



SURFACE TEXTURE ON LOW VOLUME ROADS

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Outline of the presentation

- Texture
 - Alabama project

- Texture and Noise
 - Canada project

Research Program (Alabama)

- Scope
 - 650 miles HMA pavement in 2 Alabama Counties
 - AL1
 - Lane width: 8-9ft
 - ADT: 430 to 8 000
 - AL2
 - Lane width: 9-11ft
 - ADT: 600 to 15 000

Data Collection

- Texture
 - Right wheel path

Alligator Cracking



Patch



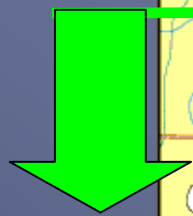
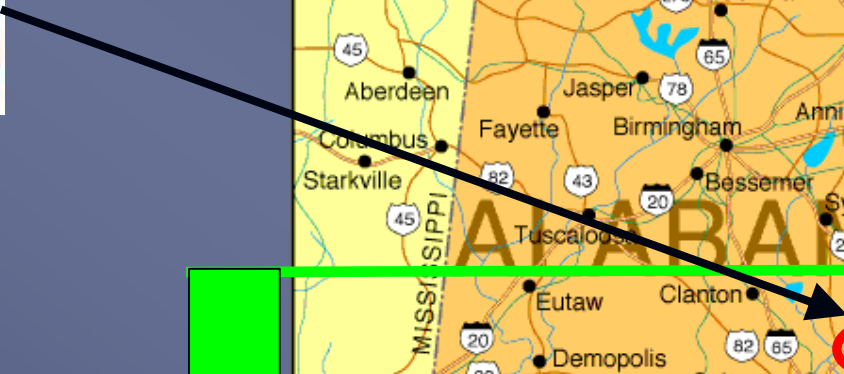
Transverse Cracking



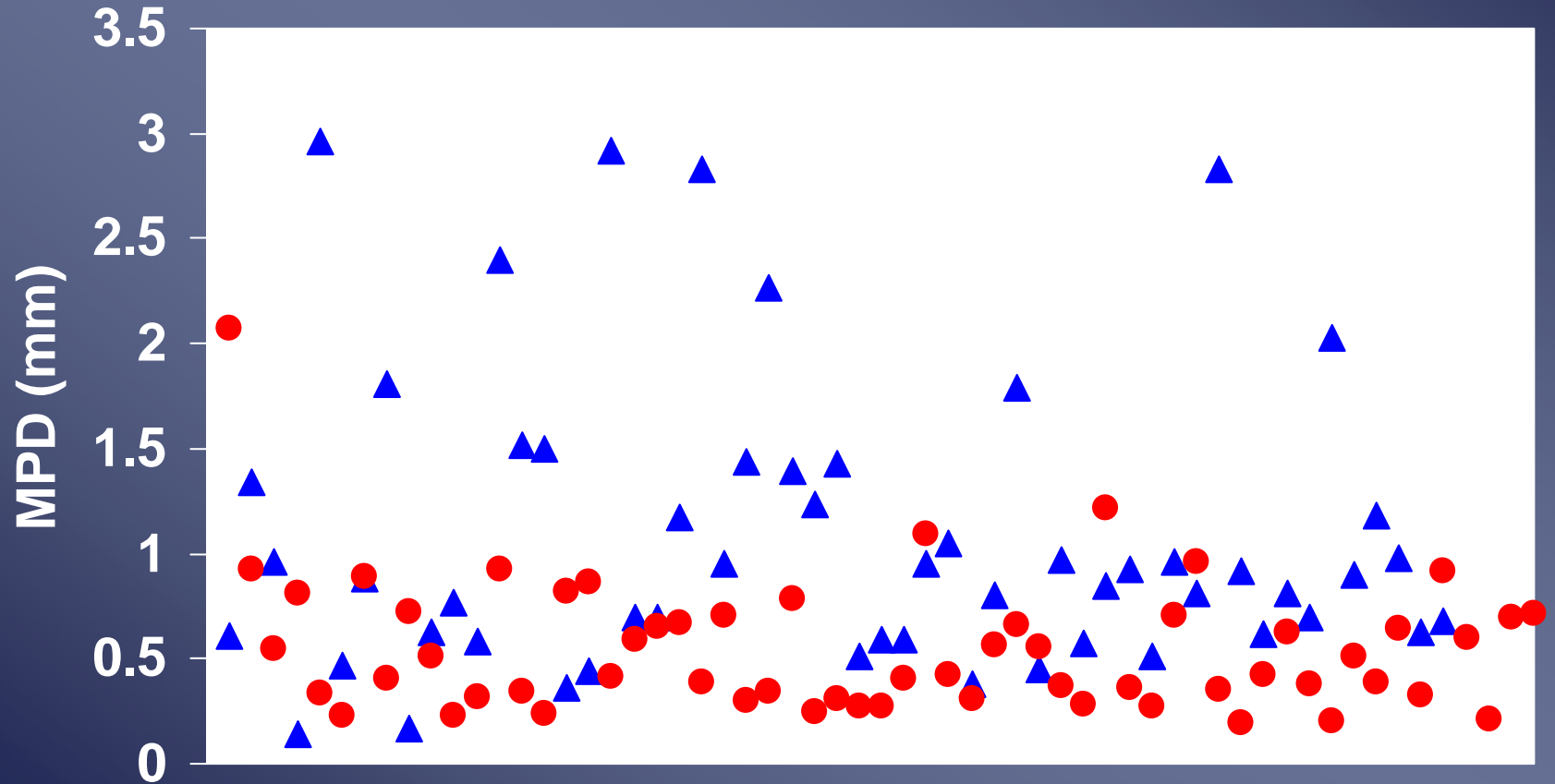
Auburn University Aran Van



Alabama Project



Average texture both Counties

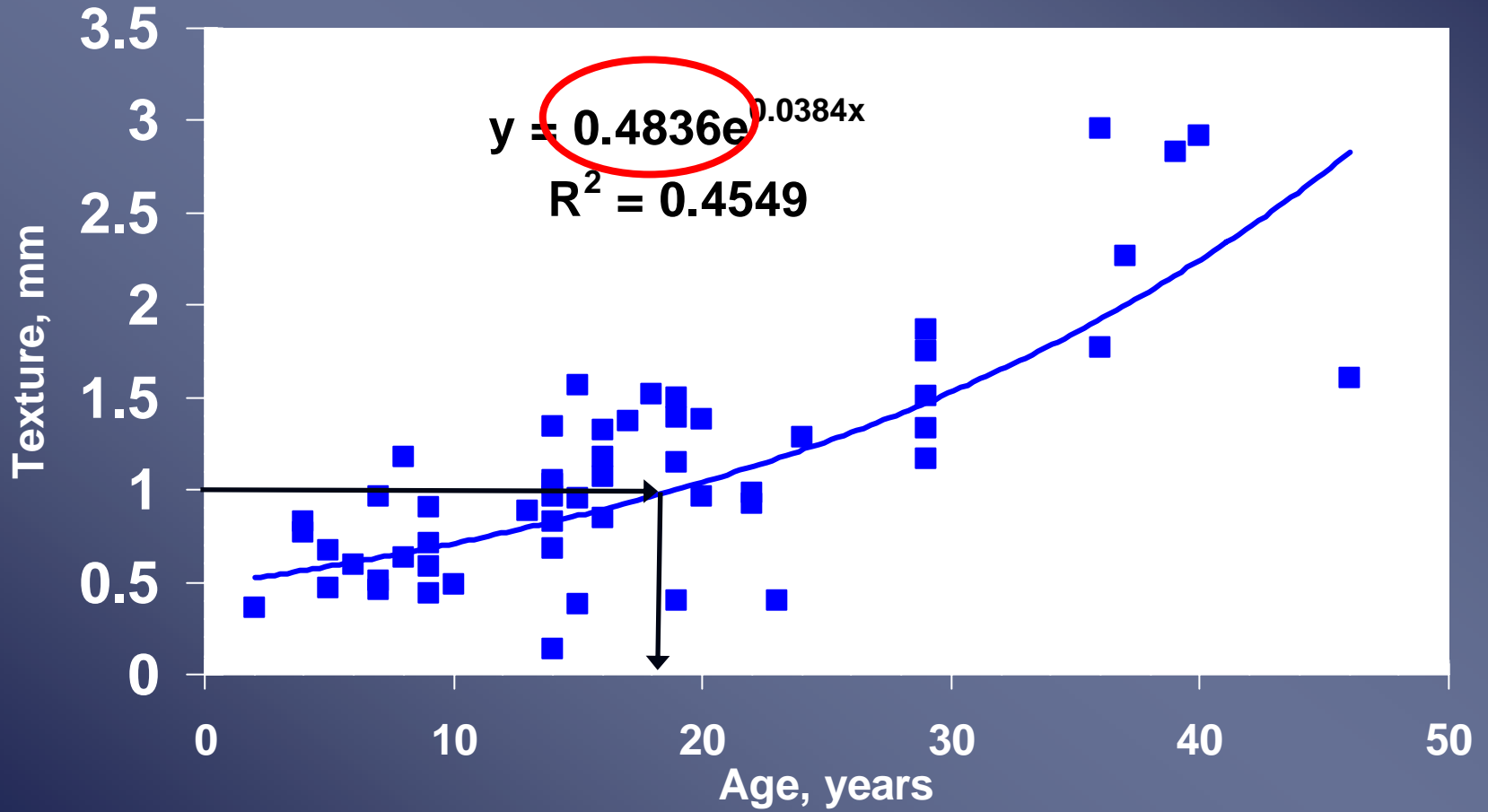


Texture

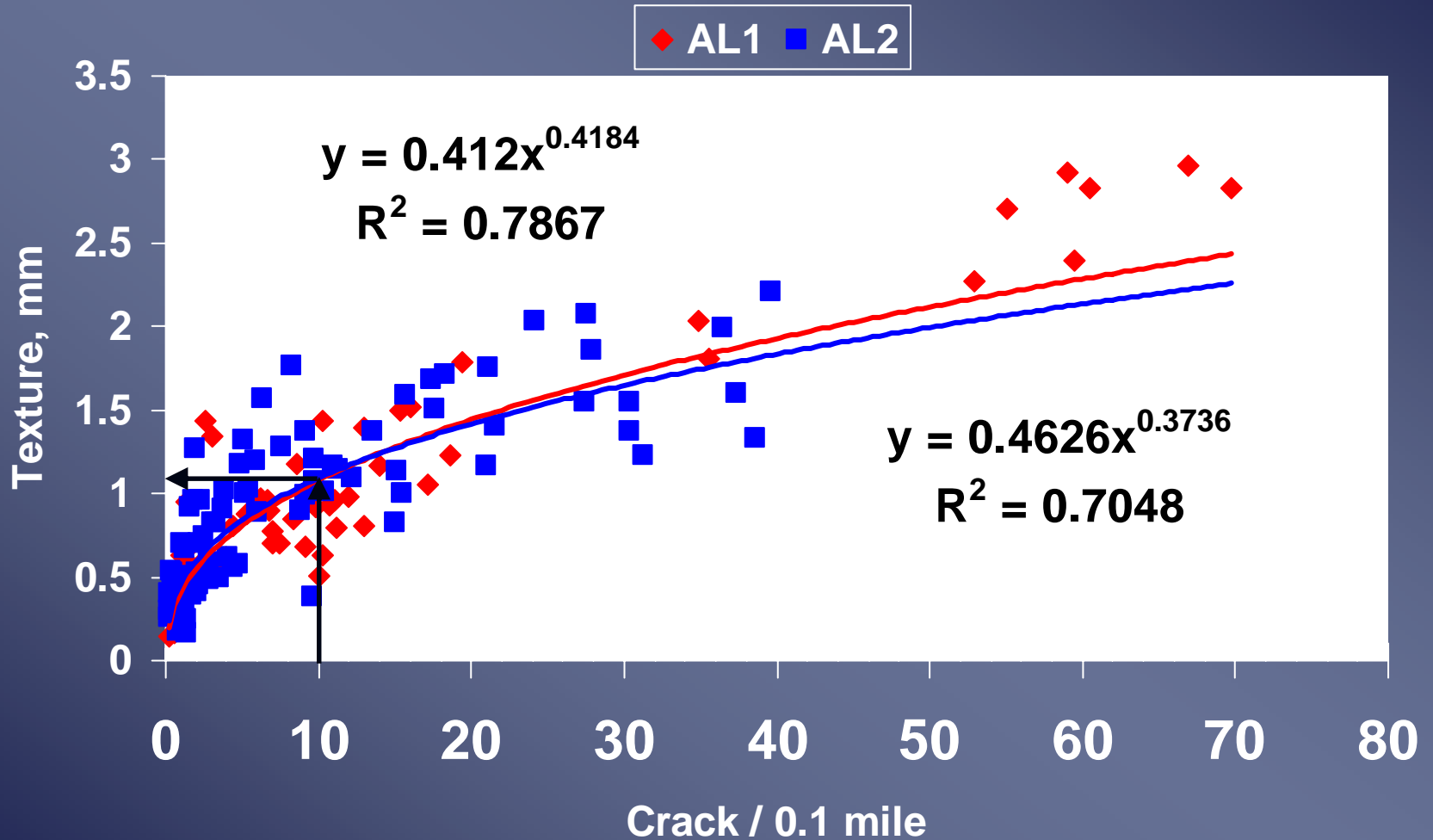
- Texture is a function of surface HMA gradation

