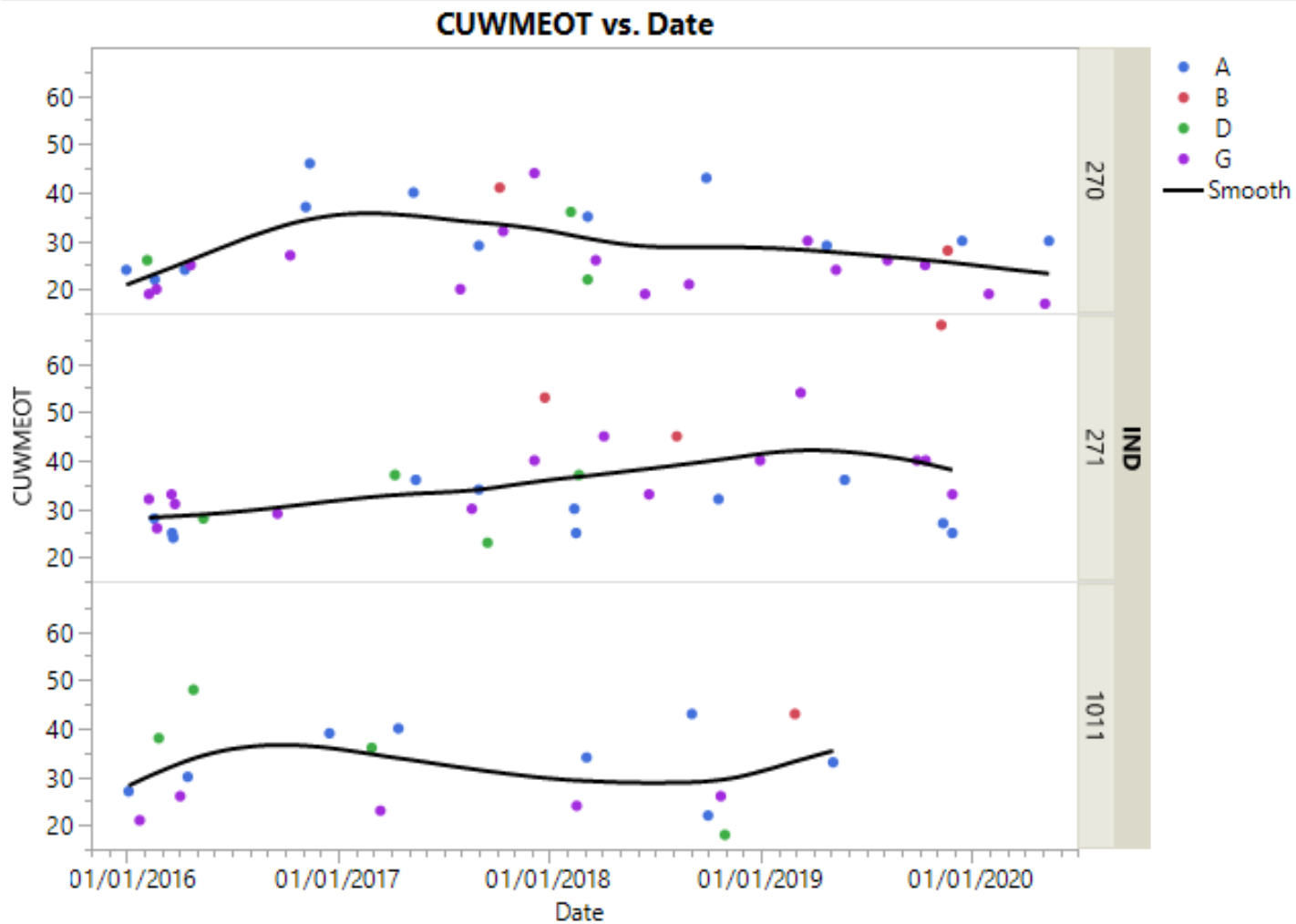
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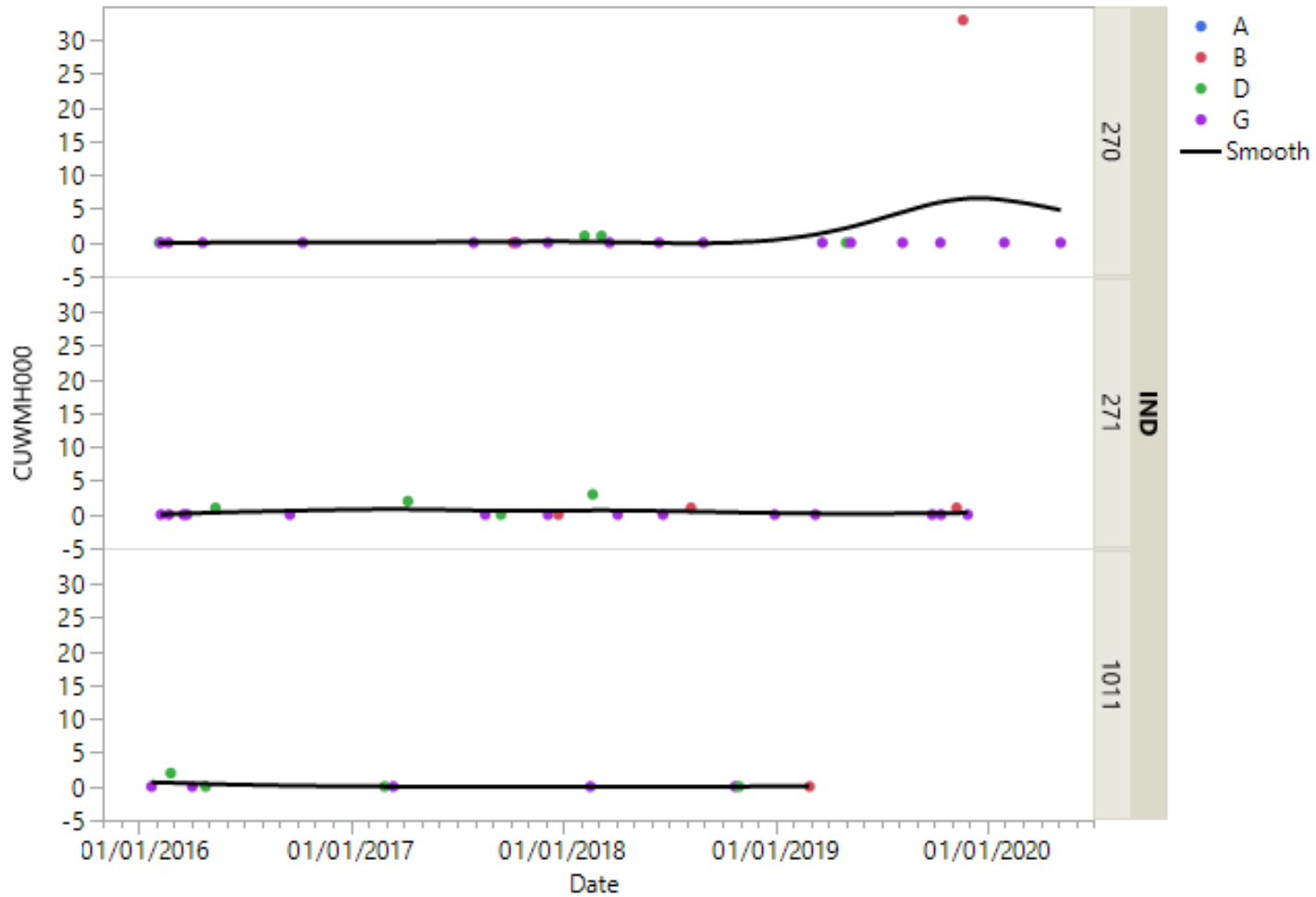


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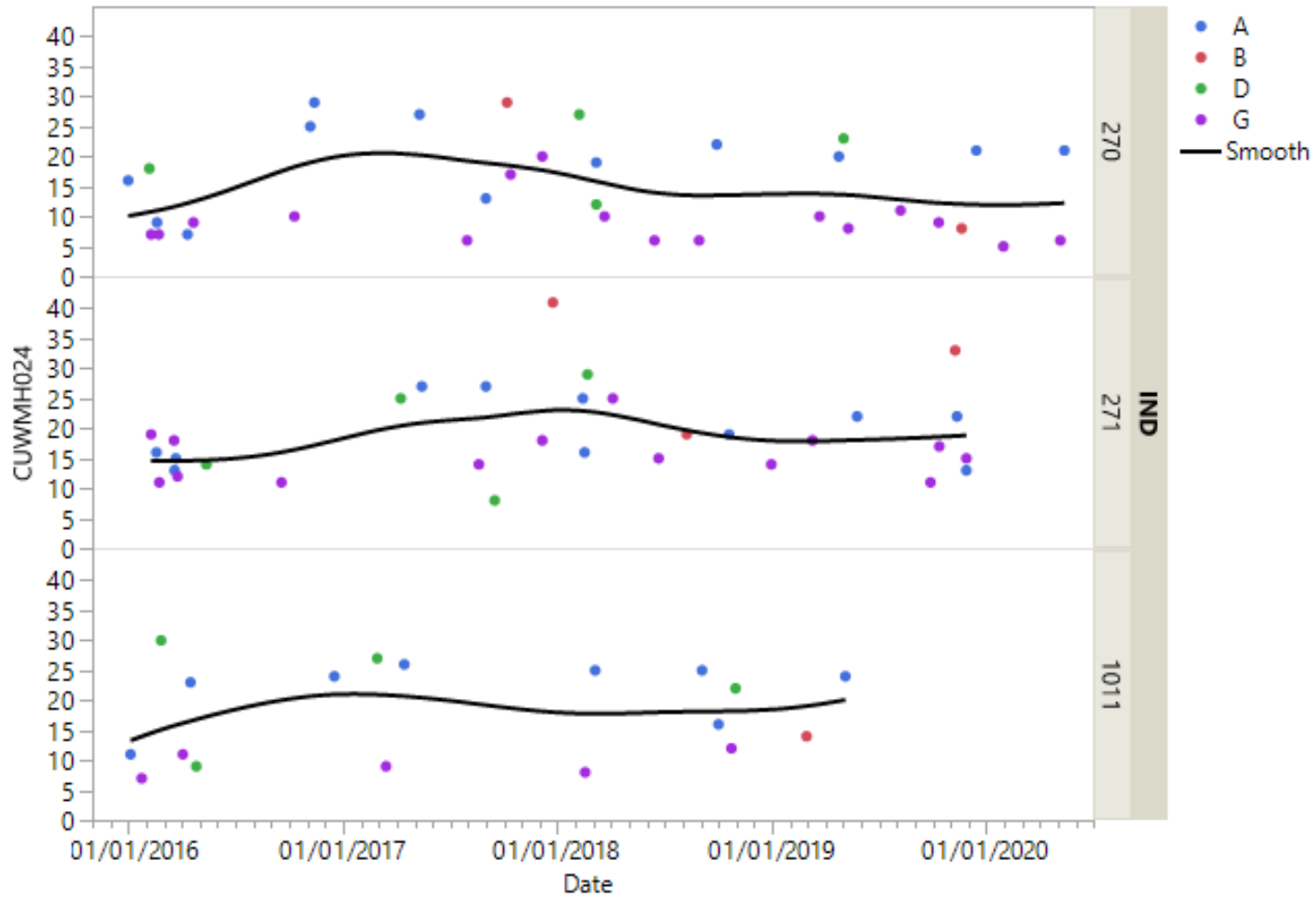
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CUWMH000 vs. Date

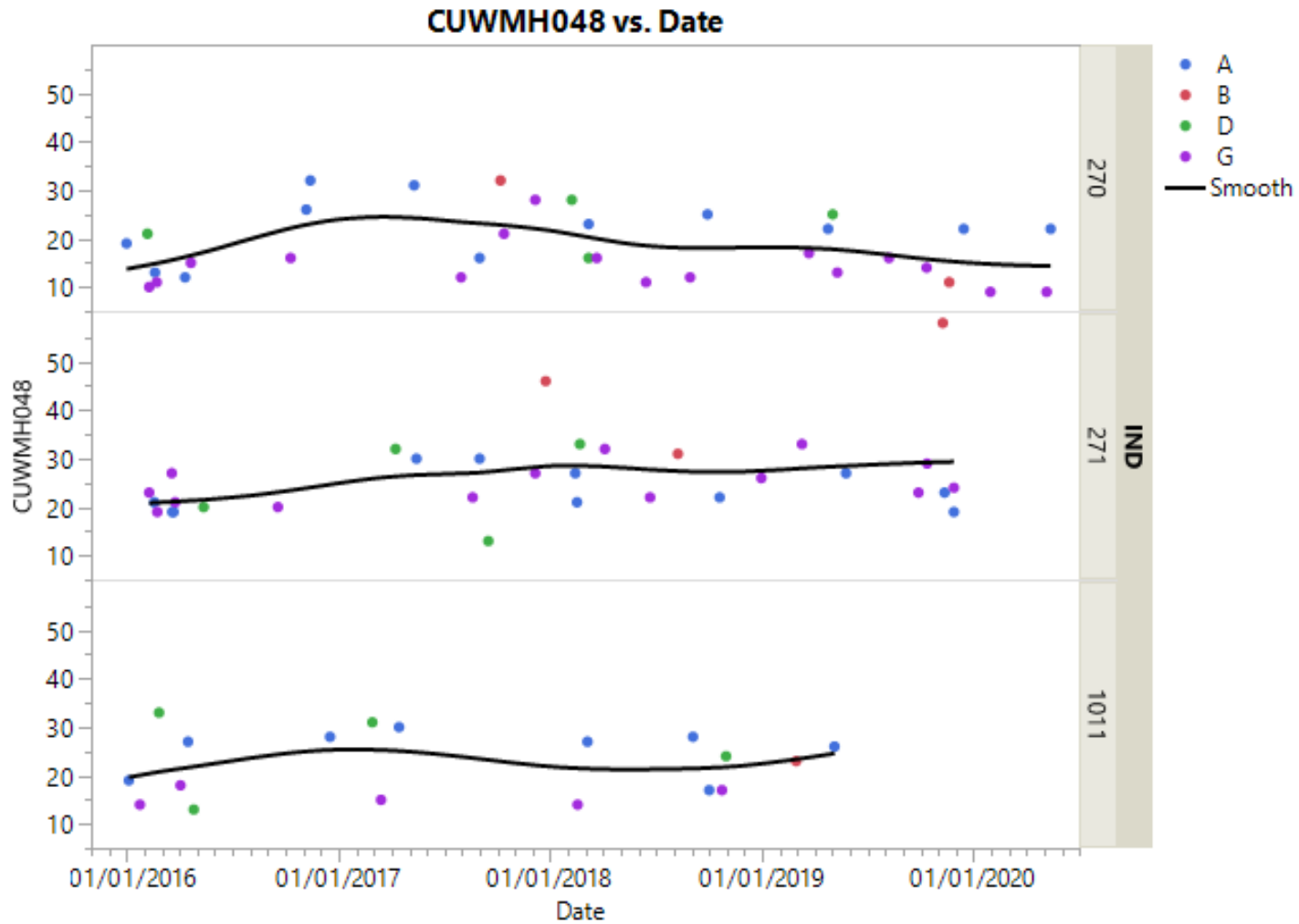


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CUWMH024 vs. Date

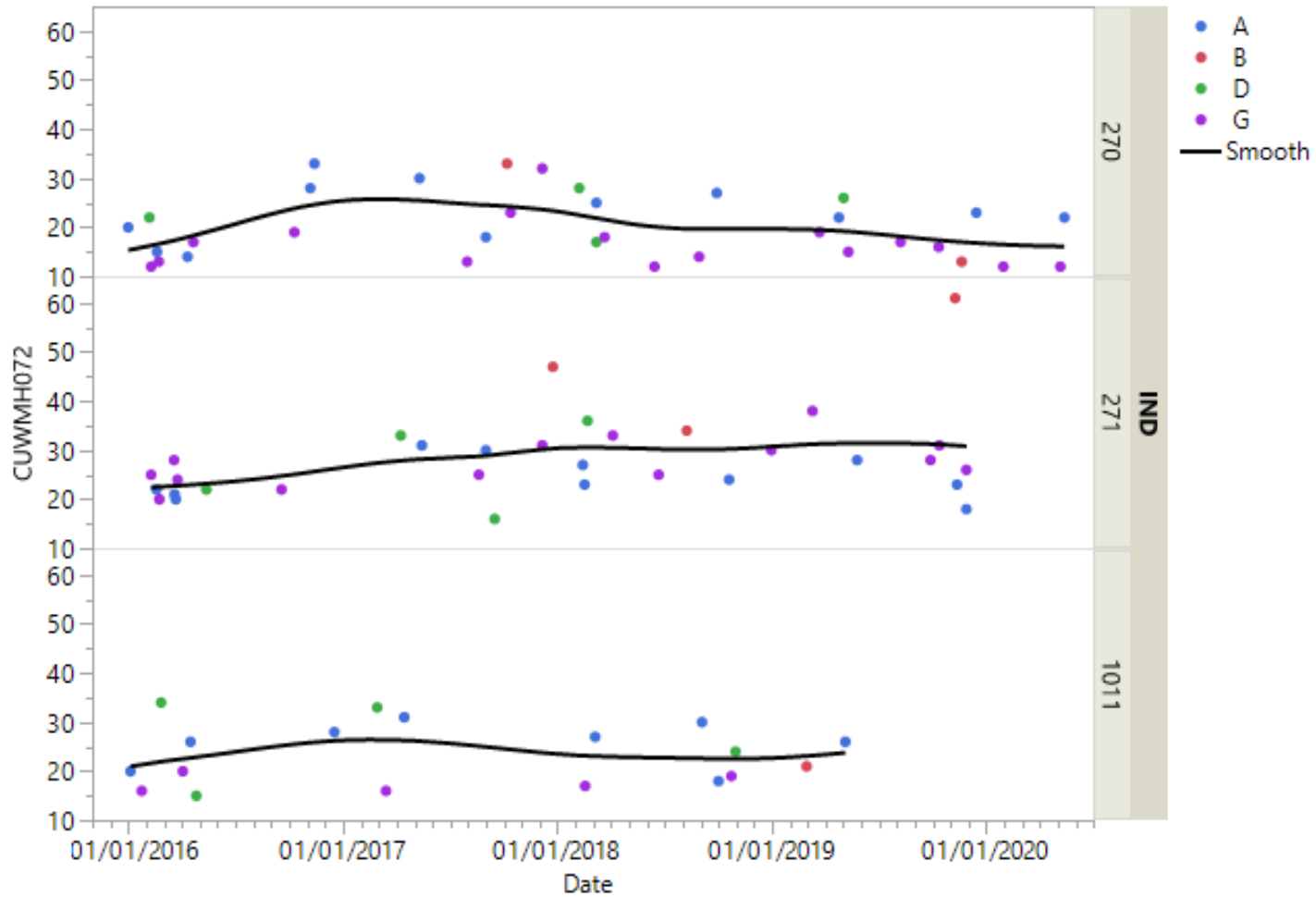


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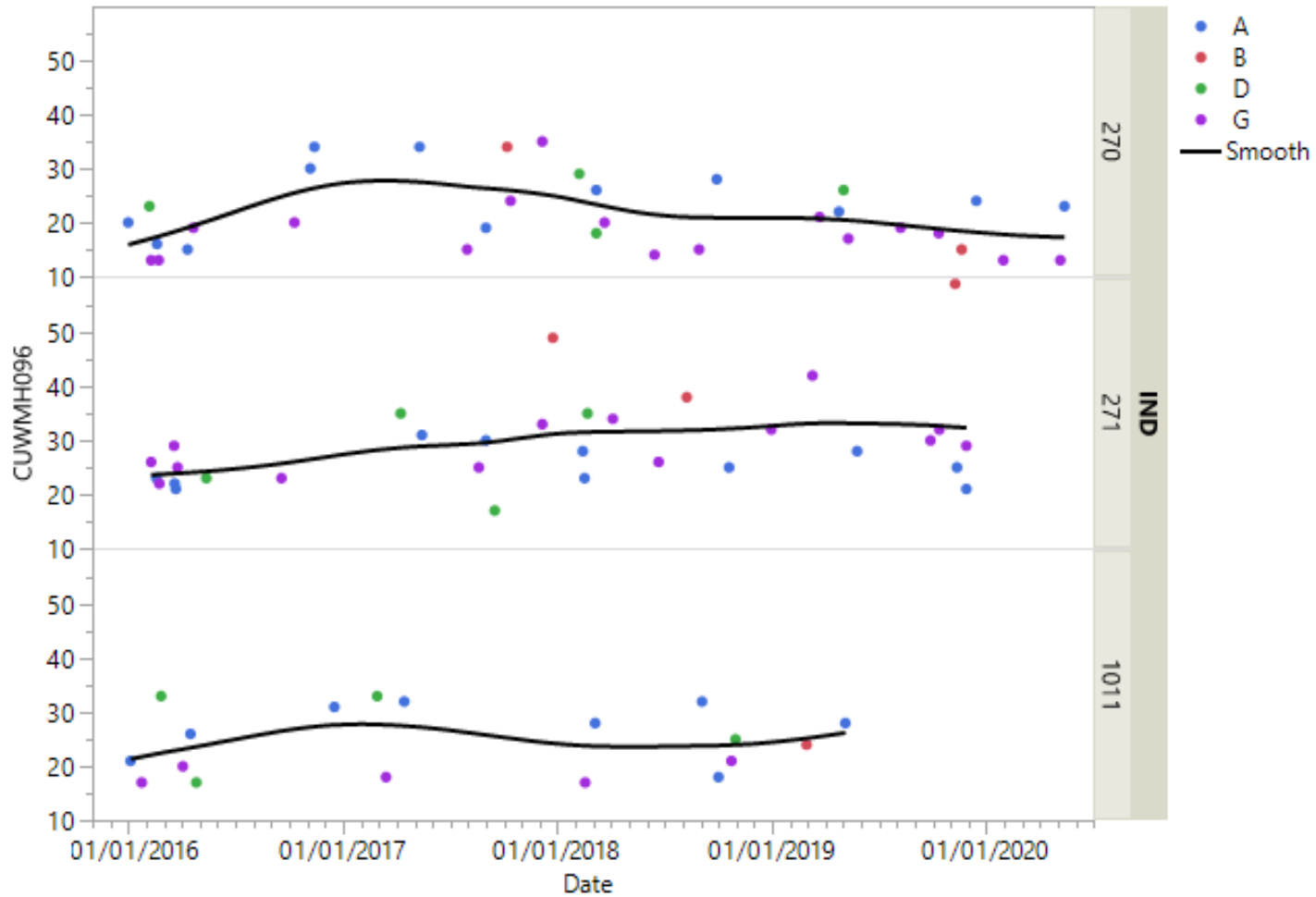
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CUWMH072 vs. Date



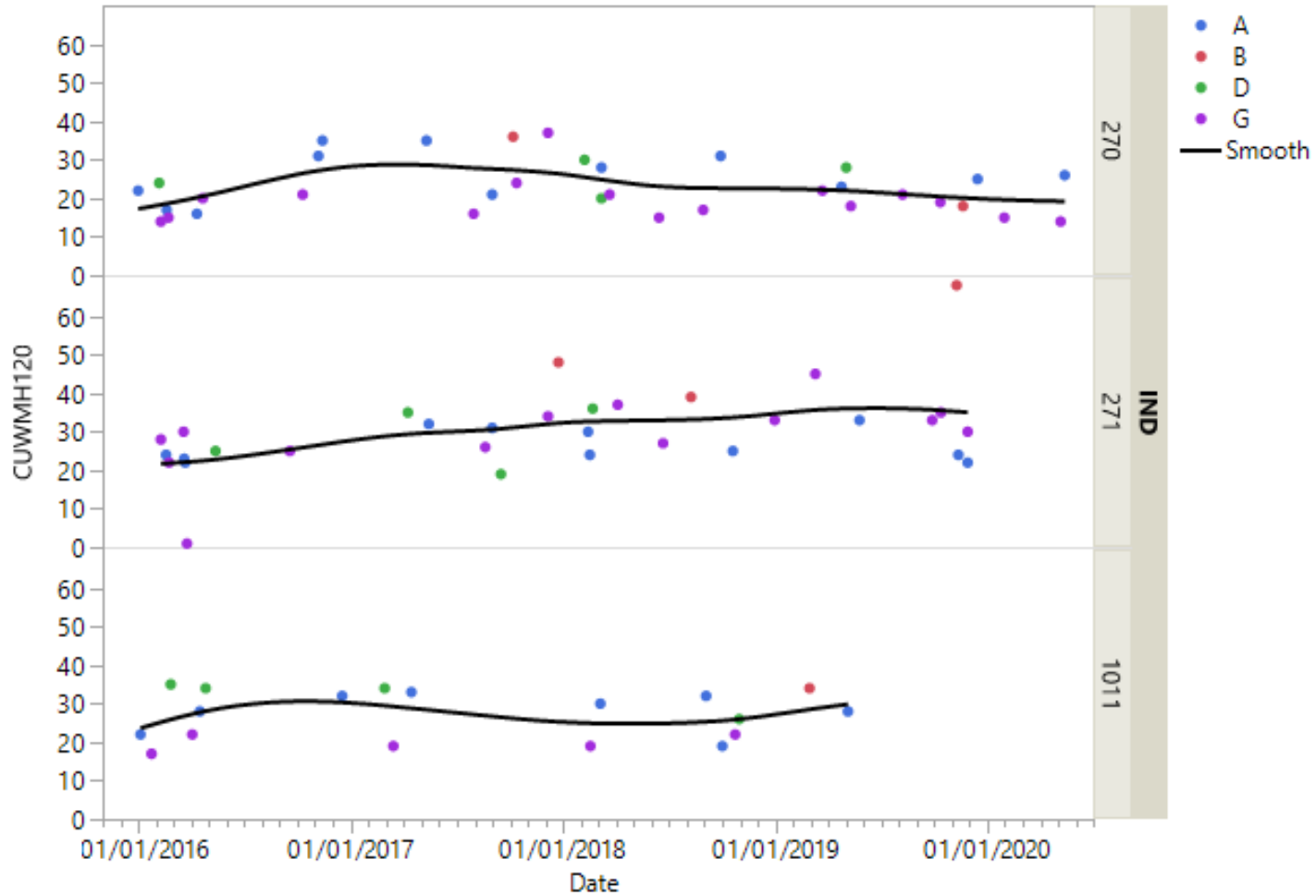
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CUWMH096 vs. Date



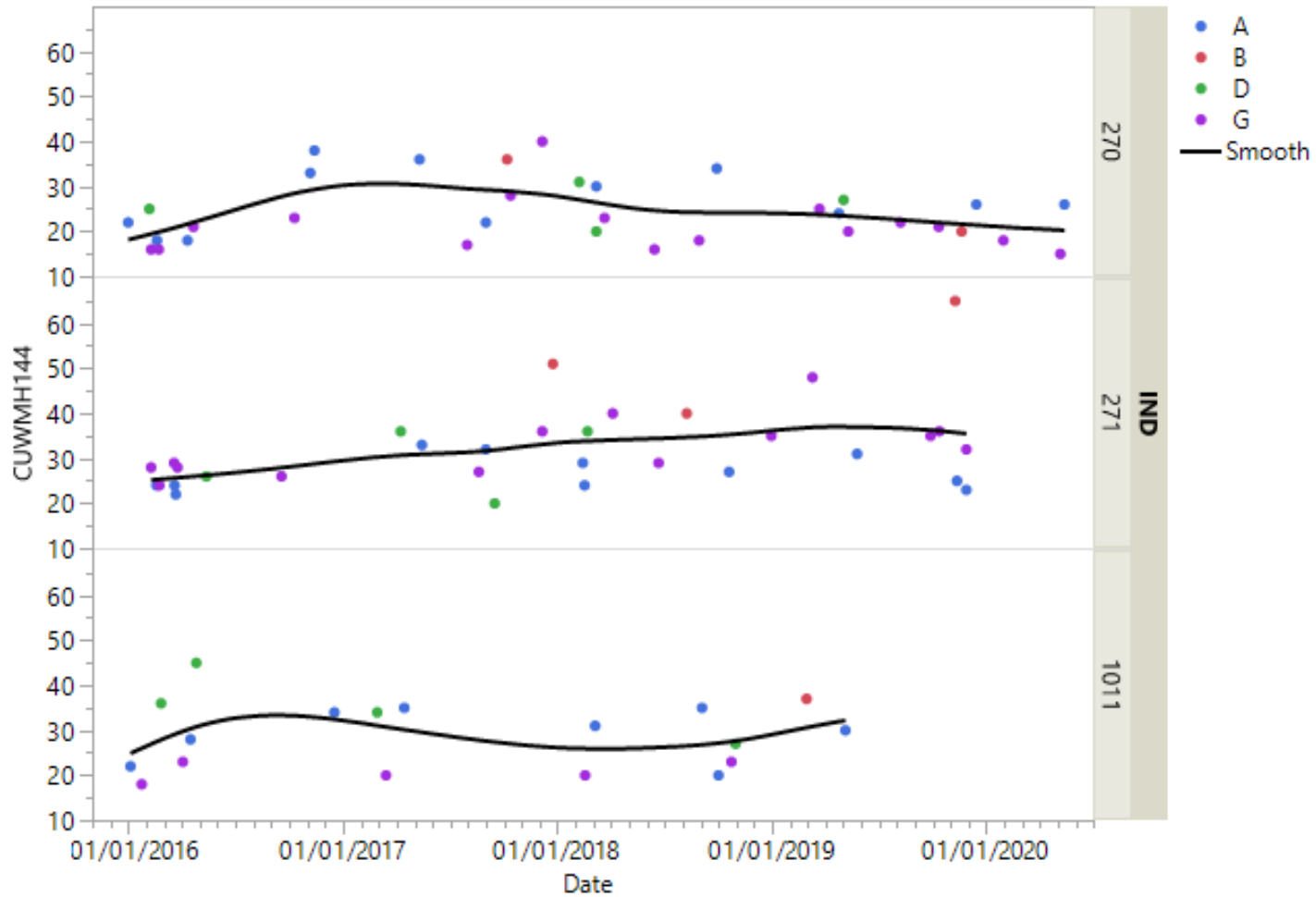
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CUWMH120 vs. Date

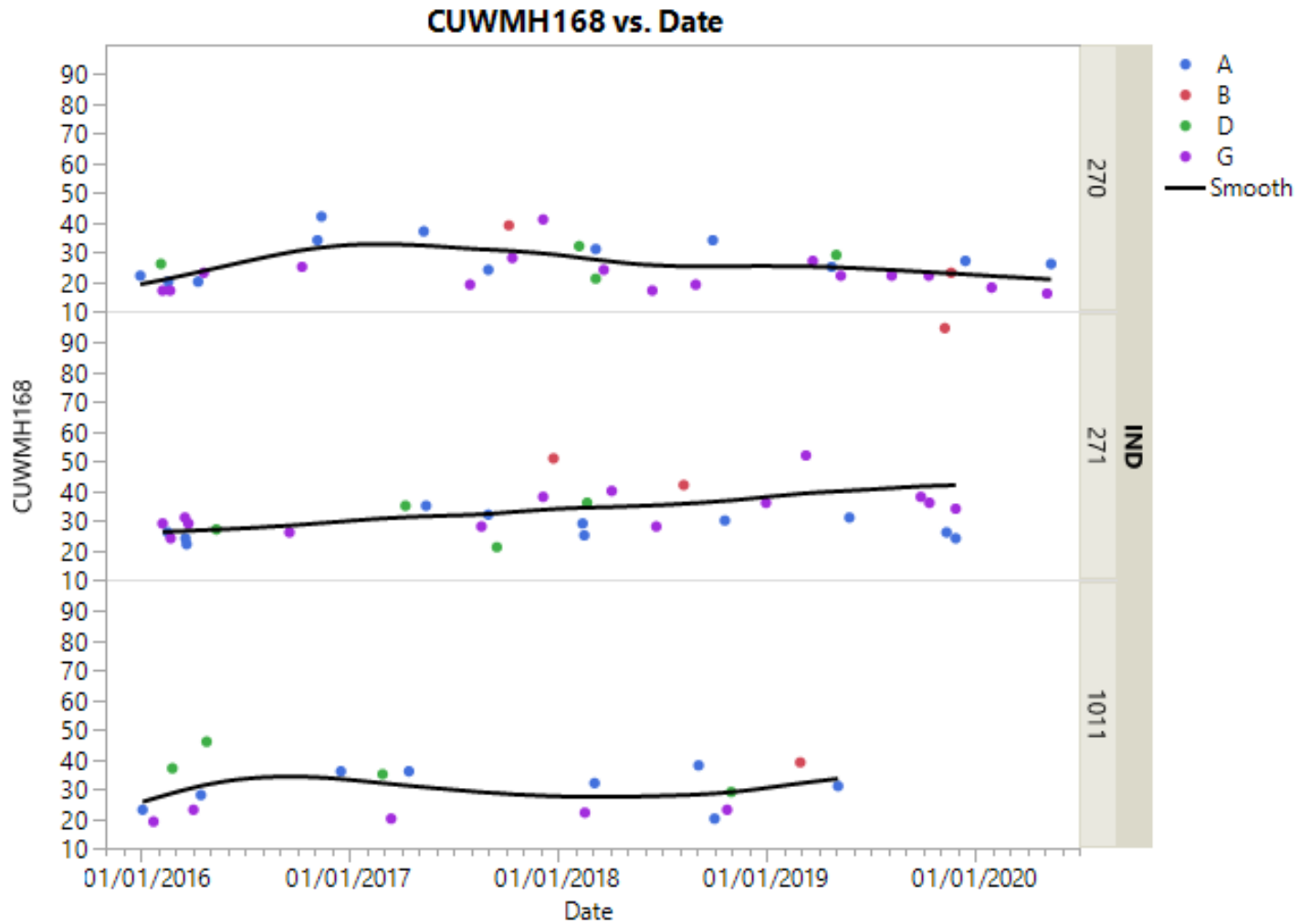


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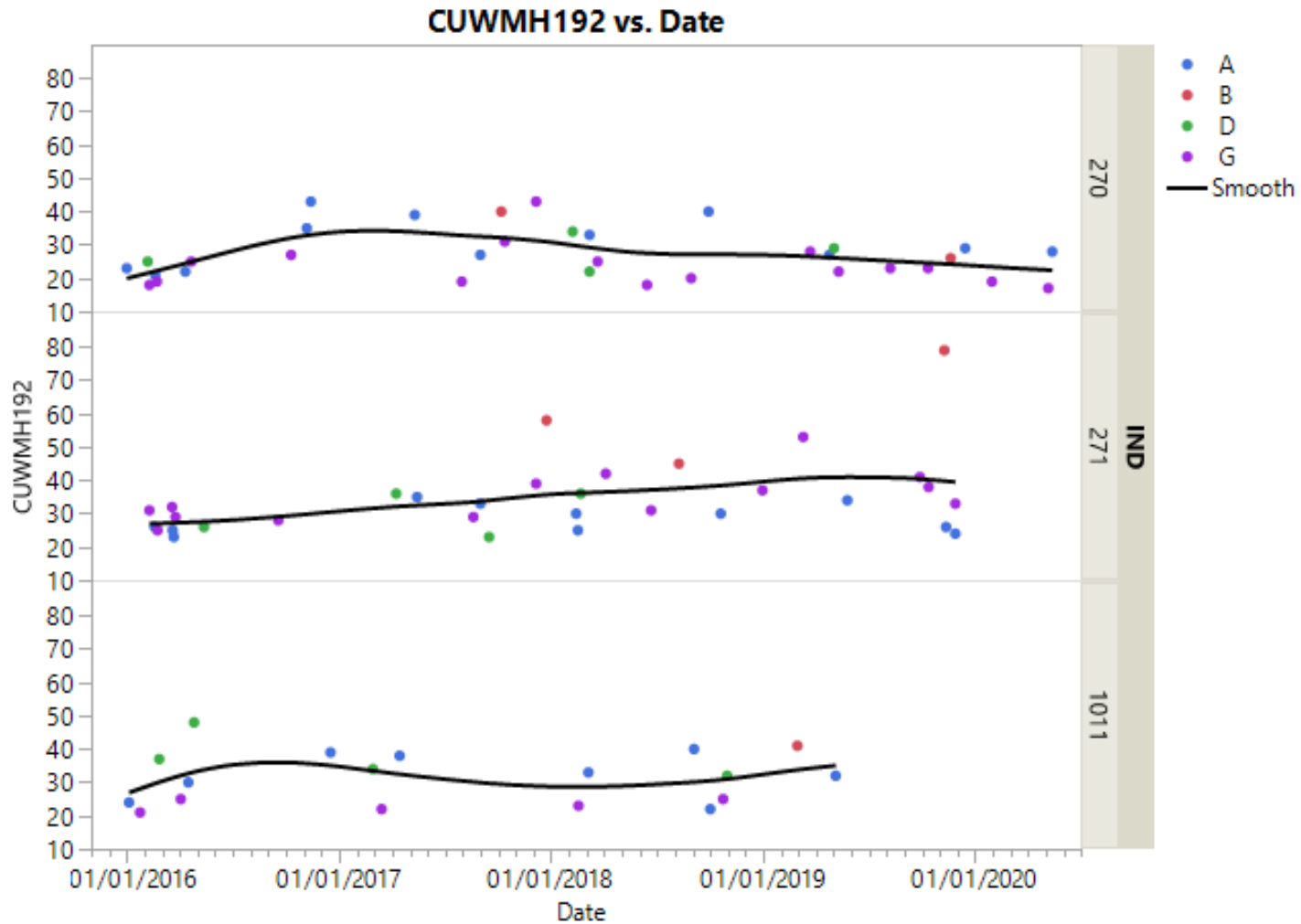
CUWMH144 vs. Date



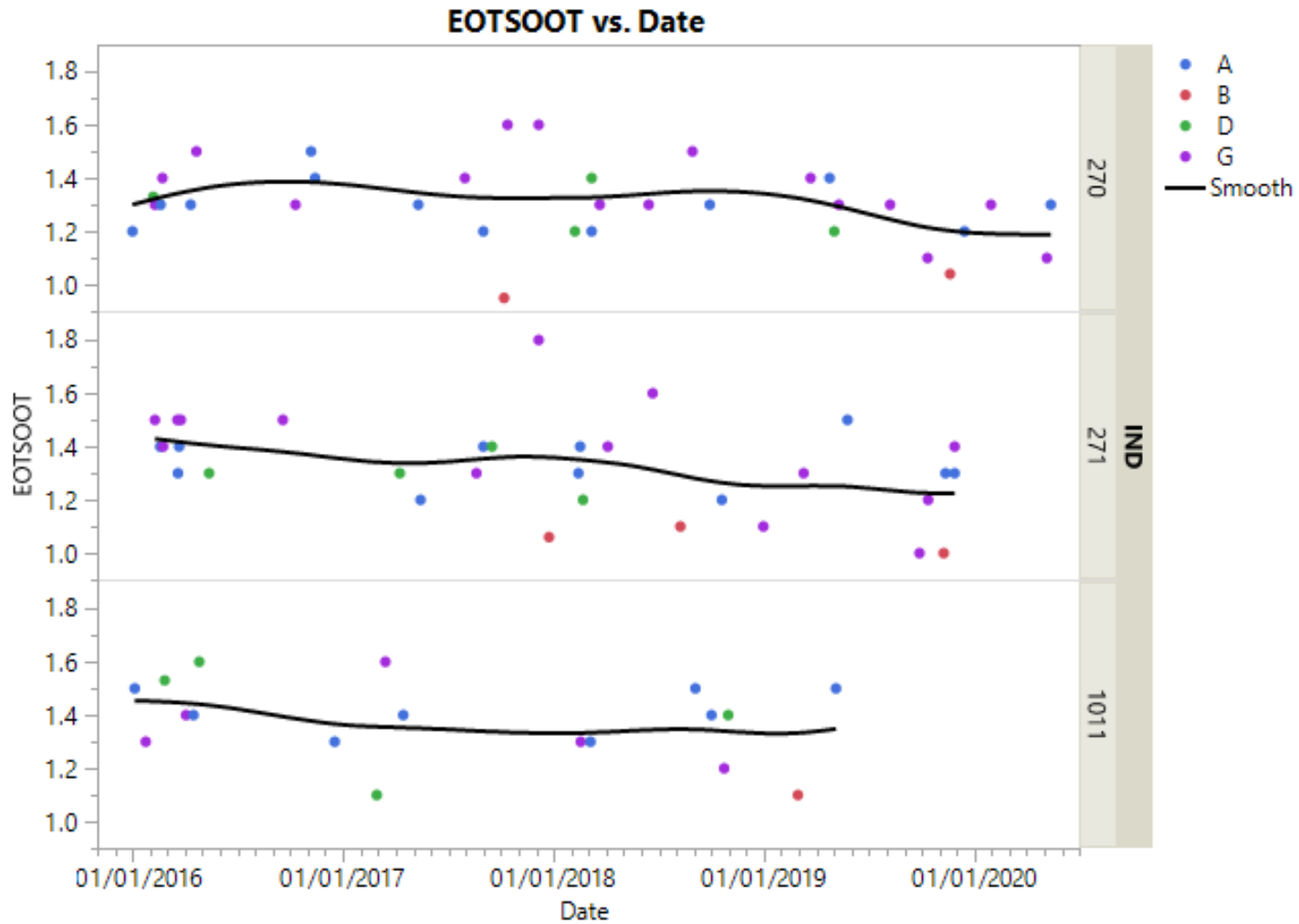
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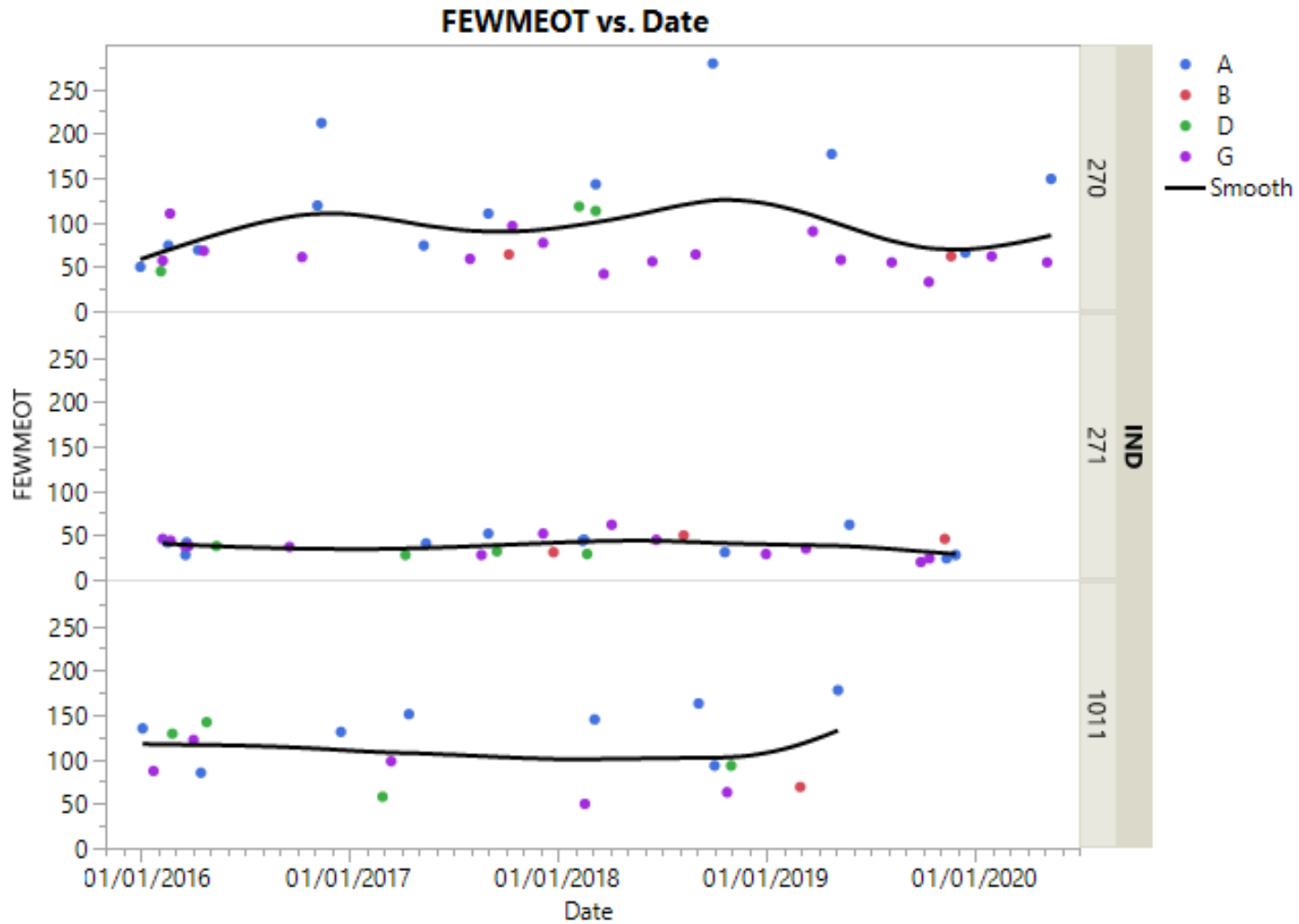
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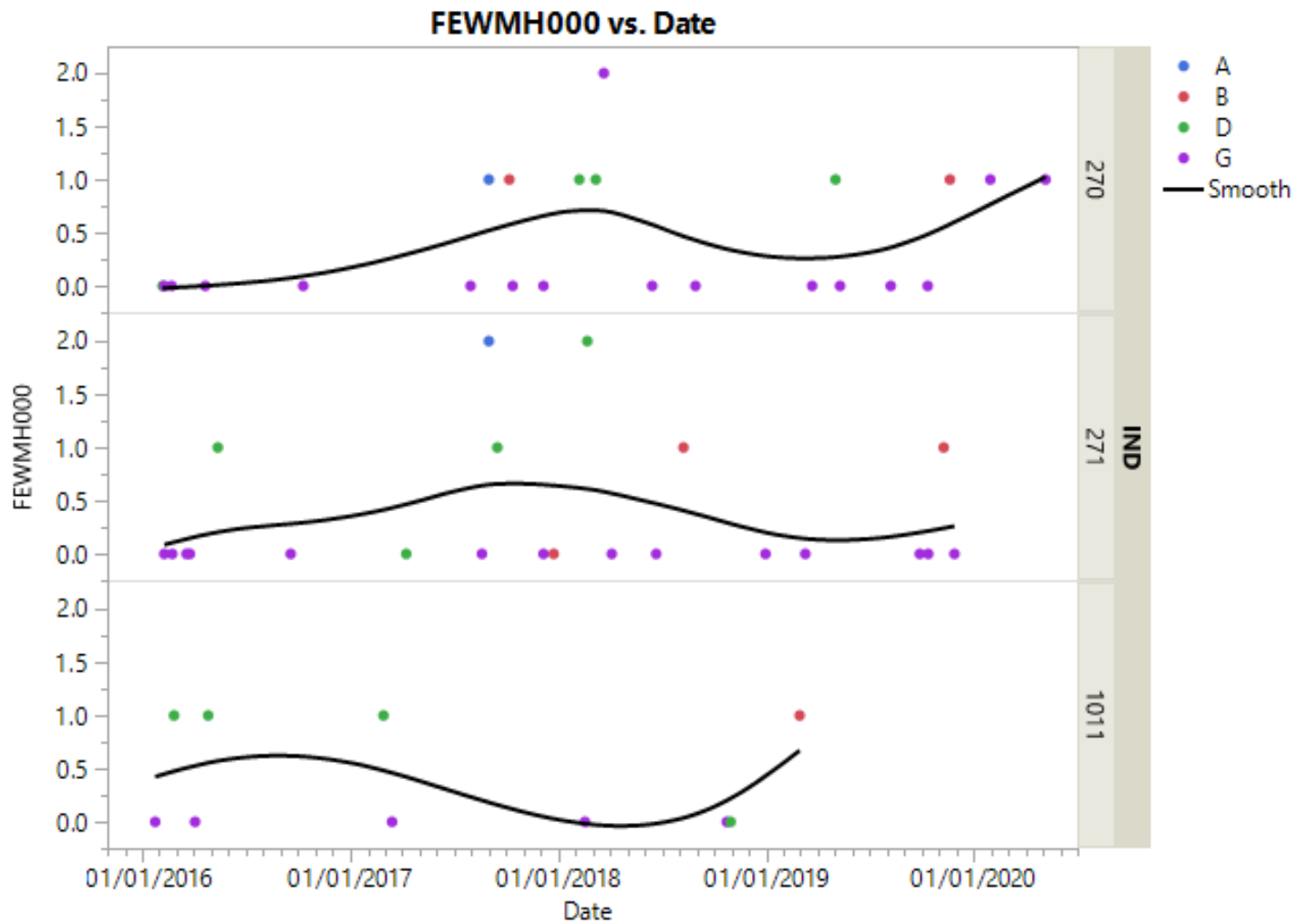
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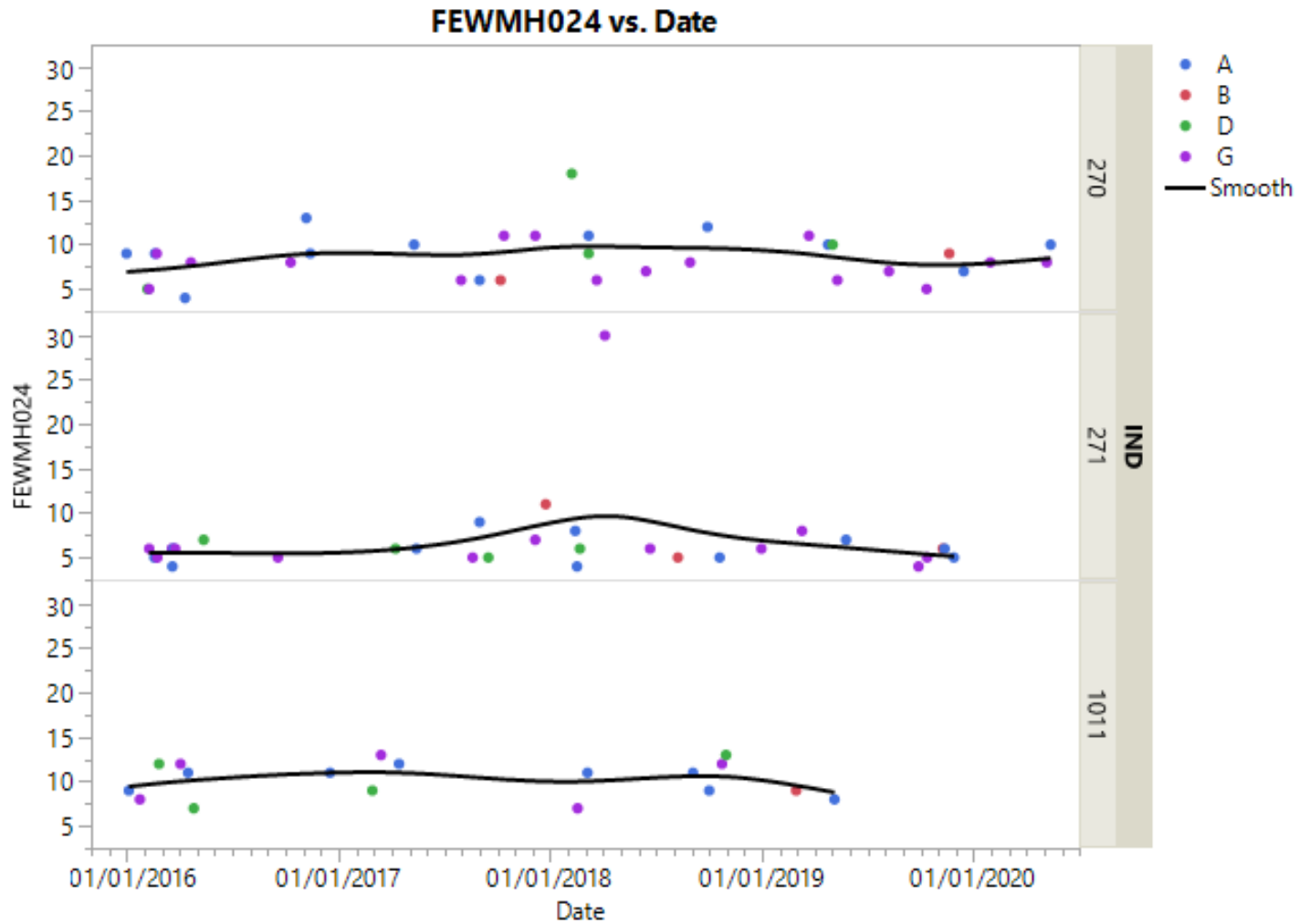
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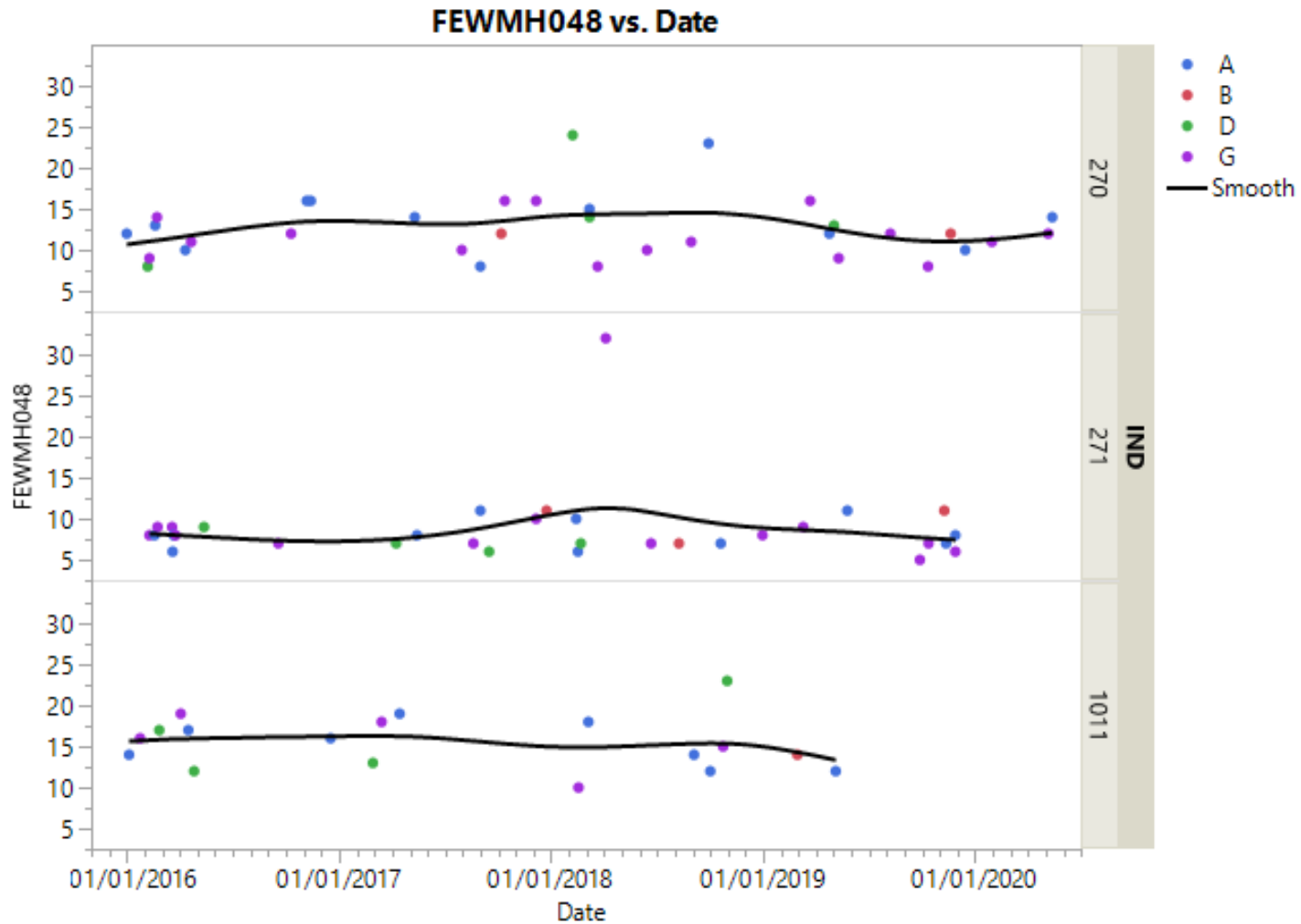
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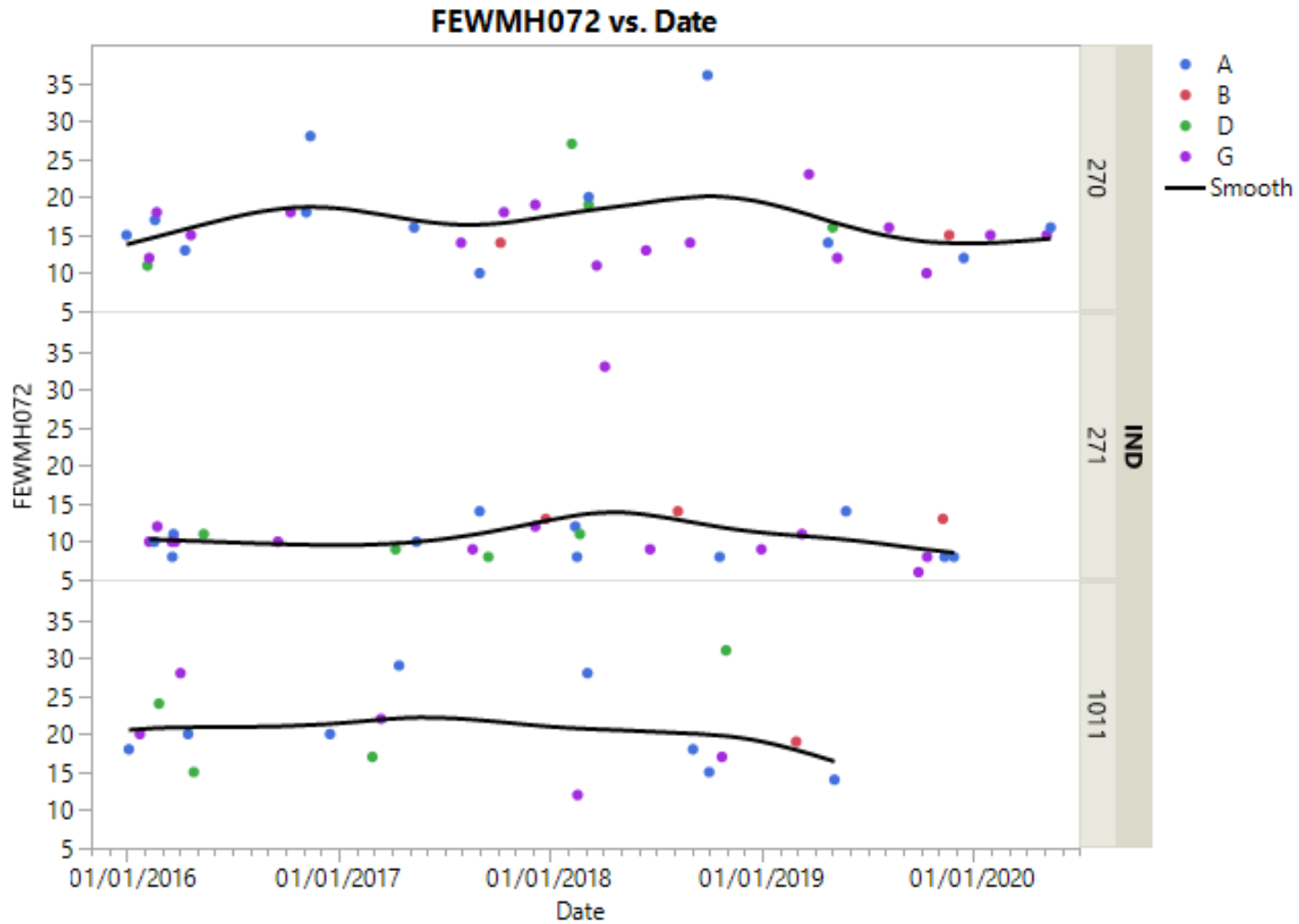
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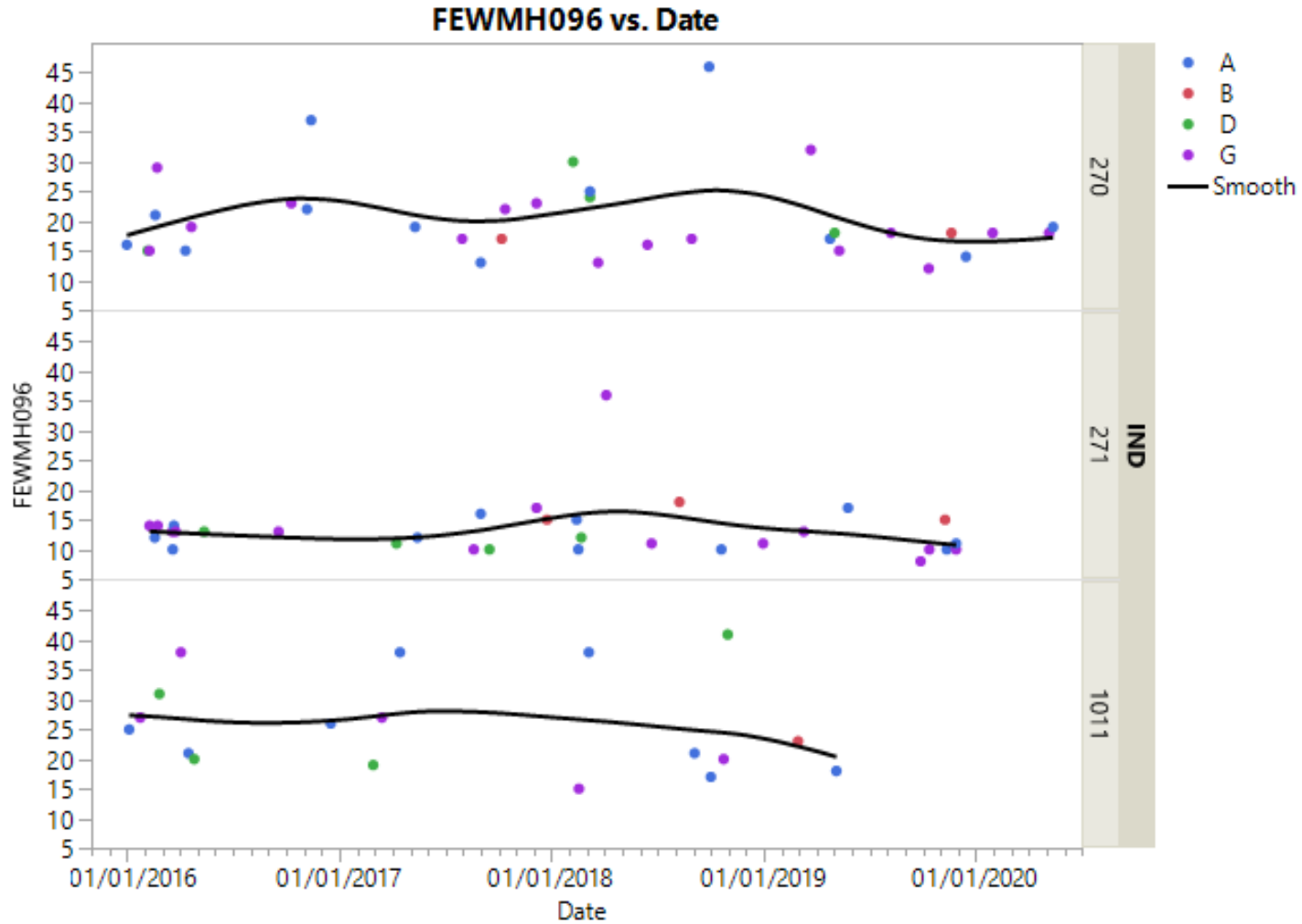
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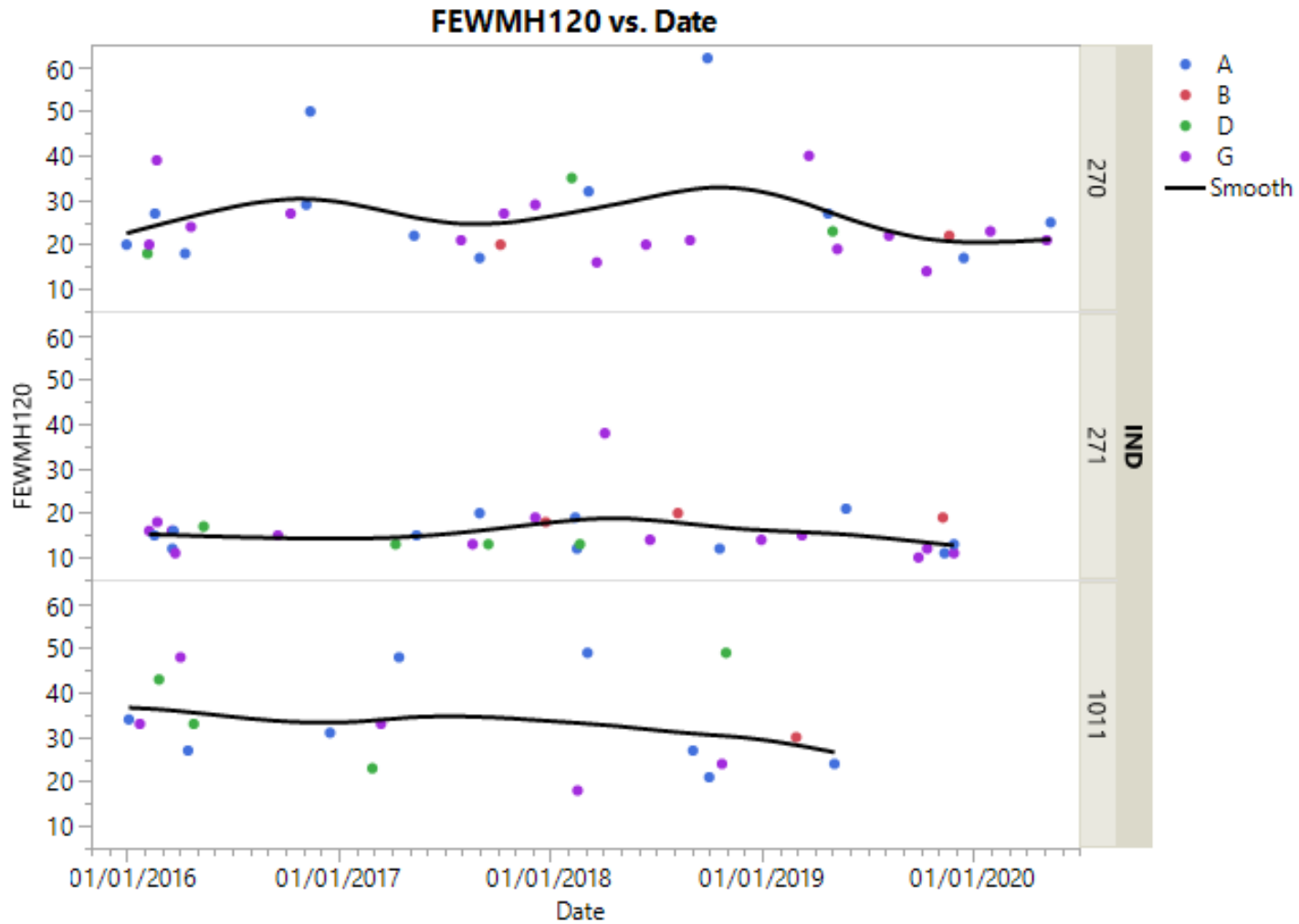
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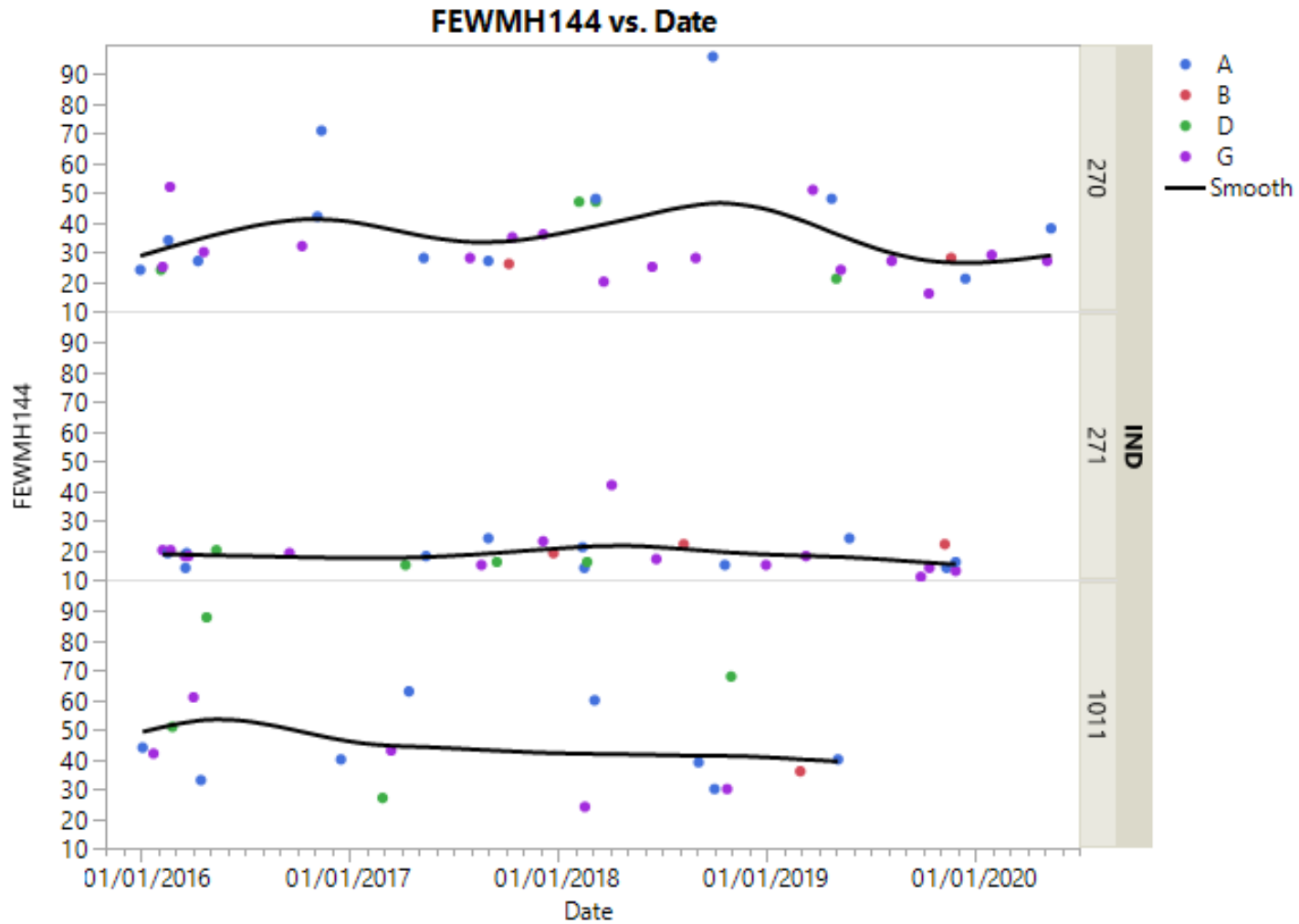
Graph Builder



