

# Data Filtering Impact on PV Degradation Rates and Uncertainty

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## 1 Introduction

Important to know Power decline over time accurately

Degradation rates (Rd)

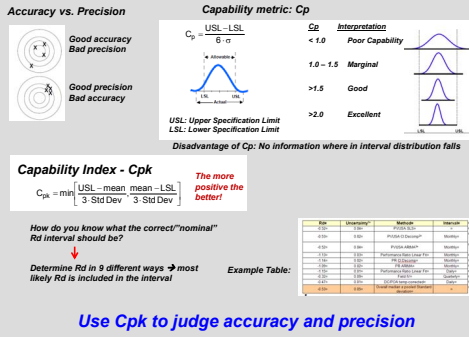
- Financially:  
Cash flow  
Uncertainty directly related to risk
- Technically:  
Lifetime prediction  
Product improvement

Comprehensive list of uncertainties on known systems including

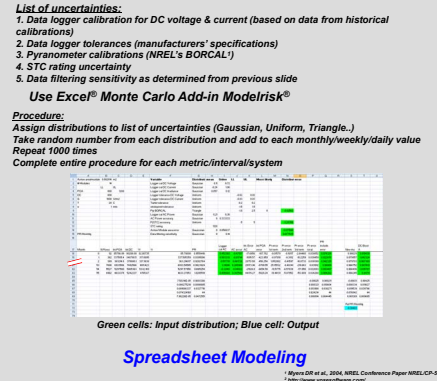
- Instrumentation specifications
- Instrumentation calibrations
- Data filtering

## 4 Evaluation of Rd

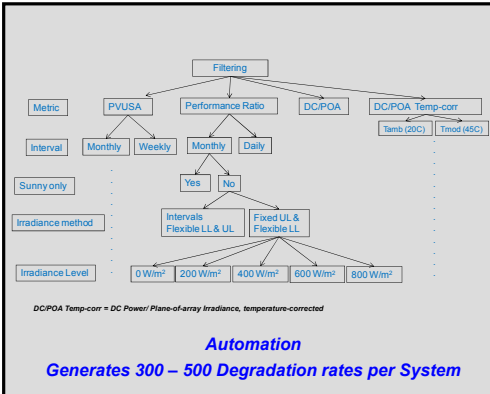
- Determine "correct" Rd=nominal Rd accurately
- Determine it with precision, i.e. small uncertainty



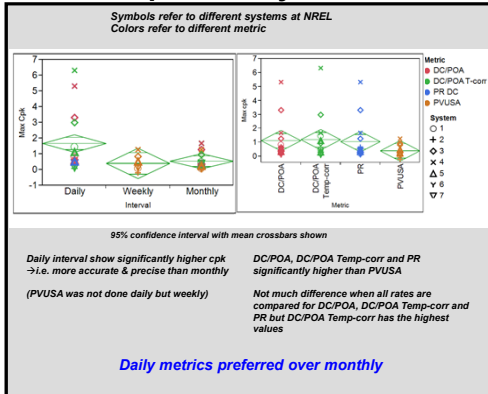
## 7 Total Uncertainty Calculation



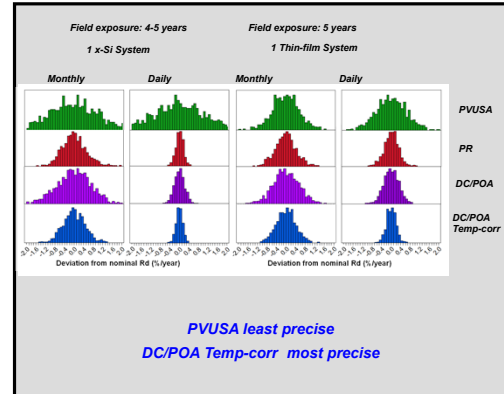
## 2 Data Filtering Criteria



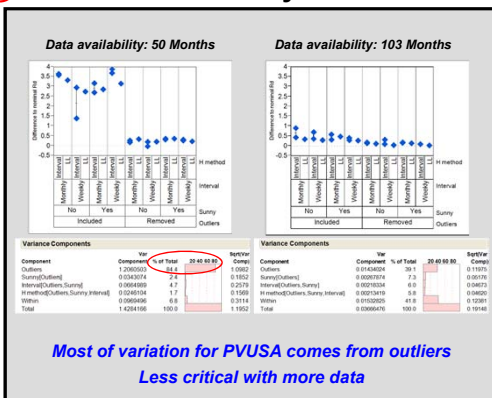
## 5 Cpk for 7 systems



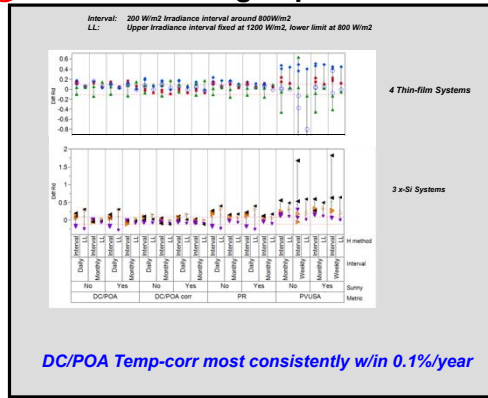
## 8 Monte Carlo Results



## 3 PVUSA Sensitivity to Outliers



## 6 Data Filtering Impact on Rd



## 9 Conclusion

- Data filtering has a big impact on assessing long-term degradation
- PVUSA is most sensitive to outliers, particularly for shorter field exposure
- Daily metrics are preferred over monthly metrics
- DC/POA Temp-corr is most consistent in determining Rd w/in 0.1%/year
- Total uncertainty fluctuates somewhat from dataset to dataset – DC/POA Temp-corr best performing