Mixes	Average Values		Standard Deviations	
	Max Agg, mm	Texture, mm	Max Agg, mm	Texture, mm
Superpave Mixes	15.7	0.44	4.8	0.15
Marshall Mixes	17.4	0.47	6.1	0.16
Fine	12.5	0.24	0.0	0.03
Med.	11.4	0.32	1.5	0.13
Coarse	11.9	0.38	0.0	0.02
SMA	12.5	0.47	0.0	0.08

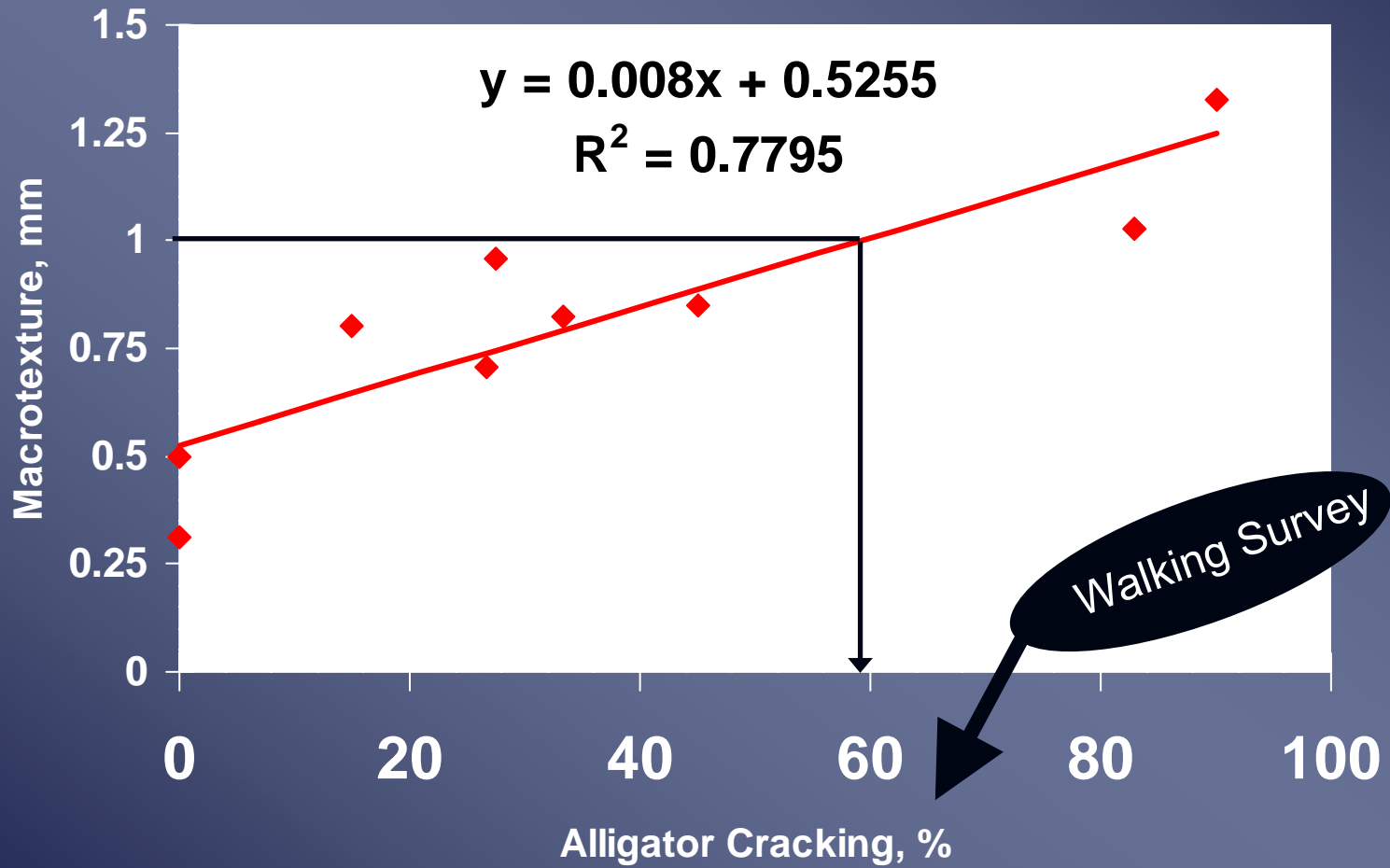
Both Counties



Both Counties

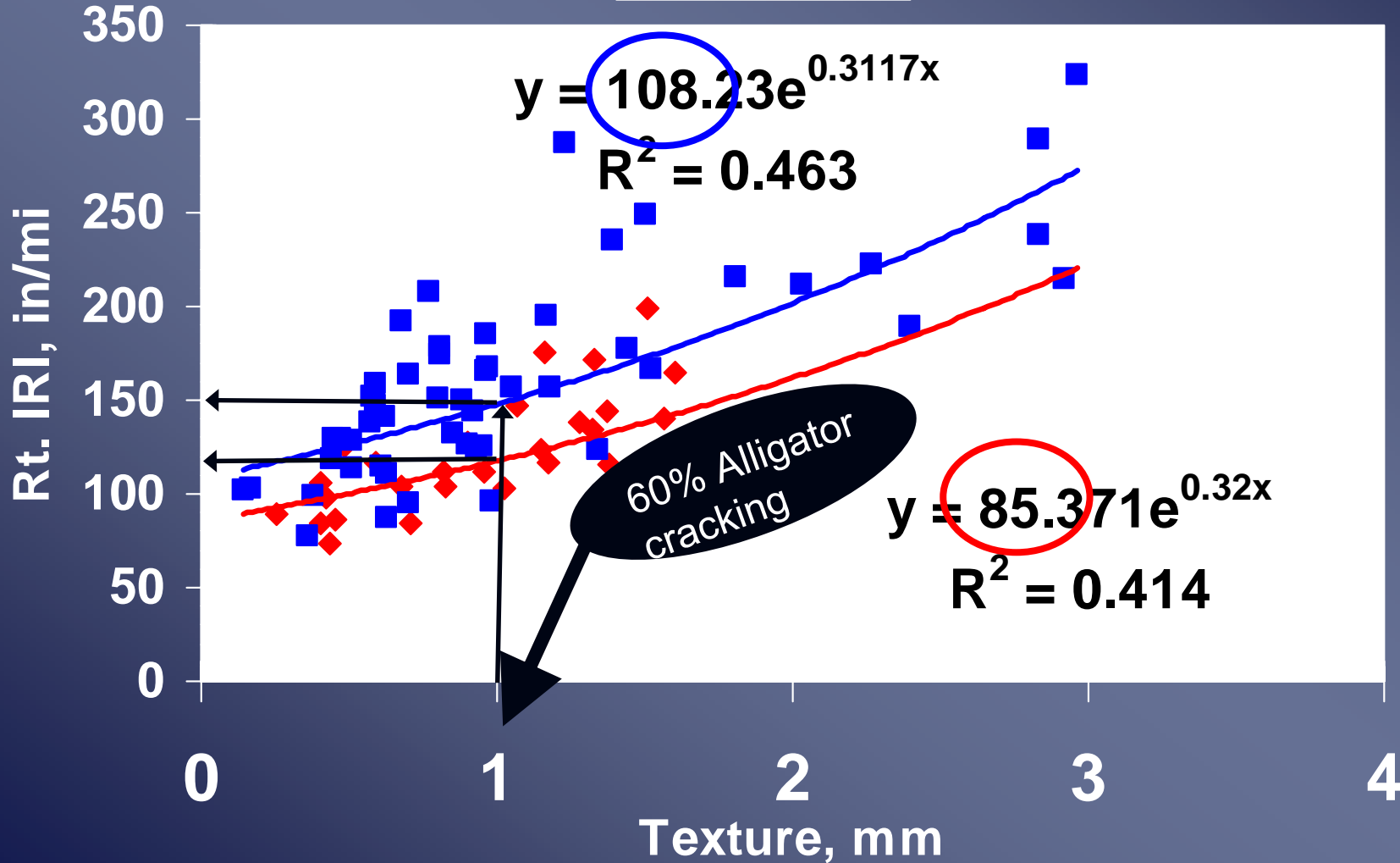


Both Counties



Both Counties

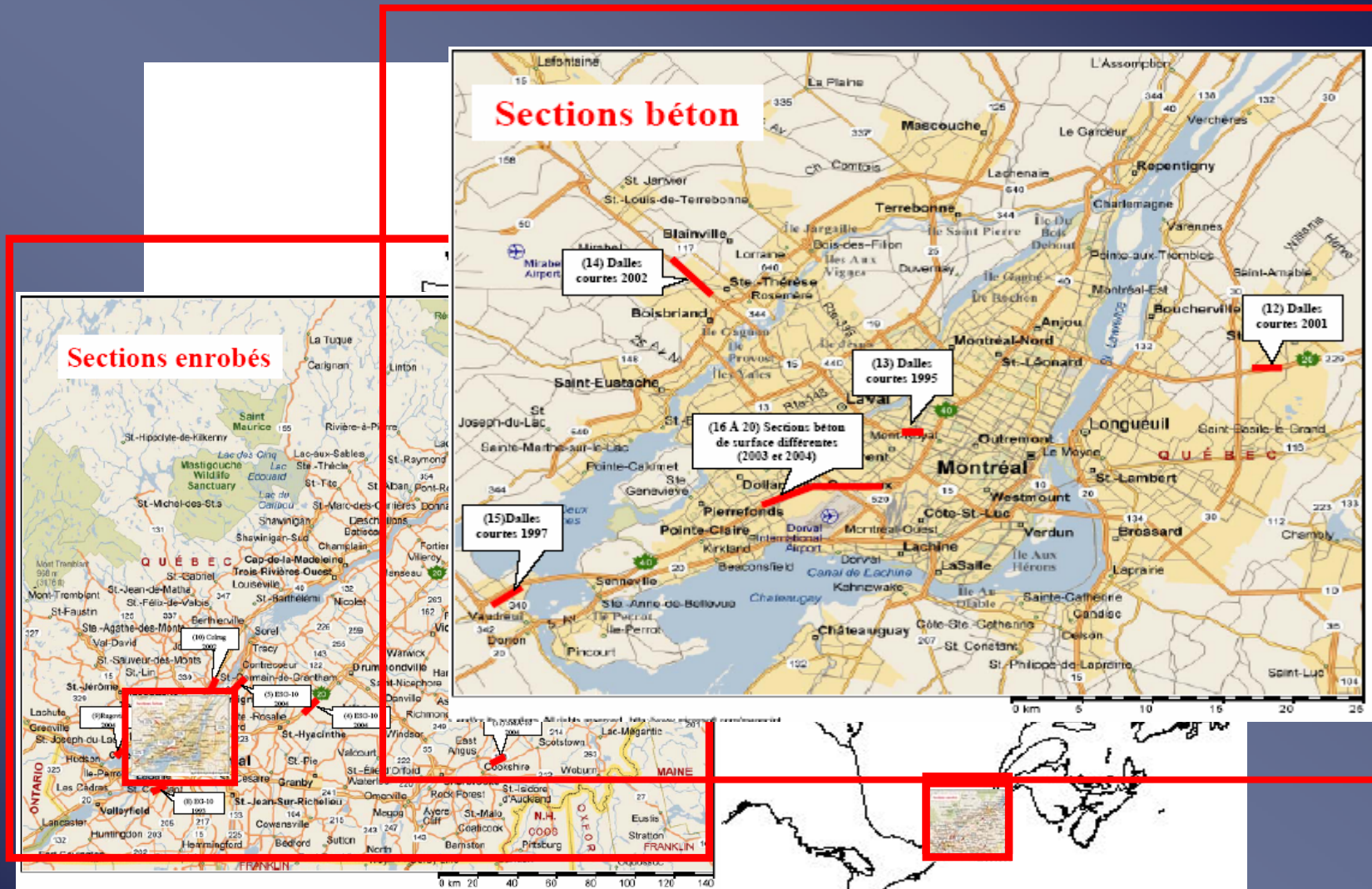