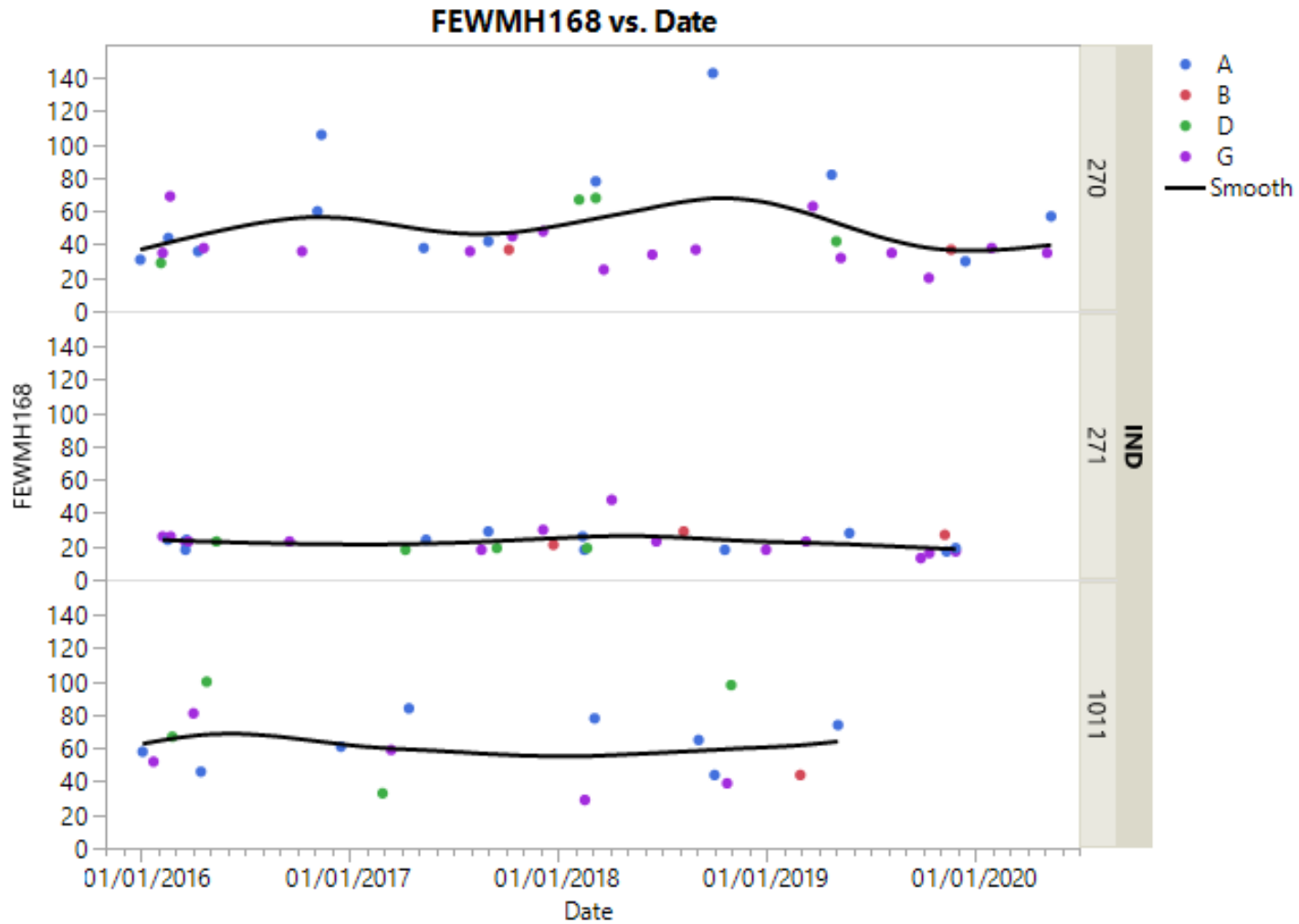
Graph Builder



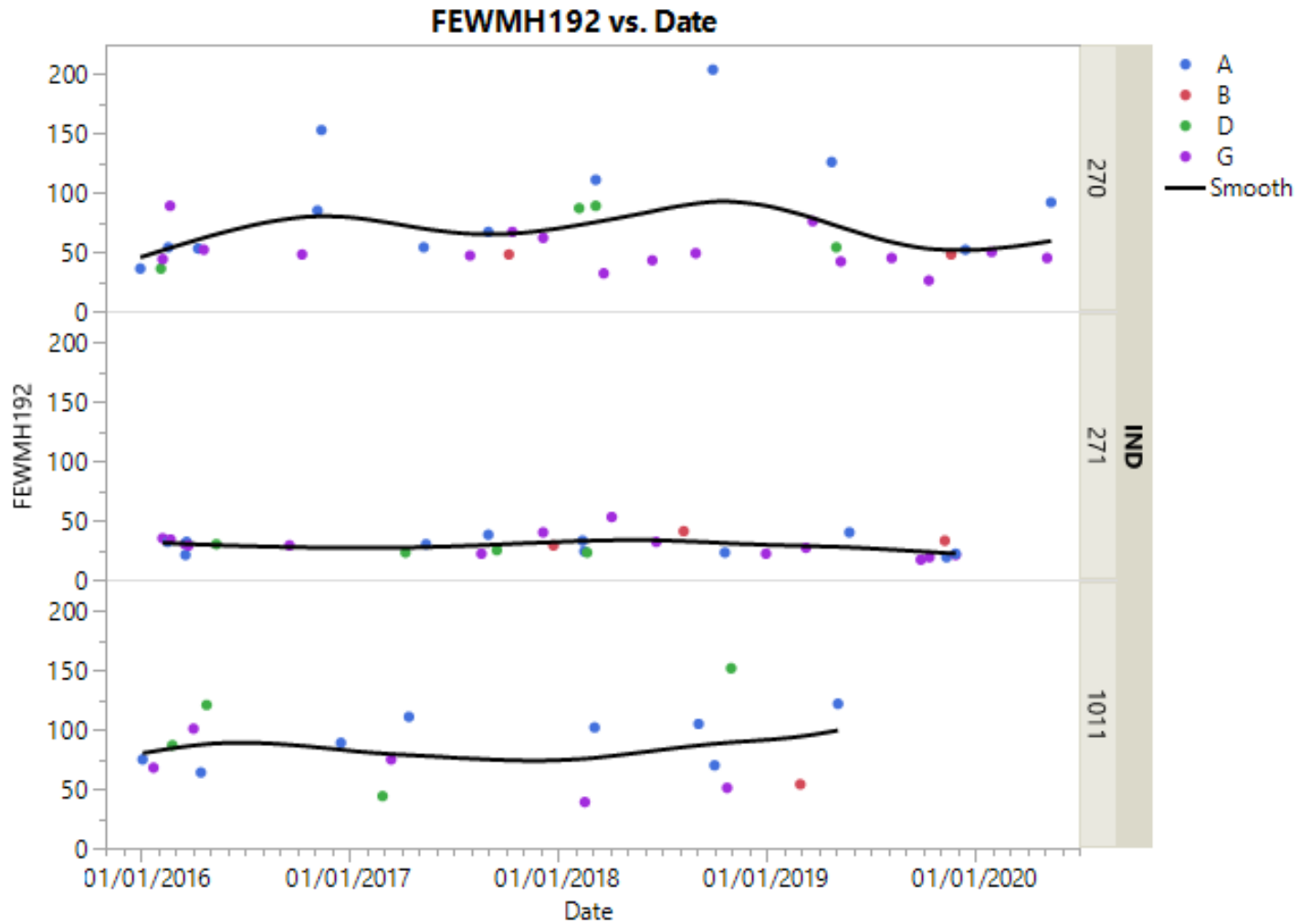
Graph Builder



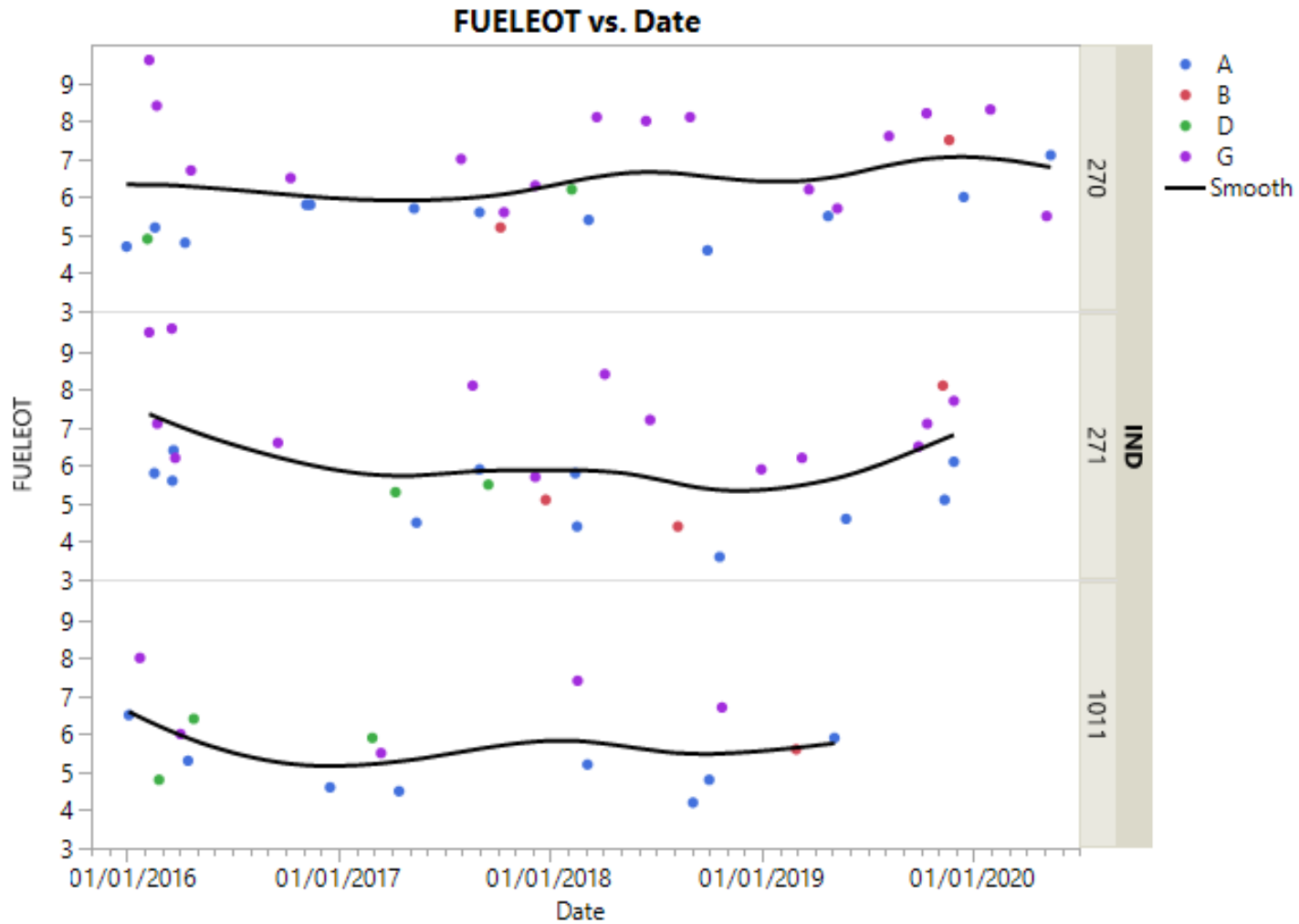
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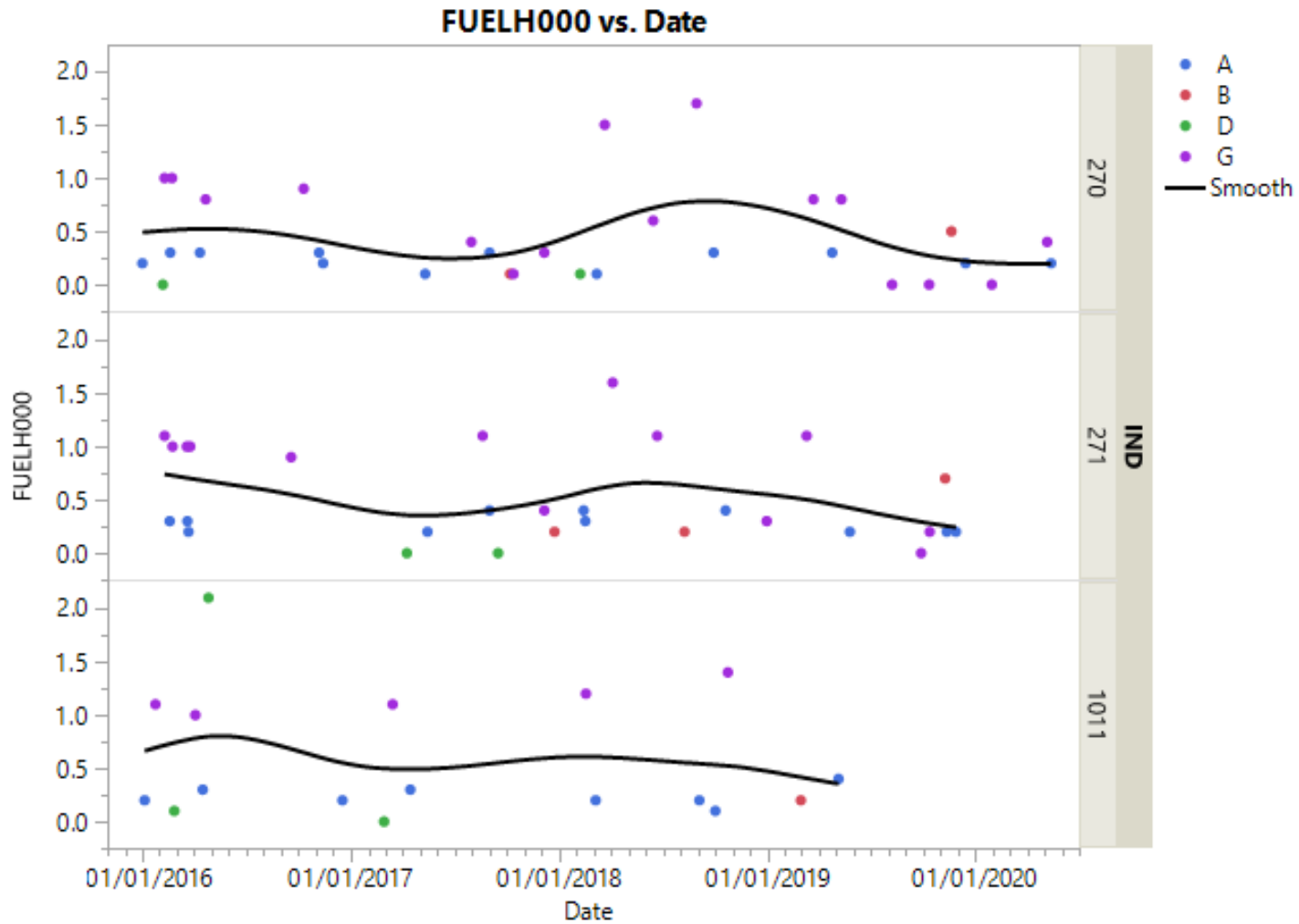
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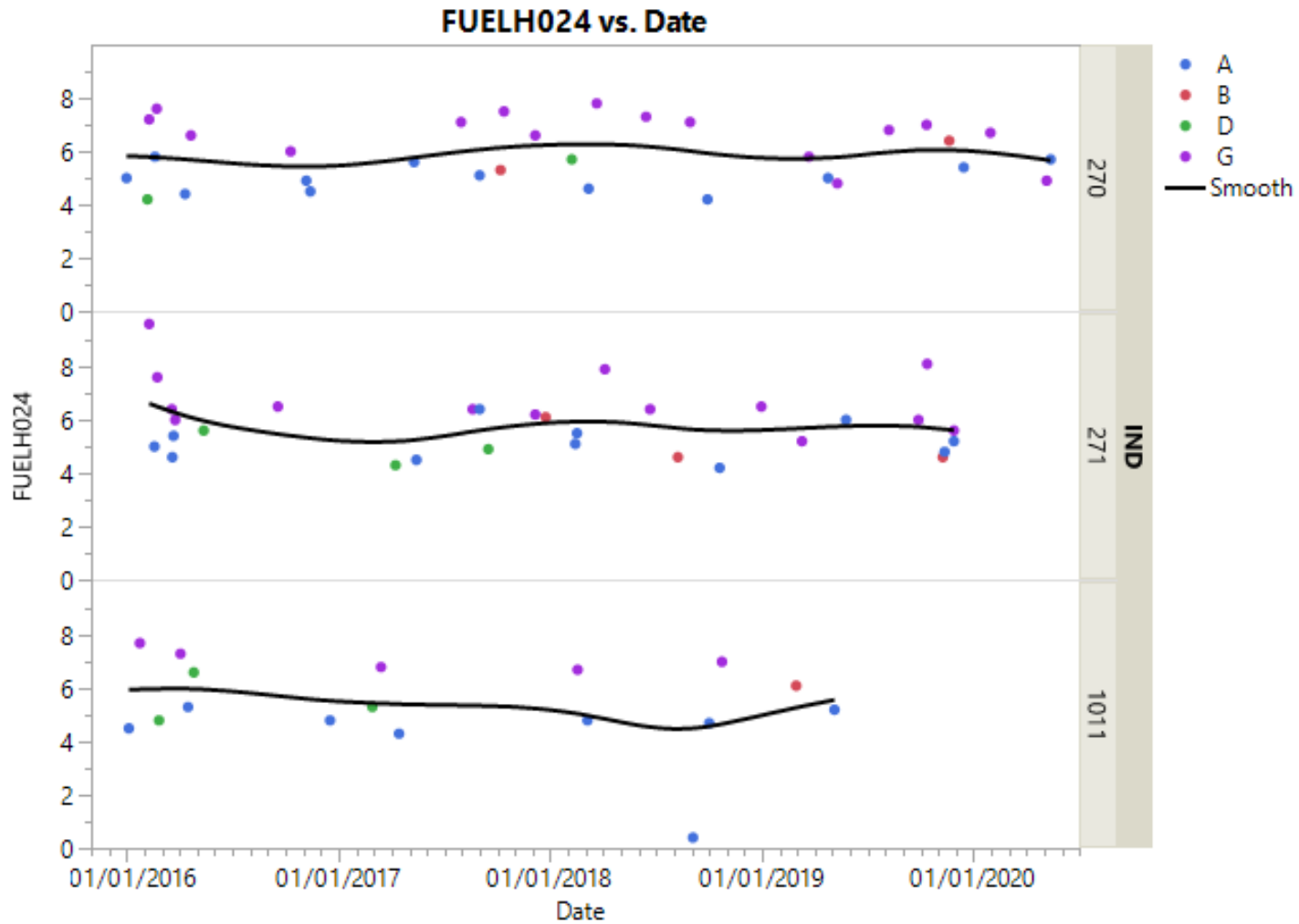
Graph Builder



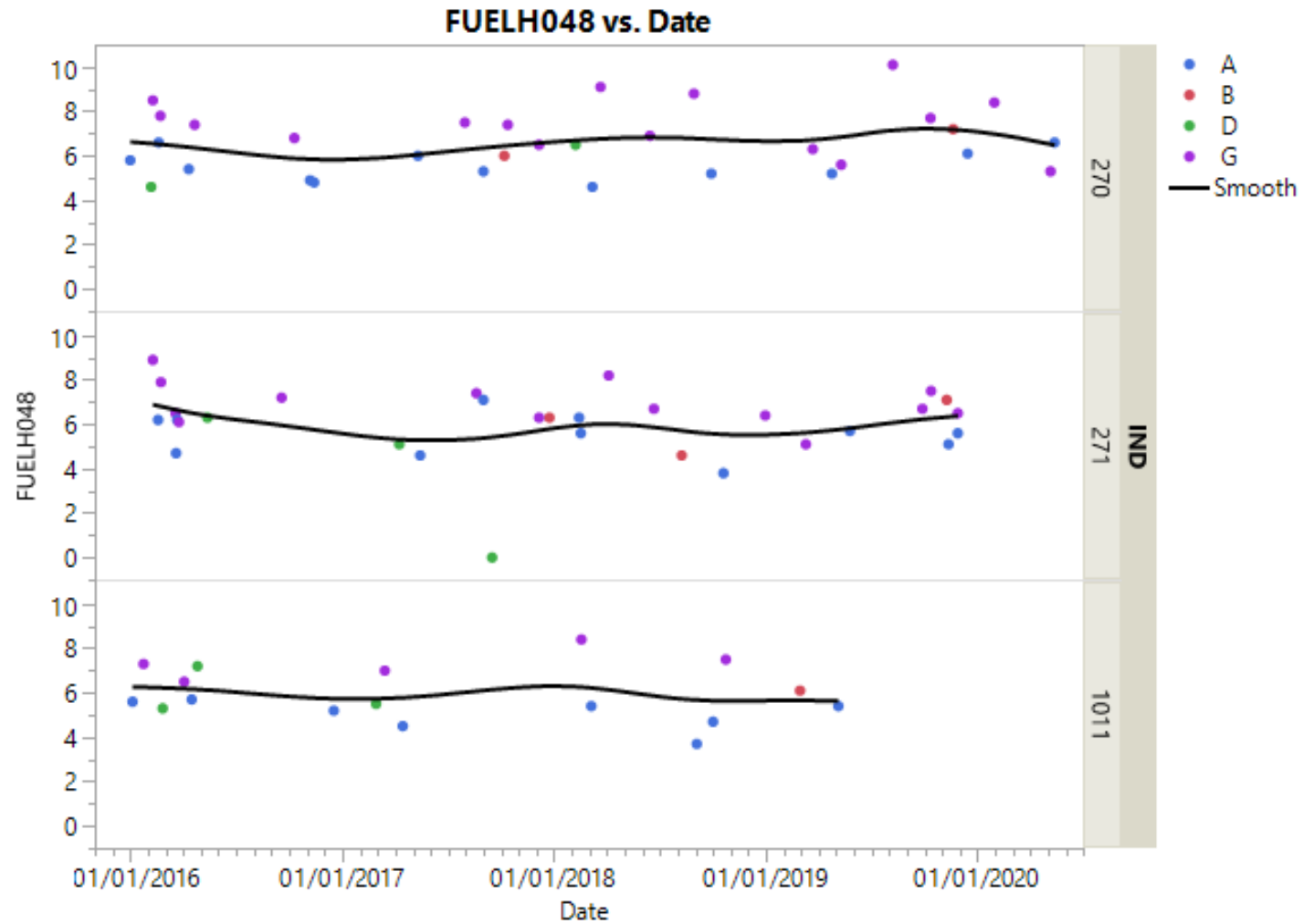
Graph Builder



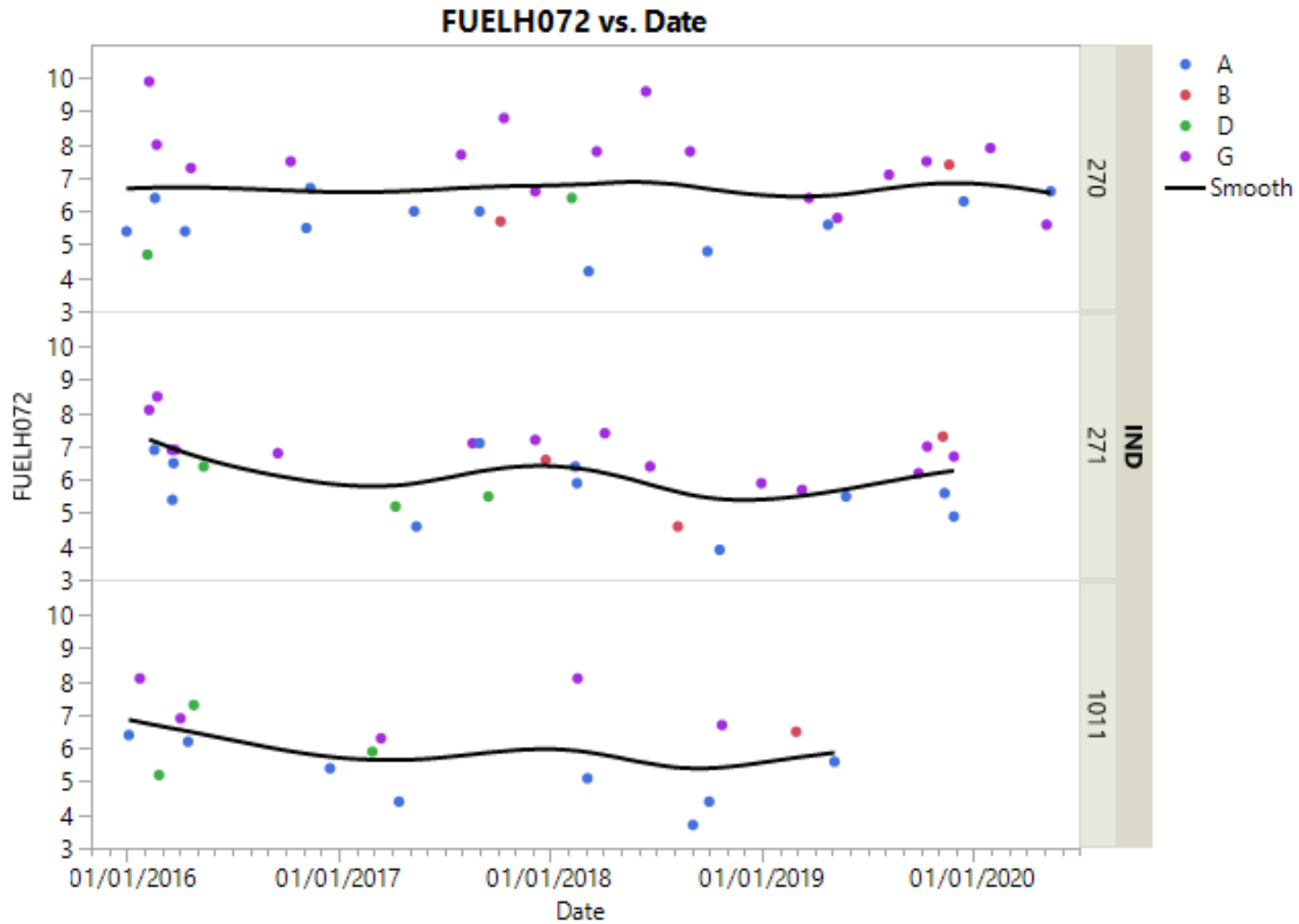
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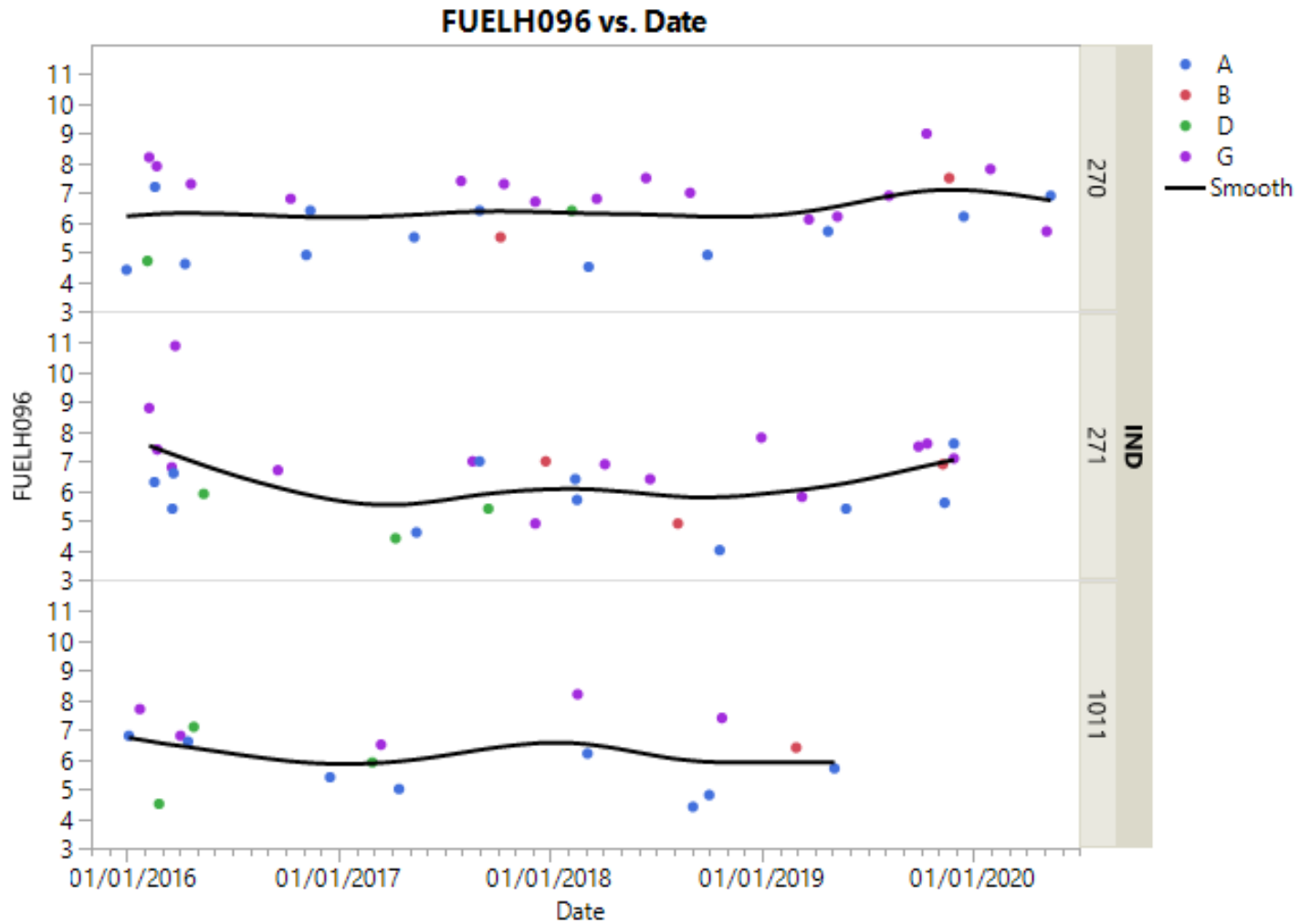
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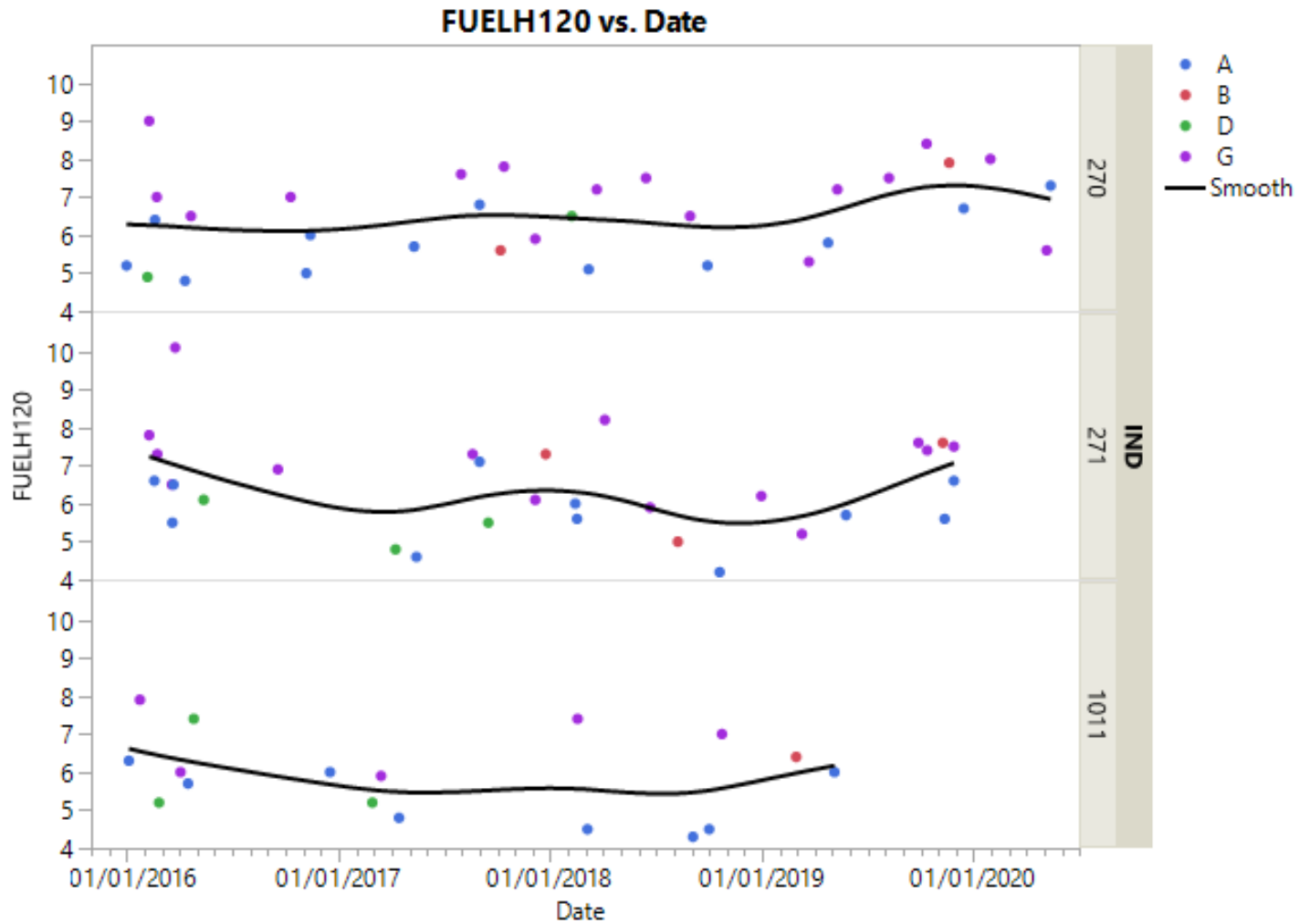
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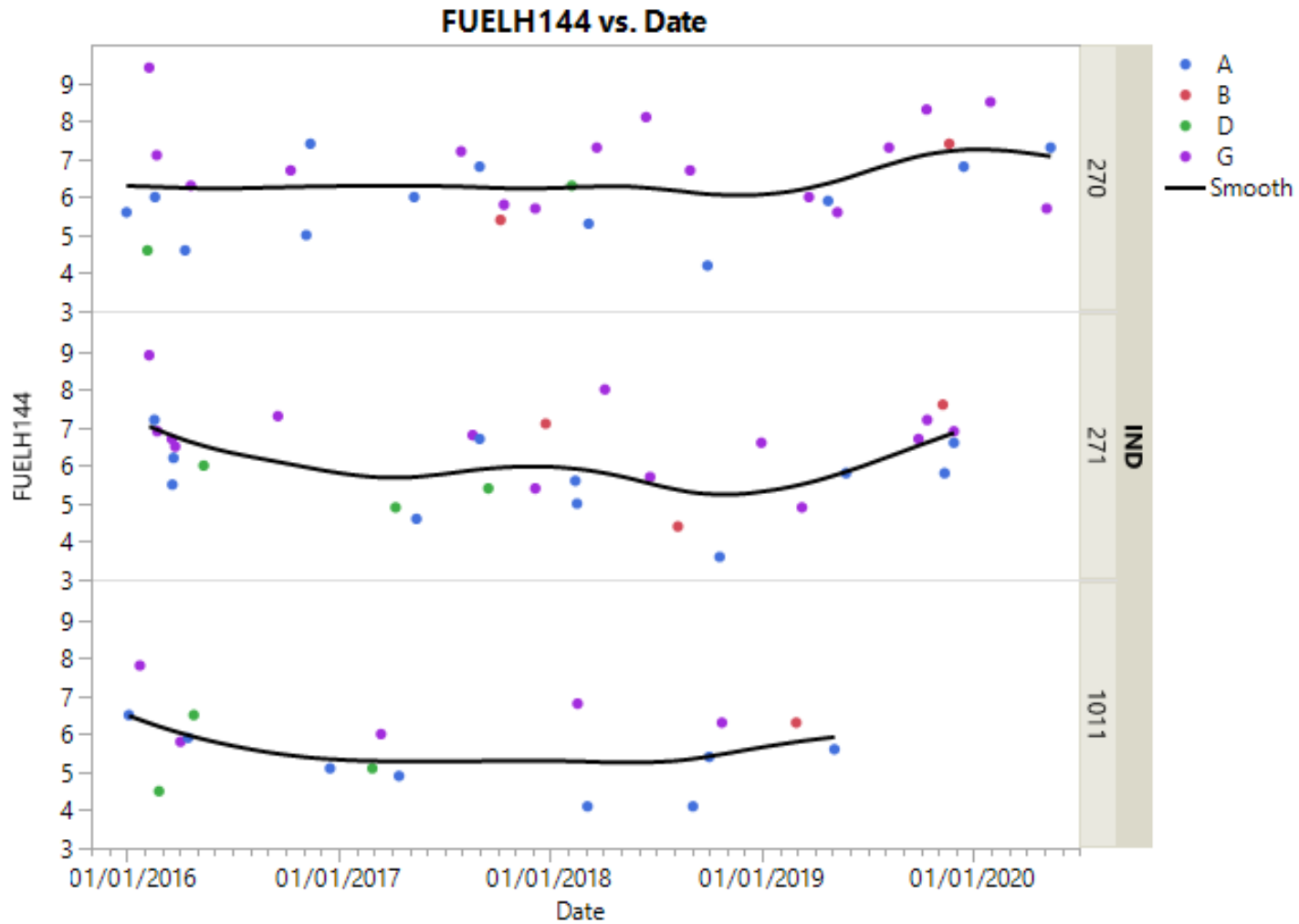
Graph Builder



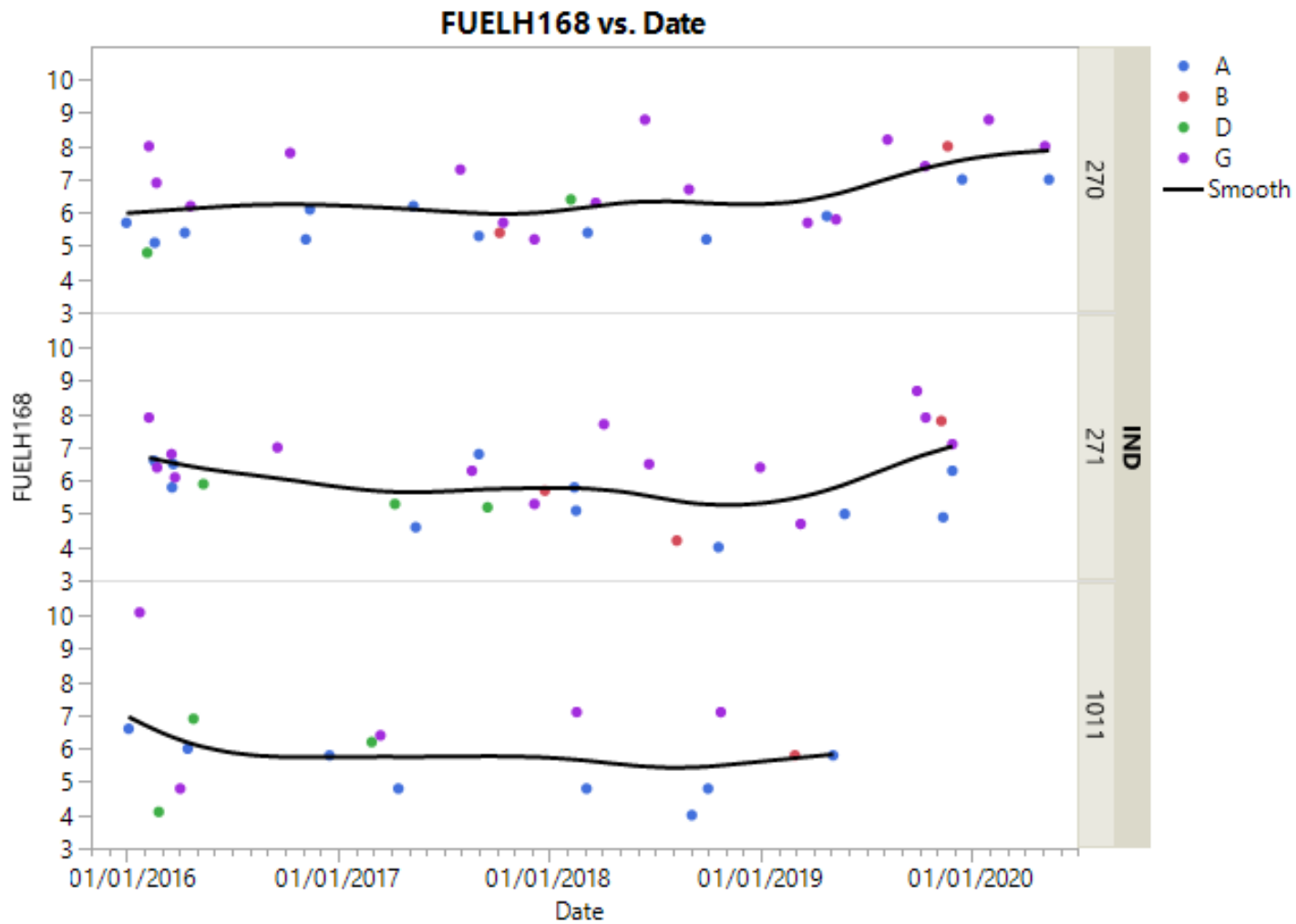
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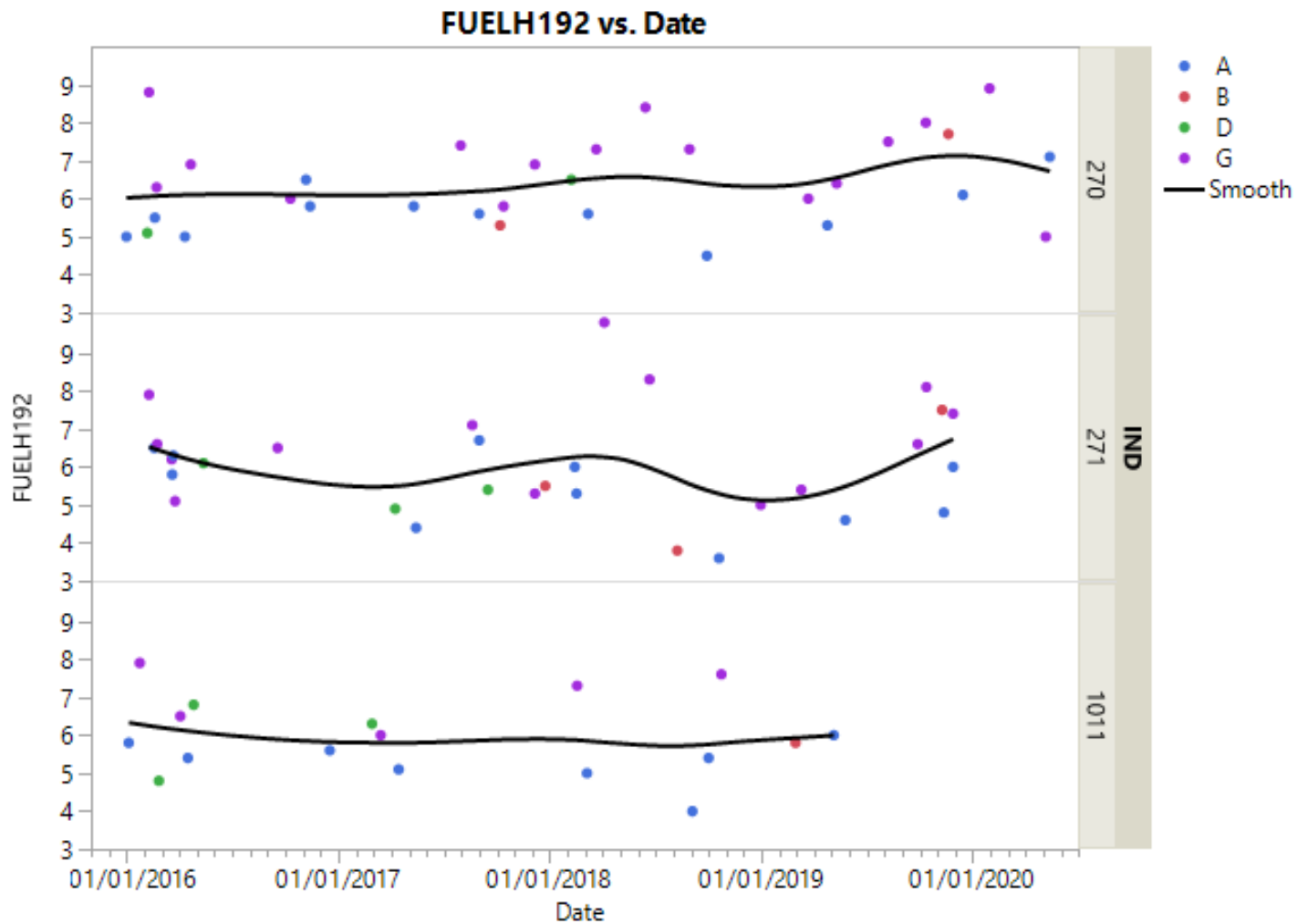
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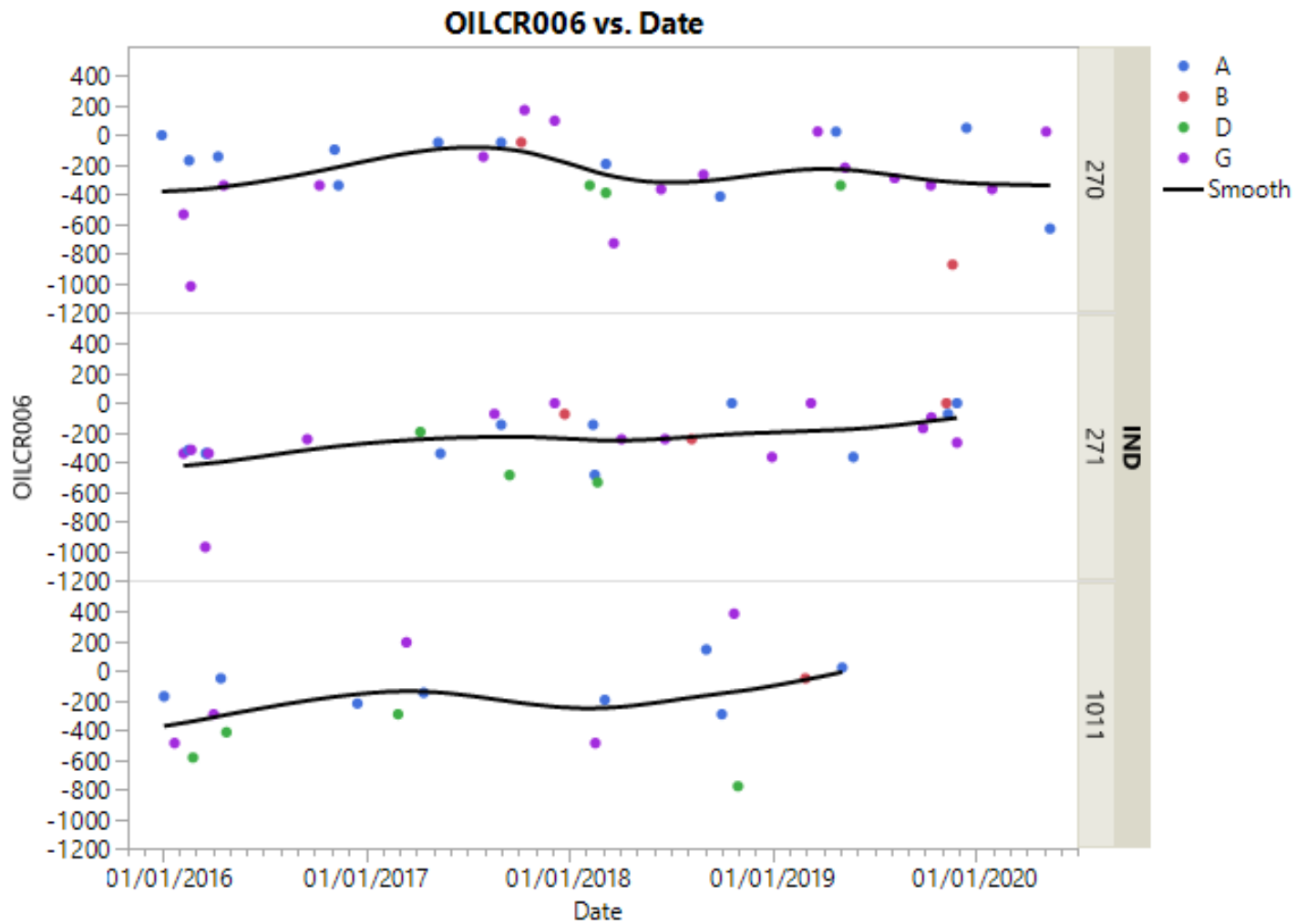
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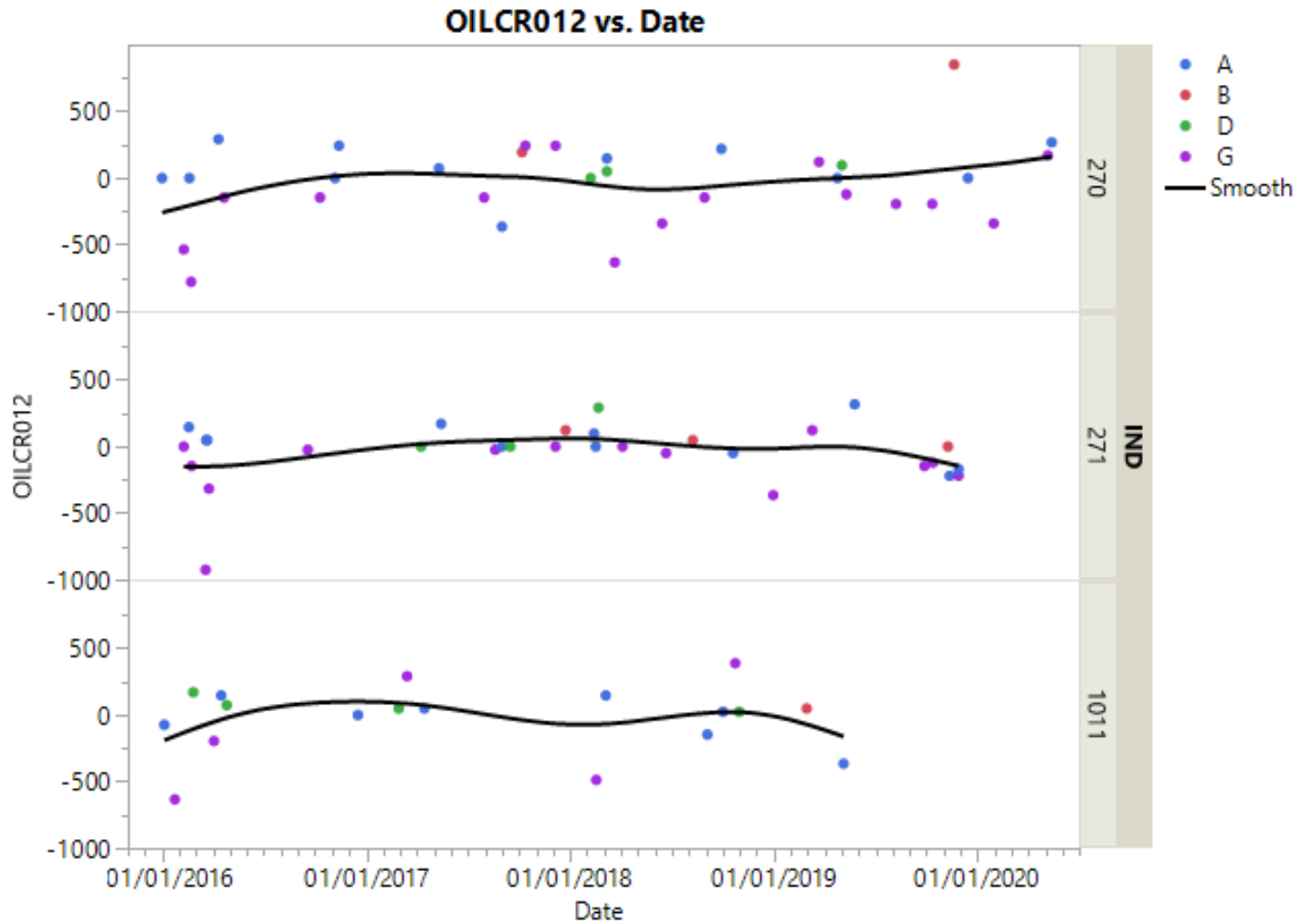
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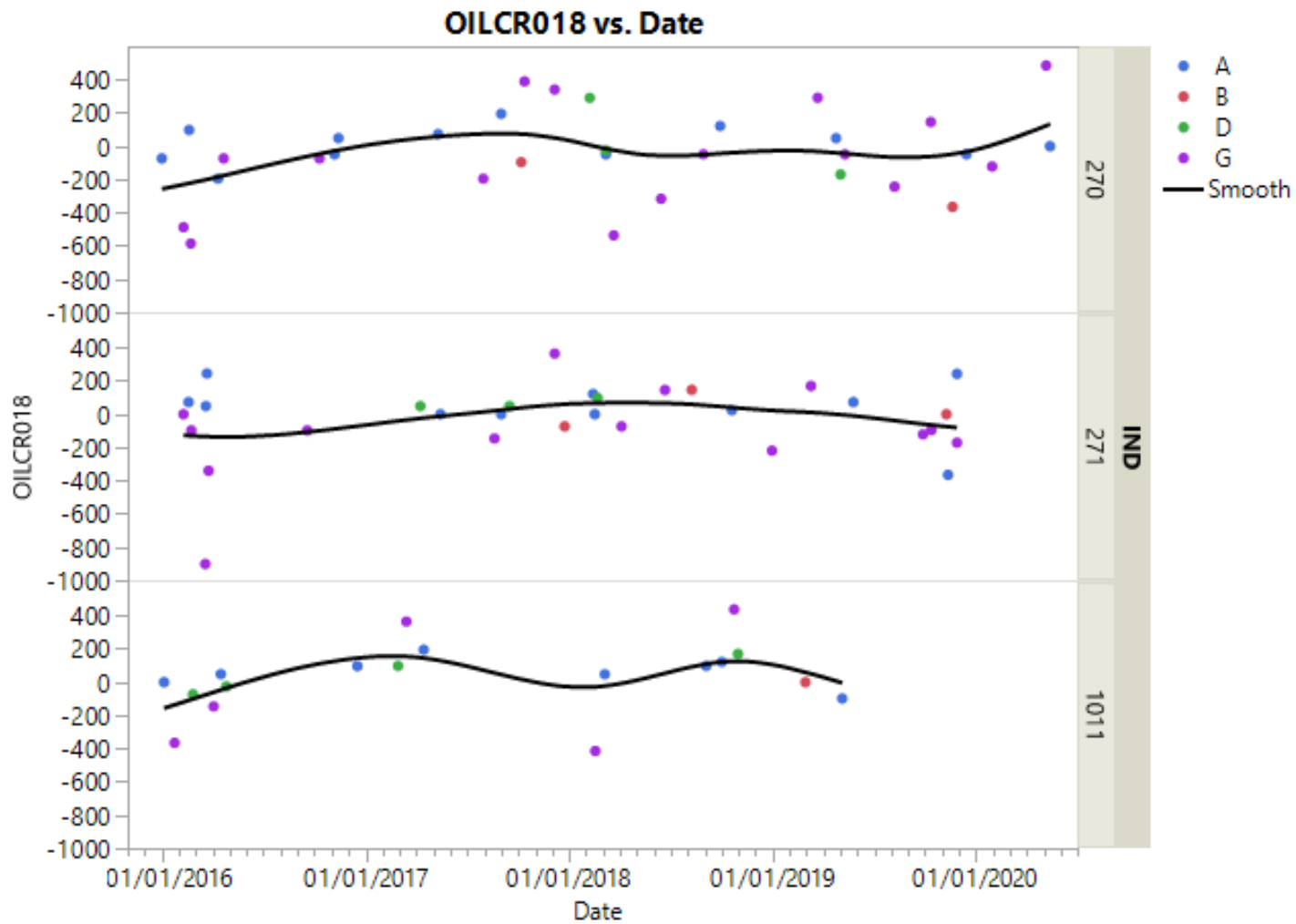
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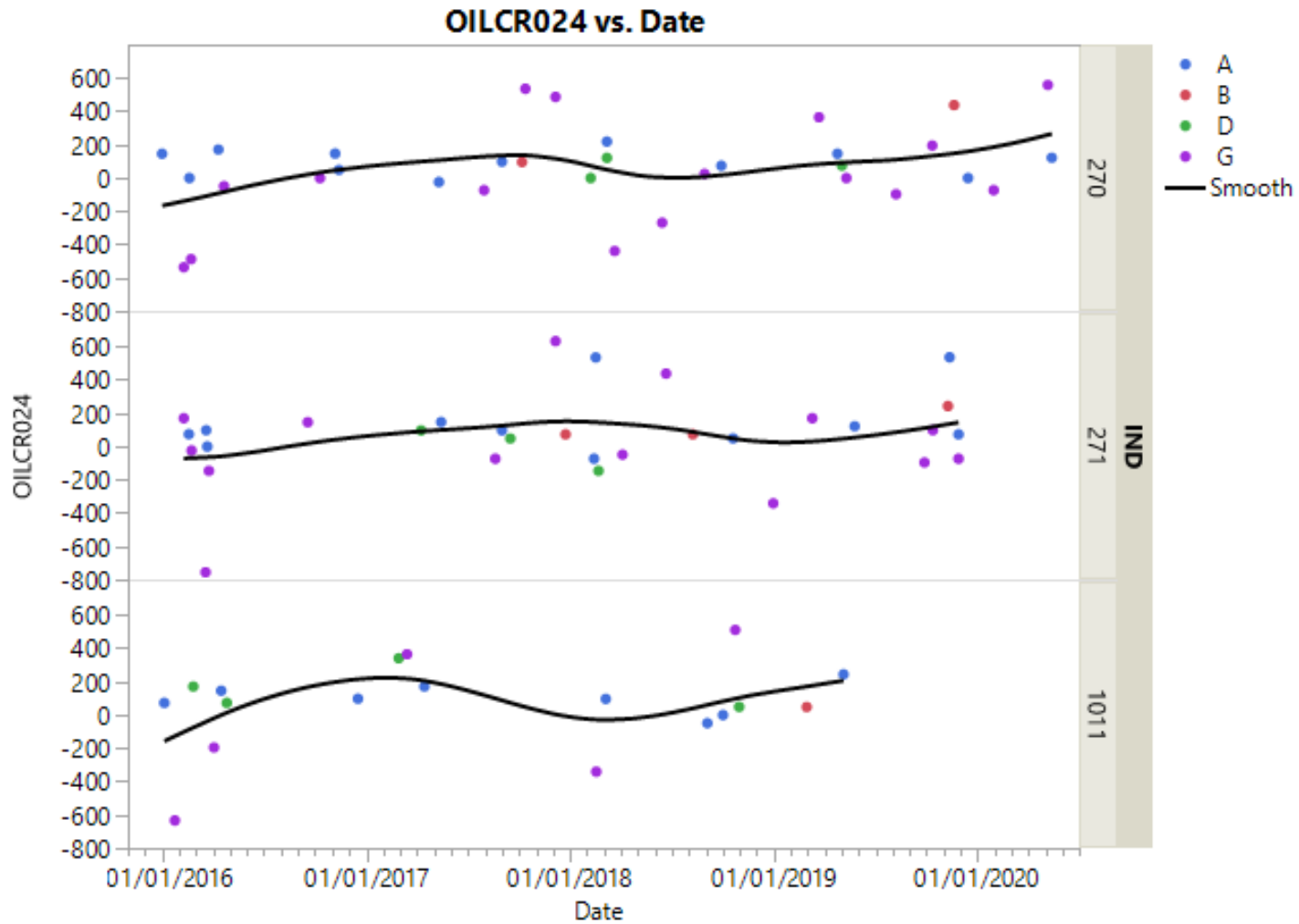
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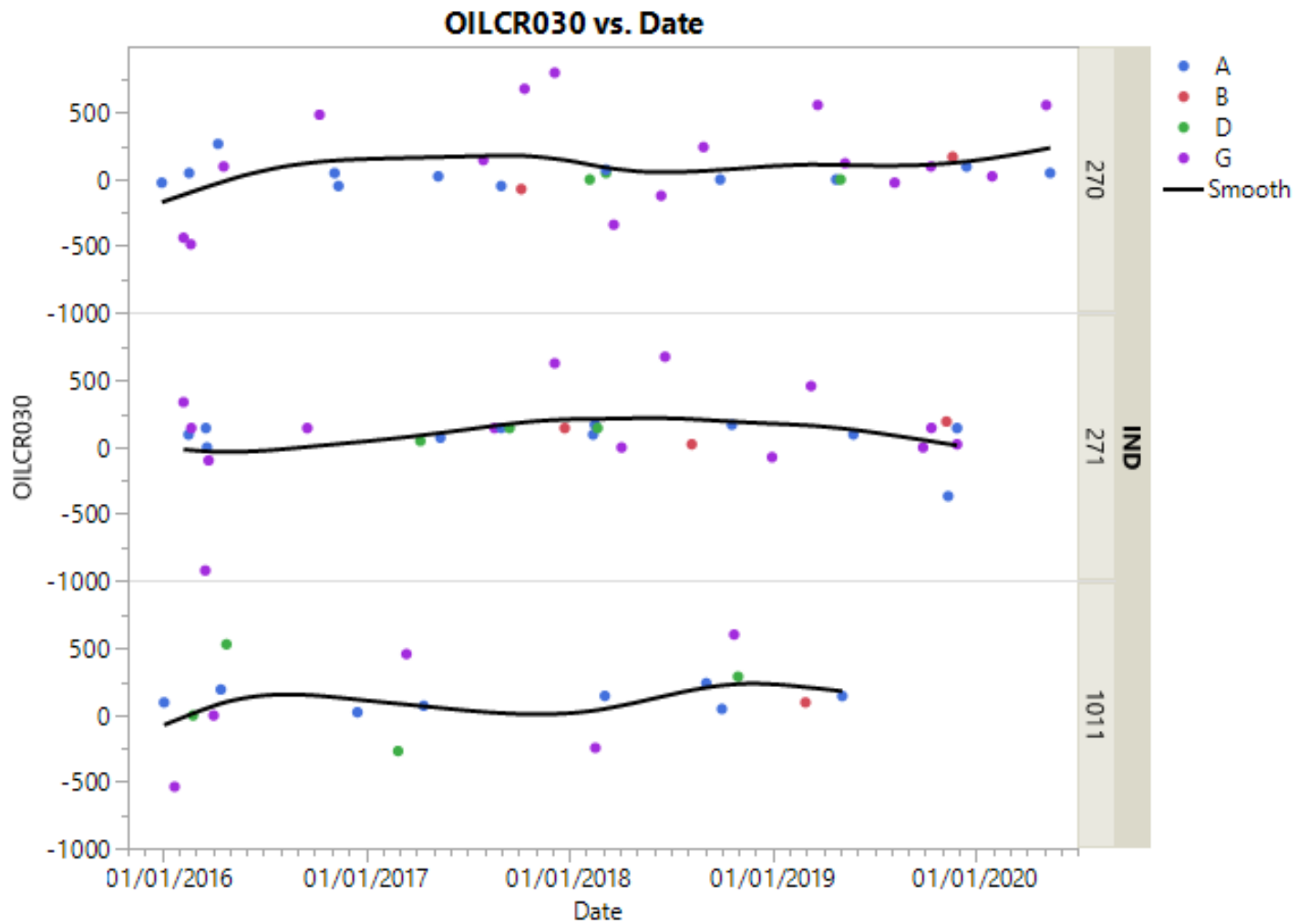
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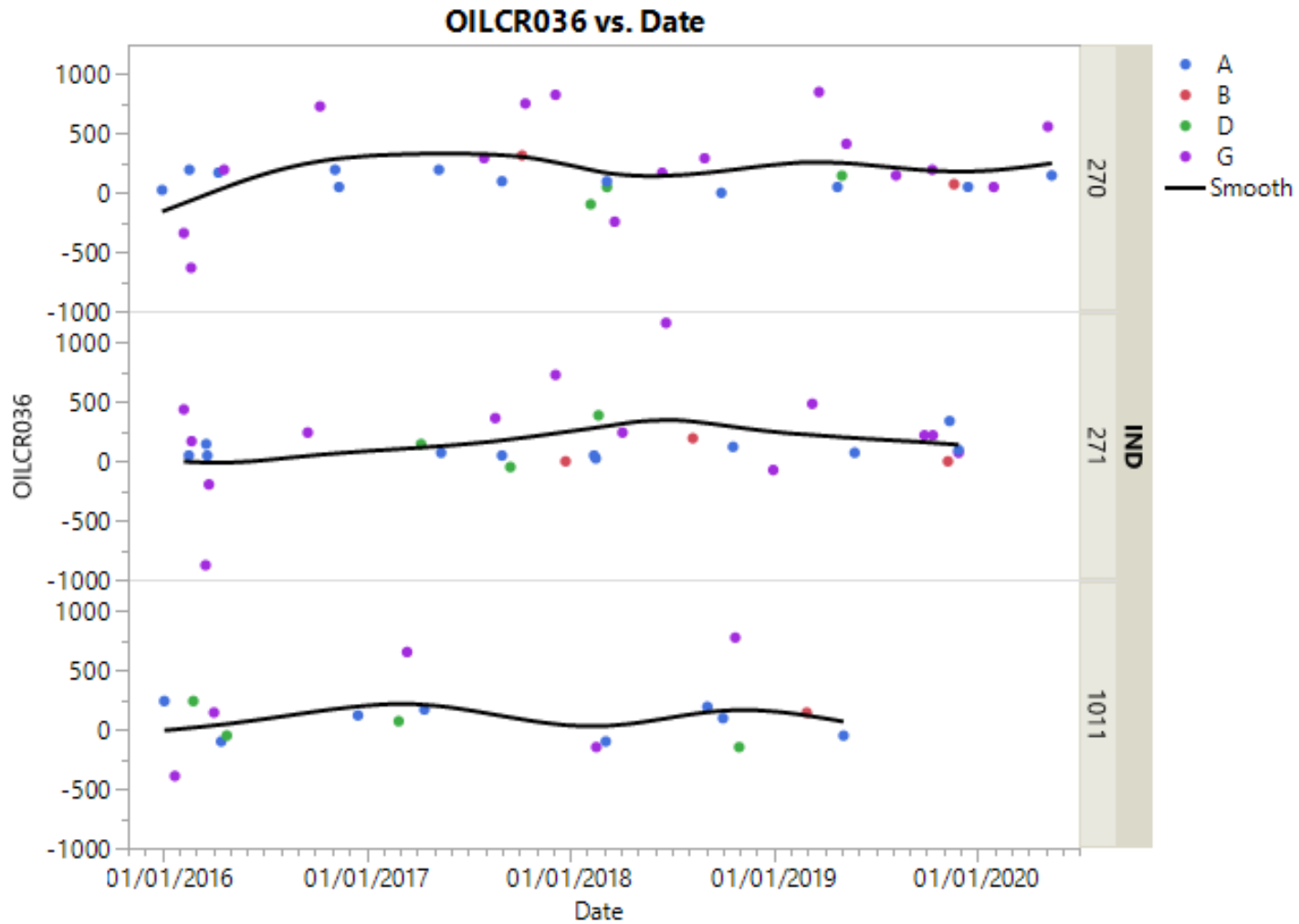
Graph Builder



