Multi-Stress Creep and Recovery Test Jnr diff determination

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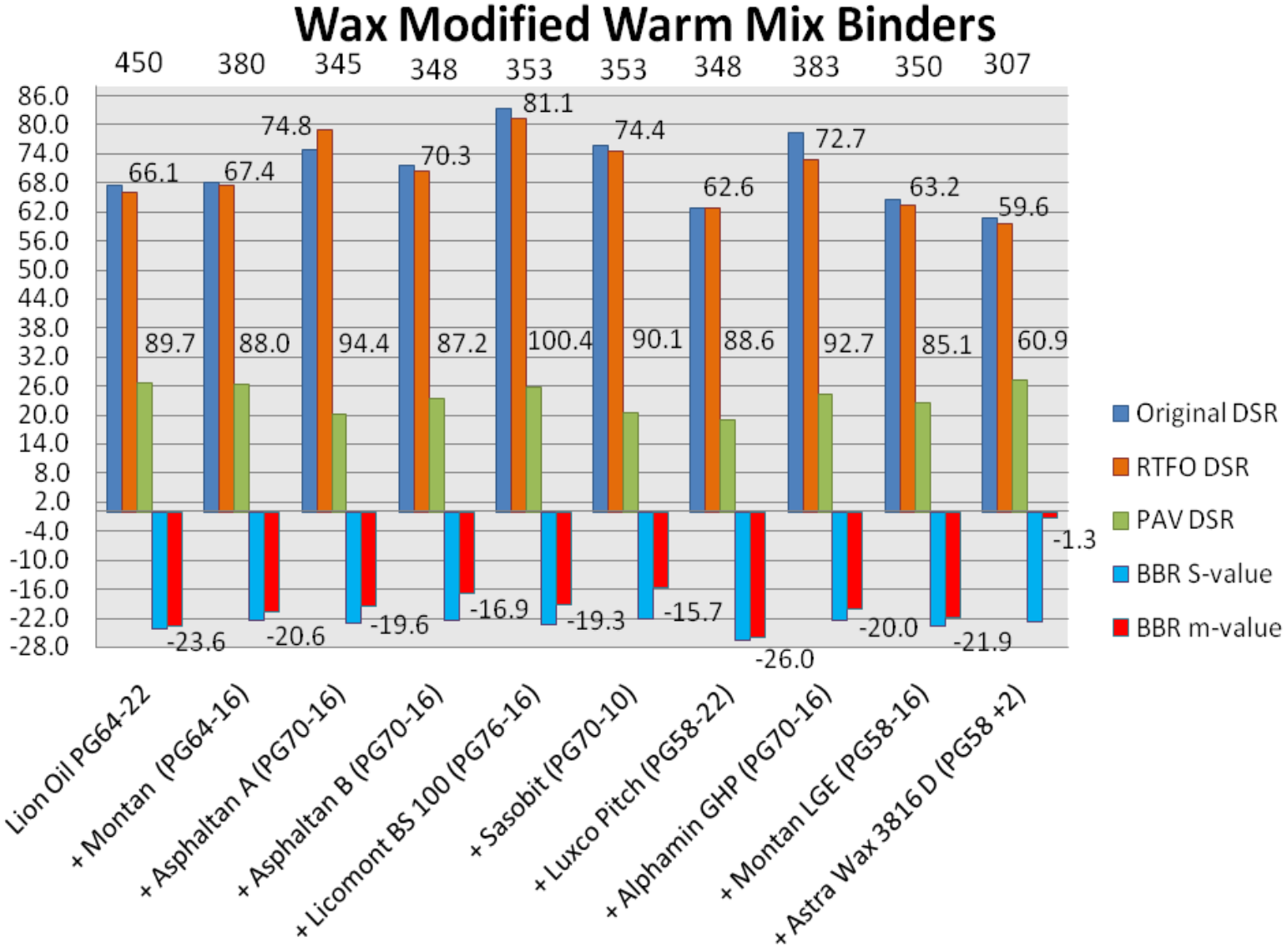