◆ AL2 ■ AL1



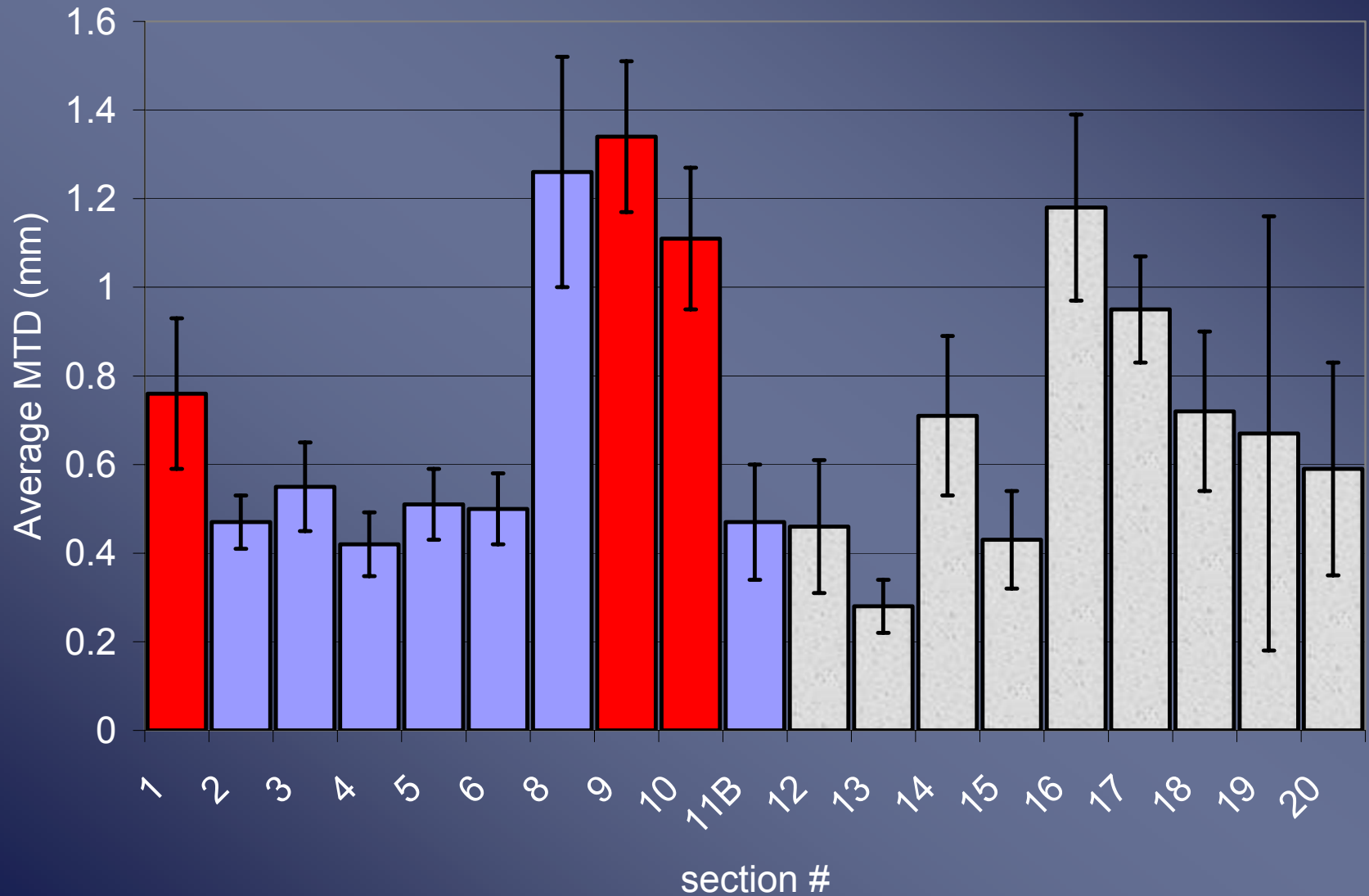
Conclusion for texture

- Texture is a good indicator of pavement condition
- Texture can be use to estimate:
 - Alligator cracking
 - Number of cracks
 - IRI

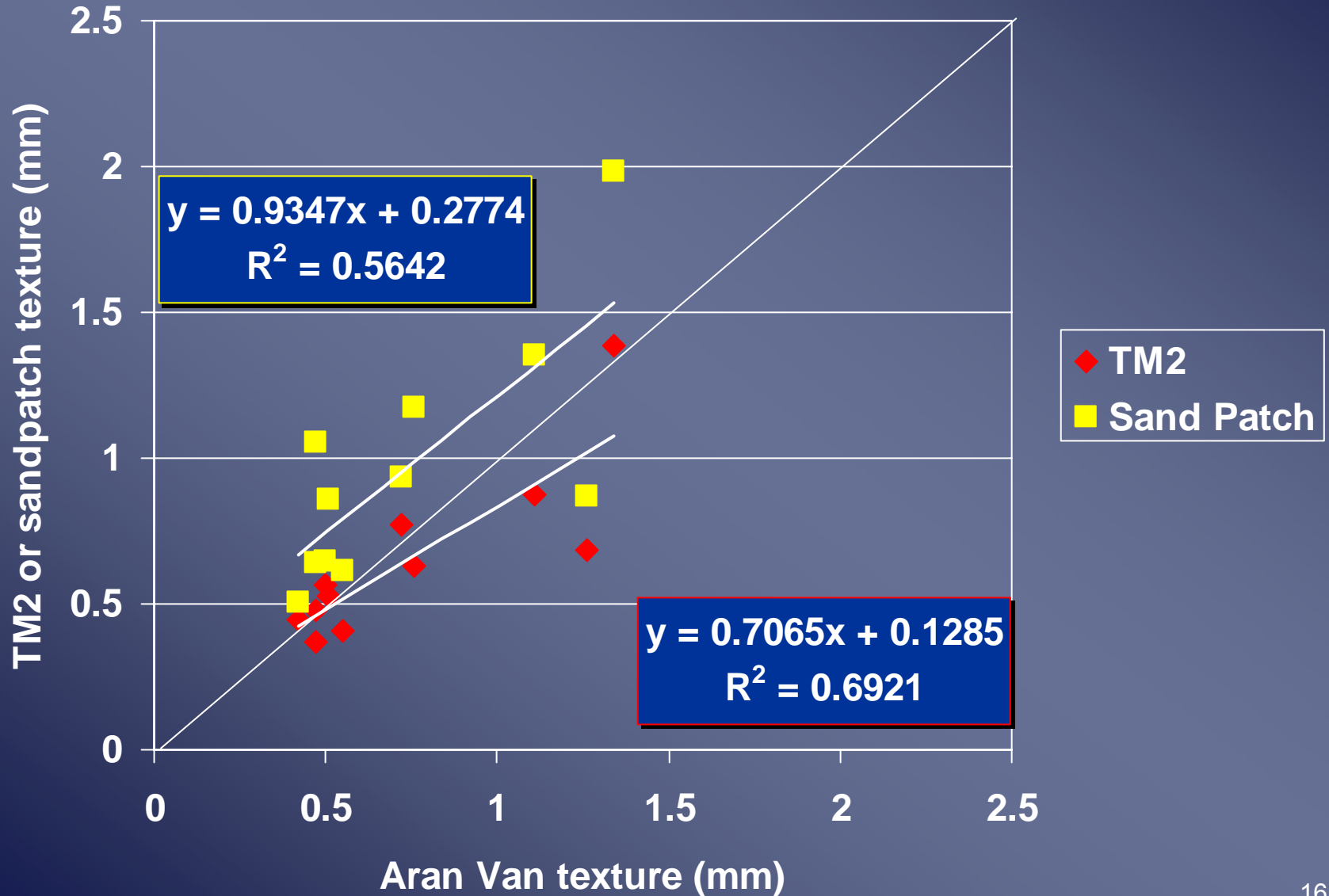
Project in Canada



Texture Canada



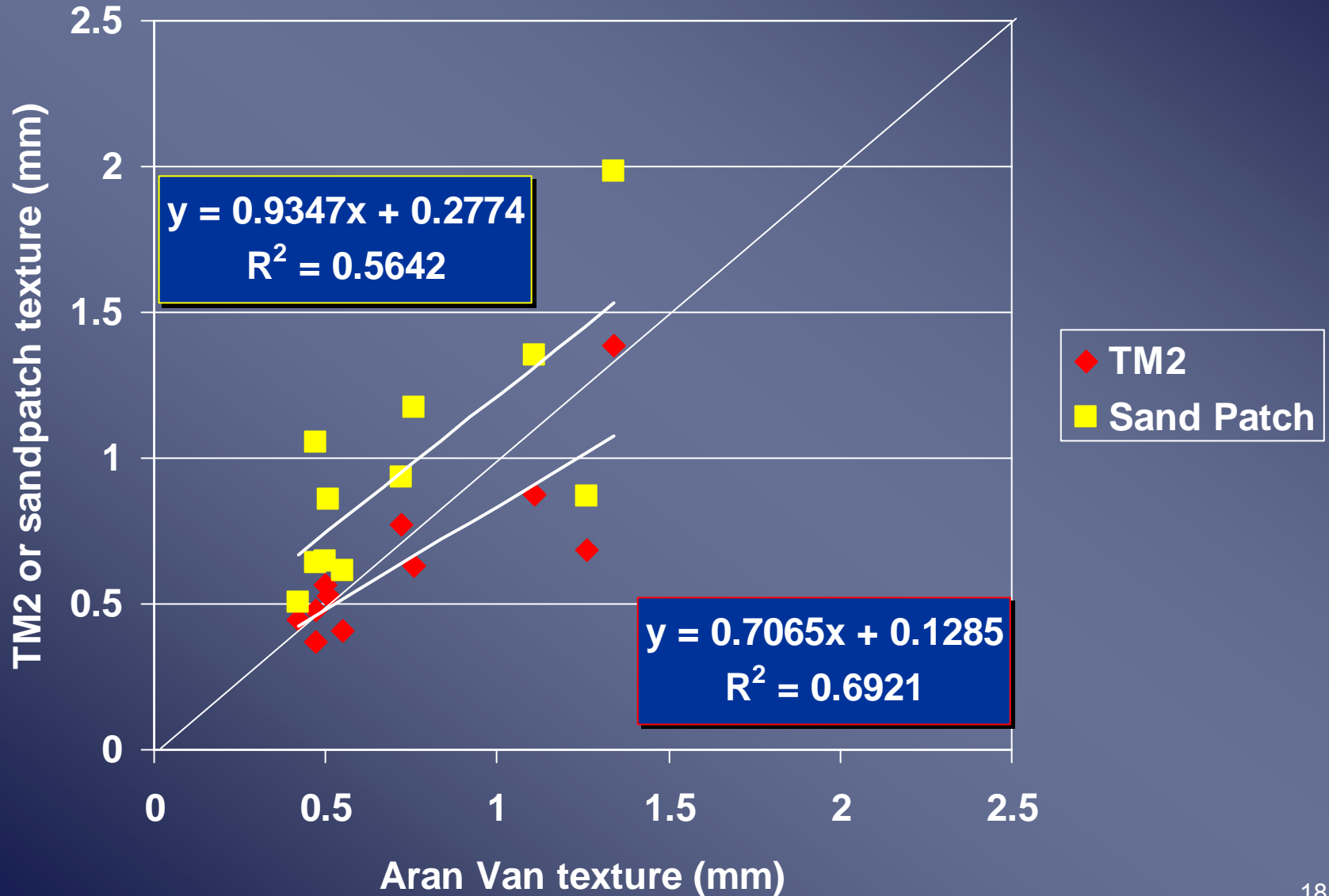
Texture Measurement system comp.



TM2



Texture Measurement system comp.

