A suntracker at La Réunion Island for monitoring surface solar radiation under tropical maritime climate conditions: towards a new BSRN site?

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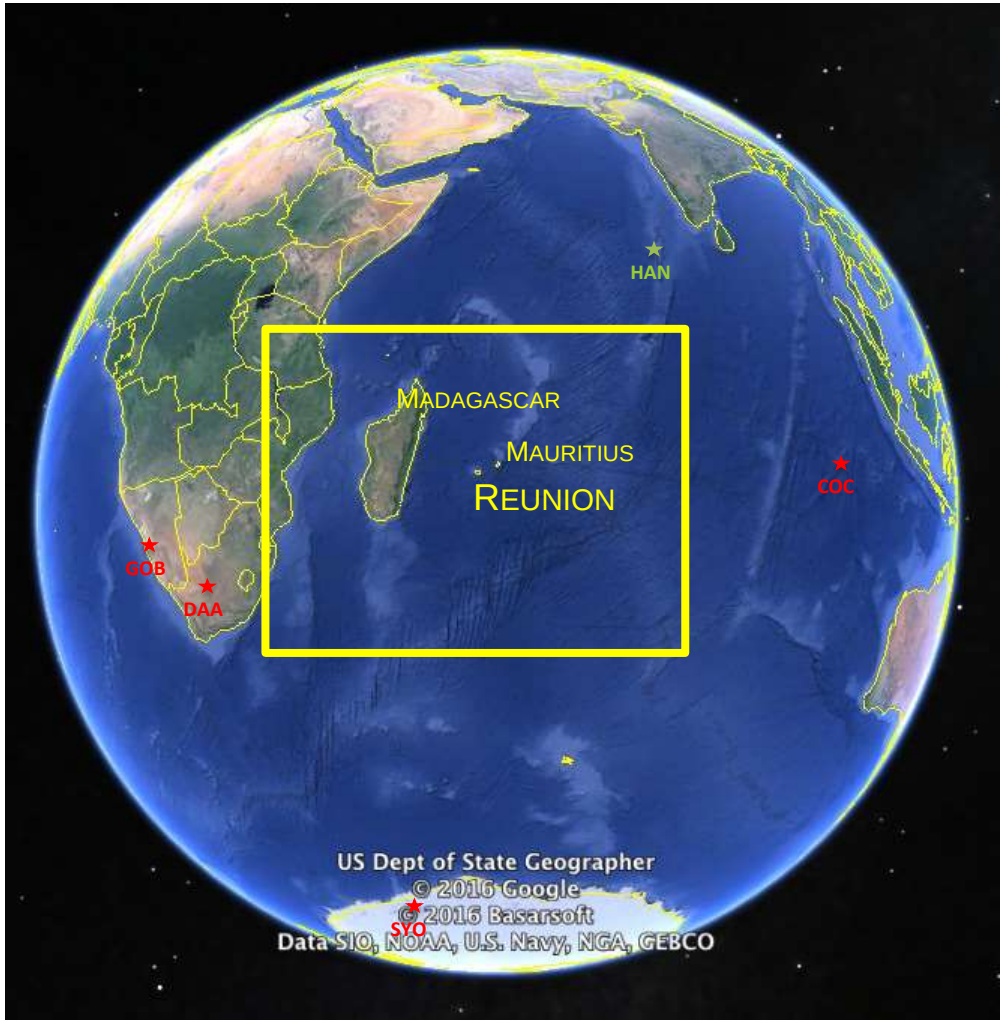
Introduction

A Research Unit of the University of Reunion Island

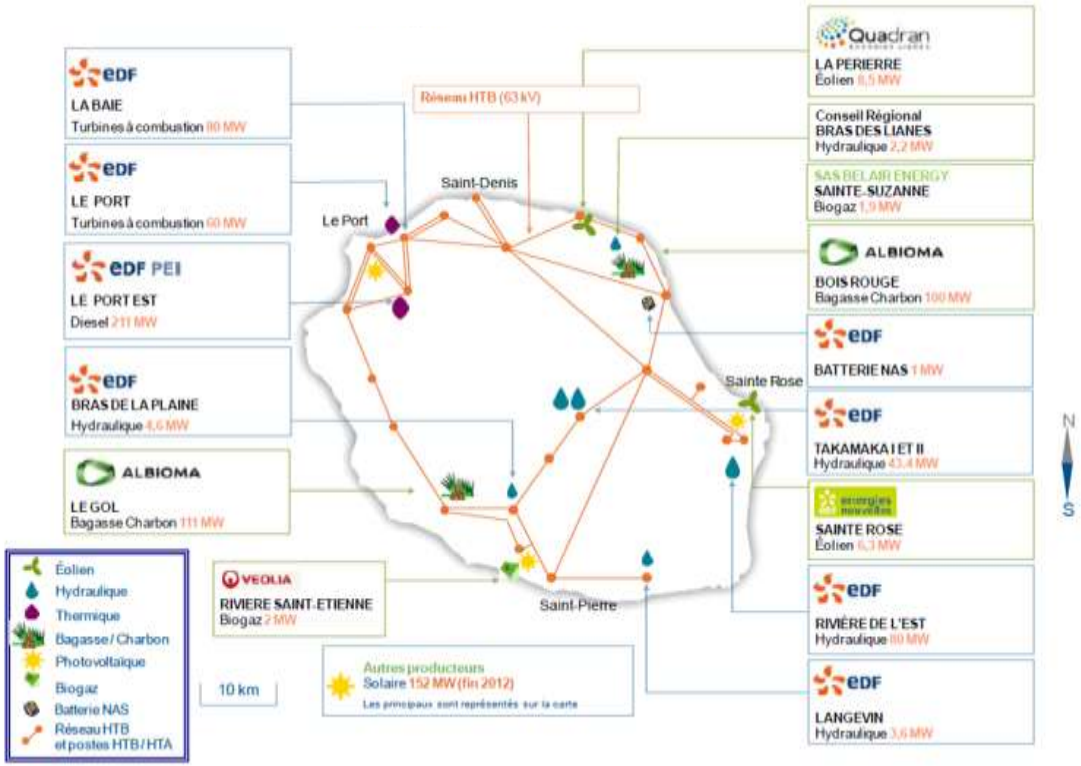
- Permanent Staff: 12,5
  12 (Pr. + Ass. Pr.) + 2.5 (Admin. + Eng. + Tech. Ass.)
- Non Permanent Staff (2015): 32
  18 (PhD Students) + 2 (Post-Doc) + 12 (Admin. + Eng. + Tech. Ass.)

