



## PVsyst updates

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**PVPMC Workshop**

**12-14 May 2026  
Albuquerque, USA**

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## 3. PVsyst basic: New product

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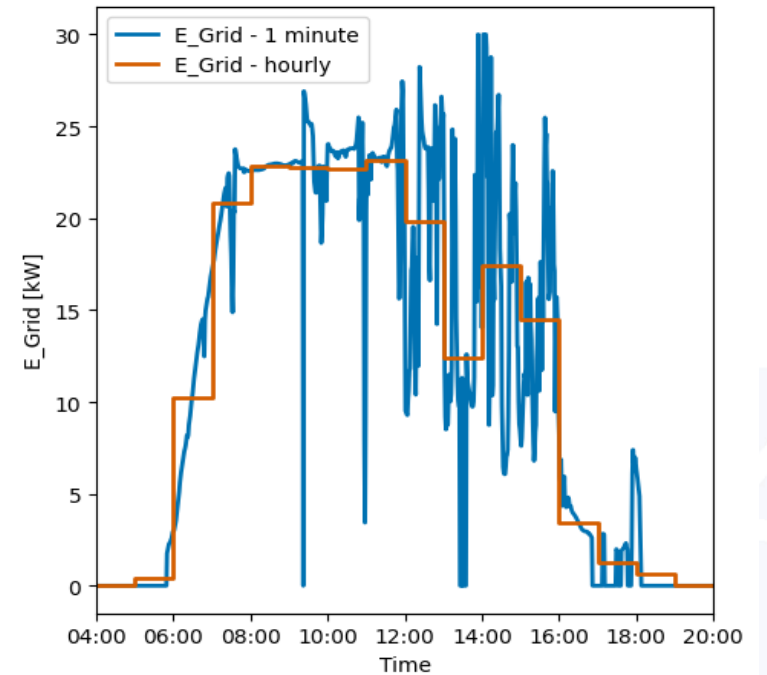
# 1.1 PVsyst 8.1: update overview

Major feature : Sub-hourly simulation

- Run simulation with time steps down to 1 minute

Other novelties

- **Meteonorm 9** : Synthetic minute weather data
- **Weather import wizard** : Redesigned import process
- **Parameters from imported timeseries**
  - Power shifting
  - Grid limitation
  - Cooling
  - Ground Albedo
  - More to come



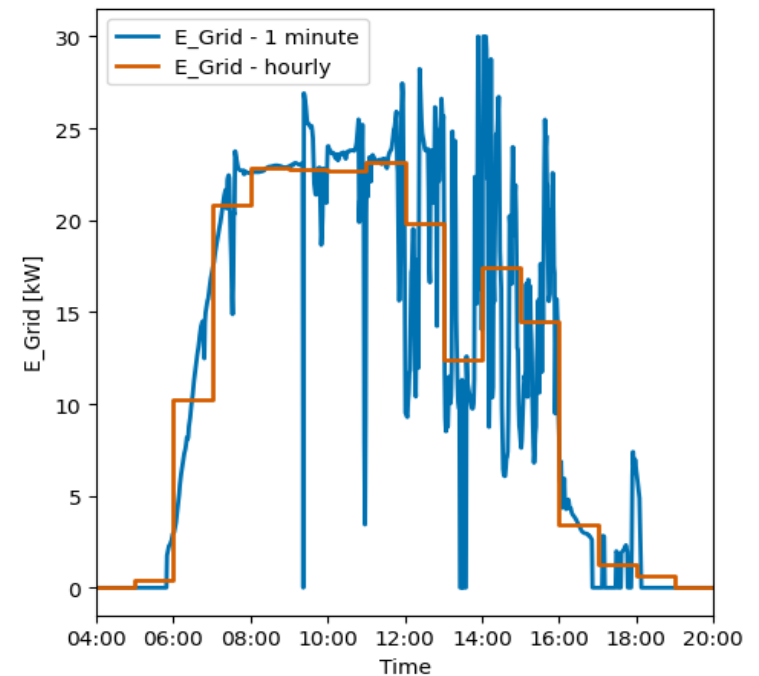
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## 1.2 Irradiance models adaptation

**GHI to DHI** and **diffuse irradiance decomposition for transposition** are based on coefficients fitted on hourly measurements

Both are affected by the simulation time step → Models and coefficients need an update

New fit using IEA-PVPS task 16<sup>1</sup> dataset:

- 113 stations
- 1-min GHI/DHI ground measurement



113 locations with 1 minute data measurement

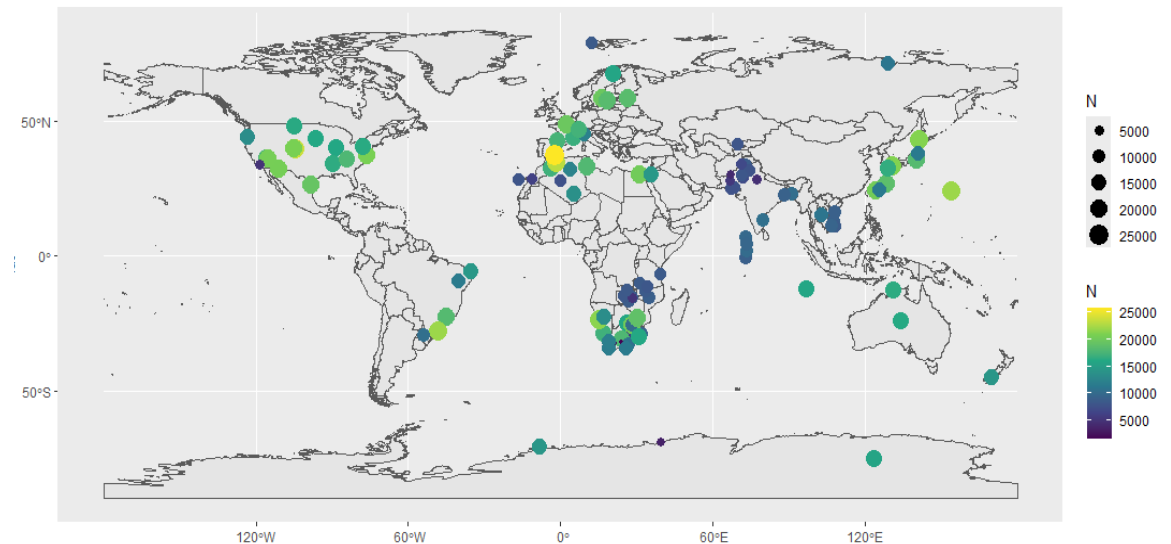
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## 1.2.1 GHI to DHI

### Diffuse model adaptation (sub-hourly conversion)

The **Diffuse** model is used to convert global horizontal irradiation (**GHI**) into Direct and Diffuse (**DHI**) components.

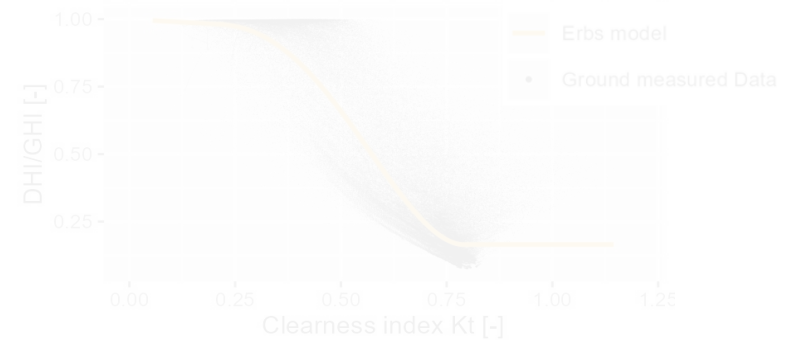
Current model : Erbs<sup>1</sup>

- Based on **GHI** and **Clearness index** ( $K_t$ )
- Set of coefficients based on measured hourly data

**Issue** : Does not account for sub-hourly dynamics

→ systematic bias at shorter time steps.

Example of real GHI /DHI distribution compared to Erbs model



Erbs annual bias over 113 sites, dt = 1 min



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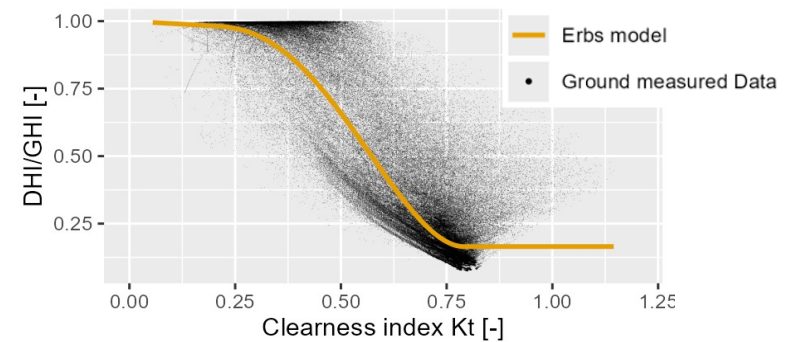
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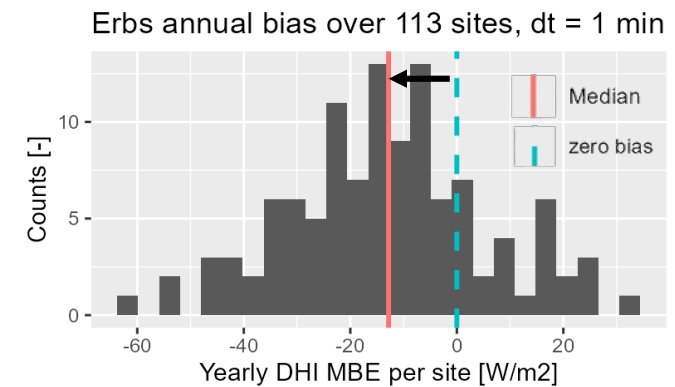
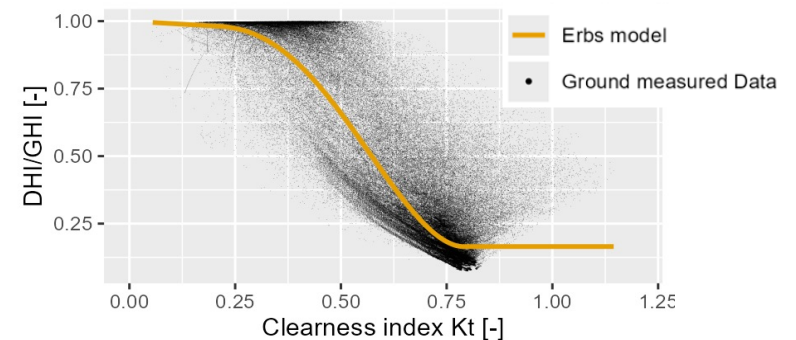
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#### New model : Engerer<sup>1</sup>

