iPPF: a Radiance based online tool for solar and daylight access studies in urban areas

Raphaël Compagnon

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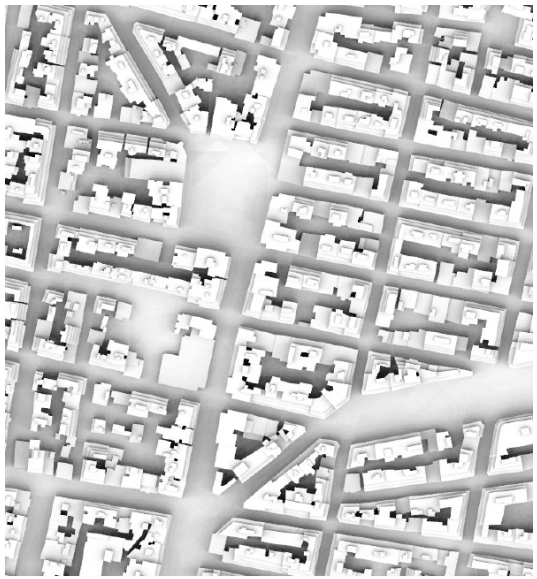


Hes·so
Haute Ecole Spécialisée de Suisse Occidentale

Ecole d'ingénieurs et d'architectes de Fribourg
Hochschule für Technik und Architektur Freiburg

Motivations

•To make our developements available for other users without the burden of writing manuals or solving remote problems.
•To be able to rapidly make changes or add new features to the system.
•To experiment an « integrated » platform that may also serve for future tools.

The developments implemented so far are results from three research projects:
• PRECis: Assessing the Potential for Renewable Energy in Cities, EU project completed in 2000
• SOLURBAN: Solar Energy Utilisation Potential of an Urban Site, Swiss Federal Office of Energy project, nearly at the end
• RUROS: Rediscovering the Urban Realm and Open Spaces, EU project completed in 2004

Underlying calculation method described in:
R. Compagnon, **Solar and daylight availability in the urban fabric**
Energy and Buildings Volume 36, Issue 4 , April 2004, Pages 321-328

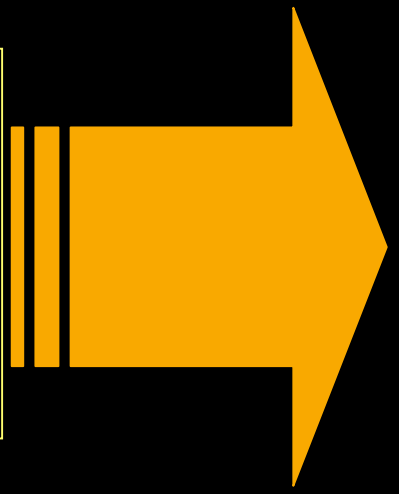
Existing Web based interfaces to computer tools in the field of solar/daylight simulations

European of Daylight and Solar Radiation:
http://www.satel-light.com/

Integration and exploitation of networked solar radiation databases for environment monitoring:
http://www.soda-is.com/

Lightswitch Wizard:
http://www.buildwiz.com/

Virtual Lighting Simulator:
http://gaia.lbl.gov/vls/



Also using RADIANCE as calculation engine!

Stepwise procedure:

1) Upload the model
2) Select the type of results required (with or without sky models), submit the calculations
3) After receiving a mail from the system, look at the results
4) Other results required ? Then Iterate from step 2