Introduction

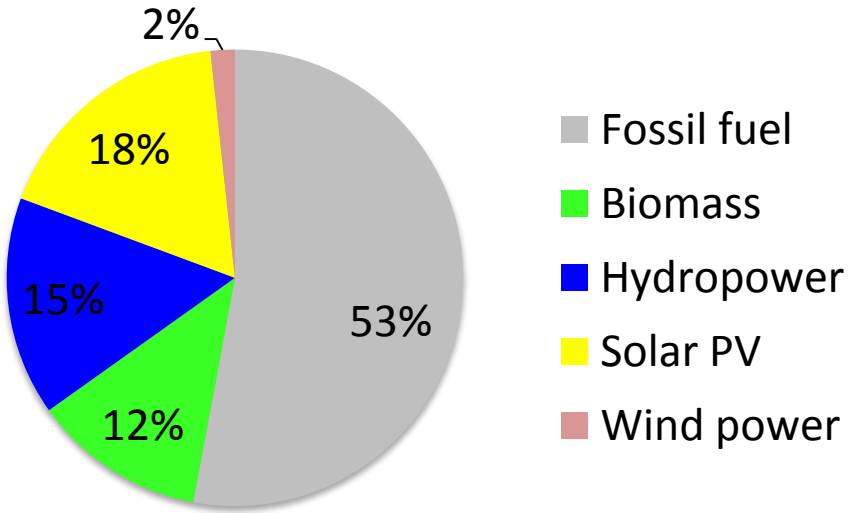


Introduction

Electricity distribution grid over Reunion



Energy mix



Introduction

Smart management of solar energy

Topic 1 – Solar resource variability

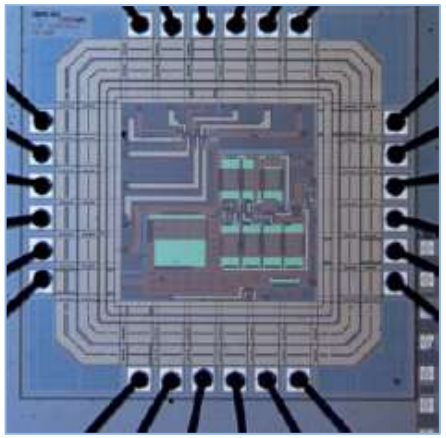
Topic 2 – Energy conversion and storage

Topic 3 – Energy optimization

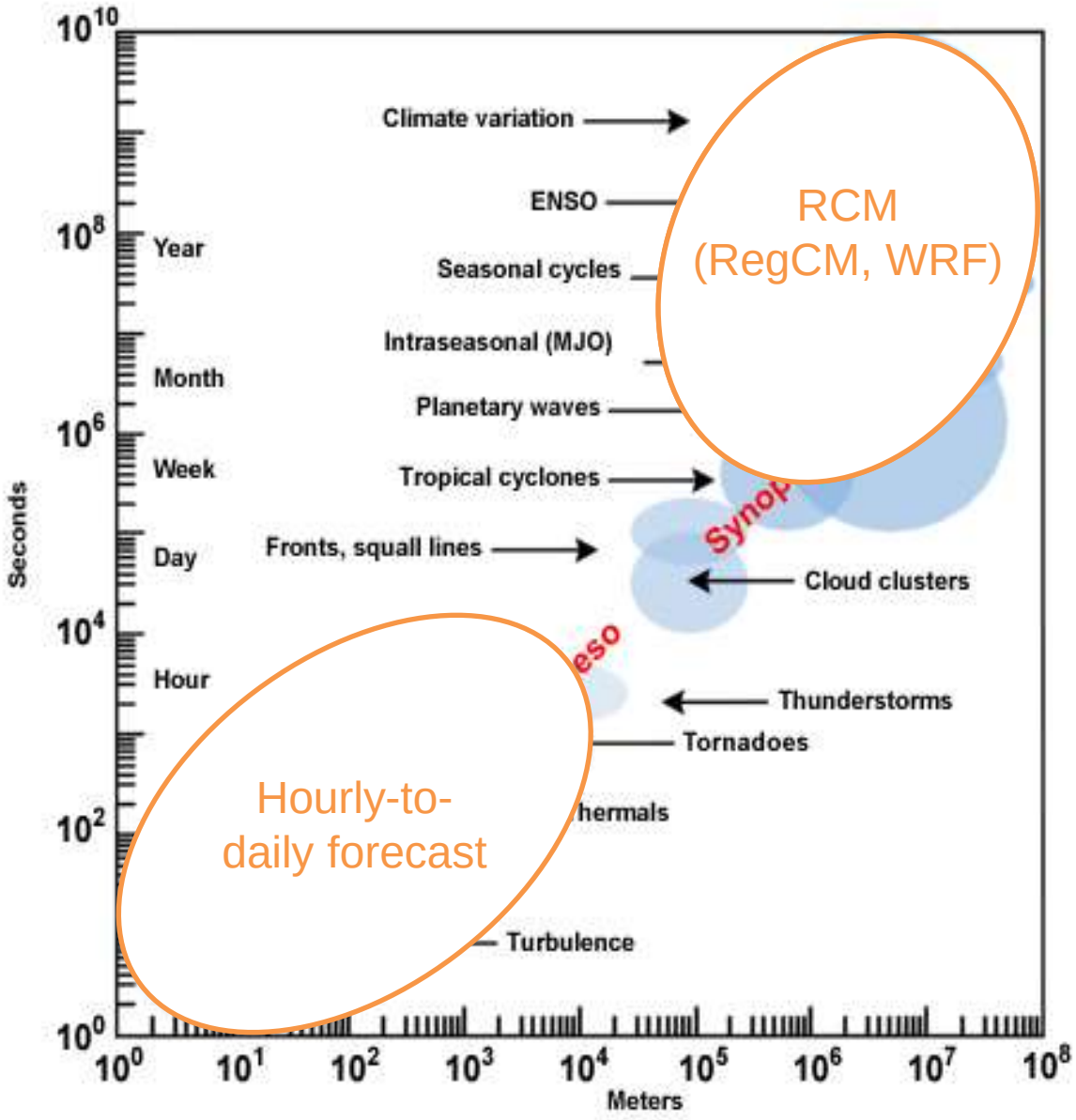
radiative assessment

fuel cell hybrid system

WSN

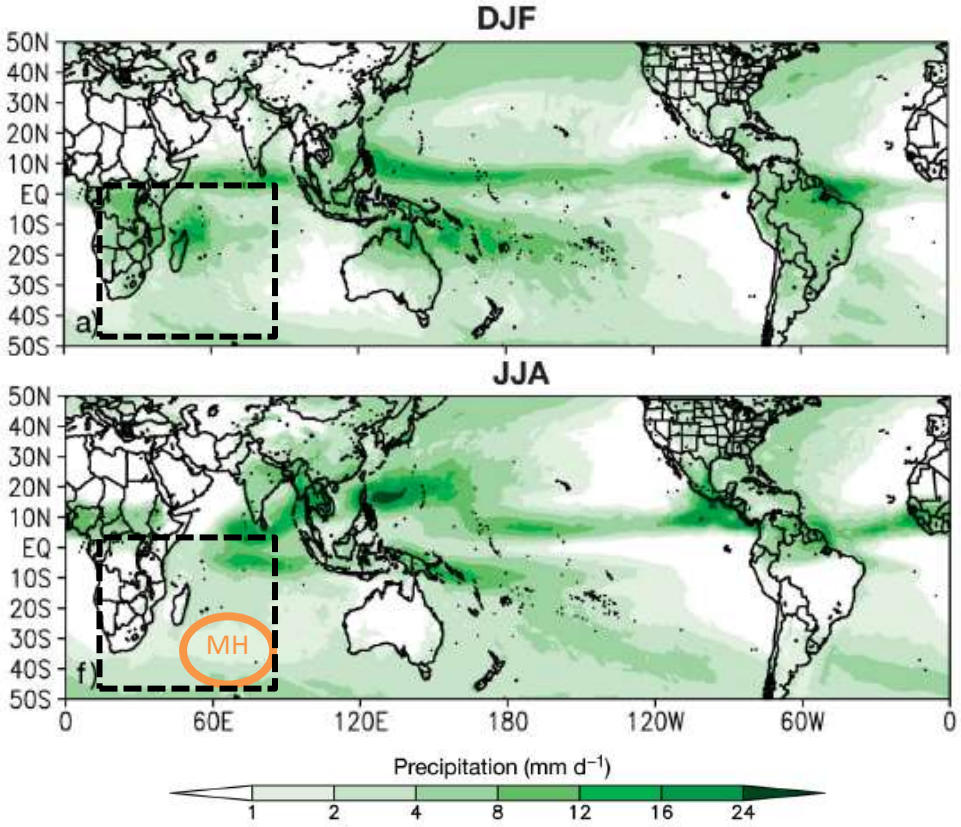


Introduction



Cloudiness variability: SWIO

