FIELD EXPERIENCE

THE USE OF SPECTROMETRY FOR SOILING ANALYSIS ON PV

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SPECTROMETRY FOR SOILING ANALYSIS ON PV

Why this research is relevant

- Soiling is a certain – especially in arid environments
- Spectral transmission interference

The known and the unknown

- Current research primarily focus on s/c current and output efficiency
- Associative effects cannot be quantified

The experiment

- Curtailing associative effects through Spectrometry
- Documenting real life spectral data of radiation and soiling

The hypothesis

- Identifying limitations and requirements of the measuring procedure
- Introducing new ways of collecting solar data

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DESIGN OF THE FIELD EXPERIENCE

Experiment Characterization

- Non-automated measurements
- Spectroradiometry measurements
- Two spectrometers – confirming own measurements

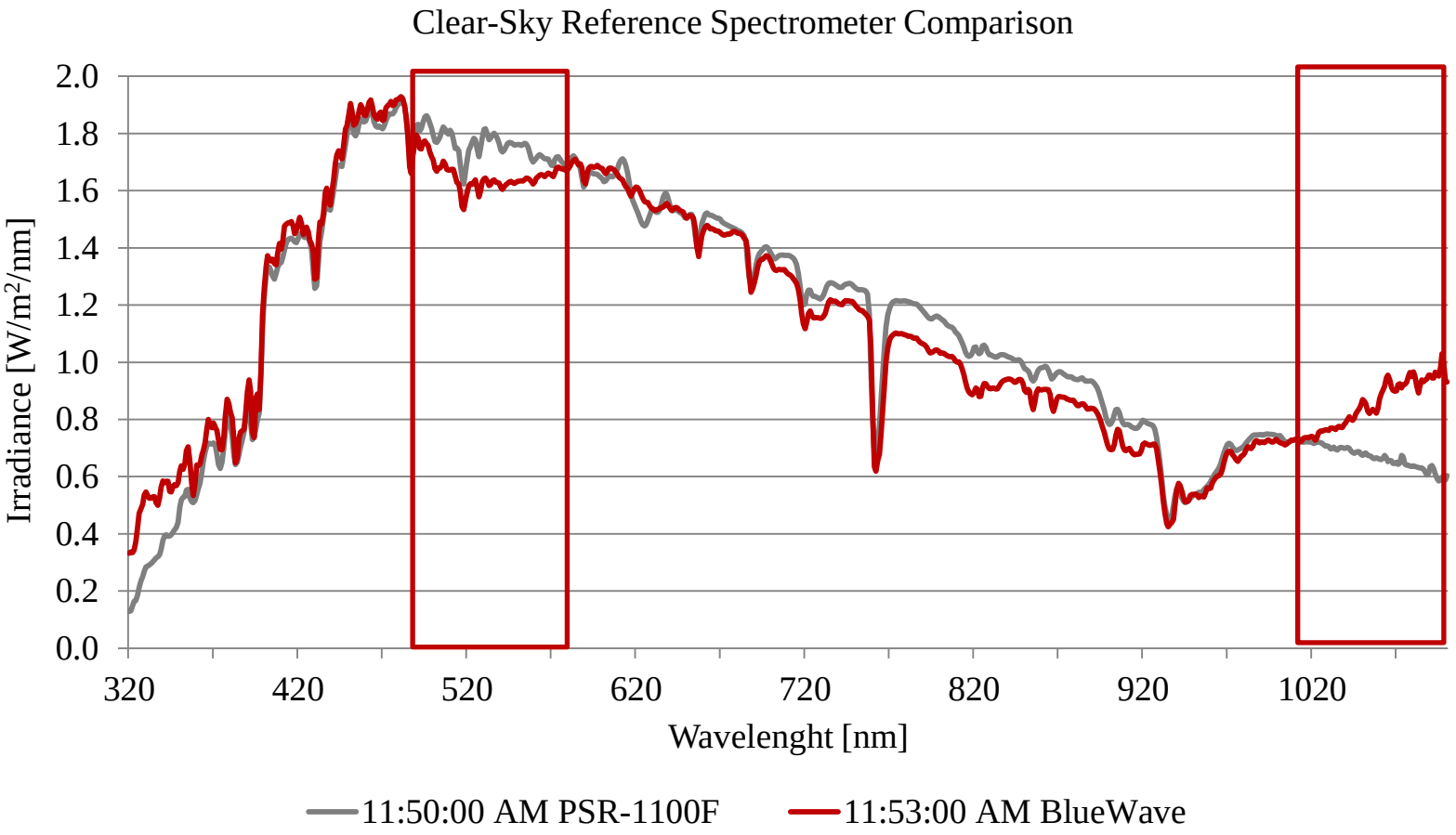
Spectrometer Technicalities

- BLUE-Wave StellerNet and PSR-1100F Spectral Evolution
- Spectral wavelength range