Graph Builder

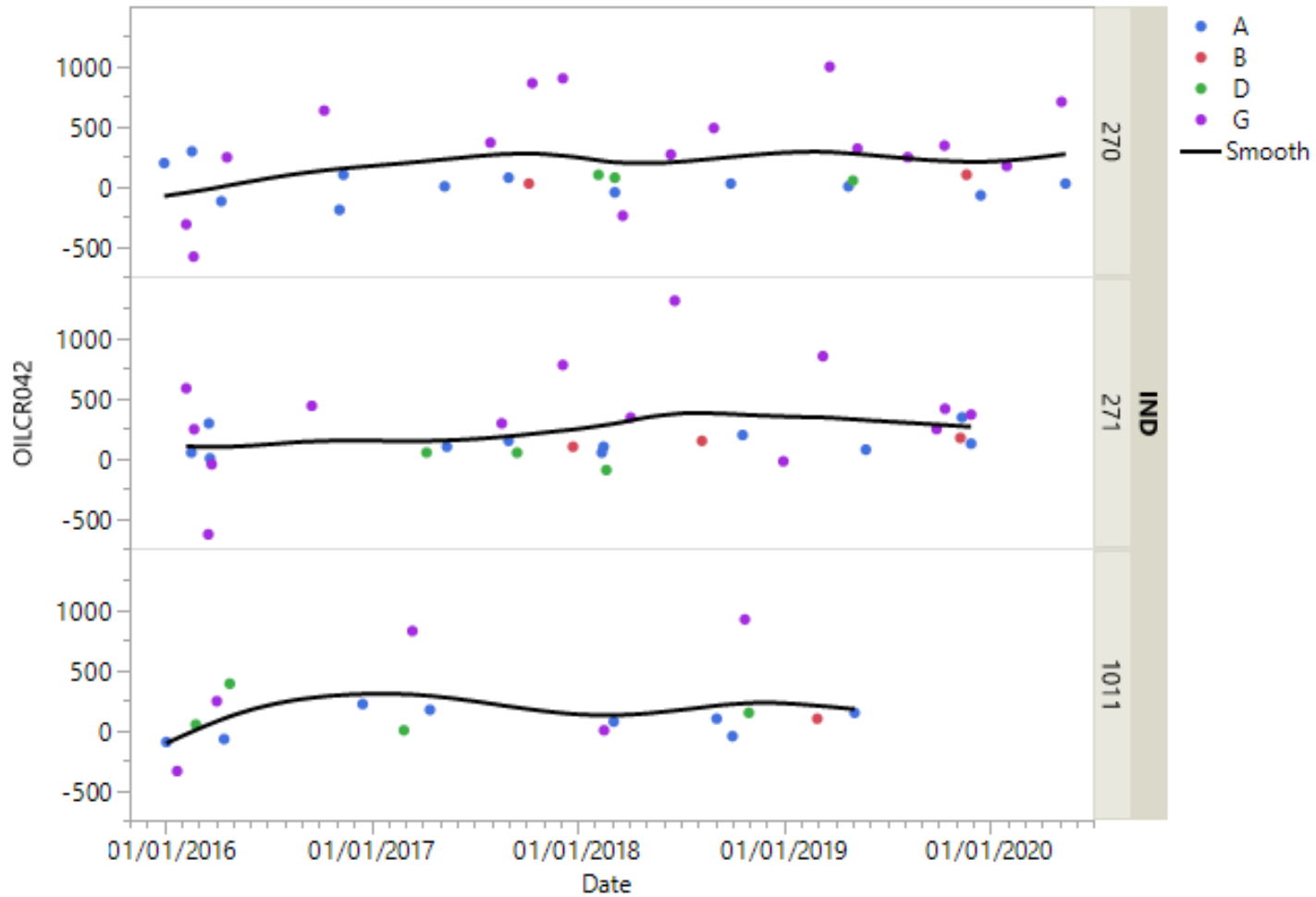


Graph Builder

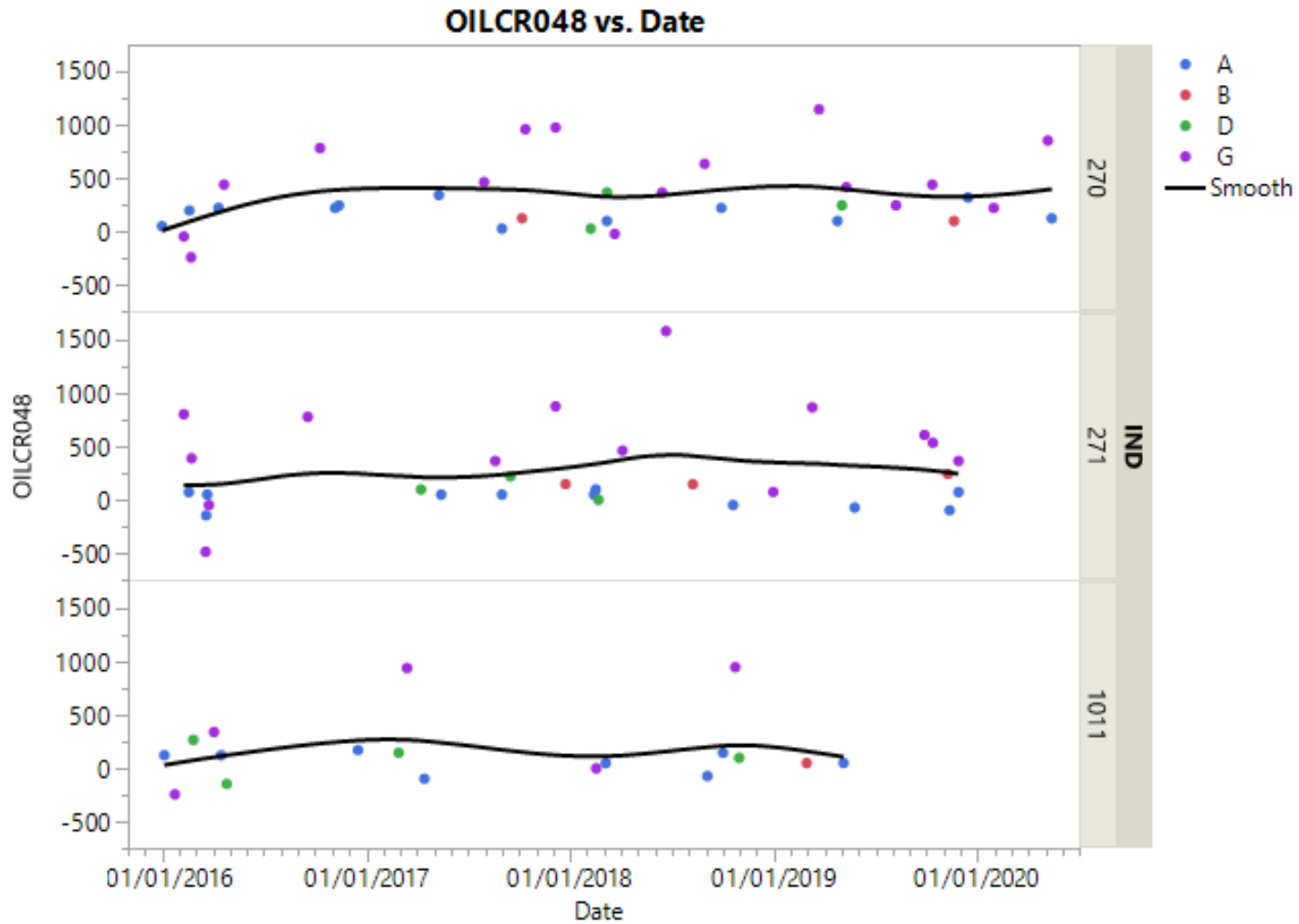


Graph Builder

OILCR042 vs. Date

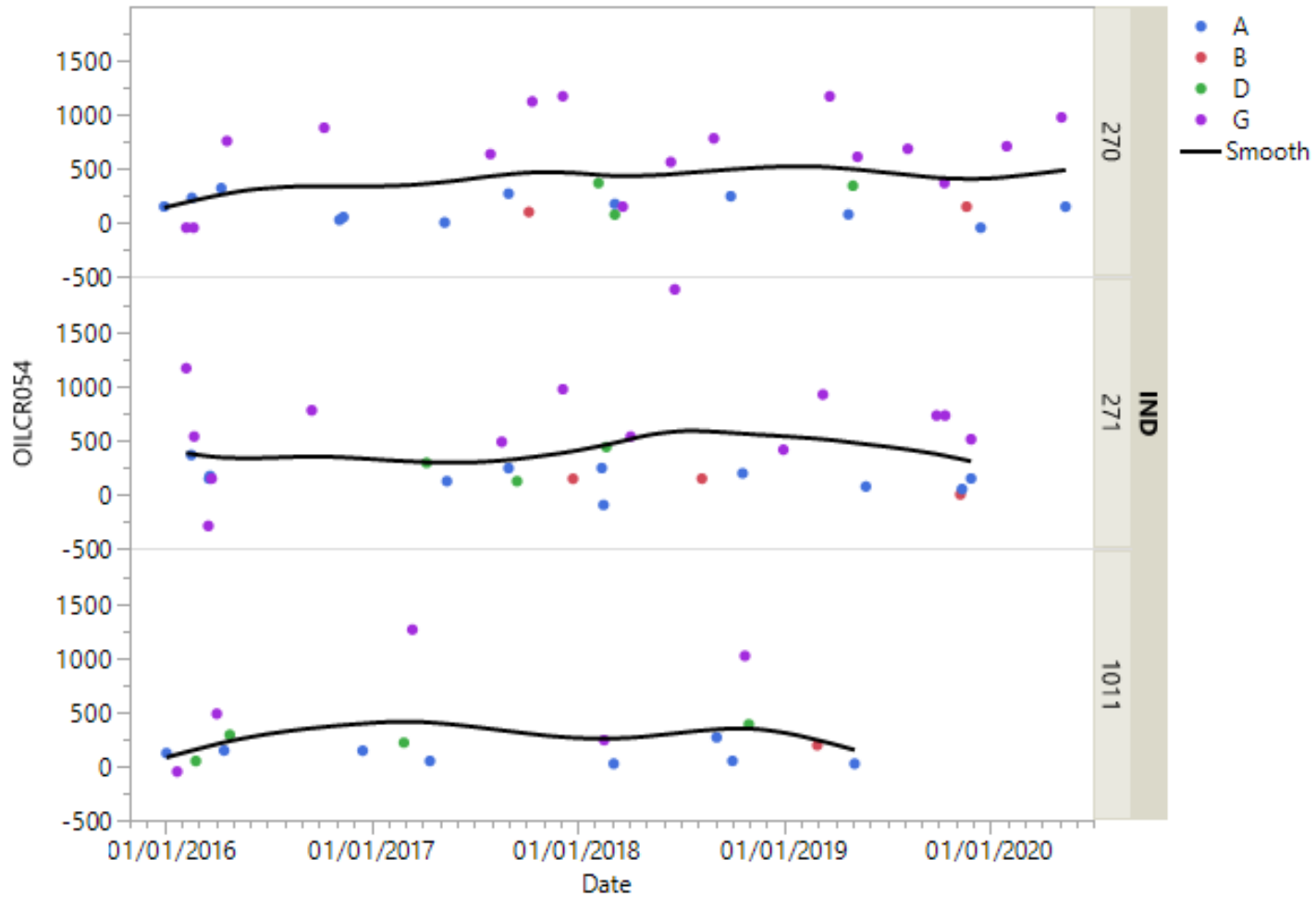


Graph Builder

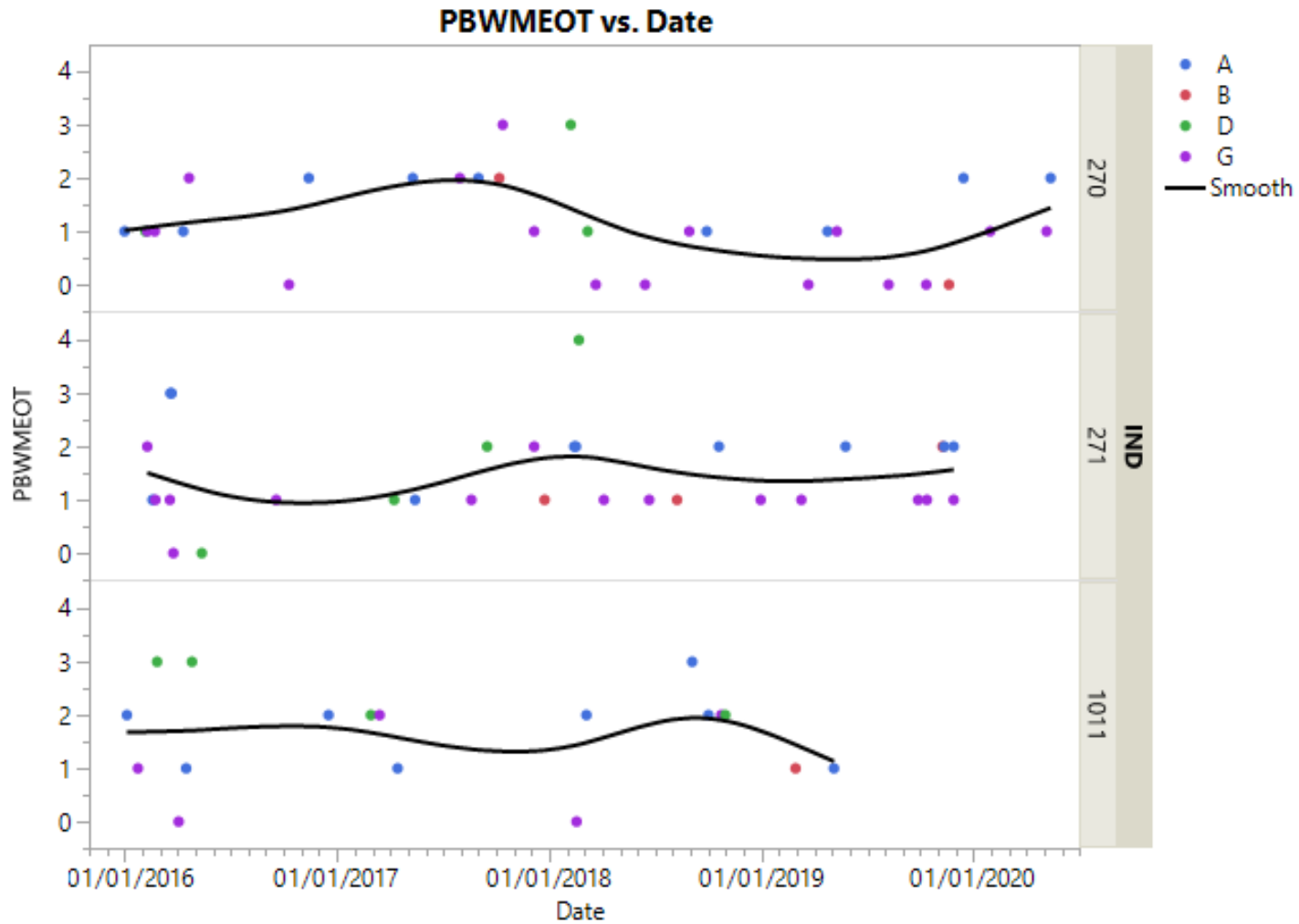


Graph Builder

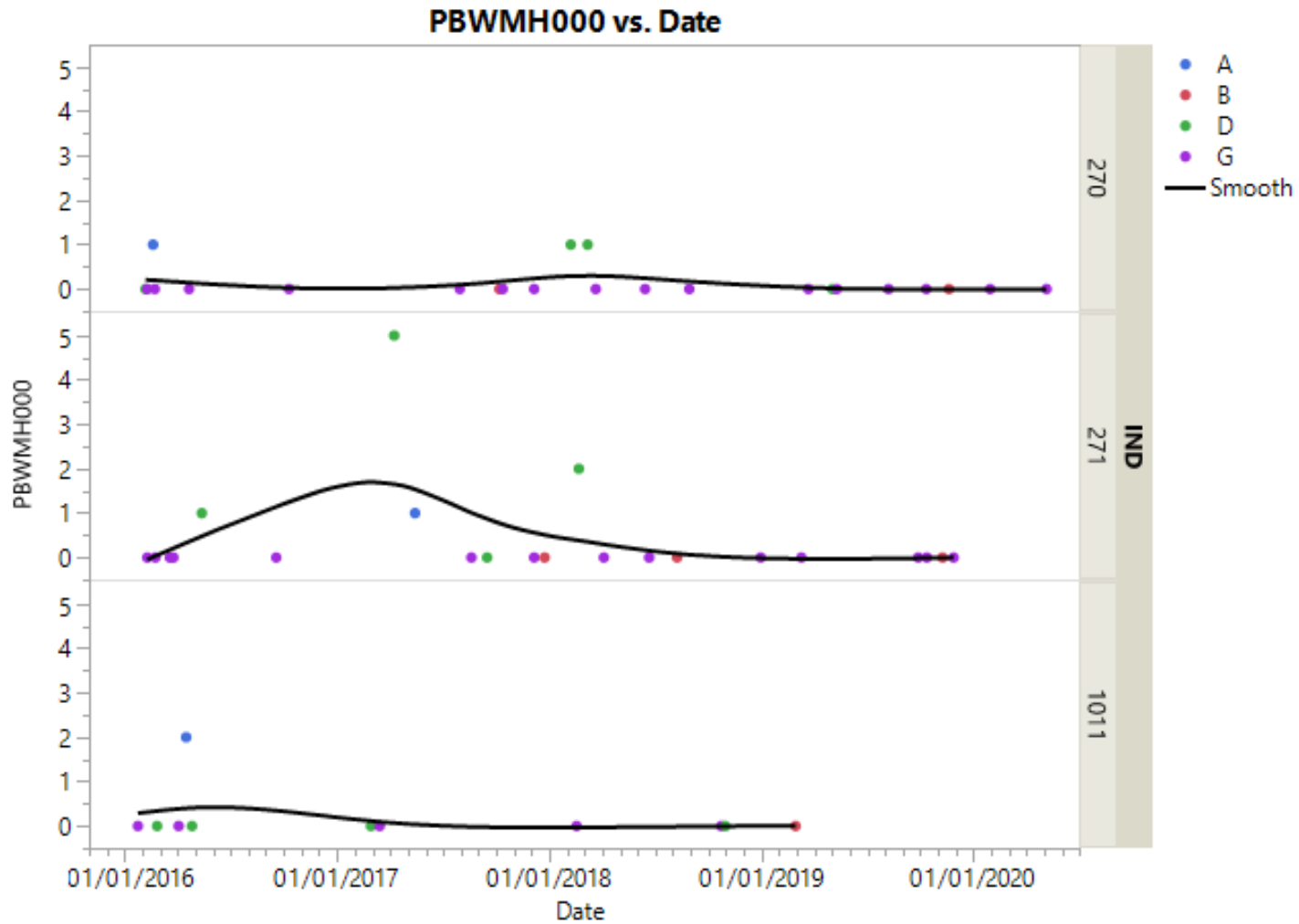
OILCR054 vs. Date



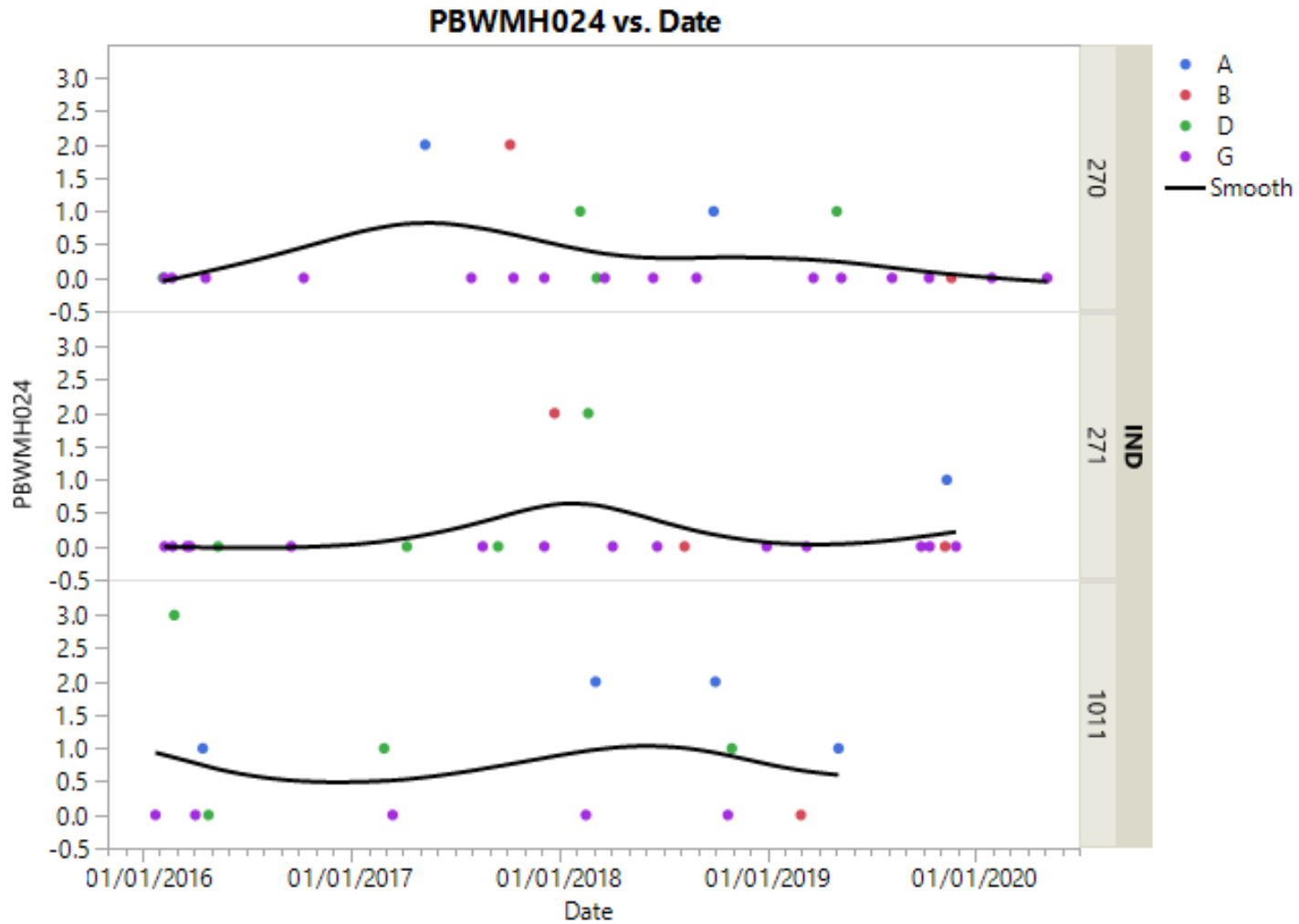
Graph Builder



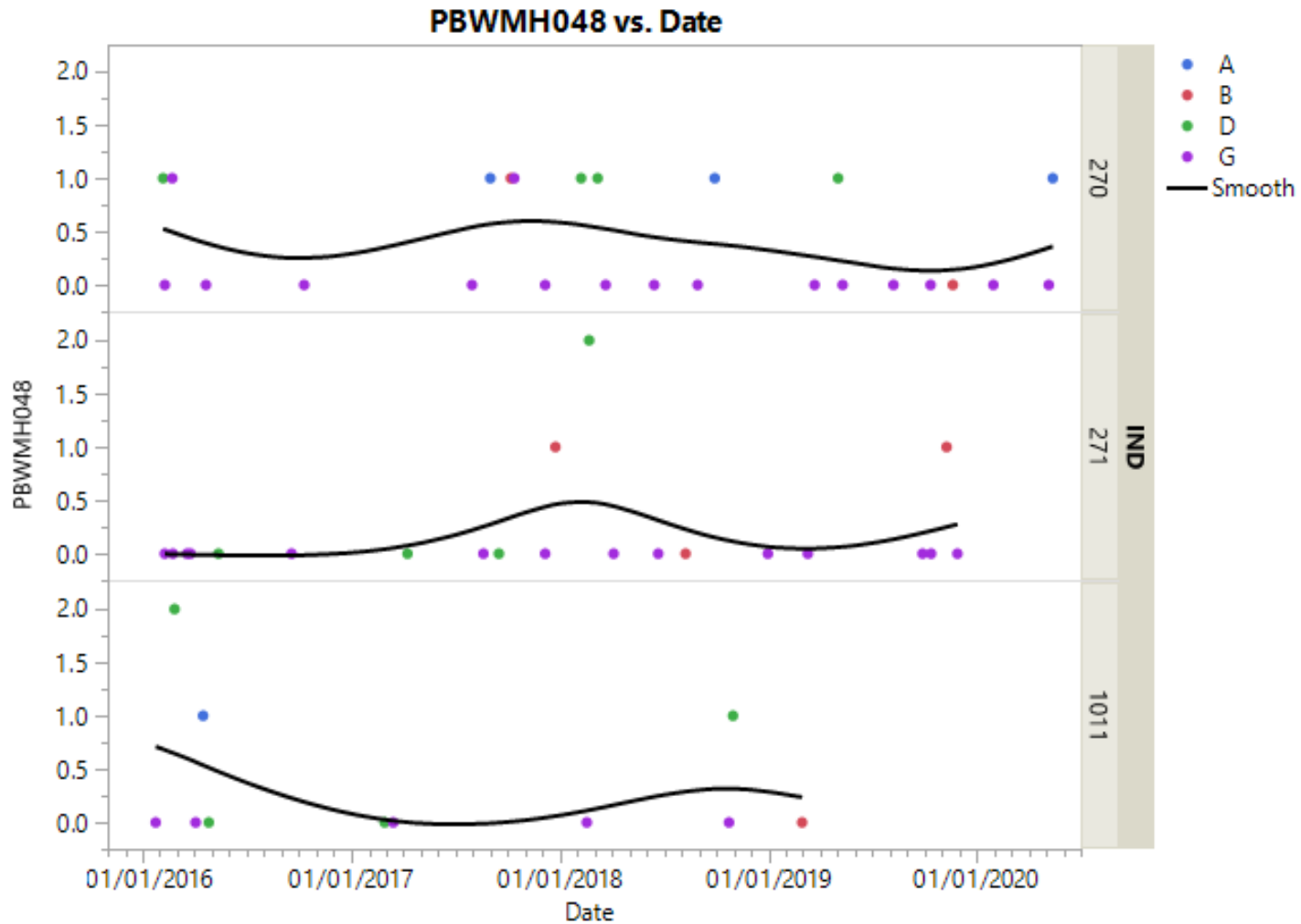
Graph Builder



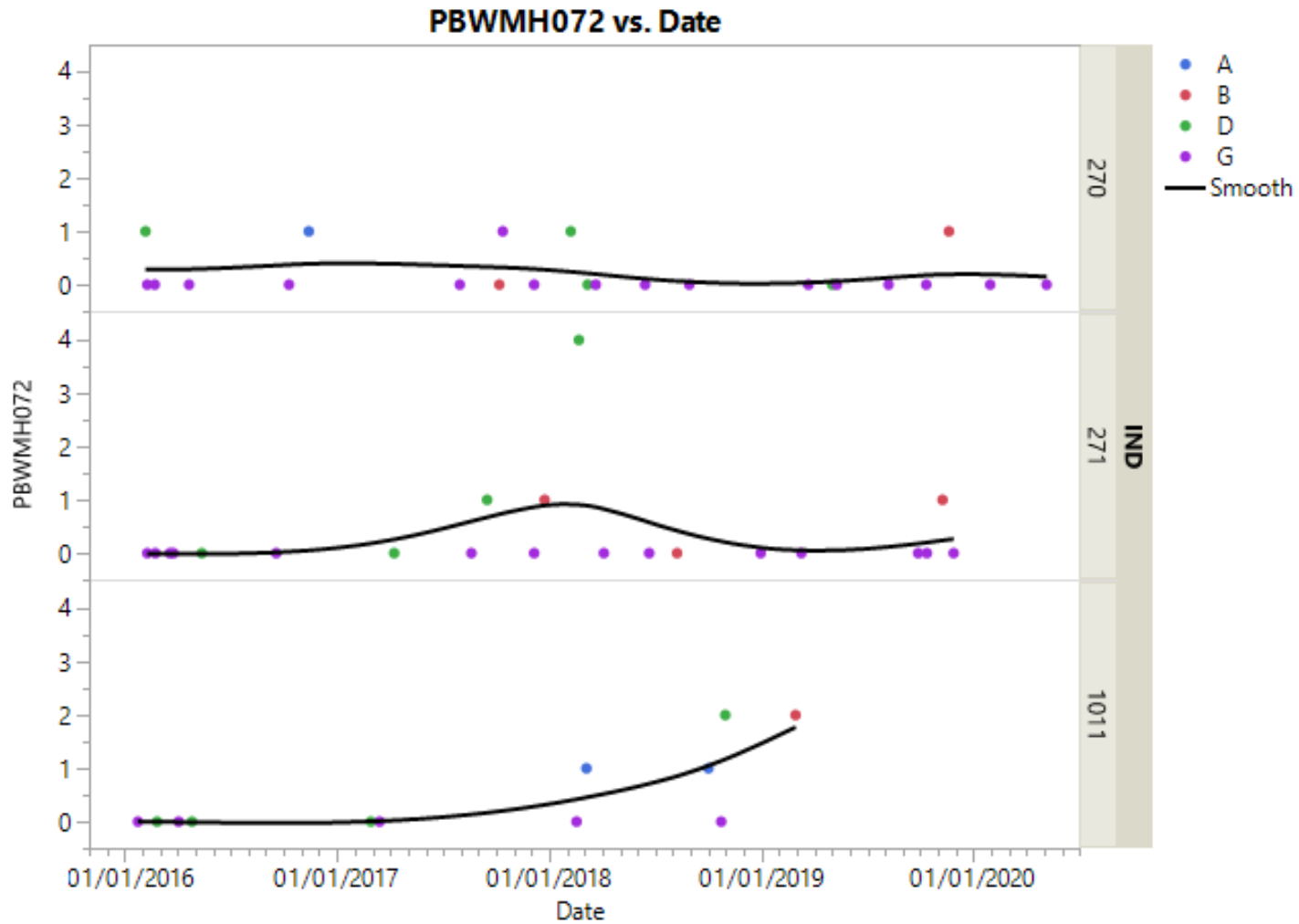
Graph Builder



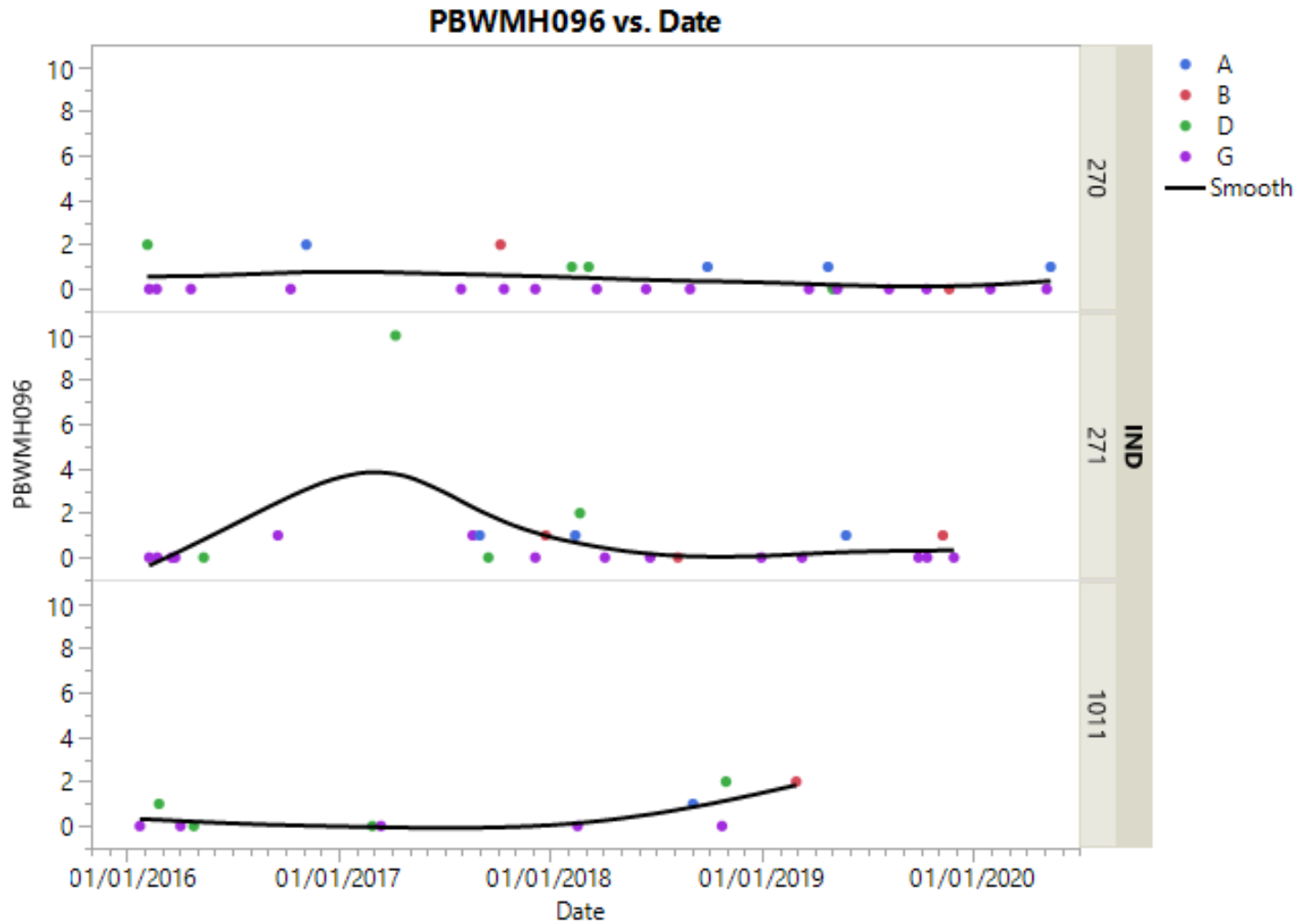
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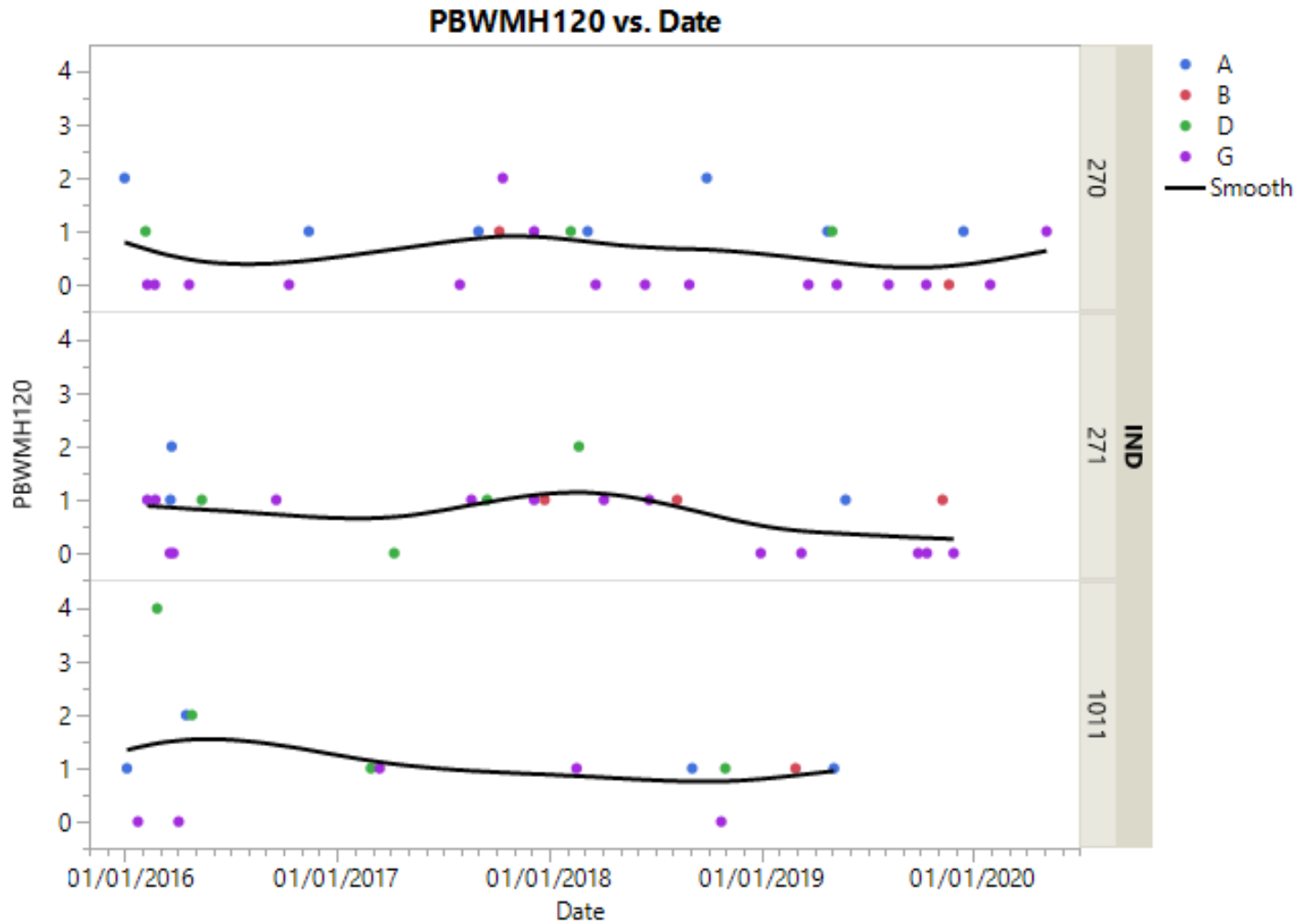
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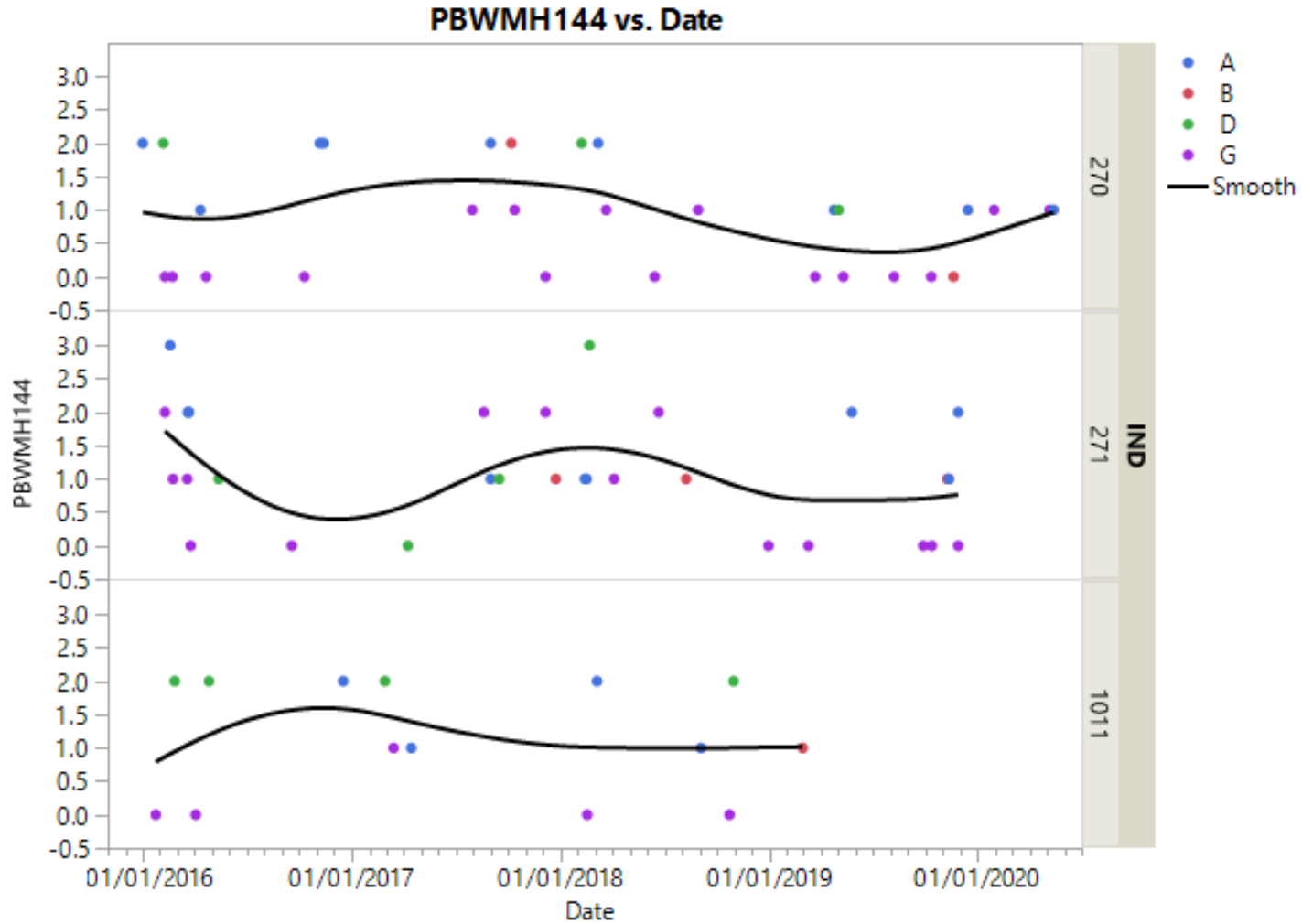
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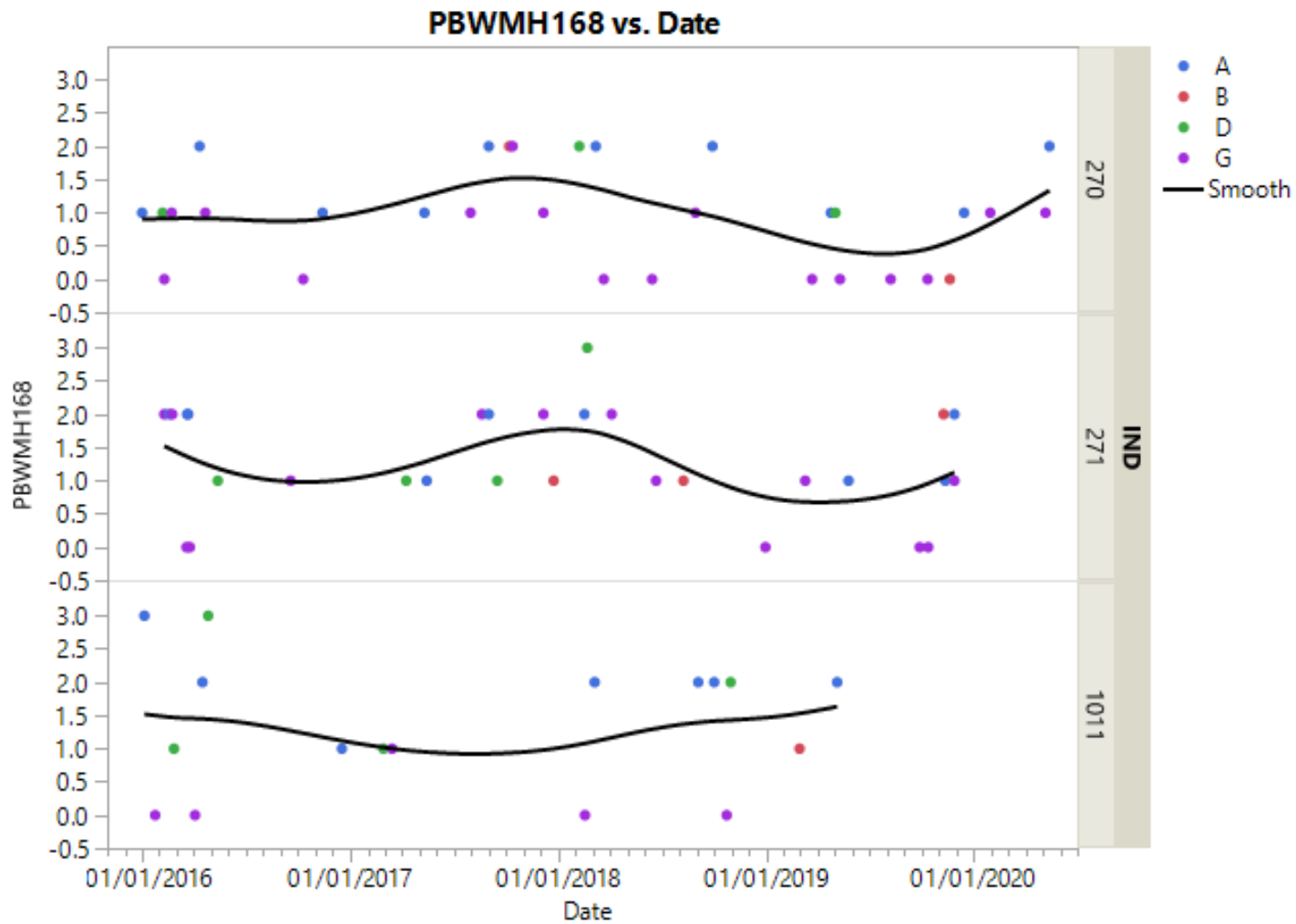
Graph Builder



