To Average or Not to Average – That is the Question

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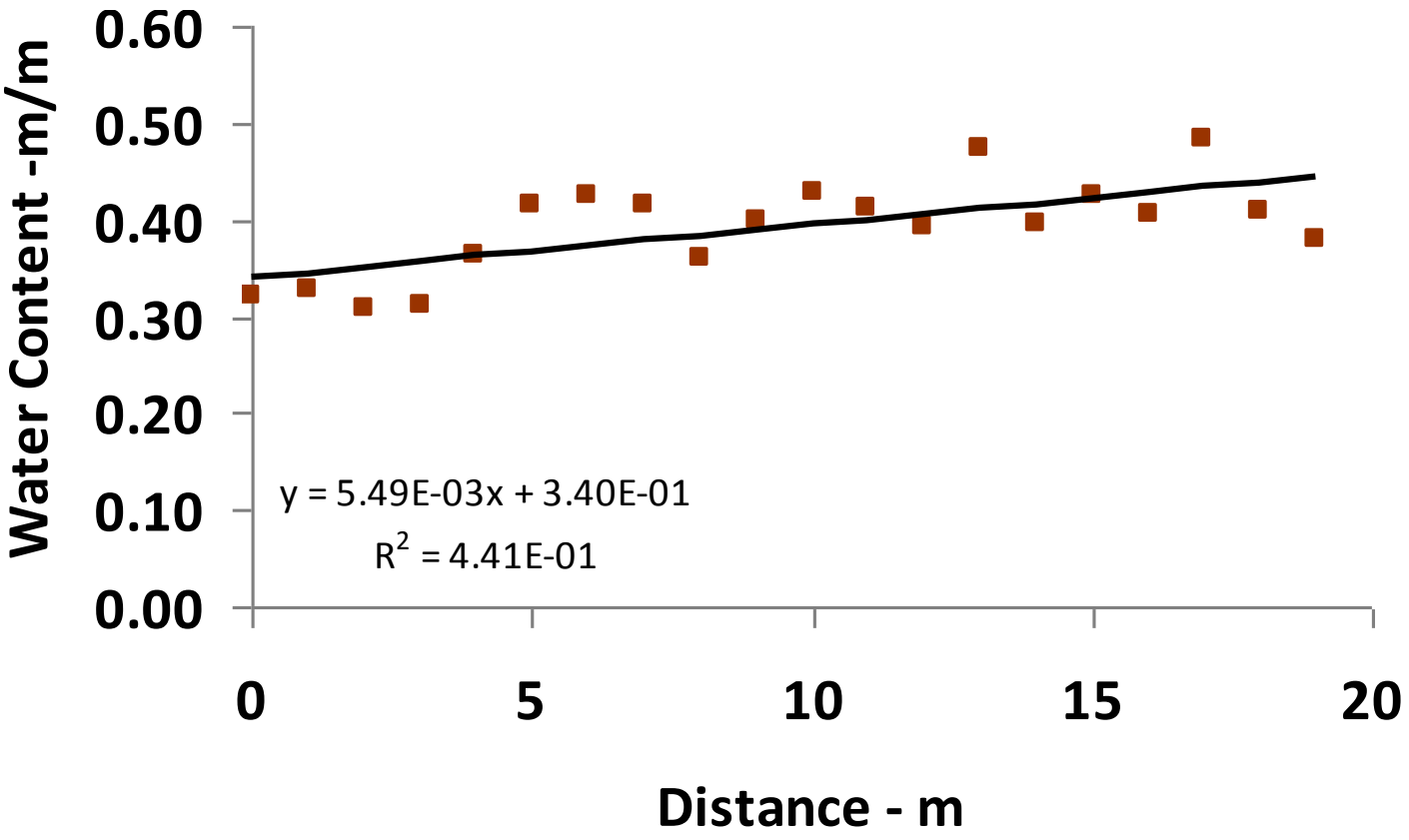
Systematic and Random Variation in Soil Moisture