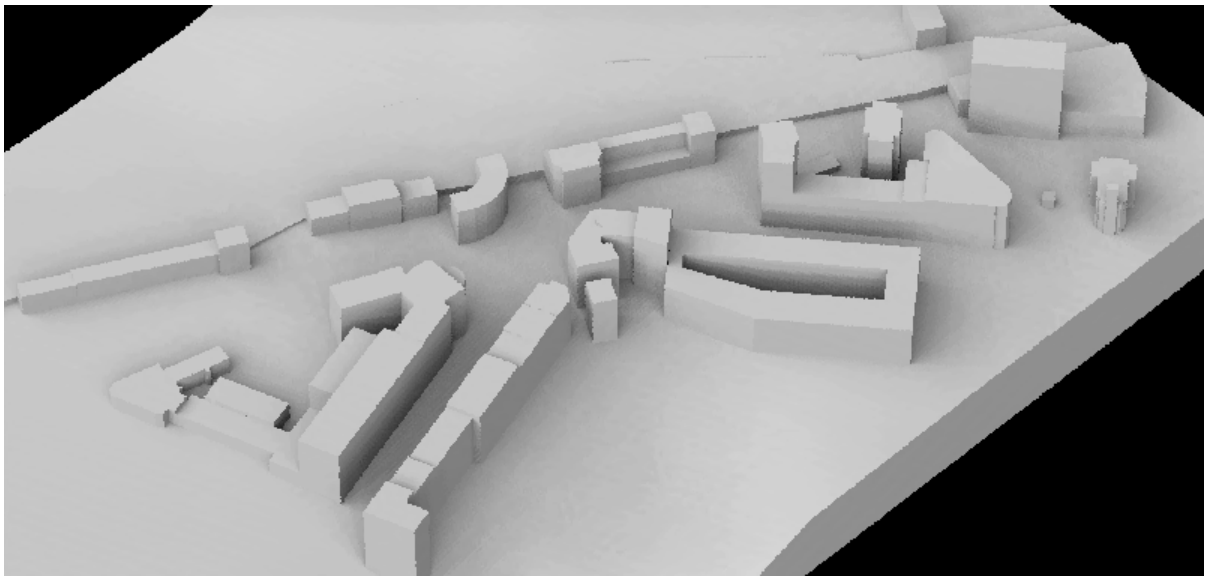
Input of buildings

Through textfiles using a simple command line format :

```
defsite ex2 0 0 0 0 0 0 80 80
<ppf_slab A 12 20 10 5 5
<ppf_slab A 9  10 10 25 10
<ppf_dup A 1 40 0 1 0 25
ground
25 20
35 20
35 15
45 15
45 35
25 35
0 0
```

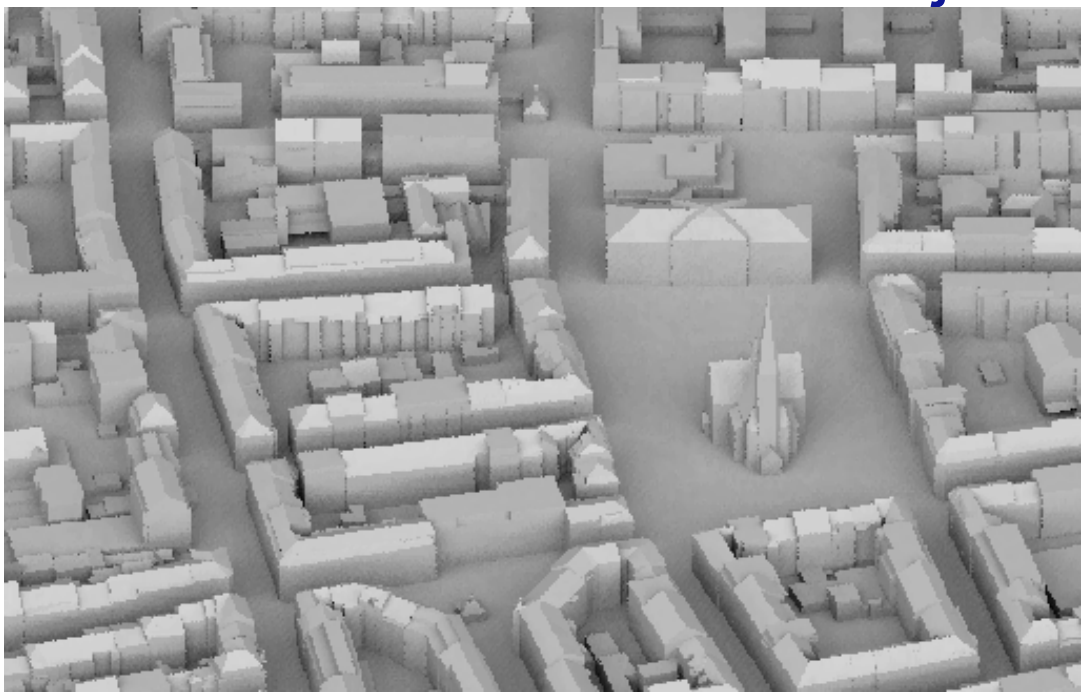
Limitations:

Simple extruded block buildings



Input of buildings

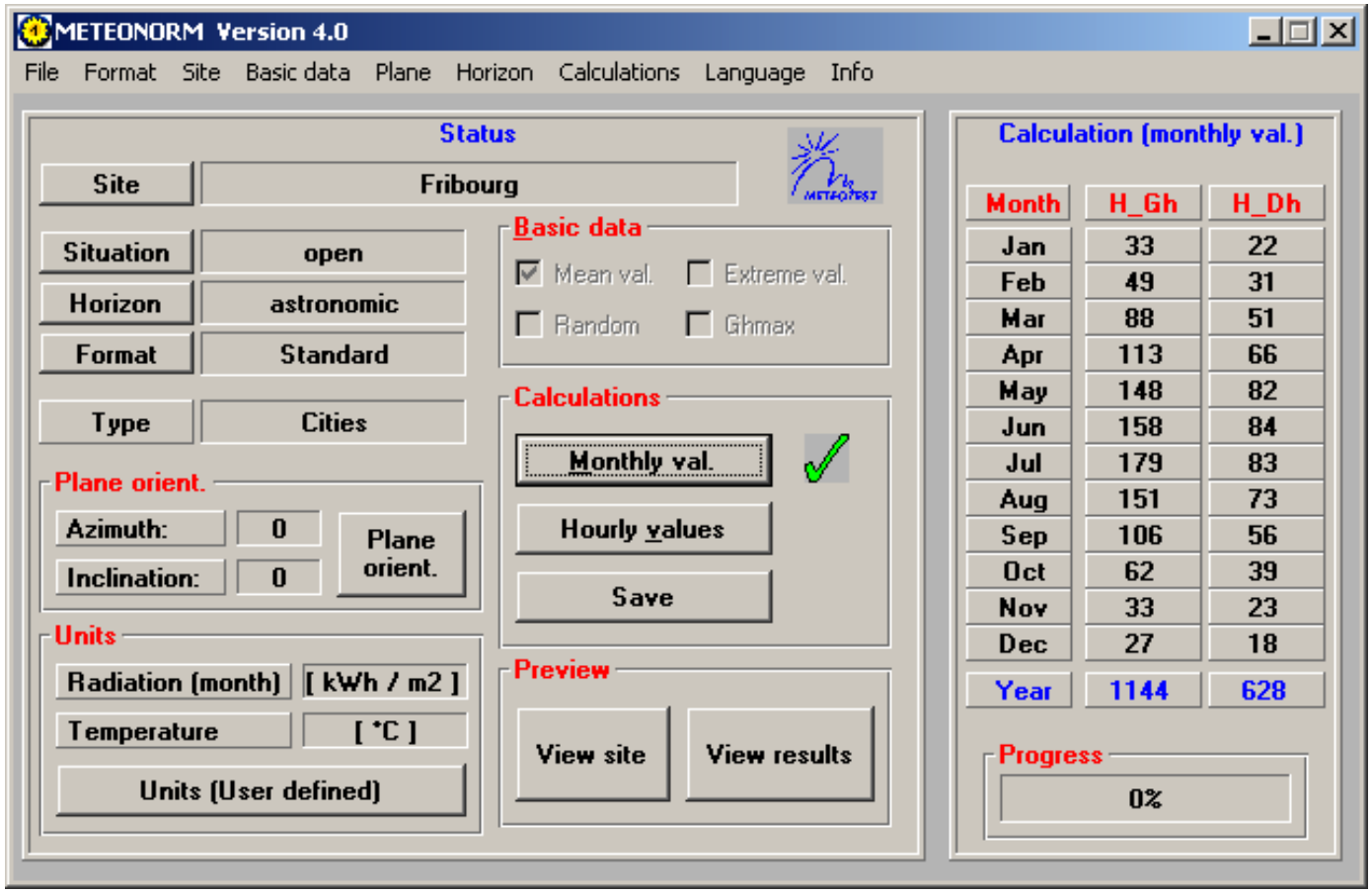
- Through *properly generated* DXF files (extruded POLYLINES or 3DFACE objects only)



- Through MID/MIF files generated from Mapinfo of other GIS software

Input of skies

- Through a textfile containing hourly direct normal irradiances, diffuse horizontal irradiance and air temperature (easy to obtain using METEONORM)