Graph Builder

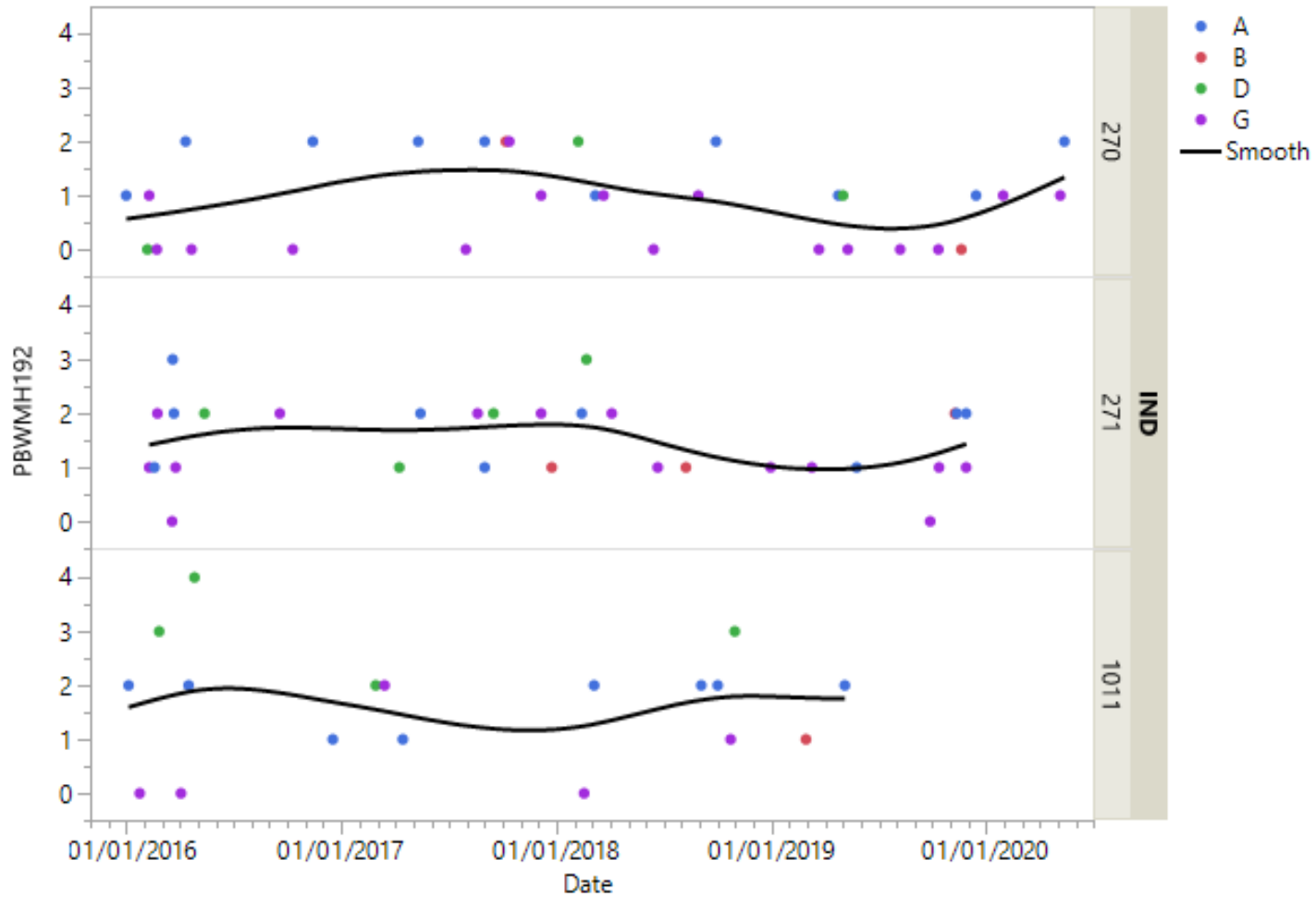


Graph Builder

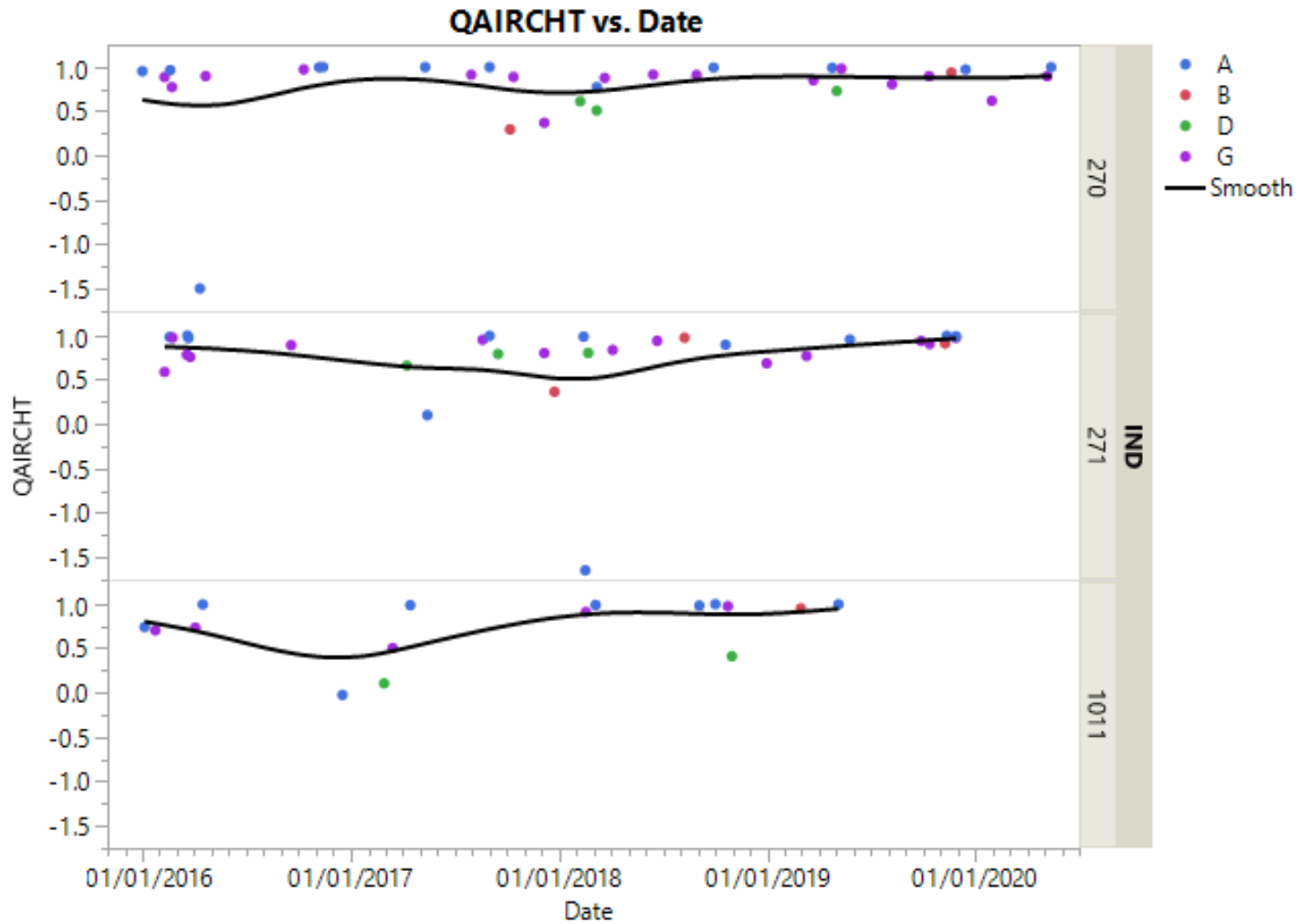


Graph Builder

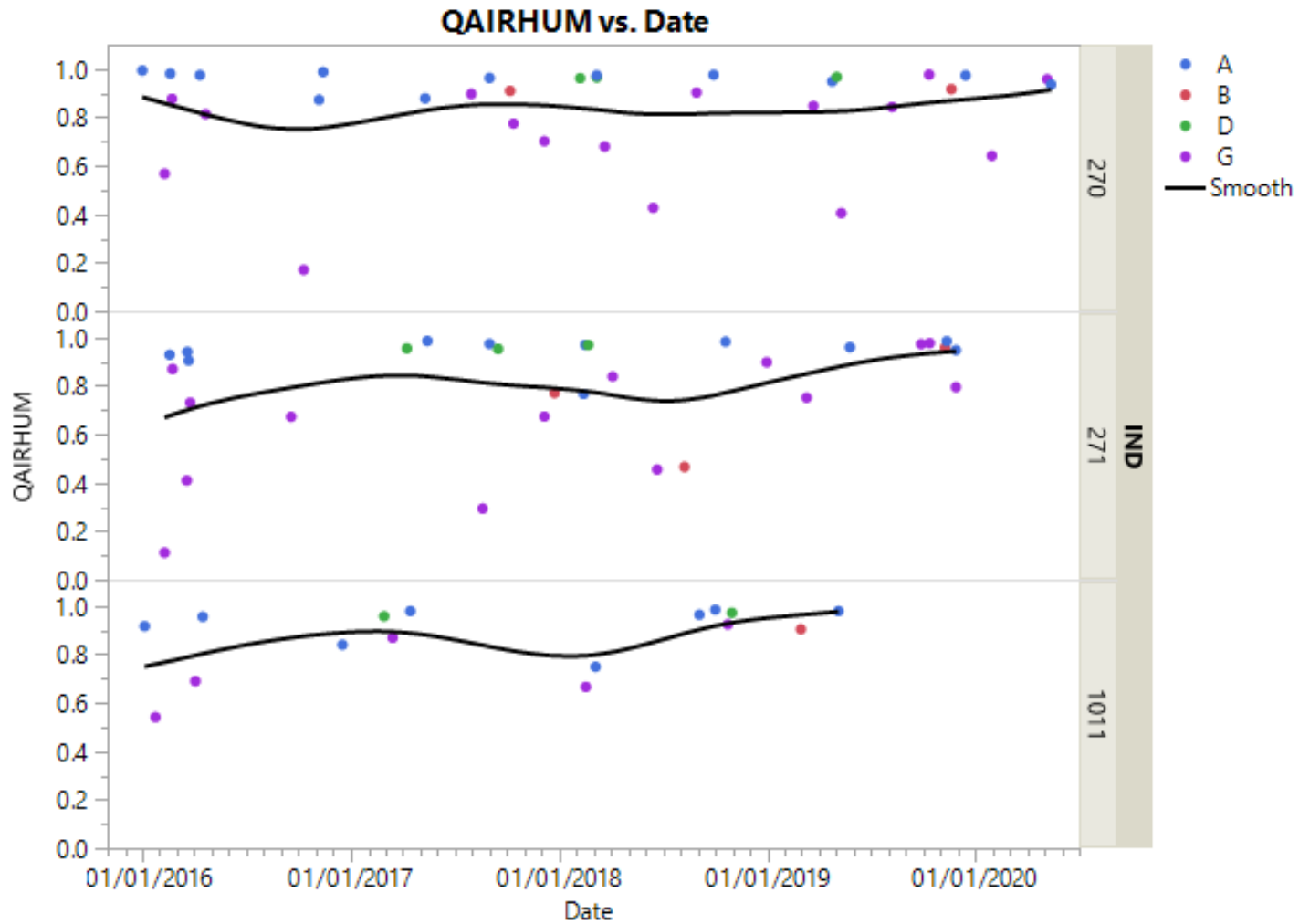
PBWMH192 vs. Date



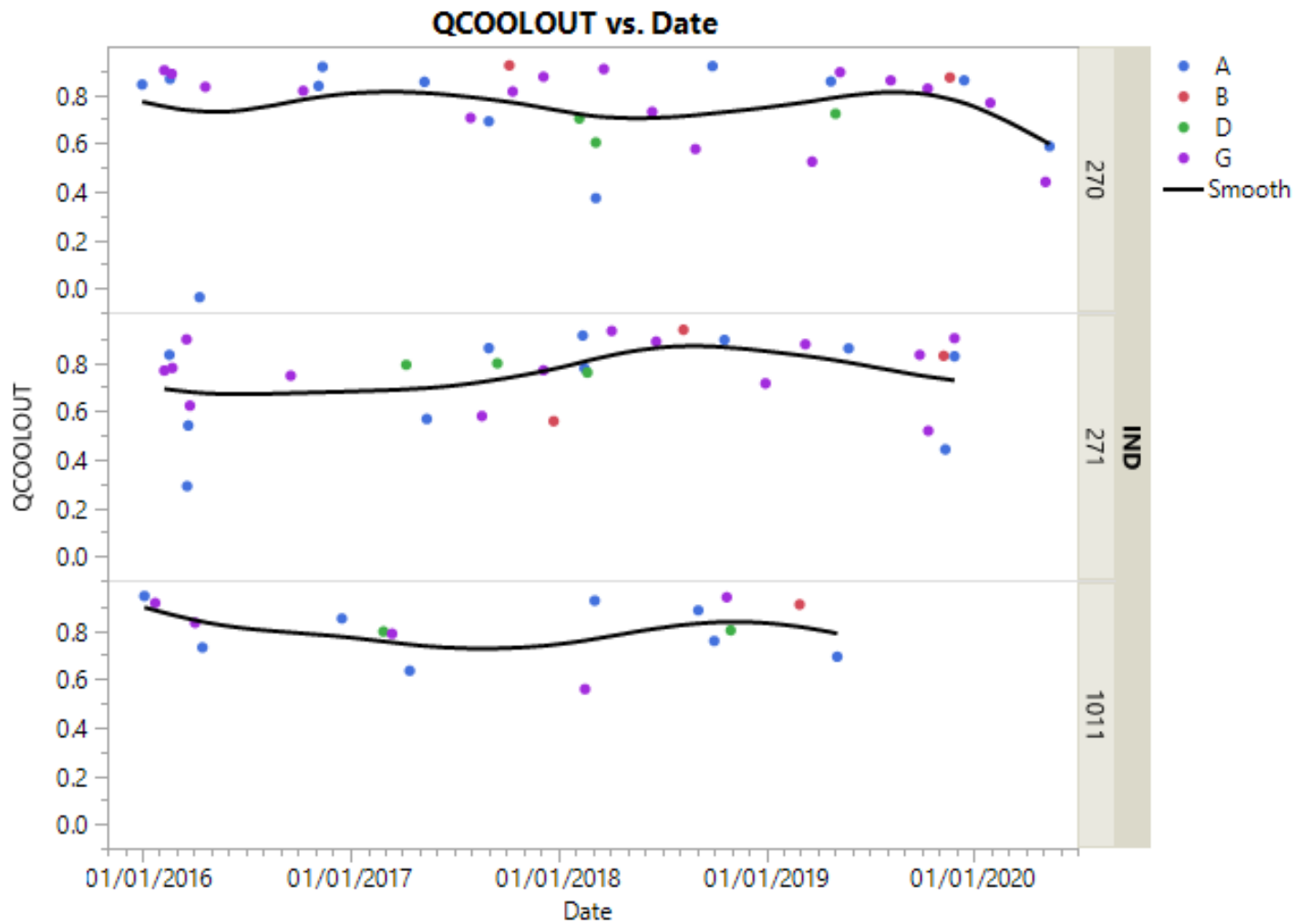
Graph Builder



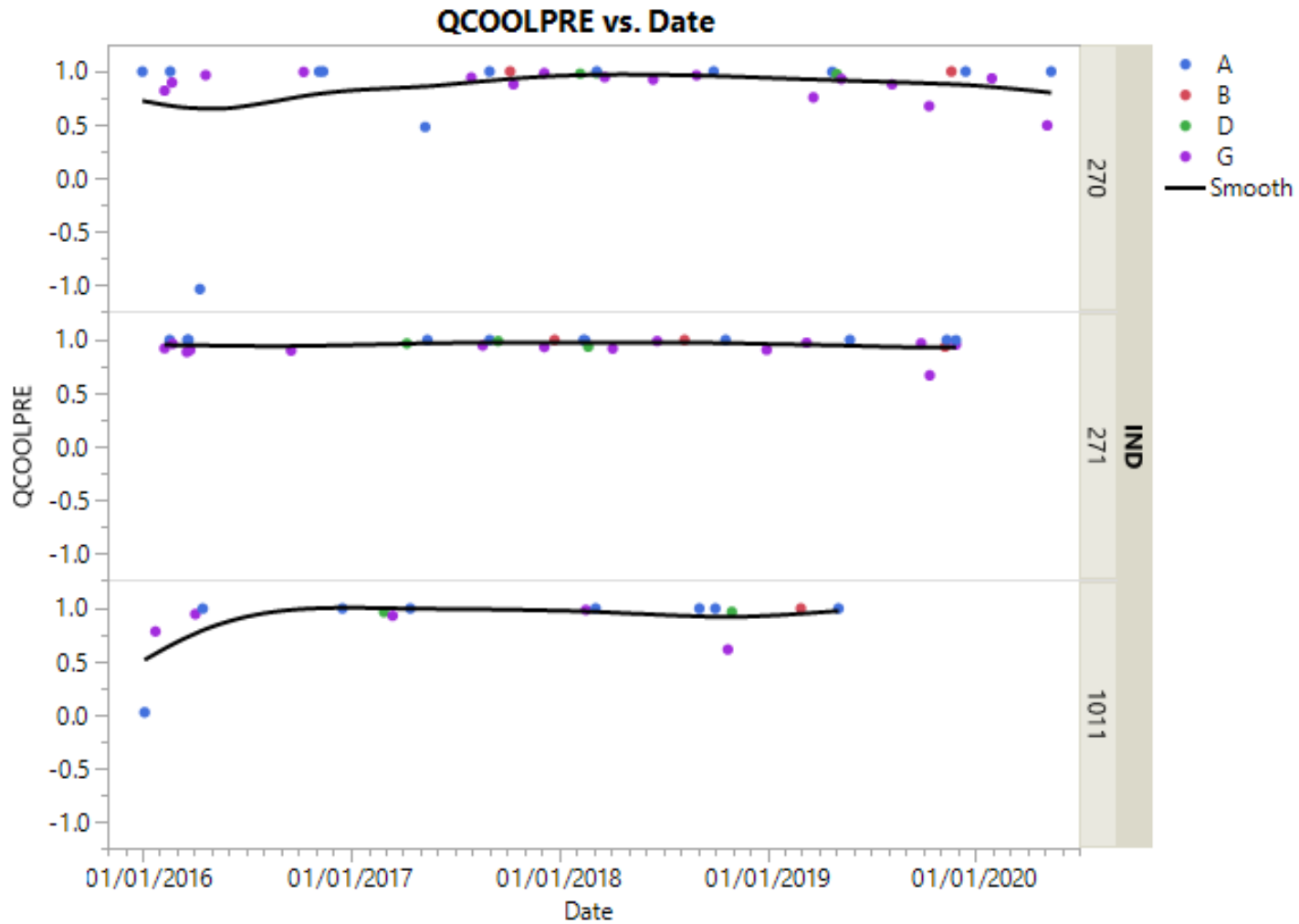
Graph Builder



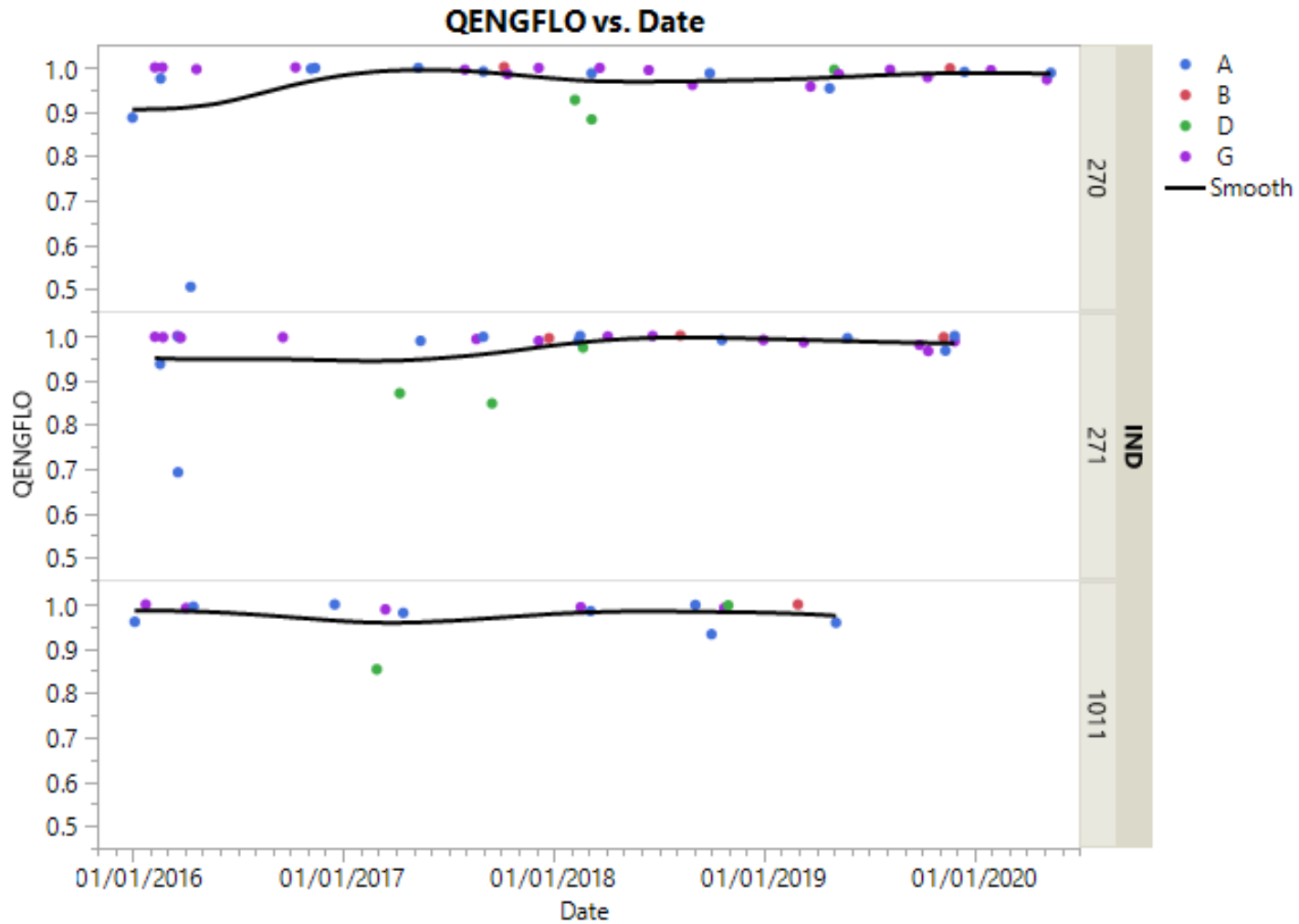
Graph Builder



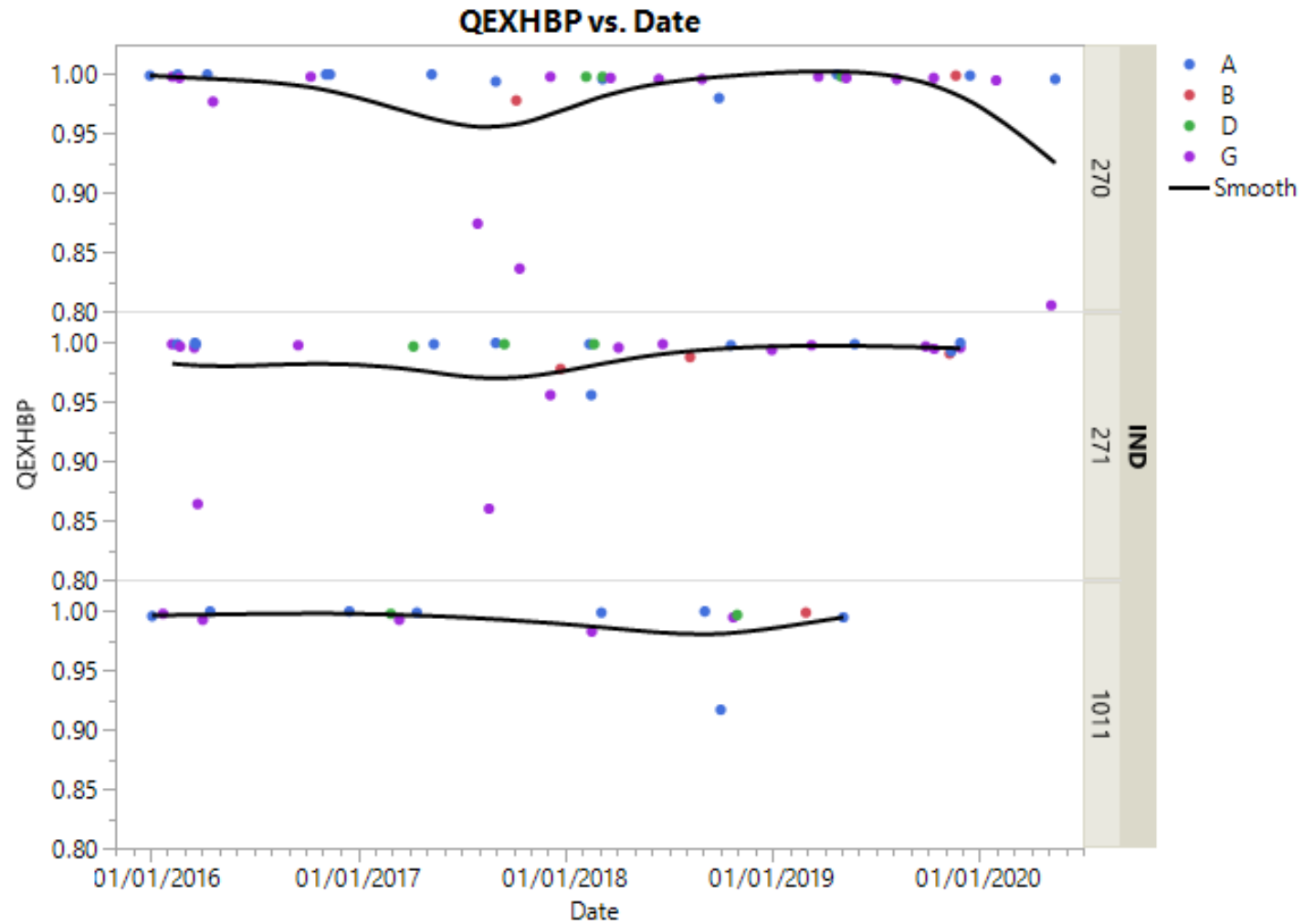
Graph Builder



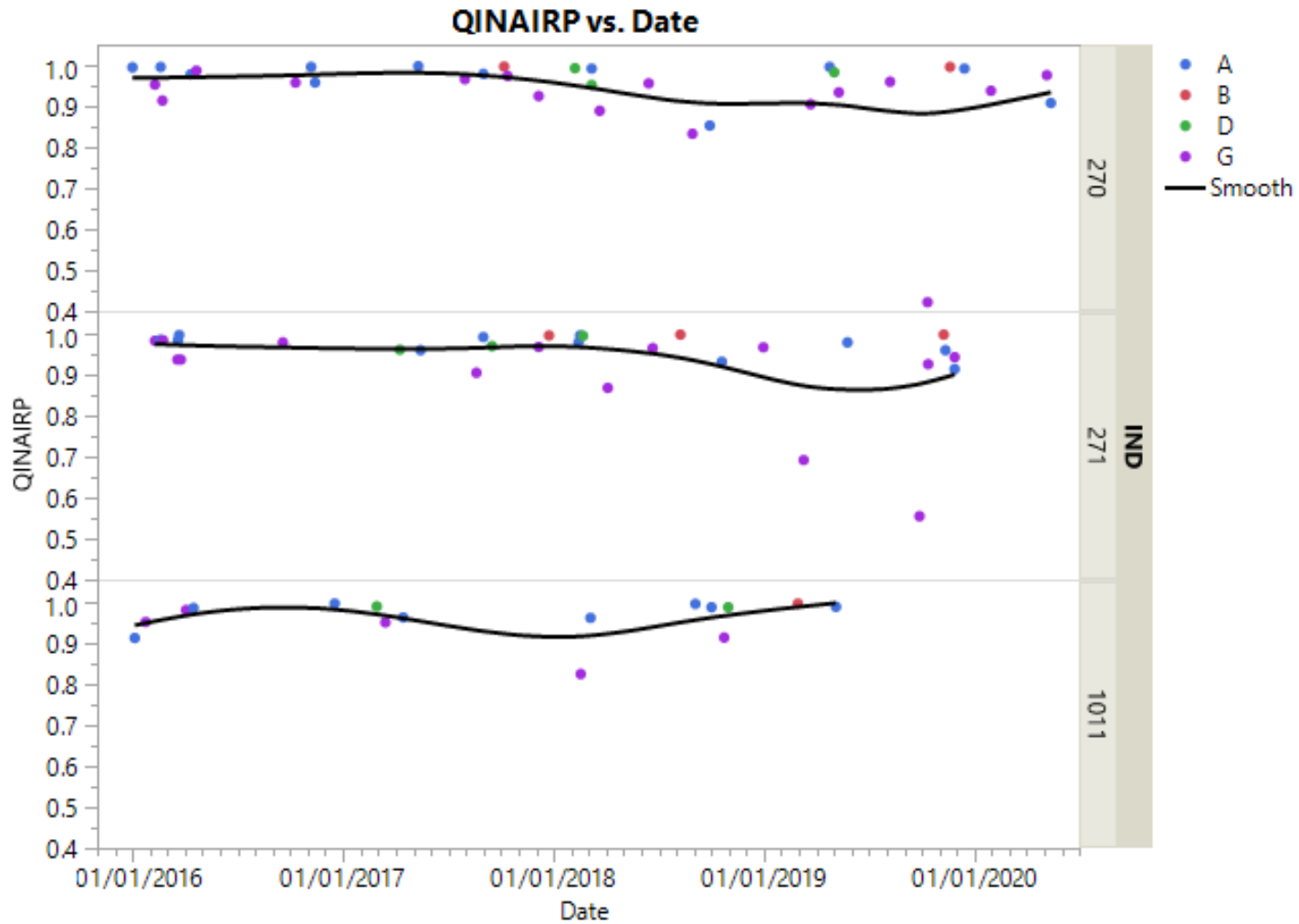
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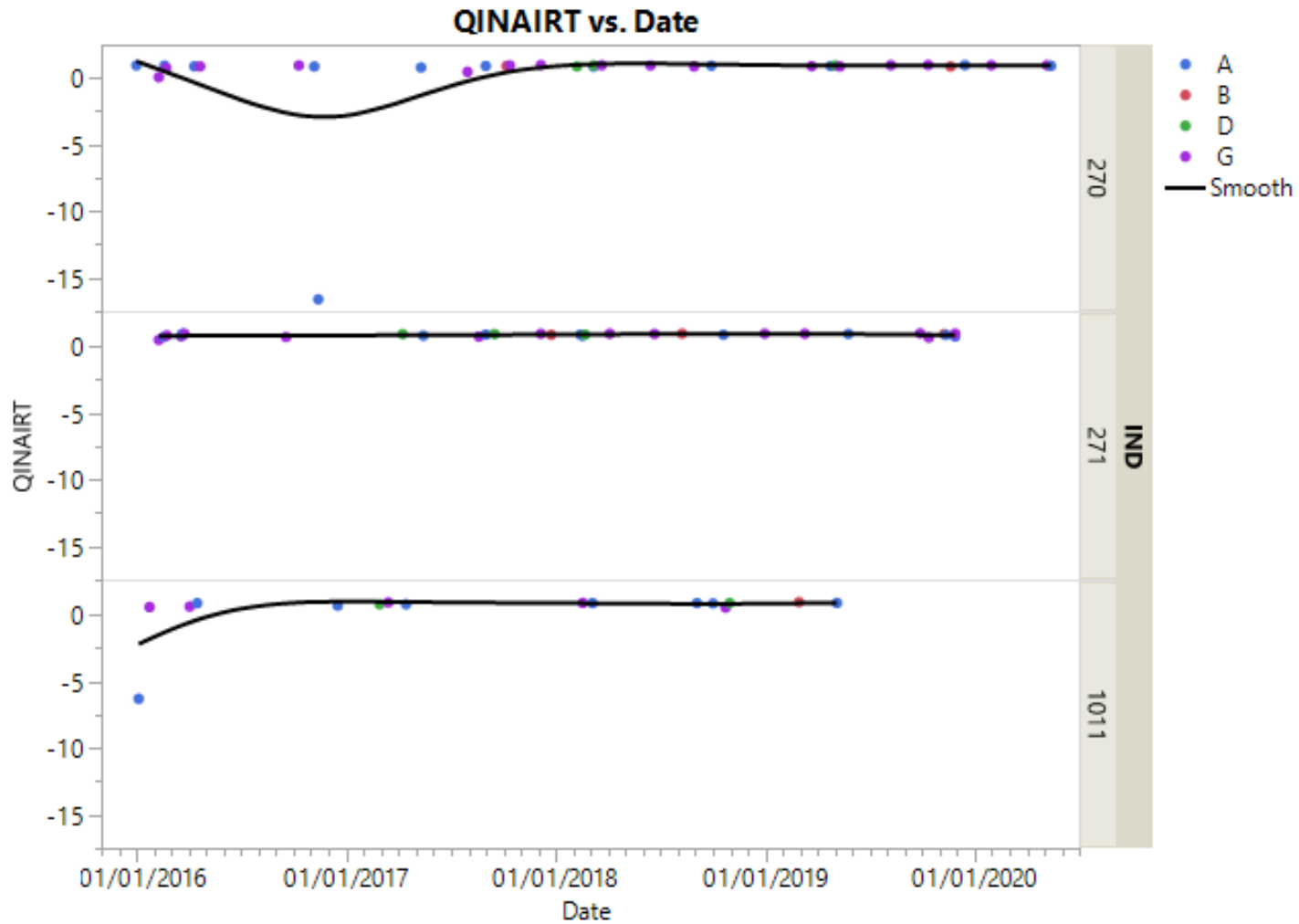
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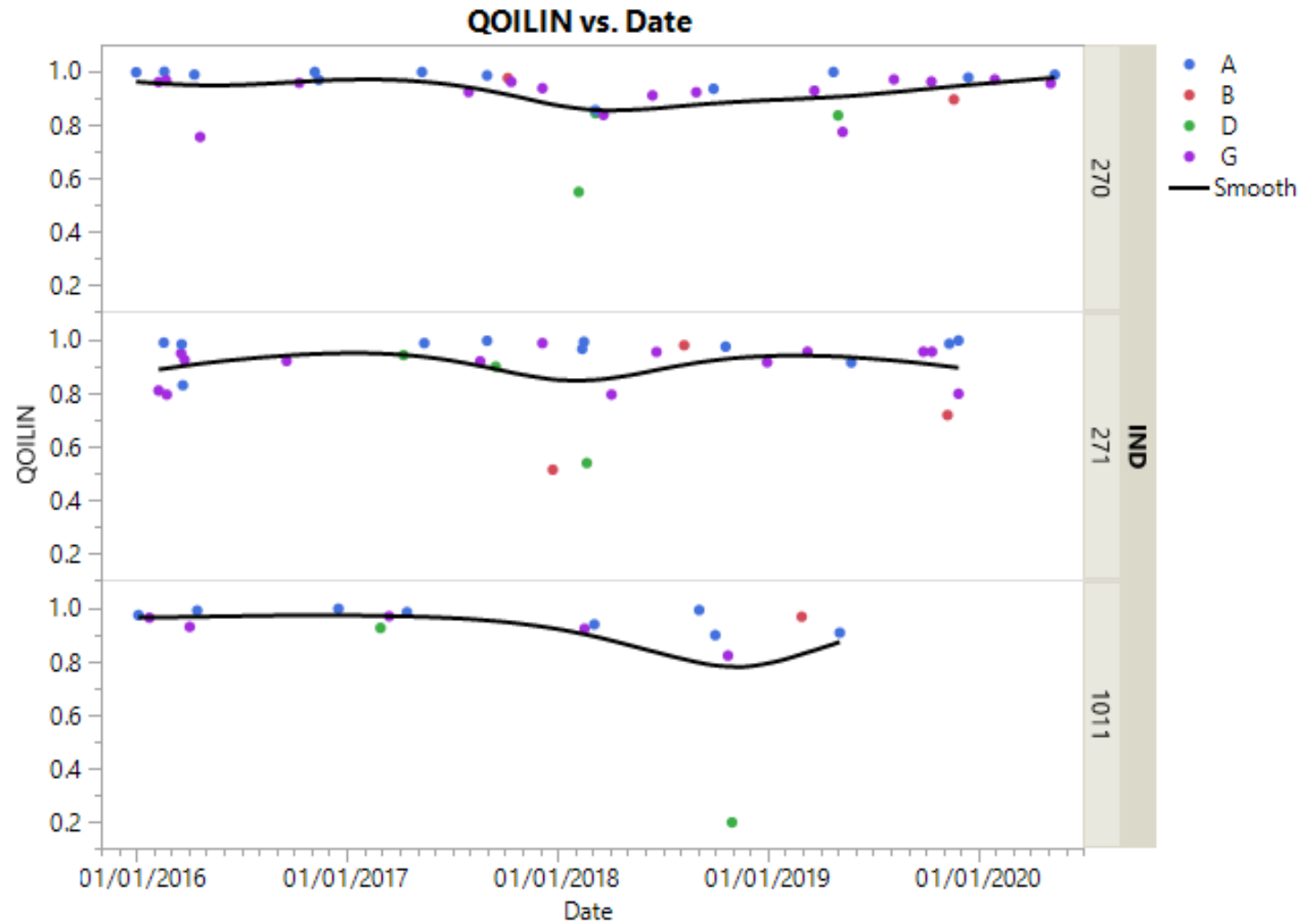
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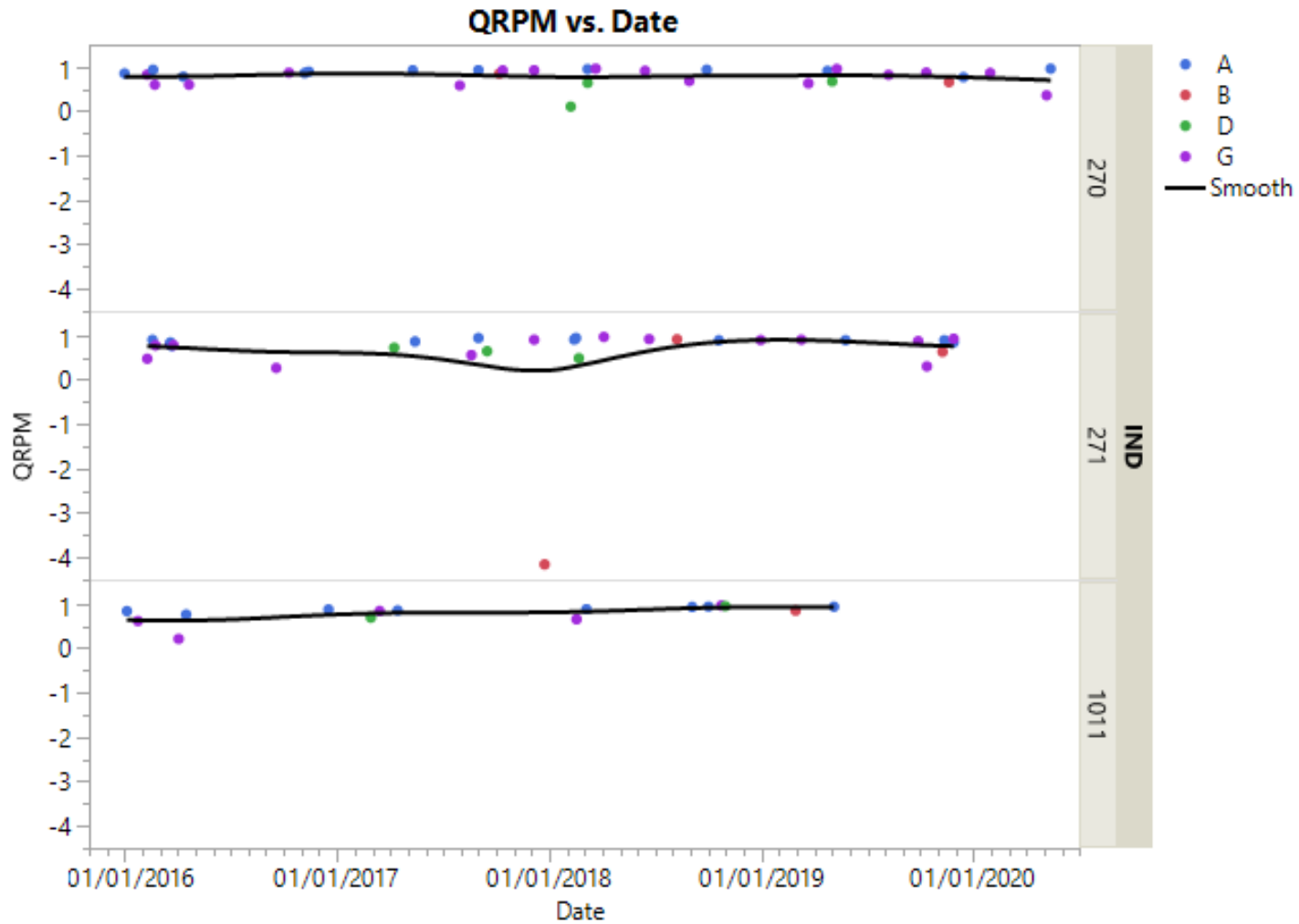
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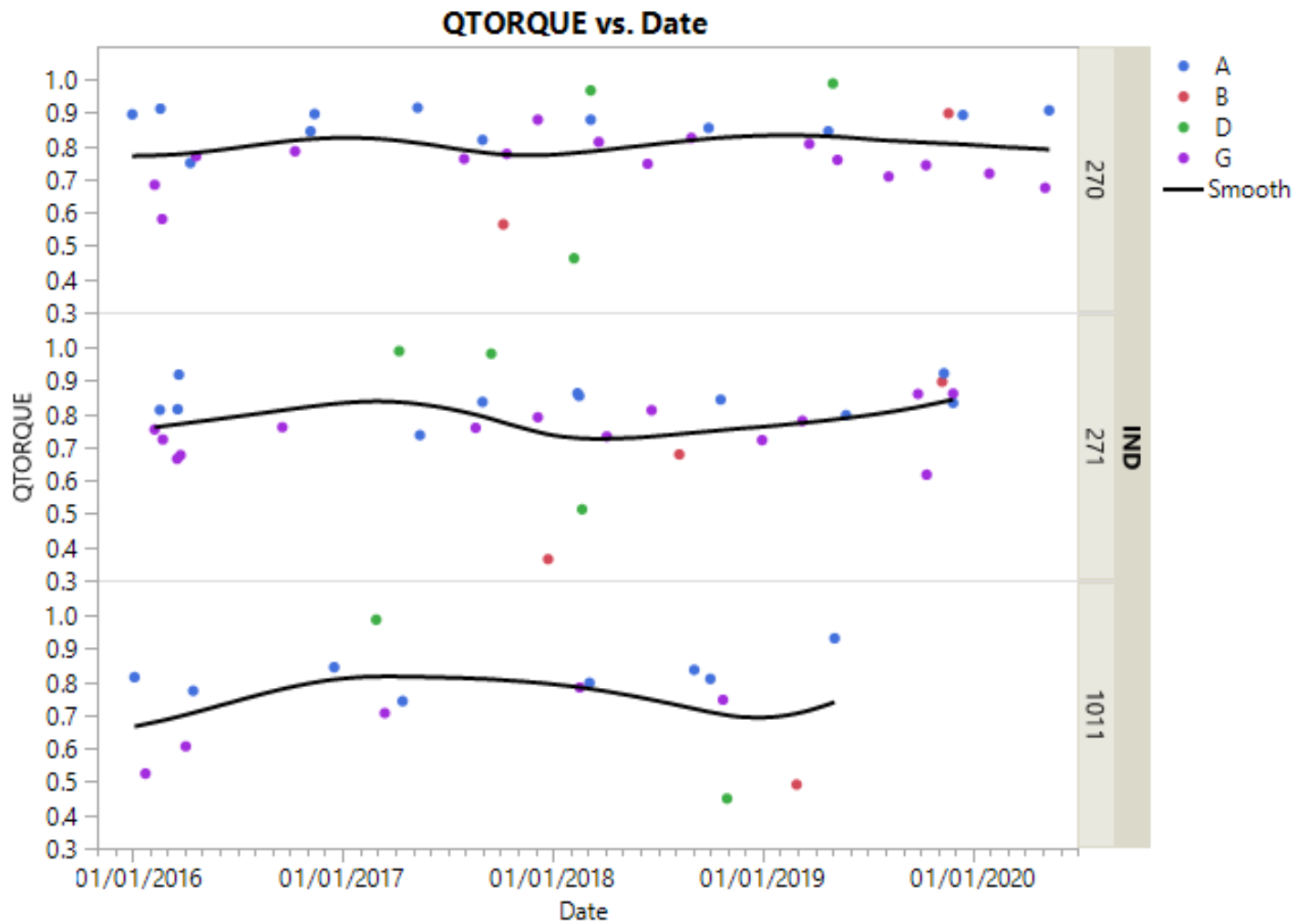
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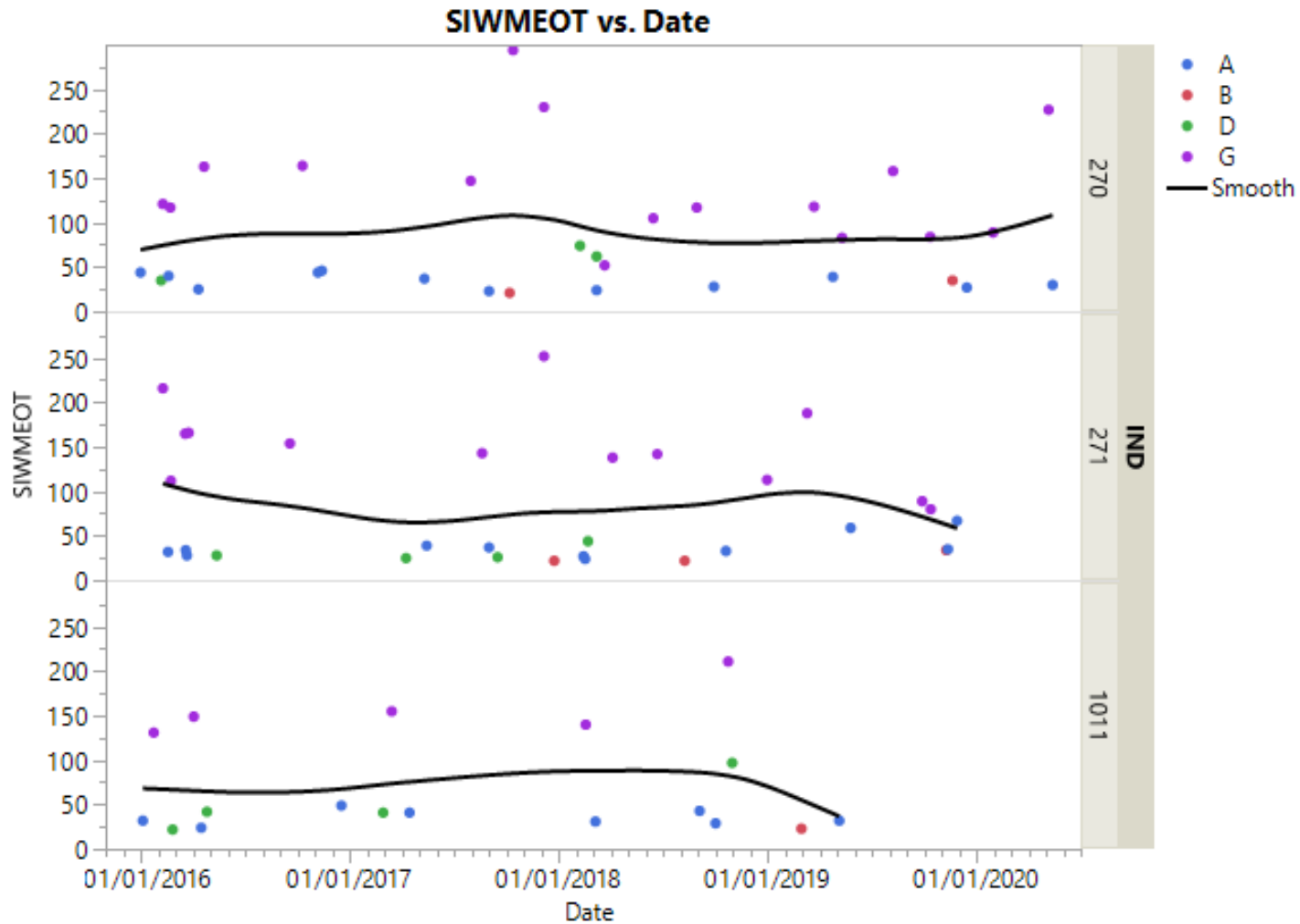
Graph Builder



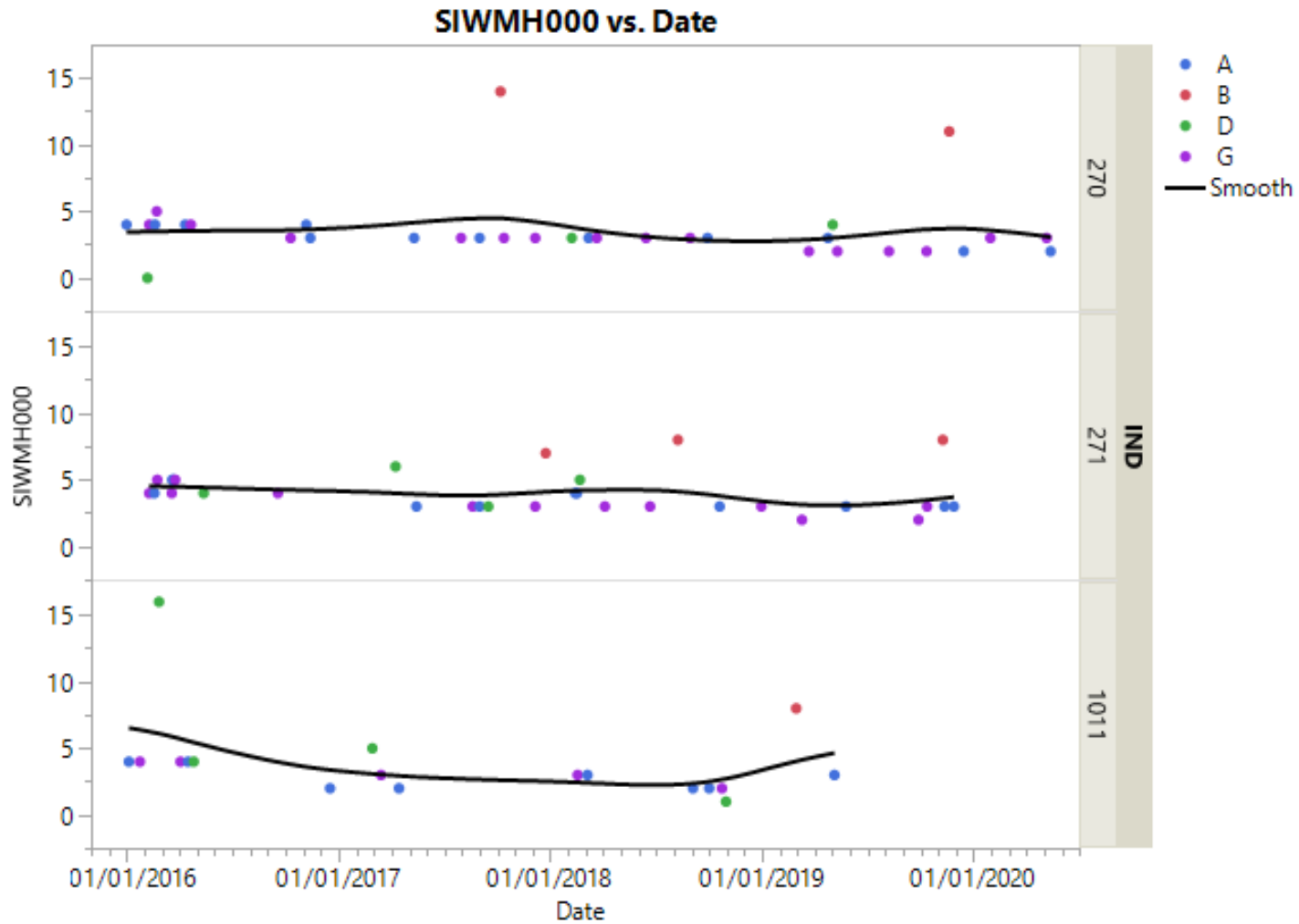
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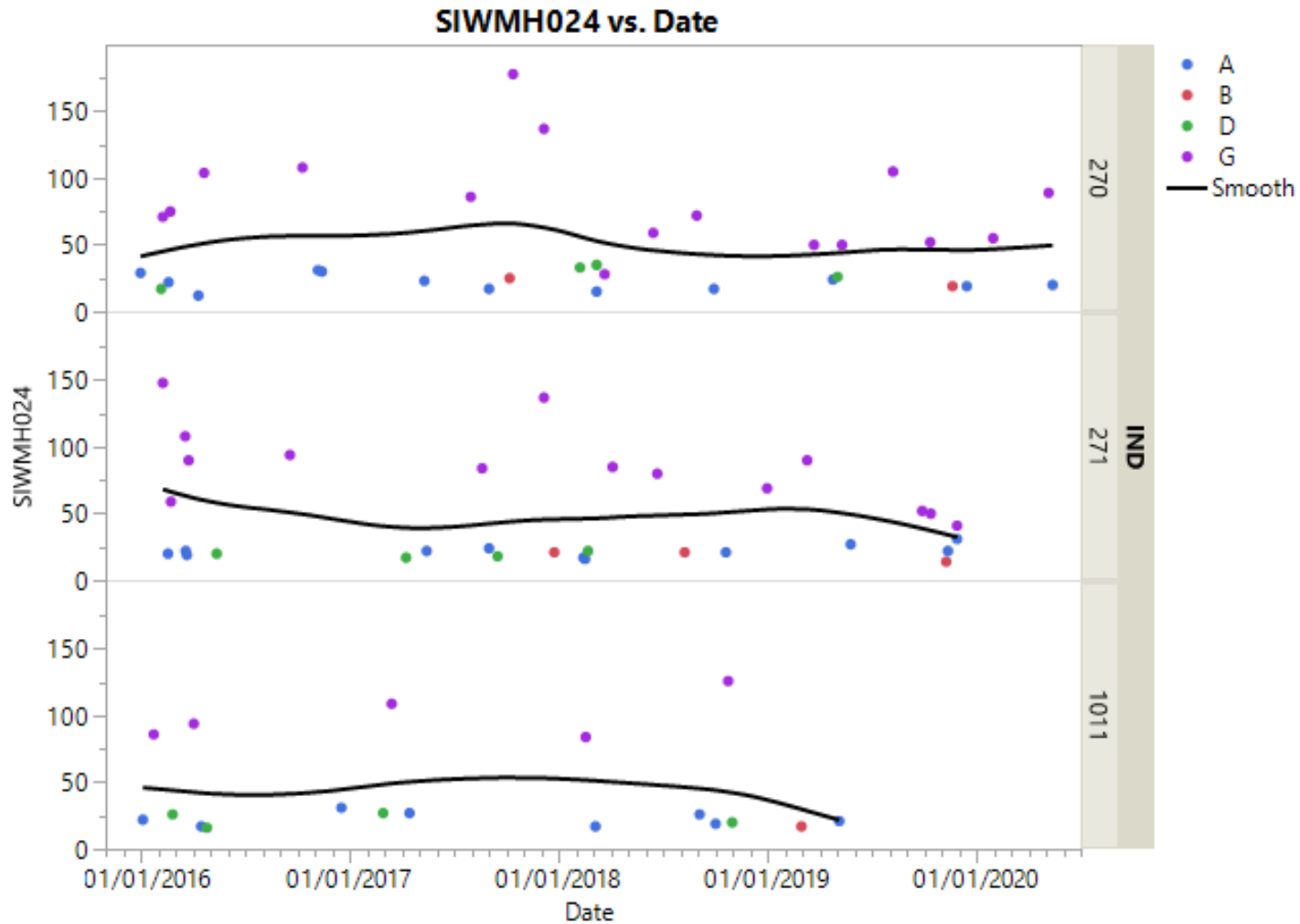
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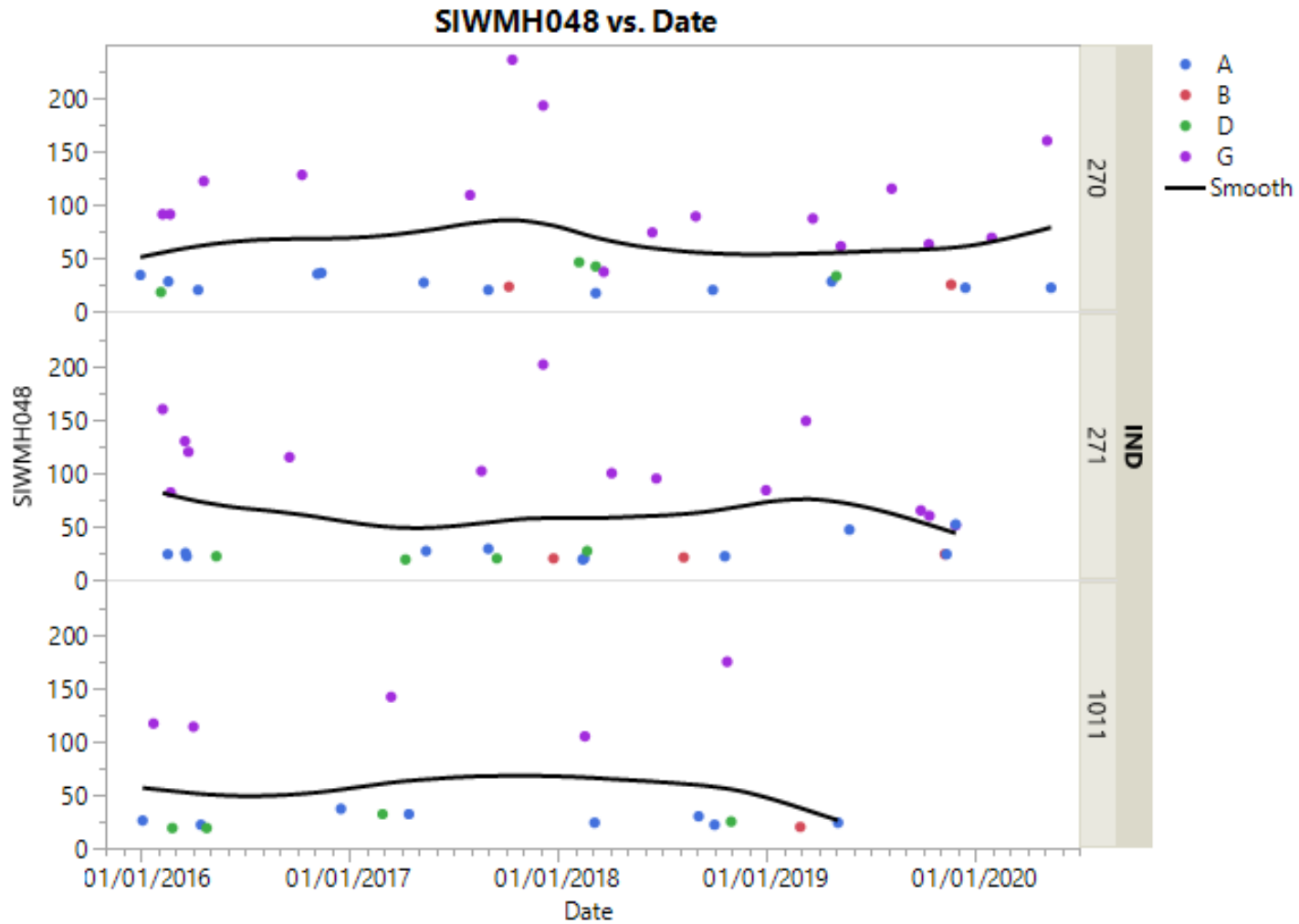
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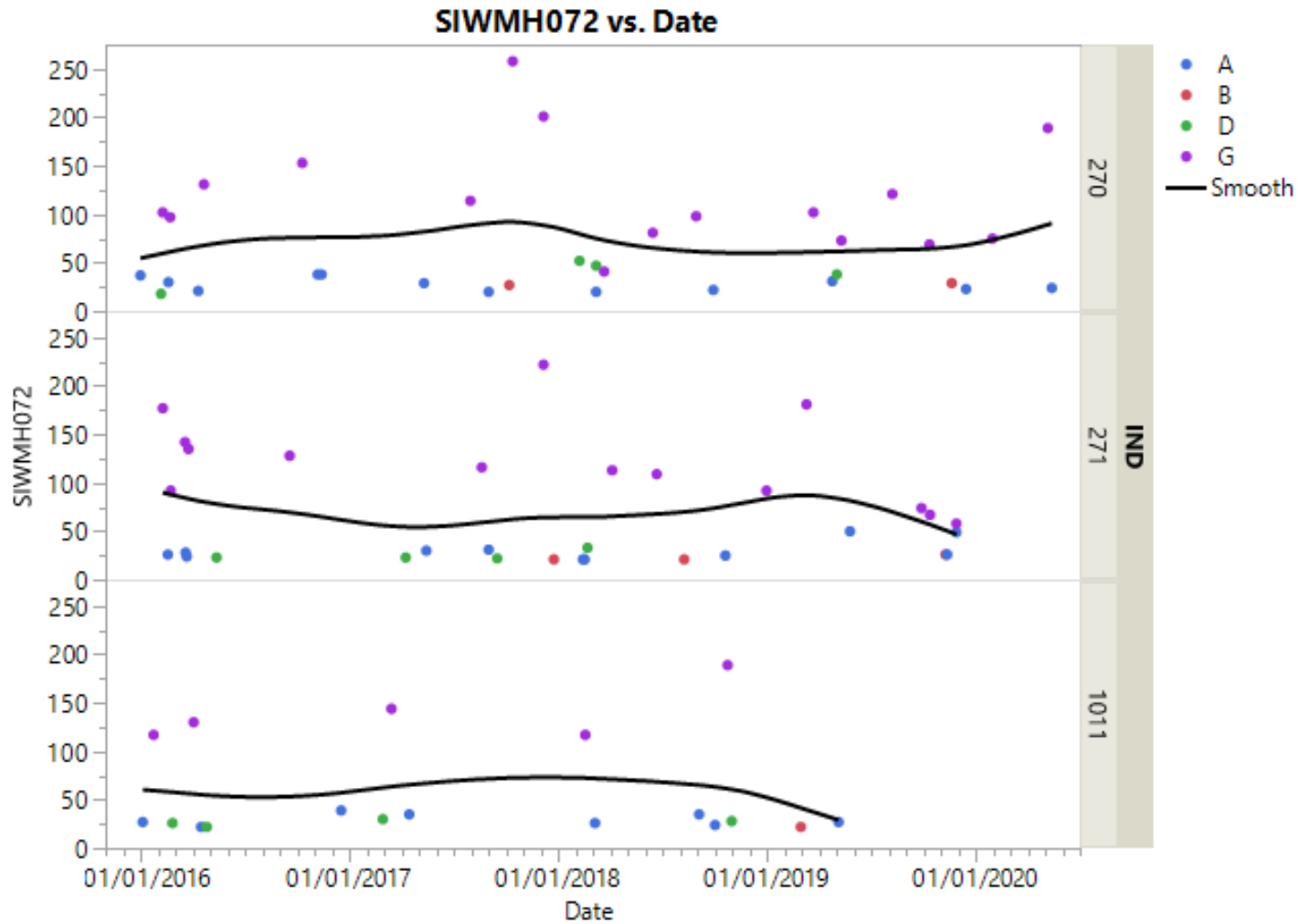
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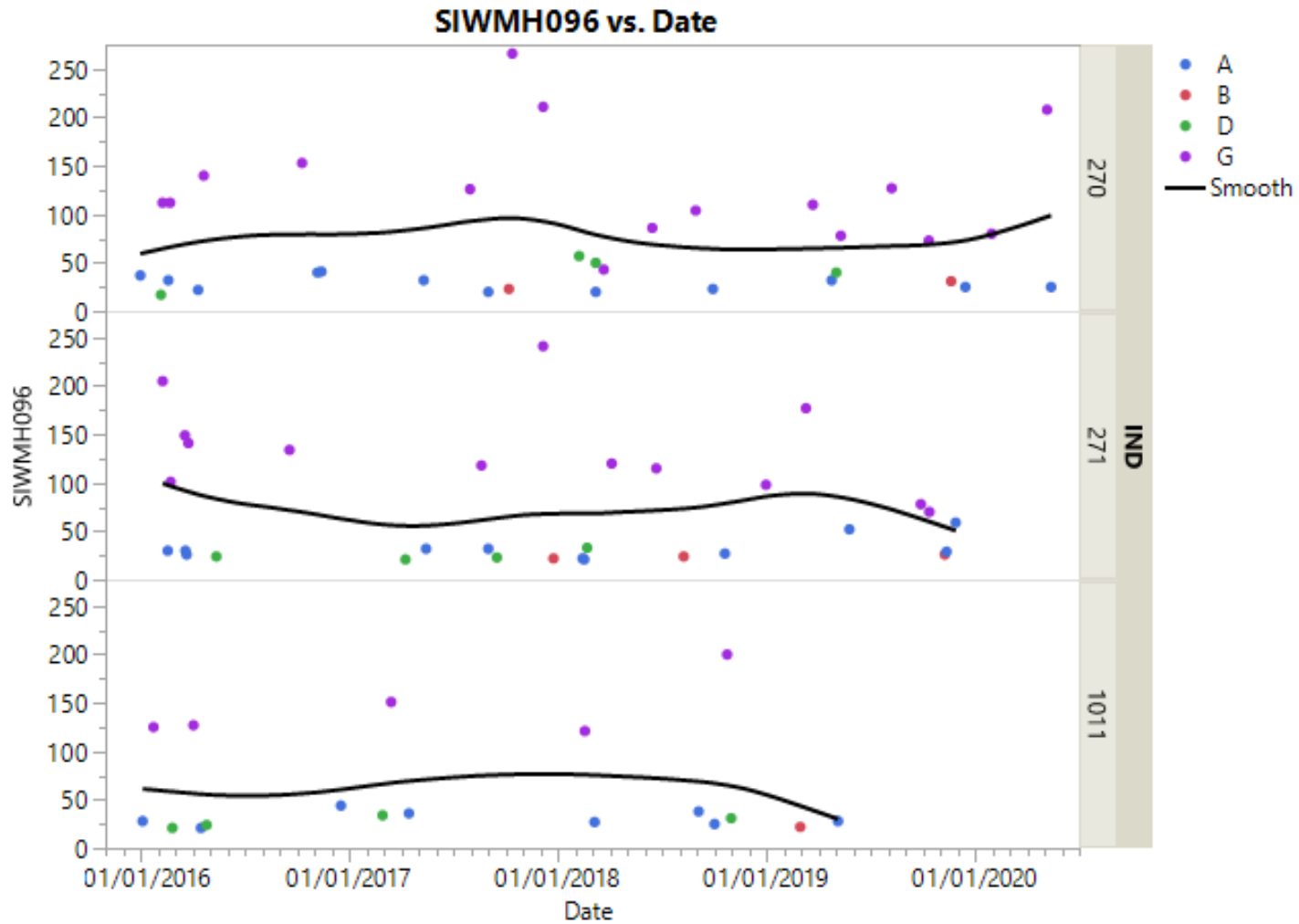
Graph Builder