Spectral Characterization

- Comparing and interpreting spectral data
- Noting spectral markers due to instrumentation

SPECTRAL CHARACTERIZATION



METHOD OF THE FIELD EXPERIENCE

Physical Measurement

- The glass is mounted at altitude 30°, facing North
- Measurements performed in a fixed position, parallel to the glass
- Field of view has an significant effect on measurements

Stable Conditions

- Absorption through the air column is substantial, therefore the zenith angle is a critical parameter
- Determining spectral variation at each measurement confirms stable conditions

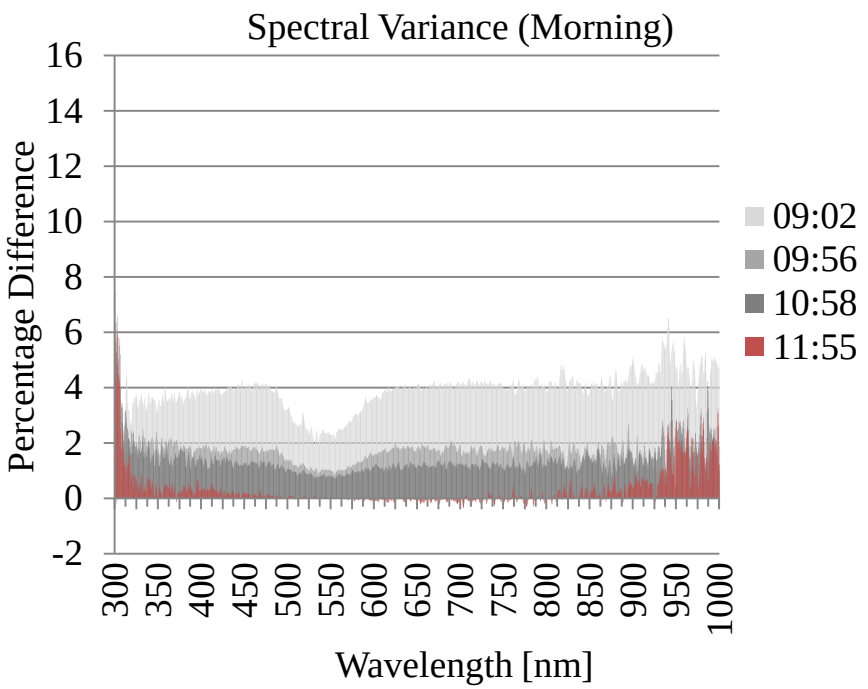
Discrepancies

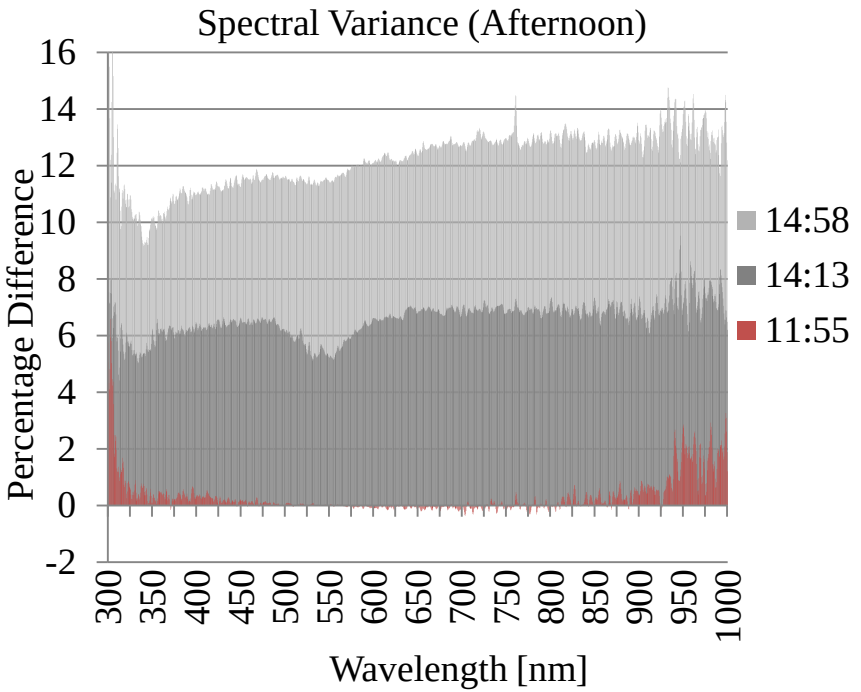
- Sun position
- Possible shading

METHOD: % CHANGE IN REF MEASURMENTS