Variance
44% model
56% random

Std dev 5%
s_{yx} 3.5%

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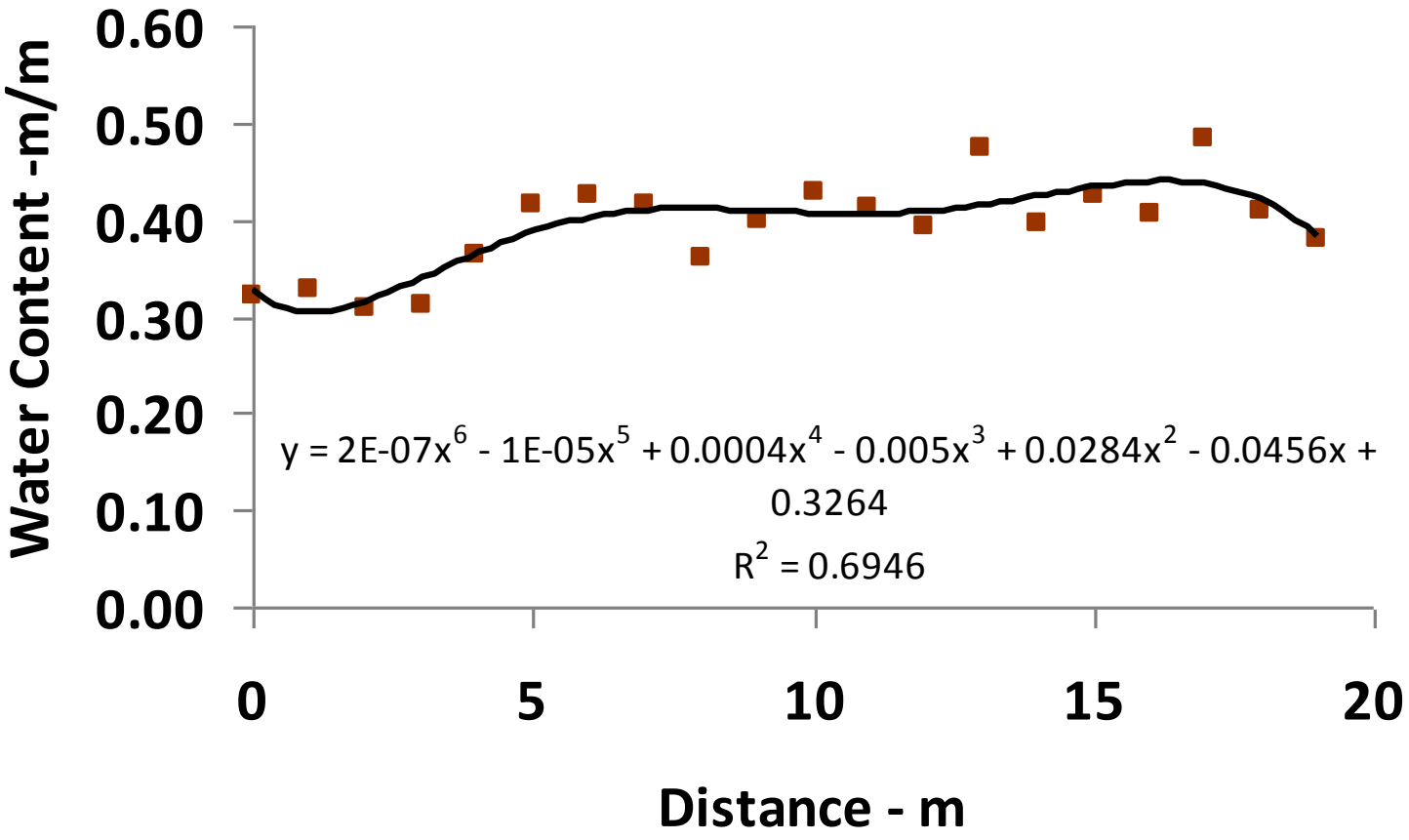
Maybe there is even more structure to be modeled--