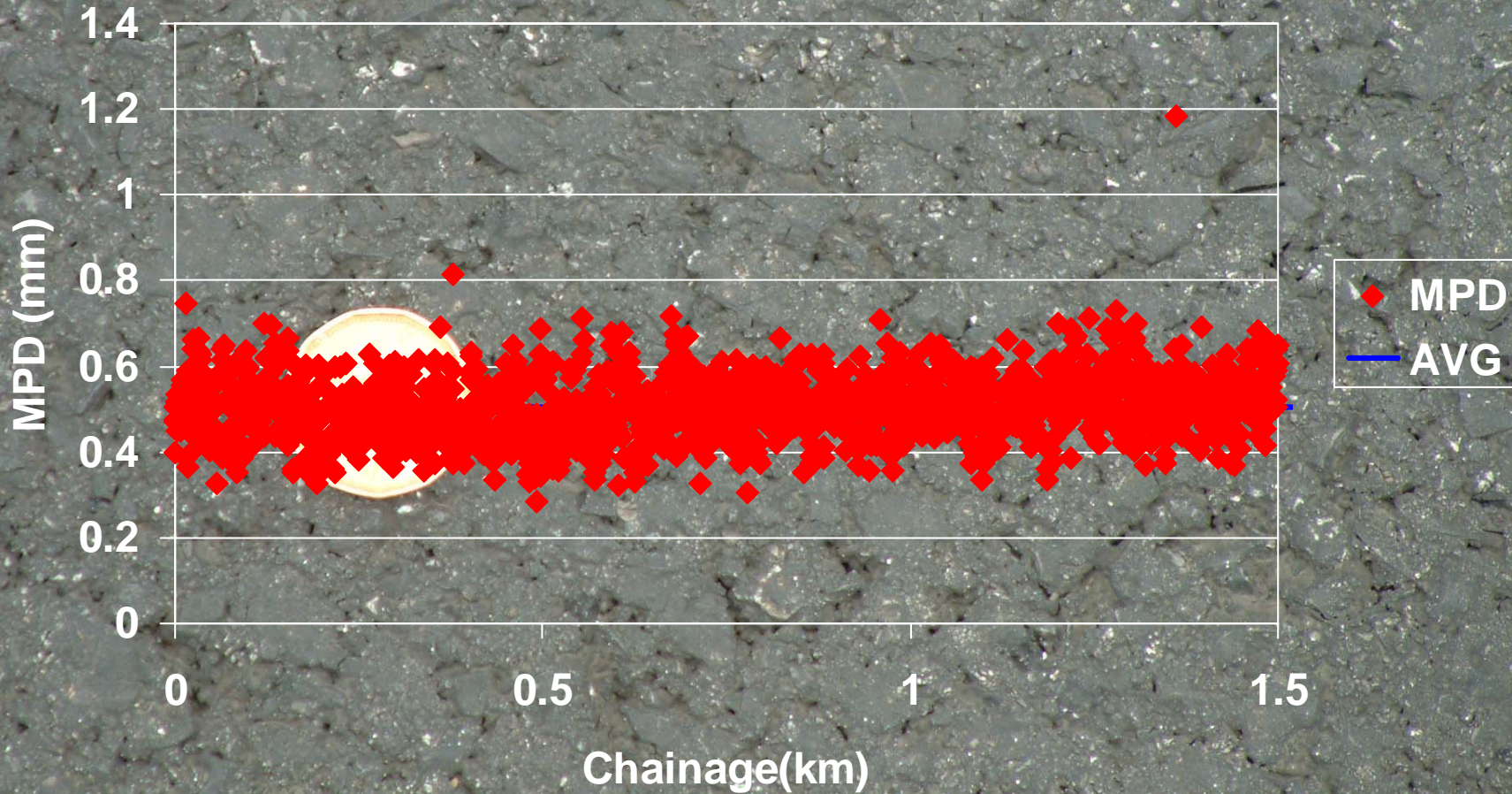


HMA

MTD AVG: 0.505763

STDEV: 0.075941

COV: 15.0%

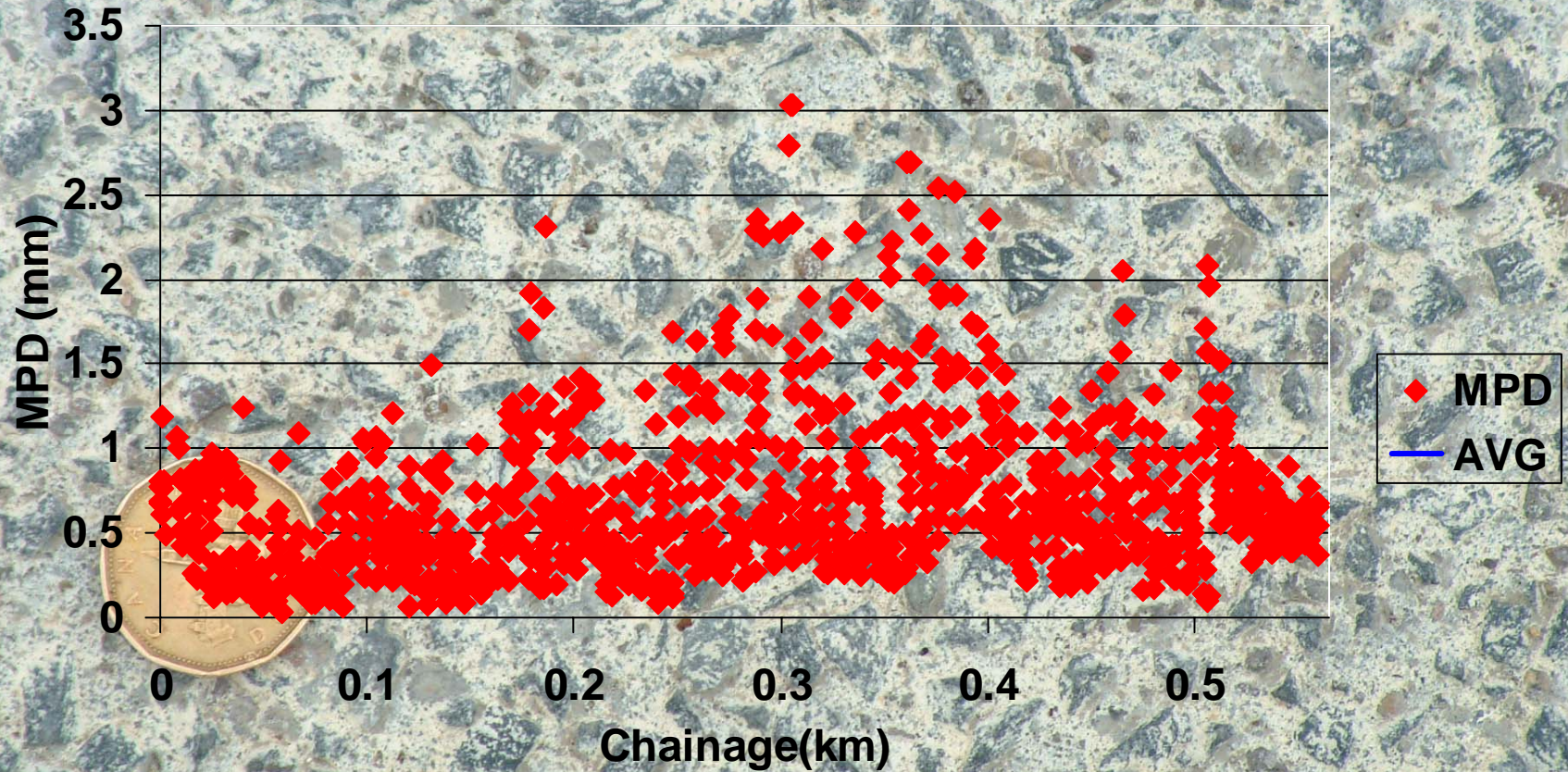


PCC

MTD AVG:0.6741

STDEV: 0.4874

COV: 72.3%

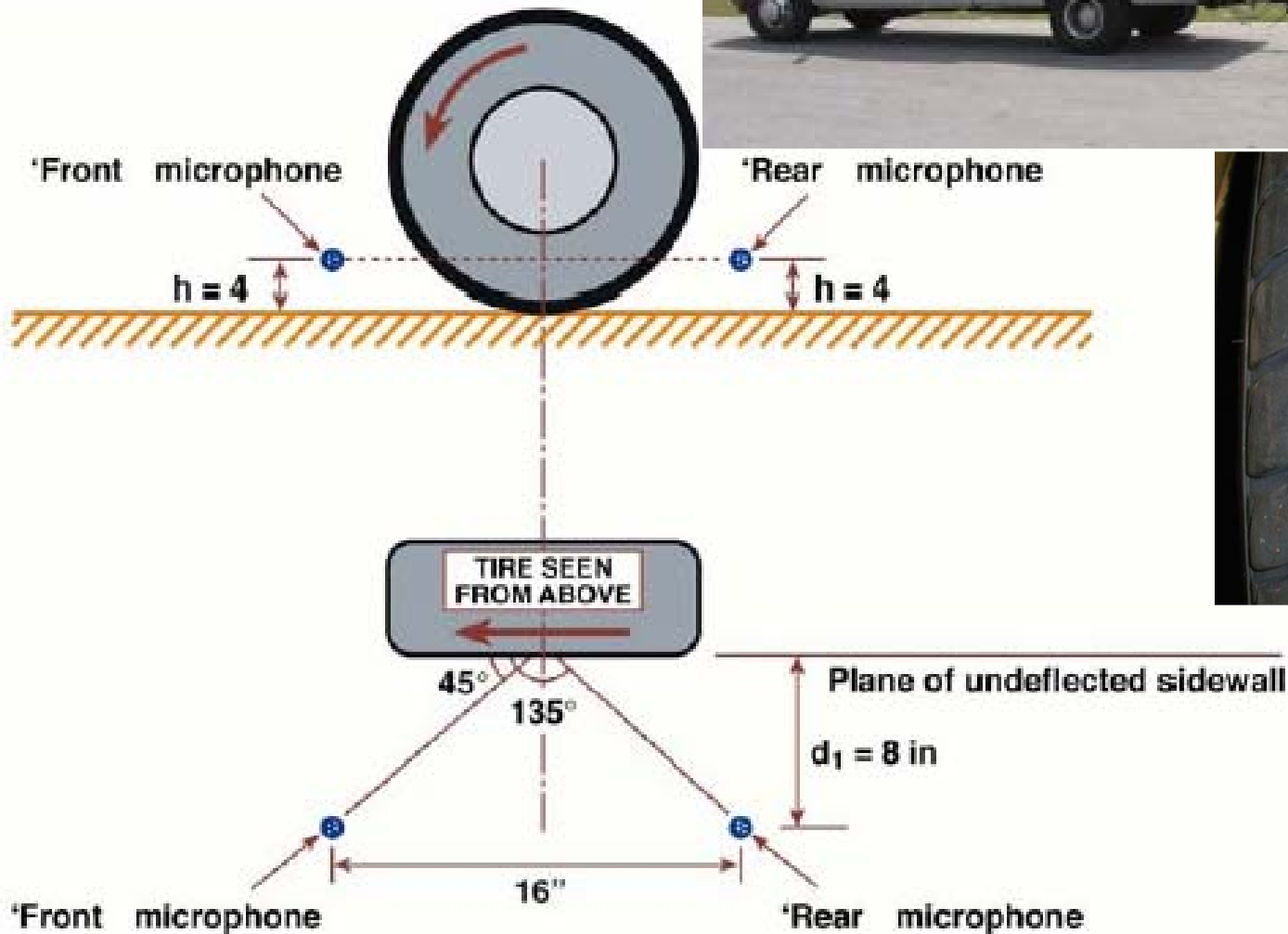


Parameters with influence on noise

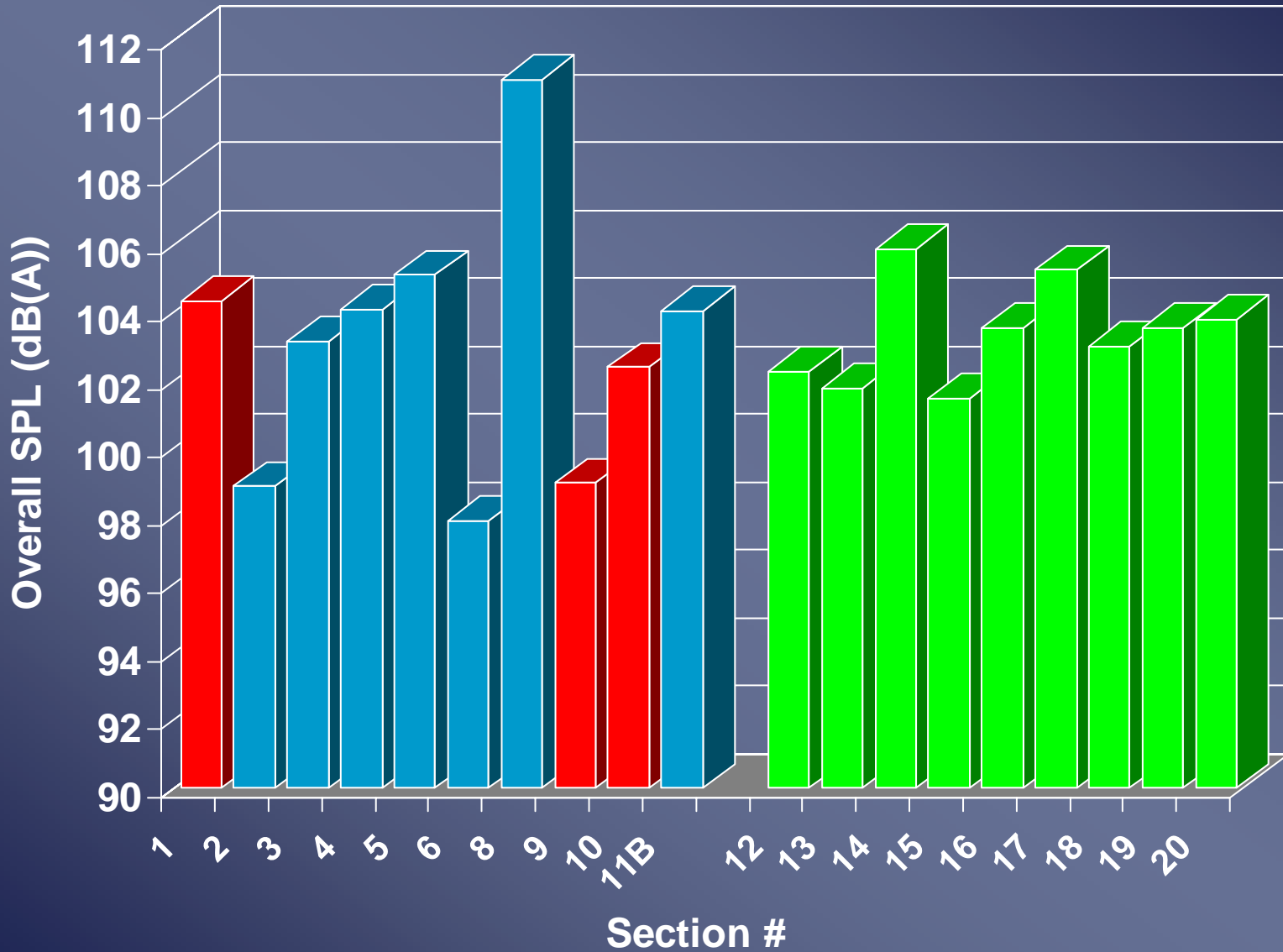
Parameter	Degree of Influence	Wavelength (mm)
Microtexture	Low-Moderate	< 0.5
Macrottexture	Very High	0.5 to 50
Megattexture	High	50 to 500
Unevenness	Minor	> 500
Porosity	Very High	-
Thickness of layer	High (for porous layer)	-

Sandberg (2002)

