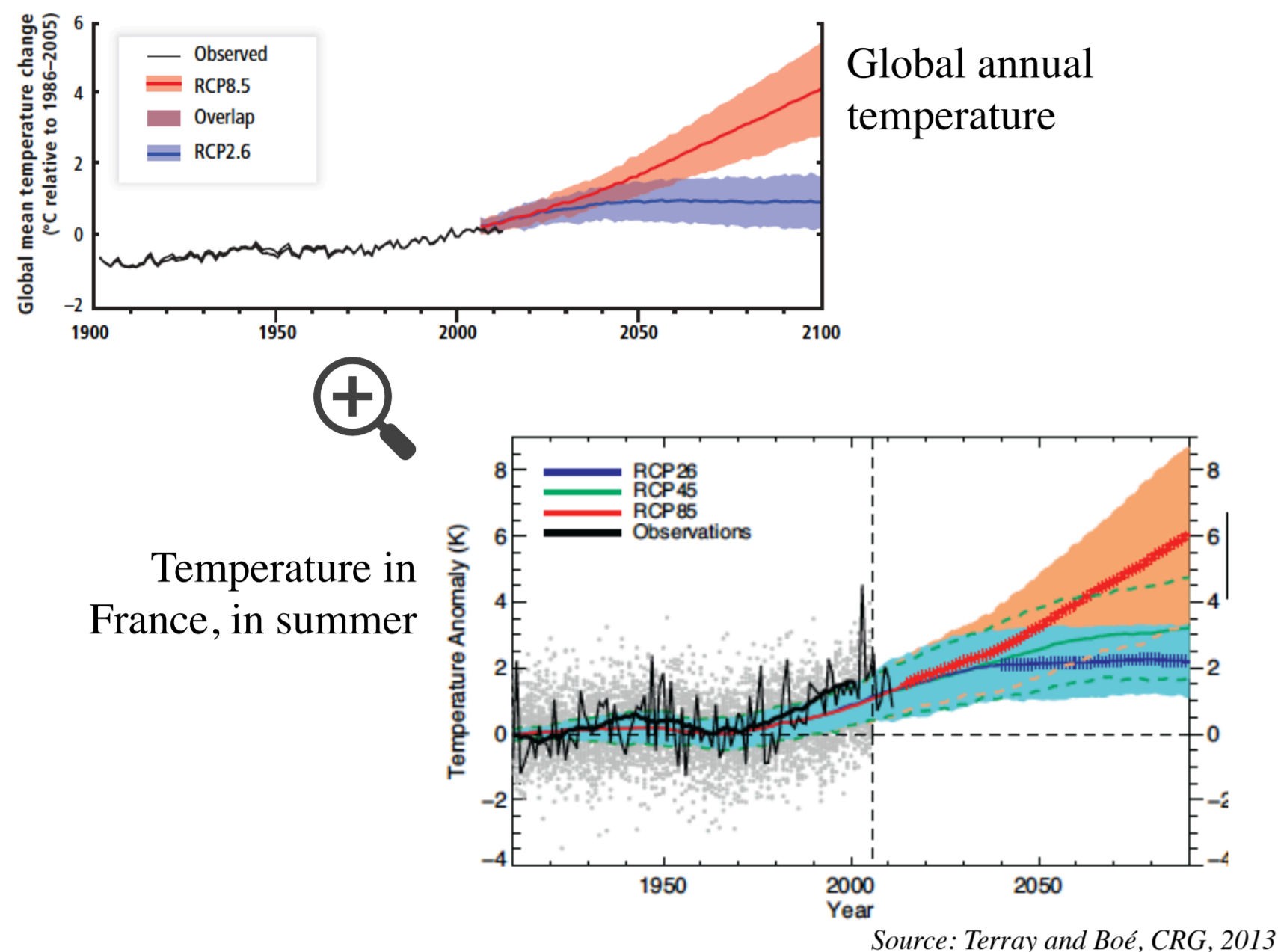


# Synthetizing, homogenizing, aggregating different parameters observed at ground: the SIRTa-Re-OBS approach

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## Context



- Important interannual and seasonal variabilities
- Important dispersion of the models
- Low frequency variability and extremes badly represented by ensemble

→ Strong uncertainties at regional scale, which is an important scale in term of impacts

→ At this scale, we must use observations to improve our understanding of the processes that create this variability

## SIRTa observatory



[sirta.ipsl.fr](http://sirta.ipsl.fr)

Since 1999: an atmospheric observatory in a peri-urban area, 20 km in the South-West of Paris

- 150 instruments: *in situ*, active and passive remote-sensing
- 5300 files/day
- 3Go of data /day
- 250 scientific publications

Topics: climate, air quality, atmospheric processes, renewable energy...