Variance
Model 69%
Random 31%

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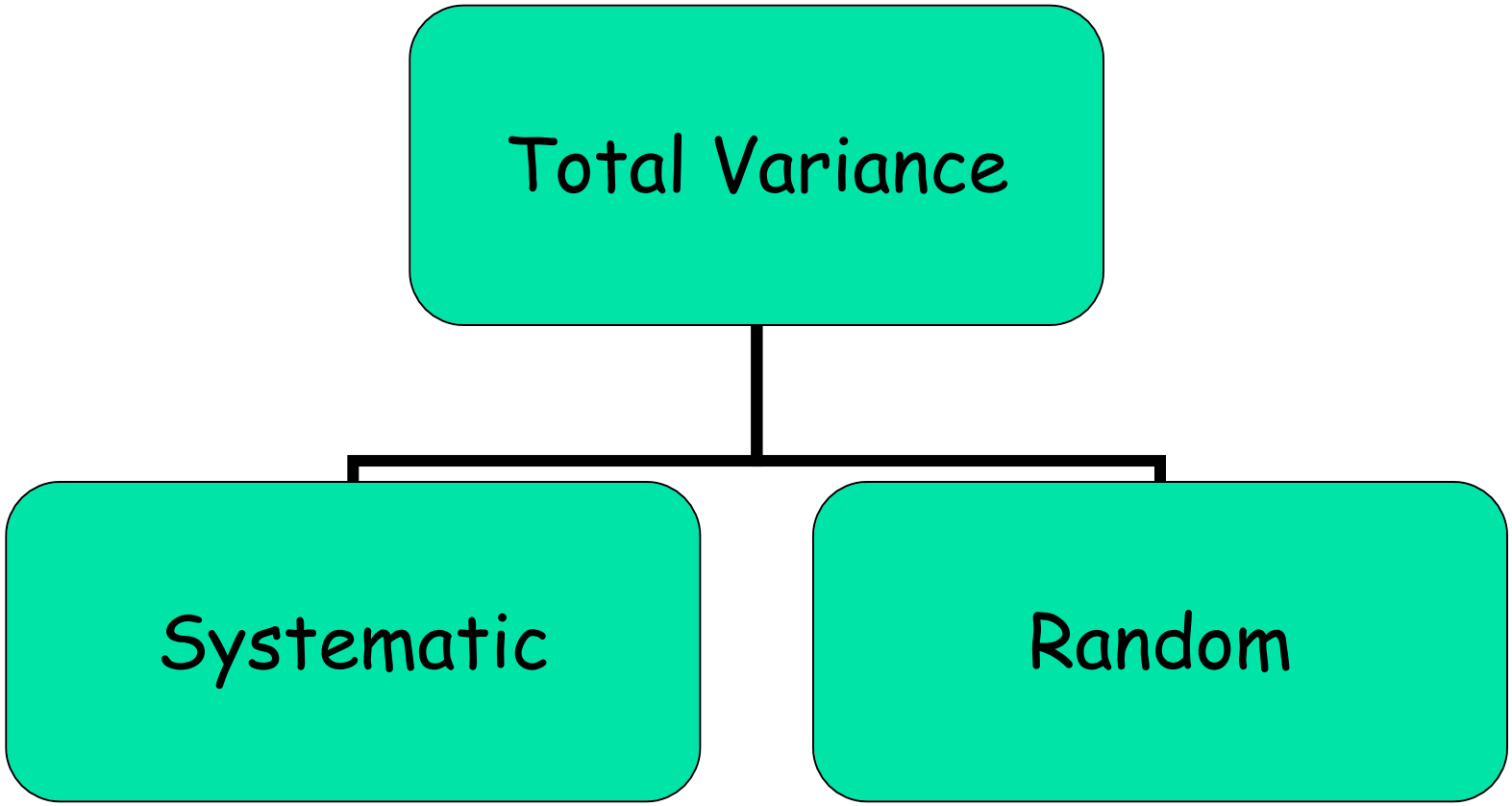
Total variance is the sum two components