– **Seasonal**: fluctuations of the location and intensity of the ITCZ and the trade winds

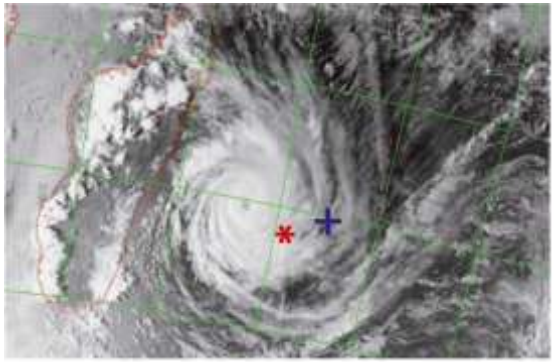


Coppola et al. 2012

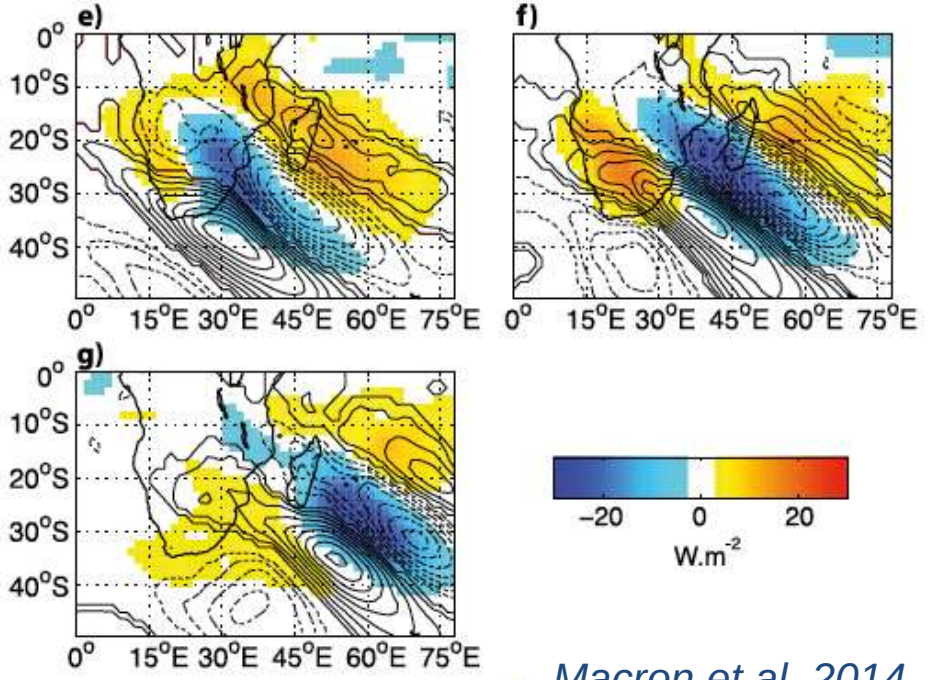
Cloudiness variability: SWIO

– **Seasonal**: fluctuations of the location and intensity of the ITCZ and the trade winds

– **Synoptic**: tropical cyclone, tropical temperate trough



Morel et al. 2014



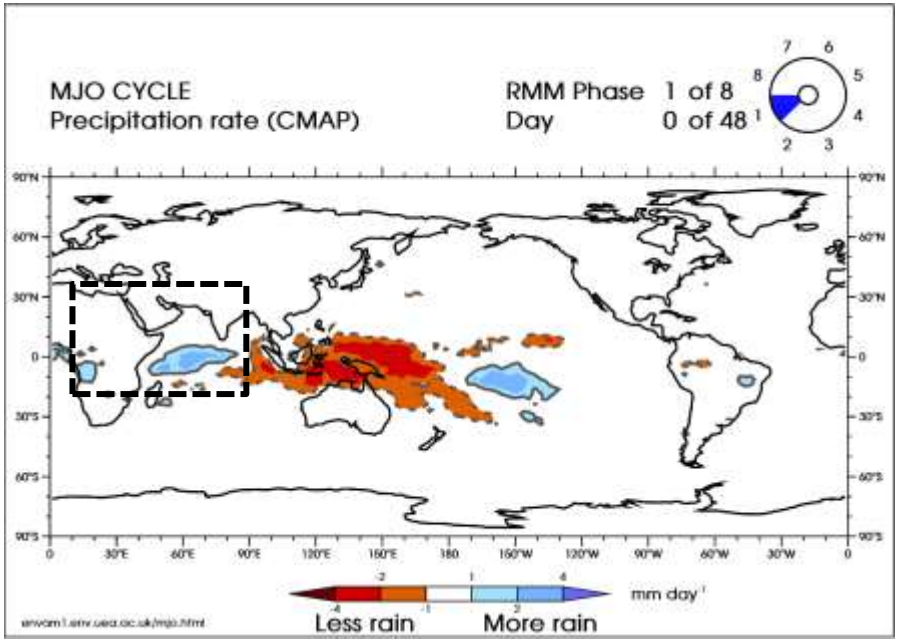
Macron et al. 2014

Cloudiness variability: SWIO

– **Seasonal**: fluctuations of the location and intensity of the ITCZ and the trade winds