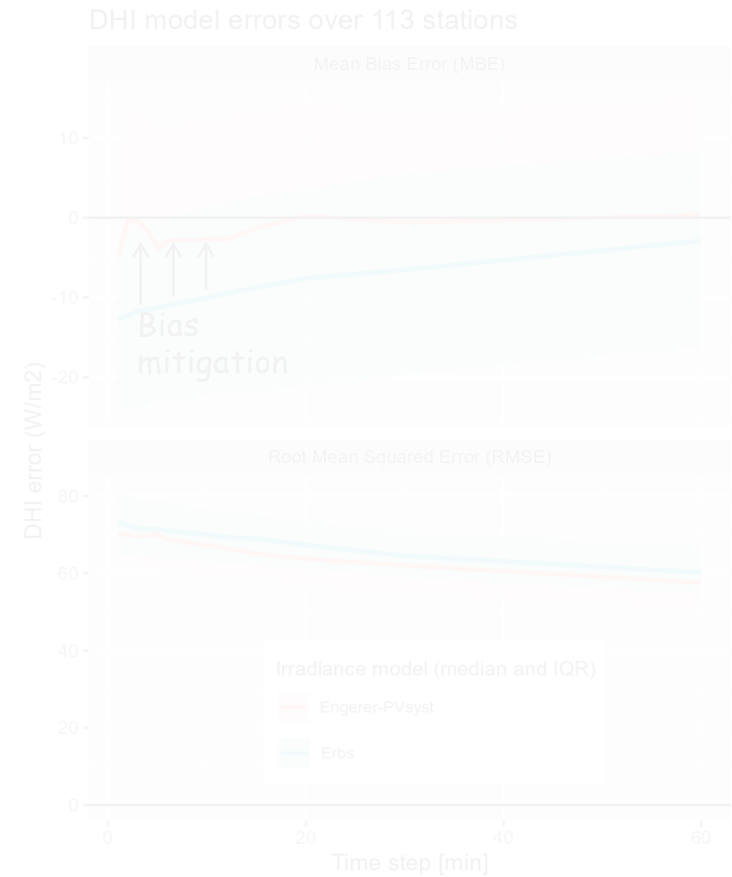
- **GHI**, Clearness index (**Kt**) + **Clear sky model**
- Coefficients **f(time step)**: fitted to minimize the error with measured DHI

#### PVsys rework :

- New fit based on a larger dataset than Engerer publication.

#### Results :

- Much smaller bias (vs Erbs) for any timestep.
- Slightly better RMSE.