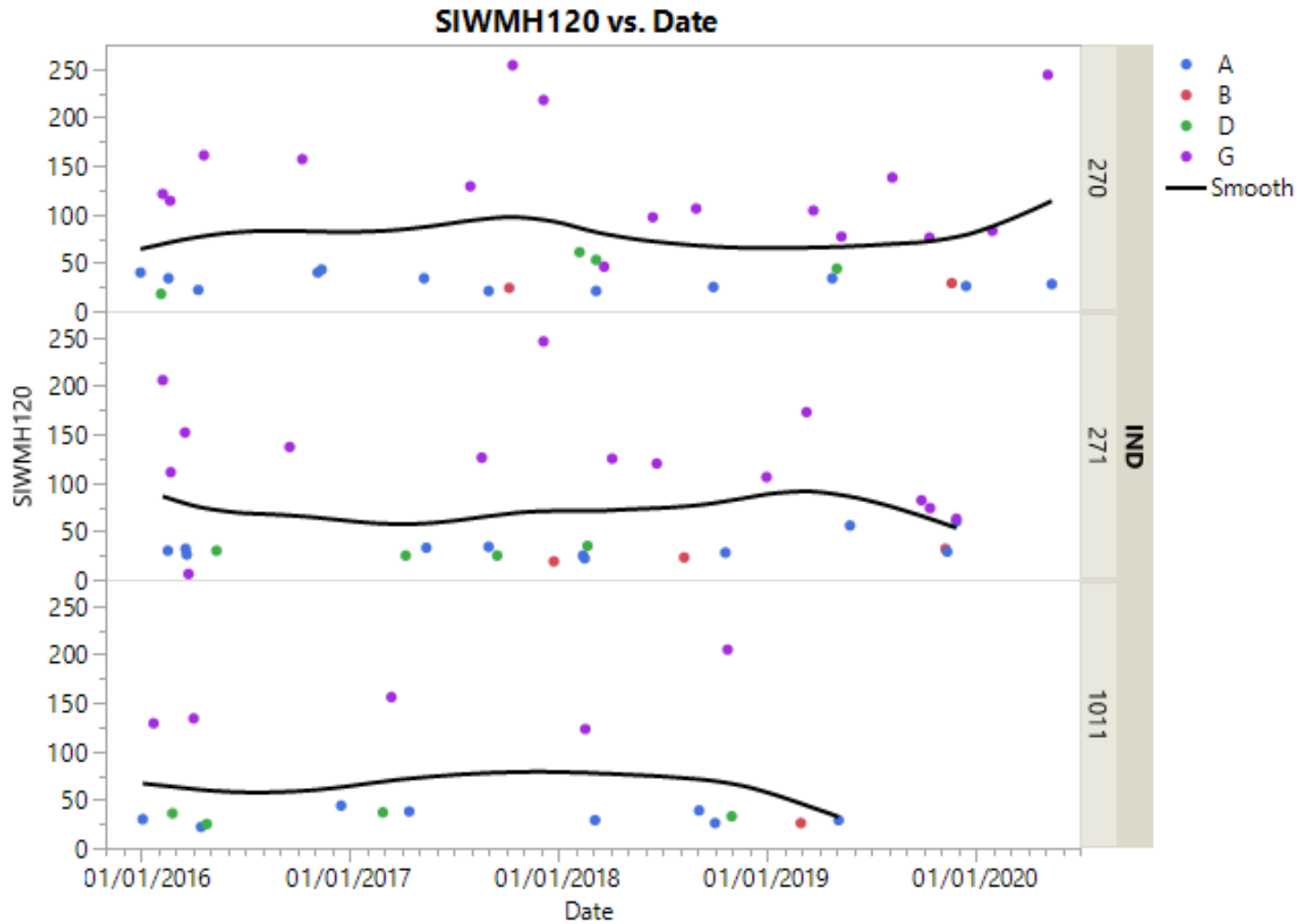
Graph Builder



Graph Builder

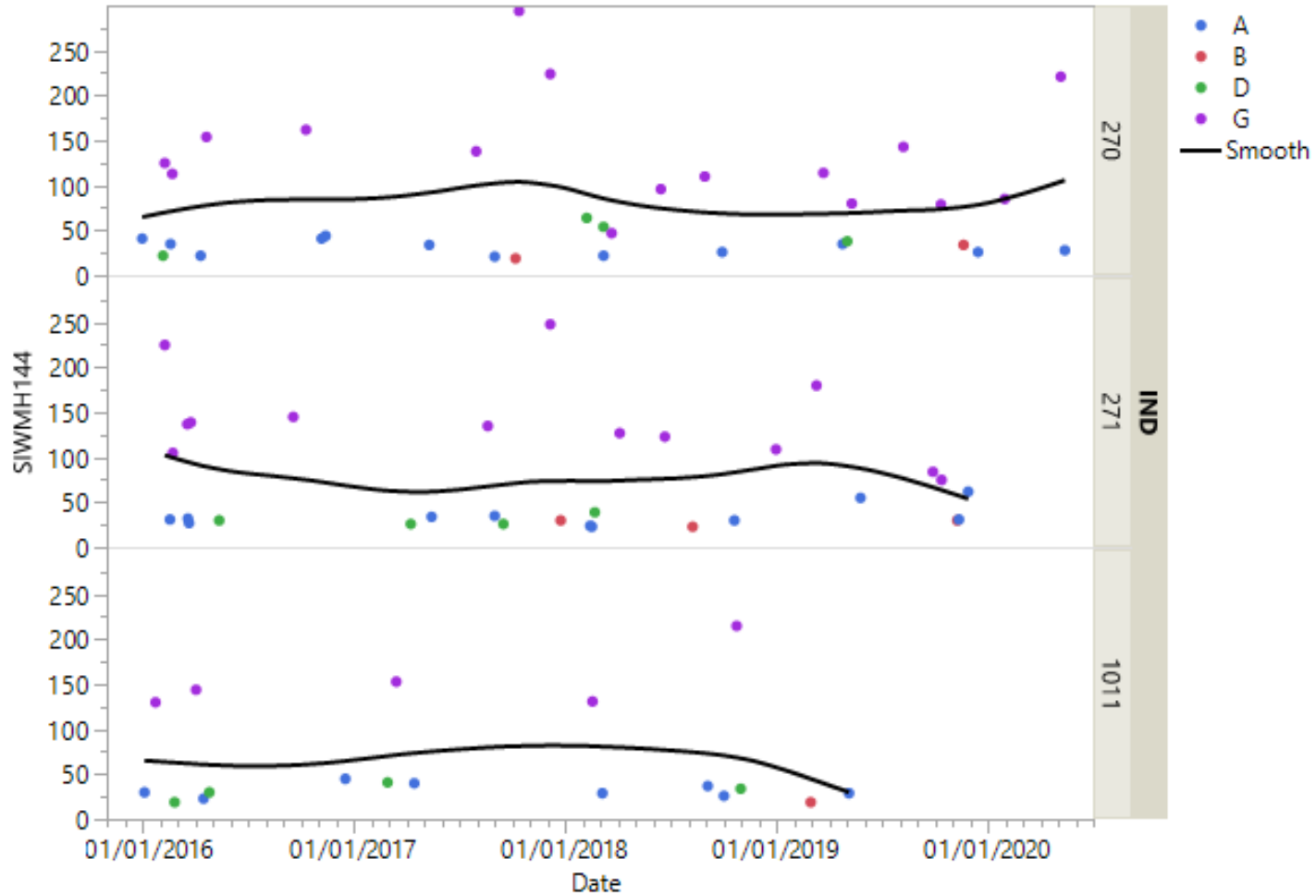


Graph Builder

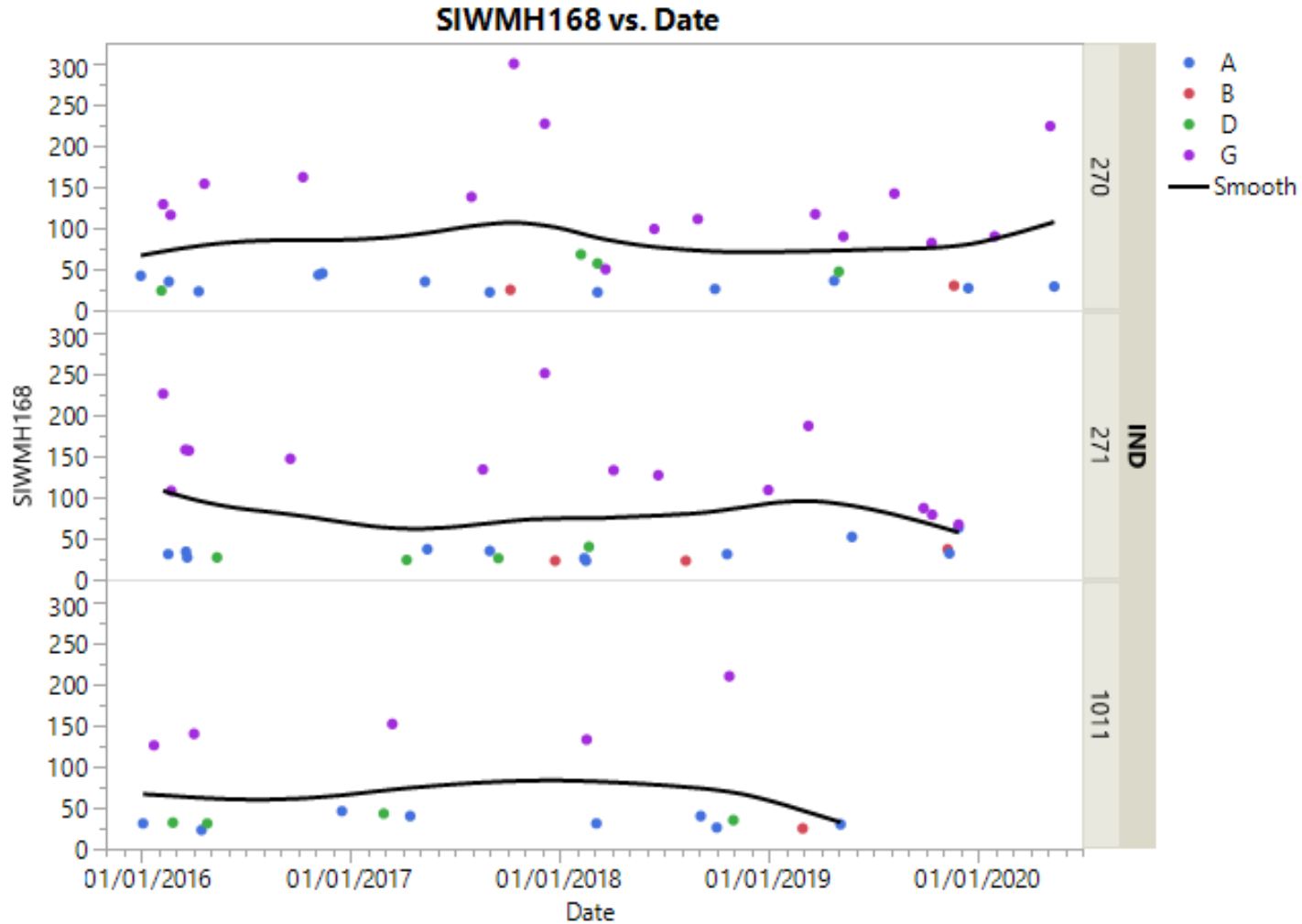


Graph Builder

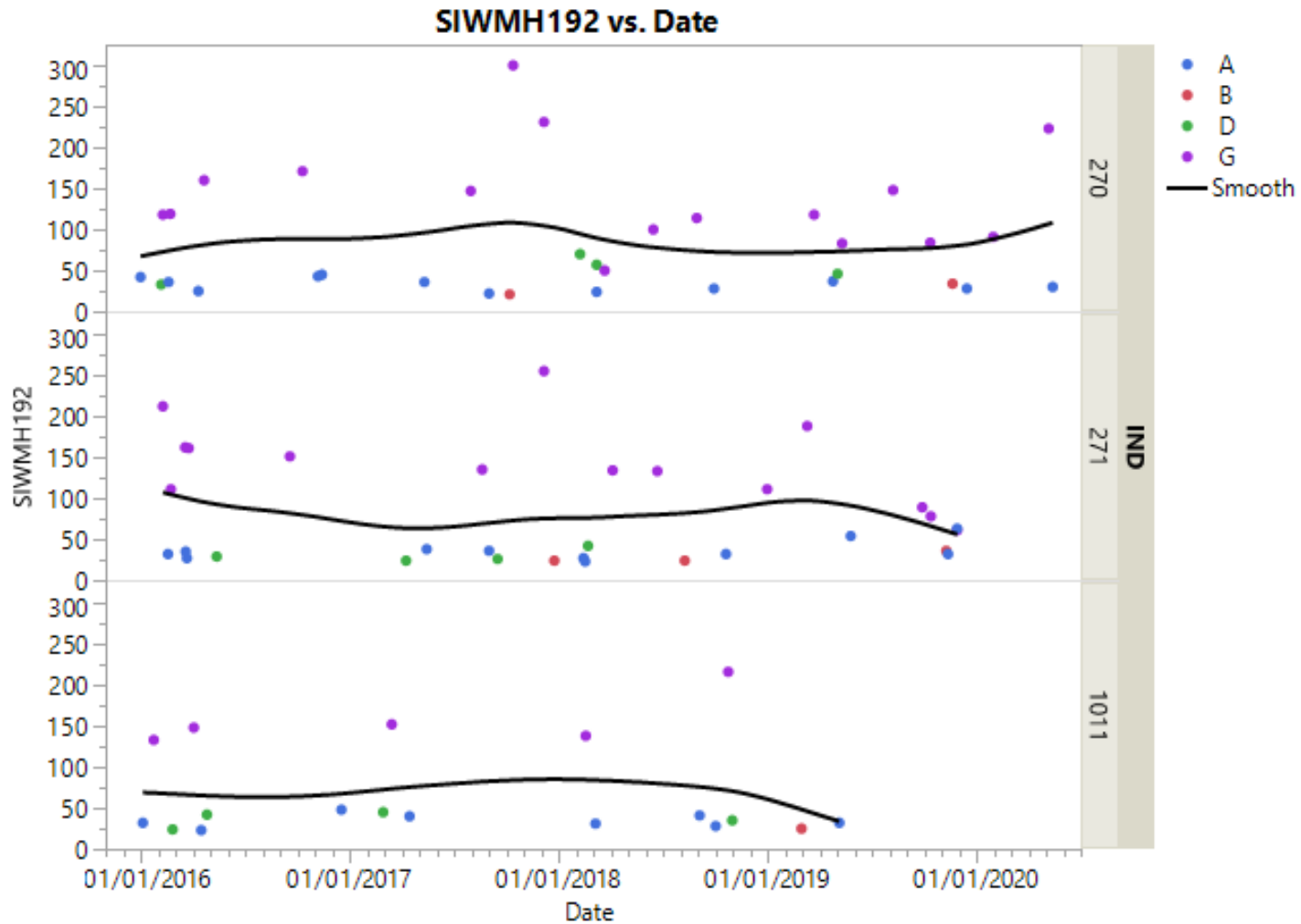
SIWMH144 vs. Date



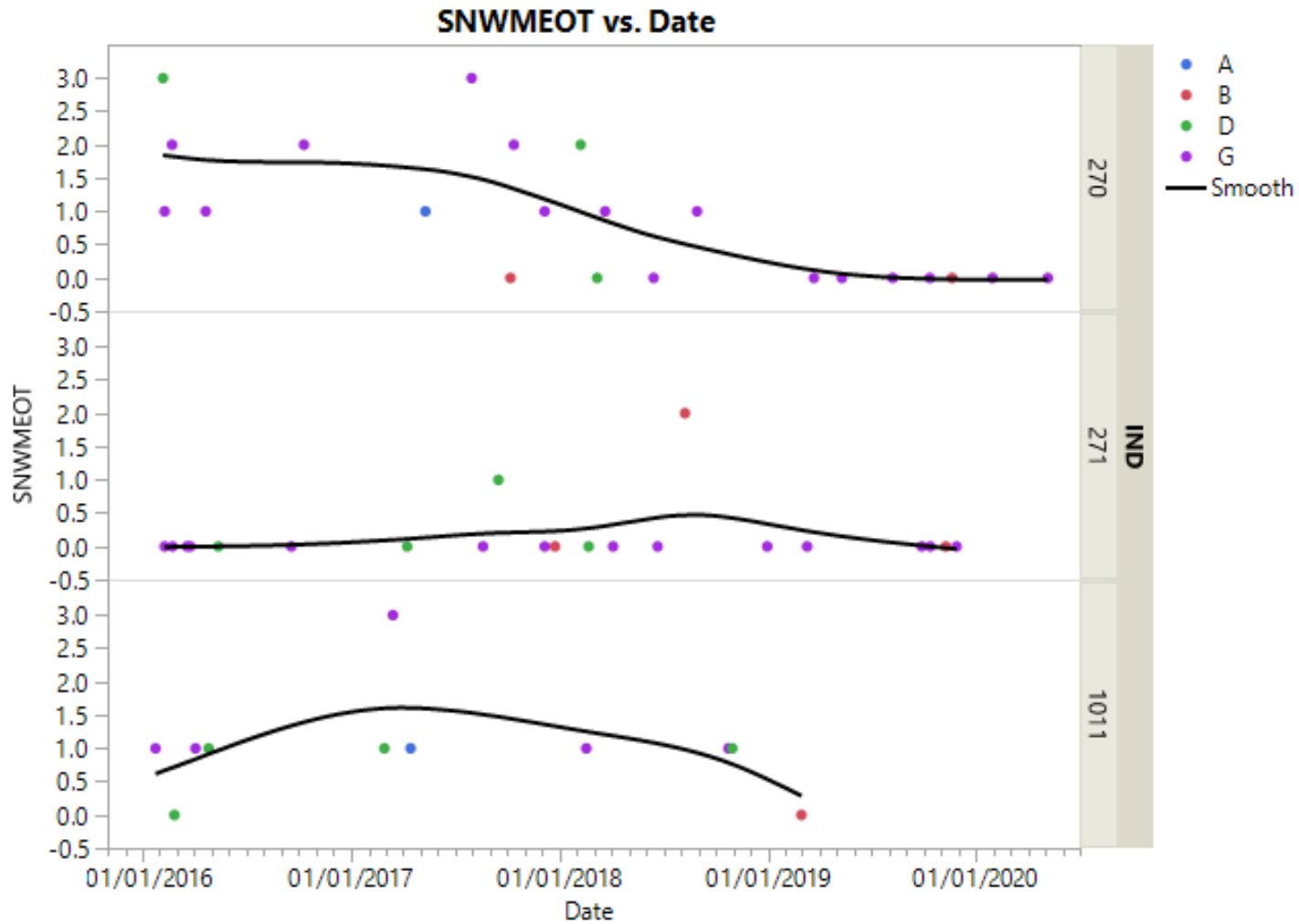
Graph Builder



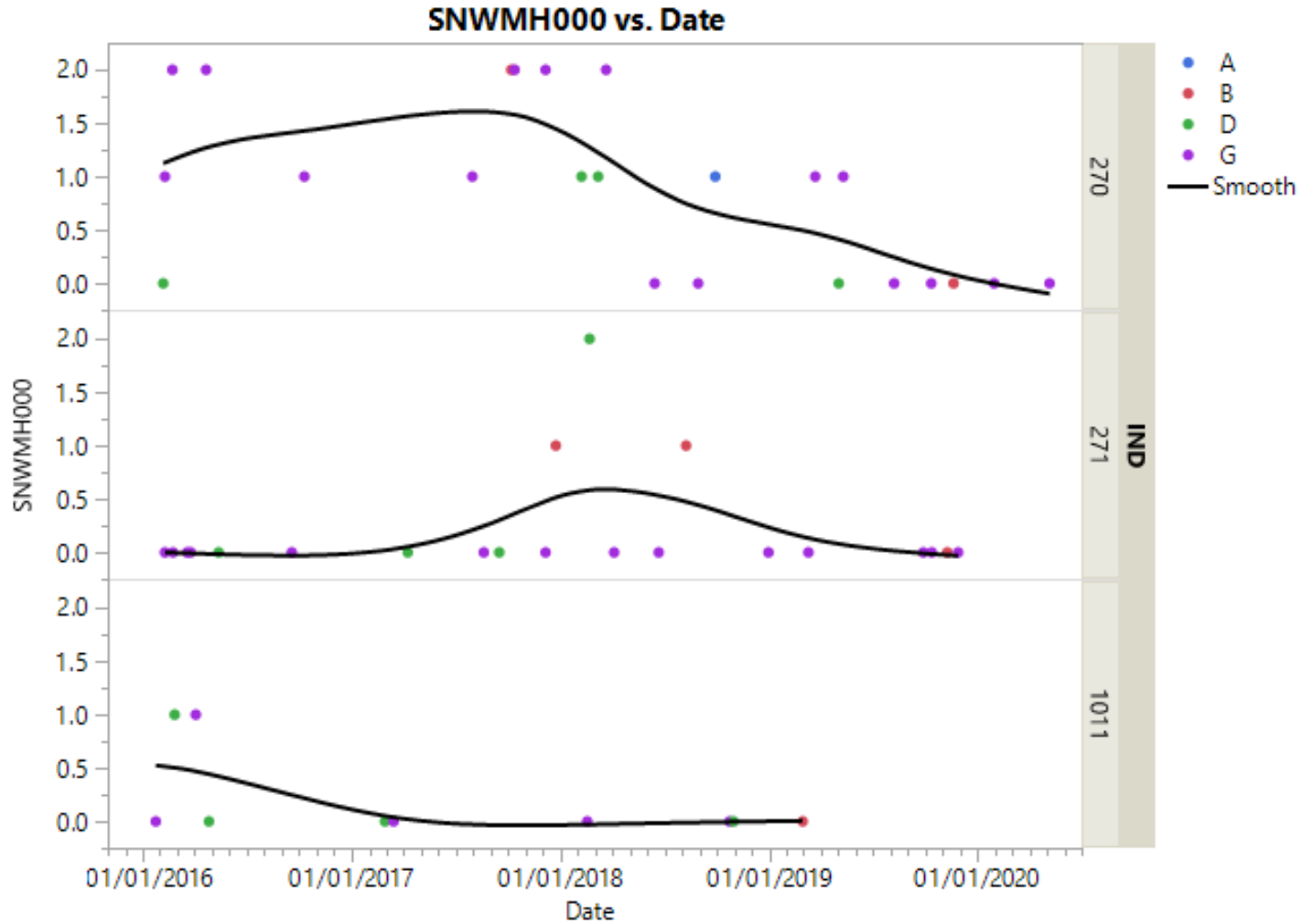
Graph Builder



Graph Builder

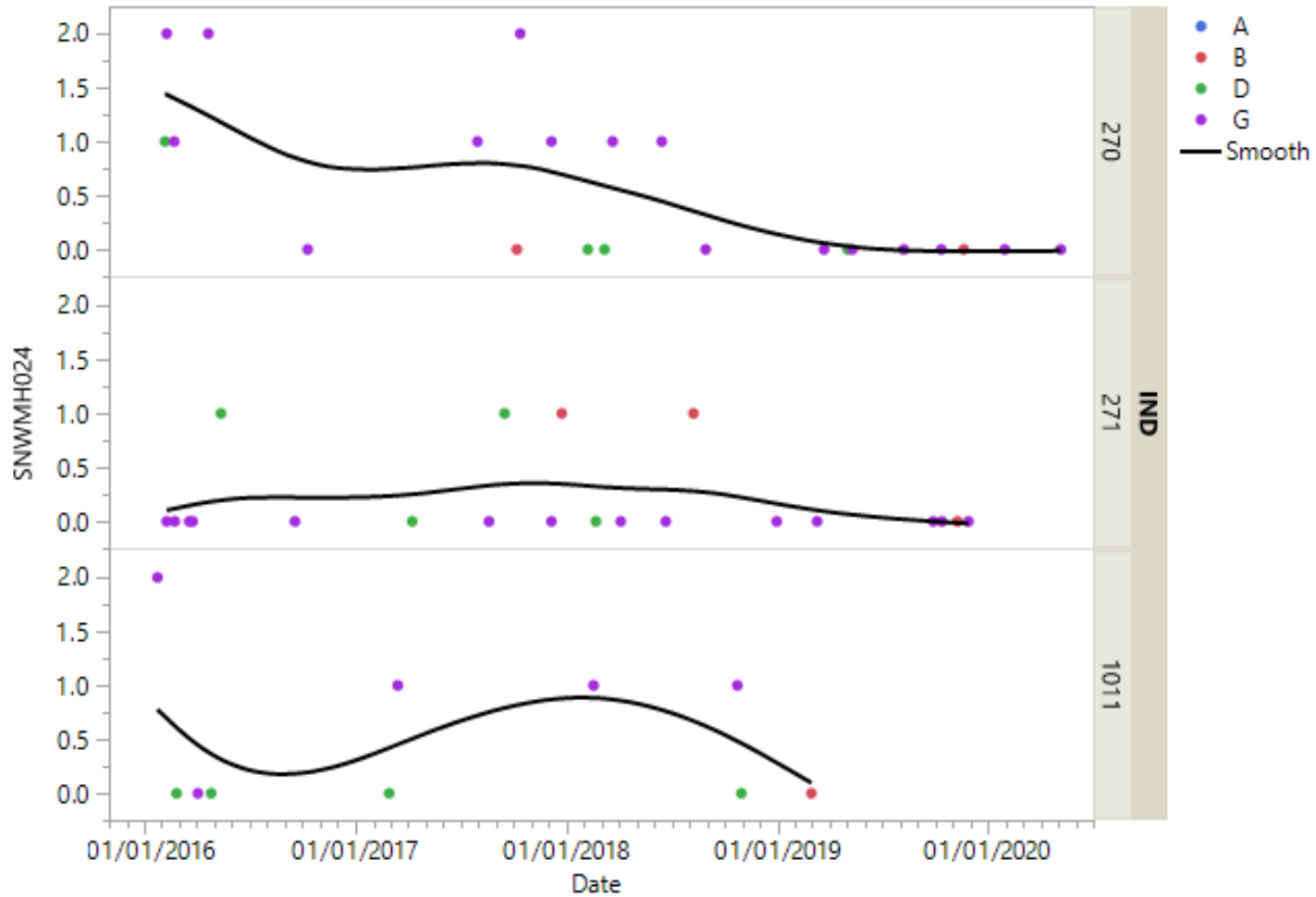


Graph Builder

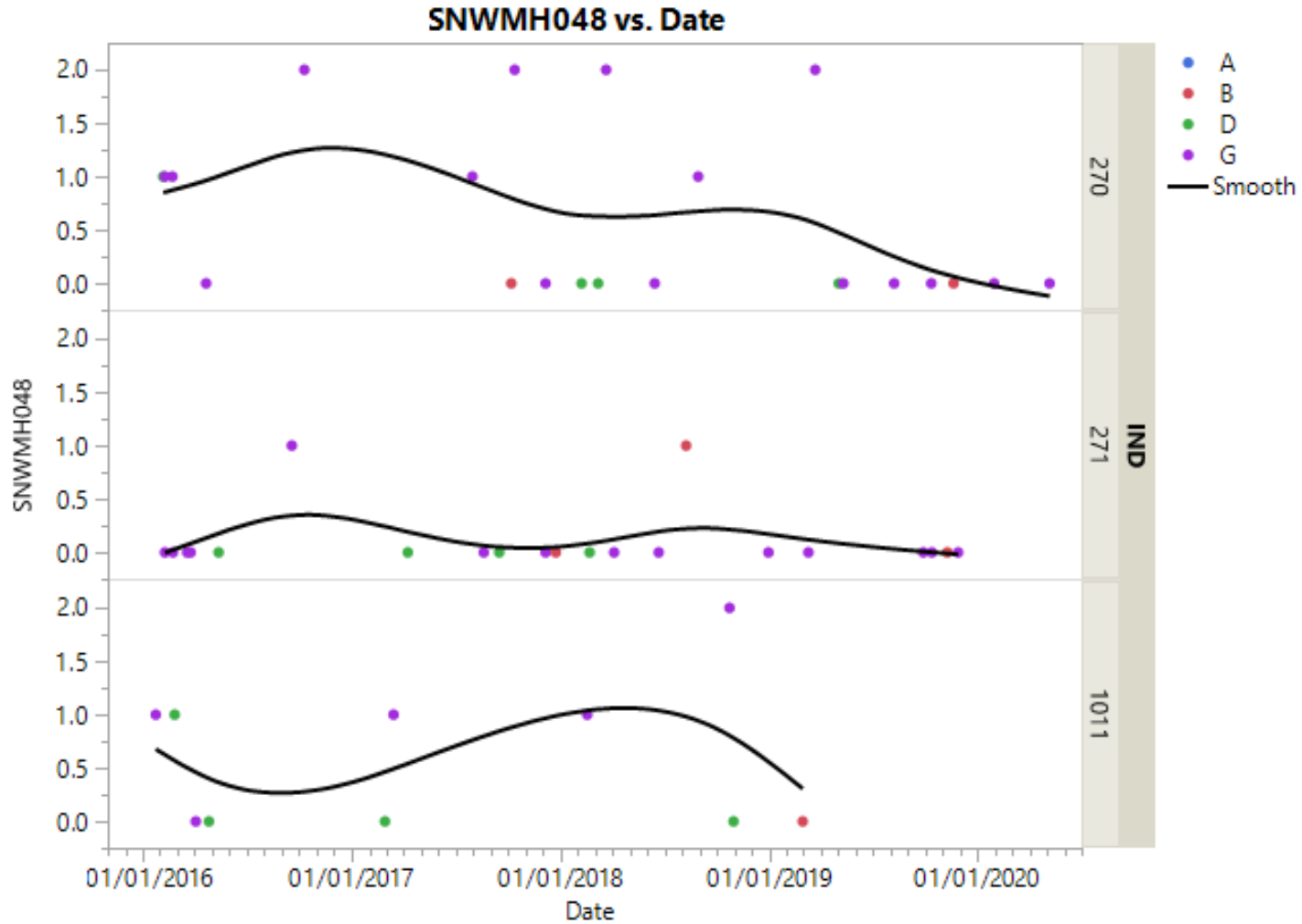


Graph Builder

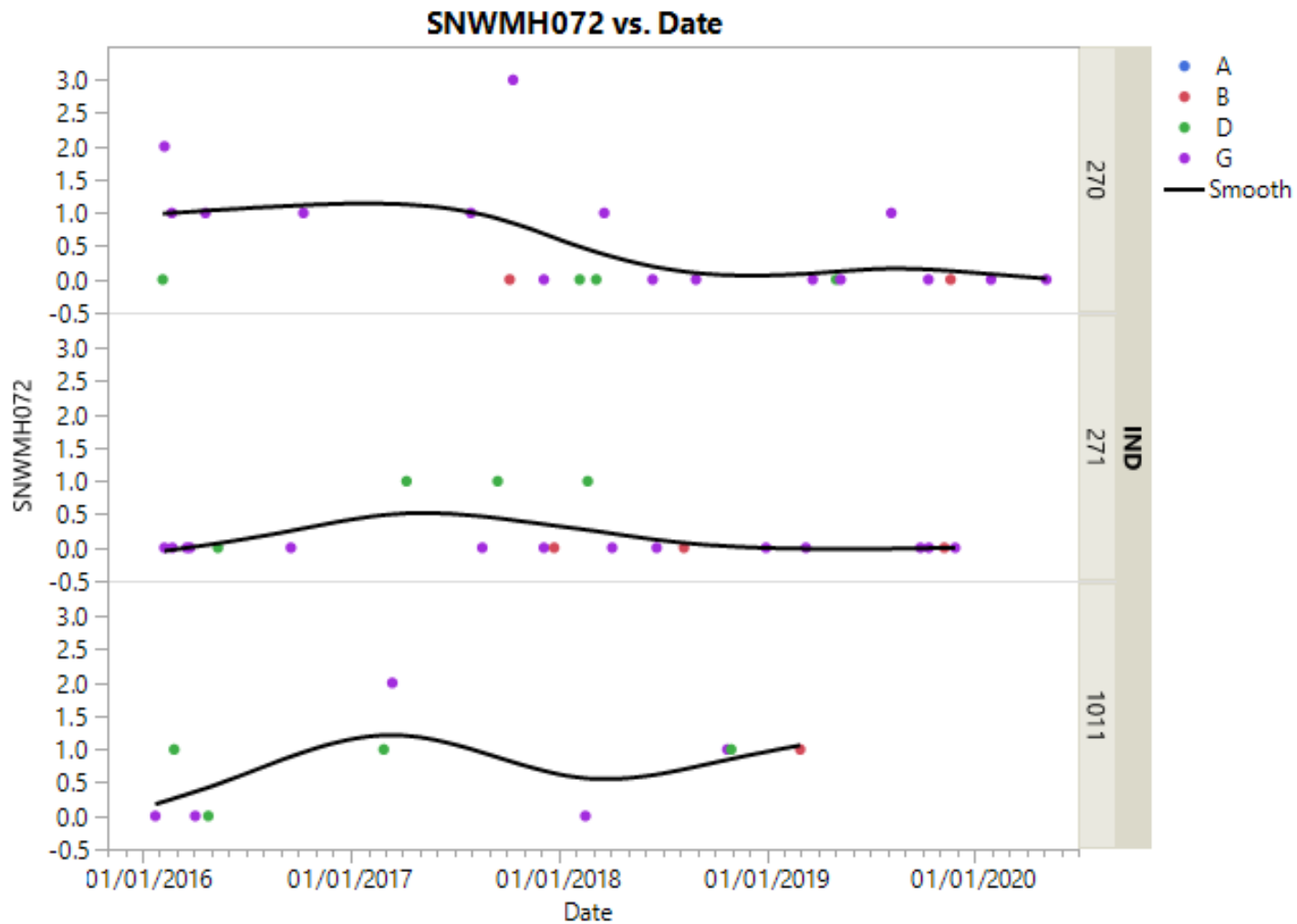
SNWMH024 vs. Date



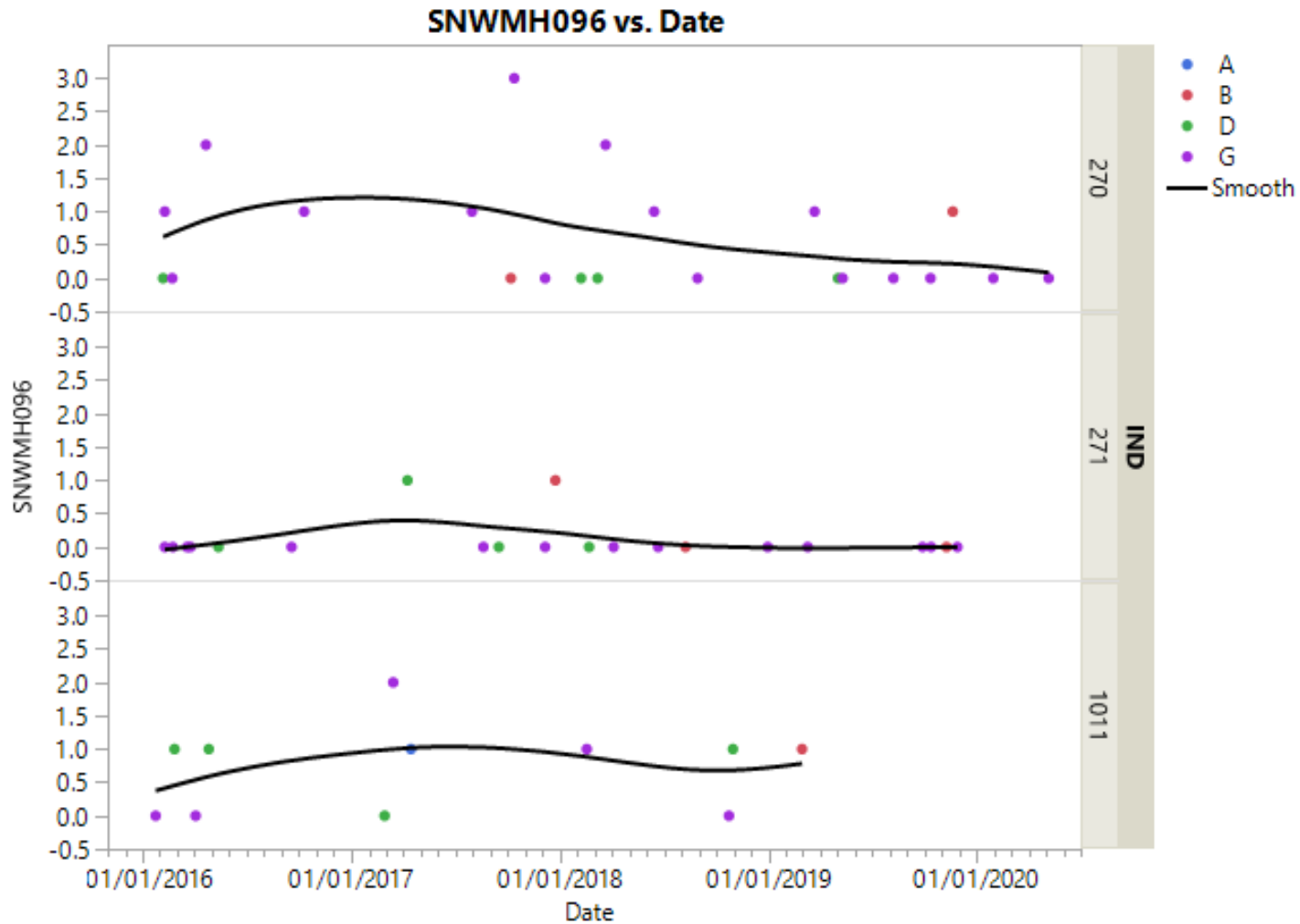
Graph Builder



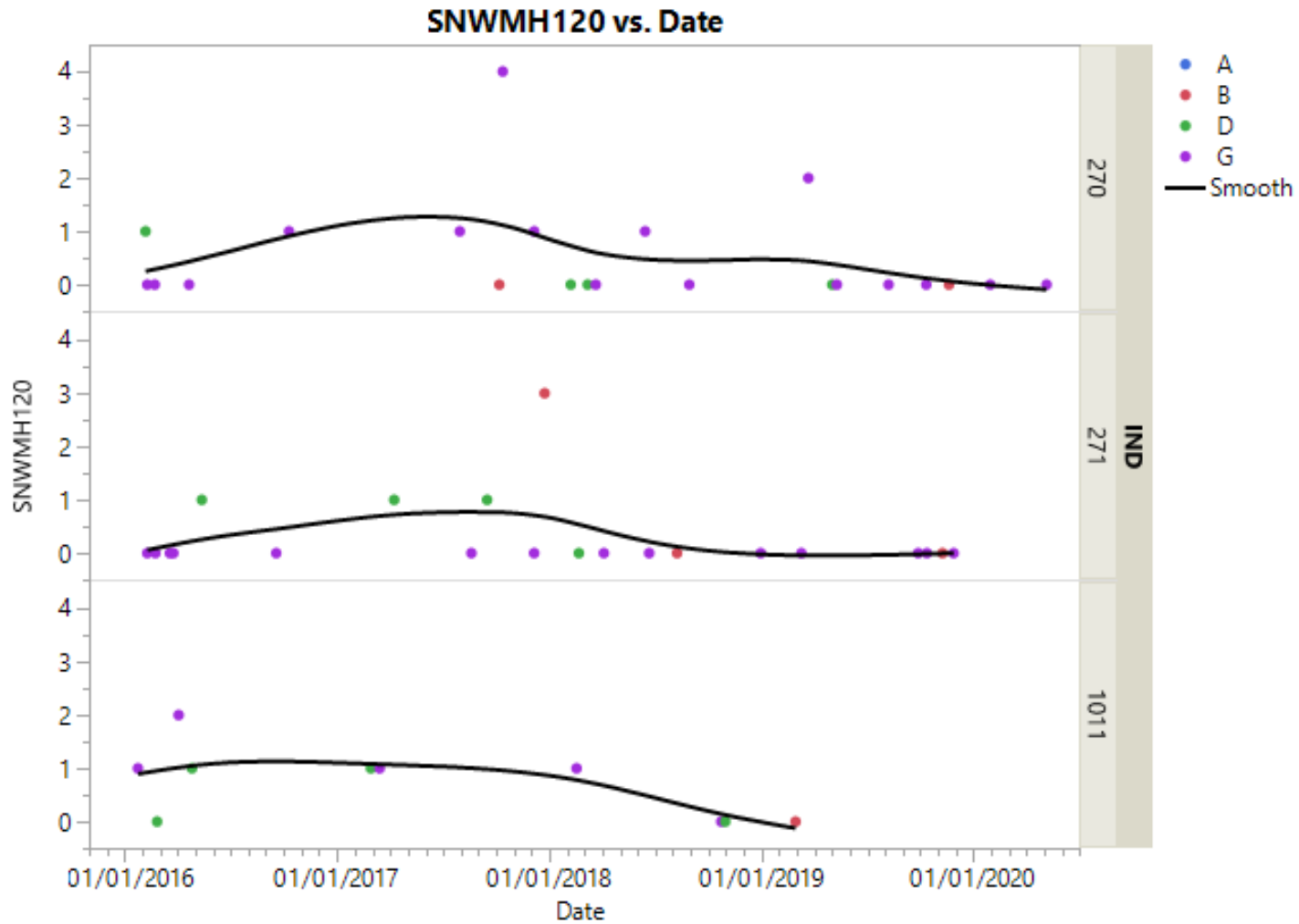
Graph Builder



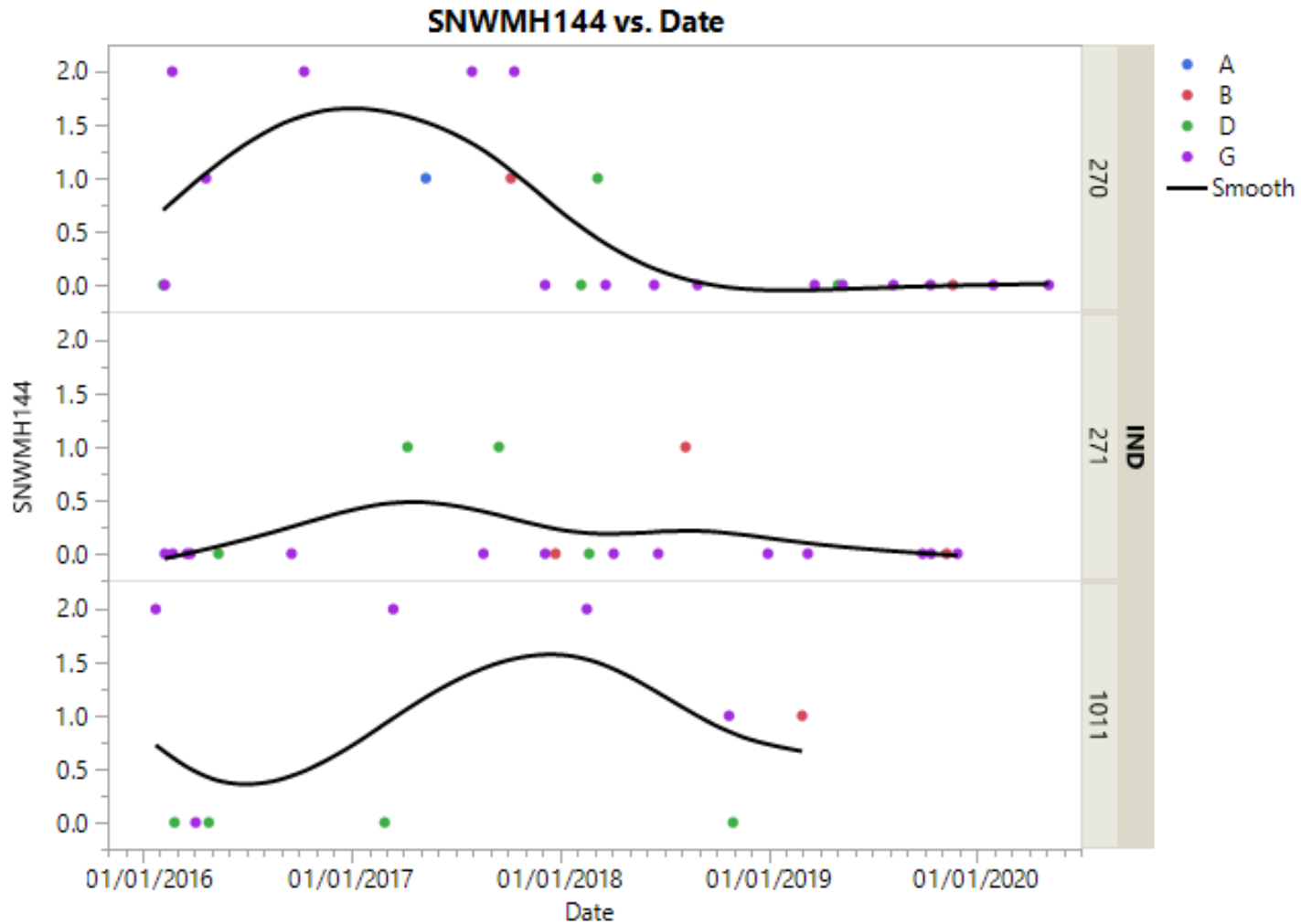
Graph Builder



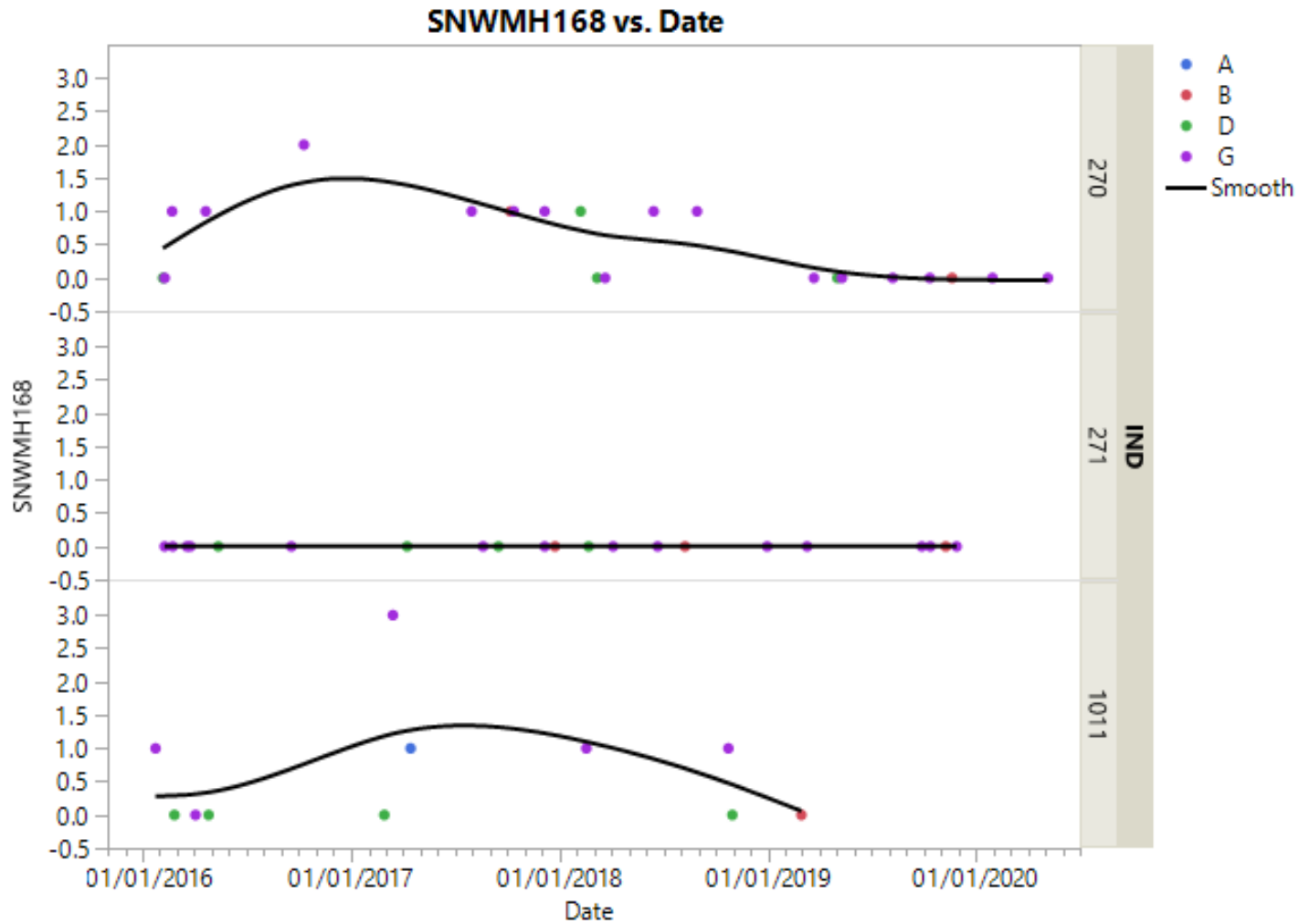
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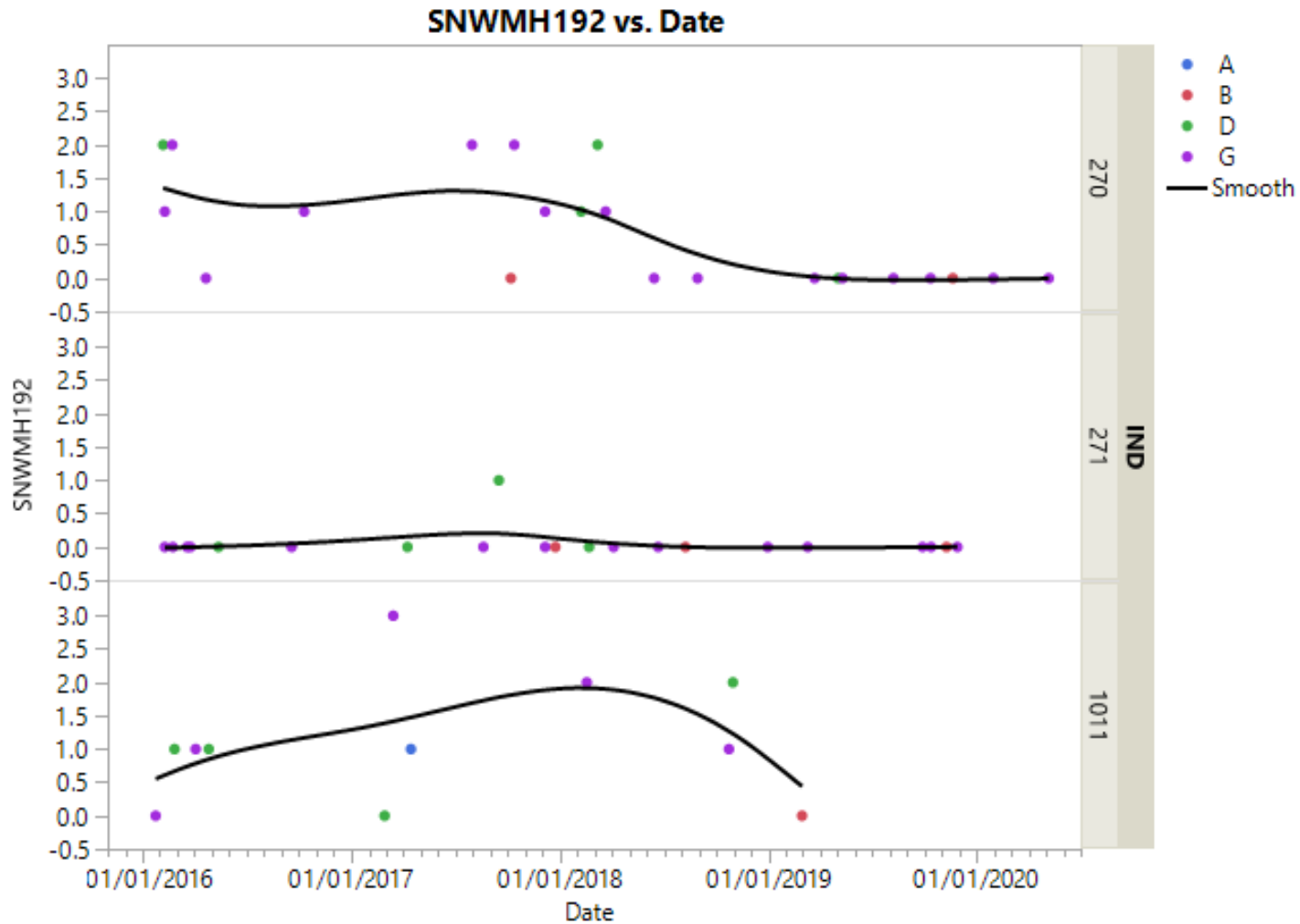
Graph Builder



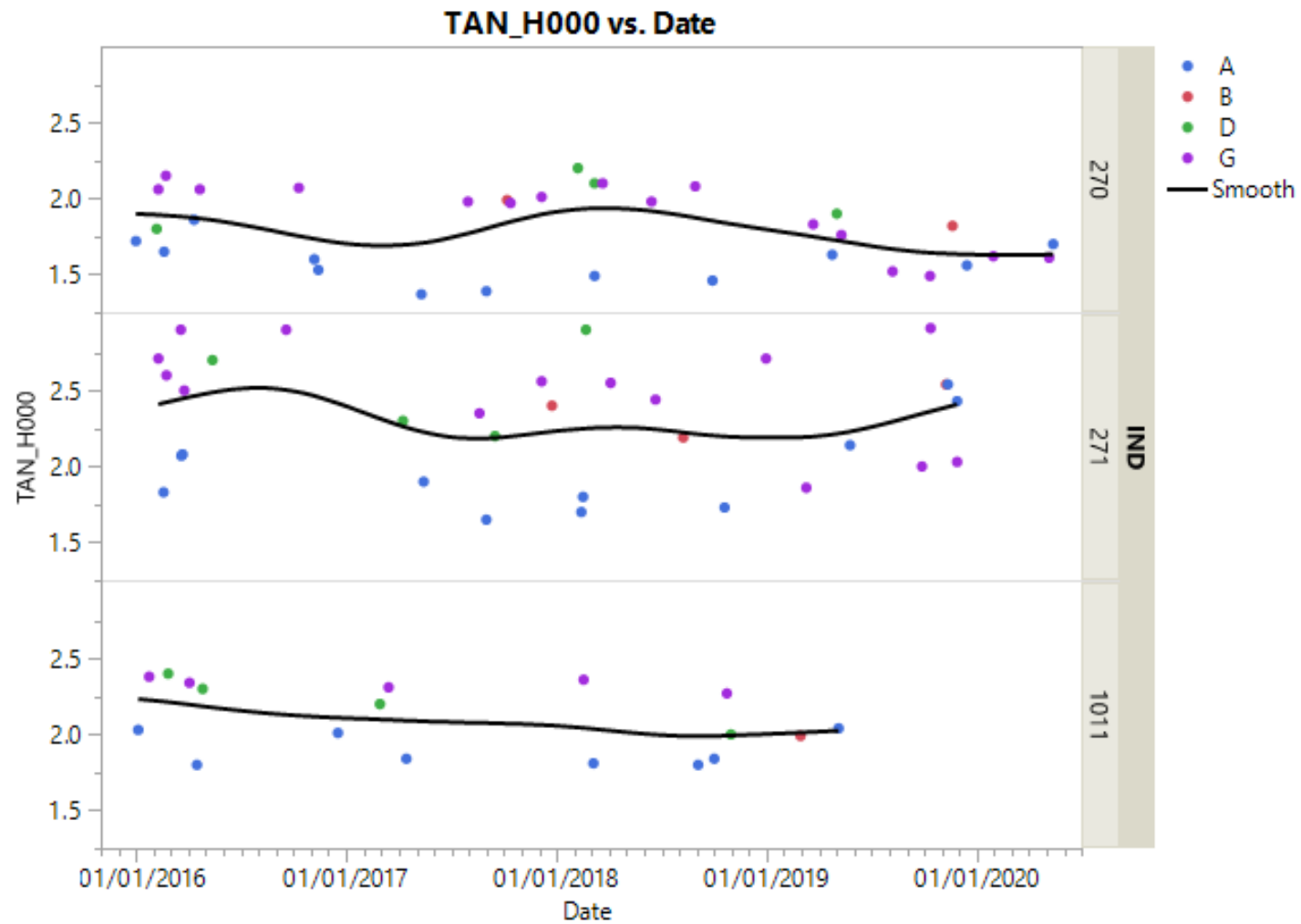
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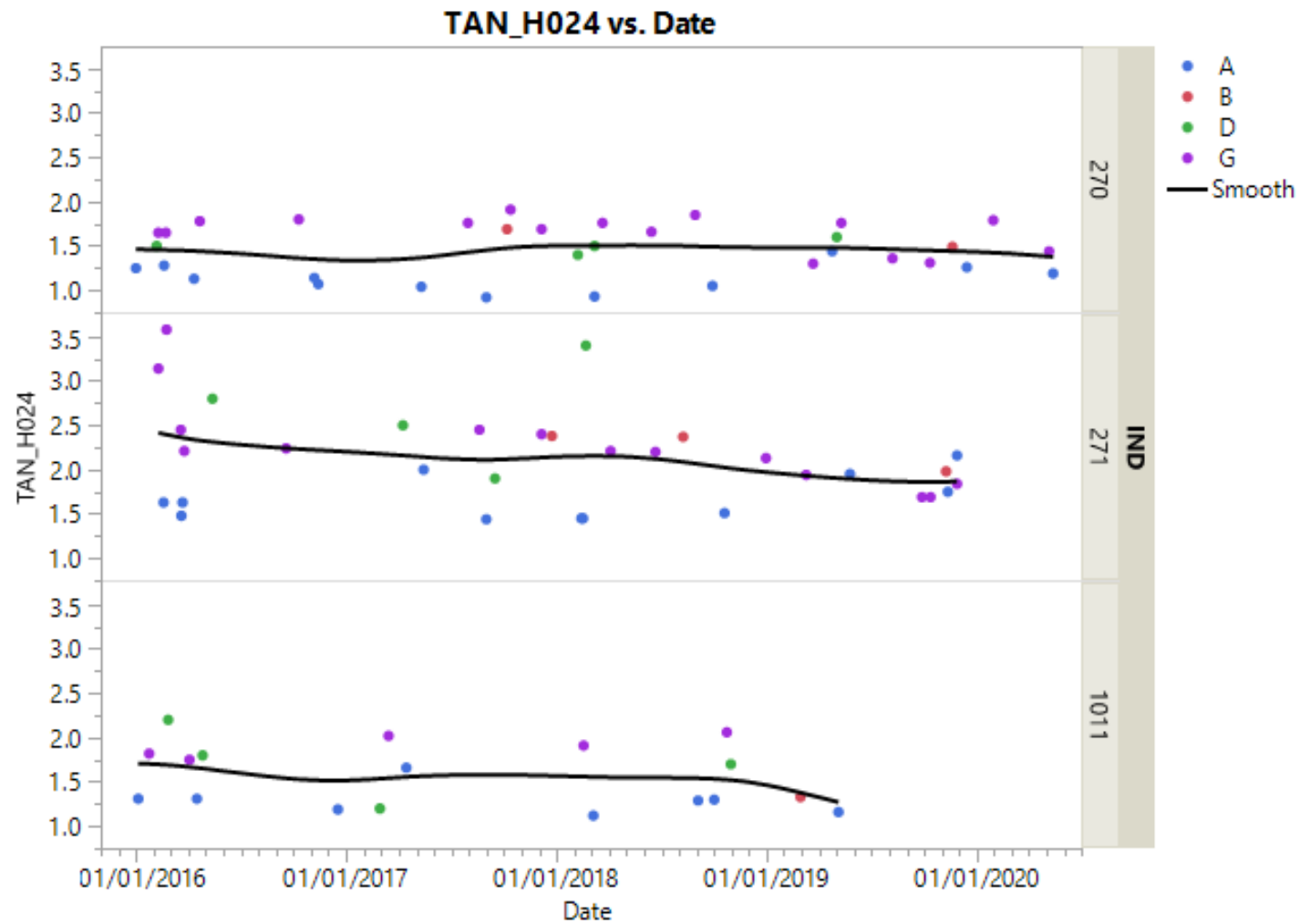
Graph Builder