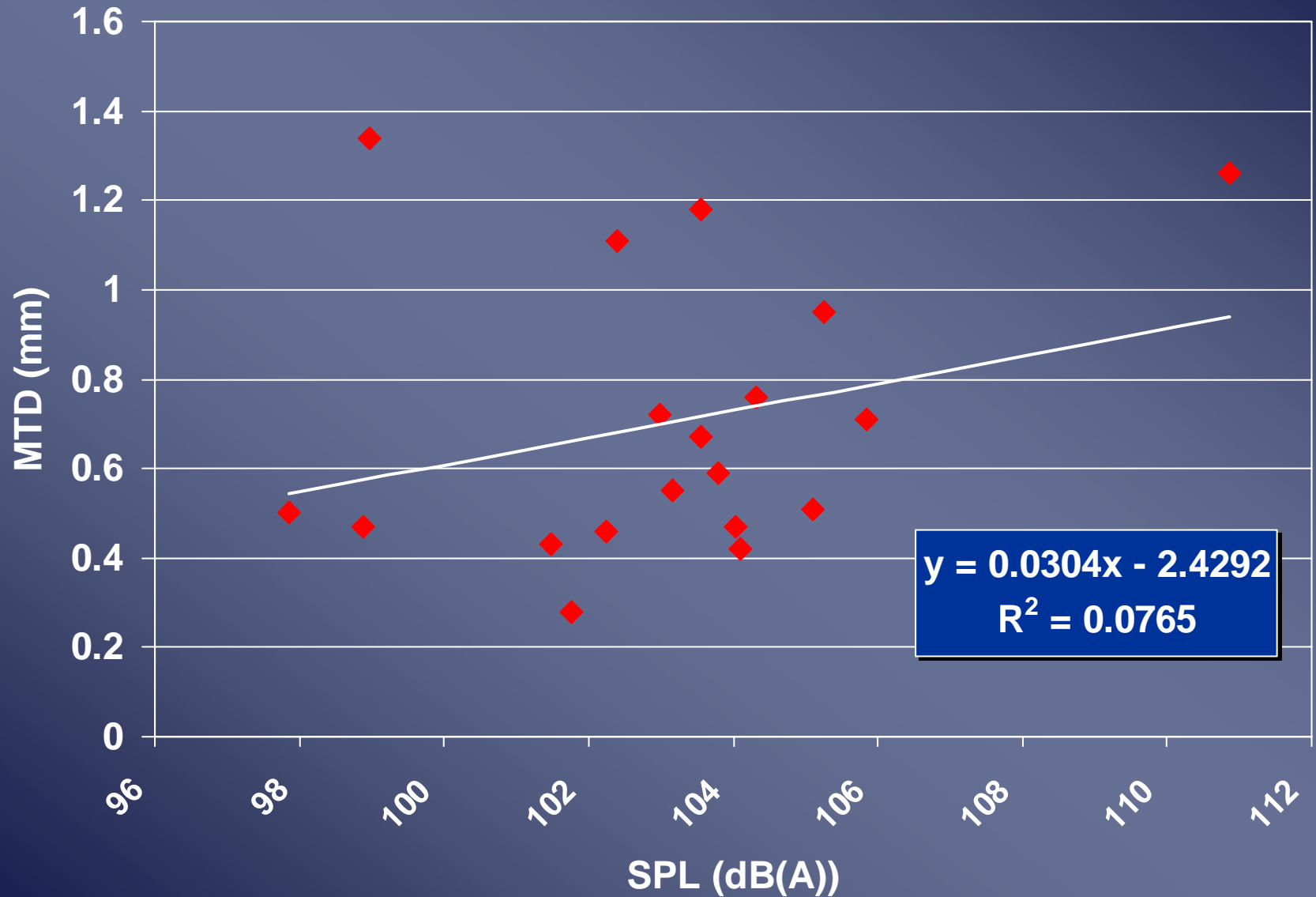
NCAT Noise Trailer



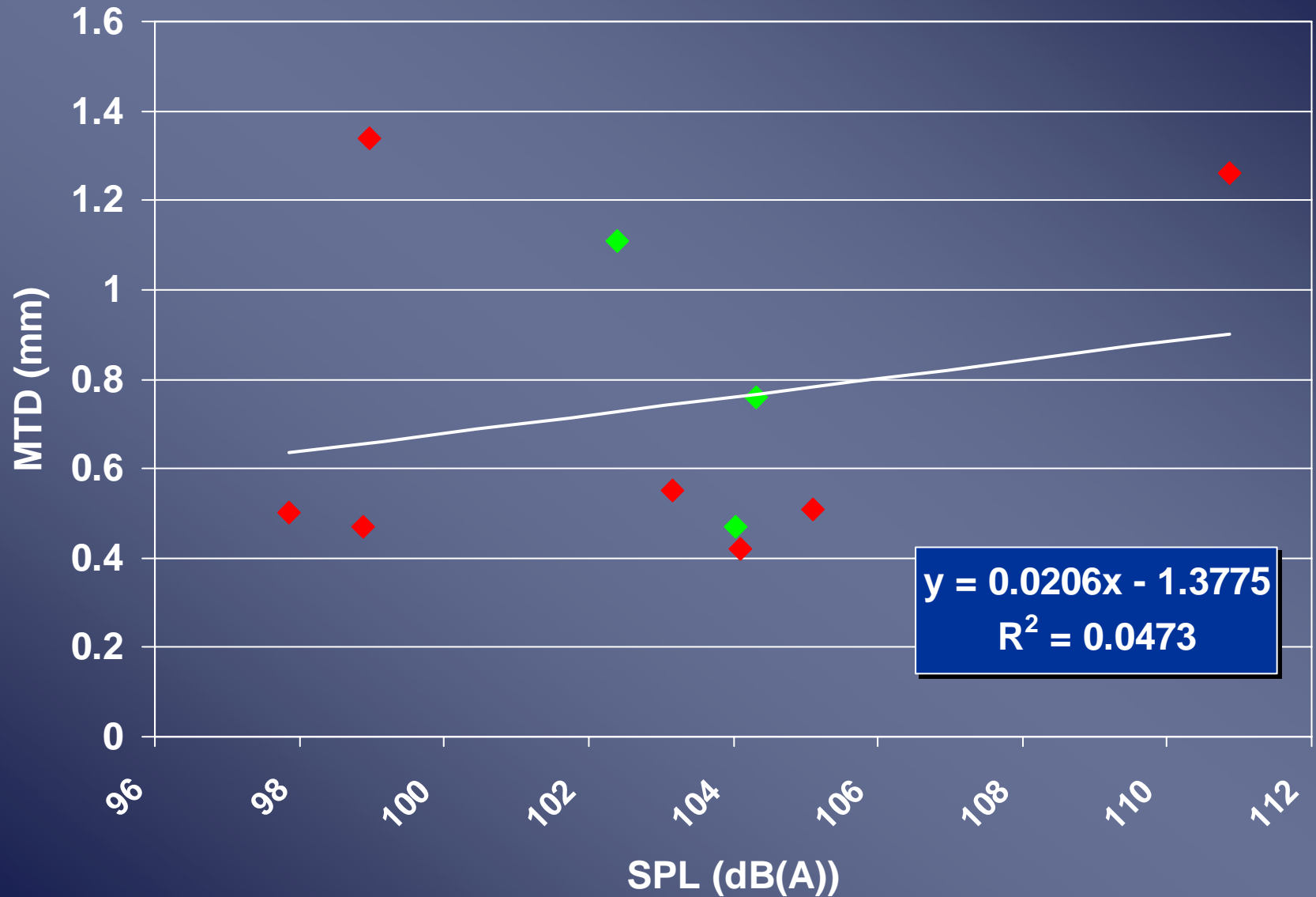
Overall SPL all sections



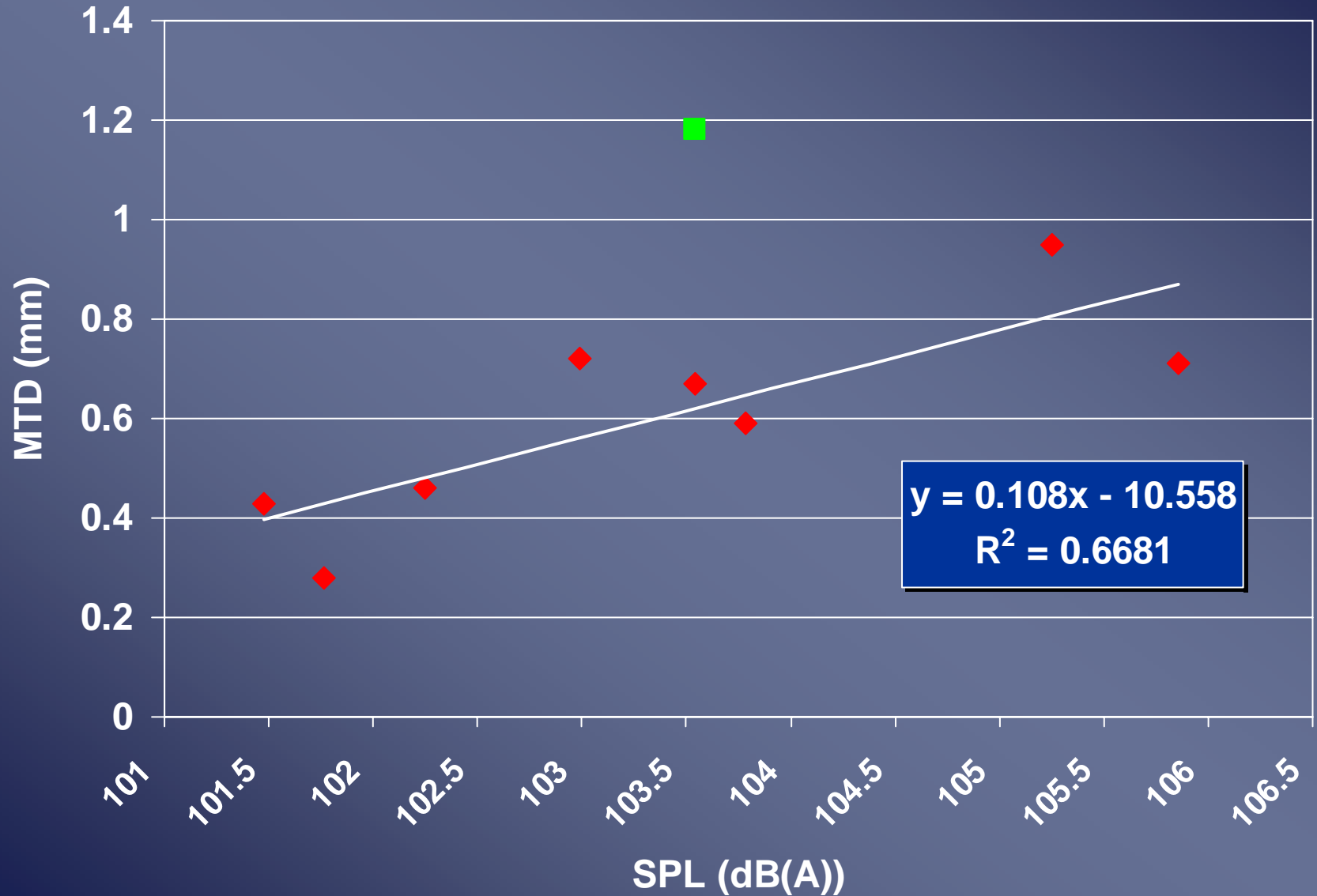
Overall SPL all sections



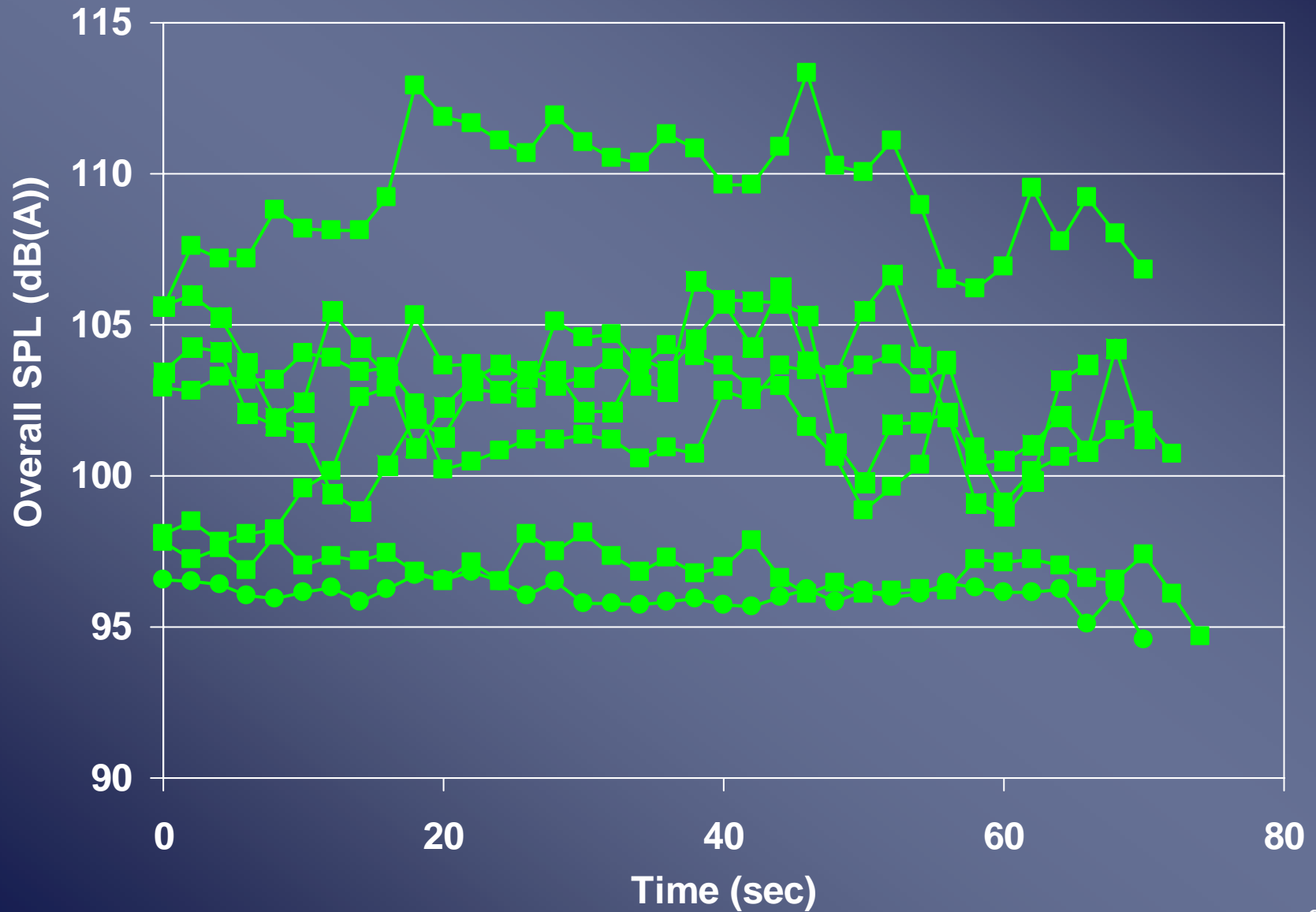
Overall SPL Asphalt only