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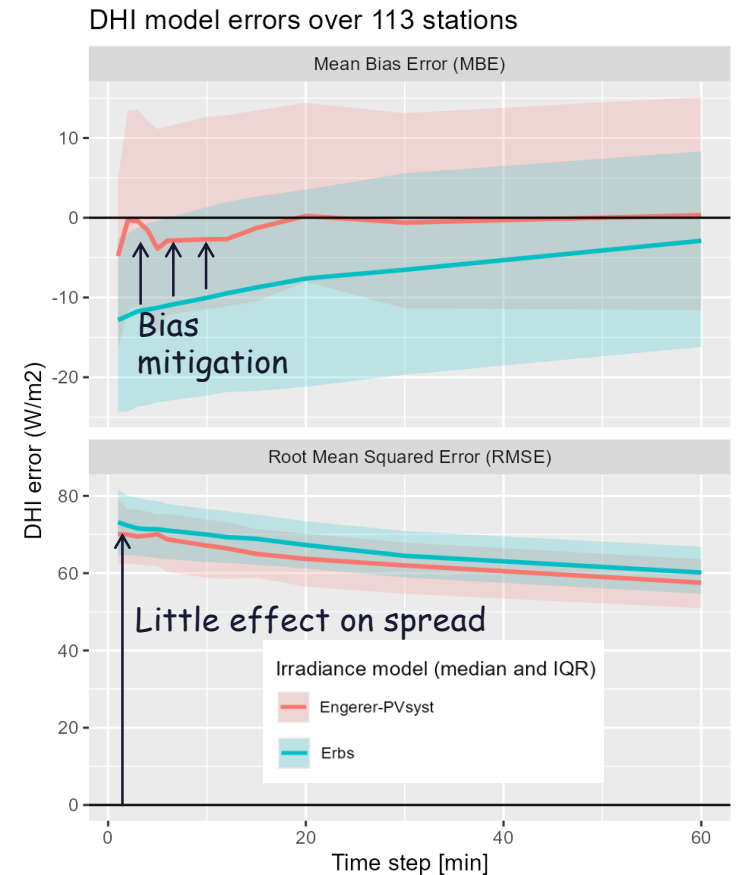
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## 1.2.2 Transposition model

### Diffuse decomposition adaptation

The transposition model converts the irradiance from **horizontal plane** to the **plane of array**.

It requires to split the diffuse horizontal Irradiance (**DHI**) into more elementary components.

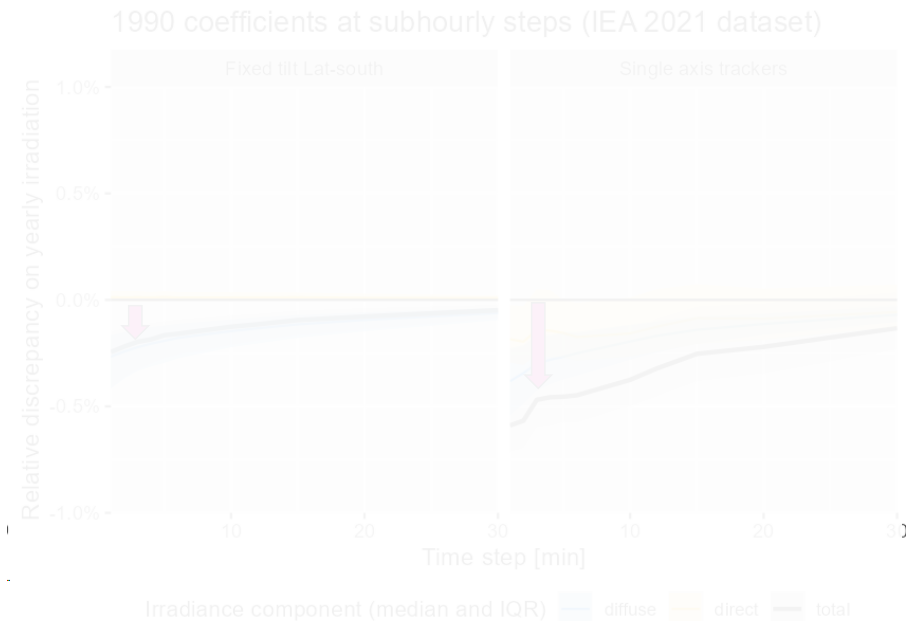
#### PVsystr 8.0: Perez model for diffuse transposition<sup>1</sup>

→ Set of coefficients fitted using mostly hourly measured values in 1990

Issue : Coefficients **not fitted** for sub-hourly dynamics of diffuse irradiance