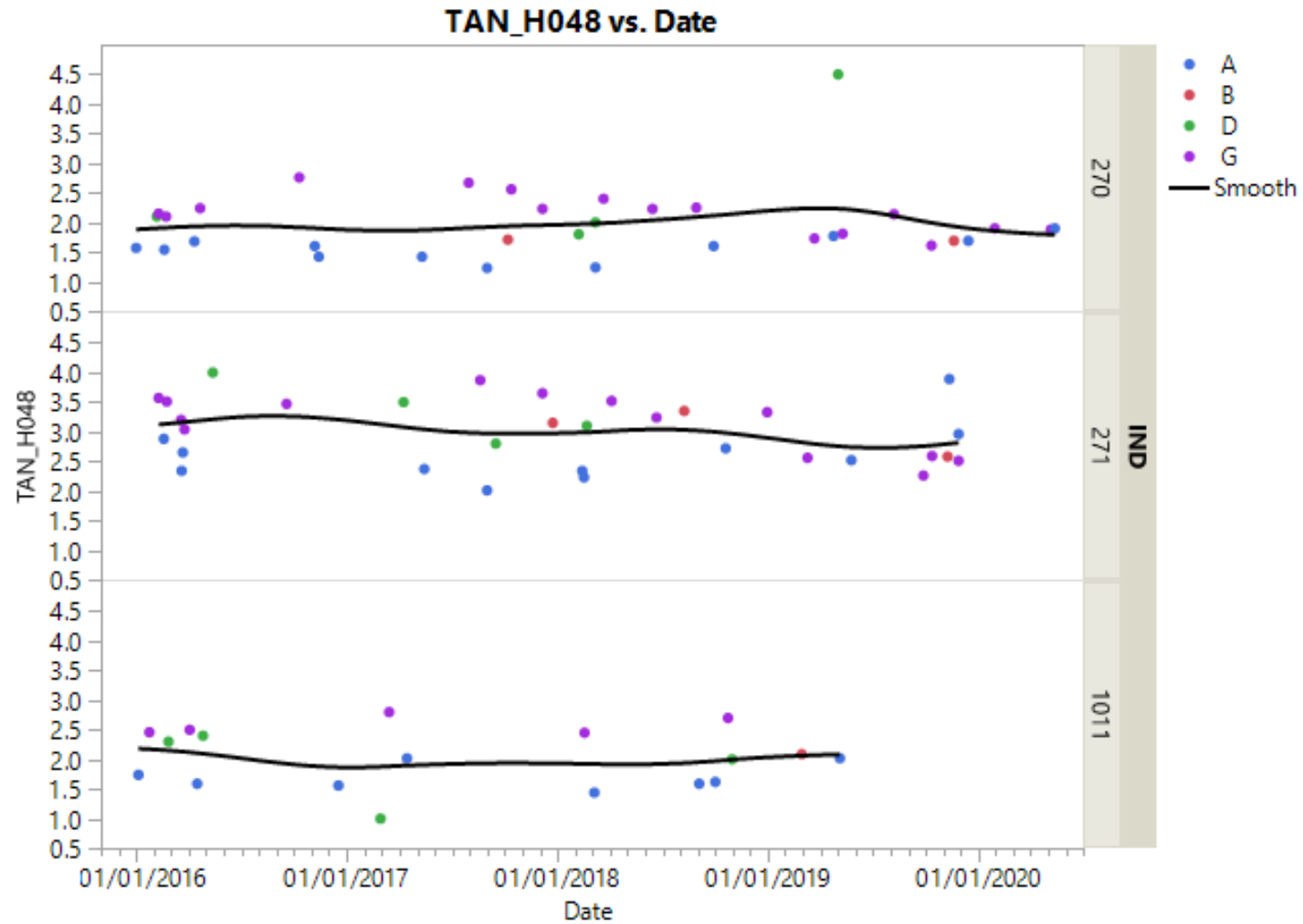
Graph Builder



Graph Builder

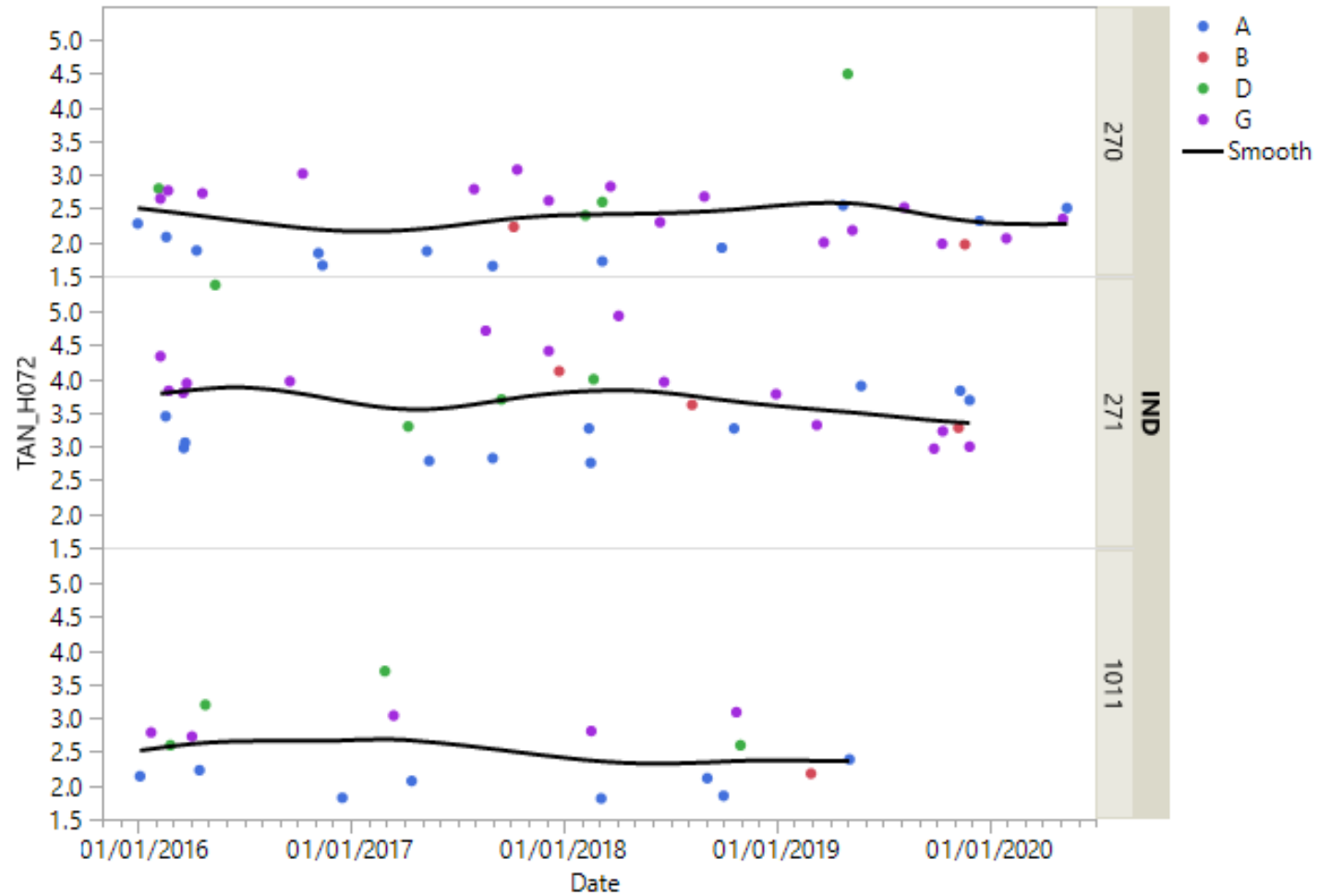


Graph Builder



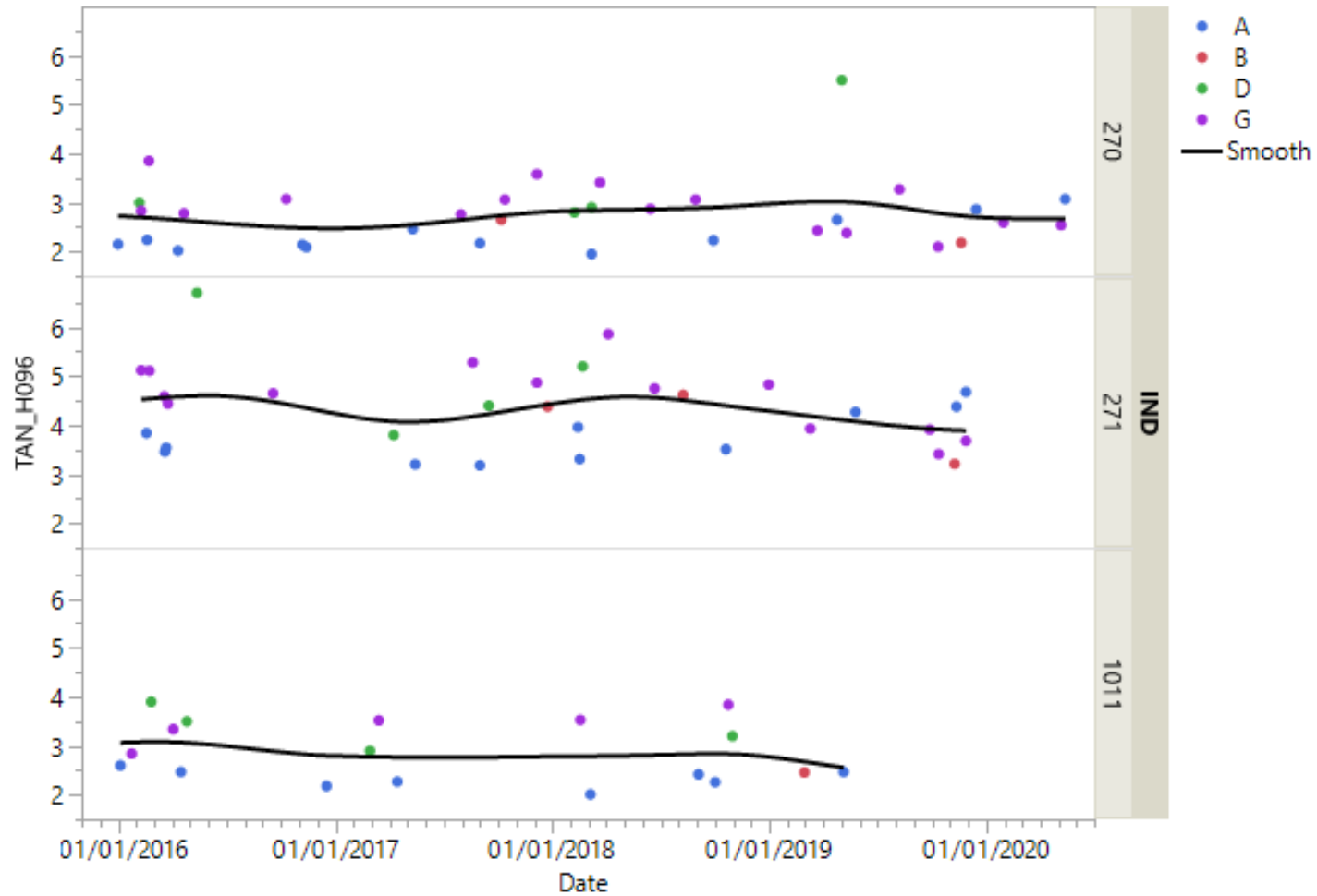
Graph Builder

TAN_H072 vs. Date

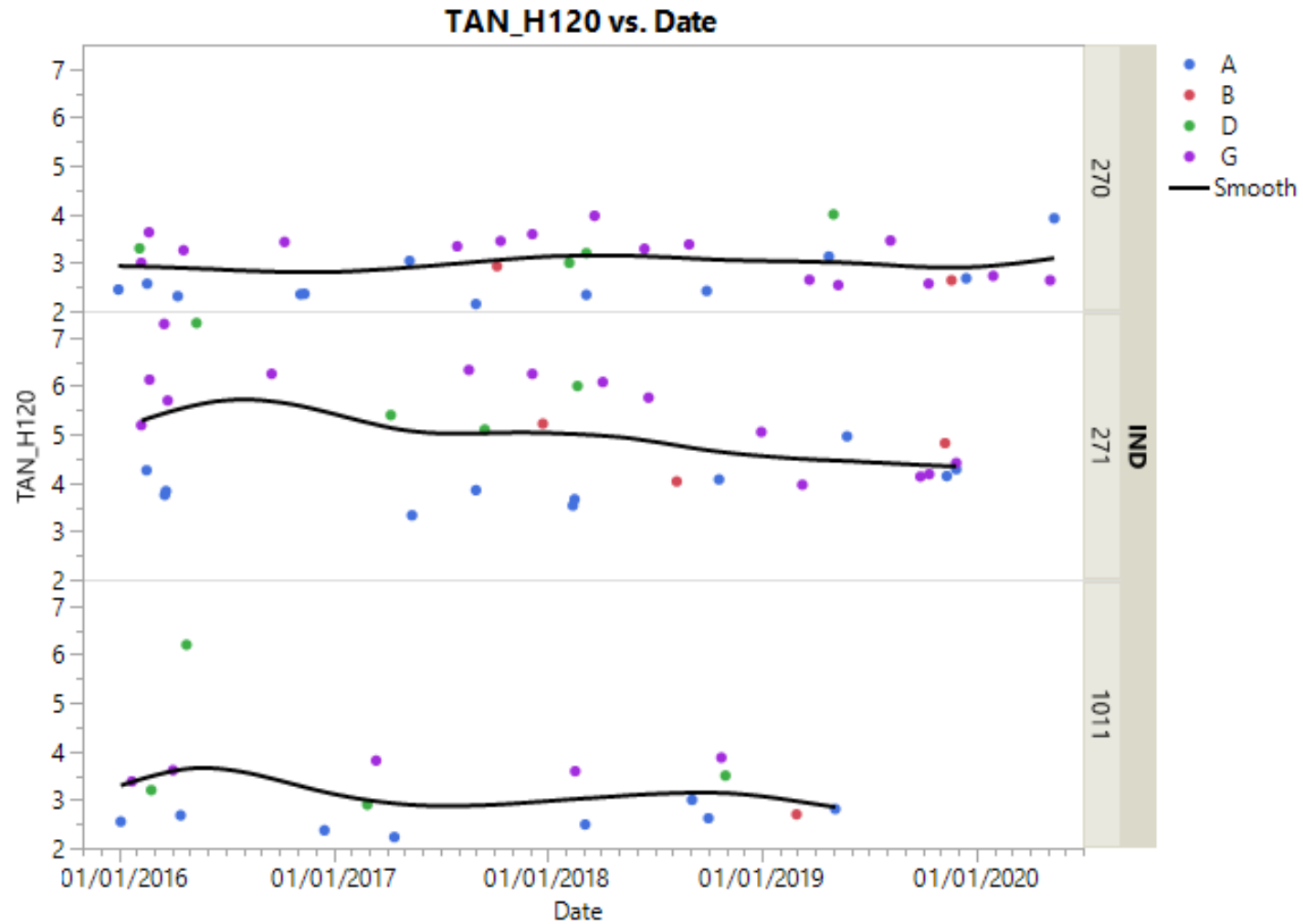


Graph Builder

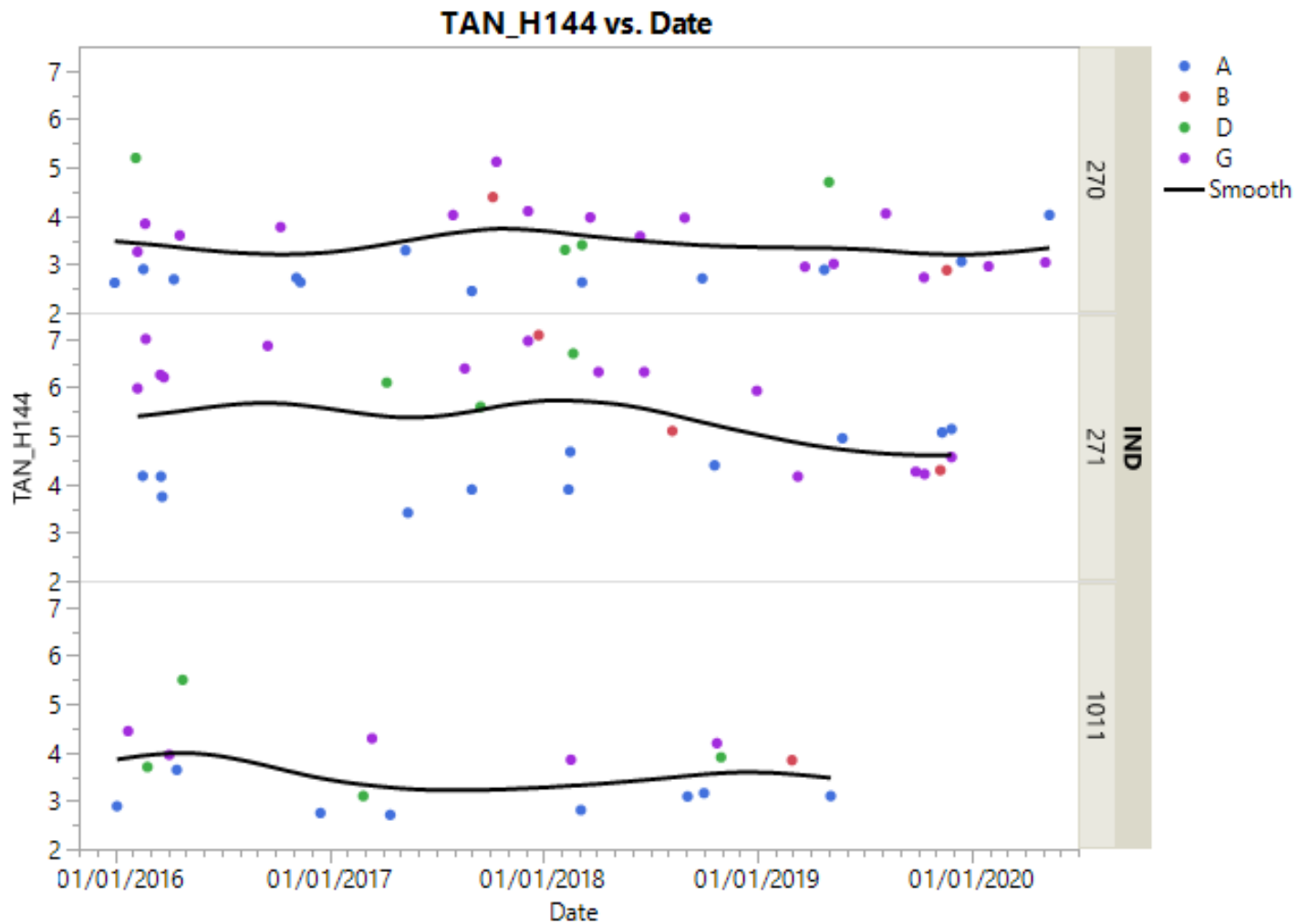
TAN_H096 vs. Date



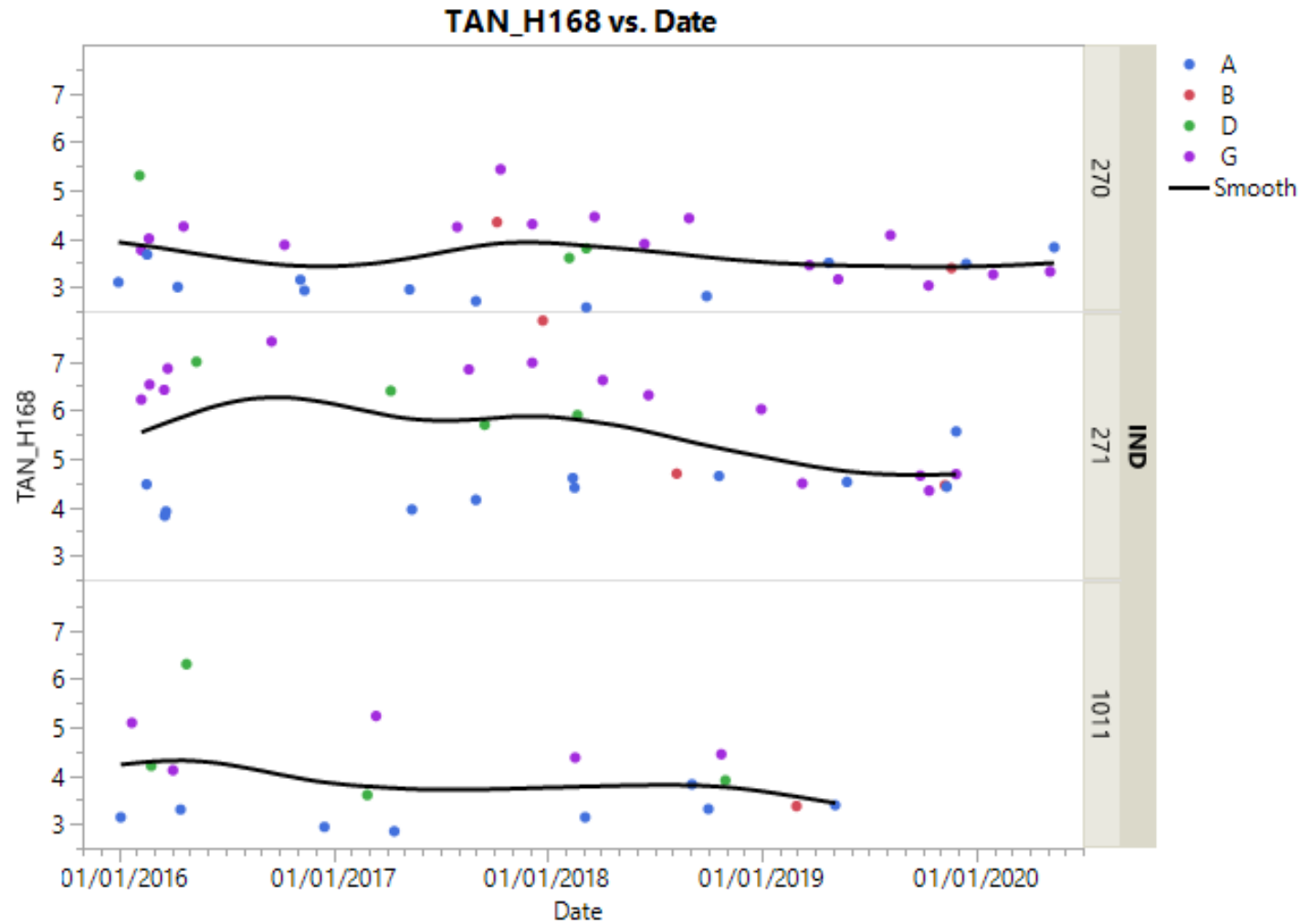
Graph Builder



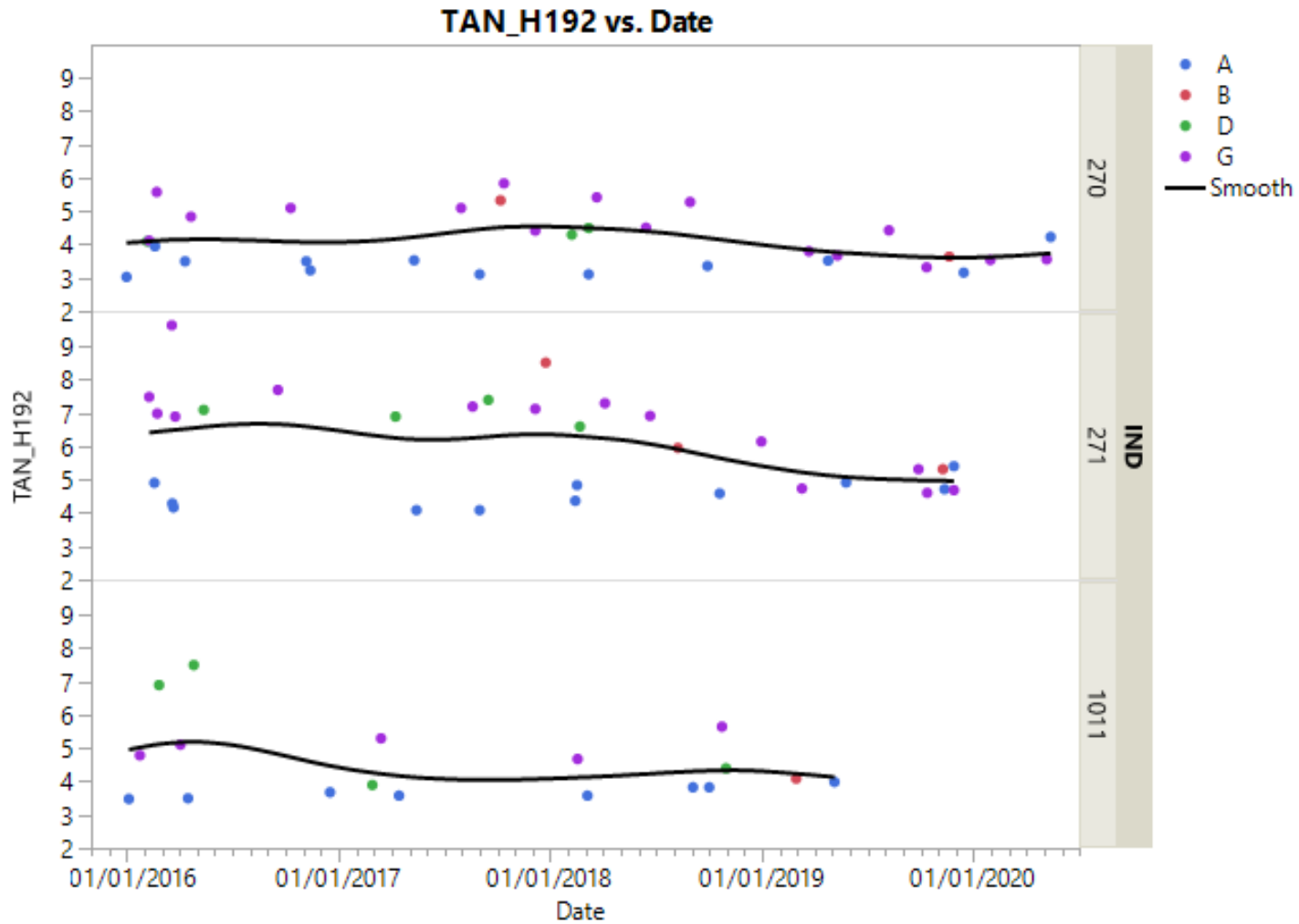
Graph Builder



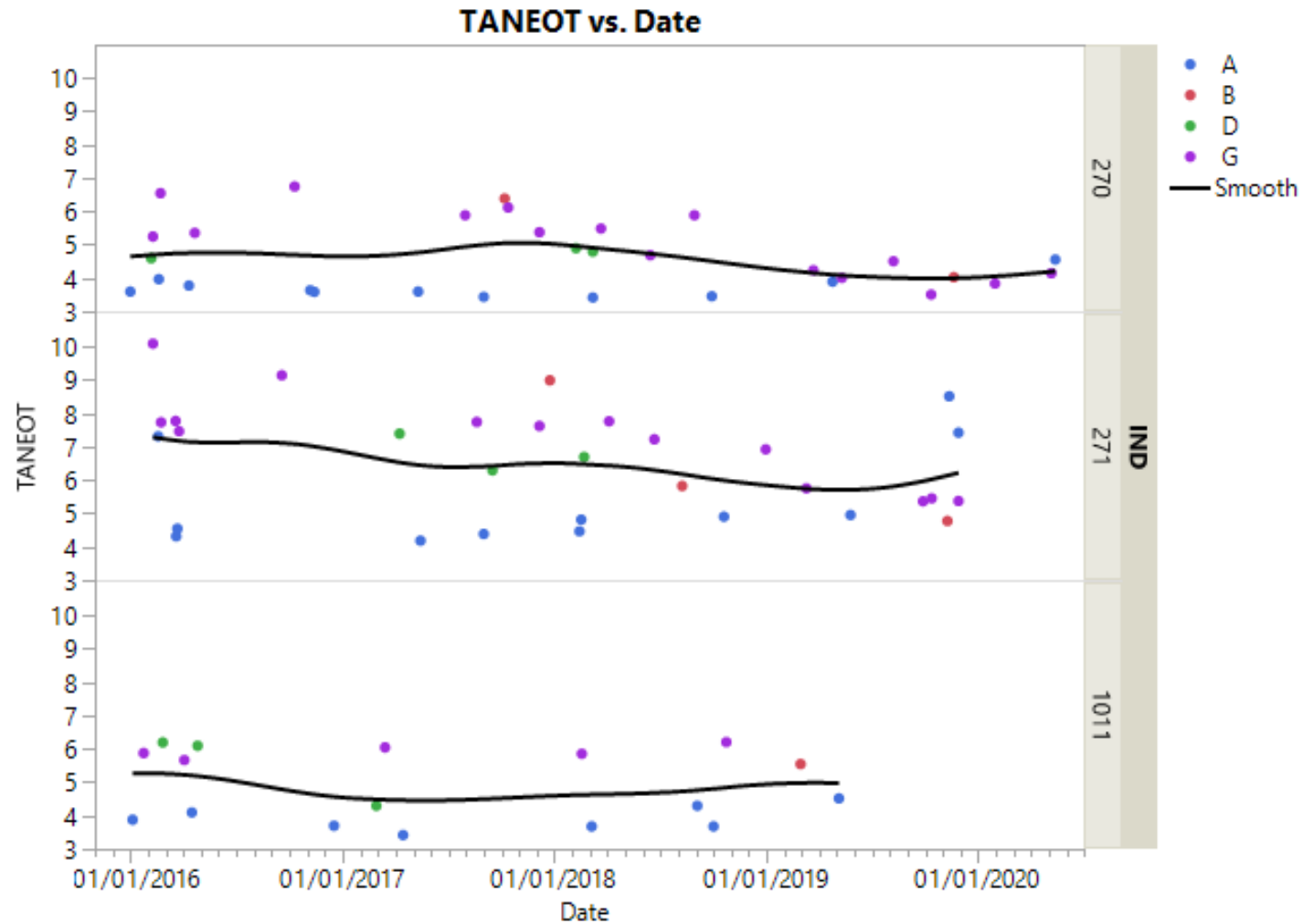
Graph Builder



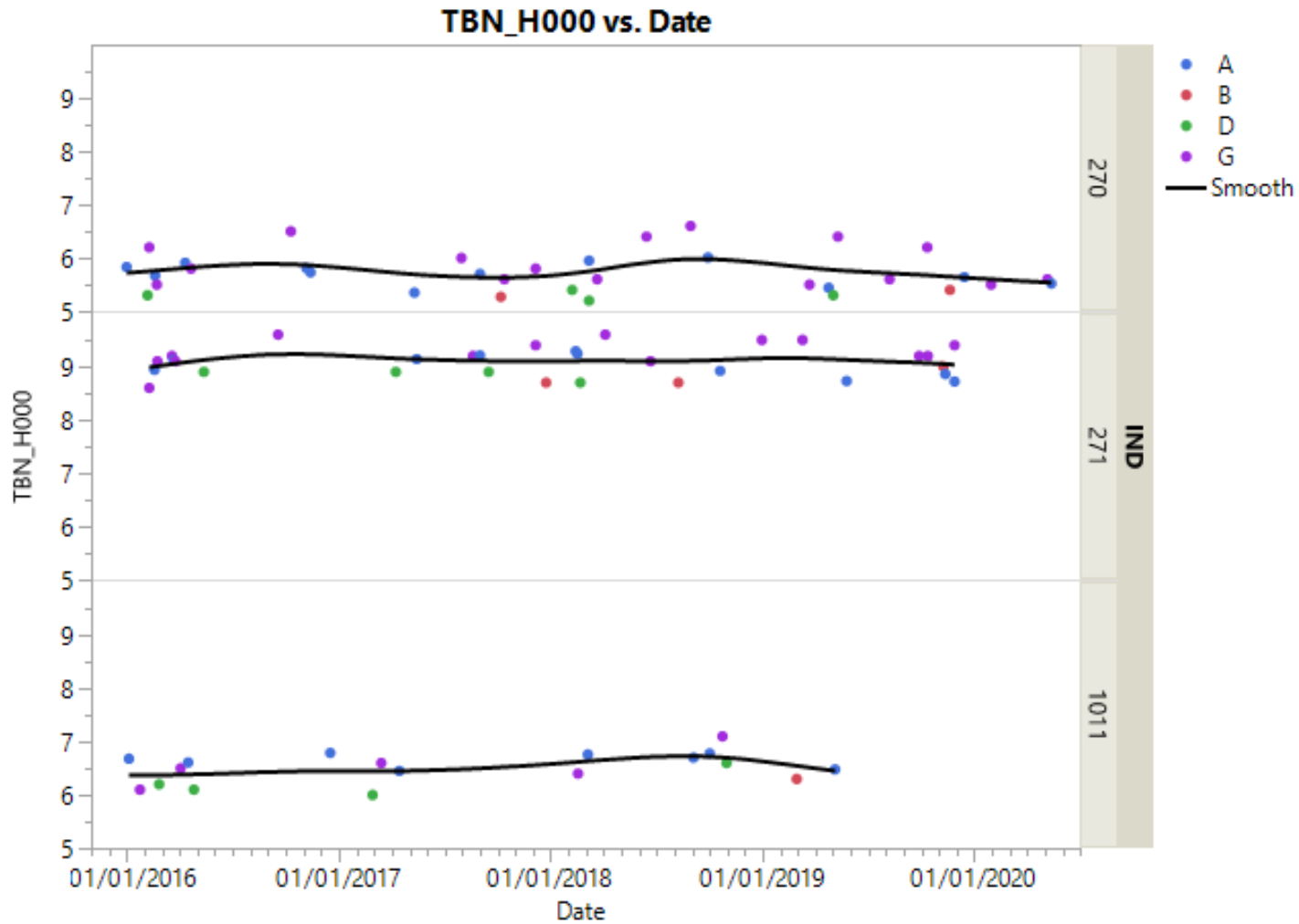
Graph Builder



Graph Builder

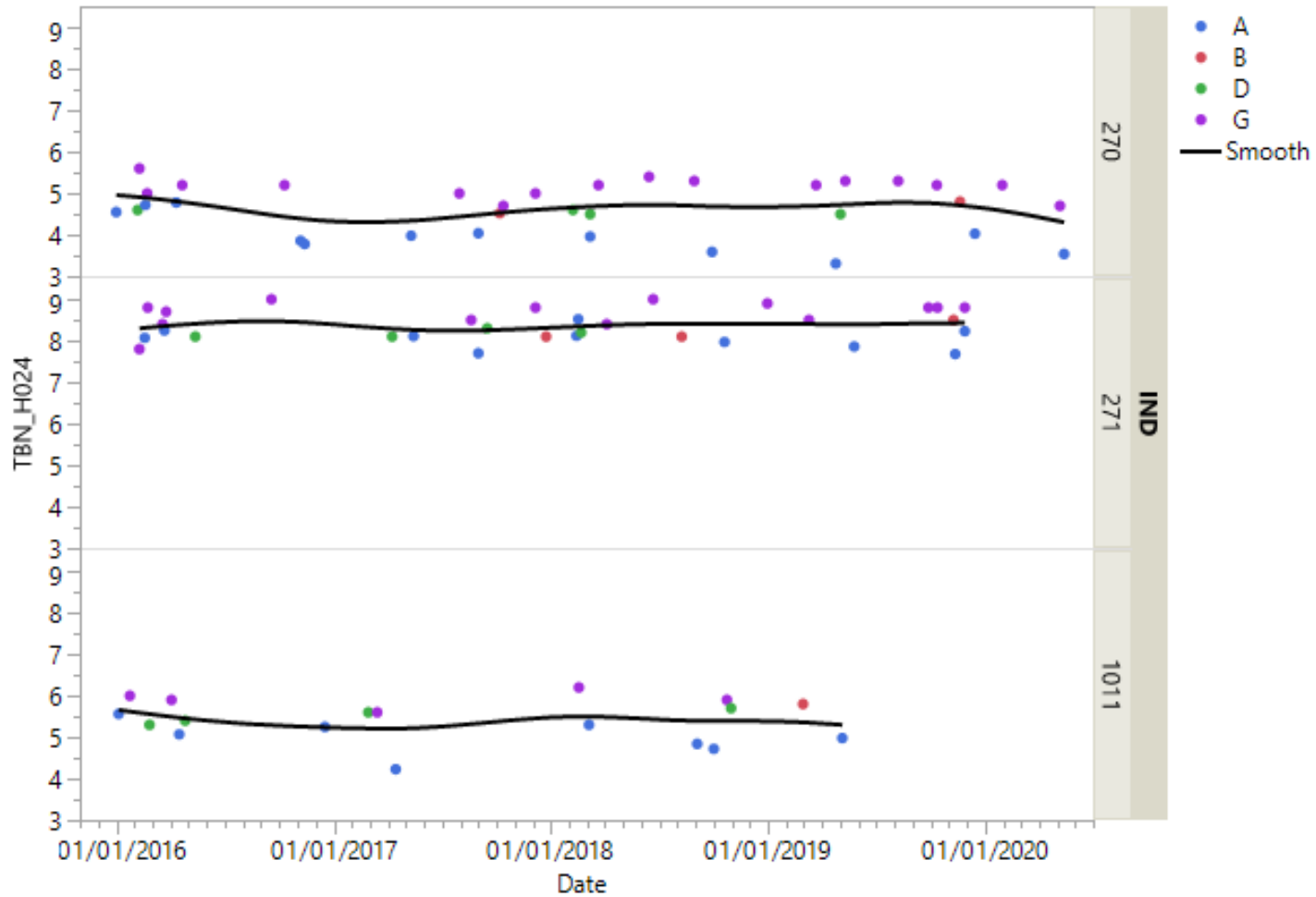


Graph Builder

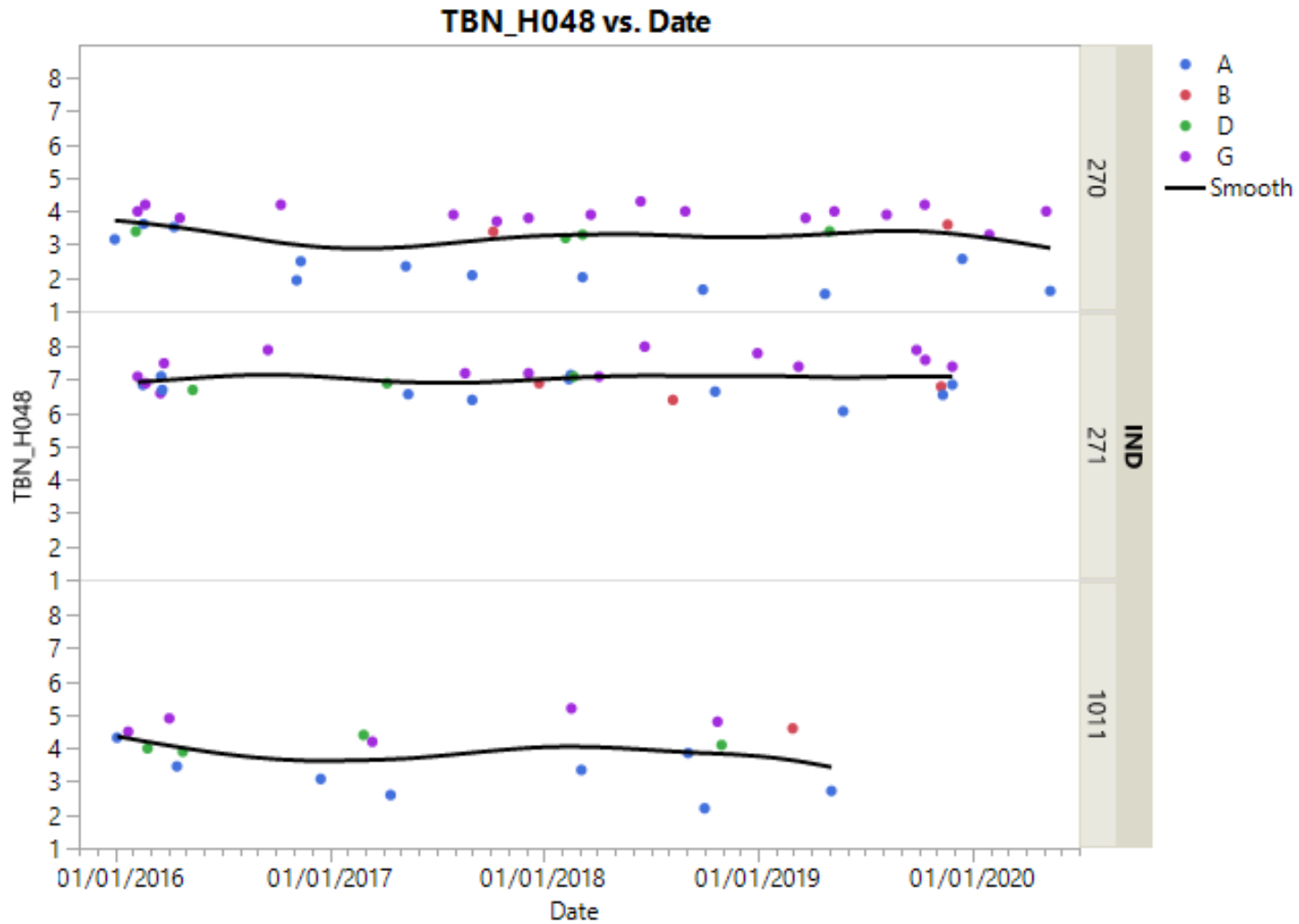


Graph Builder

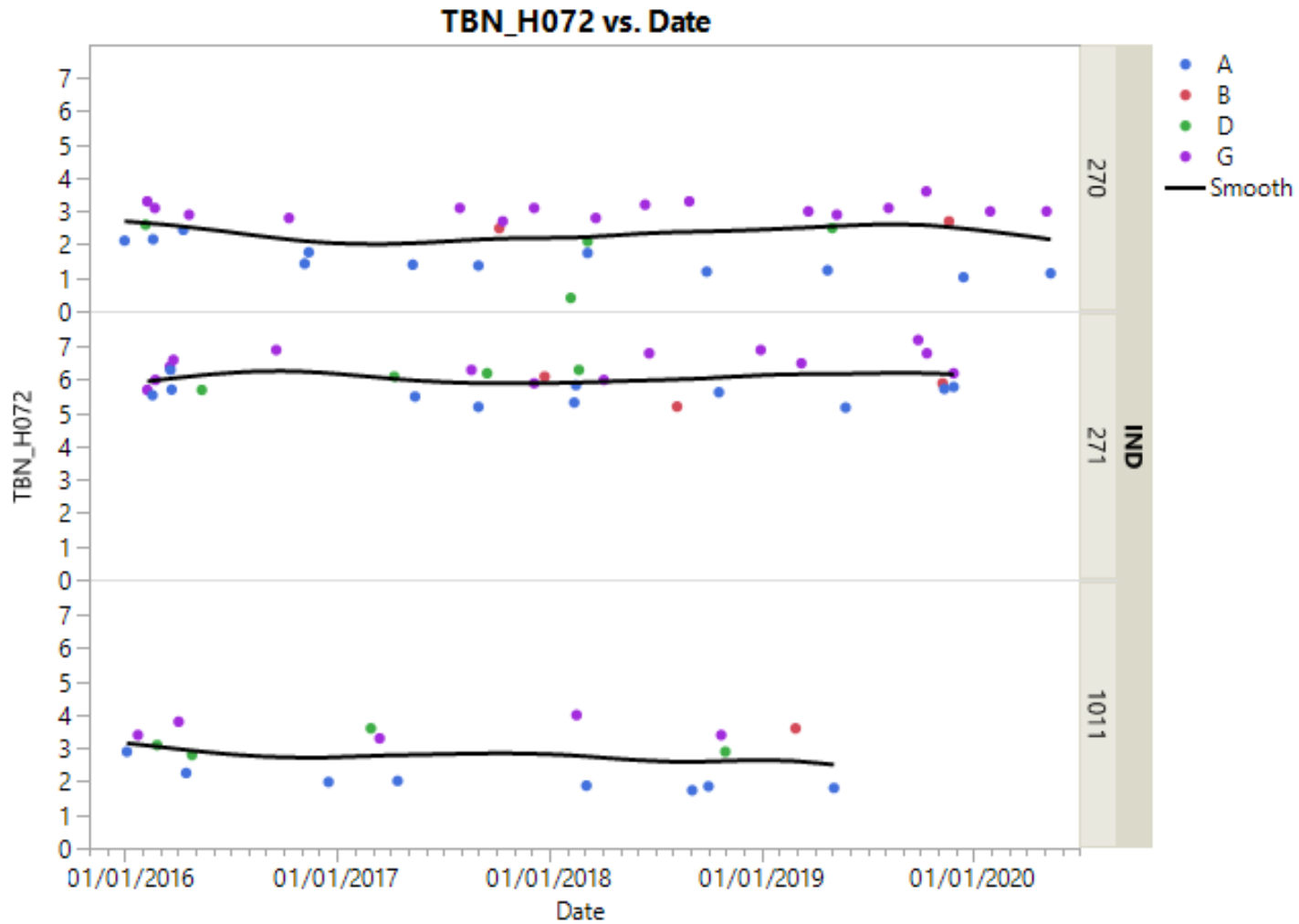
TBN_H024 vs. Date



Graph Builder

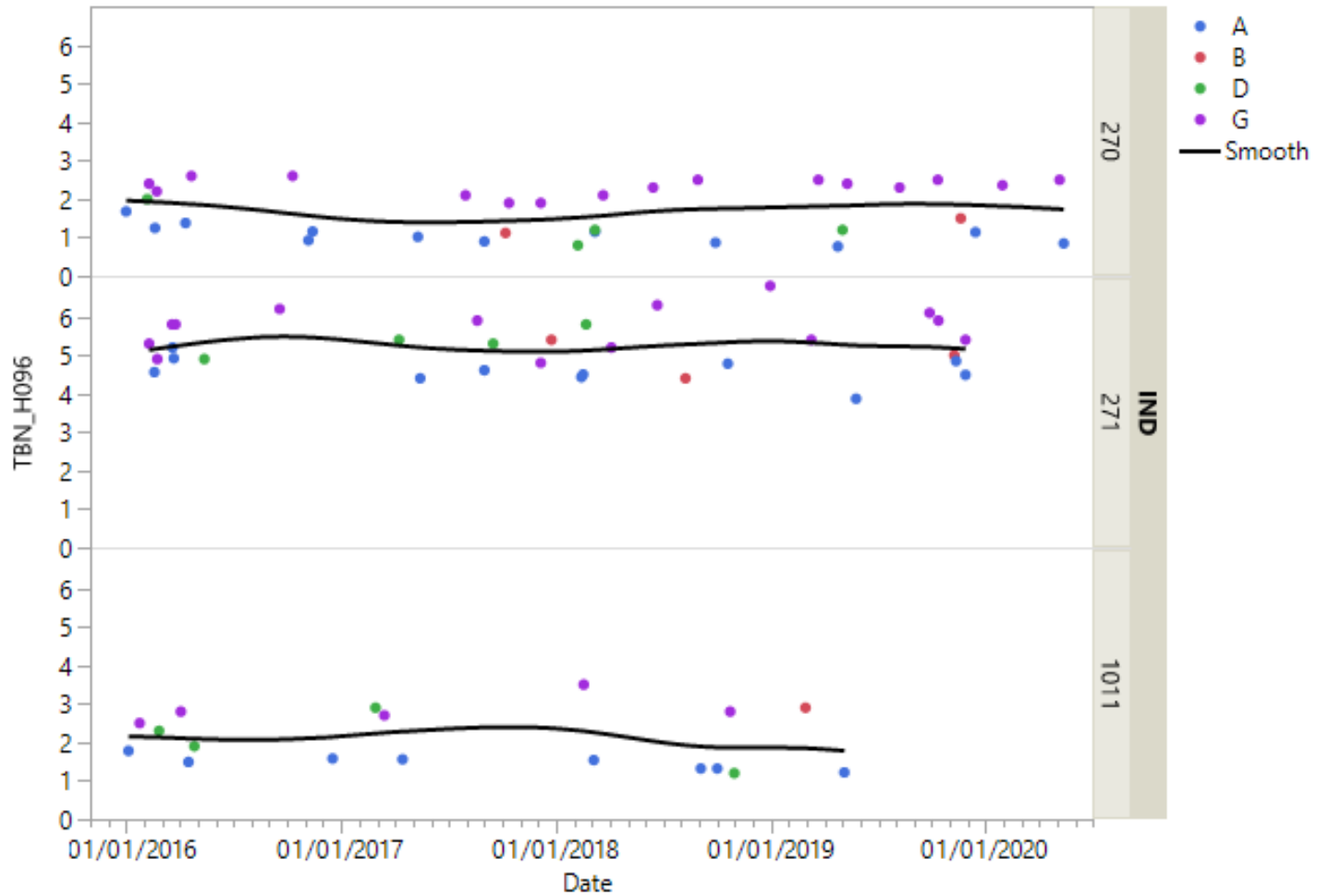


Graph Builder

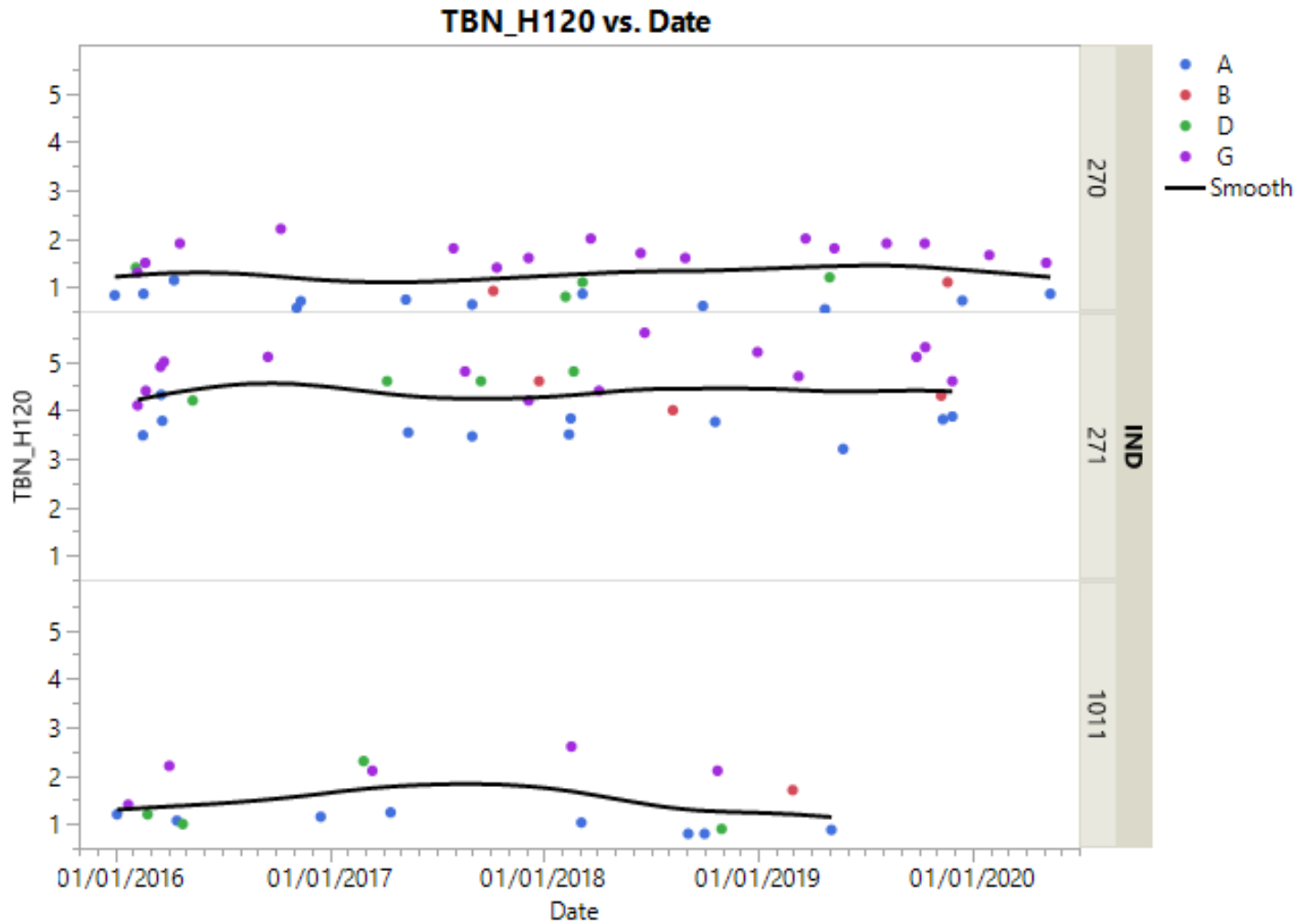


Graph Builder

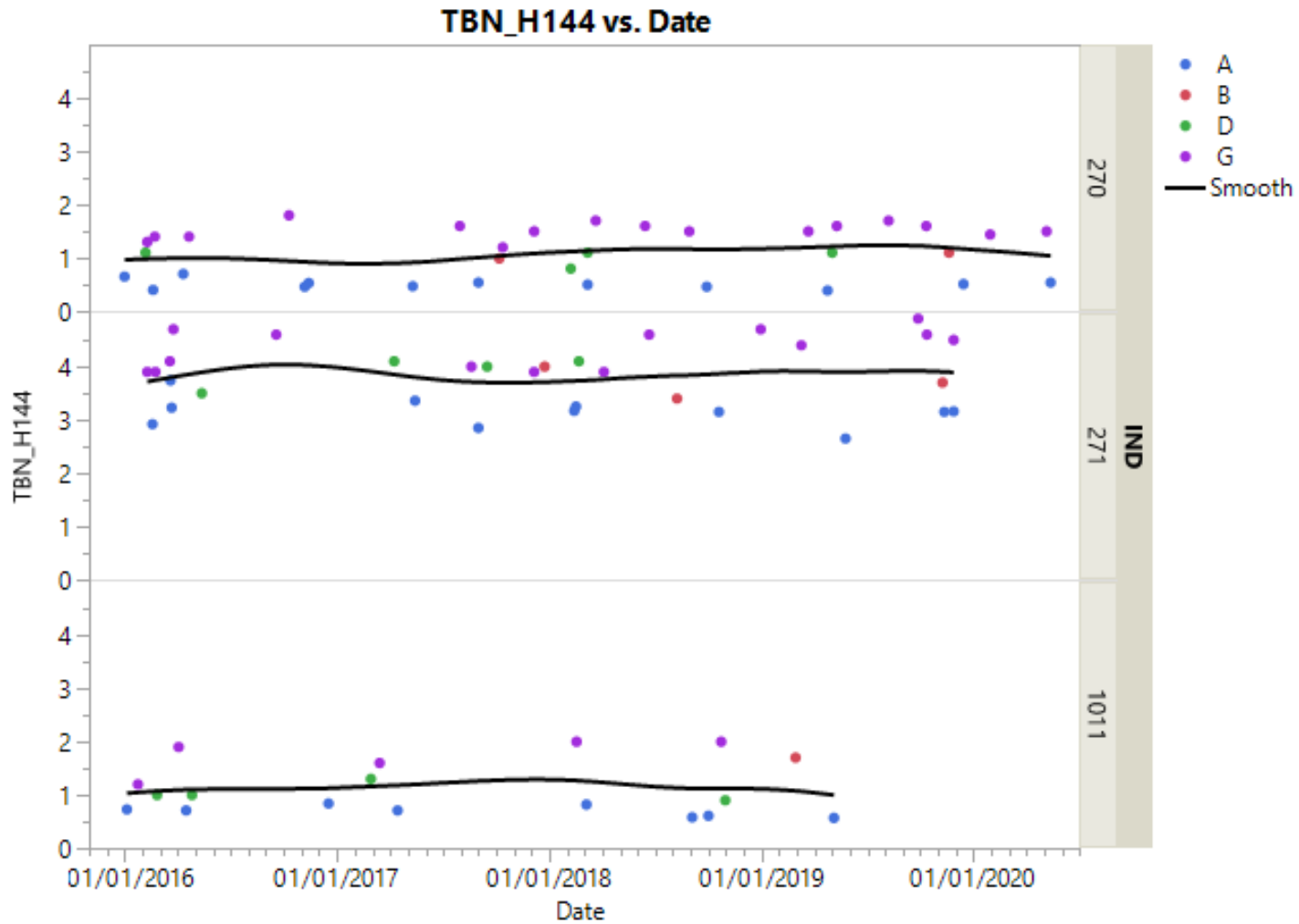
TBN_H096 vs. Date



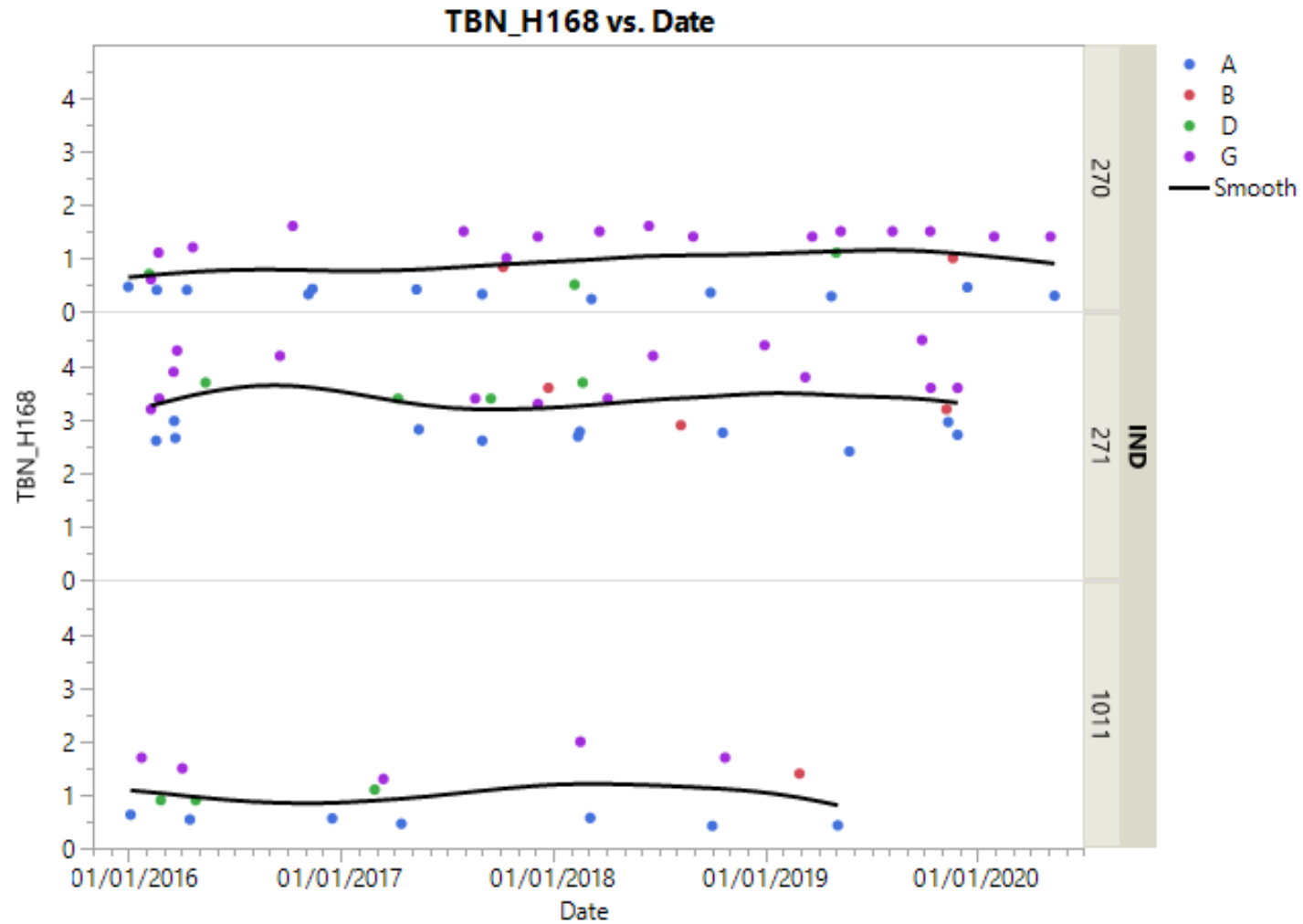
Graph Builder



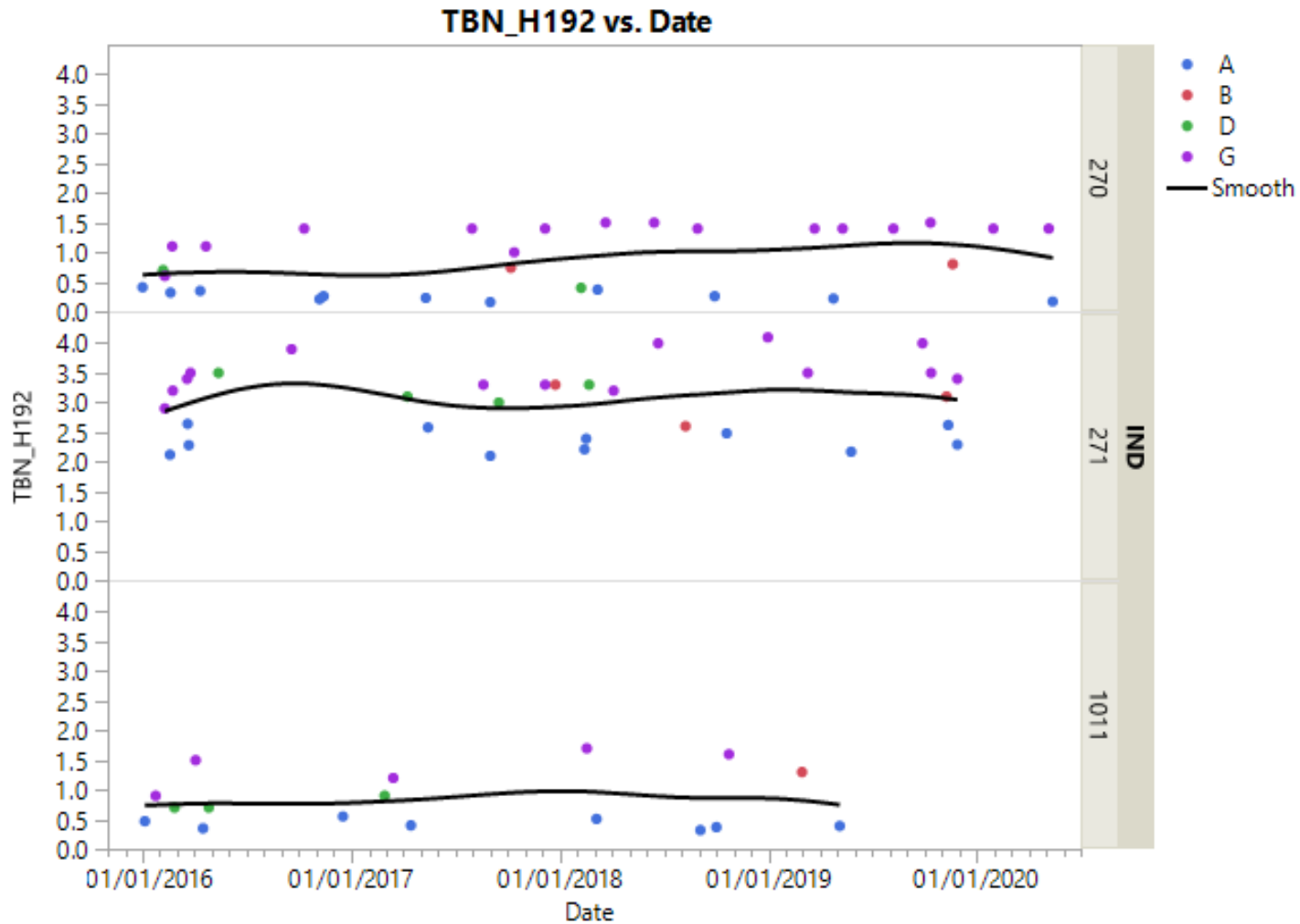
Graph Builder



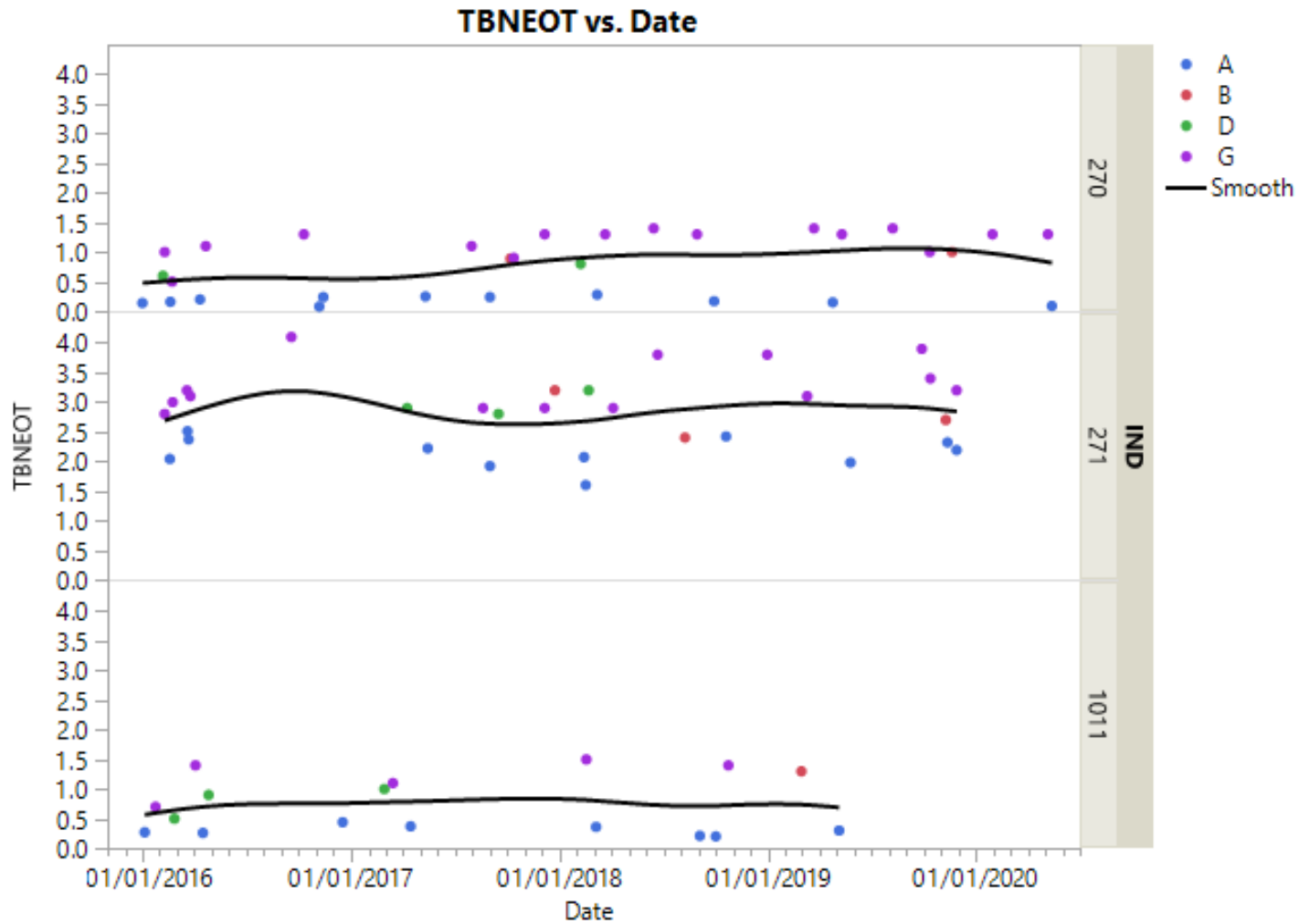
Graph Builder



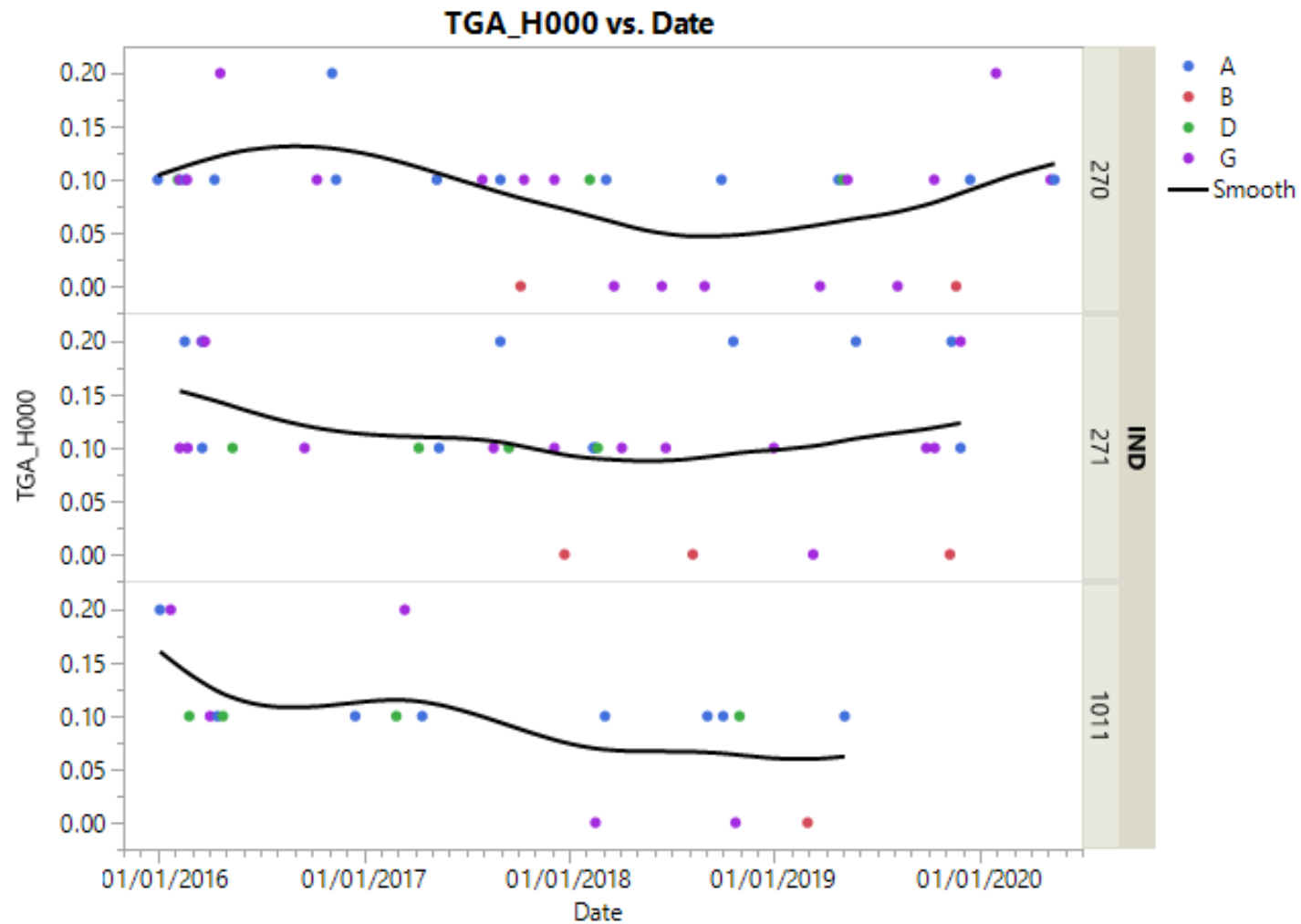
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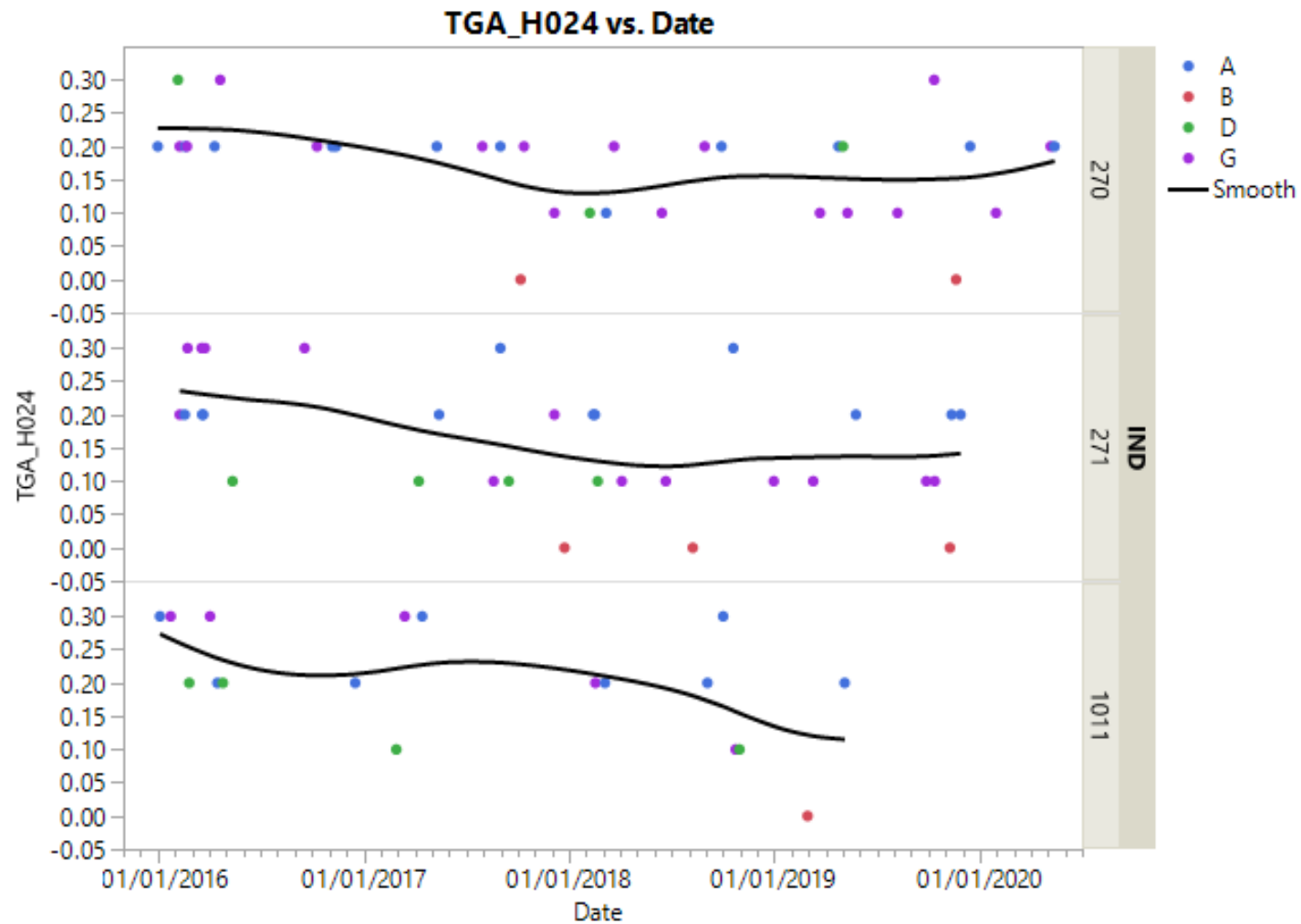
Graph Builder



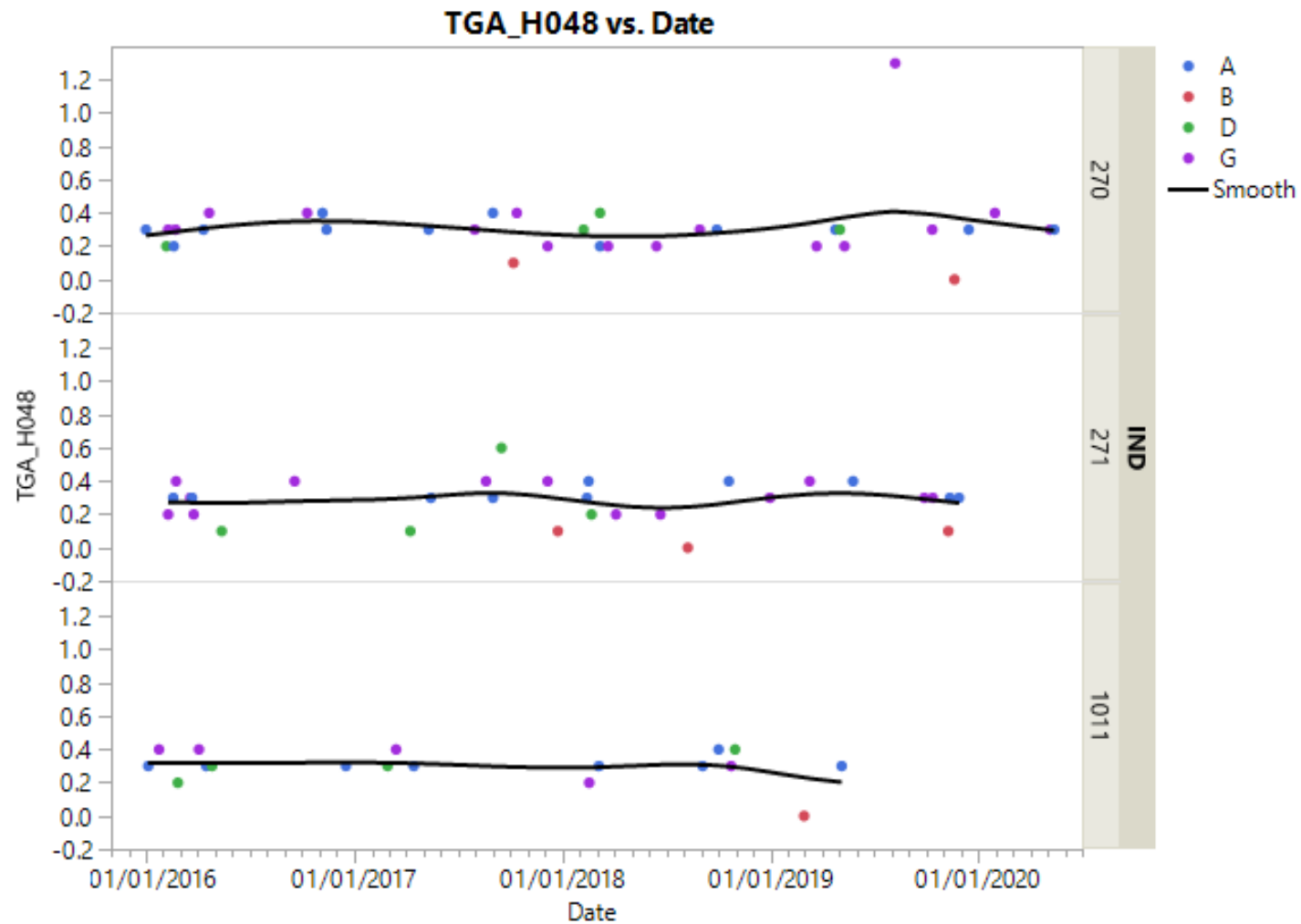
Graph Builder



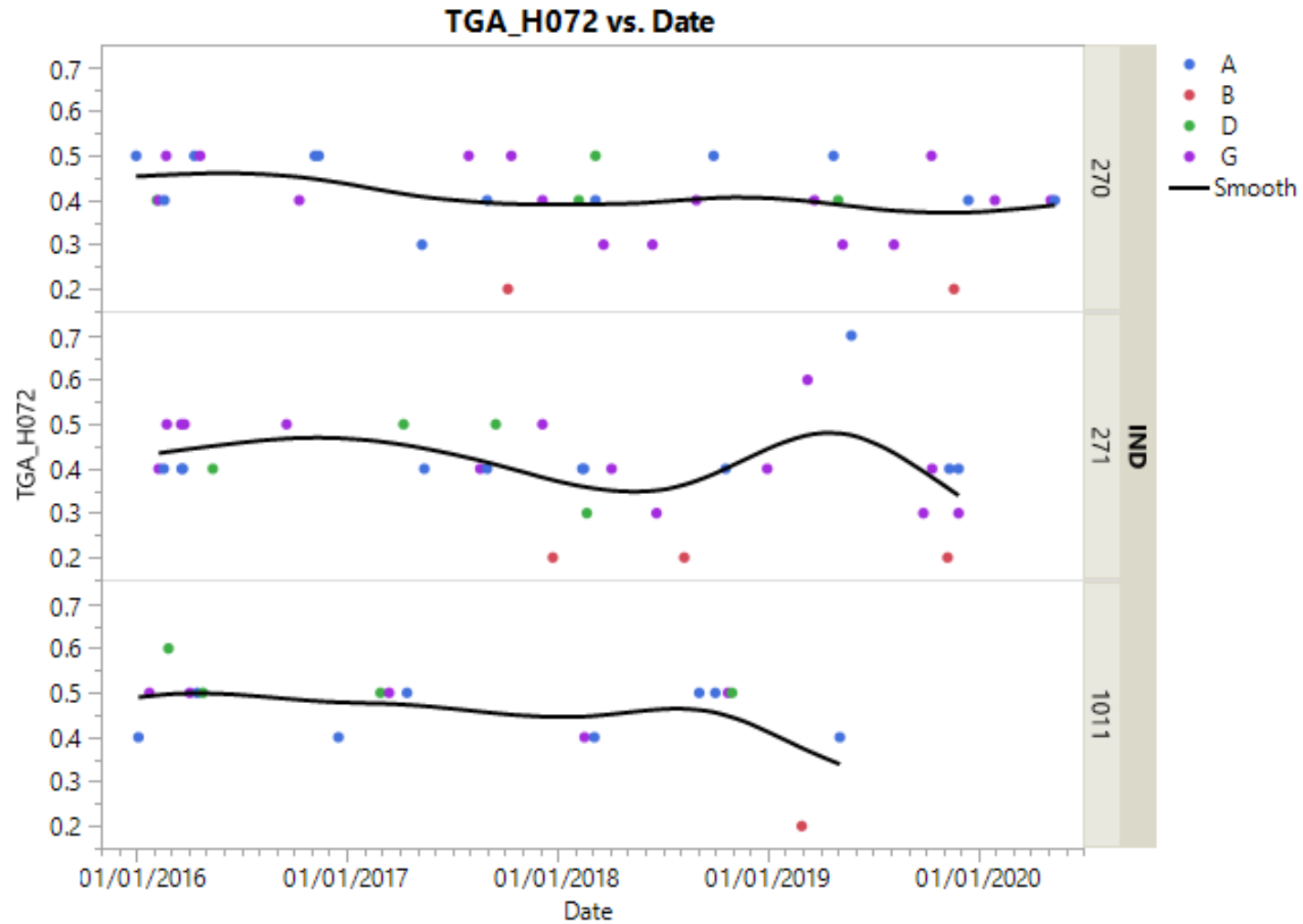
Graph Builder



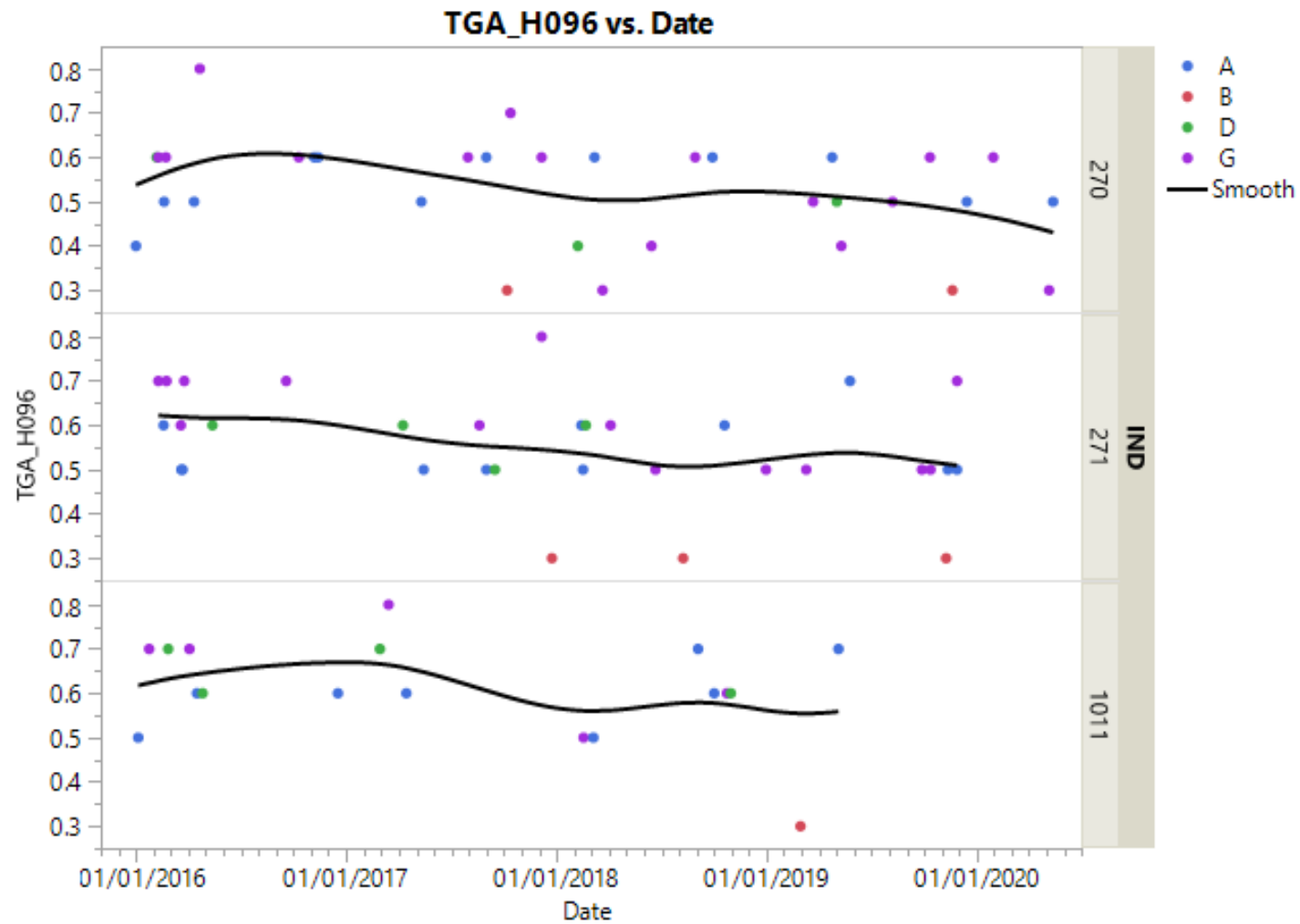
Graph Builder



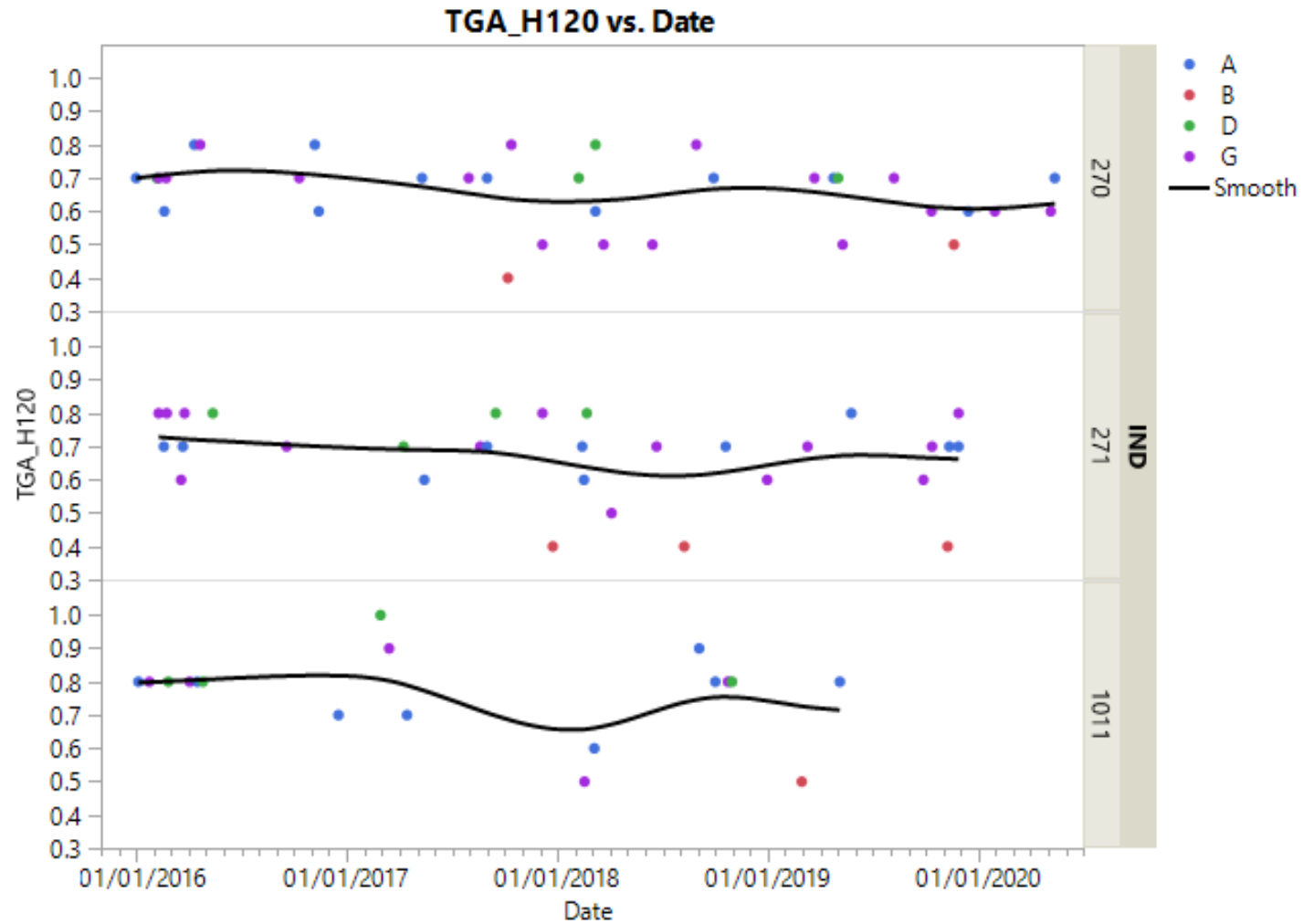
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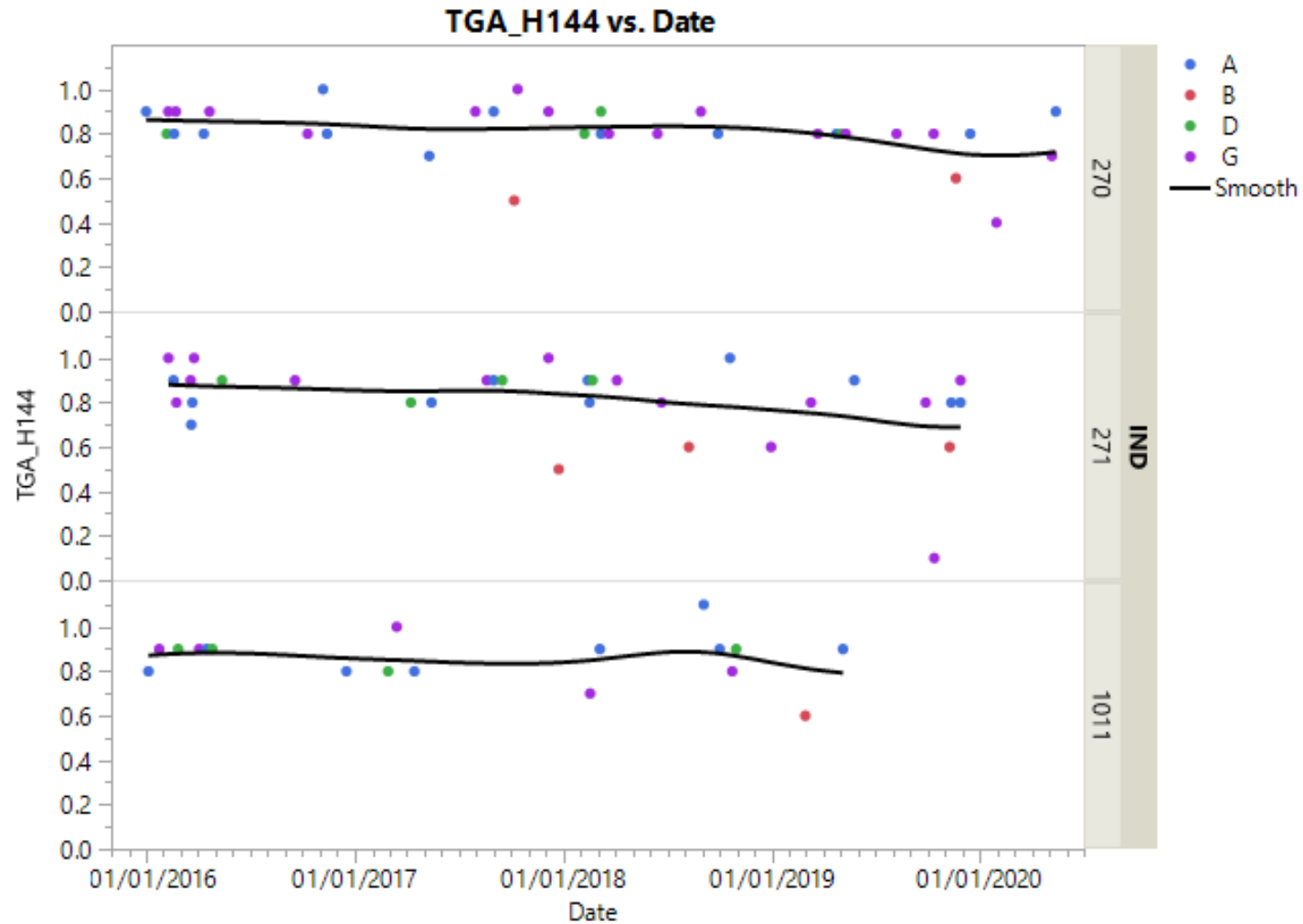
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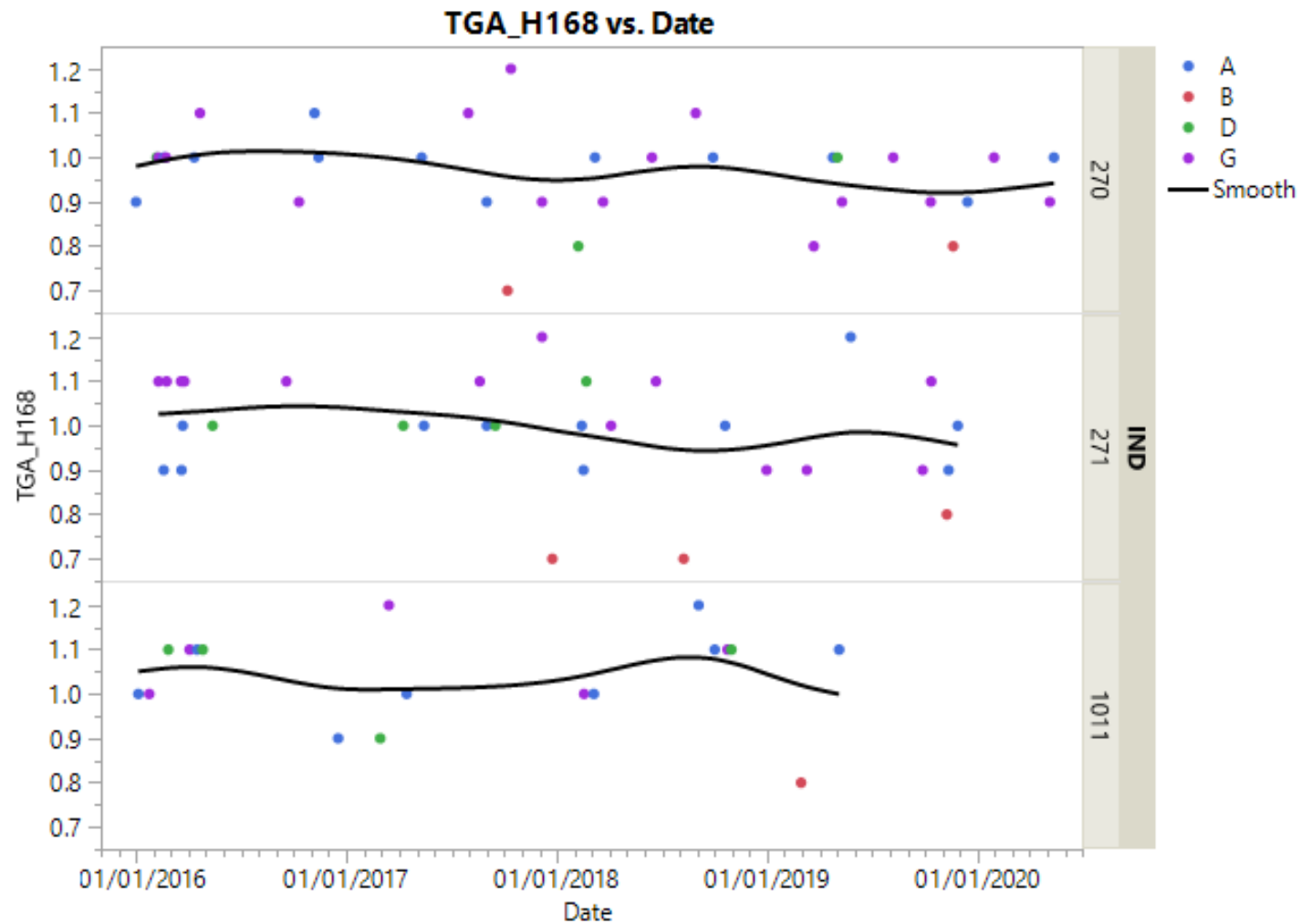
Graph Builder



