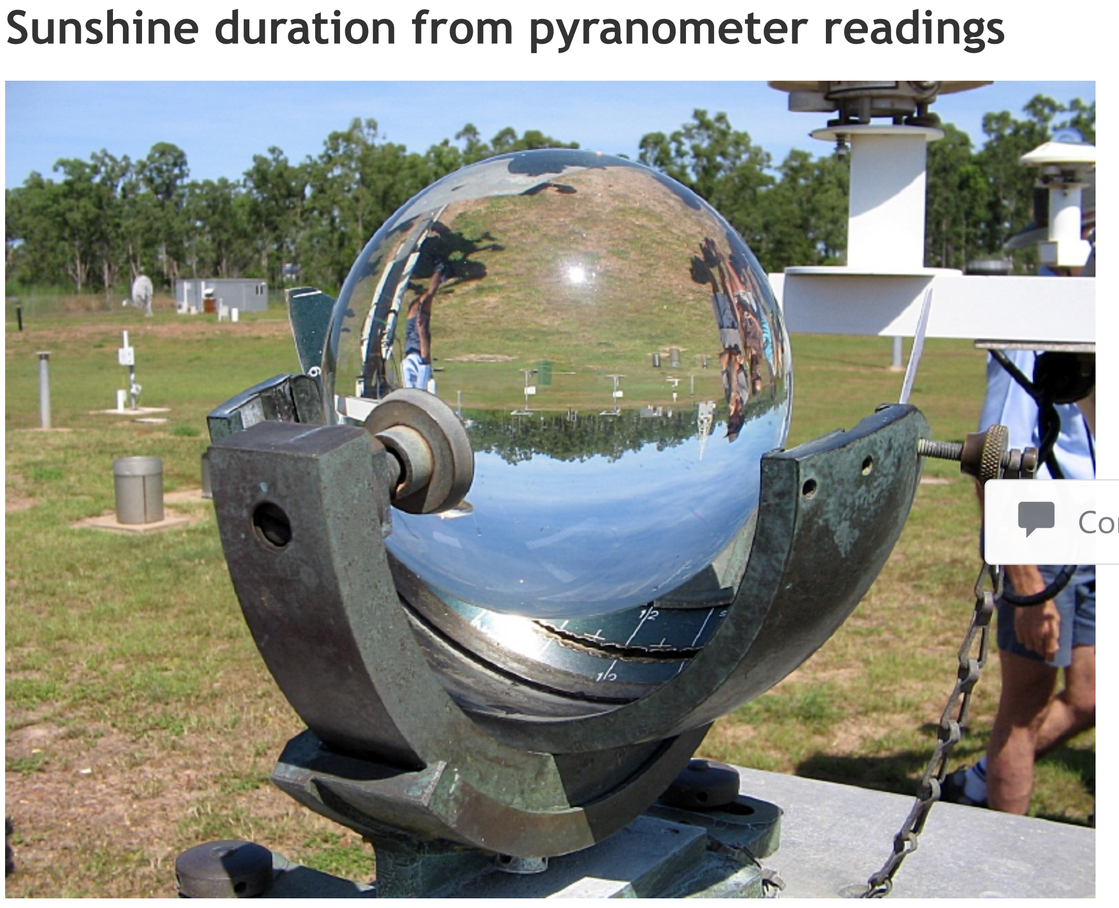
Sunshine duration from pyranometer readings



I just finished yesterday a short paper comparing 7 different methods to derive sunshine duration from pyranometer measurements. This is a very old problem, for which there exist many potential solutions; these all are usually heavily localized, i.e. they contain parameters valid only for a certain region. MeteoLCD uses since many years a very simple method developed by Jean Oliviéri, a now retired scientist who worked at MeteoFrance's Centre de Radiométrie de Carpentras. I compared his method with 6 others using 11 years data from meteoLCD. I also used the 11 years monthly reports from the national meteorological station of the Findel airport; they used and still use the Campbell-Stokes sunshine recorder(pictured above, source = http://www.adagunes.com/).

As a "reference" algorithm I took one published in 2006 by Hinssen & Knap from the Durch KNMI; these researchers made simultaneous measurements with a pyrheliometer (which measures direct solar irradiance) and a pyranometer (which measures global = direct + diffuse + reflected irradiances). The WMO definition from 2003 states that sun does shine if the direct irrandiance is at least 120 Wm-2, so a sun-tracking pyrheliometer is the proper instrument to use. As it is a rather expensive gadget, you won't find many at "ordinary" weatherstations. This makes the existence of pyranometer-readings based algorithms so useful, even if sunshine duration, which was formerly one of the essential weather parameters to know has lost much of its importance. Campbell-Stokes recorders are notorious for overestimation sunshine duration, something which we see every year at Diekirch, and which the paper also points too. As they are manually operated, they tend to disappear completely in a time where most weather stations are working automatically.

The conclusions from the paper confirm that Oliviéri's method "beats them all", which will be quite a satisfaction for the inventor (and for meteoLCD which long times ago made the correct choice!).

The full text of the paper can be found **here** (PDF).

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