– **Synoptic**: tropical cyclone, tropical temperate trough

– **Intraseasonal**: MJO



MJO animation from Adrian Matthews

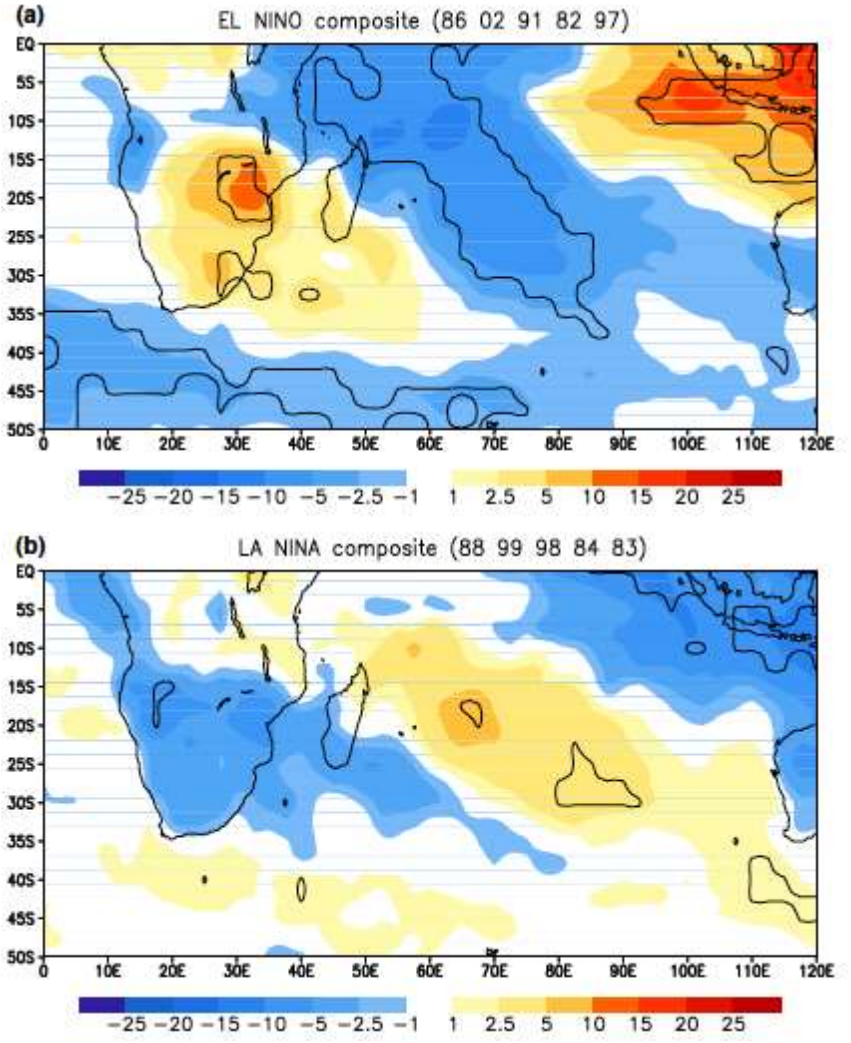
Cloudiness variability: SWIO

– **Seasonal**: fluctuations of the location and intensity of the ITCZ and the trade winds

– **Synoptic**: tropical cyclone, tropical temperate trough

– **Intraseasonal**: MJO

– **Interannual**: ENSO



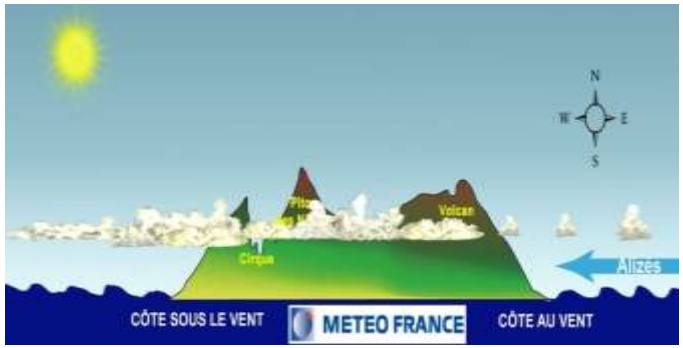
Faucherau et al. 2009

Cloudiness variability: Reunion

– meteorology driven by a combination of large/meso-scale and local-scale processes (land-sea breezes, slope winds, …)

→ 3 typical weather situations

1. dry trade-wind regime



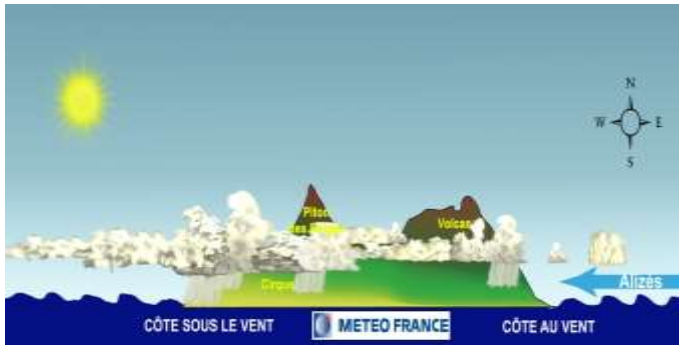
http://www.meteofrance.re/climat/pedagogie/situations

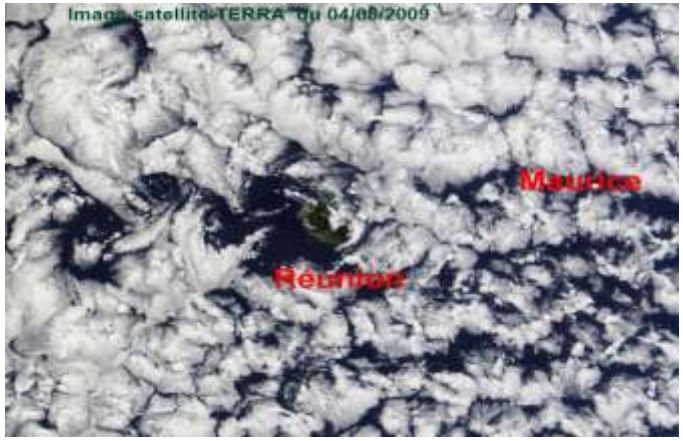
Cloudiness variability: Reunion

– meteorology driven by a combination of large/meso-scale and local-scale processes (land-sea breezes, slope winds, …)

