On the evaluation of the interannual variability of the solar resource for solar projects

A first step to assess the reliability of the probability of exceedance

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User needs for conversion of solar radiation projects

Driven by the **bankable report** :

Major part of the investment takes place in the beginning of the project. As a consequence, major part of the projects are financed thanks to loans from bank.
In order to evaluate the opportunities and risks associated with the project, bankable reports are established.

No scientific consensus or industry-standard methodology for performing risk assessment in bankable report

Usually based on a statistical assessment of the solar resource.

Worst case scenario: probability of exceedance (p90)

Commonly, **worst case scenario of yield production** is analyzed in order to ensure the viability of the project

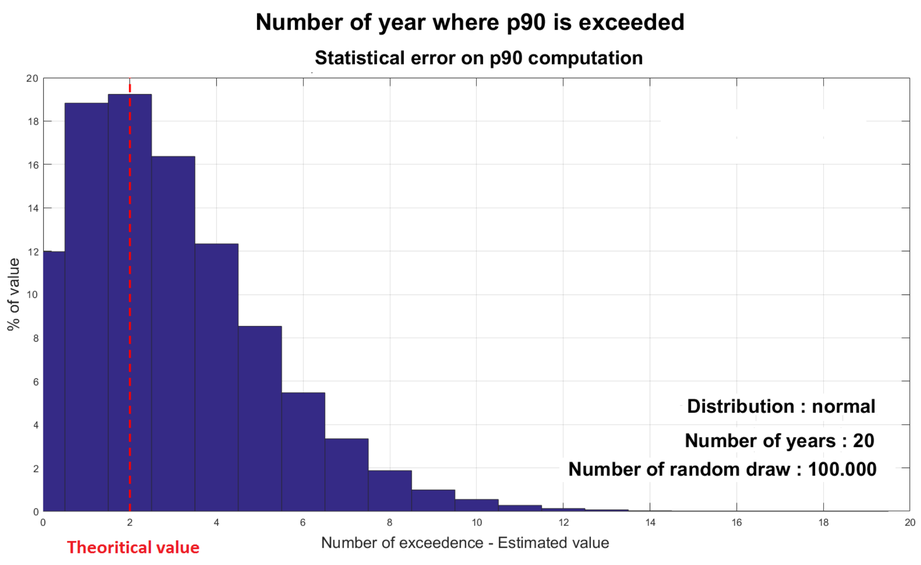
Characterized by the probability of exceedance of **multi-annual average of yearly irradiation**
A minimum of 10-year database is recommended to statistically characterize the solar resource in a location
Ideally, it is computed over the expected lifetime of the project (typical amortization period 20 years)

How to assess the reliability of this estimator?
Will the production be less than the worst case scenario defined by the P90 on the lifetime of the project?