### Challenge – have a dataset that :

- ✧ Involves different time-scale: from the decades to the diurnal cycle
- ✧ Is high quality in order to be able to detect low magnitude signals
- ✧ Allows multi-parameter studies

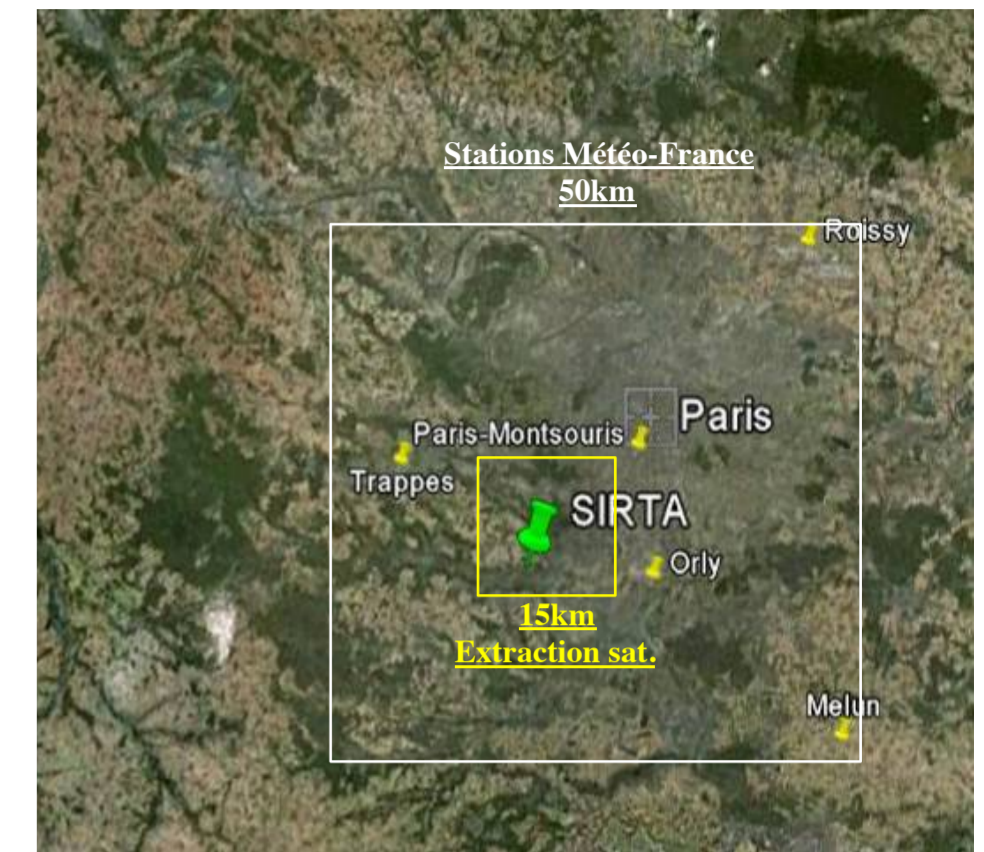
### WCRP Climate Symposium 2014 Recommendation #12:

“To enhance the value of existing observation records for climate research and applications, operational and research space agencies should put a sustained effort into re-processing and re-analyzing existing archived data to produce temporally homogeneous products to study climate variability and change”

## SIRTa-ReOBS

SIRTa-ReOBS : 12 years of multi-parameters observations at SIRTa

- Re =
- Re-calibration
  - Re-quality control
  - Re-averaging
  - Re-treatment
  - Re-expertise
  - ...