Demo

Online version will/should… be made available on the Internet by the end of the year

www.eif.ch/ippf/

File Edit View Go Bookmarks Tools Window Help

http://pcphco.eif.ch:8080/ippf/index_en.jsp

Welcome on the iPPf simulation tool

User

Password

Enter

Examples

Creation of a visitor account

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Ecole d'ingénieurs et d'architectes de Fribourg
Hochschule für Technik und Architektur Freiburg

Contact: raphael.compagnon@eif.ch

ISES
Regular
Member

partner
brenet
building and renewable energies network of technology

File Edit View Go Bookmarks Tools Window Help

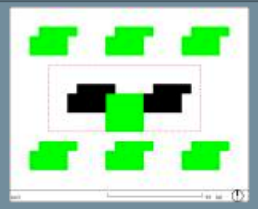
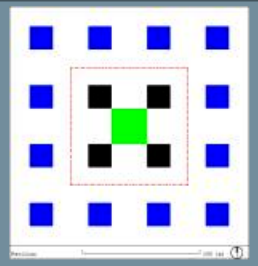
http://pcphco.eif.ch:8080/ippf/userSimulation.jsp

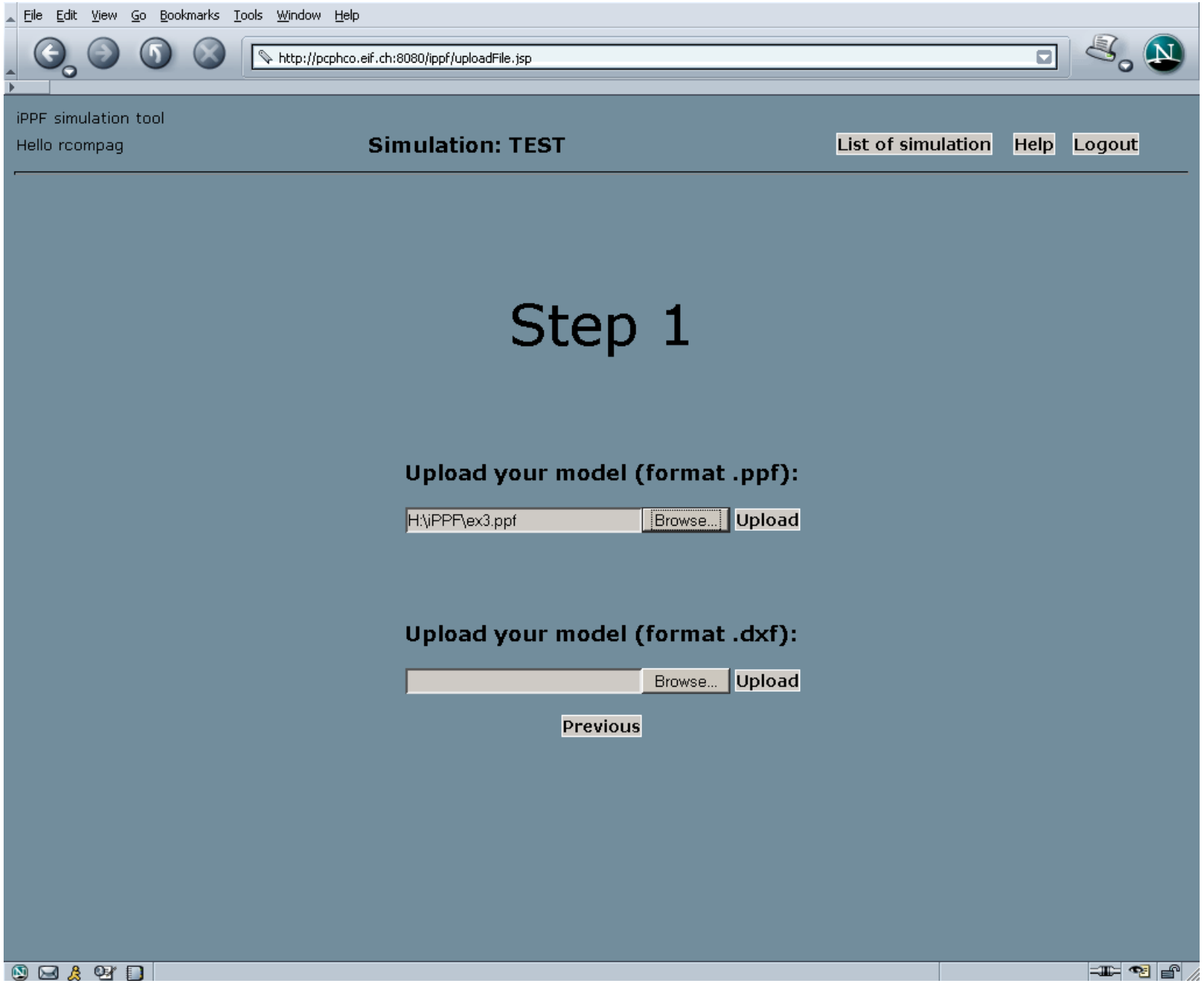
iPPF simulation tool

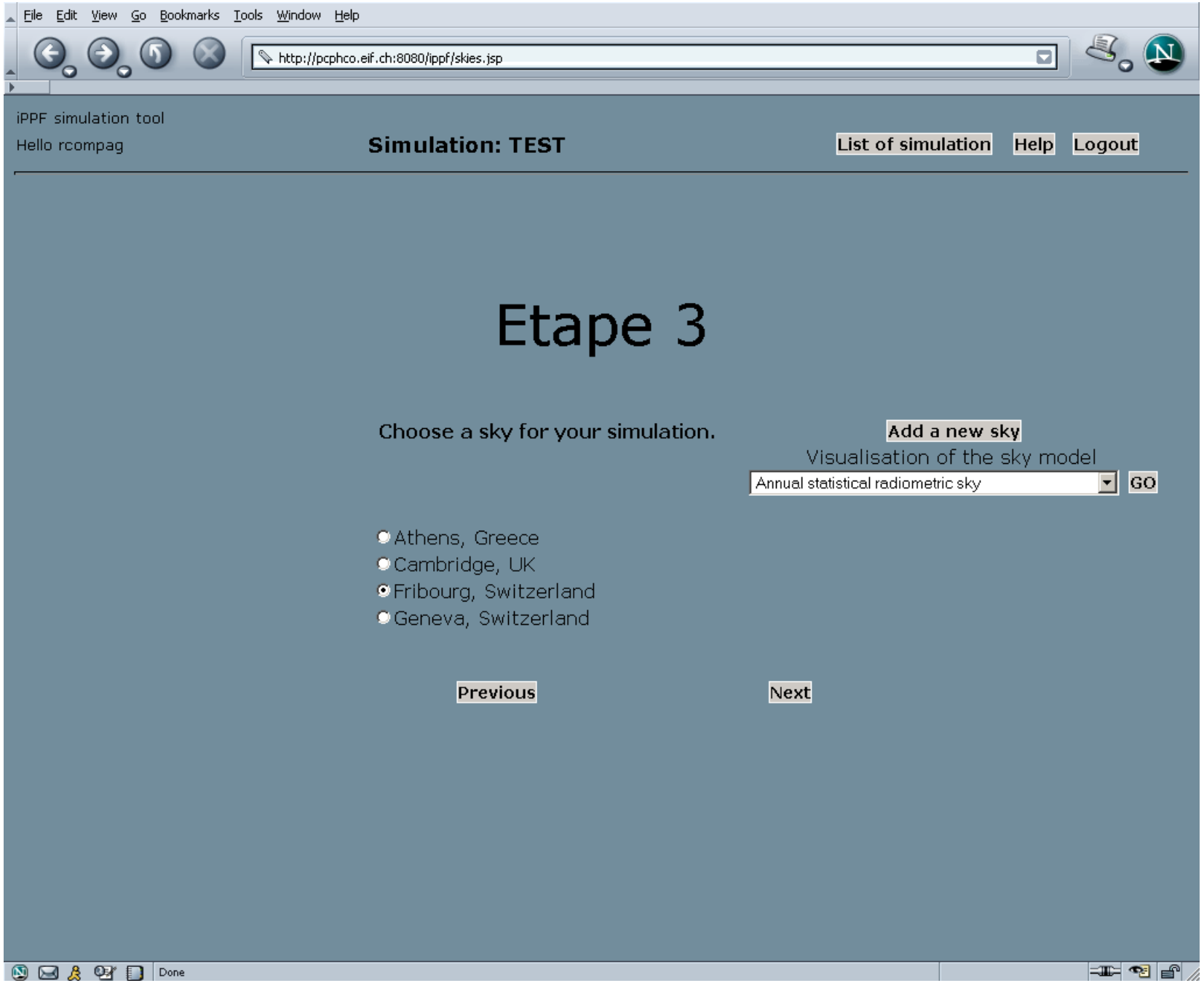
Hello rcompag

Help Logout

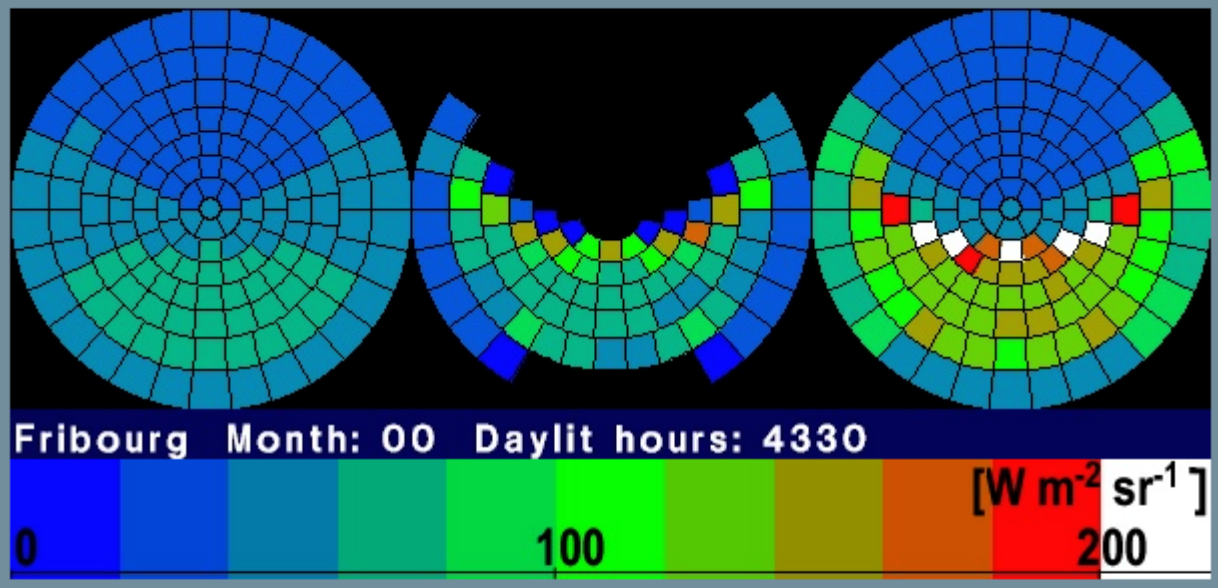
Your simulations:

Simulation	Description	Map	Status	
THERMI	thermi			Remove Archive
Ex3bis	Exemple 3 avec AUTOSITE			Remove Archive
Pavilion	Generic Urban Form: PAVILION			Remove Archive