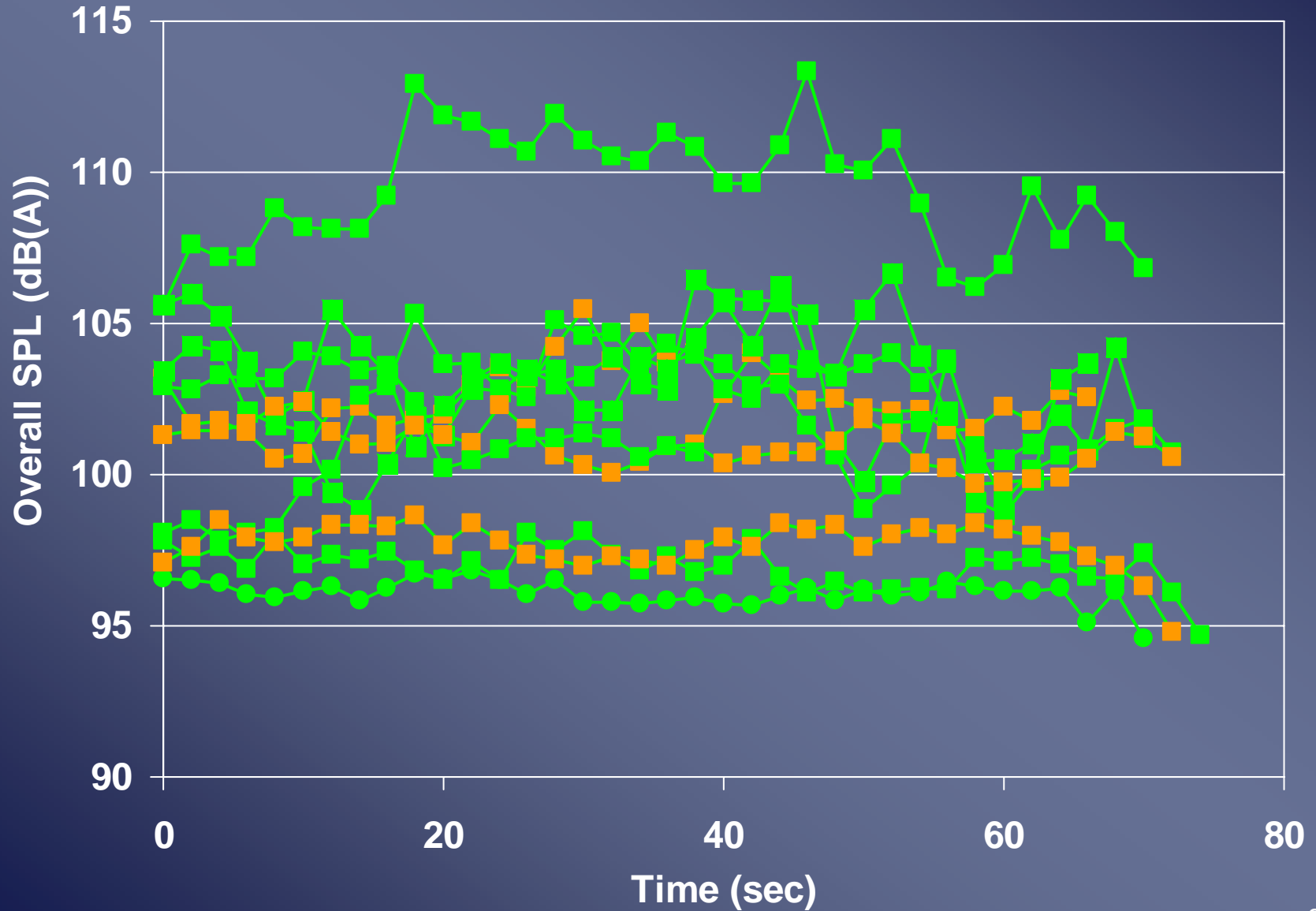
Overall SPL PCC only



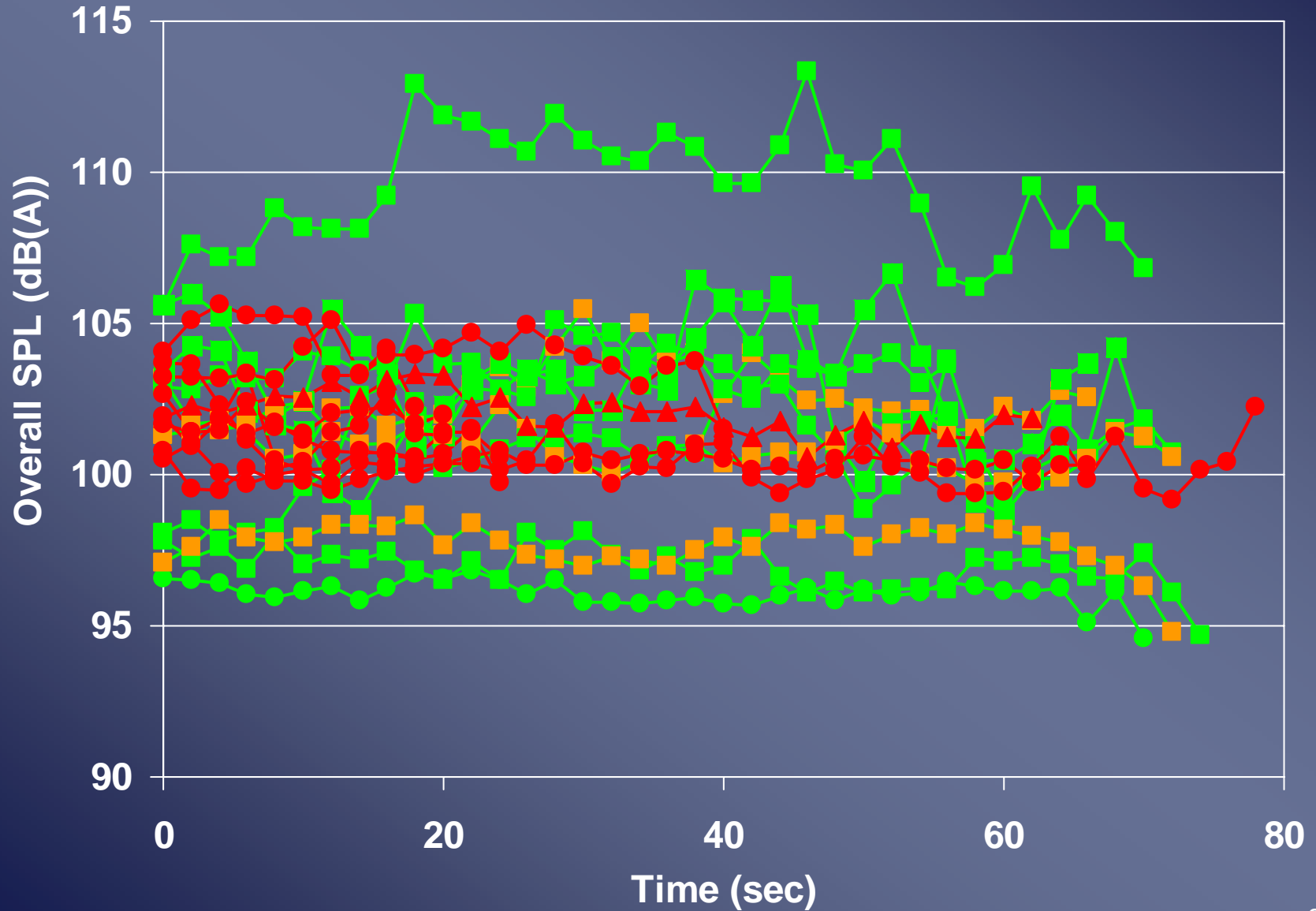
Overall Noise



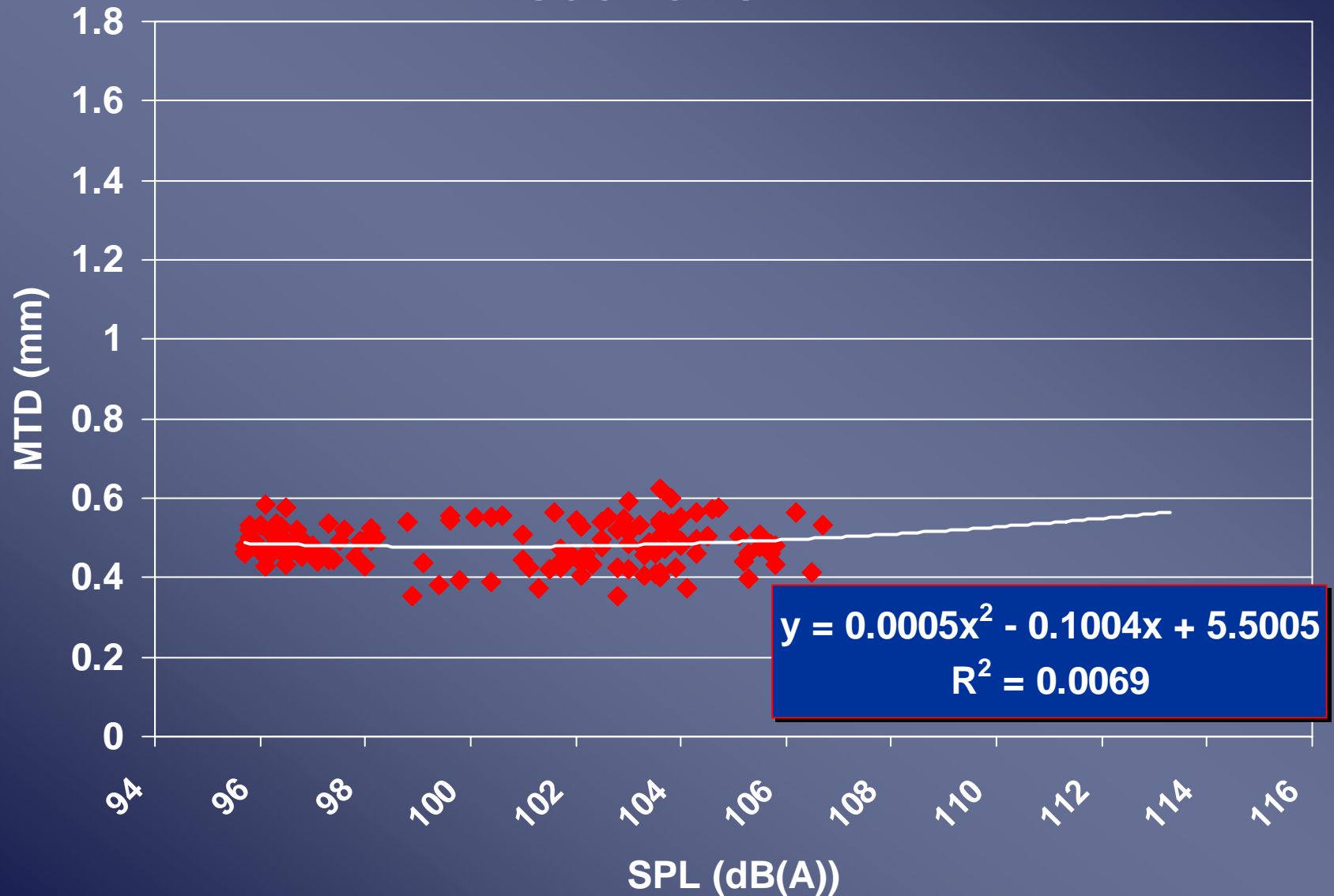
Overall Noise



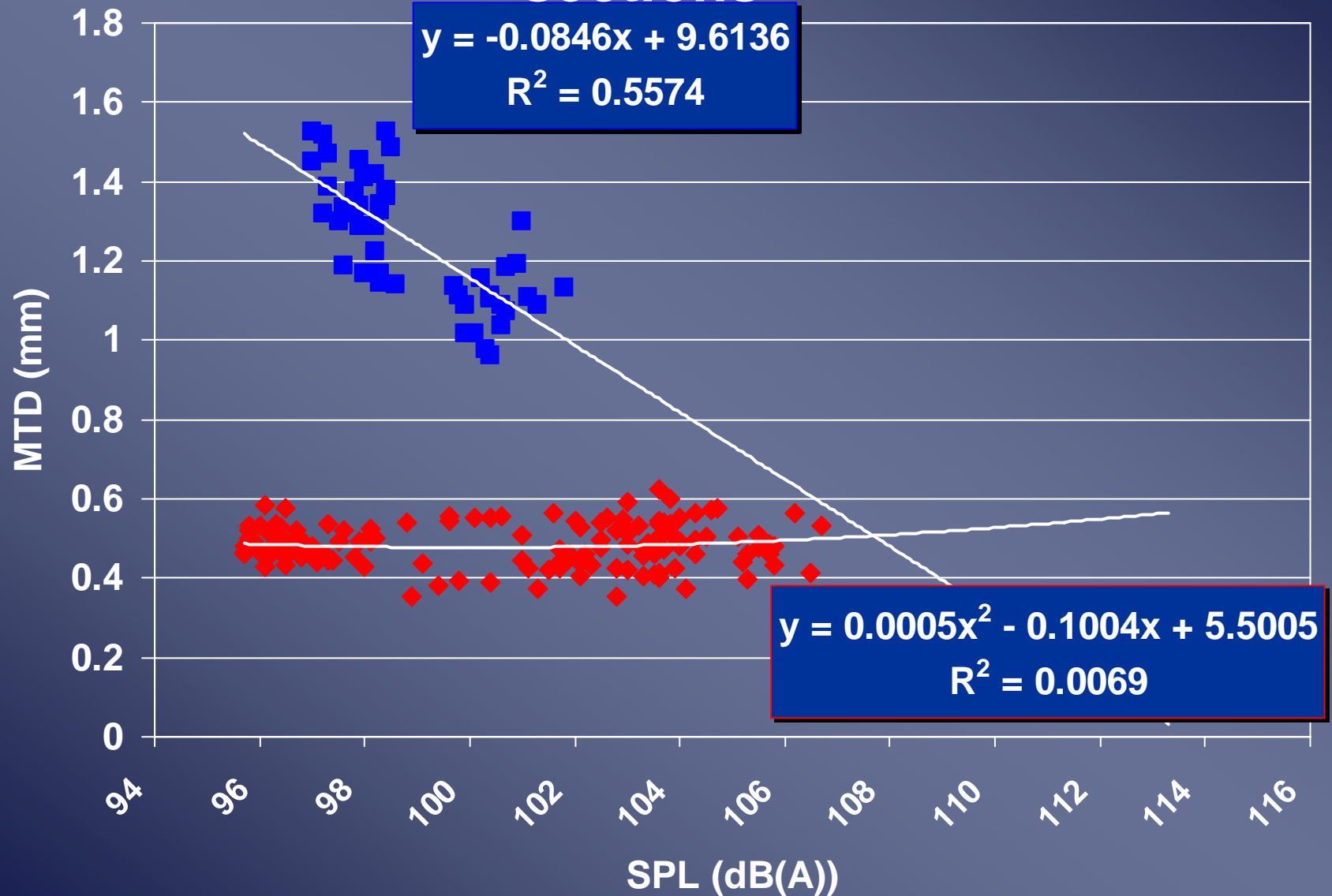
Overall Noise