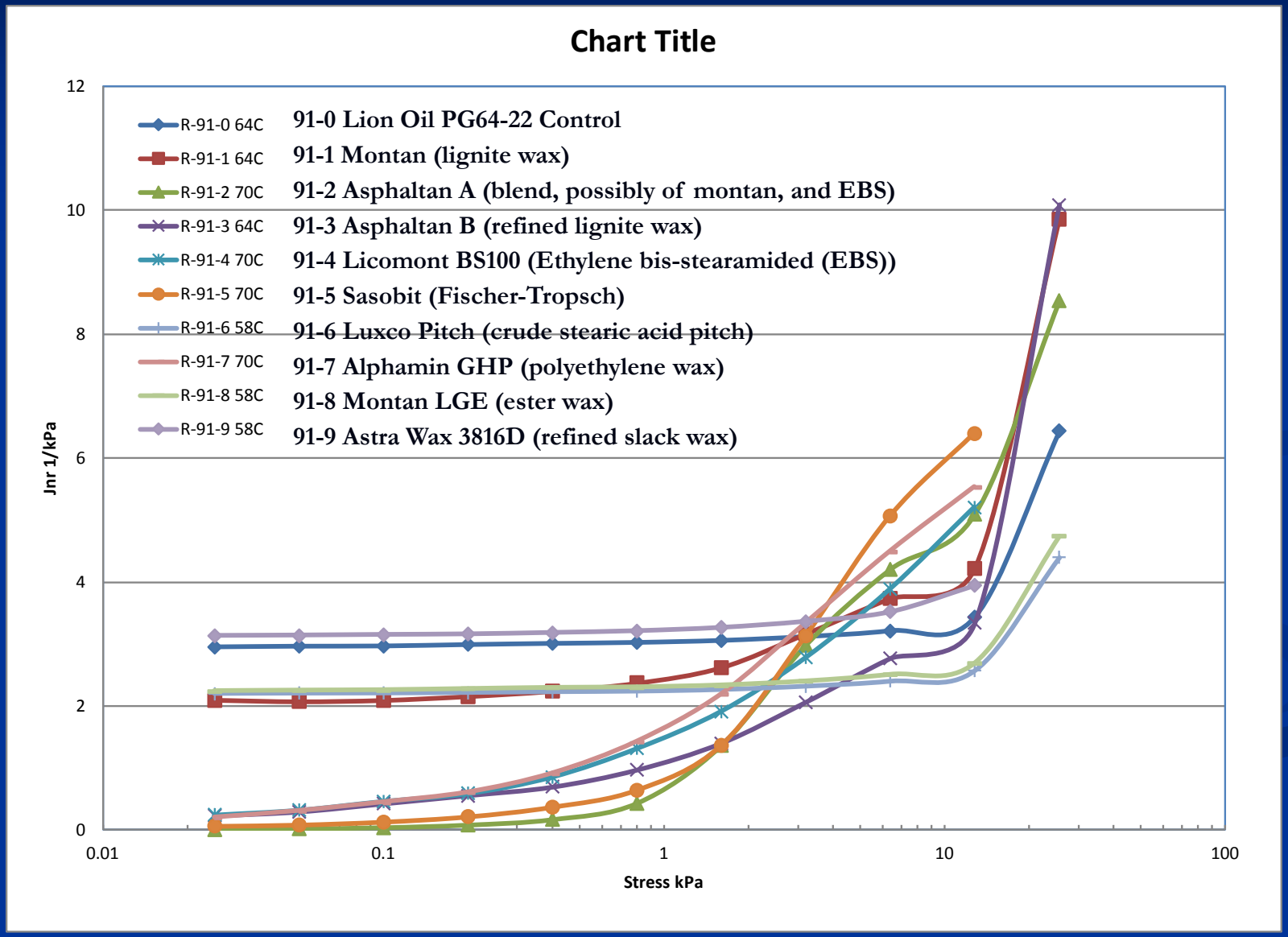
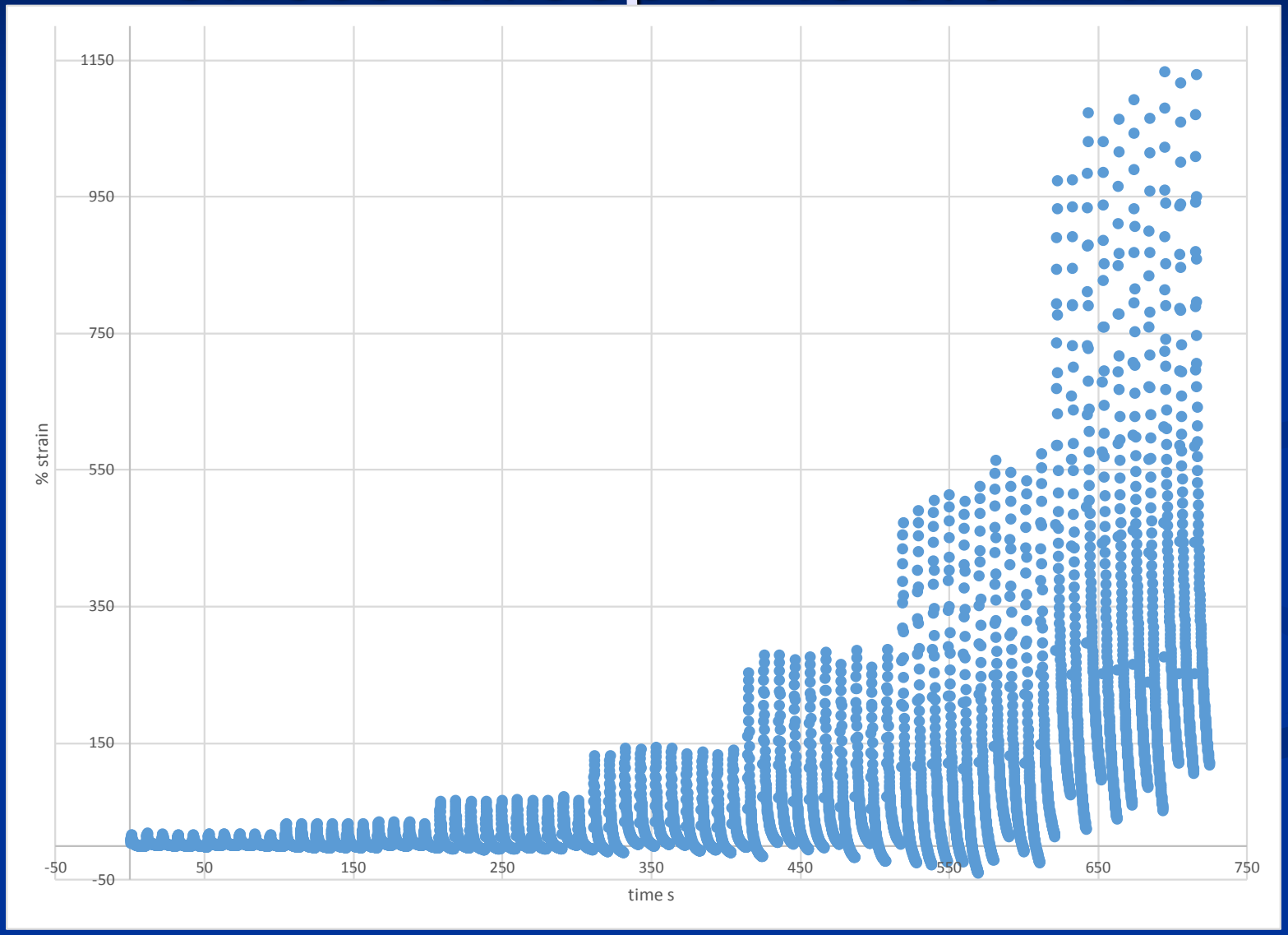
ETG Wax study