→ 3 typical weather situations

1. dry trade-wind regime
2. humid trade-wind regime





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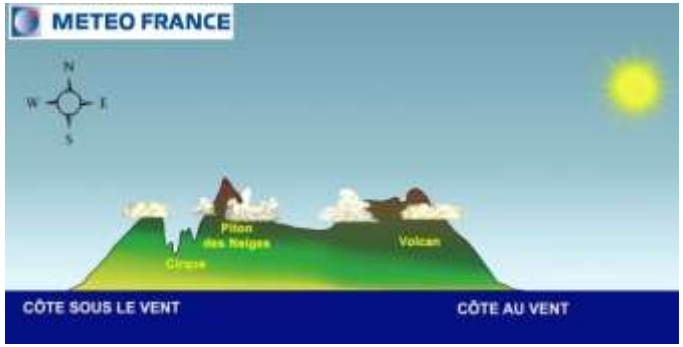
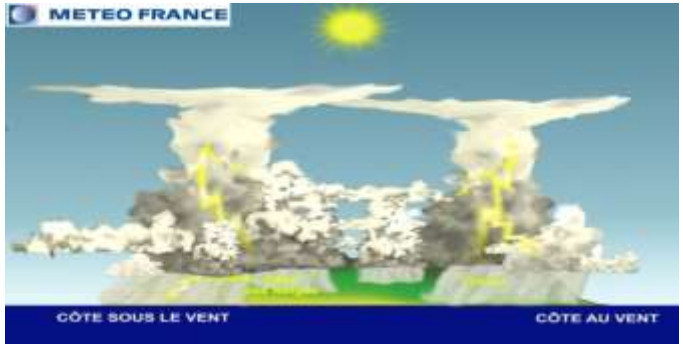
Cloudiness variability: Reunion

– meteorology driven by a combination of large/meso-scale and local-scale processes (land-sea breezes, slope winds, …)

→ 3 typical weather situations

1. dry trade-wind regime
2. humid trade-wind regime
3. convection over the topography