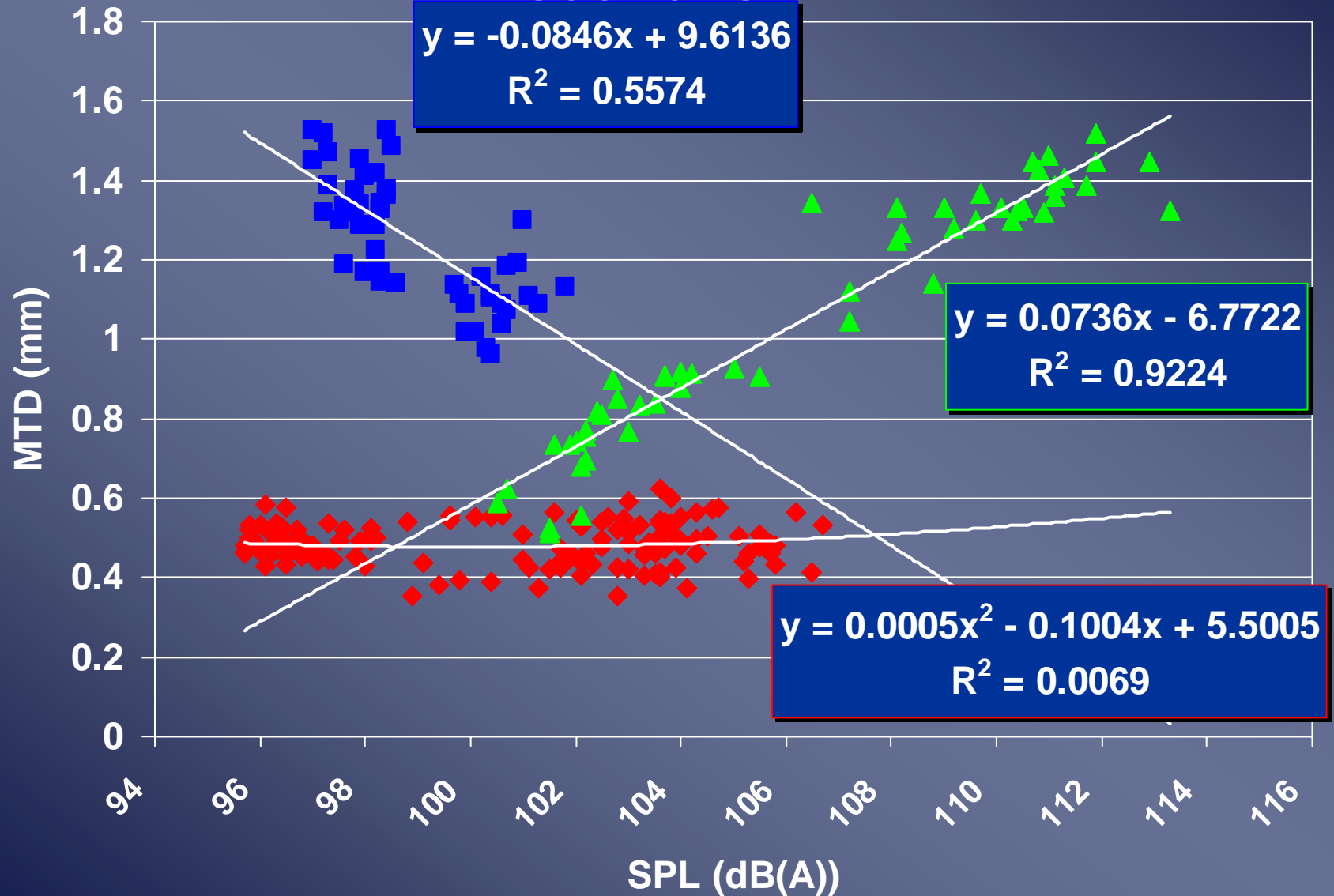
Noise vs texture with distance HMA sections



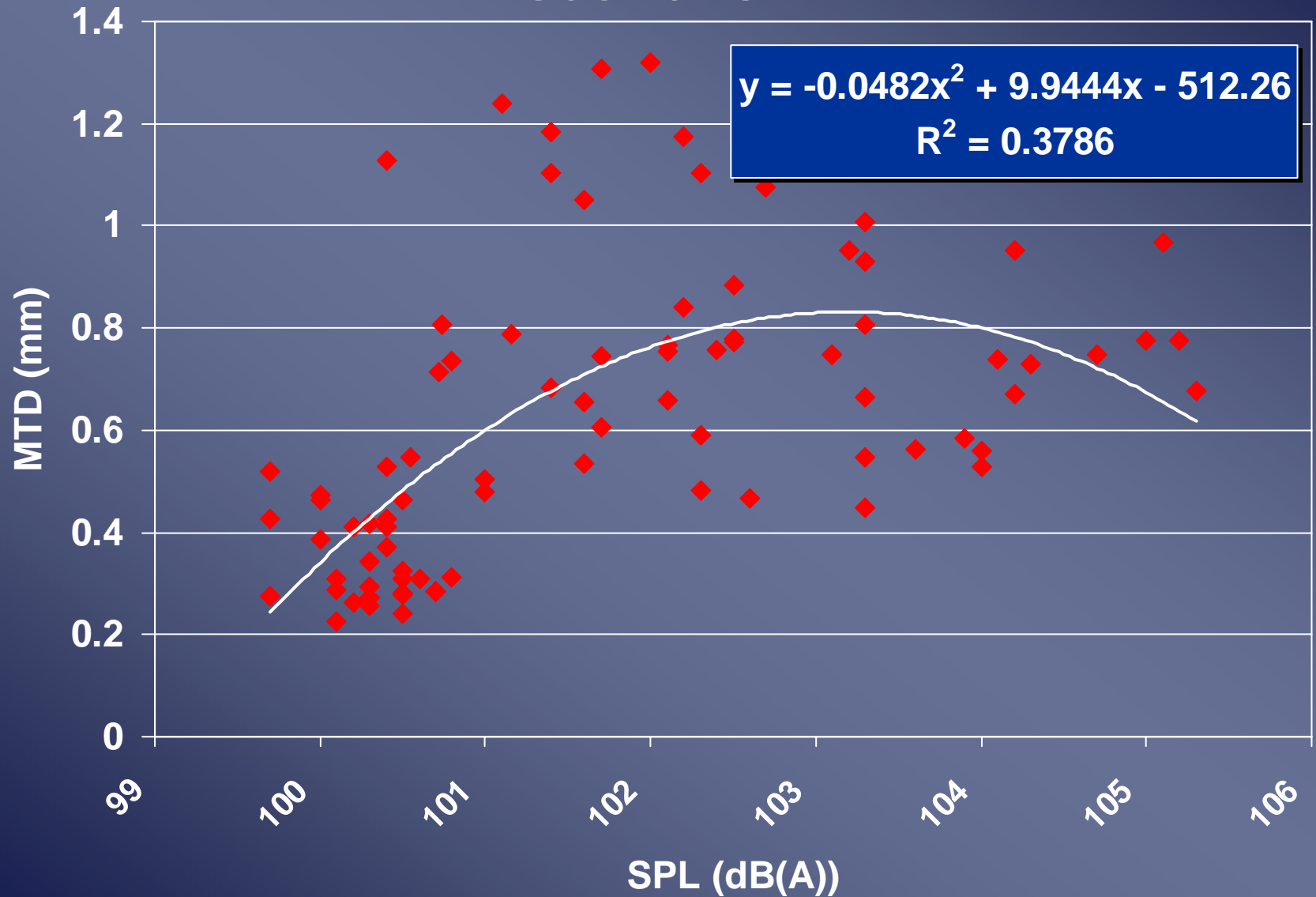
Noise vs texture with distance HMA sections



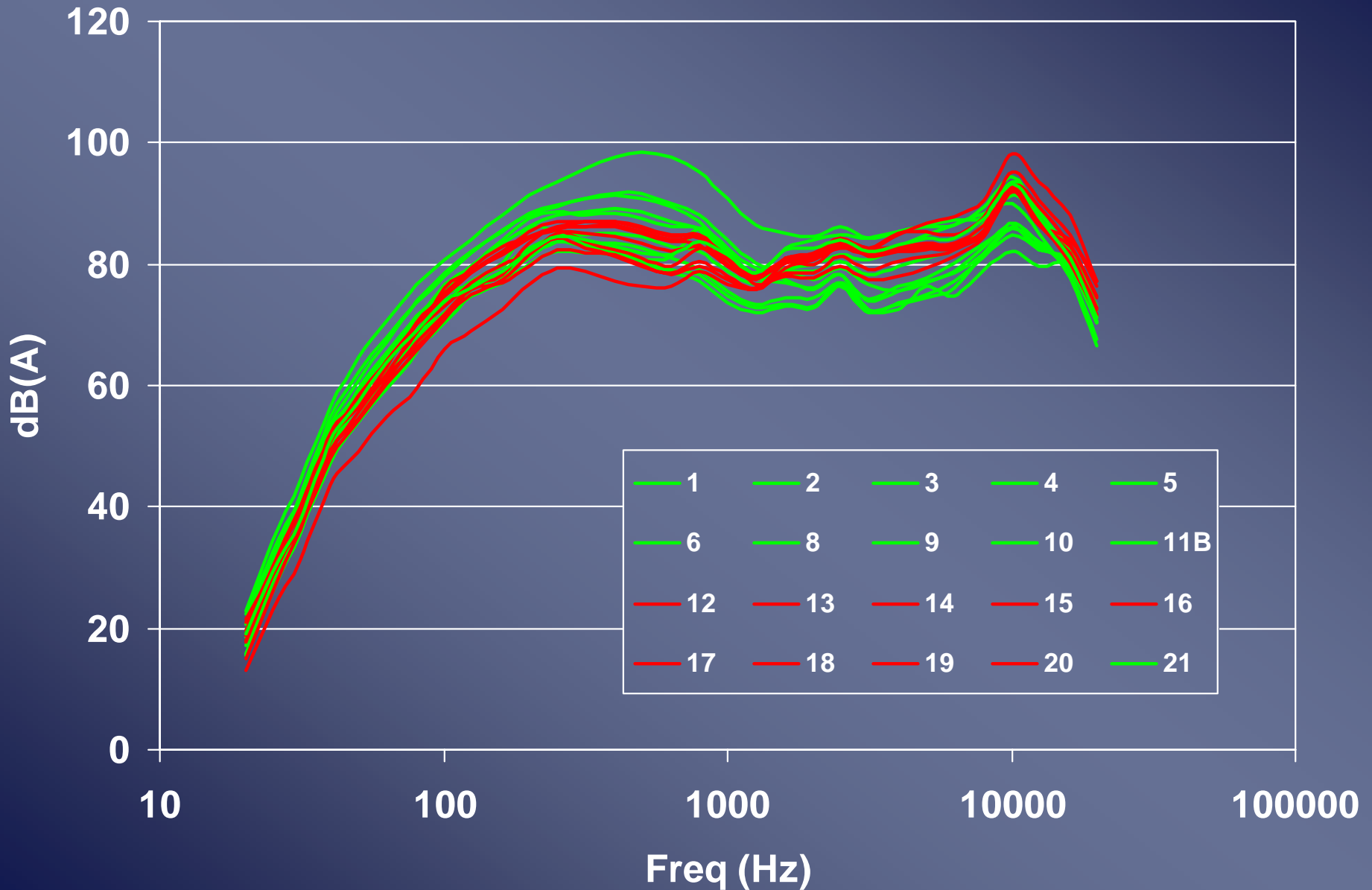
Noise vs texture with distance HMA sections