→ Systematic downward bias at shorter time steps

Solution : Compute a new set of coefficients for each time step



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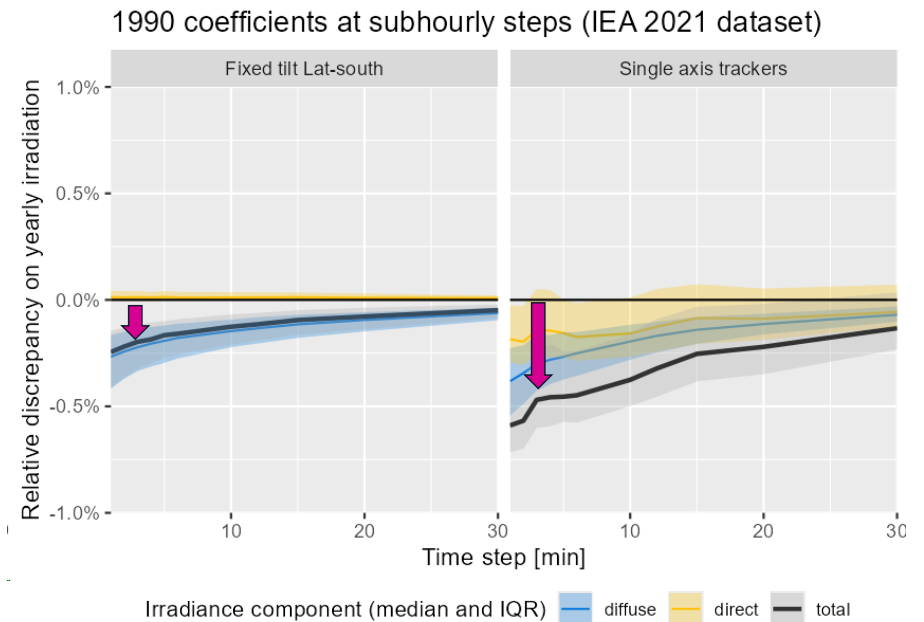
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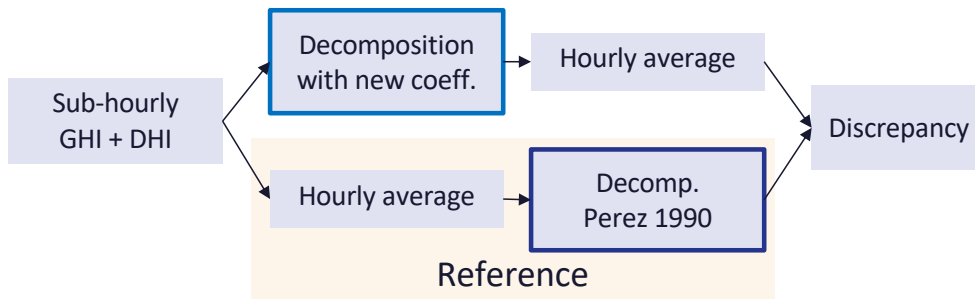


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## Diffuse decomposition adaptation

### Methodology:

Least-squares fit of coefficients to minimize bias between *average decomposed irradiance* and *decompose averaged irradiance* (reference) over an hour



### Result:

- Smaller discrepancy between hourly and sub-hourly simulations

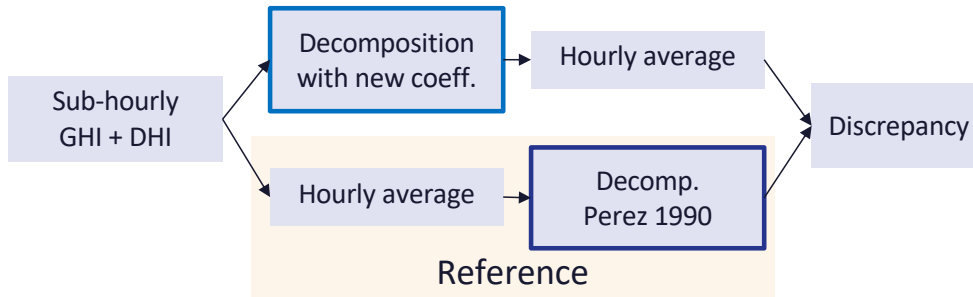


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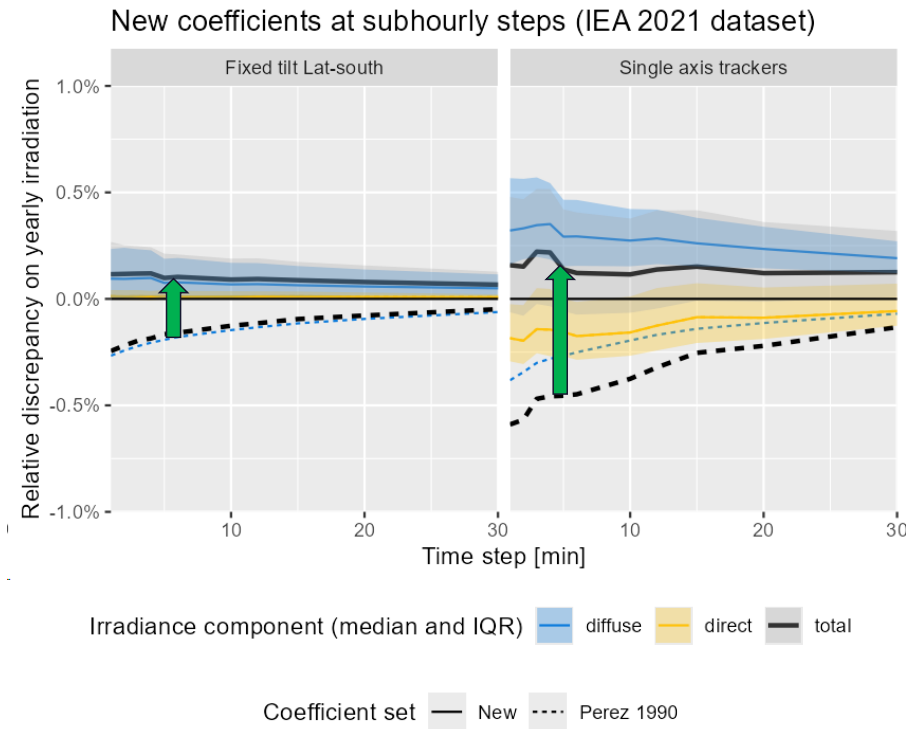
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### Transient model

Until **PVsyst 8.0**, PV modules temperature model was **steady state**.