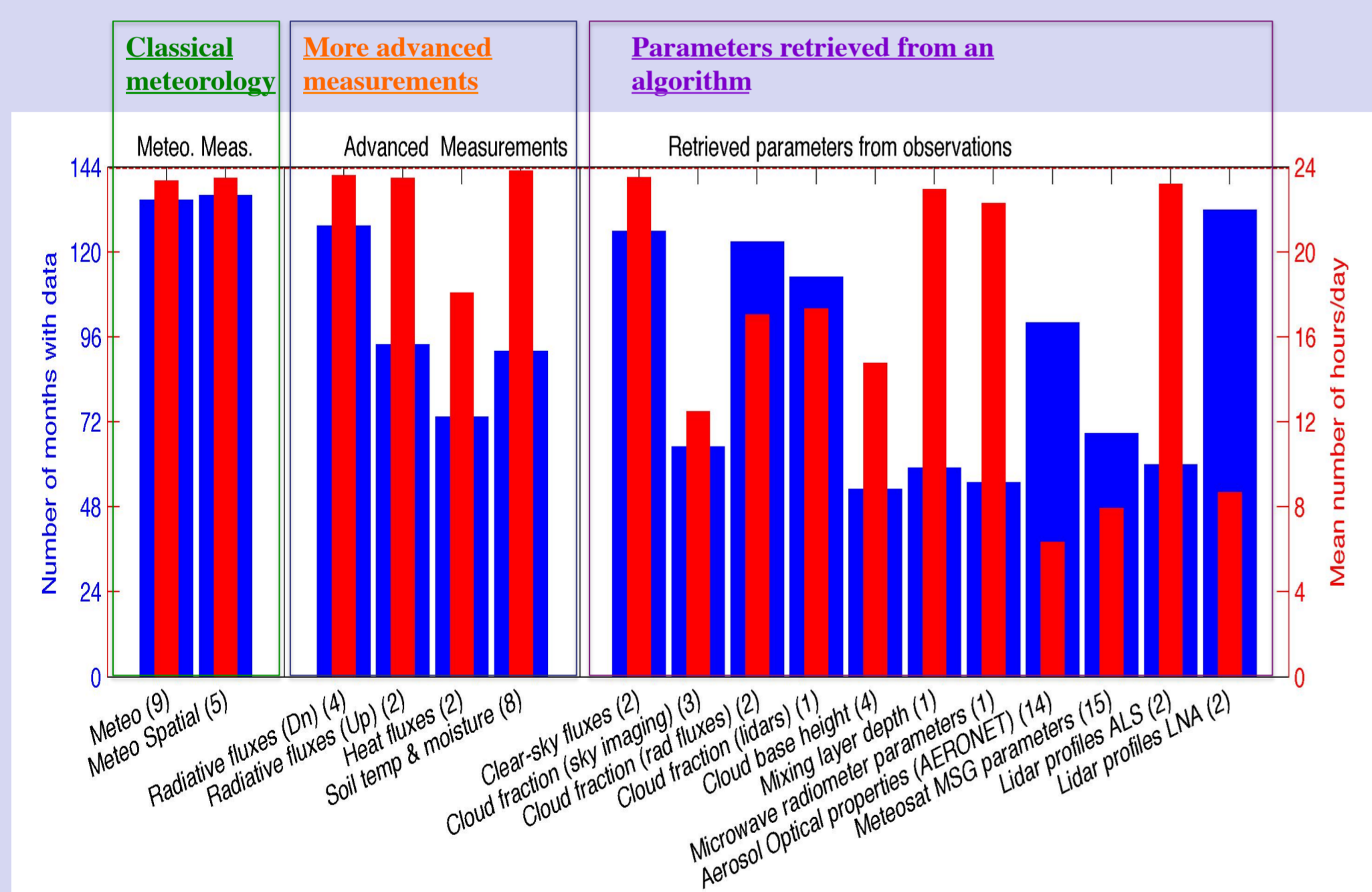


- Harmonization treatment/inversion
- Synchronization and hourly averaging
- Quality control ++
- Standardized nomenclature
- Evaluation of uncertainties and representativity
- Manage changing of instruments and algorithms
- Documentation/Metadata