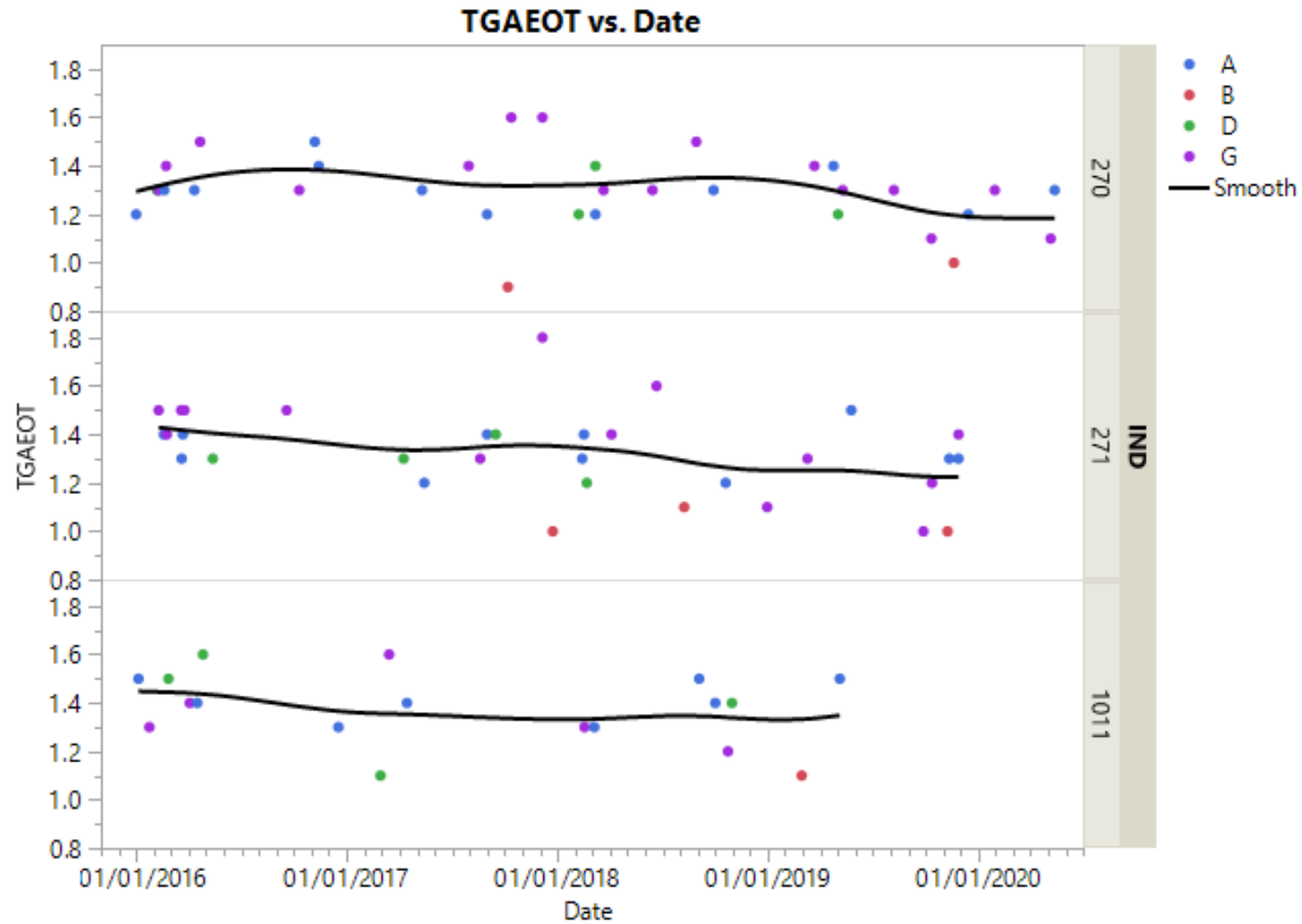
Graph Builder



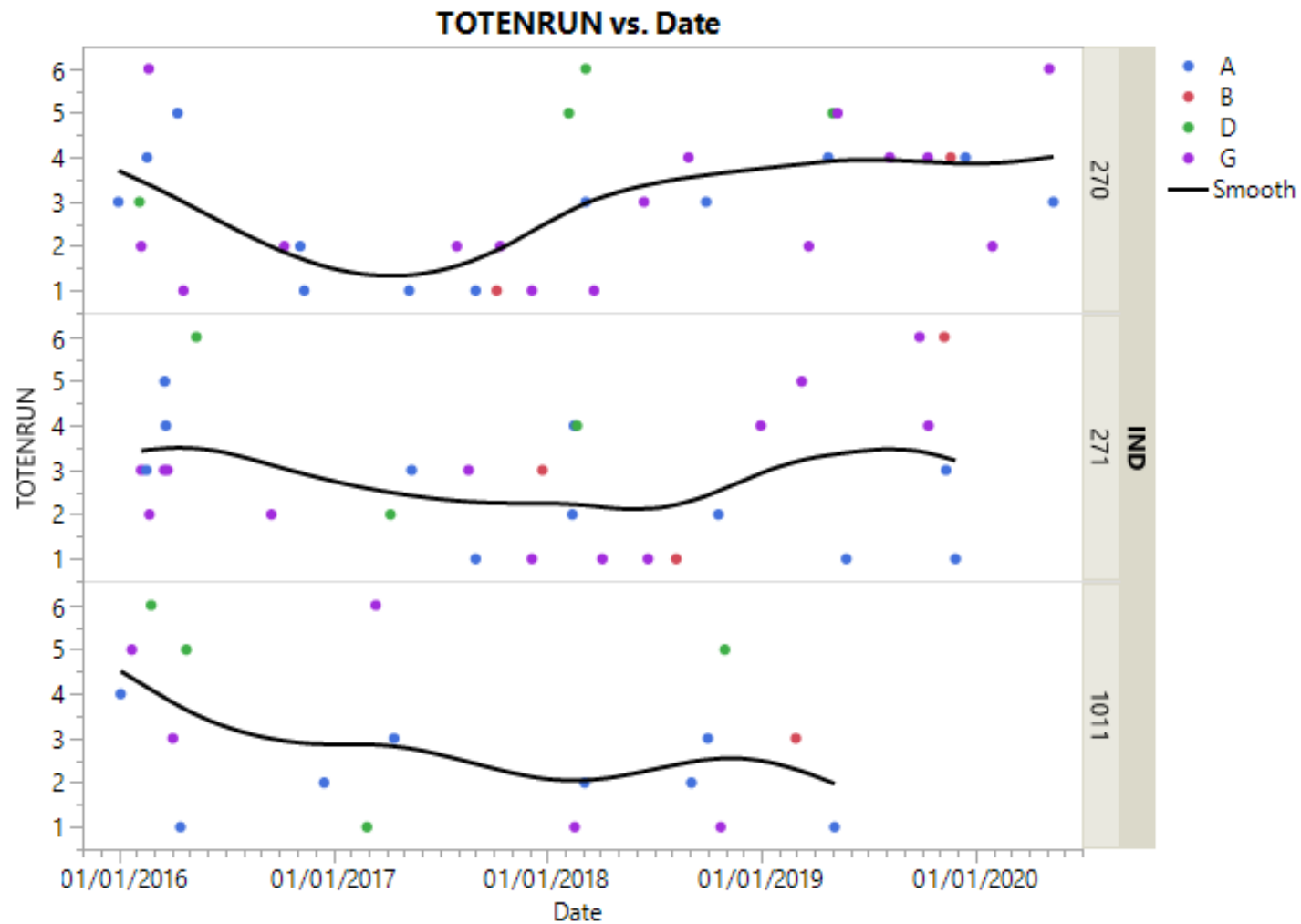
Graph Builder



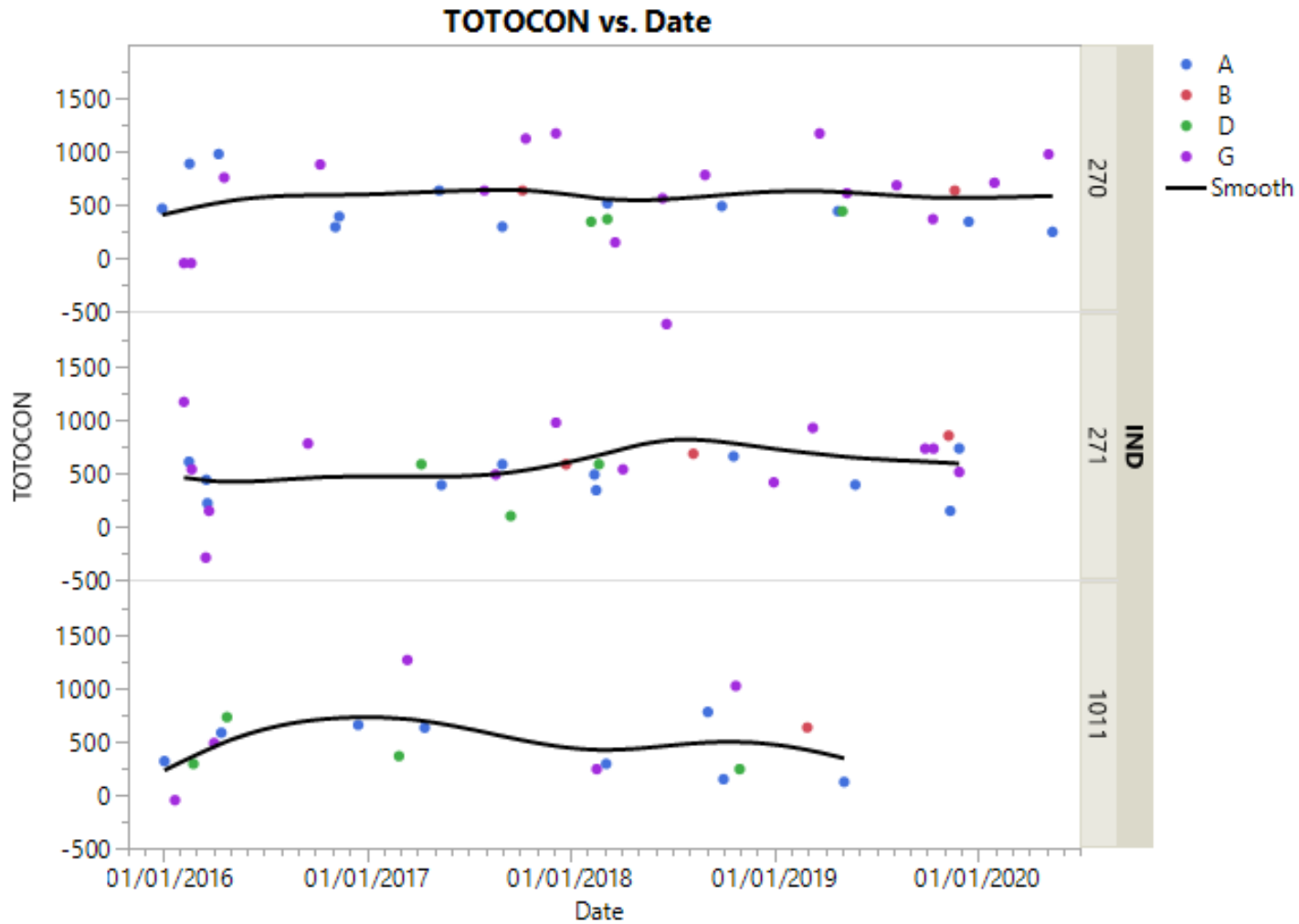
Graph Builder



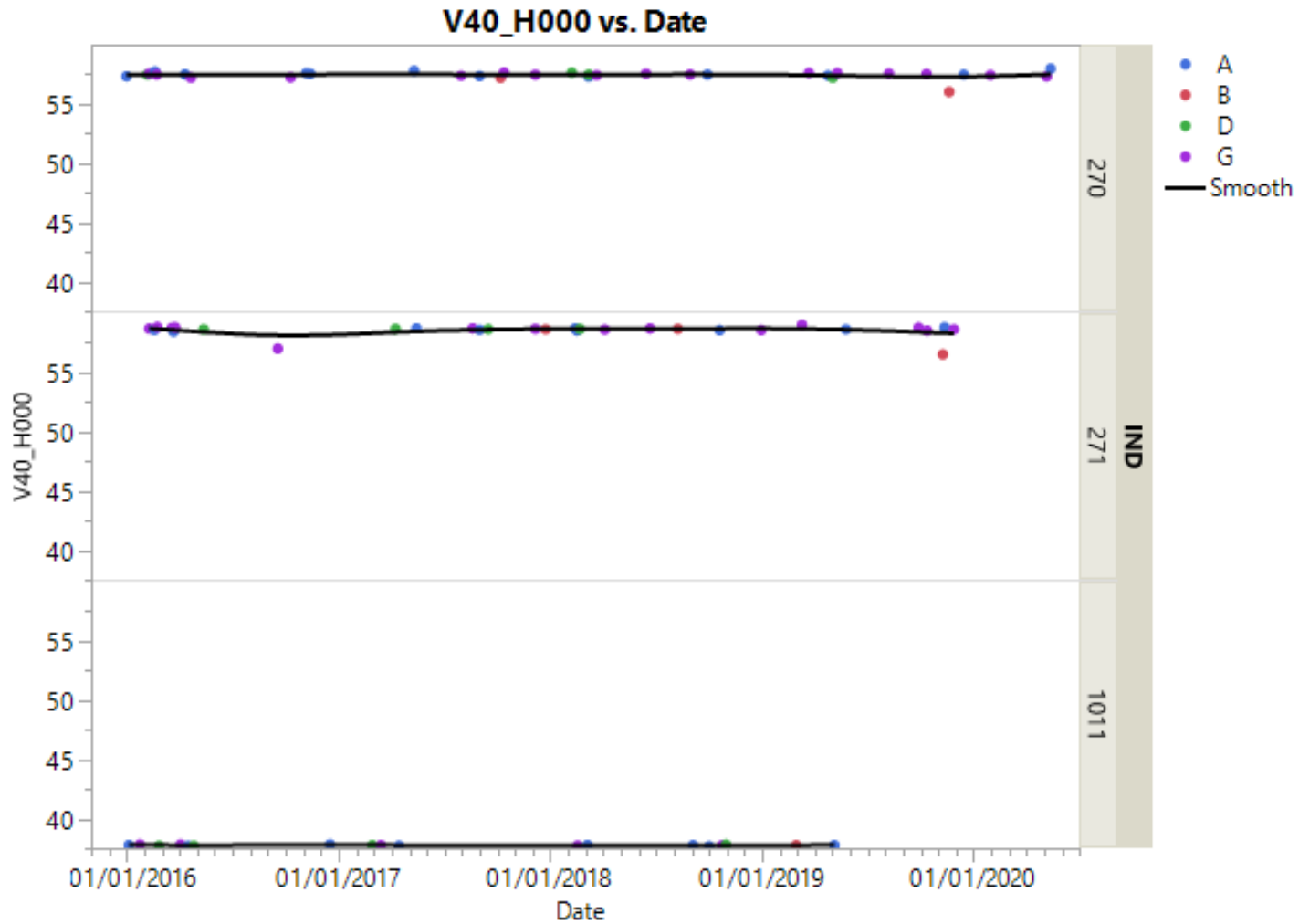
Graph Builder



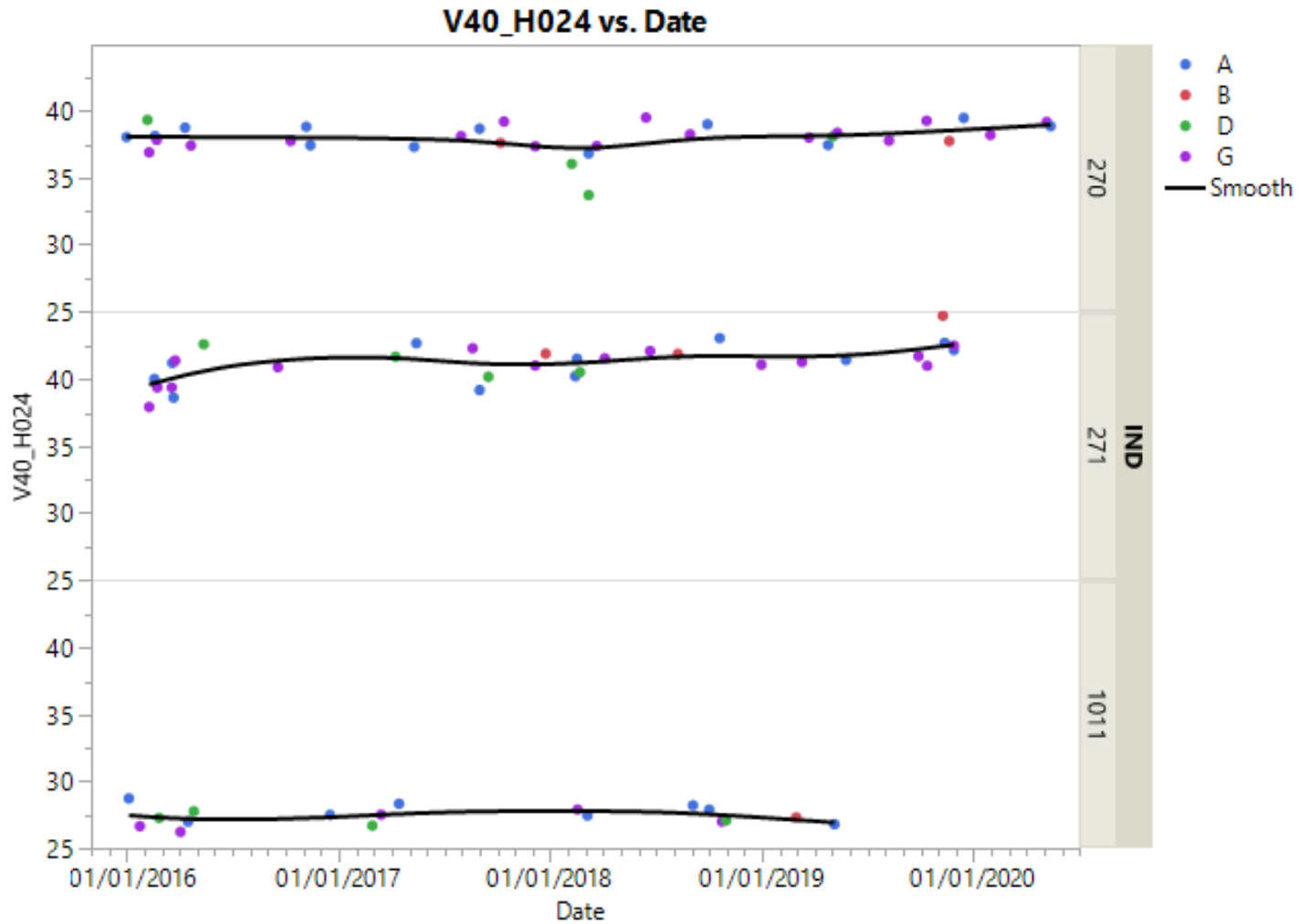
Graph Builder



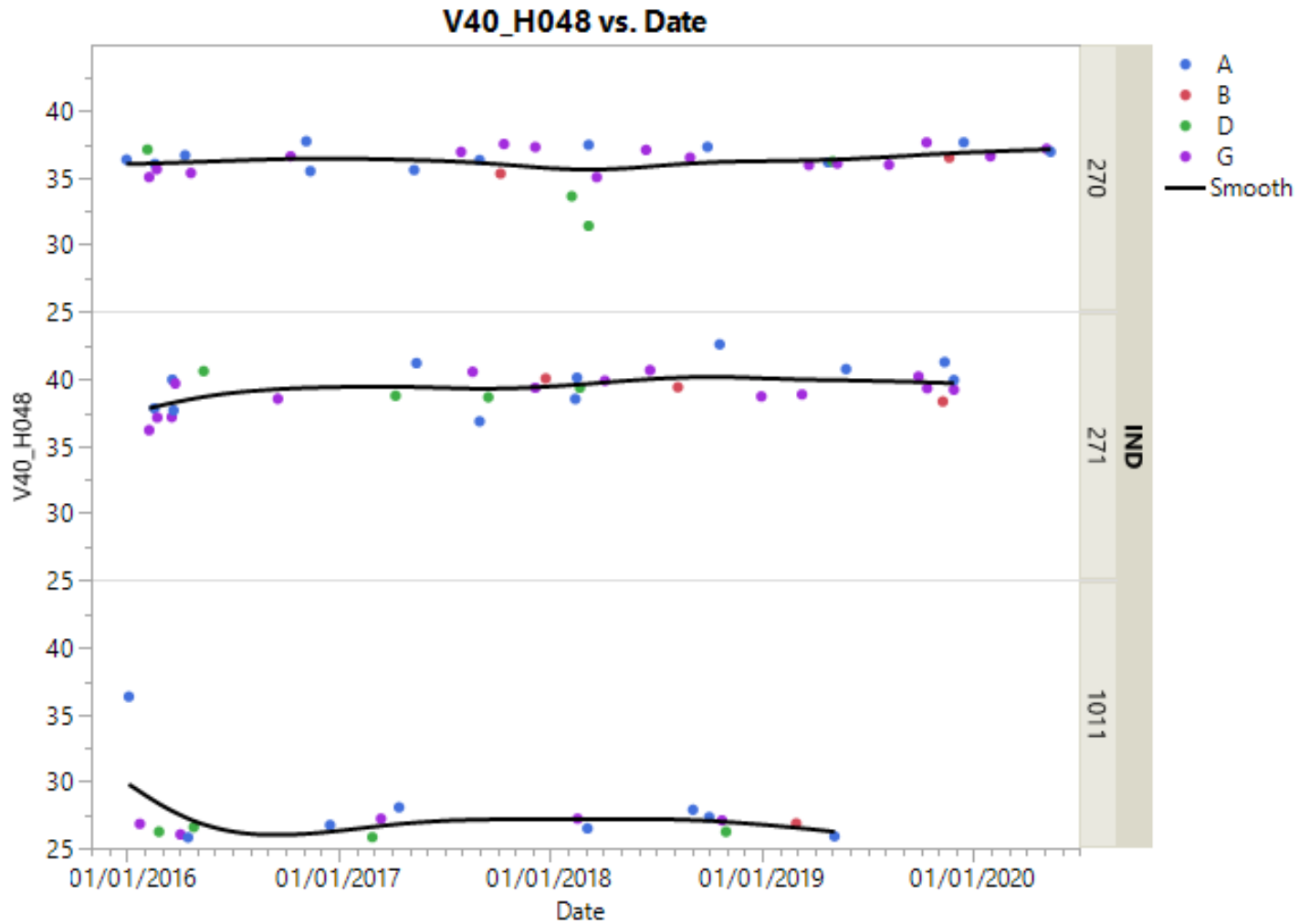
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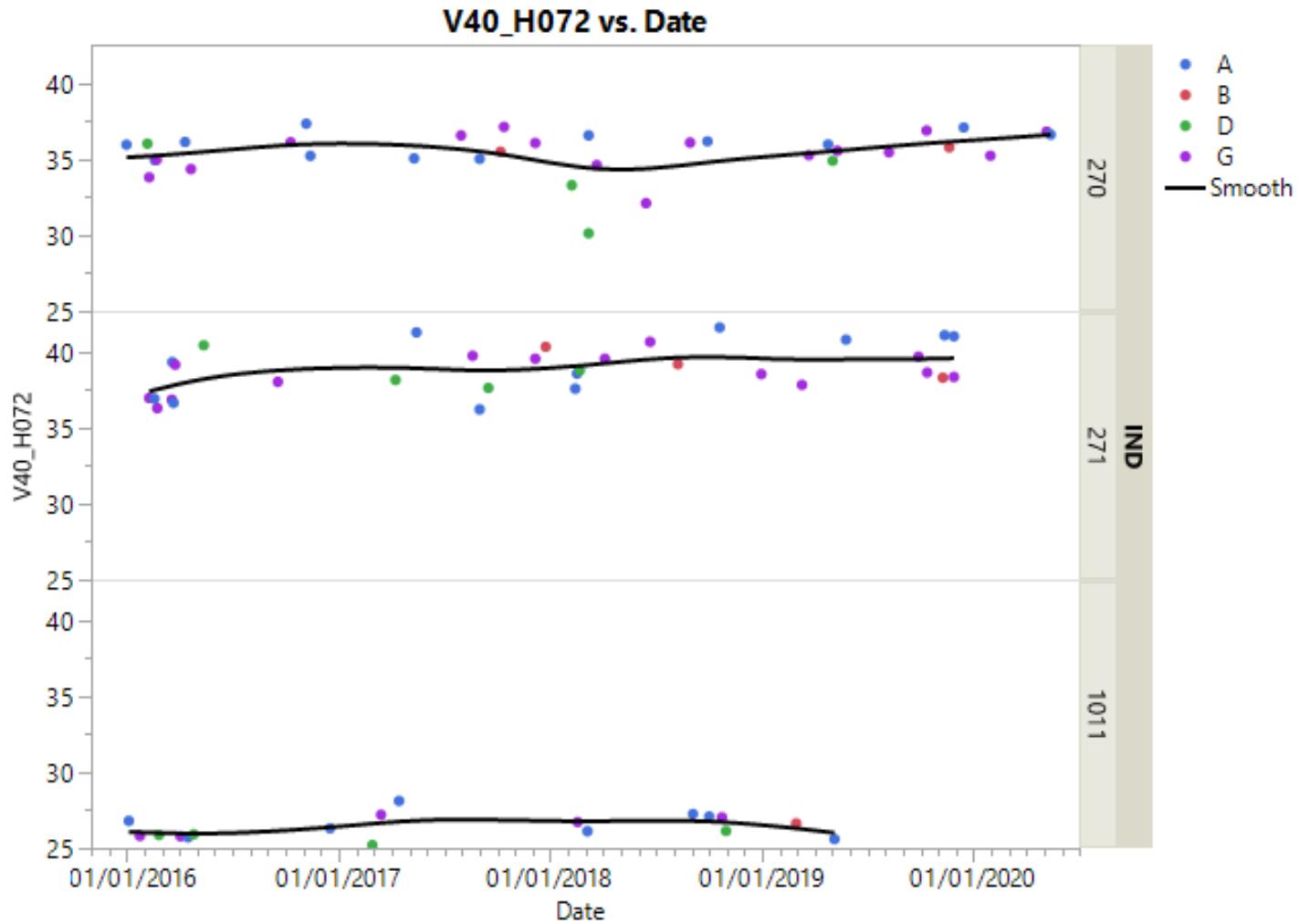
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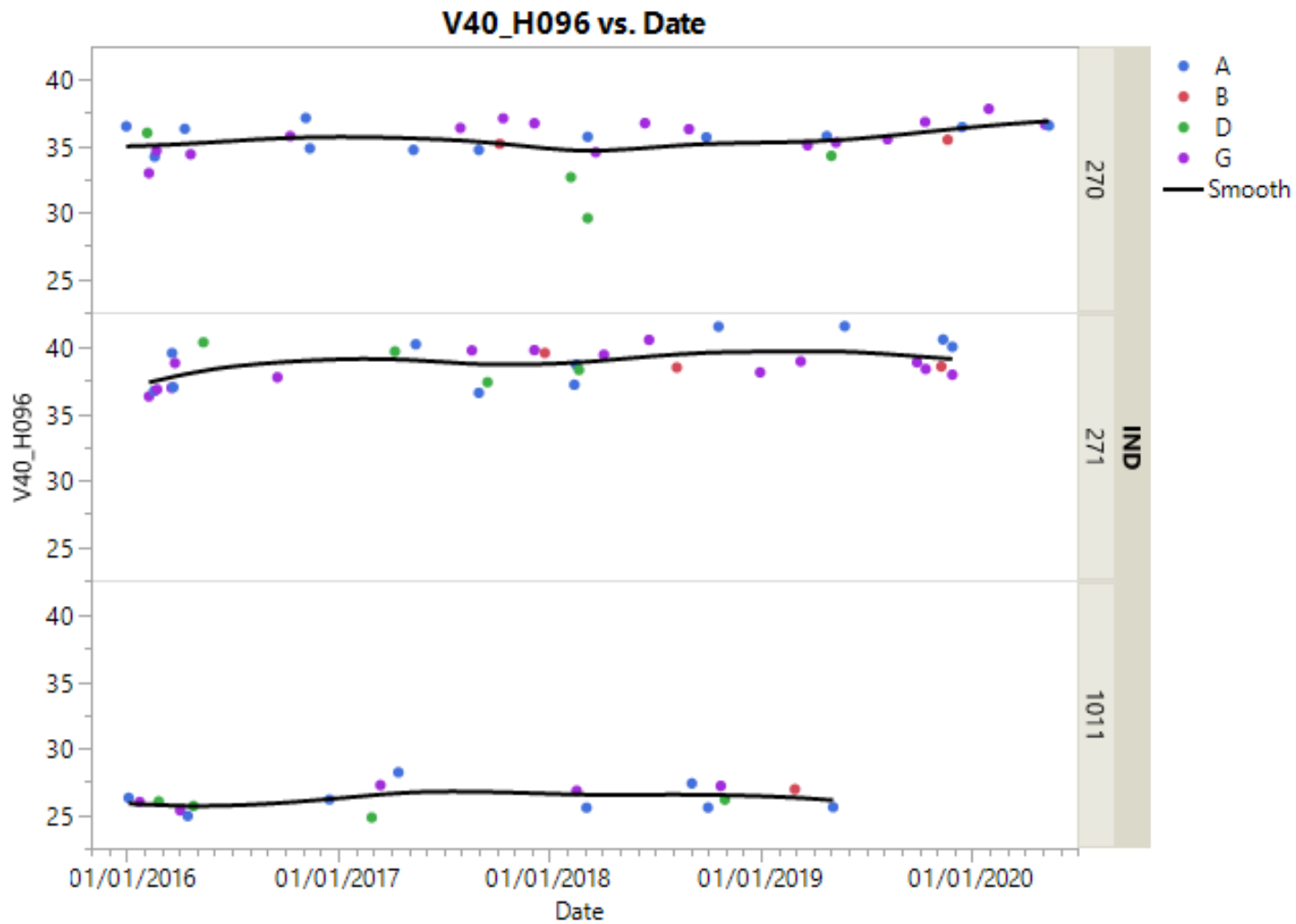
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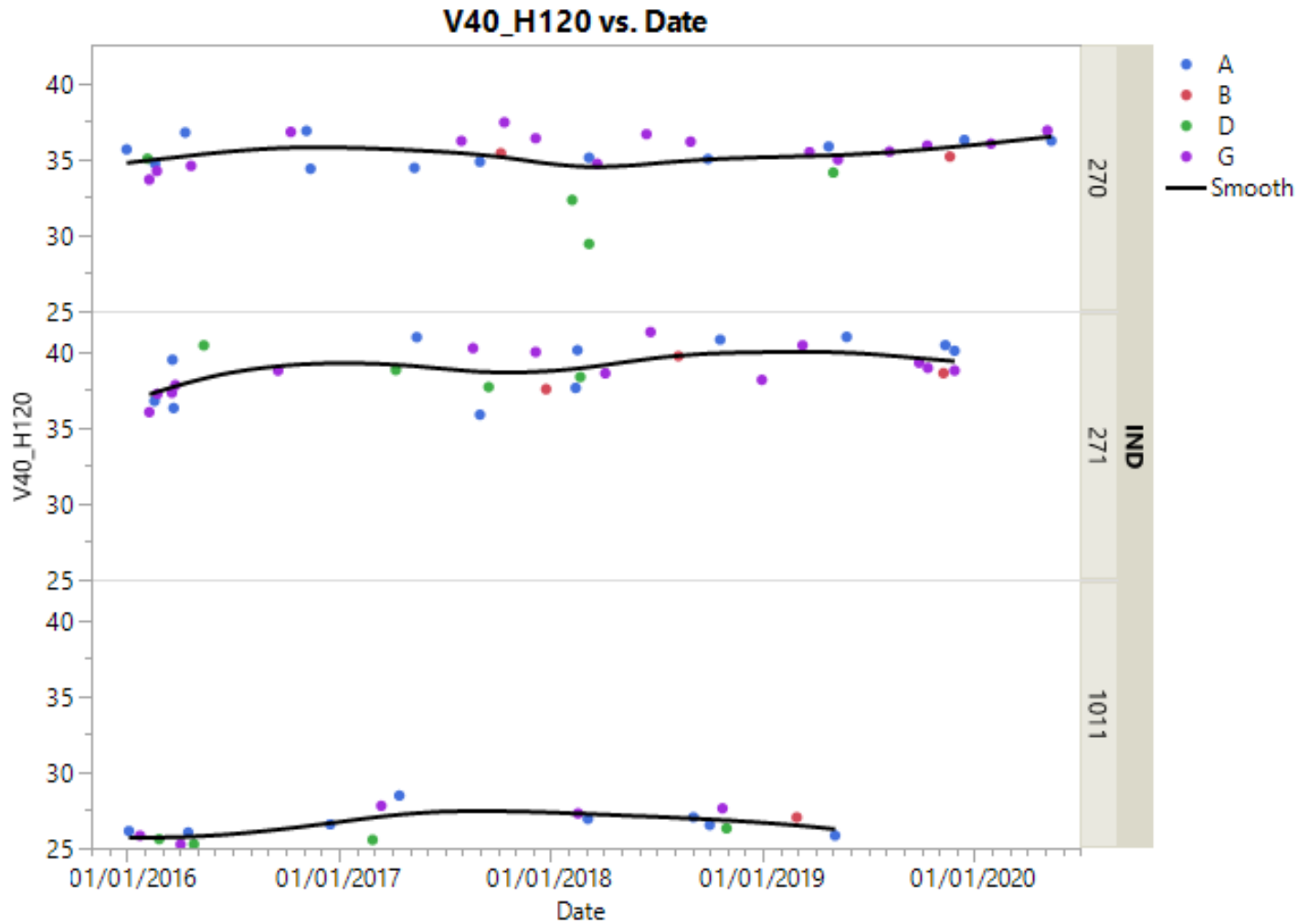
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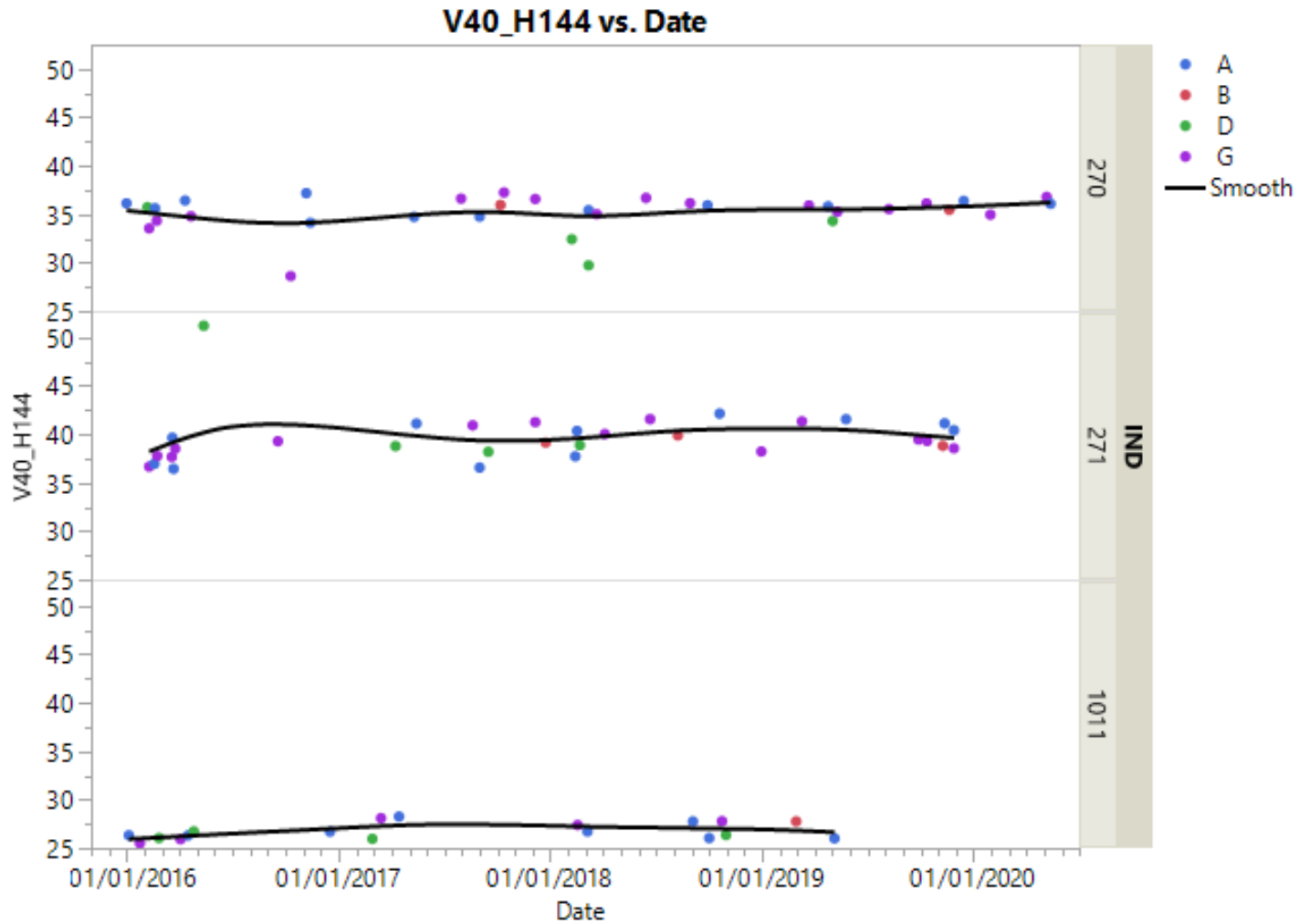
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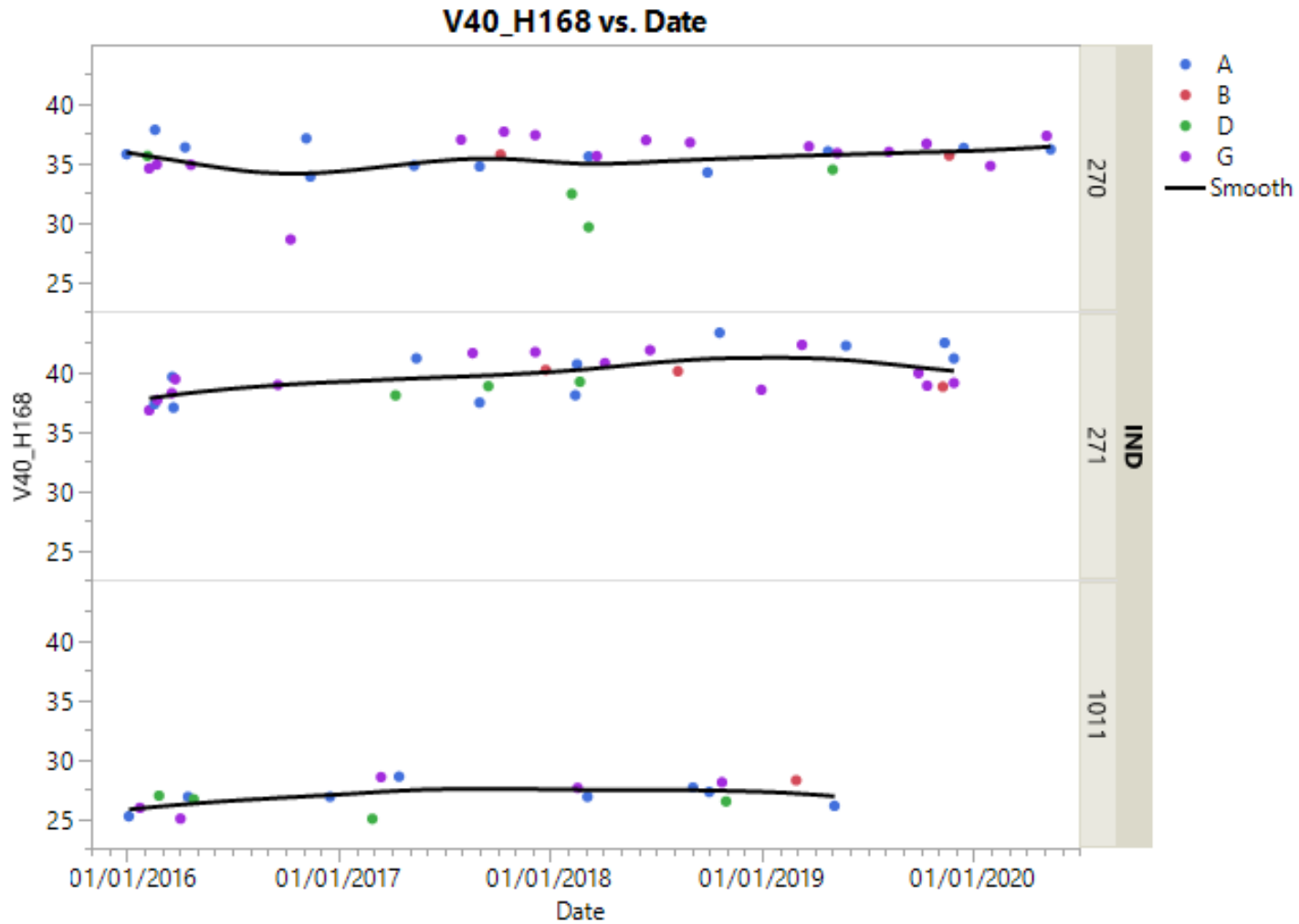
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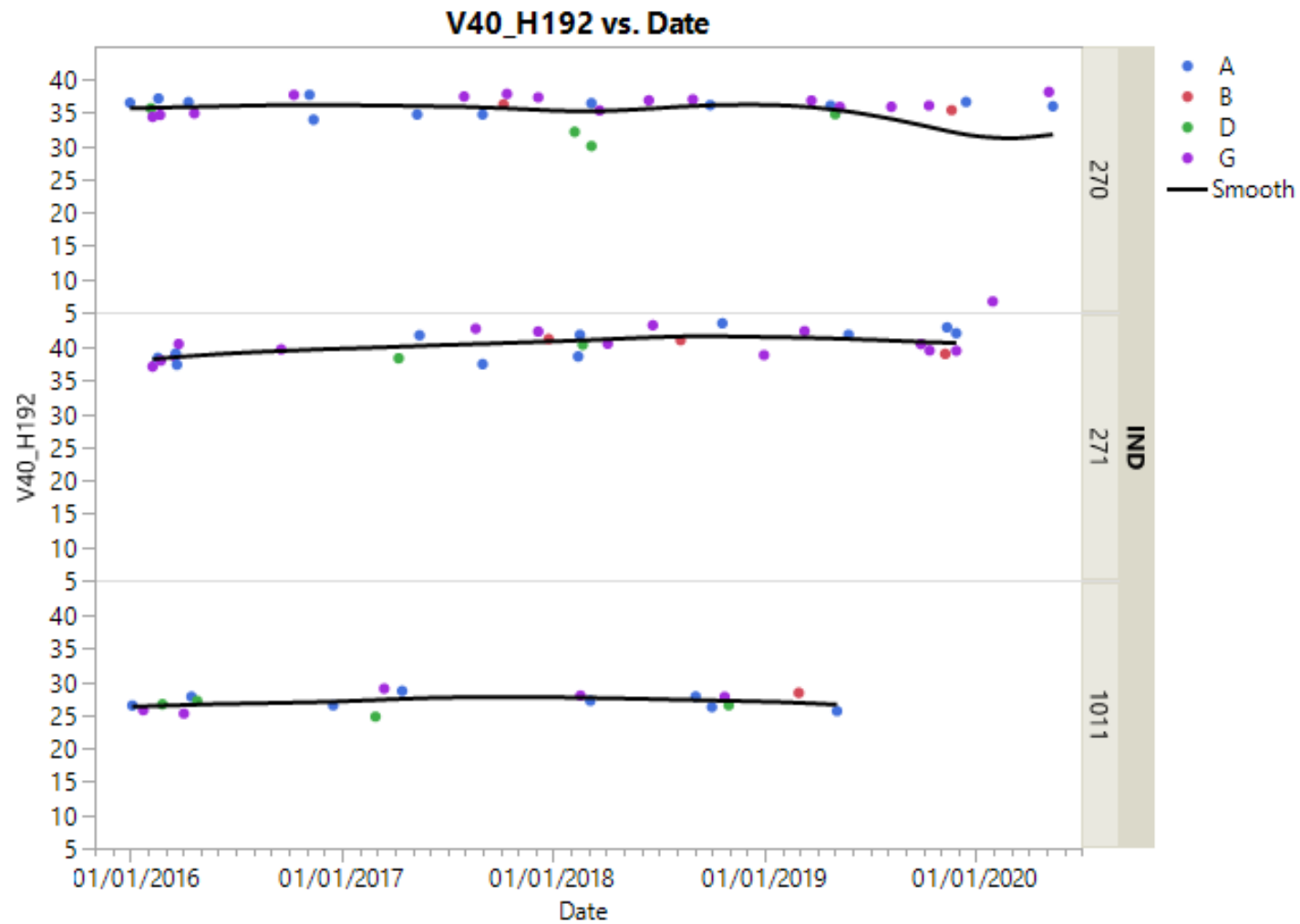
Graph Builder