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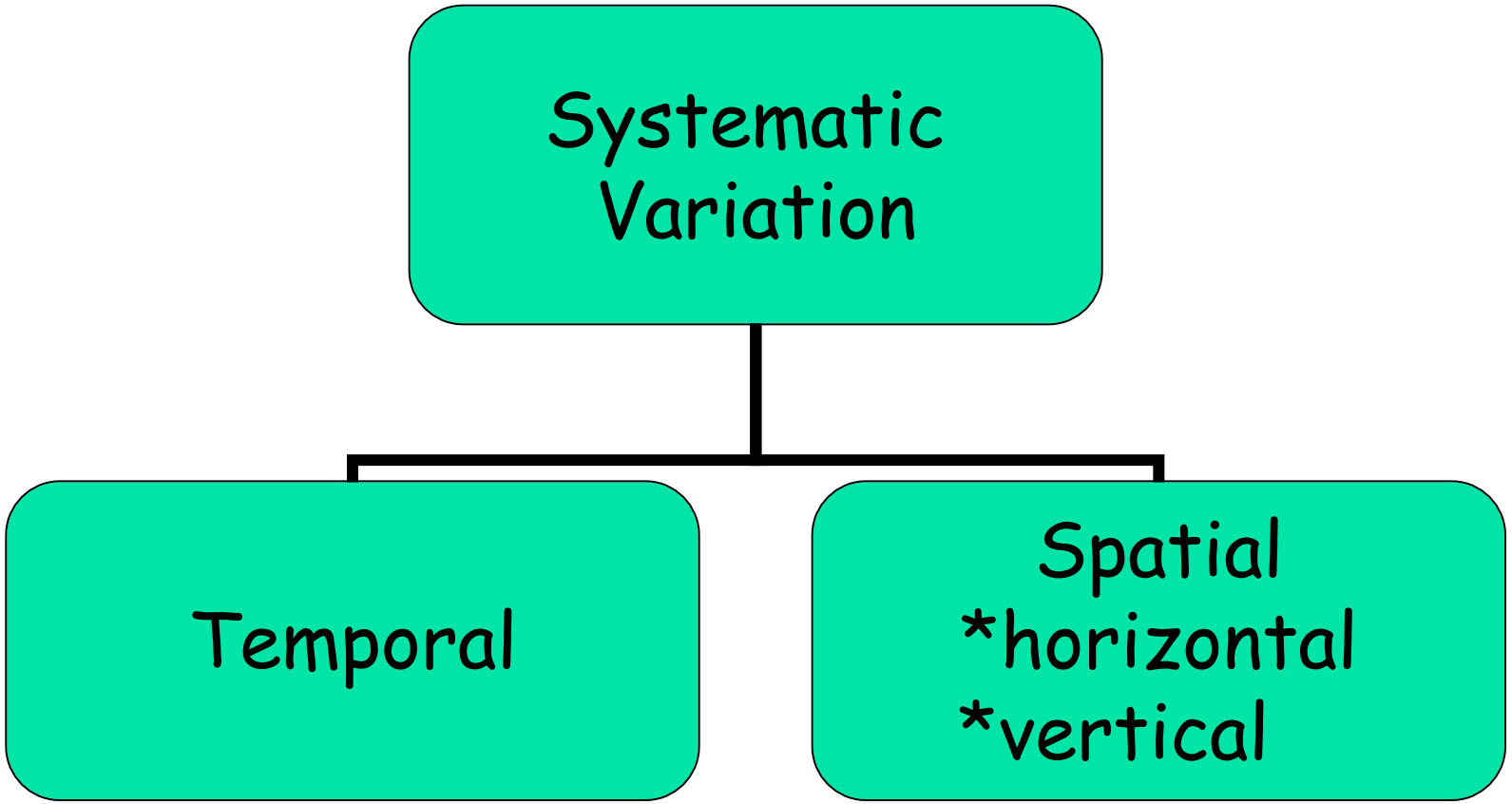
The systematic or modeled part also has two components