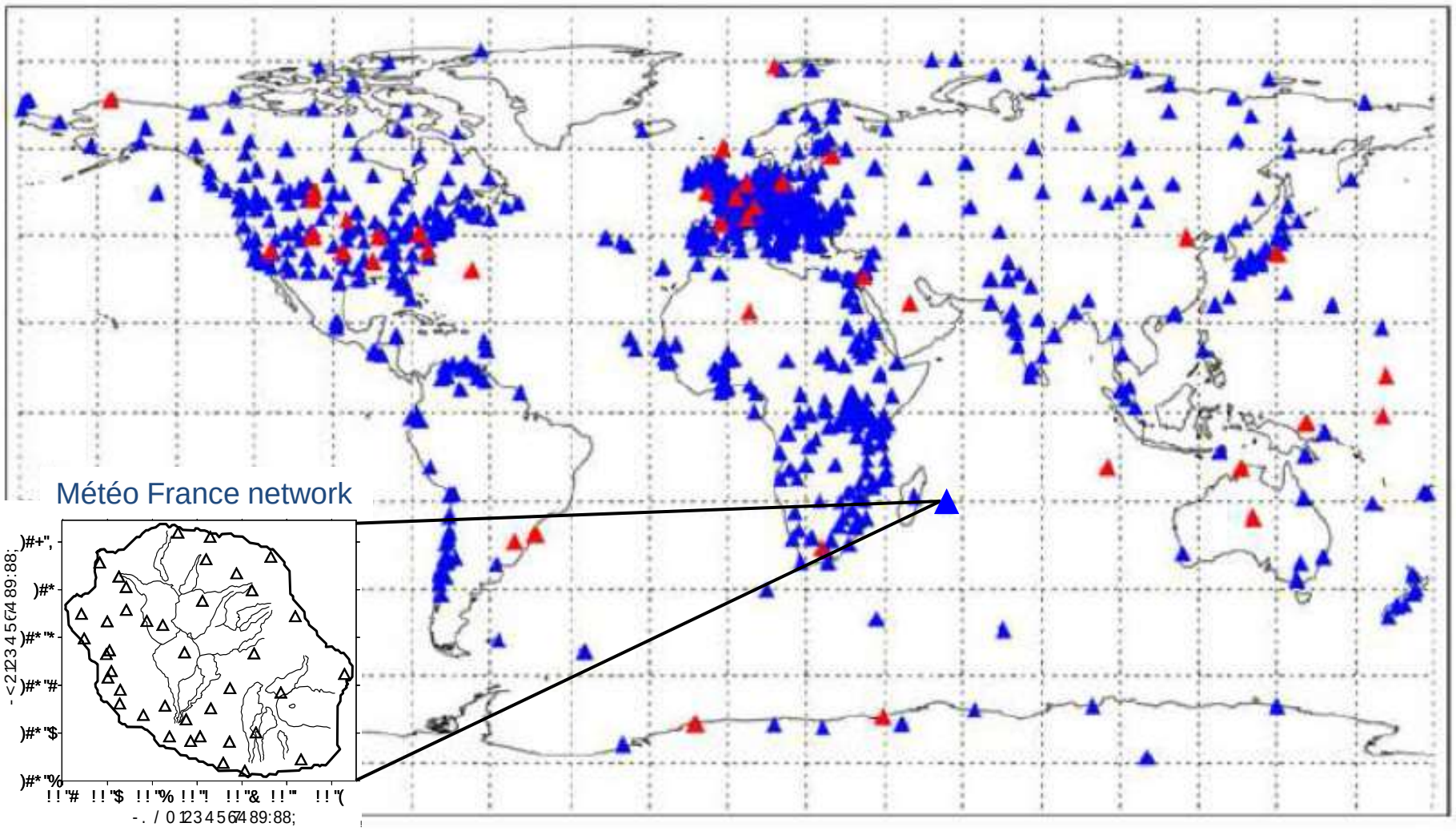




http://www.meteofrance.re/climat/pedagogie/situations

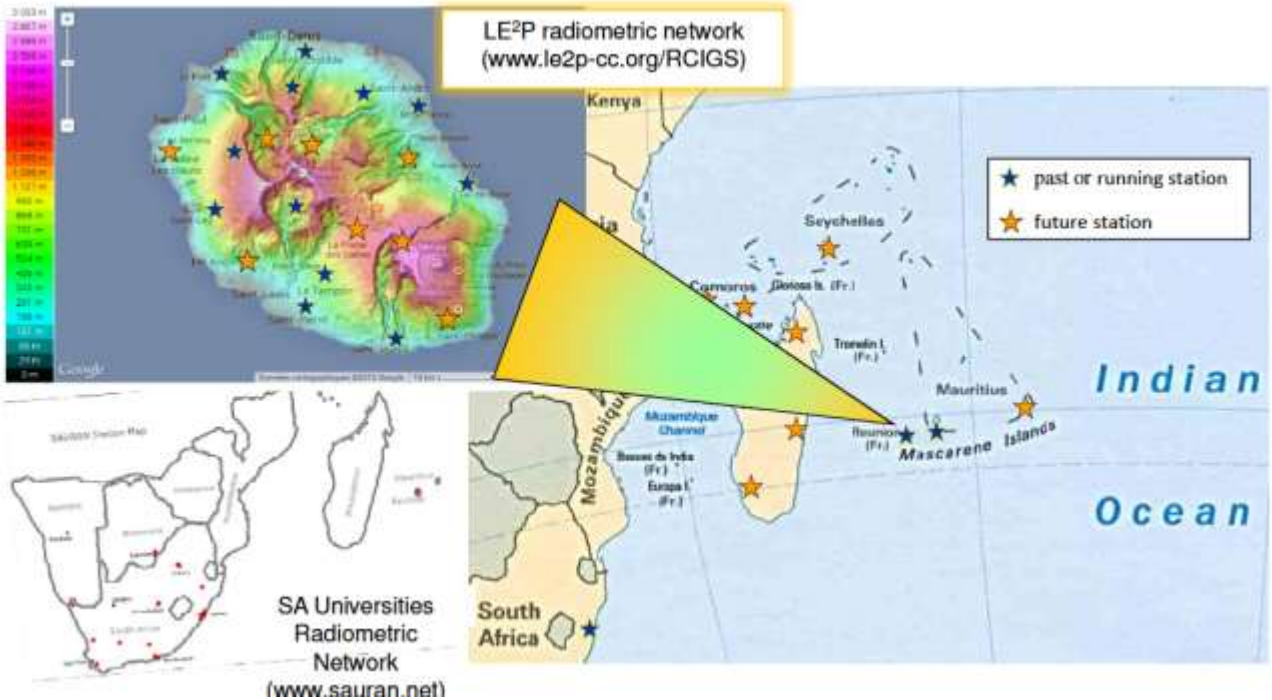
Surface radiative fluxes observations

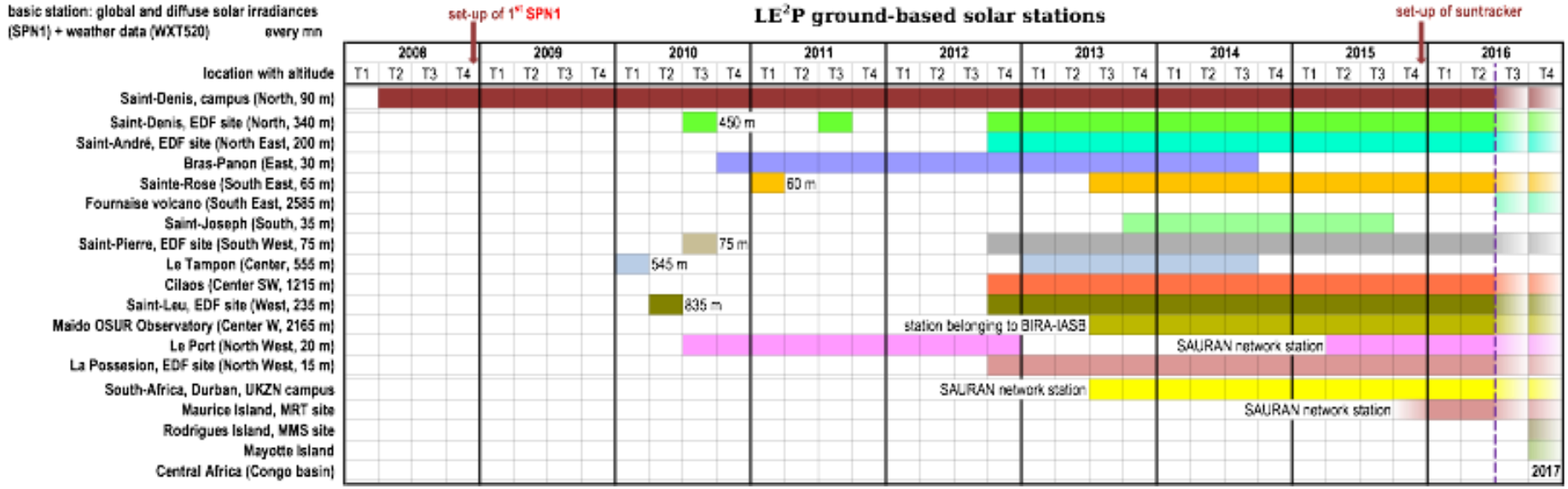
GEBA and BSRN observation sites (Wild et al. 2013)