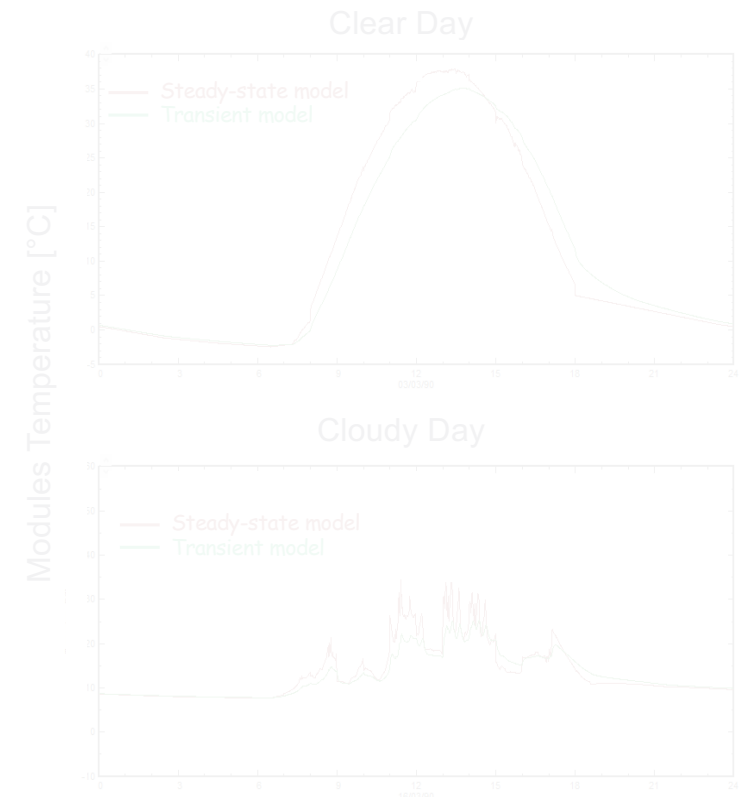
**PVsyst 8.1** introduces a transient thermal model based on **Prilliman's model<sup>1</sup>**.

**Model** : Moving average with exp. decay :

- Thermalization time: bilinear model function of
  - Module mass
  - Wind speed
- Applied both in hourly and sub-hourly simulation

**Impacts on PV production:**

- $\sim 0.1 - 0.2\%$ year for most systems,
- $\sim 1 - 3\%$ year for inverter close to overvoltage limit