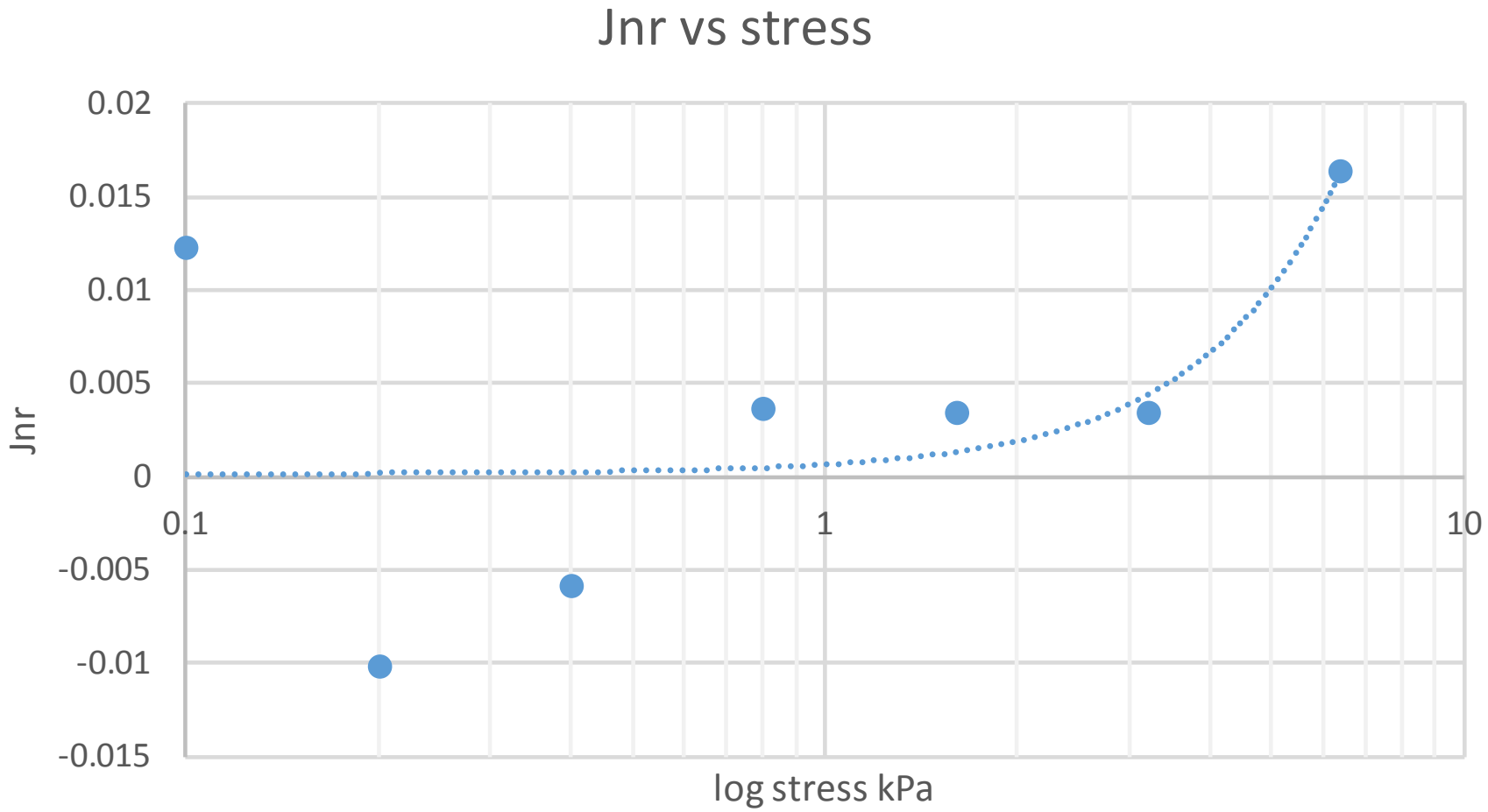
ETG Wax study



Highly modified binder MSCR stress sweep .1 to 6.4kPa



Jnr change with stress increase



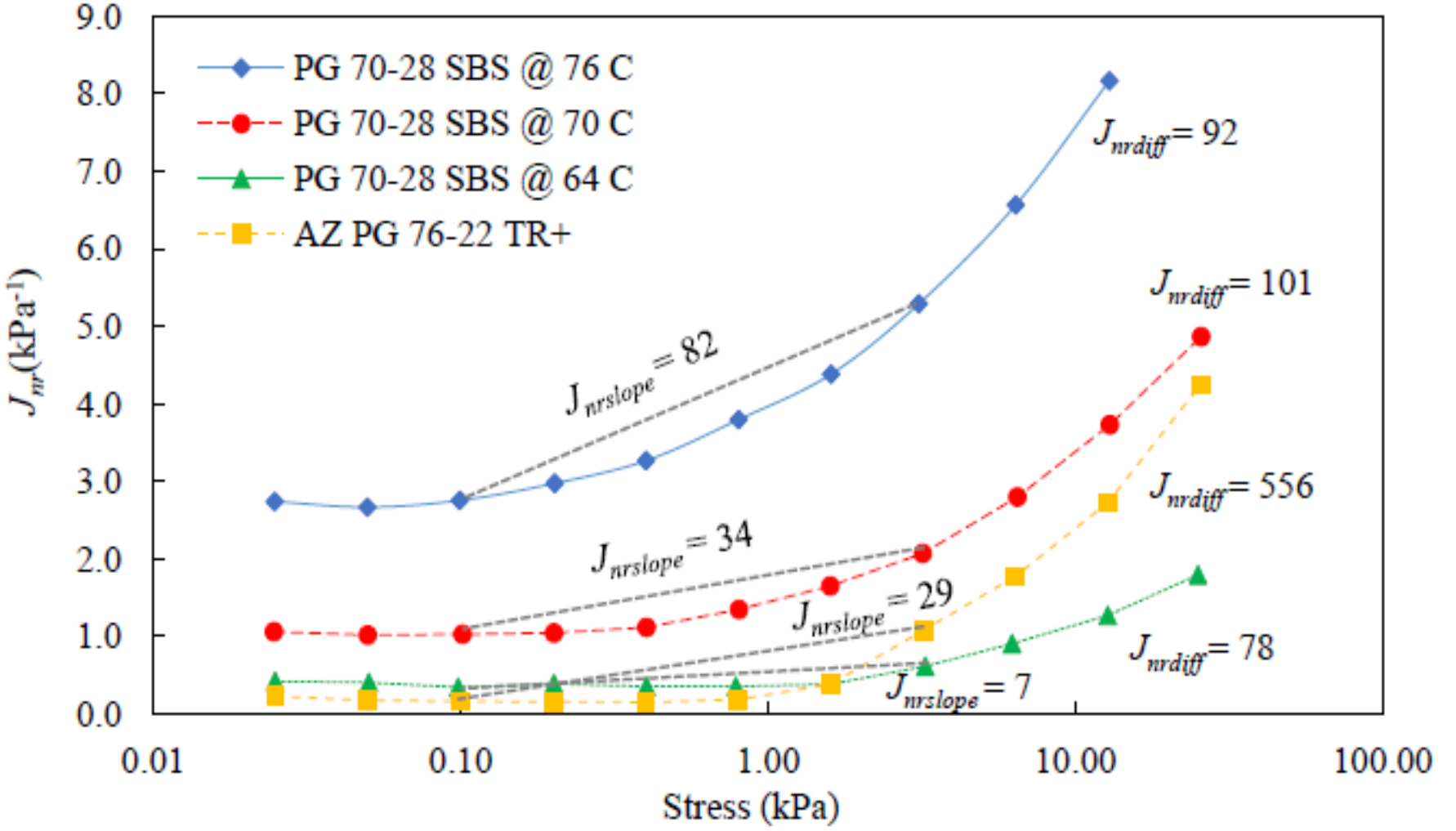
Correction of Jnr Diff

- Increase the low stress from .1 to .8 kPa still in the linear range for most AC's
- Consider going to Jnr slope Arizona procedure.
- Keep original recommendation of waive Jnr diff for E grades.

