# Free training in solar energy - session 2014

Date: 22-23-24 January 2014  Place: MINES ParisTech, 1 rue Claude Daunesse, 06904 Sophia Antipolis, France

After the success of the session 2013, MINES ParisTech / Transvalor / Armines organize a new training session in solar radiation open to everyone for 2014. The concept is that the training should be comprehensible by the largest possible audience, without depriving the experts in the solar radiation domain of essential clues.

Picture: Smiling attendees in 2013

The program is divided in 5 half days:

| **Day 1: Wednesday 22 January 2014** |
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| 09:00 – 12:00:<br>The attendees will introduce themselves in a few words.<br>Introduction of the SoDa team: MINES ParisTech / Transvalor / Armines, and brief presentation on the current activities of each one.<br>Presentation of the SoDa Service: a broker to access free Web services or to order:<br>- a time series,<br>- a Typical Meteorological Year,<br>- a map of radiation values or a solar atlas.<br>Brief presentation of the different annual subscriptions, and other on-delivery services, such as monitoring solutions, quality check of ground station measurements, calibration….<br>Several of these topics will be more deeply addressed during the training session. |
| Lunch: ~15€ |
| 14:00 - 17:00:<br>Fundamentals in solar radiation:<br>- Sun/Earth geometry, the sun course in the sky<br>- Spatial and temporal variability of the solar resource at Earth surface<br>- Time references: UT, TST, local time<br>- Components of the solar radiation<br>Ground measurements (Part 1):<br>- Measuring the global, direct and diffuse components on a horizontal or normal to sun rays surface. |
| Activity: *(tbd)* |

| **Day 2: Thursday 23 January 2014** |
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| 09:00 – 12:00:<br>Ground measurements (Part 2):<br>- Uncertainties of measures, advantages and drawbacks of ground measurements, using data from a nearby station…<br>Satellite measurements:<br>- The satellite images<br>- Inverse models, description of a few clear-sky models<br>- The Heliosat-2 method, its limits and strengths |

- The various HelioClim databases, their properties, advantages and drawbacks
- The new Heliosat-4 direct method, and the HelioClim-4 database

Open discussion

Lunch: ~15€

14:00 - 17:00:

Quality check, statistics and calibration:

- What are the relevant quantities to use in a statistical analysis?
- Procedures for checking the quality of measurements
  - Study of test cases. Encountered difficulties: shadowing effects, time shift of the ground station clock…
- Calibrating HelioClim-3 time series with ground measurements
  - Description of the calibration process
  - Description of the new Web service providing calibrated HelioClim-3 time series.

Open discussion

Restaurant: offered by MINES ParisTech

**Day 3: Friday 24 January 2014**

09:00 – 12:00:

Real-time, nowcasting and forecasting

- Provision of raw HelioClim-3 radiation maps in near real time.
- Constraints of the near real time services.
- State-of-the-art about nowcasting and forecasting methods
- Introduction to the new DNICast project, and very short-term forecast with fish-eye cameras.

Open discussion.

Lunch: ~15€

13:00: Adjourn free training session 2014 in solar energy

The PowerPoint presentations will be offered to the attendees on a USB key.