One single NetCDF file, CF convention, updated every 6 months

## Current content of SIRTa-ReOBS

SIRTa-ReOBS : decadal synthesis of ~50 measured parameters 2003 – 2014 for the oldest data



### Quality control for all variables:

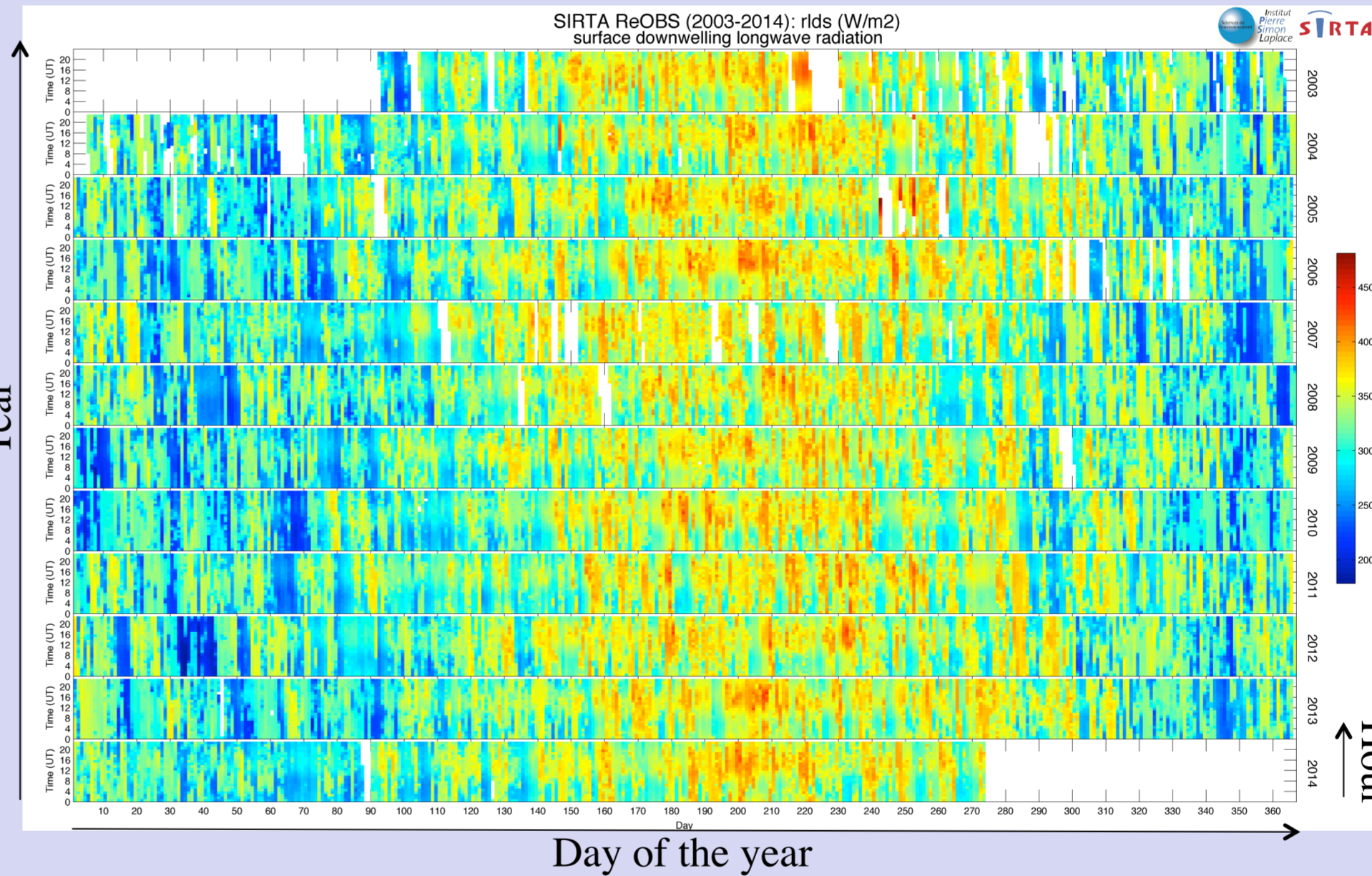
- 0 = OK
- 1 = extreme value or incomplete hour
- 2 = out of the physical limits
- 3 = missing data