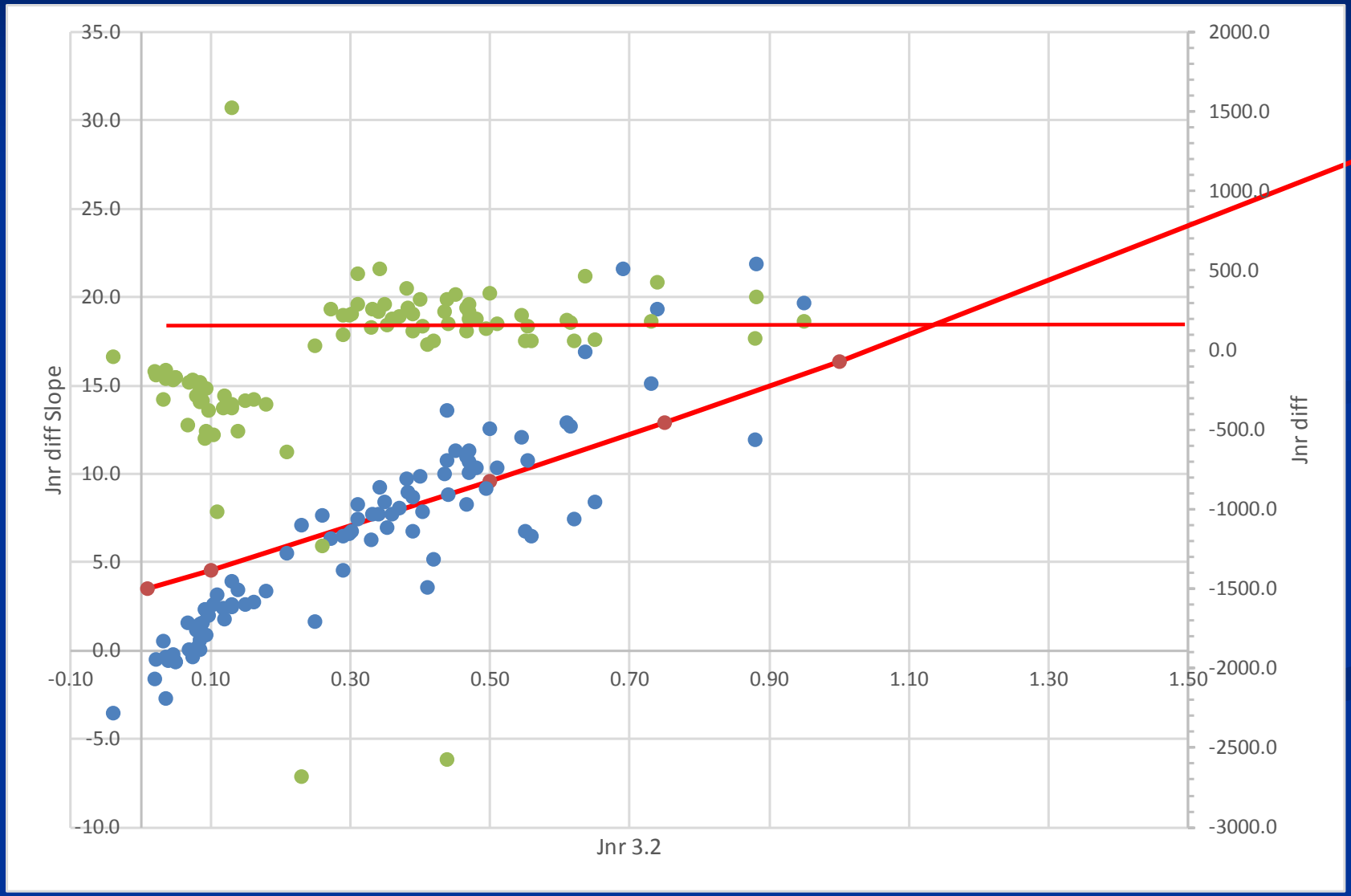
Jnr Slope

- Jnr diff (Jnr3.2 – Jnr0.1)/Jnr0.1
- Jnr diff slope (Jnr3.2 – Jnr0.1)/3.1 or (Jnr0.8 – Jnr3.2)/2.4