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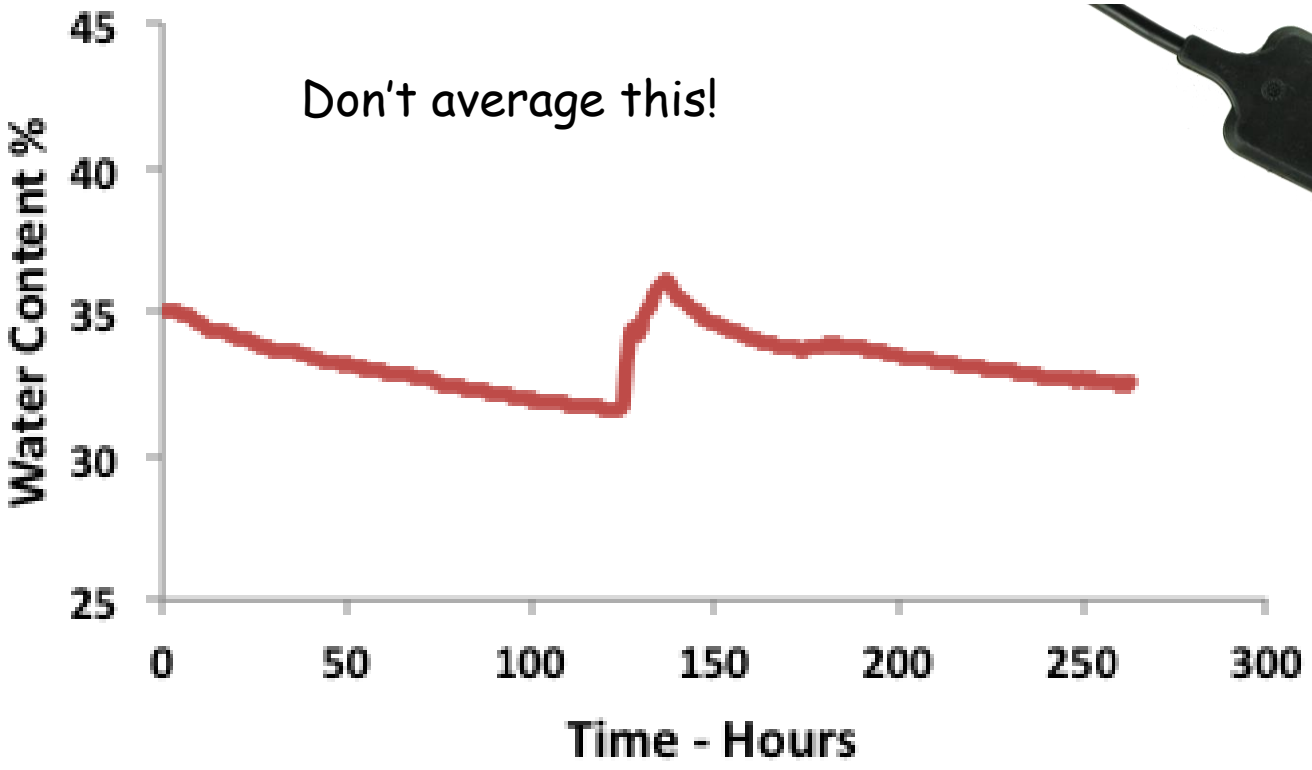
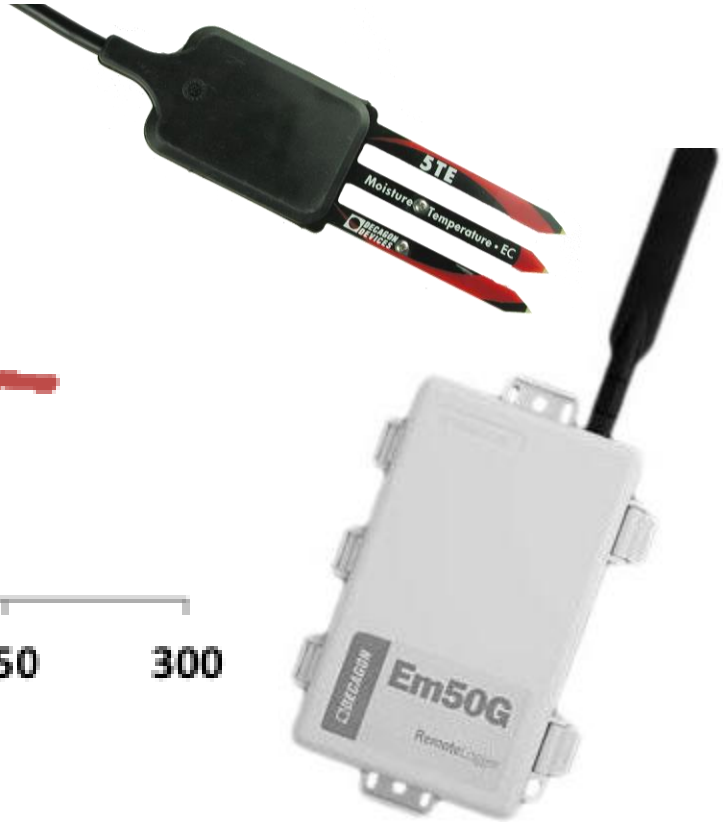
Temporal Variation - Drydown/wetup of a sensor