LE2P radiometric network

A typical station





Calibration

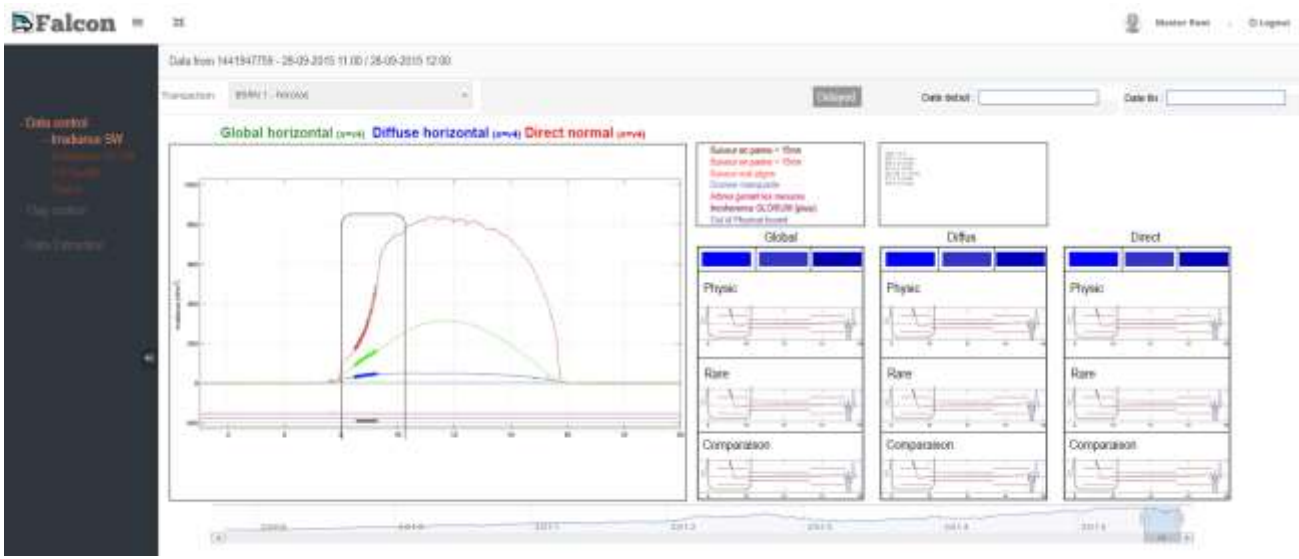
ISO

9060/9846/9847/17025

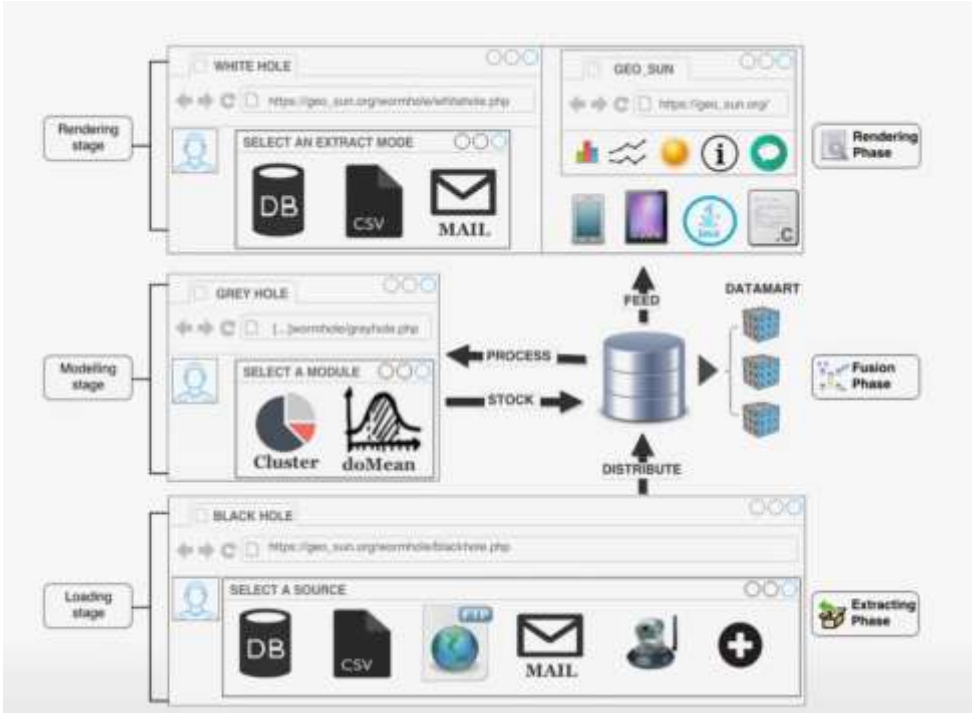
Indoor calibration

Outdoor calibration

Quality Control



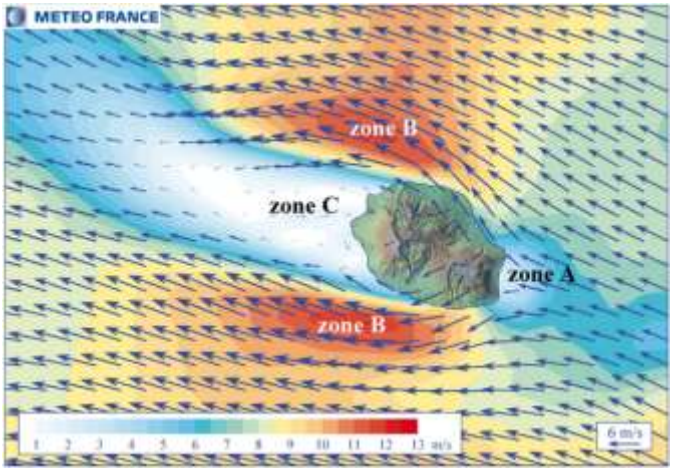
DWH

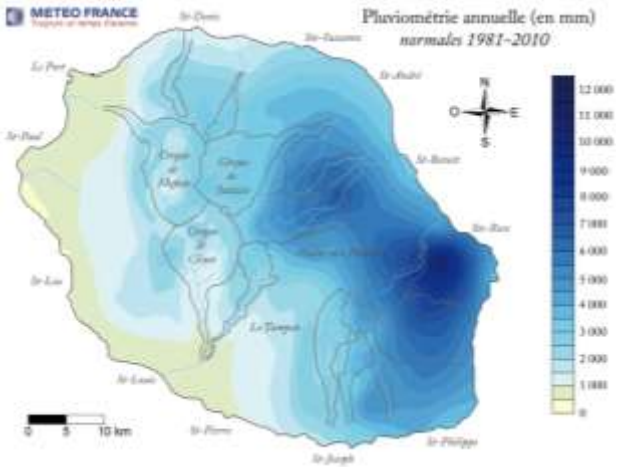



SOLYS Gear Drive

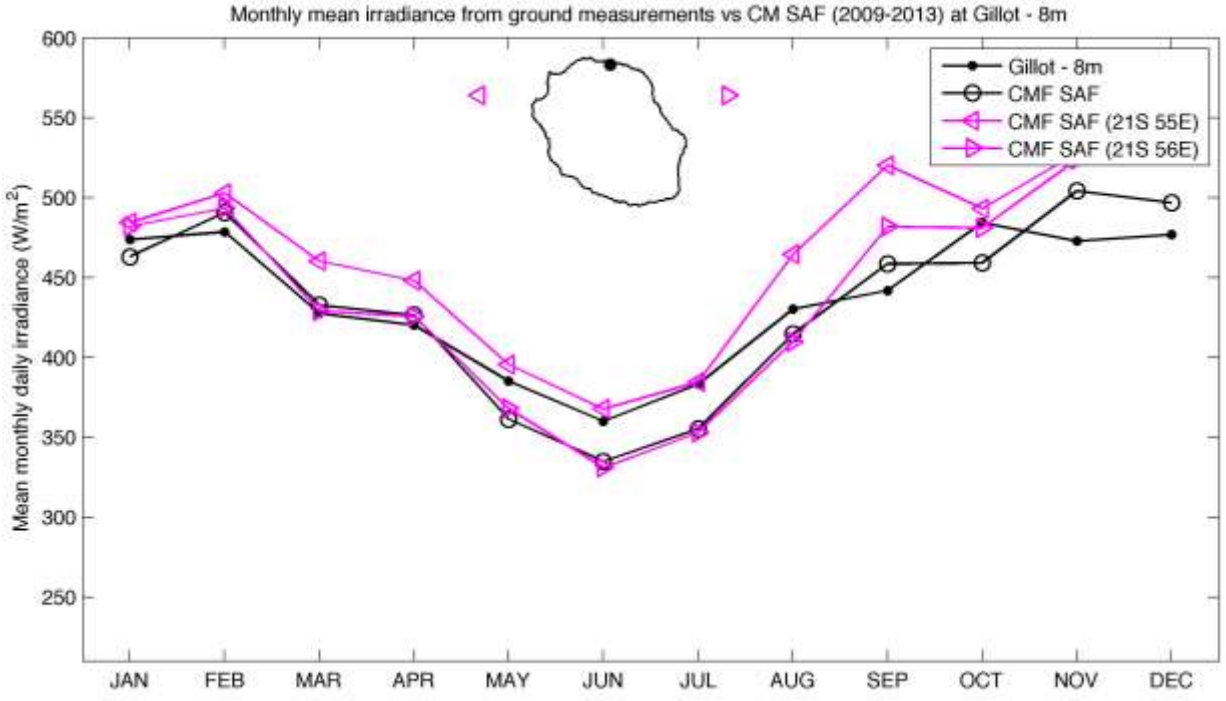
New BSRN site proposal

New BSRN site proposal

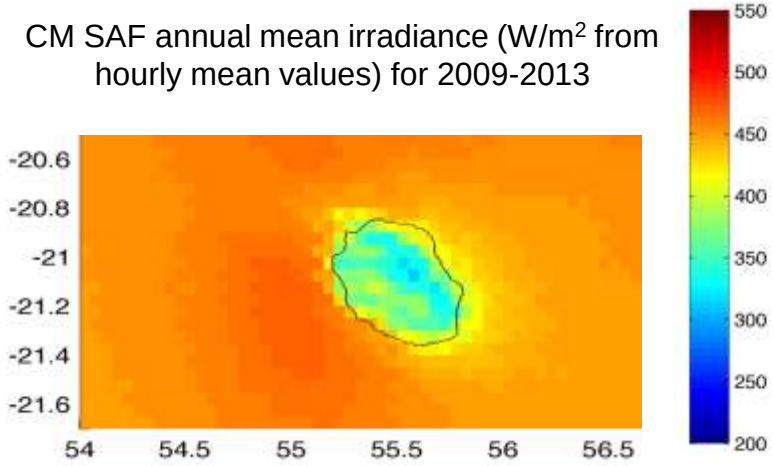




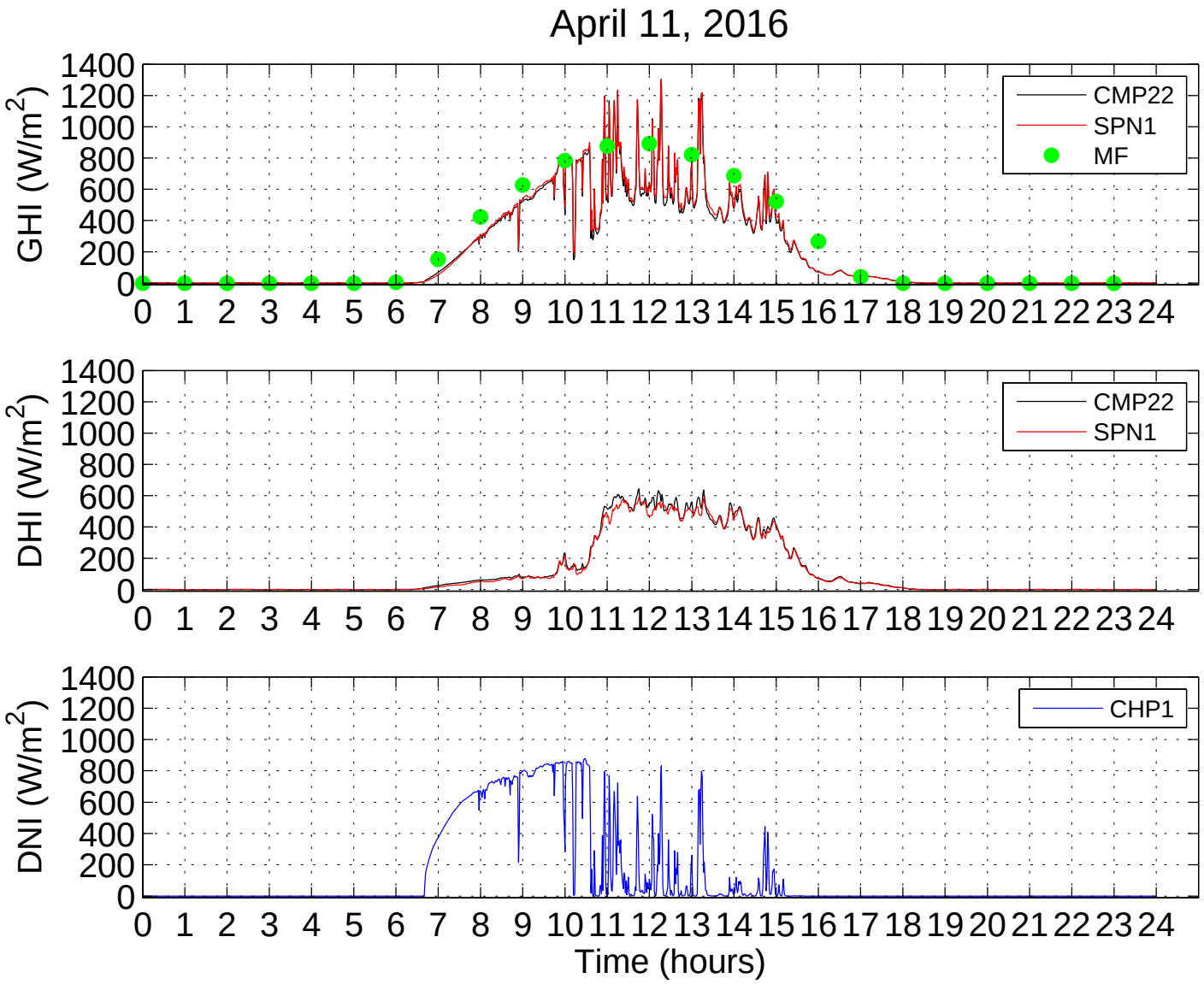
New BSRN site proposal



CM SAF annual mean irradiance (W/m^2 from hourly mean values) for 2009-2013



Very first measurements…



mean bias = –3.6%

mean bias = +5.2%

Conclusion and perspectives

- Proposed measurement site at (21°8S;55.5°E) in a climatic zone not covered by existing operational sites
- Proposed measurement site collocated with routine upper-air soundings and basic meteorological instrumentation (OPAR – Météo France)
- Very first measurements performed that need to be carried on; installation of CGR4
- Extension of the station? European Regional Development Fund project BSRN@Reunion


HAN
RUN?
COC
GOB
DAA
SYO
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