Graph Builder

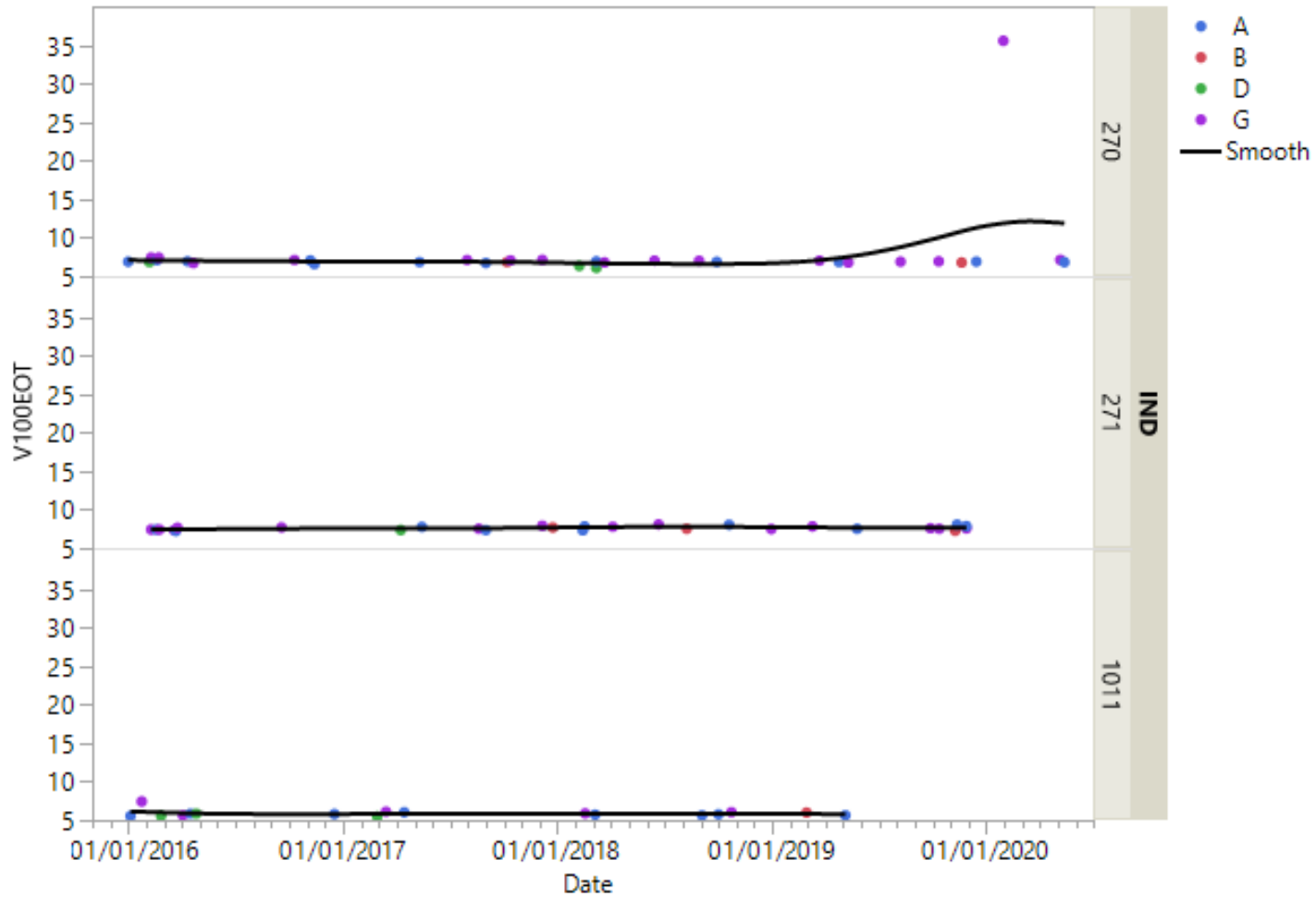


Graph Builder

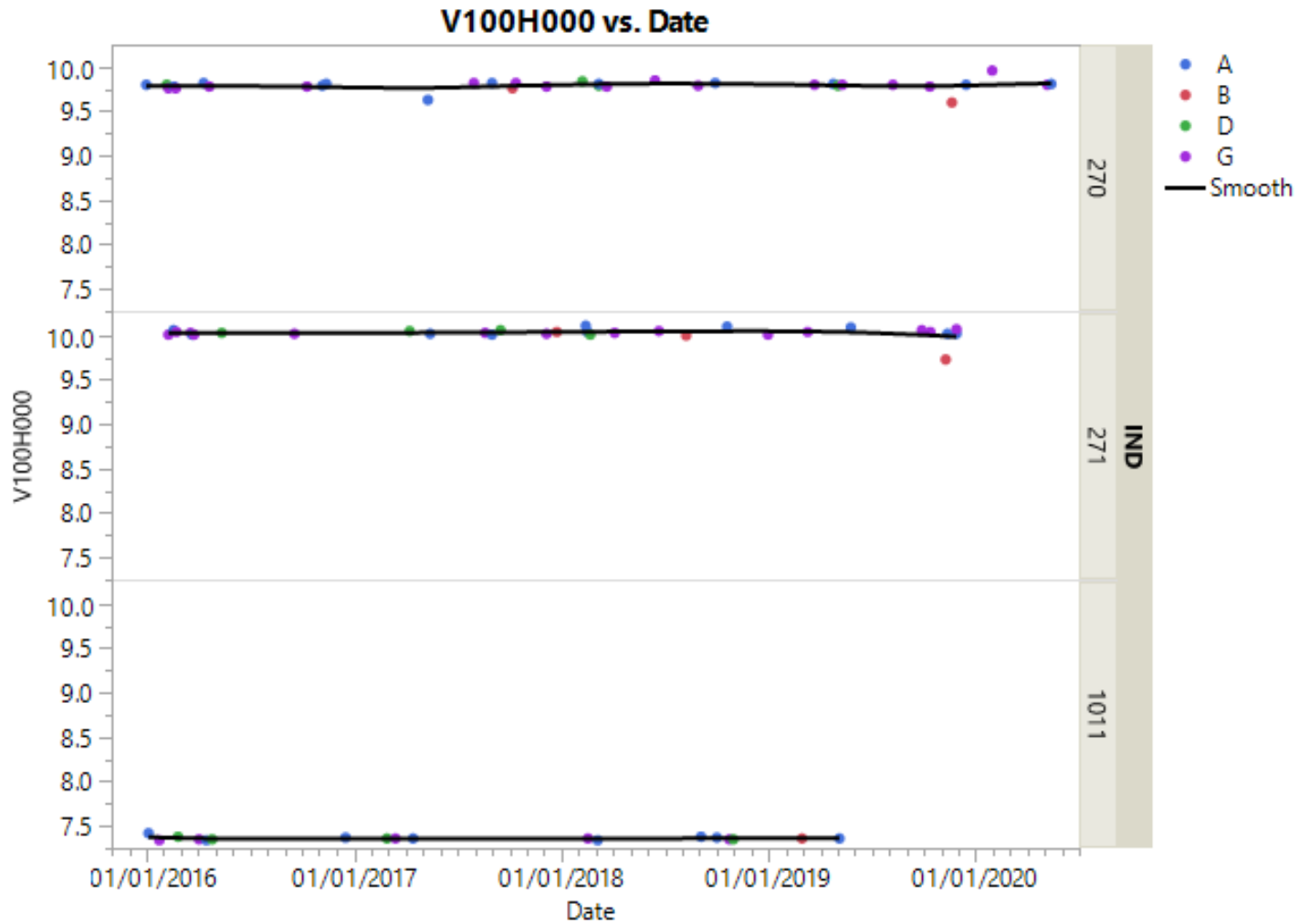


Graph Builder

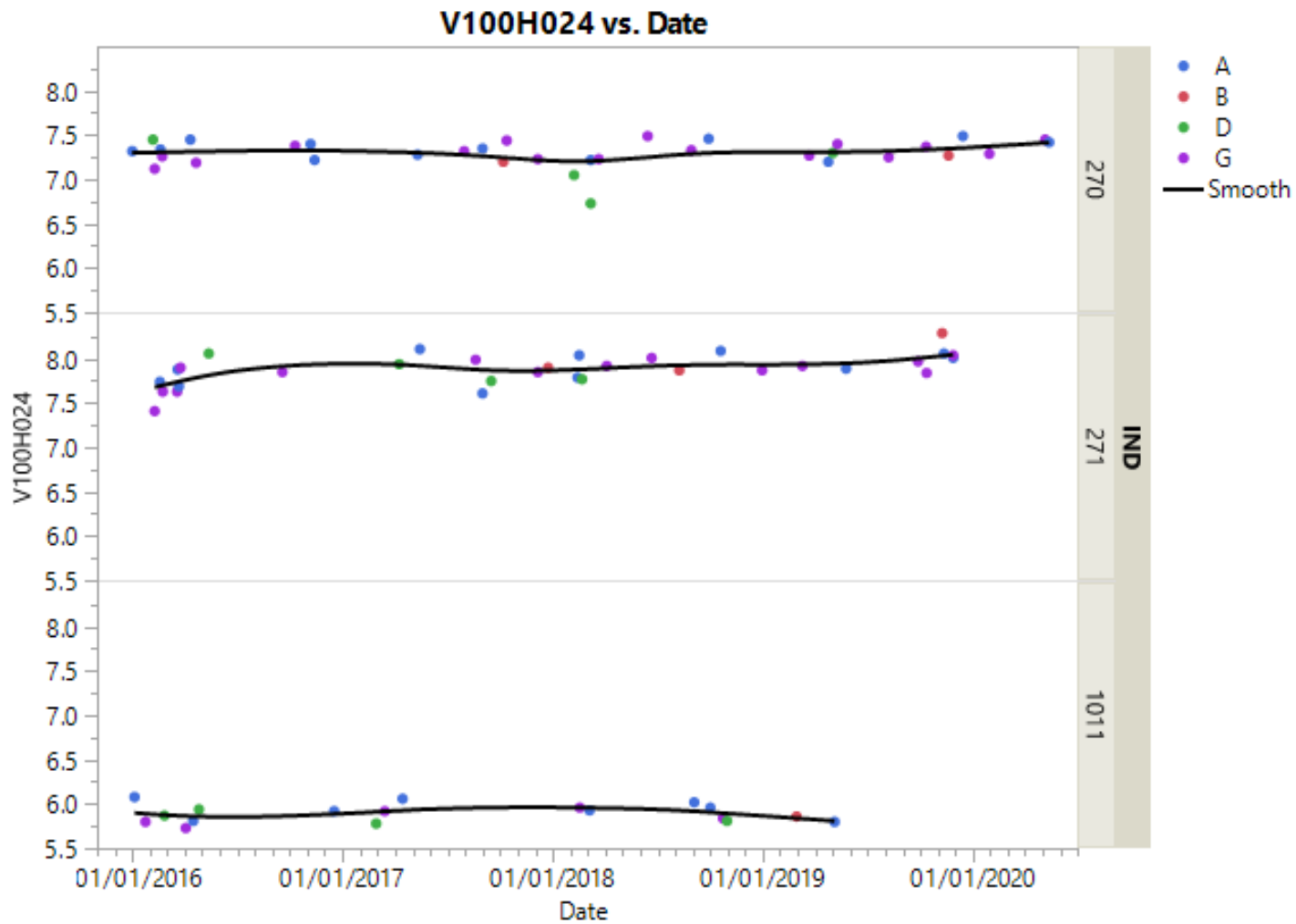
V100EOT vs. Date



Graph Builder

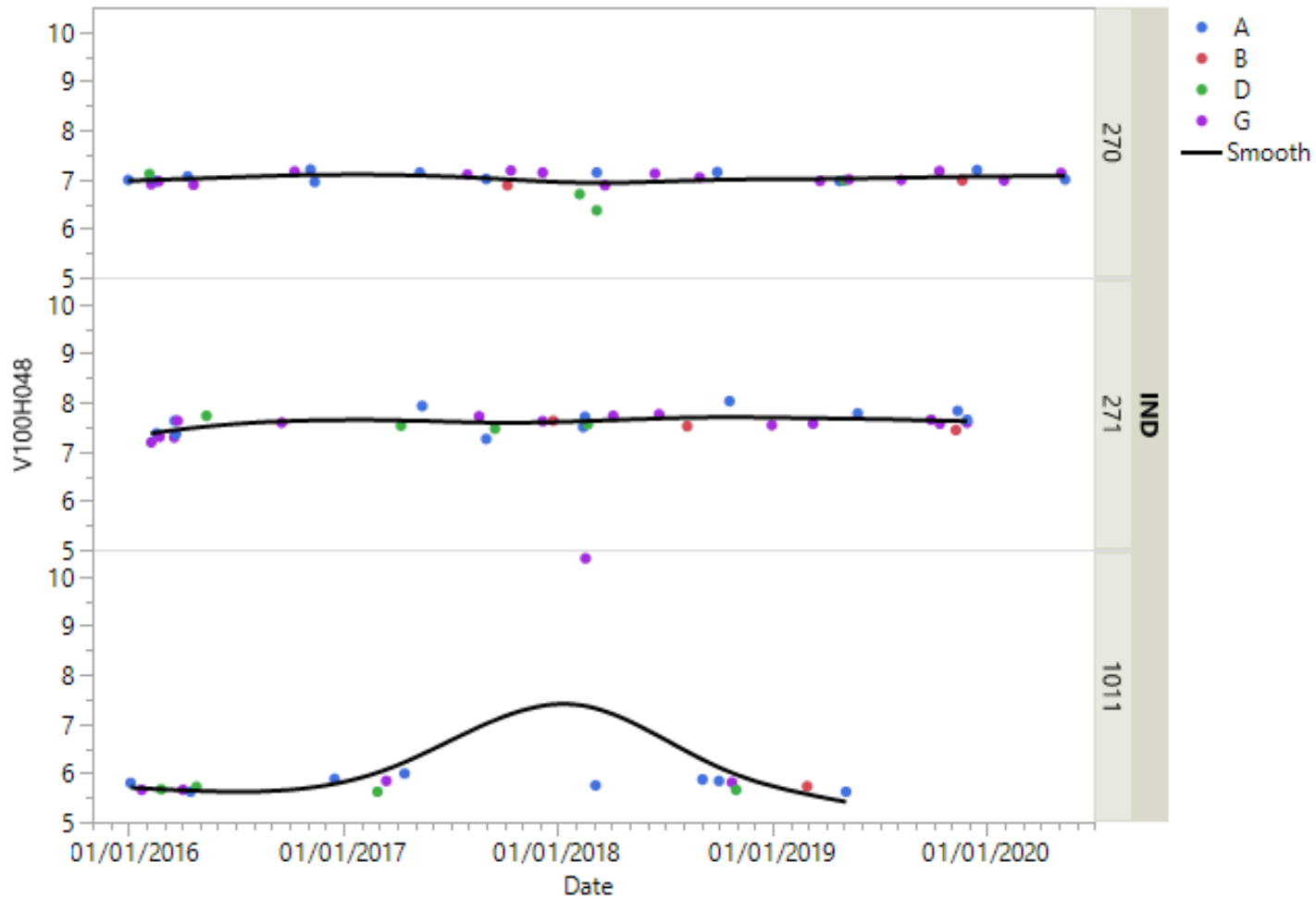


Graph Builder



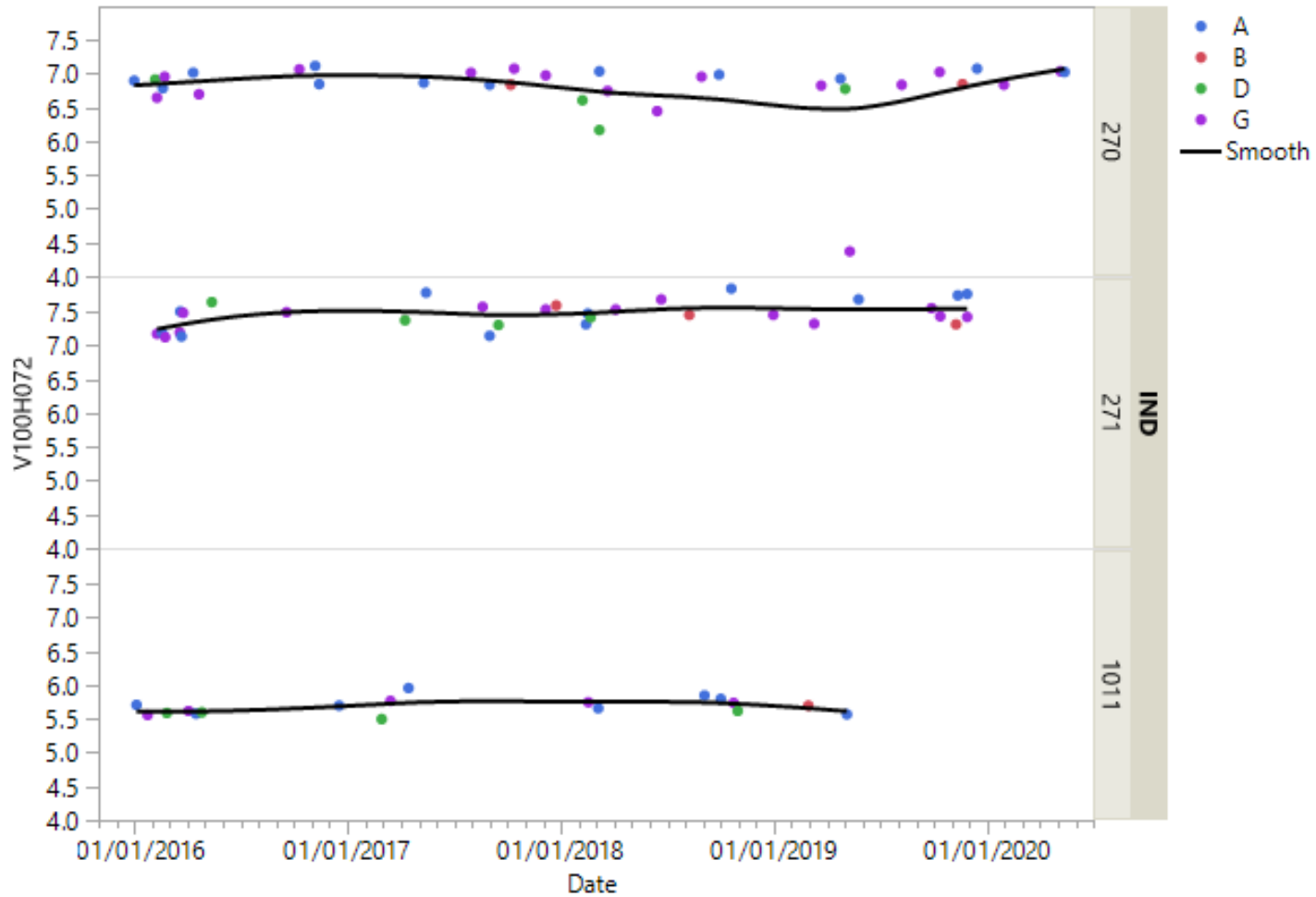
Graph Builder

V100H048 vs. Date

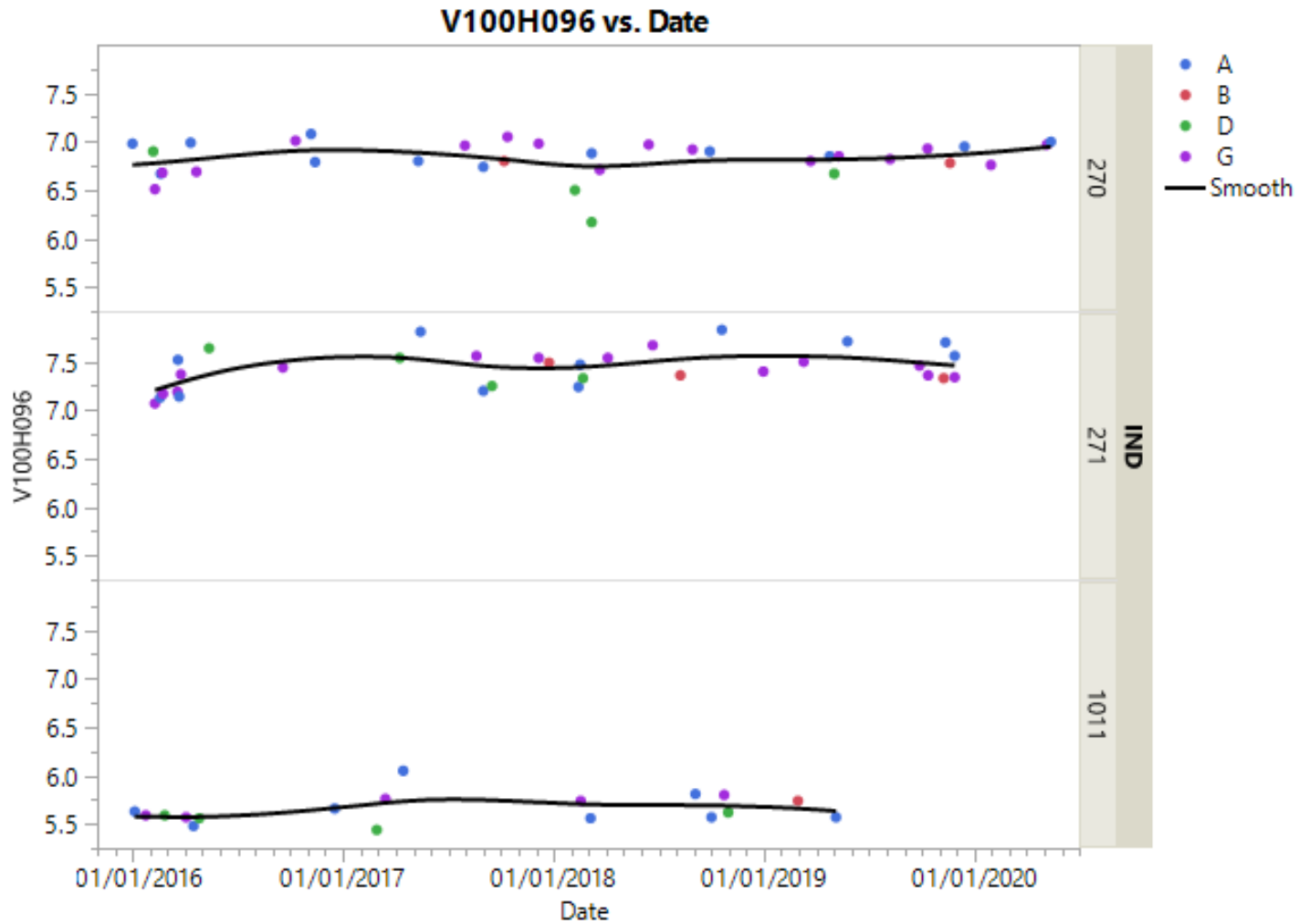


Graph Builder

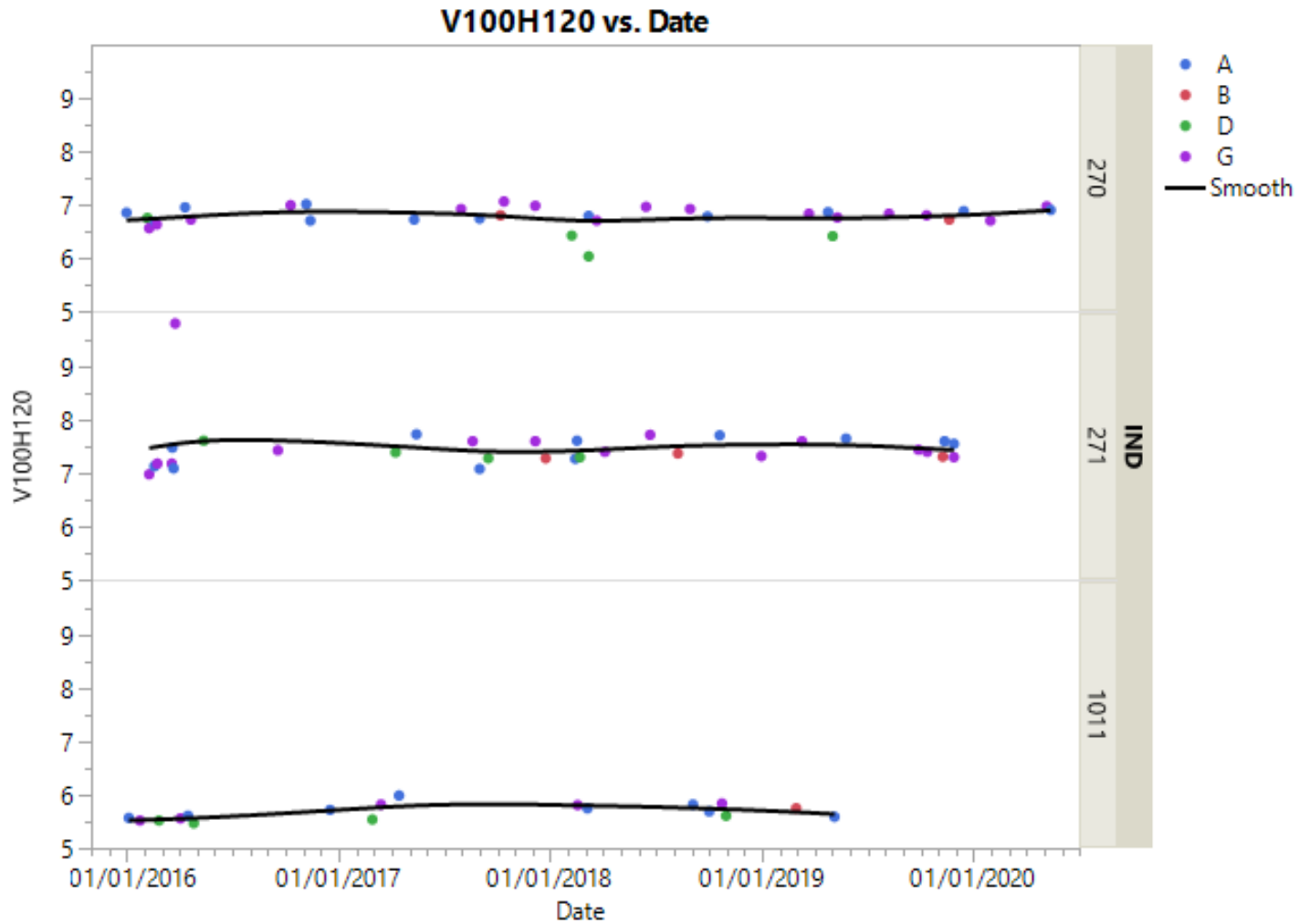
V100H072 vs. Date



Graph Builder

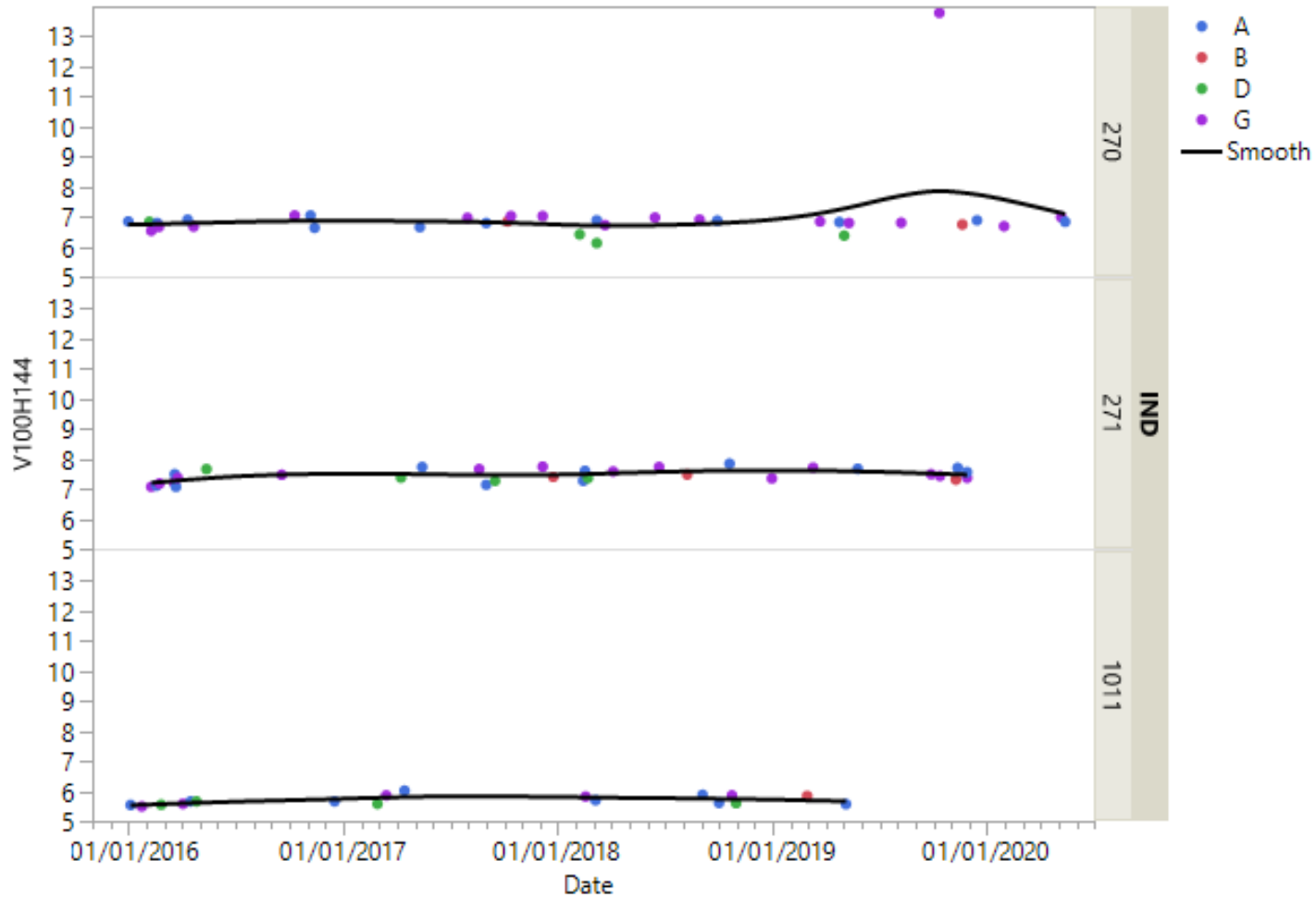


Graph Builder

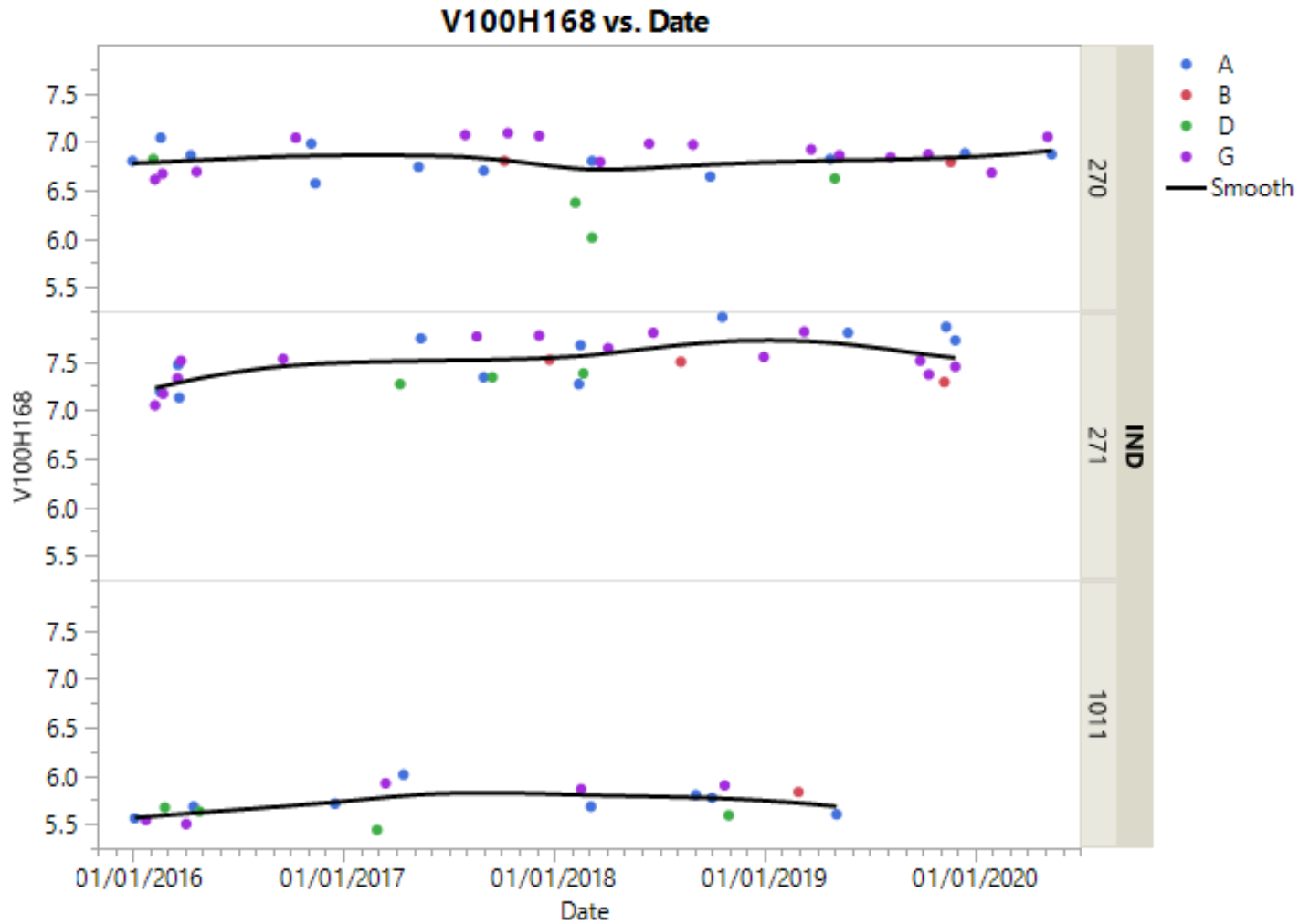


Graph Builder

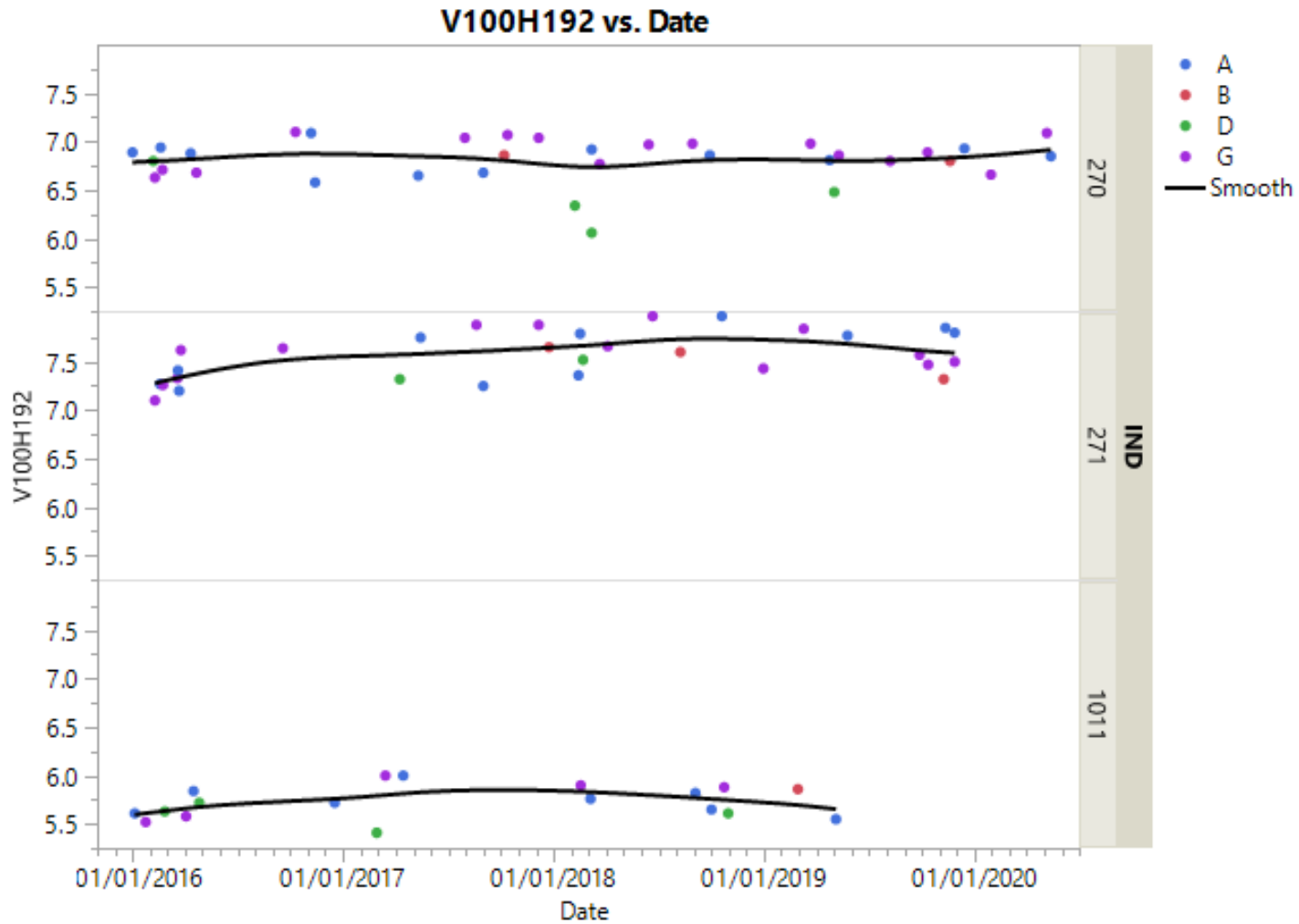
V100H144 vs. Date



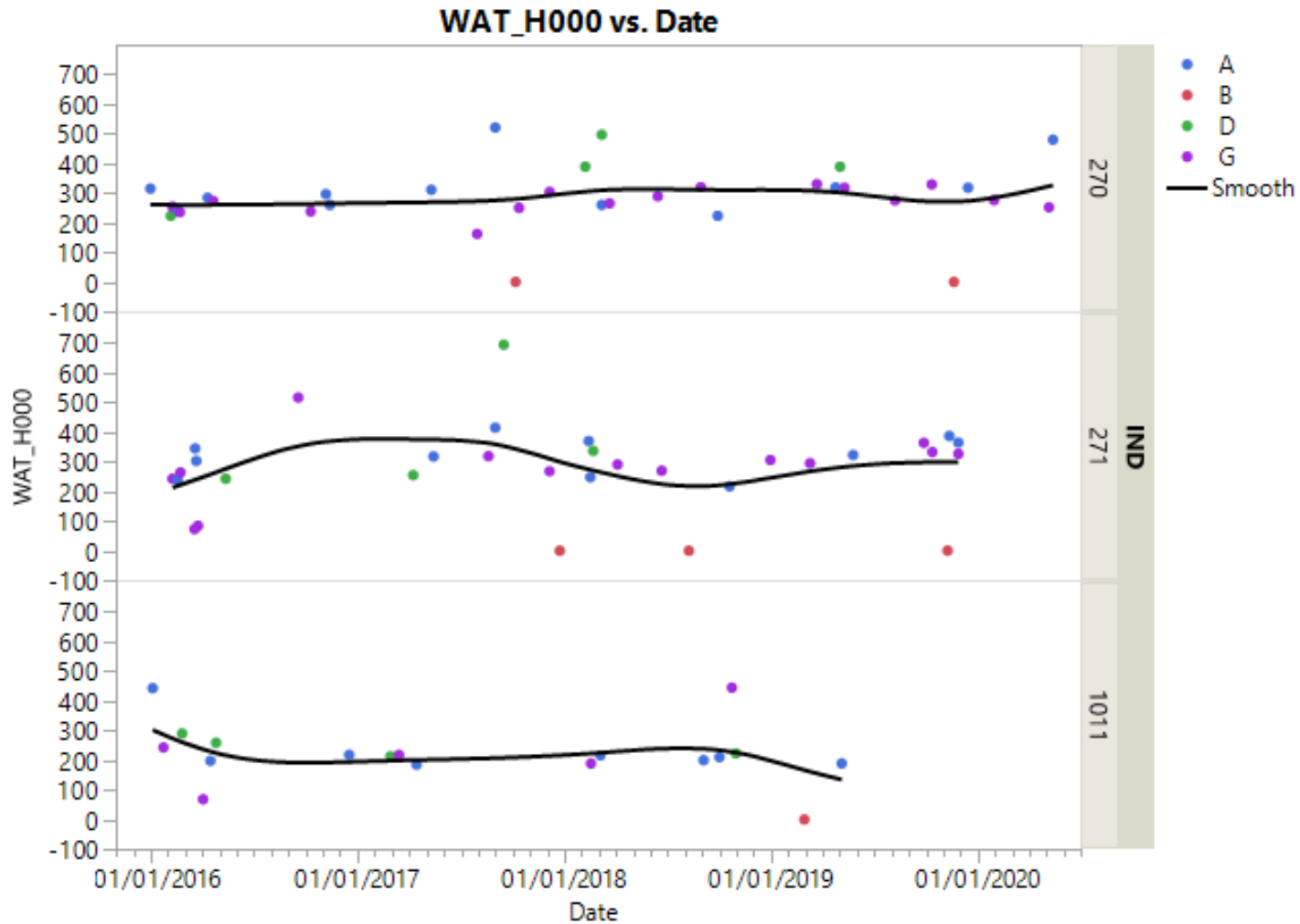
Graph Builder



Graph Builder

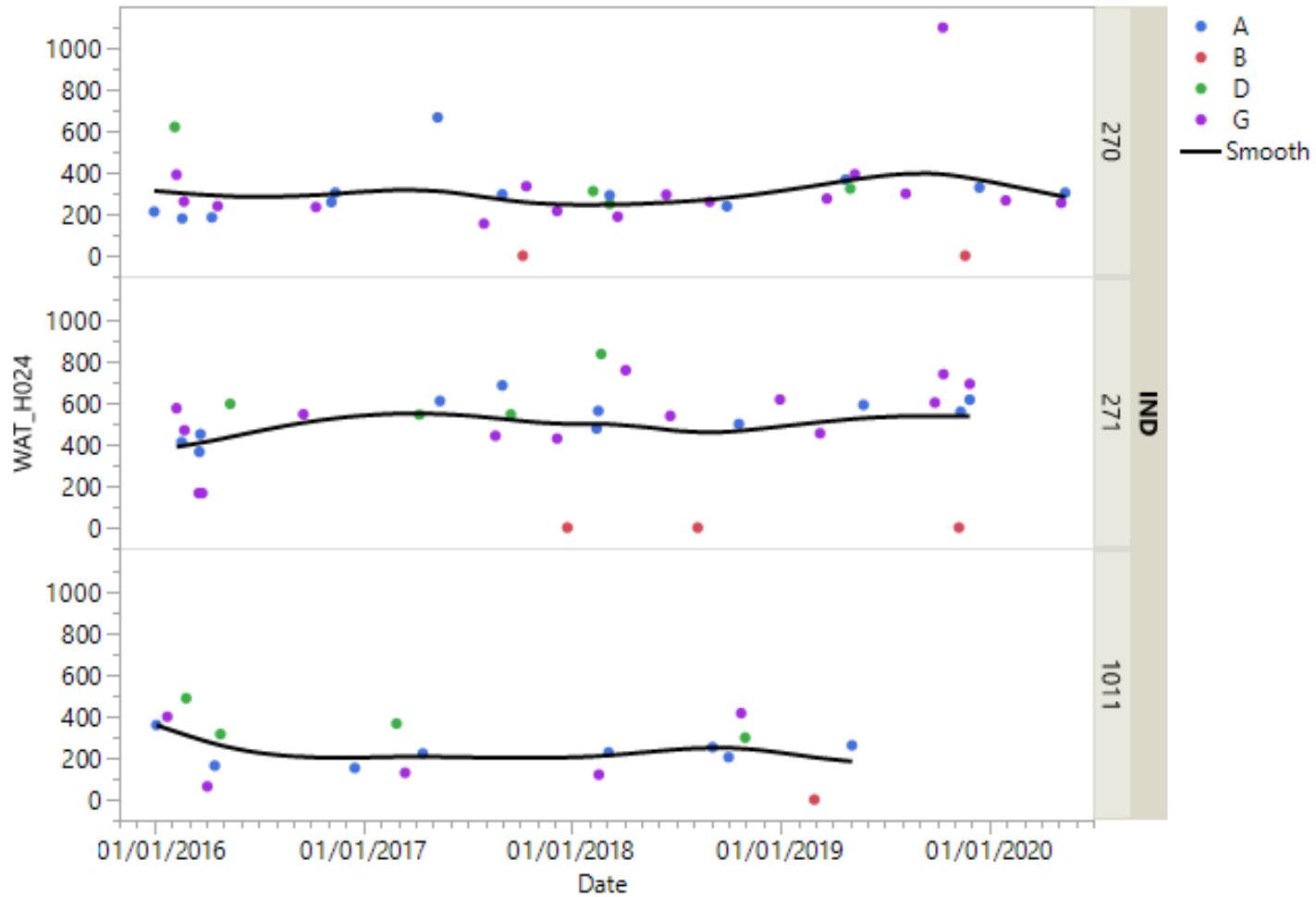


Graph Builder

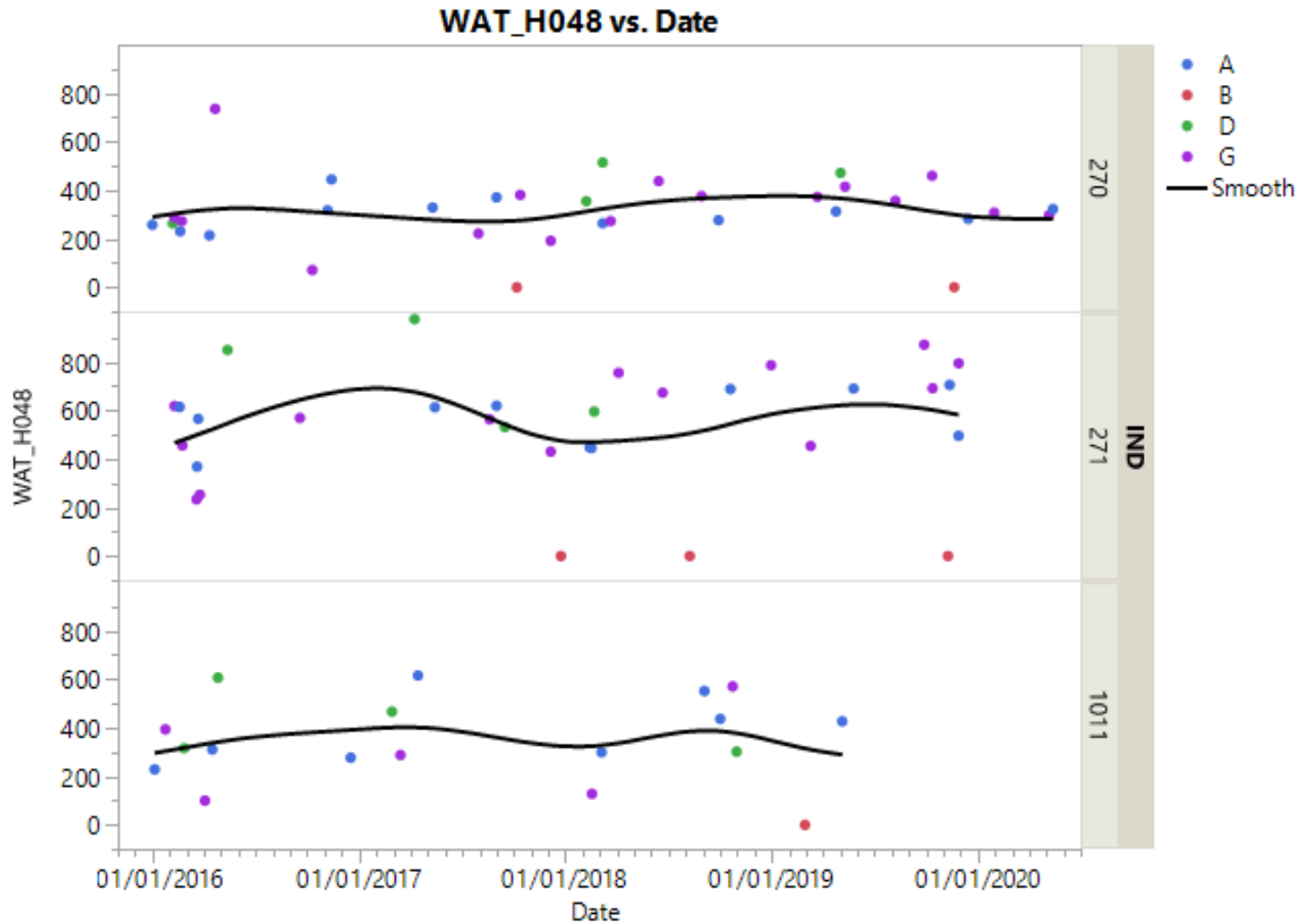


Graph Builder

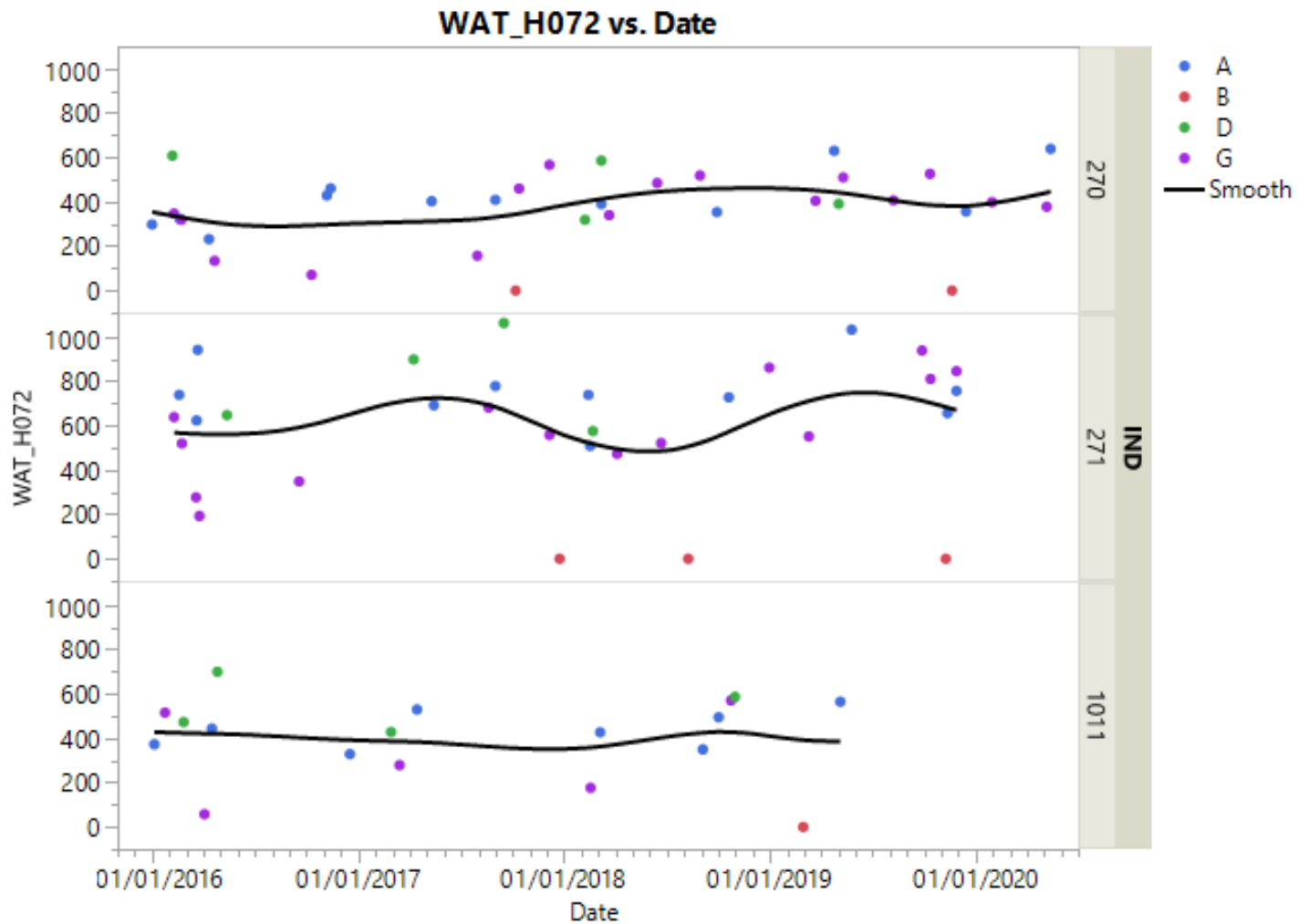
WAT_H024 vs. Date



Graph Builder

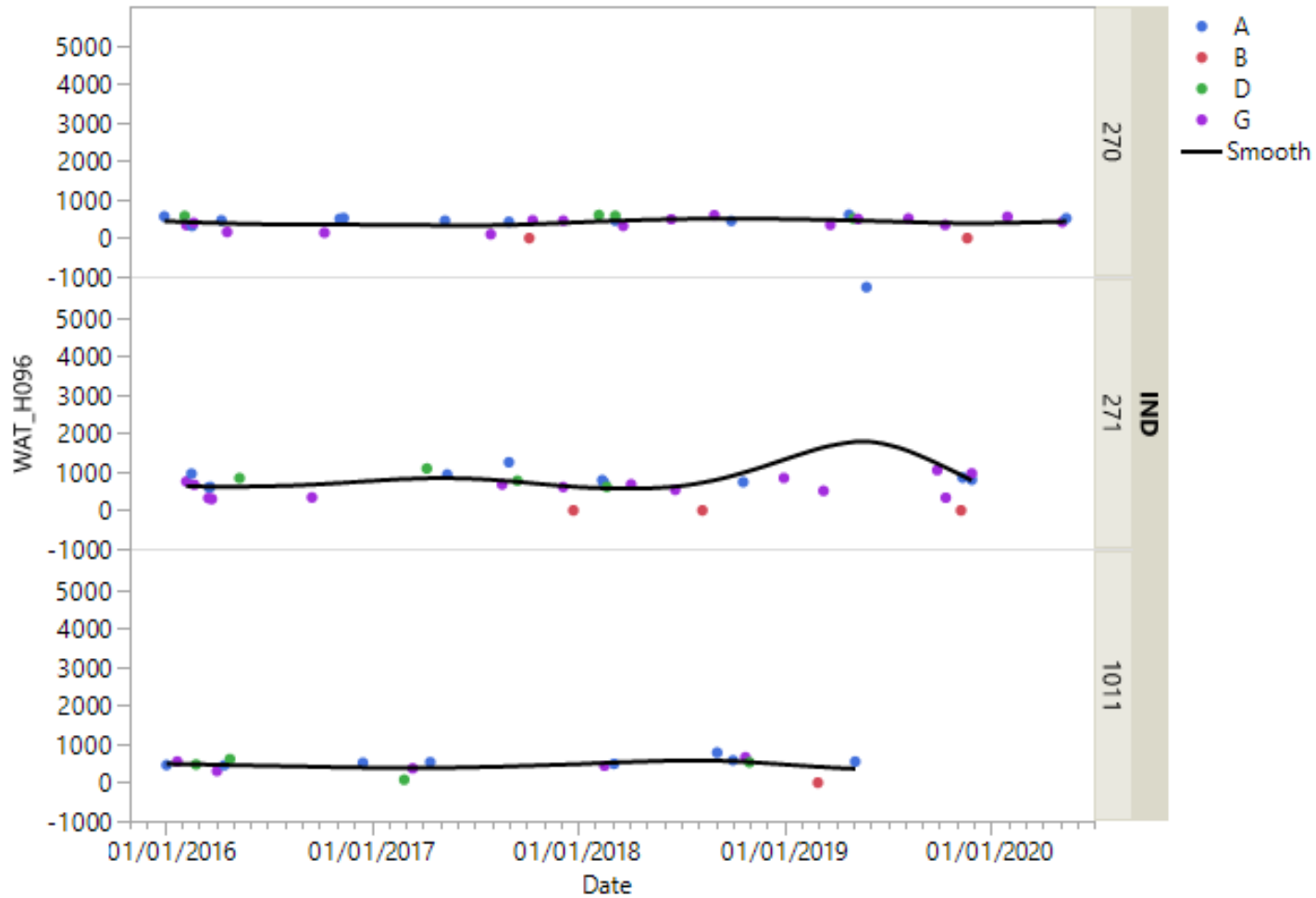


Graph Builder

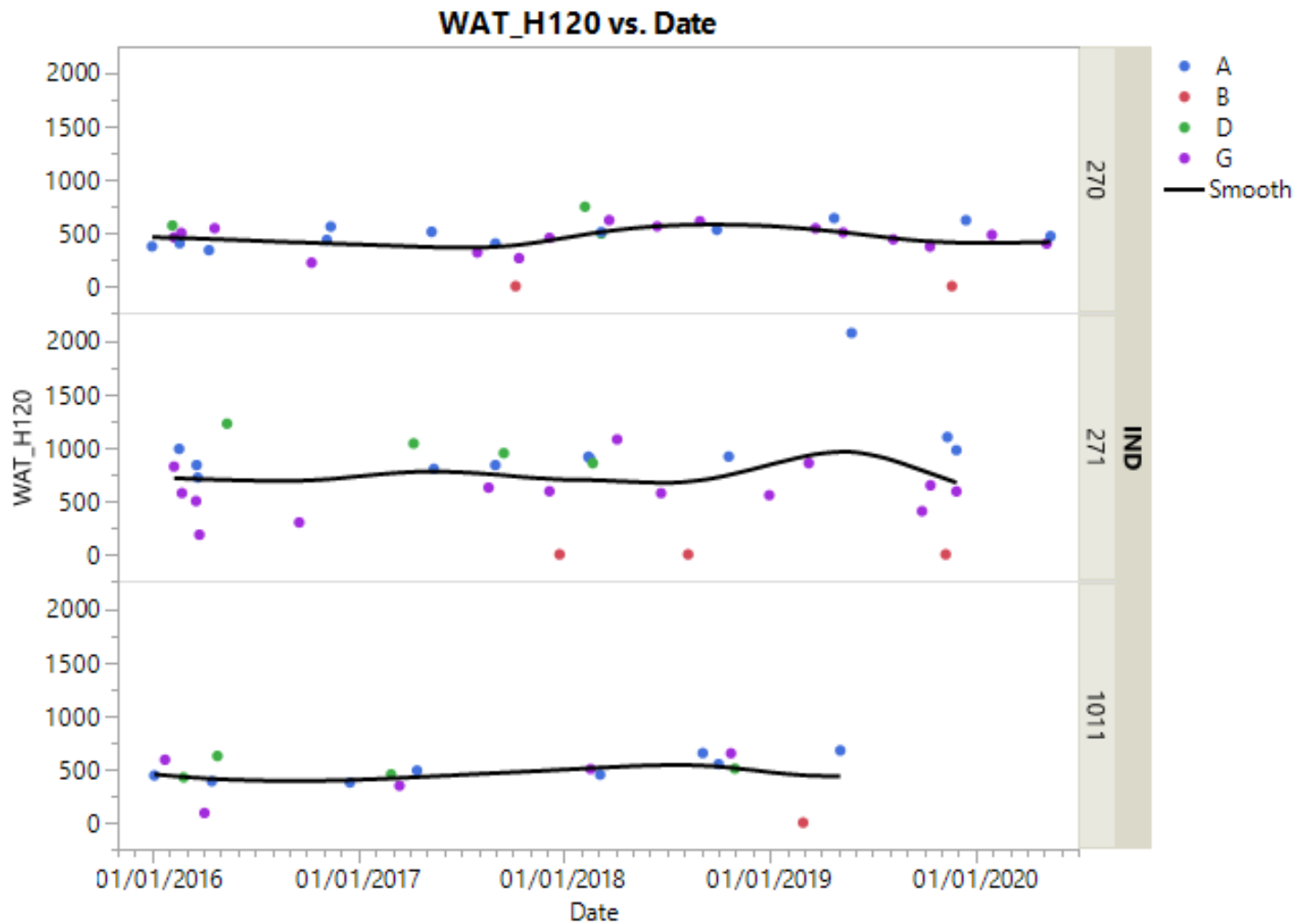


Graph Builder

WAT_H096 vs. Date

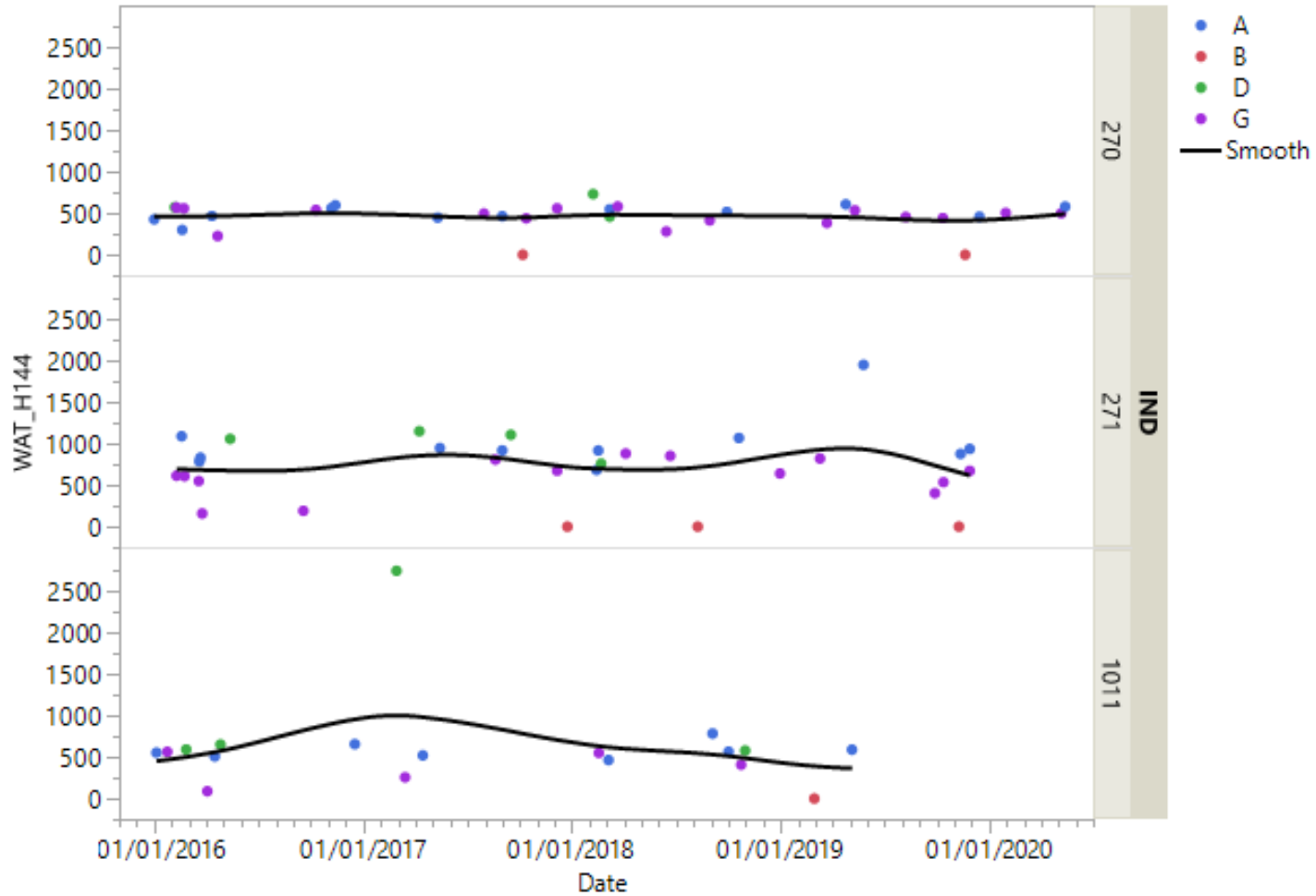


Graph Builder

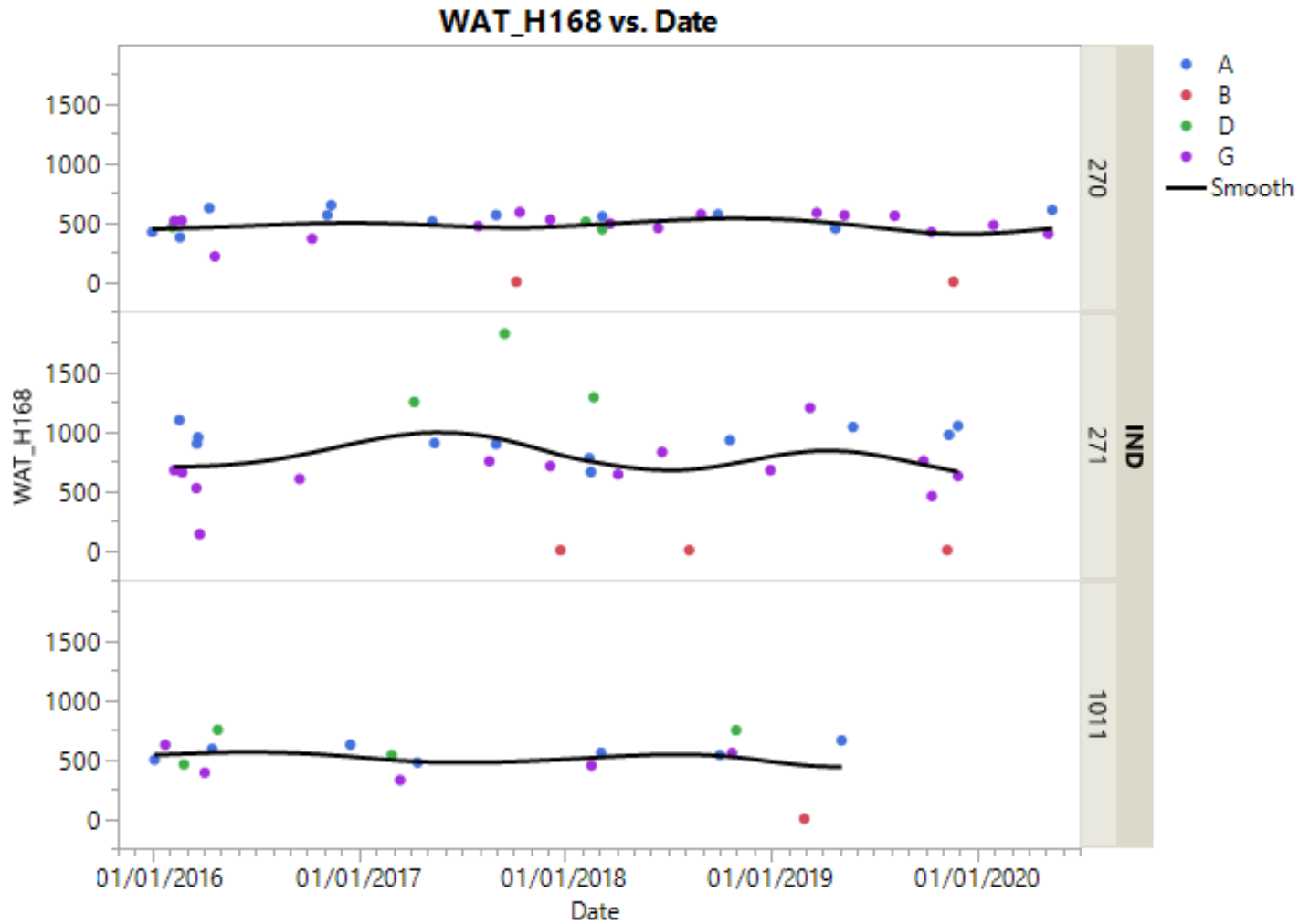


Graph Builder

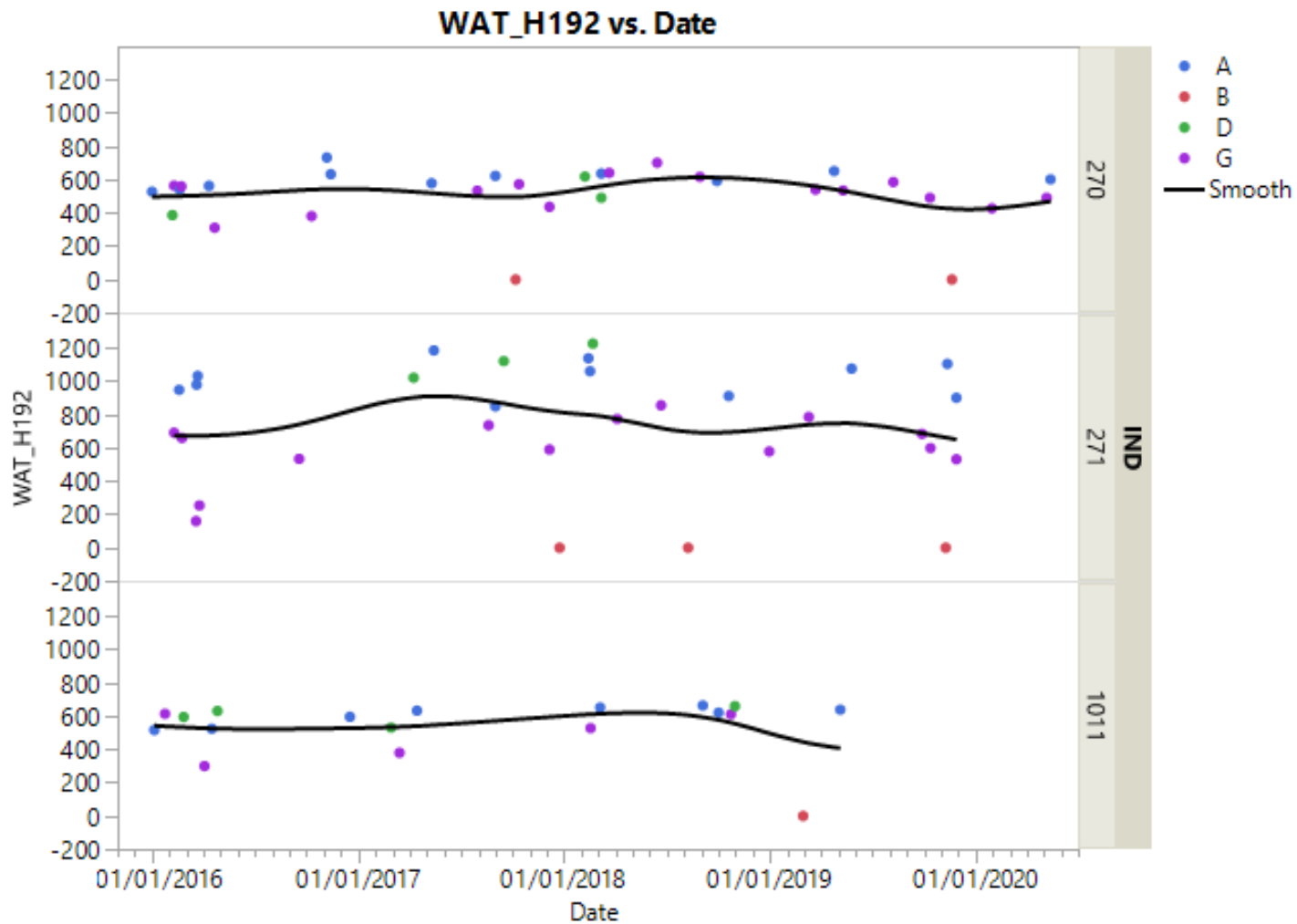
WAT_H144 vs. Date



Graph Builder

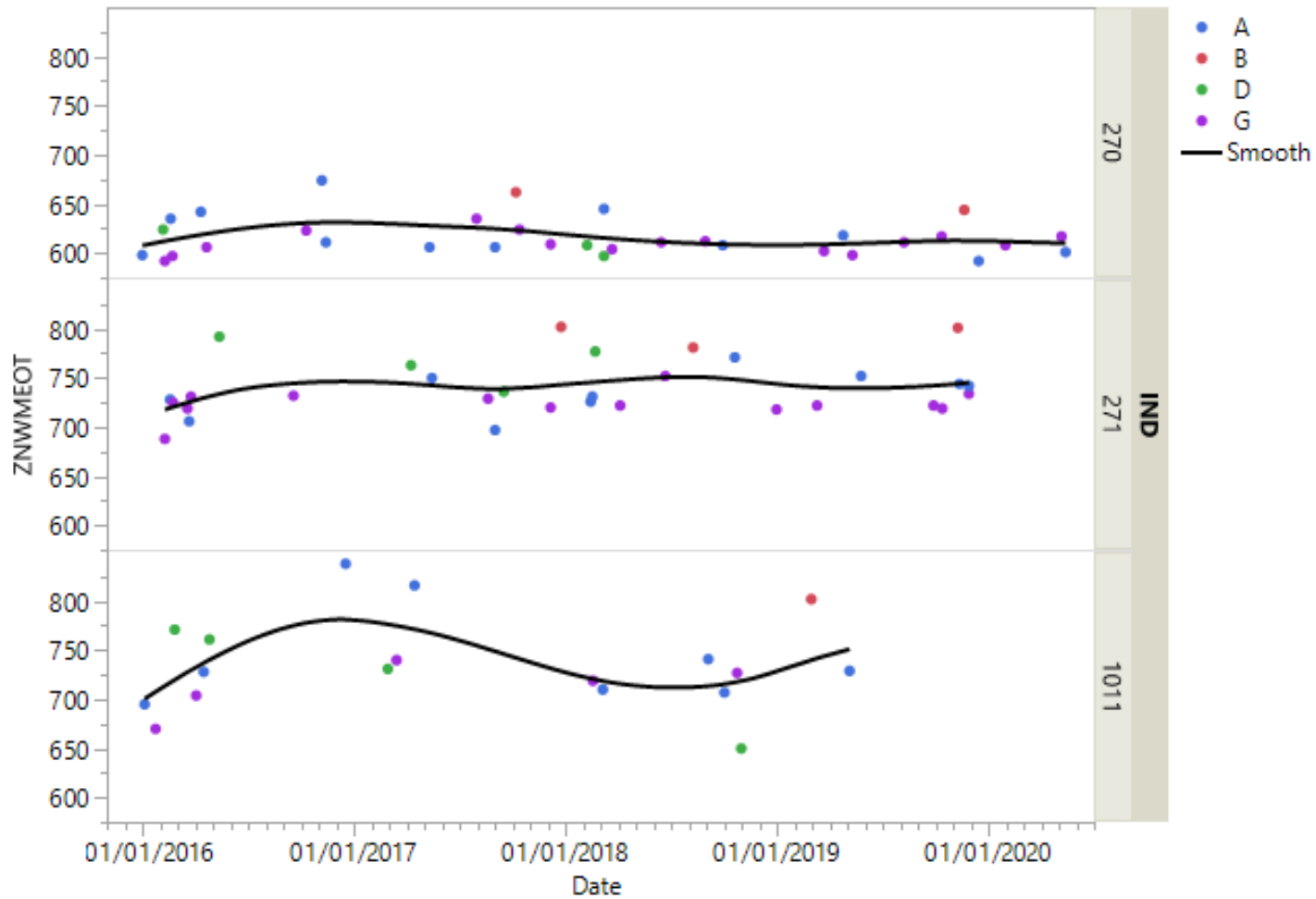


Graph Builder

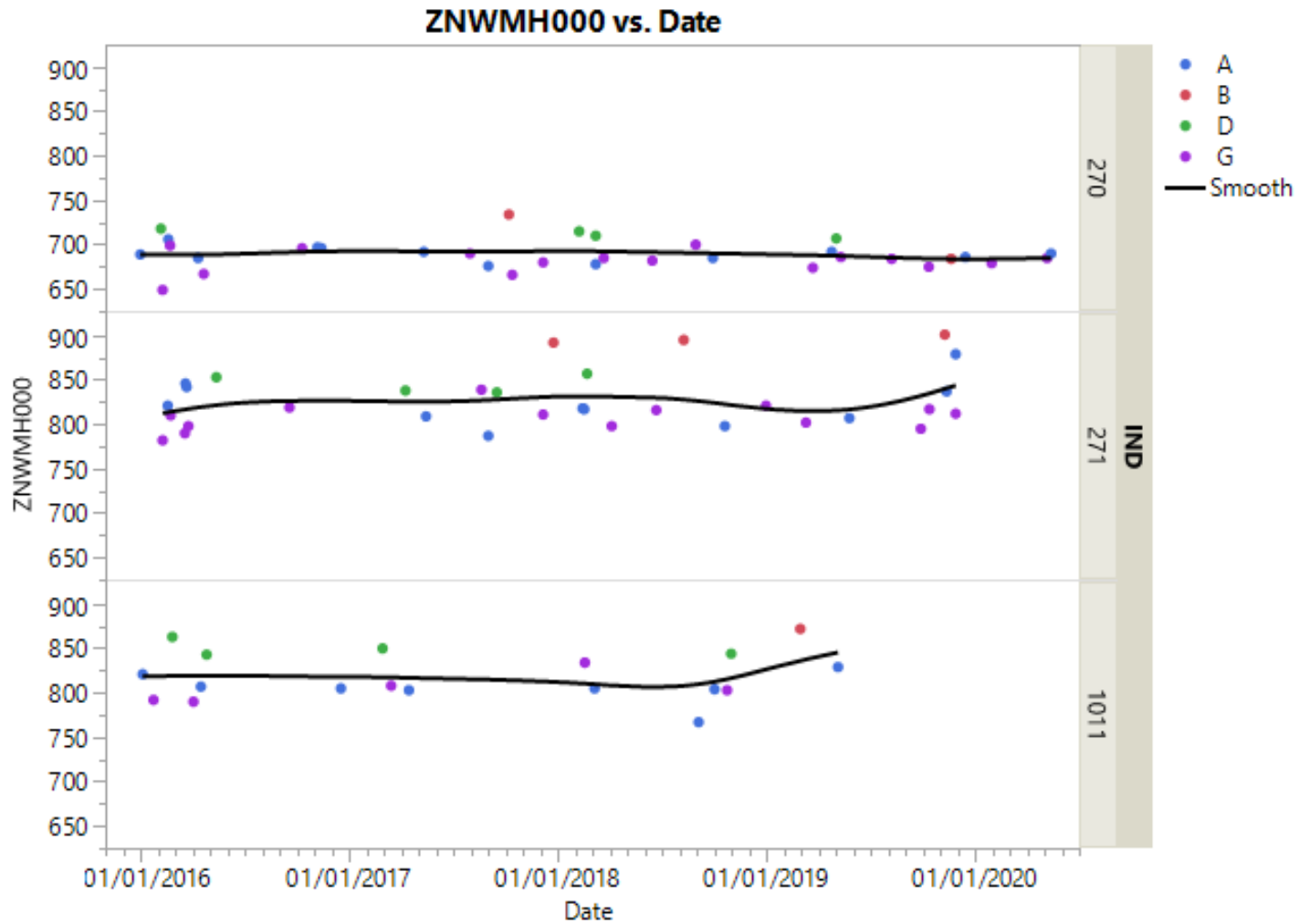


Graph Builder

ZNWMEOT vs. Date

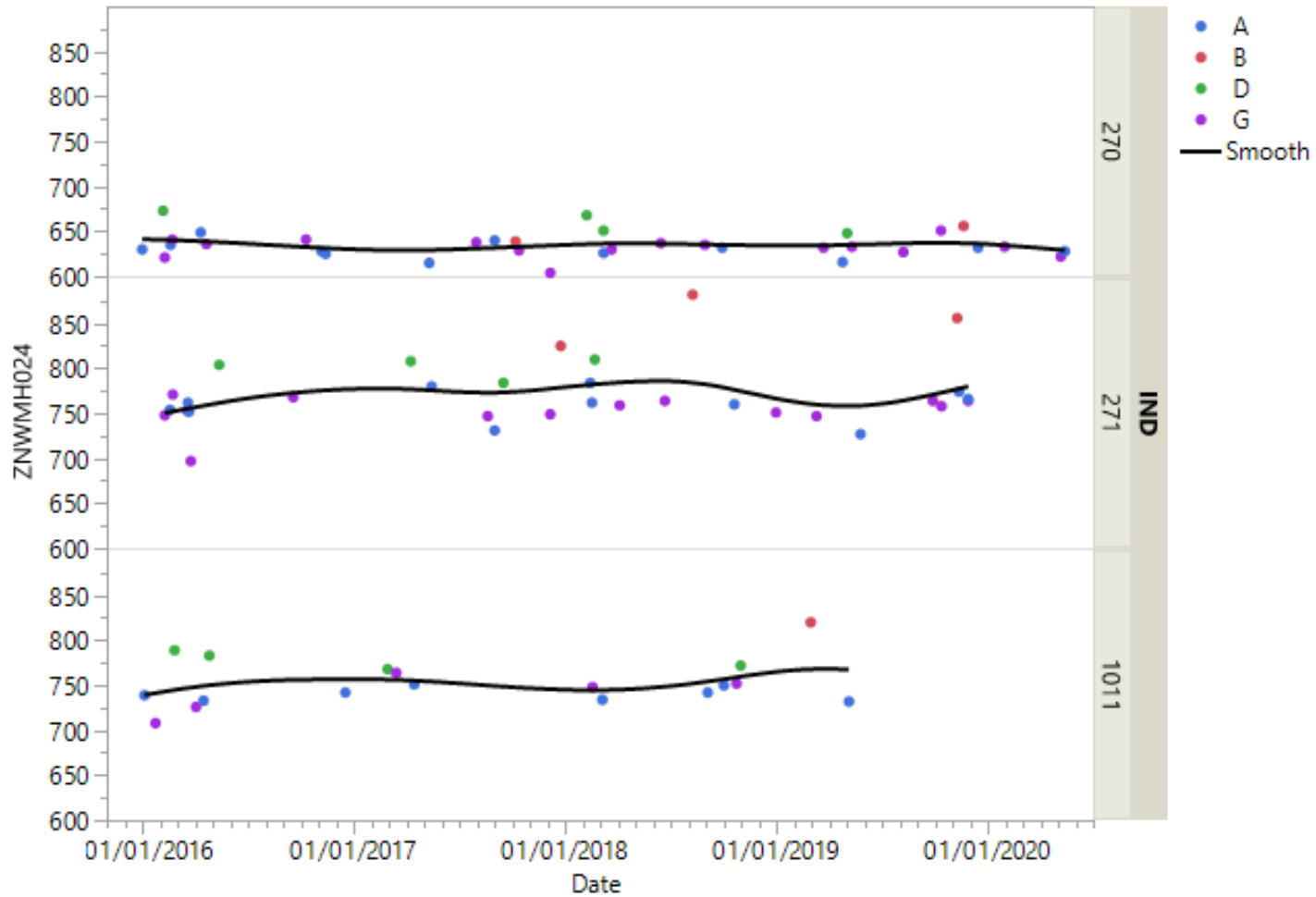


Graph Builder



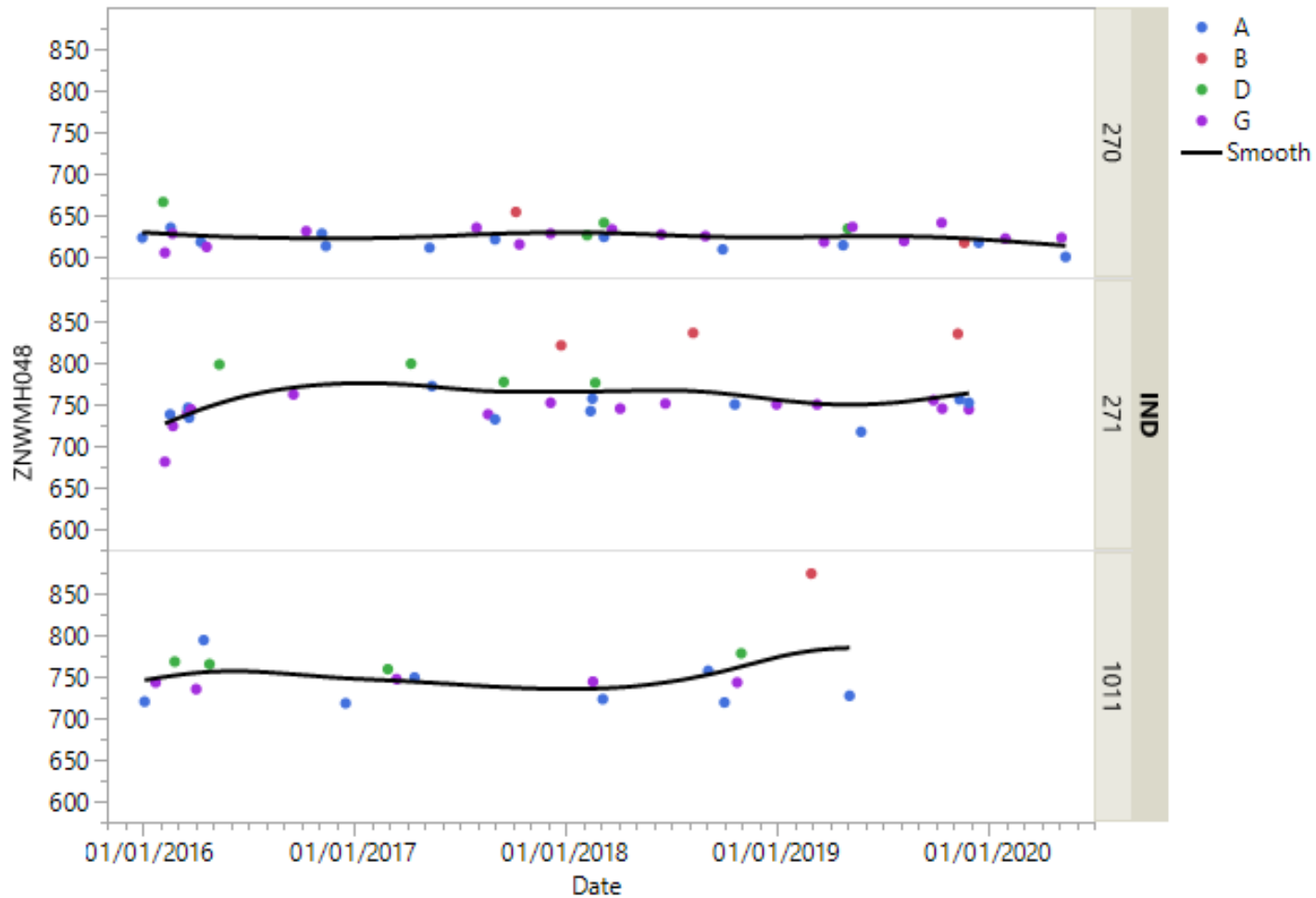
Graph Builder

ZNWMH024 vs. Date



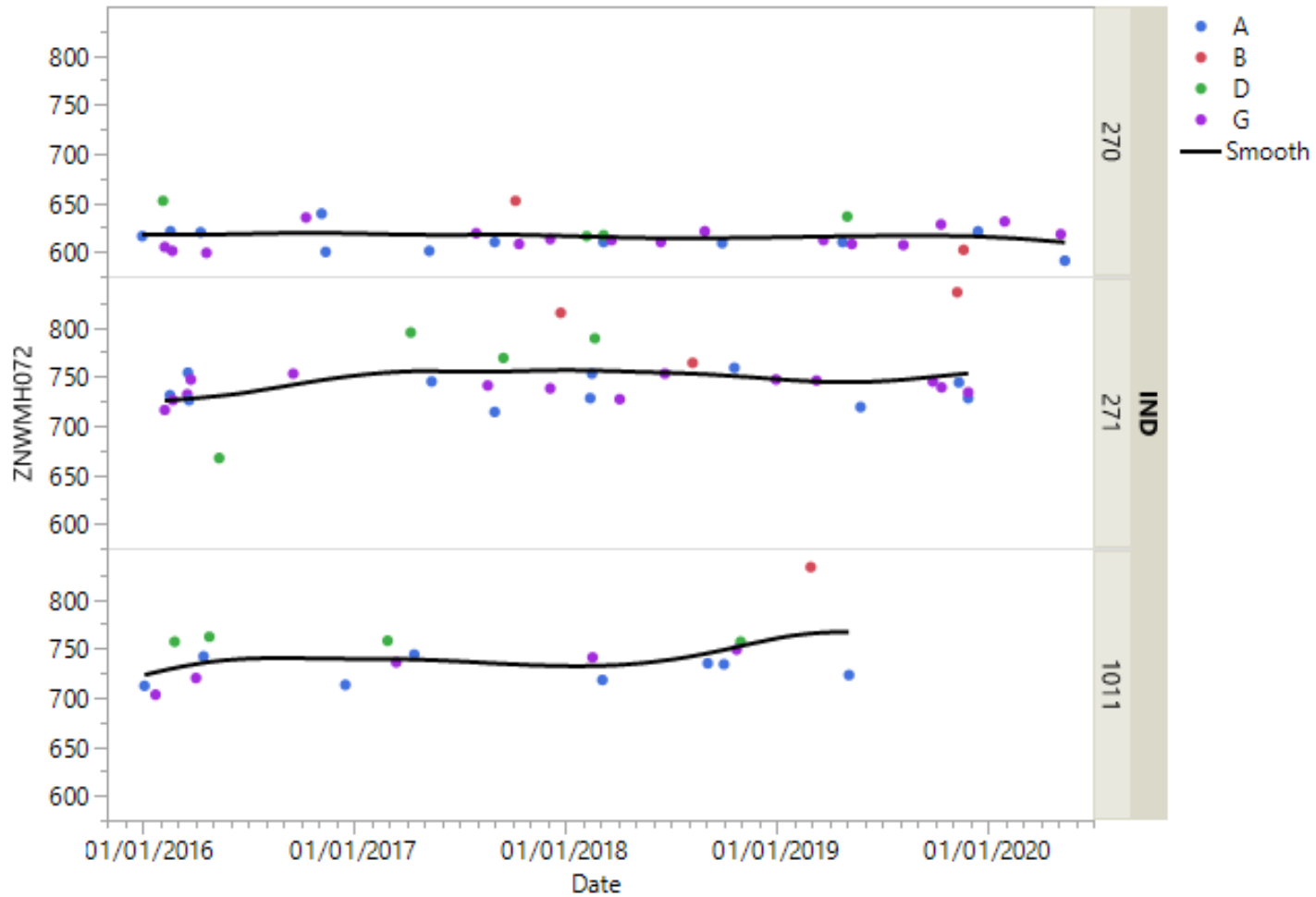
Graph Builder

ZNWMH048 vs. Date



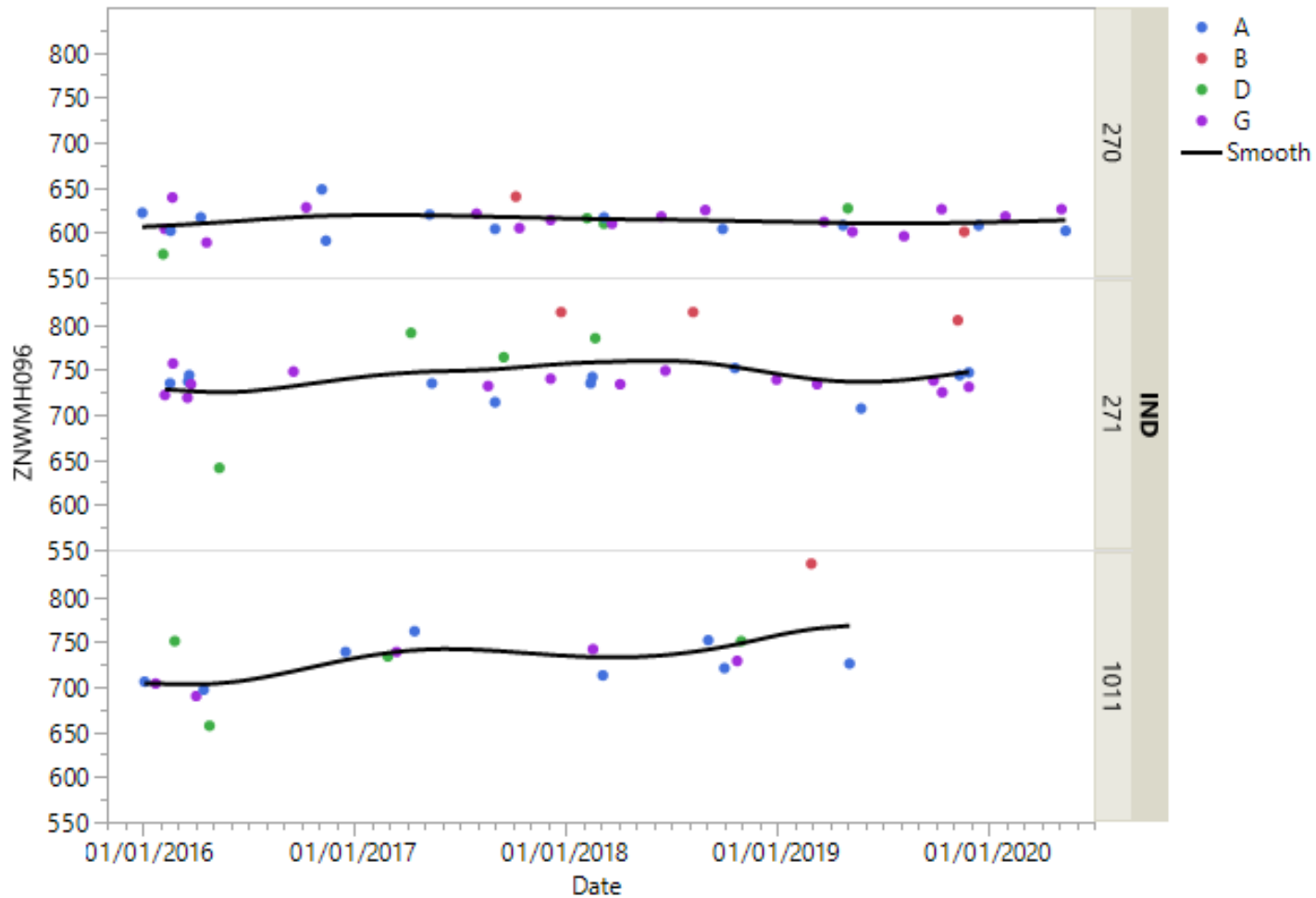
Graph Builder

ZNWMH072 vs. Date

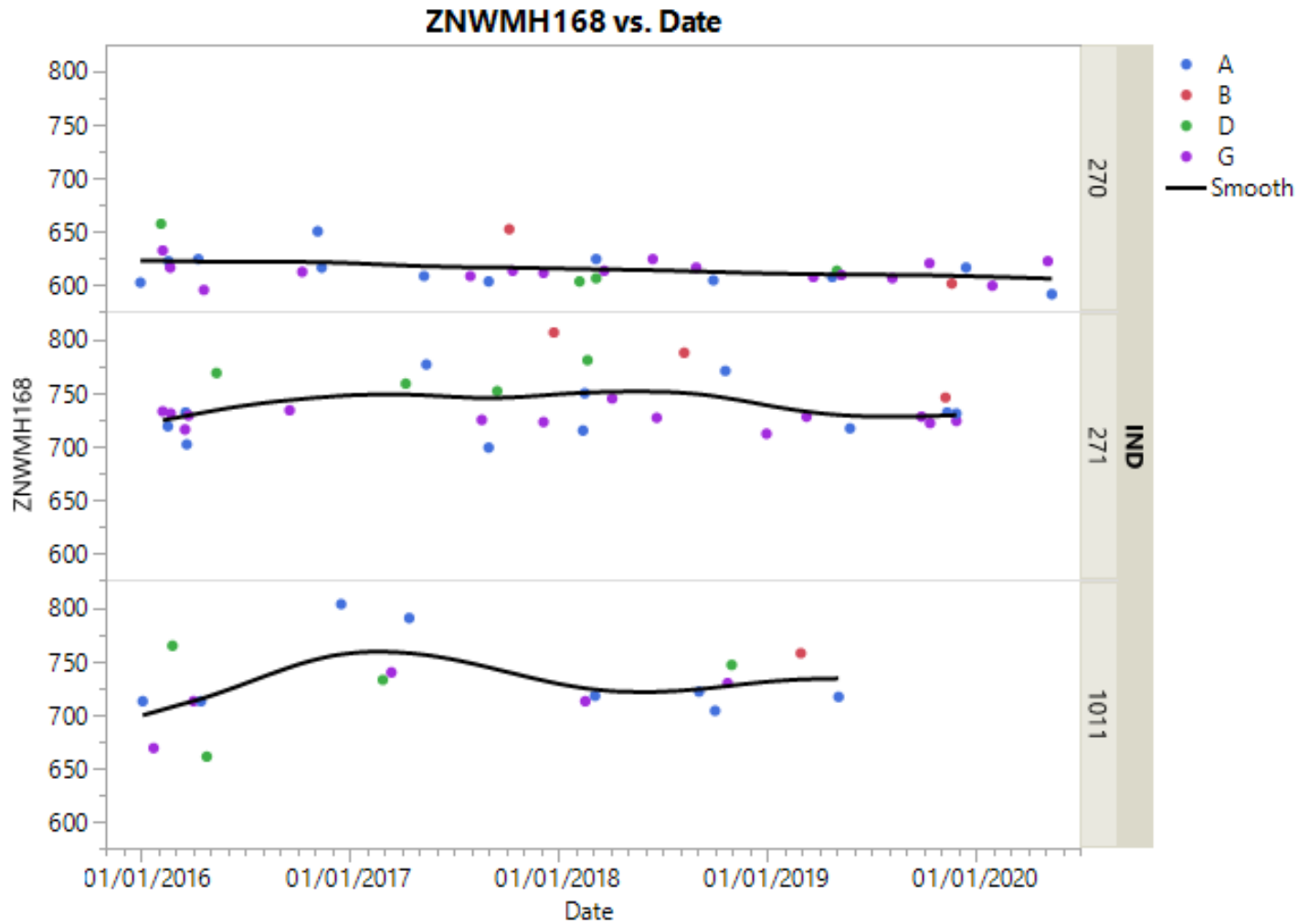


Graph Builder

ZNWMH096 vs. Date



Graph Builder



Graph Builder

ZNWMH192 vs. Date