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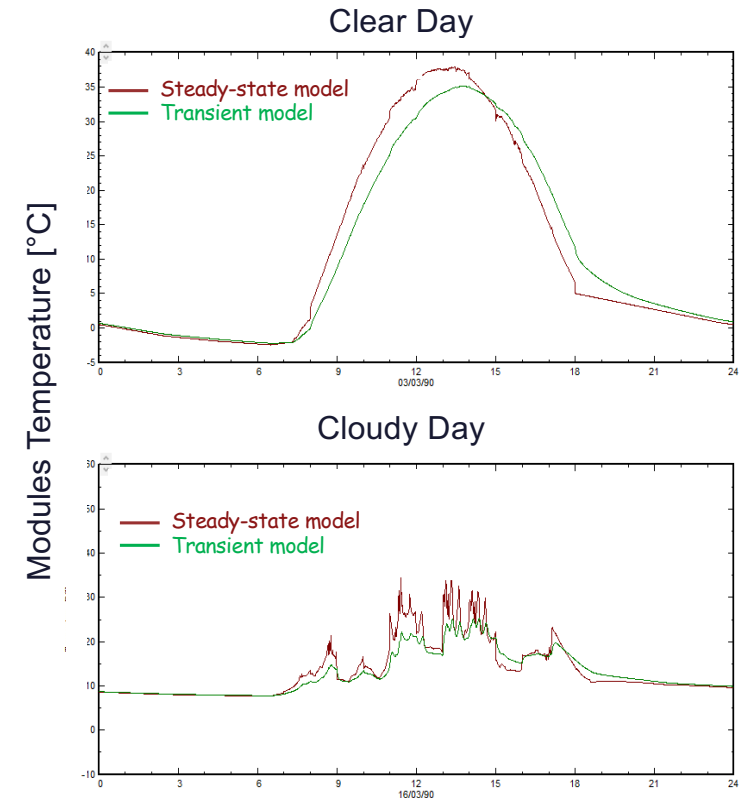
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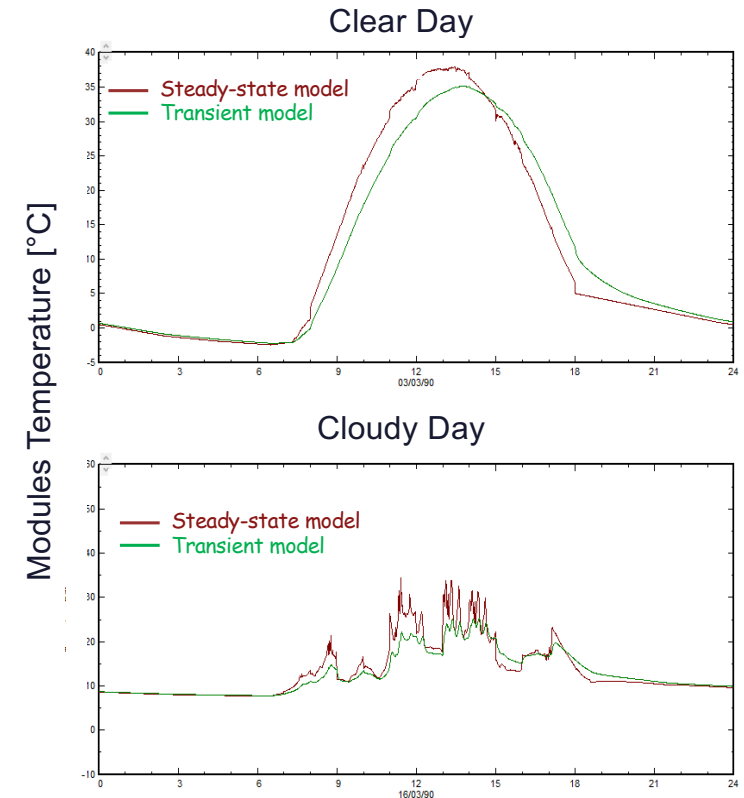
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# 1.3 PV modules thermal model

## PVsys adapted Prilliman

### Prilliman's model issues :

- Cut-off time suggested at **20min**
- "current" steady state temperature not used
- ➔ PVsys-adapted Prilliman correct those issues.

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**Prilliman's model**

### Validation against analytical model for sinusoidal irradiance variation



**Temperature error mitigated for all conditions with PVsys-adapted Prilliman**

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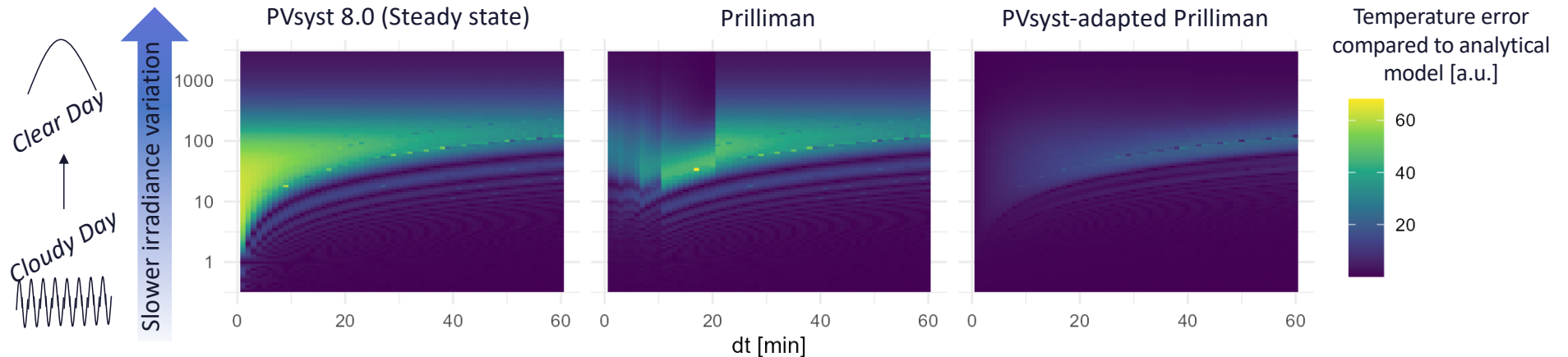
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↓  
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**Prilliman's model**

### Validation against analytical model for sinusoidal irradiance variation



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# 1.4 PVsyst 8.1 : Sub-hourly vs hourly analysis