Stable Conditions

If < 1%, throughout the field experience





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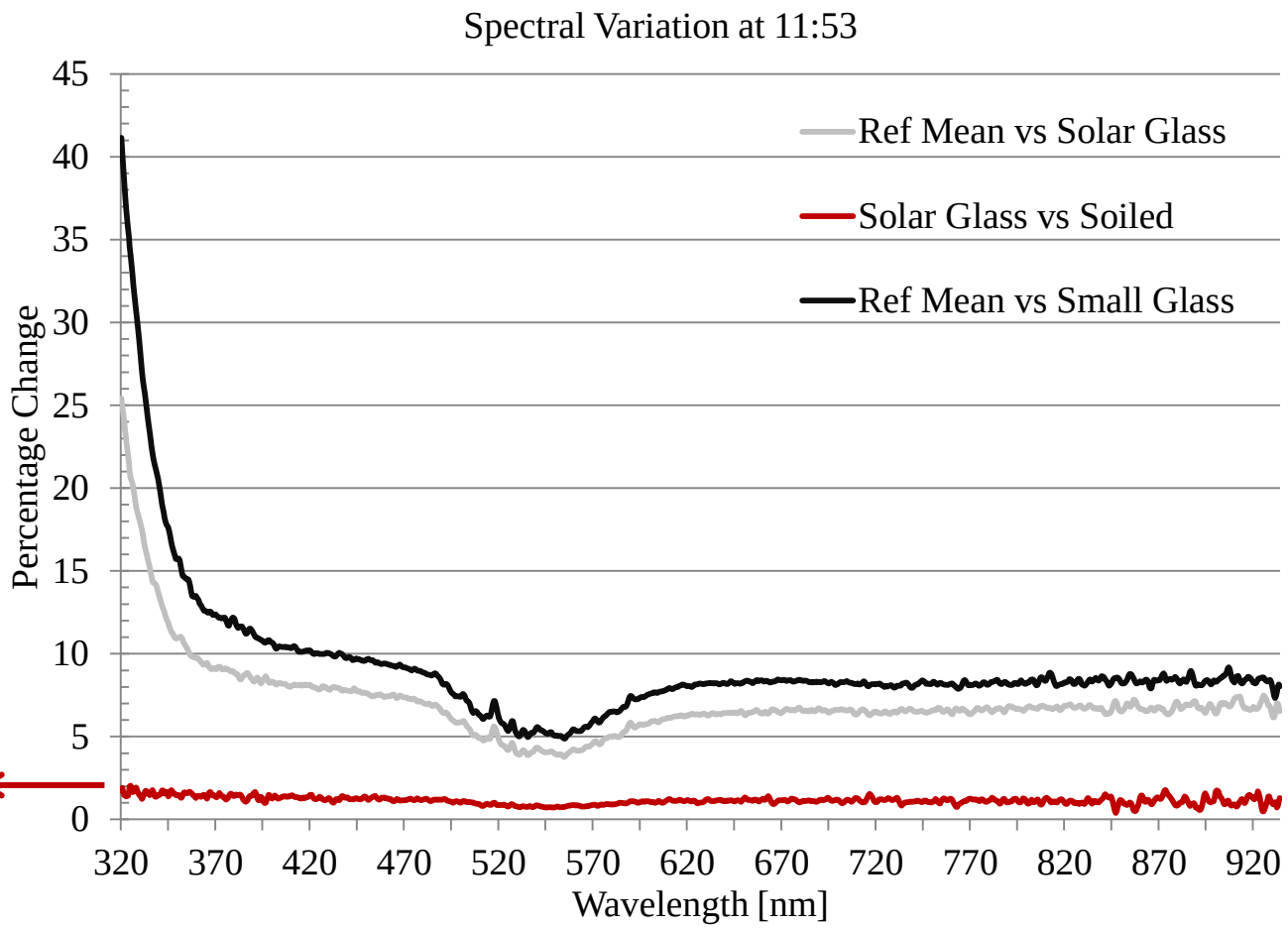
RESULTS: % CHANGE IN A MEASUREMENT SET

Clear-Sky Change
< 1%

Transmission Loss
Solar Glass ≈ 6%
Float Glass ≈ 8%

Transmission Loss
≈ 2%



SUMMARY OF THE FIELD EXPERIENCE

Sky-condition dependency	• Measure on clear-sky days around noon
Instrumentation	• Account for instrumentation sensitivity and accuracy
External influences	• Eliminate external reflections and scattering of light in the measuring process
Dust characterization	• Statistically determine the influence of soiling through localized measurements

NEXT?

AUTOMATE the measuring process

QUESTIONS?