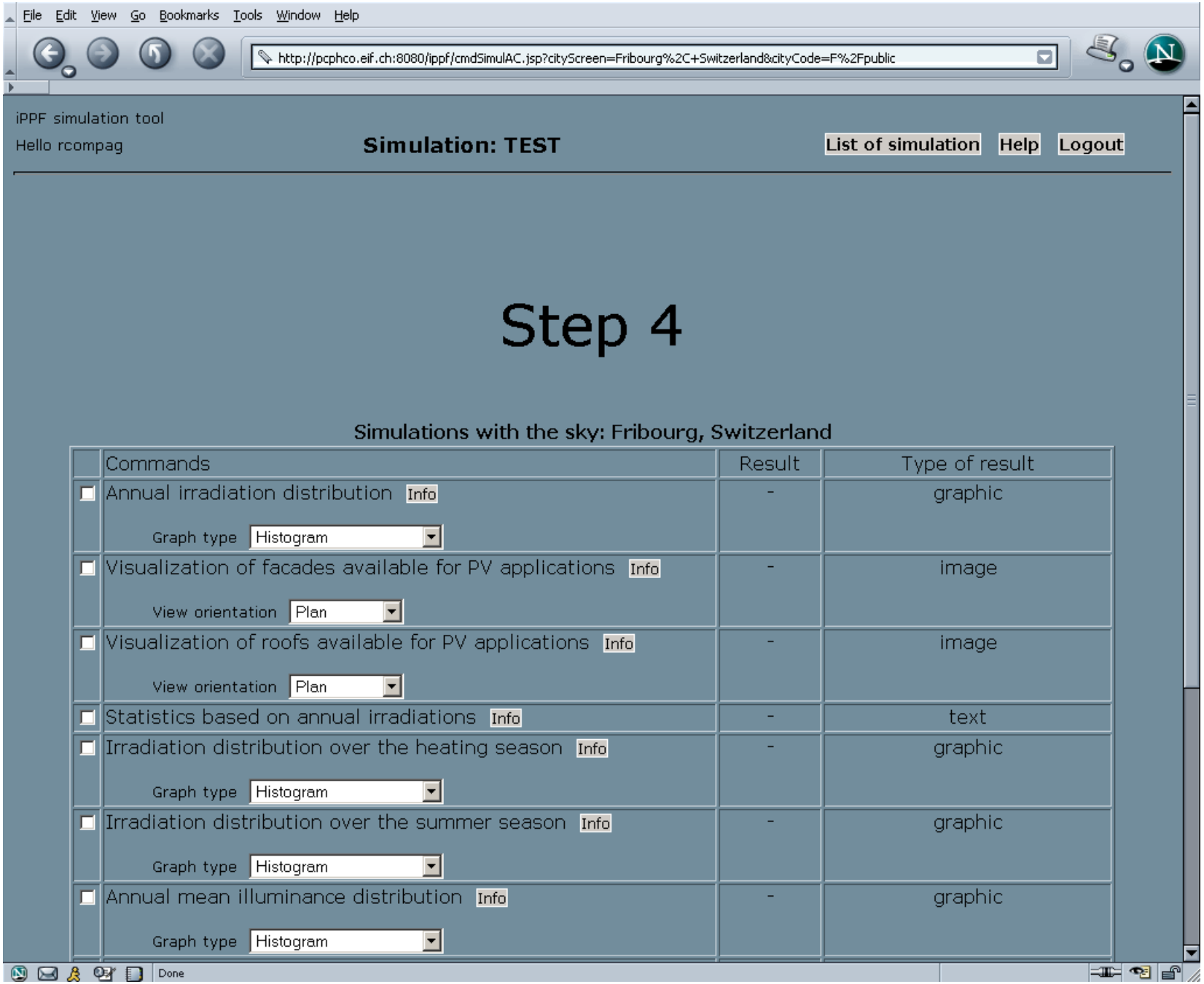

File Edit View Go Bookmarks Tools Window Help
http://pcphco.eif.ch:8080/ippf/uploadFile.jsp
iPPF simulation tool
Hello rcompag
Simulation: TEST
List of simulation
Help
Logout
Step 1
Upload your model (format .ppf):
H:\iPPF\ex3.ppf
Browse...
Upload
Upload your model (format .dxf):
Browse...
Upload
Previous


File Edit View Go Bookmarks Tools Window Help
http://pcphco.eif.ch:8080/ippf/skies.jsp
iPPF simulation tool
Hello rcompag
Simulation: TEST
List of simulation
Help
Logout
Etape 3
Choose a sky for your simulation.
Add a new sky
Visualisation of the sky model
Annual statistical radiometric sky
GO
Athens, Greece
Cambridge, UK
Fribourg, Switzerland
Geneva, Switzerland
Previous
Next
Done

Visualisation of the radiometric sky model.



Close


File Edit View Go Bookmarks Tools Window Help
http://pcphco.eif.ch:8080/ippf/cmdSimulAC.jsp?cityScreen=Fribourg%2C+Switzerland&cityCode=F%2Fpublic
iPPF simulation tool
Hello rcompag
Simulation: TEST
List of simulation
Help
Logout
Step 4
Simulations with the sky: Fribourg, Switzerland
Commands
Result
Type of result
Annual irradiation distribution Info
-
graphic
Graph type Histogram
Visualization of facades available for PV applications Info
-
image
View orientation Plan
Visualization of roofs available for PV applications Info
-
image
View orientation Plan
Statistics based on annual irradiations Info
-
text
Irradiation distribution over the heating season Info
-
graphic
Graph type Histogram
Irradiation distribution over the summer season Info
-
graphic
Graph type Histogram
Annual mean illuminance distribution Info
-
graphic
Graph type Histogram
Done