**Objective :** assess how sub-hourly simulation impacts the simulation results in various situations

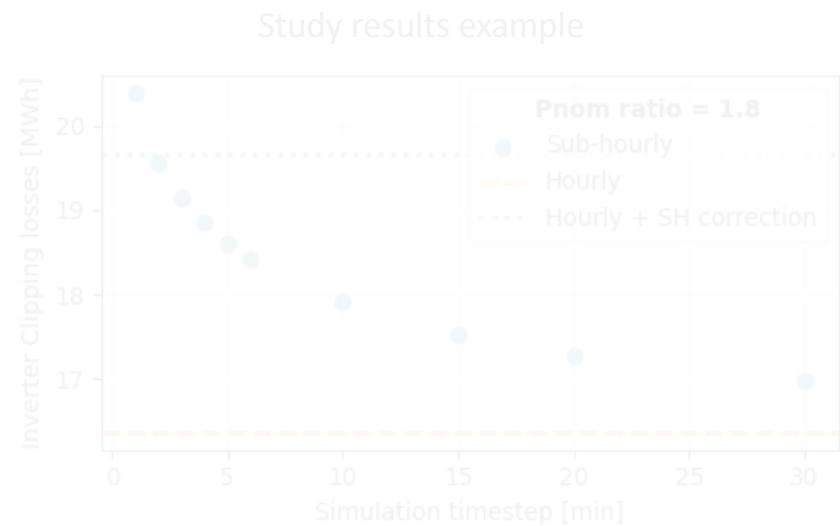
**Input data :** 1-minute measured weather data at different locations

**Methodology :** Comparison of hourly simulation against aggregated sub-hourly results



Results example:

Clipping losses function of the simulation step :  
The **Subhourly clipping correction** works well



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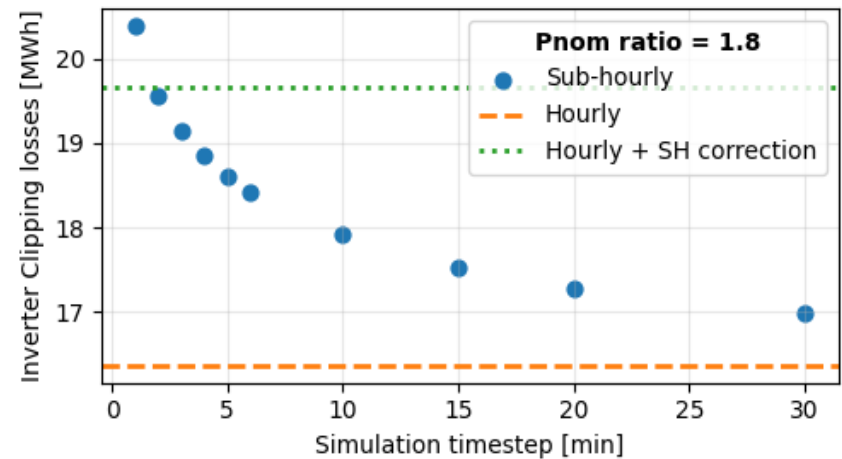
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Study results example





## 2. PVsystCLI : SIT creation

PVsystCLI is a Command Line Interface product using PVsyst models, allowing for tasks automation.

**New feature** : generate a .SIT directly in PVsystCLI and change the site before the simulation.

**Use case Example:** PV Prospection tool

Back-end

Front-end



```
PS C:\Users\rov> PVsystCLI.exe create-site --site-name:"Geneva" --latitude:46.2044 --longitude:6.2432 --altitude:375 --timezone:1 --country-code:CH --weather-data-file:"C:\Data\Geneva_Monthly_Weather.csv" --output-sit-file:"C:\PVsyst8_0_Data\Sites\Geneva.SIT"
>> PVsystCLI.exe run-simulation --workspace:"C:\PVsyst8_0_Data" --project:"Geneva" --variant:"VC0" --site:"C:\PVsyst8_0_Data\Sites\Geneva.SIT" --report-pdf-file:"C:\Reports\Geneva_Report.pdf"
```



### PV Prospection

Click a point on the map to select a site.

Latitude	Longitude	Site name	Altitude (m)	Project ID	Variant ID
46.522168	6.592999	Prospected Site	500	Default project	FT 10-S 20 rows

**Status**

**Process Console**

**Monthly Plot**

Monthly variable  
E\_Grid

Month	E_Grid (MWh)
Jan	1000
Feb	1500
Mar	2000
Apr	2500
May	2800
Jun	3000
Jul	2800
Aug	2500
Sep	2000
Oct	1500
Nov	1000
Dec	800

**Yearly KPIs**



### 3. PVsyst Basic

Simplified version of **PVsyst**

- Easier system design and sizing even with limited training.
- Focused on small isolated and remote systems

**PVsyst basic 1.0** : Pumping systems

**Pvsyst basic 2.0** : StandAlone systems



PVsyst Basic for a pumping system design

## 4. PVsyst Roadmap

### Released



- Subhourly simulation
- Weather data import

- AC circuit and losses
- Batch mode improvements
- PVC 2.0: 3D and electrical circuit

- 3D bifacial
- 3D scene

Thanks for your attention