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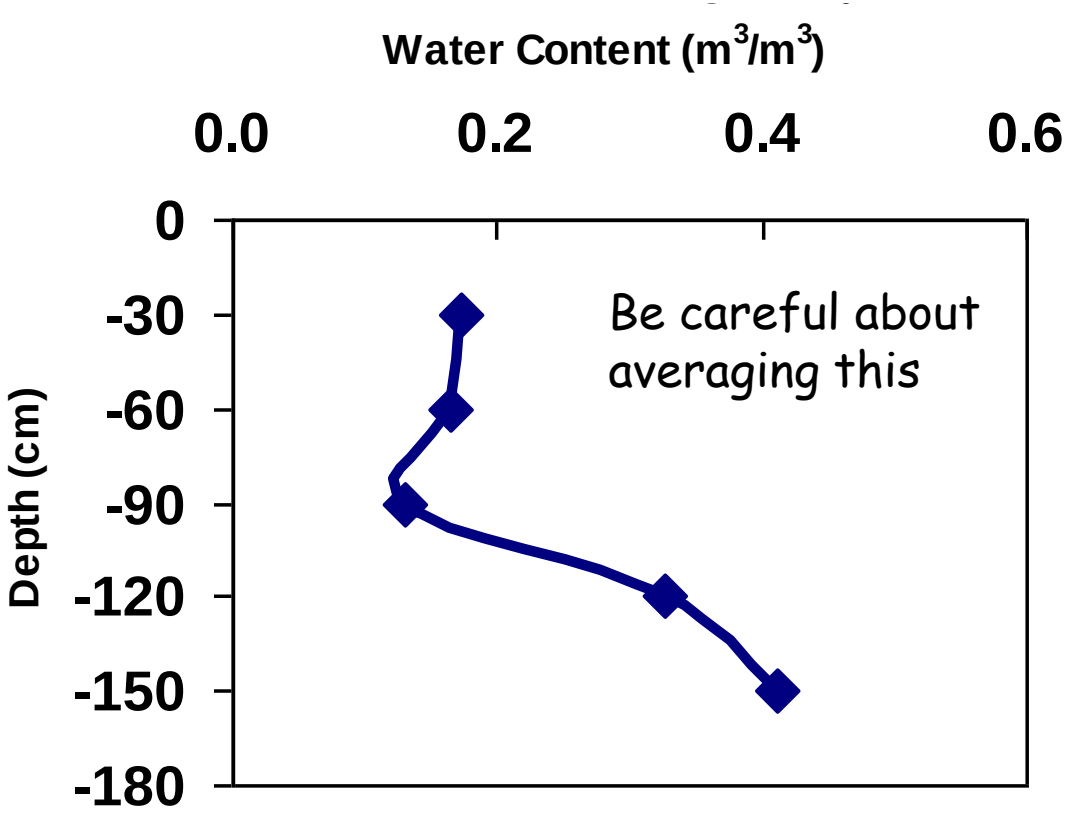
Water content variation with depth in a wheat field