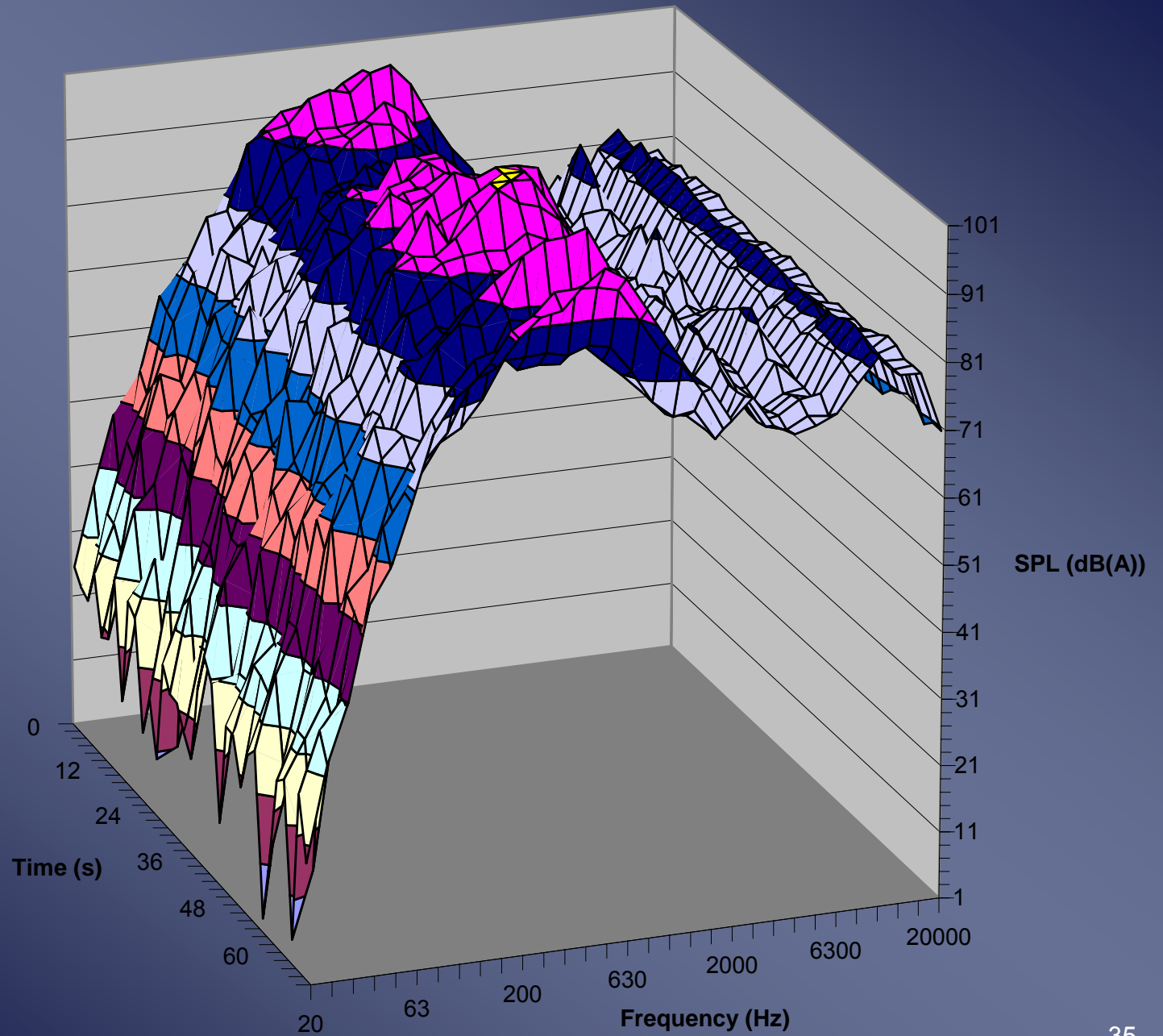


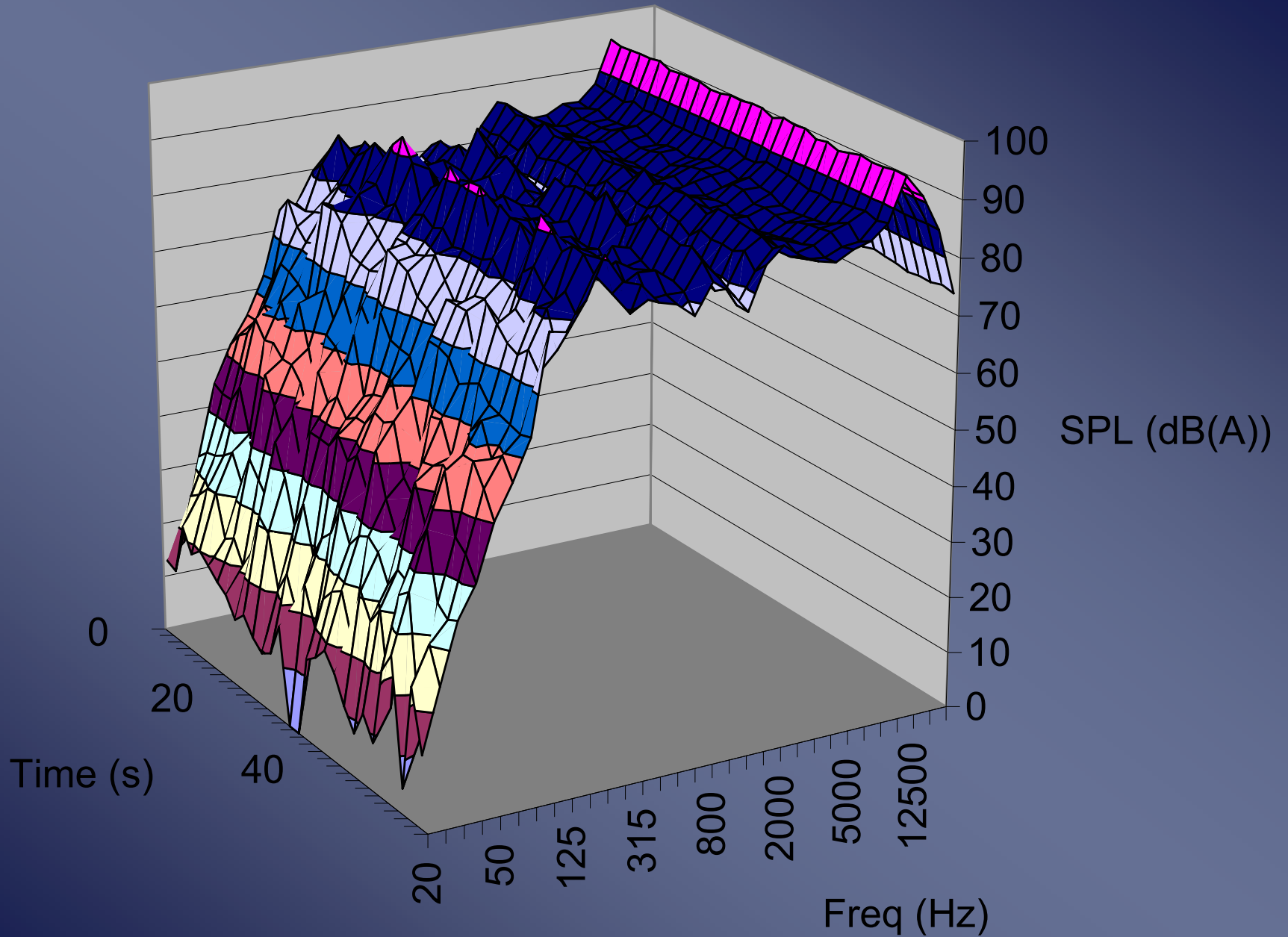
Noise vs texture with distance PCC sections



Noise spectrum all sections







Conclusion for noise

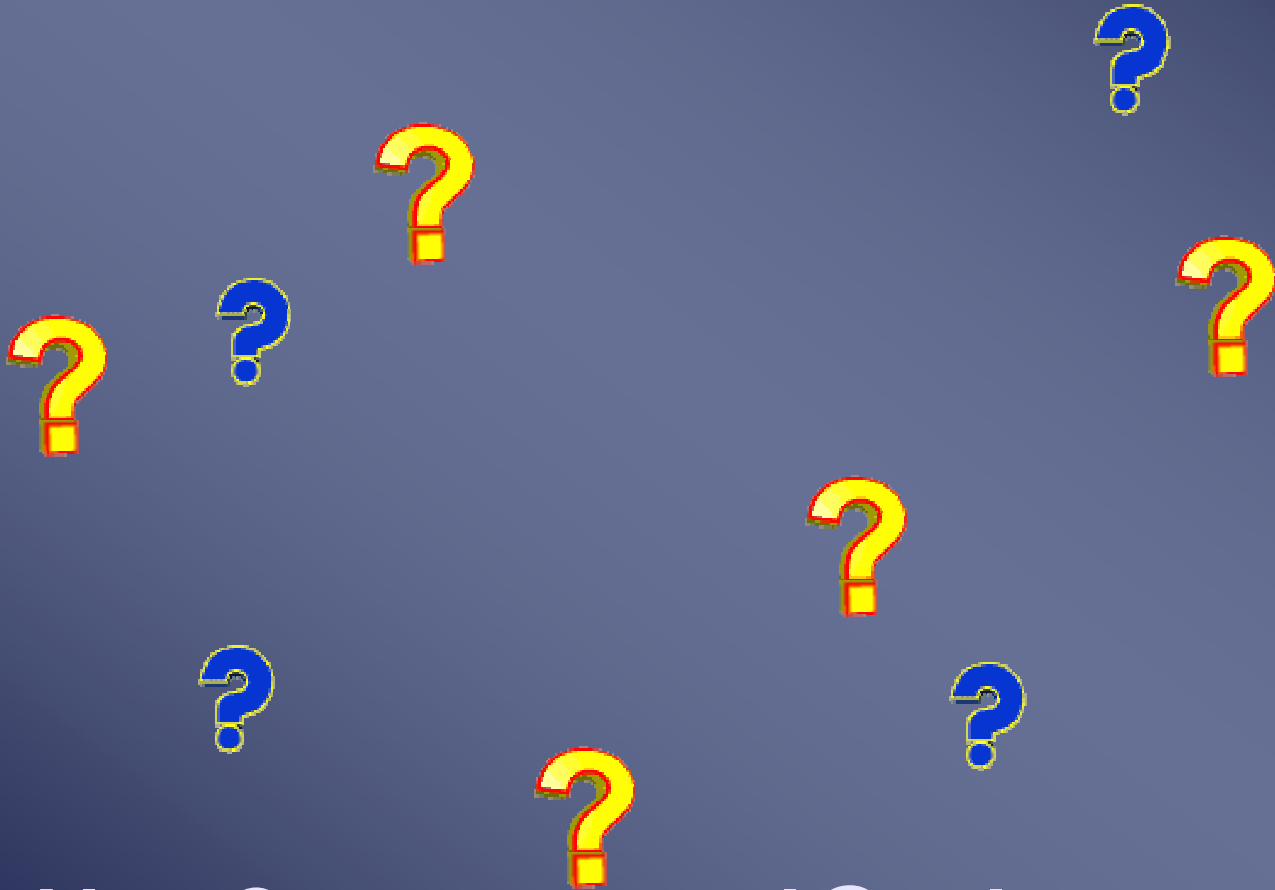
- Macrotexture has a definite effect on tire/pavement noise
- For HMA, texture \neq everything
- For PCC, texture \rightarrow good to define noise
- At constant max agg. Size, \nearrow in texture = \nearrow in noise
 - For surface treatment, \nearrow in texture = \searrow in noise
- PCC higher freq. than HMA

What's next?

- Study on noise spectrum
- Correlation with mix characteristics
- Noise absorption on samples



Thank you / Merci



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