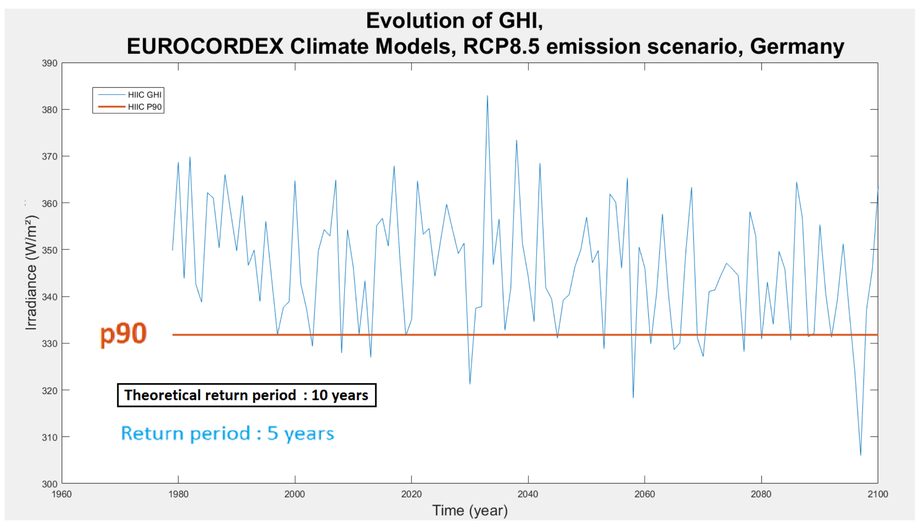
Preliminary results

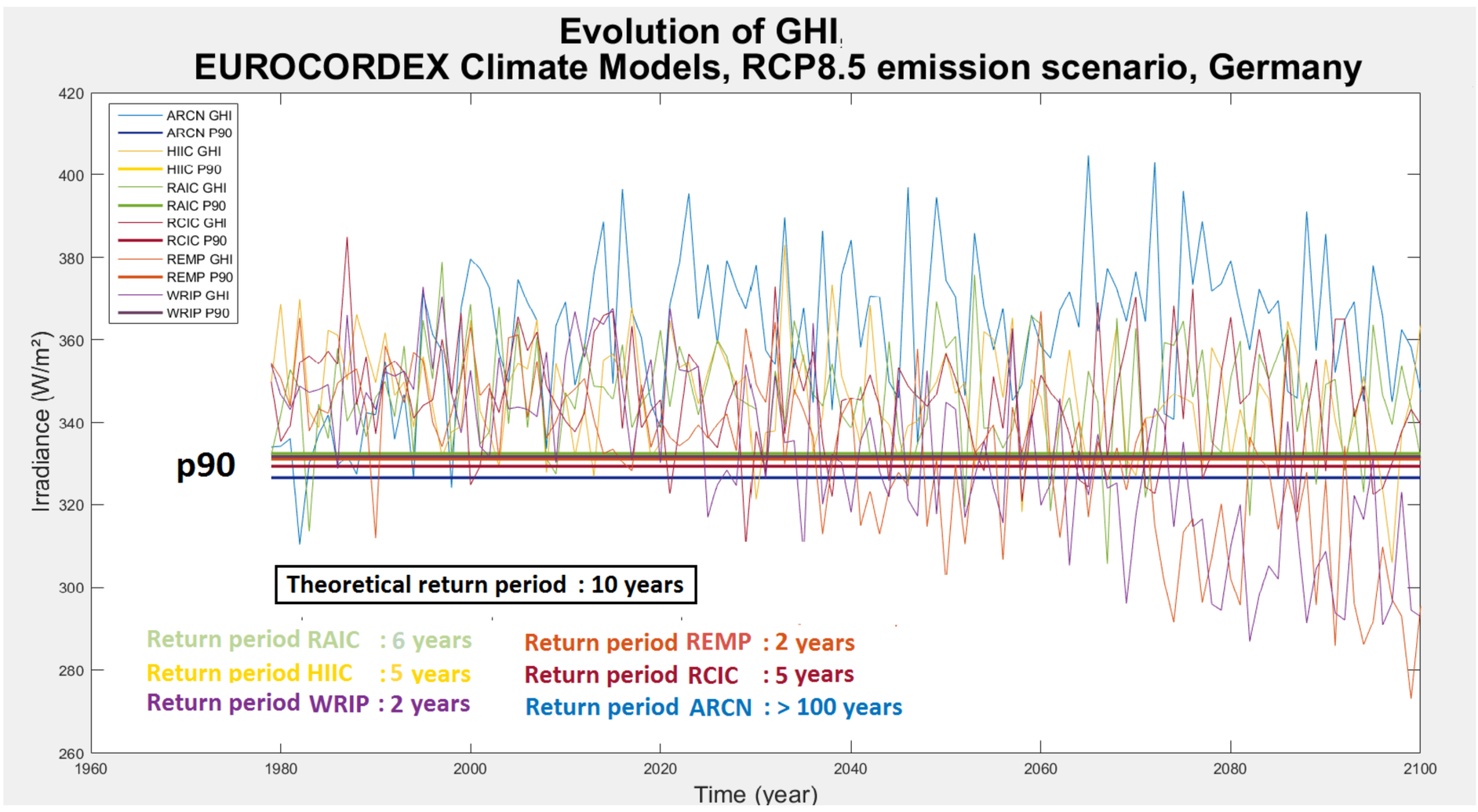
Averaging : Yearly
Hypothesis :
Years are independent
Time period for p90 computation : 20 years
Time period for return period computation : 95 years
Method for return period computation : Mean

Uncertainty due to p90 computation



Uncertainty due to interannual variability and long term change





Lessons learnt

Deal with multi-model analyses is mandatory
Independence of yearly value is questionable
Return period provides information
Take into account the uncertainty due to both p90 computation and interannual variability and long-term trends in solar resource is a key

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