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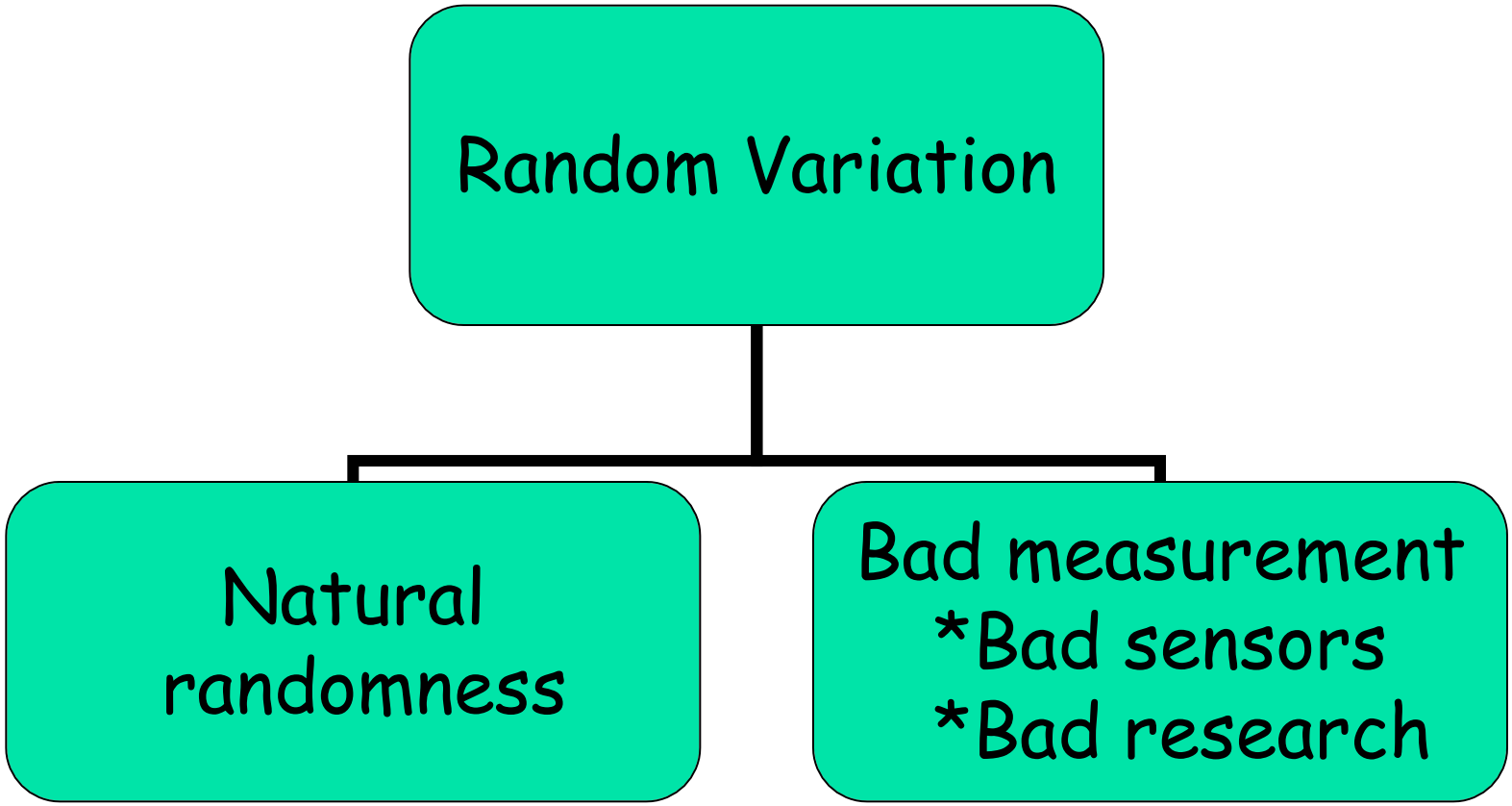
Random variation also has two components



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Conclusions

- Averaging is a slippery slope – don't throw the baby out with the bathwater
- Average over randomness – model and measure the rest
- Don't create randomness through sloppy experimental methods

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