### Uncertainty for all variables:

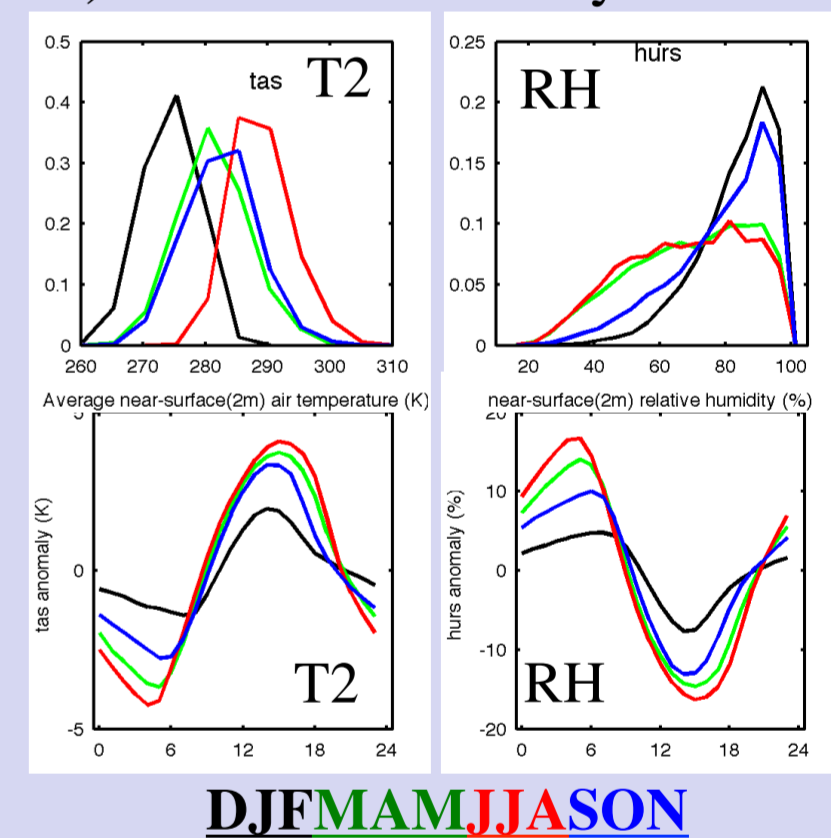
- Instrumental resolution
- Each time-step, value of the temporal standard deviation during the current hour

→ Next September: distribution of the dataset + a catalog of images like 1), via web-page and ftp