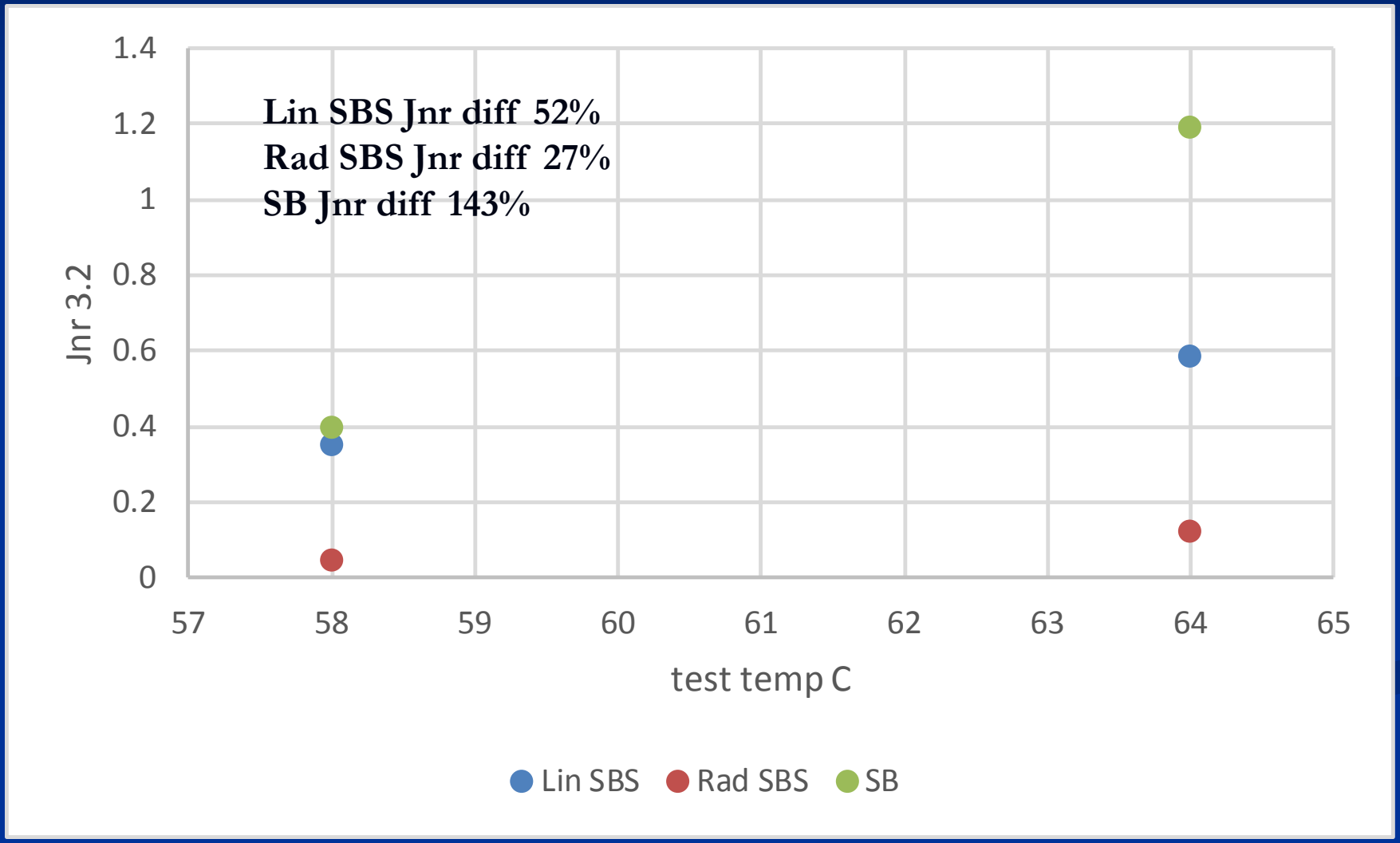
New Arizona State Procedure

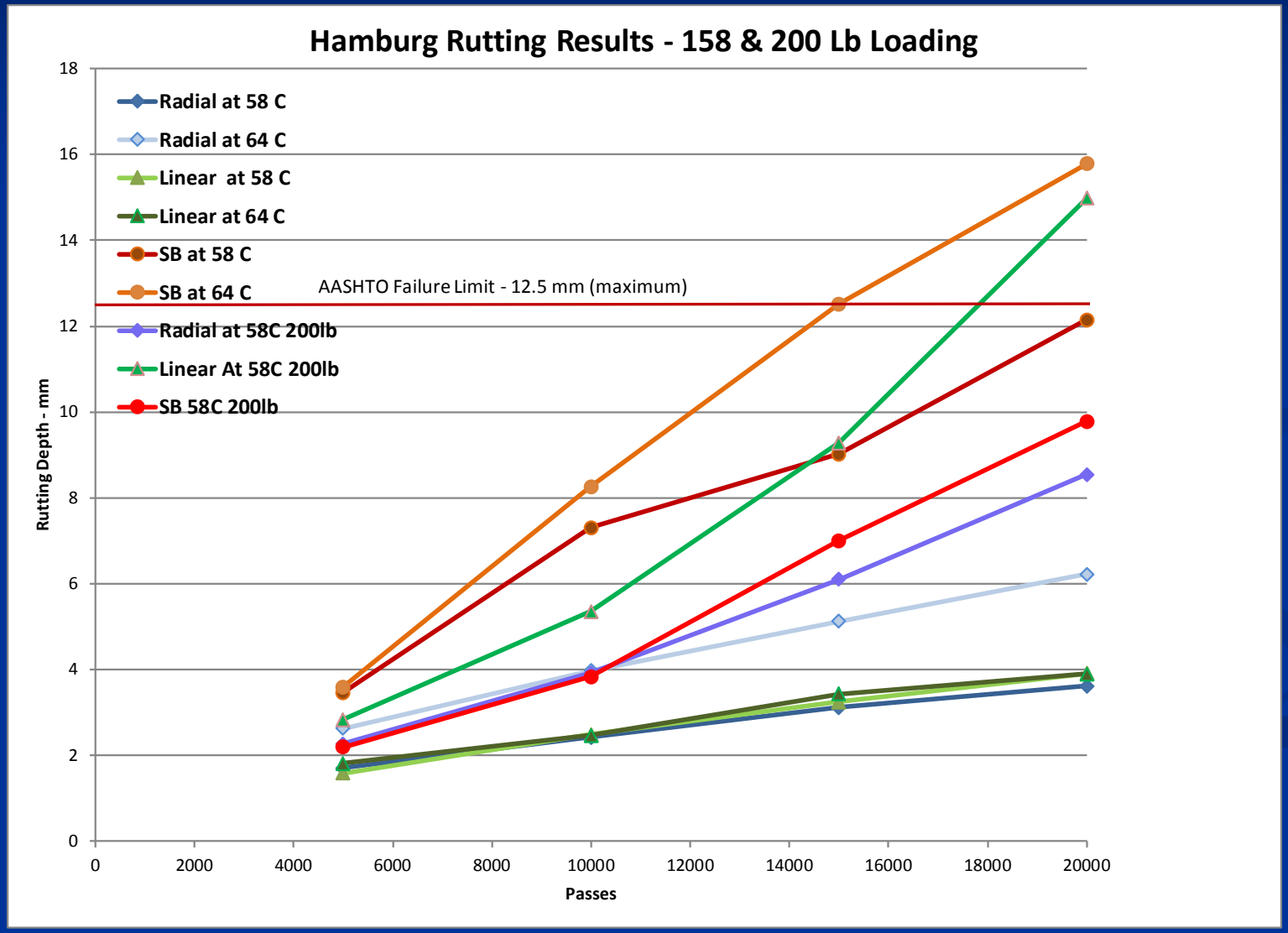


Comparison of Jnr diff to slope



Three PG 58E-34




Hamburg Rutting Results - 158 & 200 Lb Loading
Radial at 58 C
Radial at 64 C
Linear at 58 C
Linear at 64 C
SB at 58 C
SB at 64 C
AASHTO Failure Limit - 12.5 mm (maximum)
Radial at 58C 200lb
Linear At 58C 200lb
SB 58C 200lb
Rutting Depth - mm
Passes
0
2
4
6
8
10
12
14
16
18
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000

9 AC's Jnr diff .1 and .8 stress

	J_{nrdiff} (0.1-3.2) (Predicted value if cycles 11 -20 were at 0.1kPa)	J_{nrdiff} (0.8-3.2) (Percent Difference in Non-Recoverable Creep Compliance)	$J_{nr\ slope\text{-}diff}$ (Percent Difference in Non-Recoverable Creep Compliance)
58E-28	25.5	16.9	1.685212
58E-34	15.5	2.9	-0.41877
58S-34	63.5	36.7	19.23673
43166	64.1	42.8	7.836623
43168	42.9	18.5	0.866562
43174	58.0	36.1	22.80822
58E-34	26.7	29.9	0.002696
58E-34	51.9	47.4	0.033955
58E-34	142.8	77.0	0.033955

Log calculation of Jnr diff

radial	radial				linear				SB		
Stress	100	800	3200		100	800	3200		100	800	3200
Jnr	0.03	0.03	0.04		0.20	0.21	0.31		0.16	0.22	0.39
Jnr diff	0.27	0.30			0.52	0.47			1.43	0.77	
Jnr	0.03	0.03	0.04		0.20	0.21	0.31		0.16	0.22	0.39
log Jnr	-1.50	-1.52	-1.40		-0.69	-0.68	-0.51		-0.80	-0.66	-0.41
Jnr diff Log	-0.07	-0.08			-0.26	-0.25			-0.48	-0.38	

Next steps

- Collect data on Jnr slope
- Collect data on Jnr0.8kPa to calculations of both slope and Jnr diff