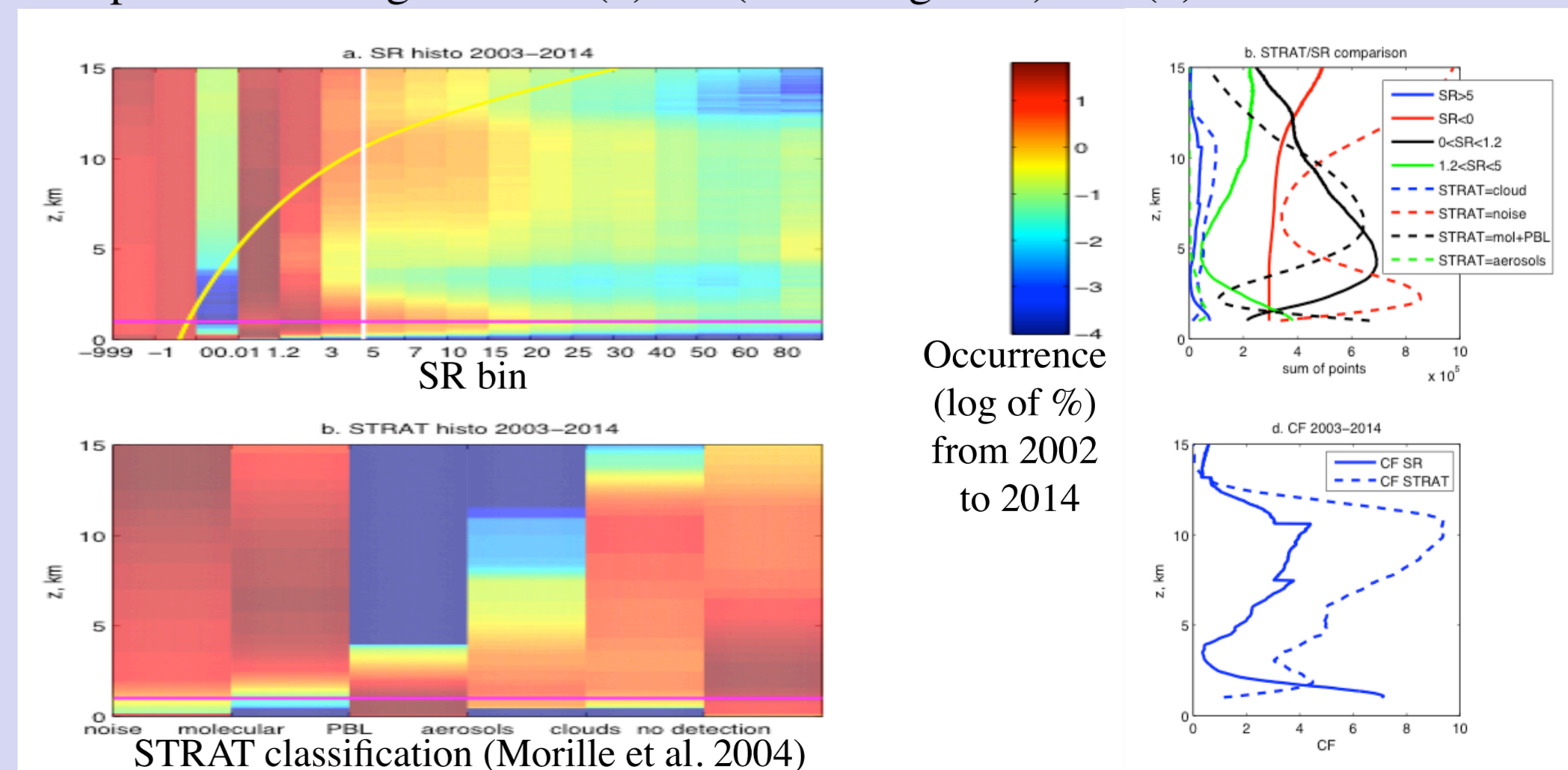
### 1) Total dataset for downwelling radiative flux



### 2) PDF and diurnal cycle



### 3) Lidar profiles - histograms of : (1) SR (scattering ratio) and (2) STRAT classification



## Related scientific publications

- ✓ Badosa J., Chiriaco, M., et al.: SIRTa-reOBS: multi-parameter, long-term, homogenised, and all-in-1-file dataset of atmospheric observations at SIRTa supersite, in prep.
- ✓ Bastin S. et al. : Regional model evaluation using collocated long term ground based observations at SIRTa: when and why does WRF-MEDCORDEX simulation fails? Submitted to Climate Dynamics
- ✓ Cheruy F. et al. , 2013: Combined influence of atmospheric physics and soil hydrology on the simulated meteorology at the SIRTa atmospheric observatory. Climate Dynamics.
- ✓ Chiriaco M. et al. 2014: European heatwave in July 2006: Observations and modeling showing how local processes amplify conducive large-scale conditions. Geophysical Research Letters.
- ✓ Chiriaco M.: Wich clouds are warming or cooling at SIRTa?. in prep.
- ✓ Campoy A., 2013: Response of land surface fluxes and precipitation to different soil bottom hydrological conditions in a general circulation model. Journal of Geophysical Research.
- ✓ Dione C.: Large-scale circulation influence on local processes for 3 different sites in France, in prep
- ✓ Pal S. et al. 2015: Dynamical features and forcing mechanisms governing diurnal and seasonal variability in the boundary layer depths: A five-year long lidar observations over a suburban site near Paris. Journal of Geophysical Research.