

Comparison of several databases of downward solar daily irradiation data at ocean surface with ePIRATA measurements

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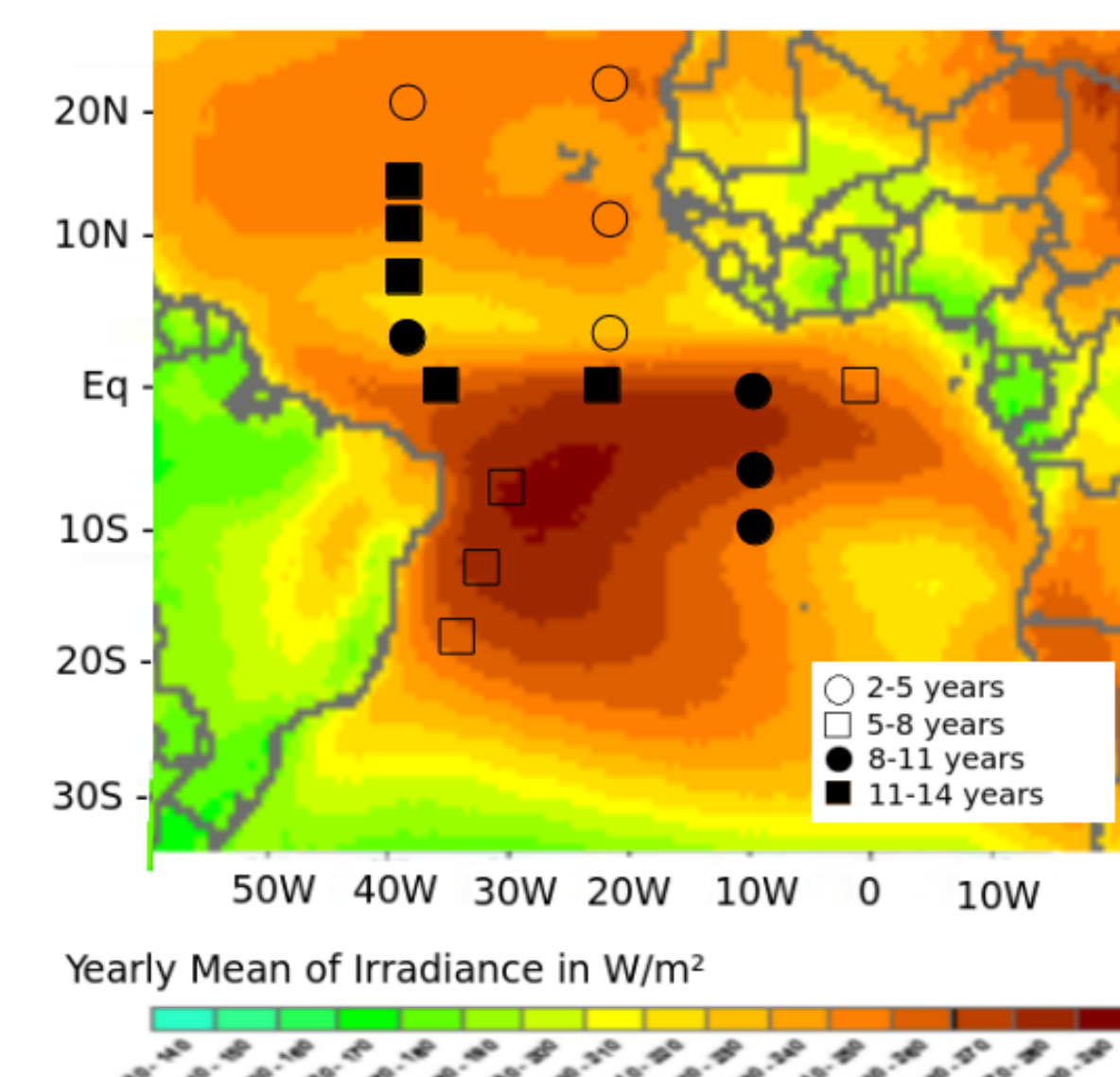
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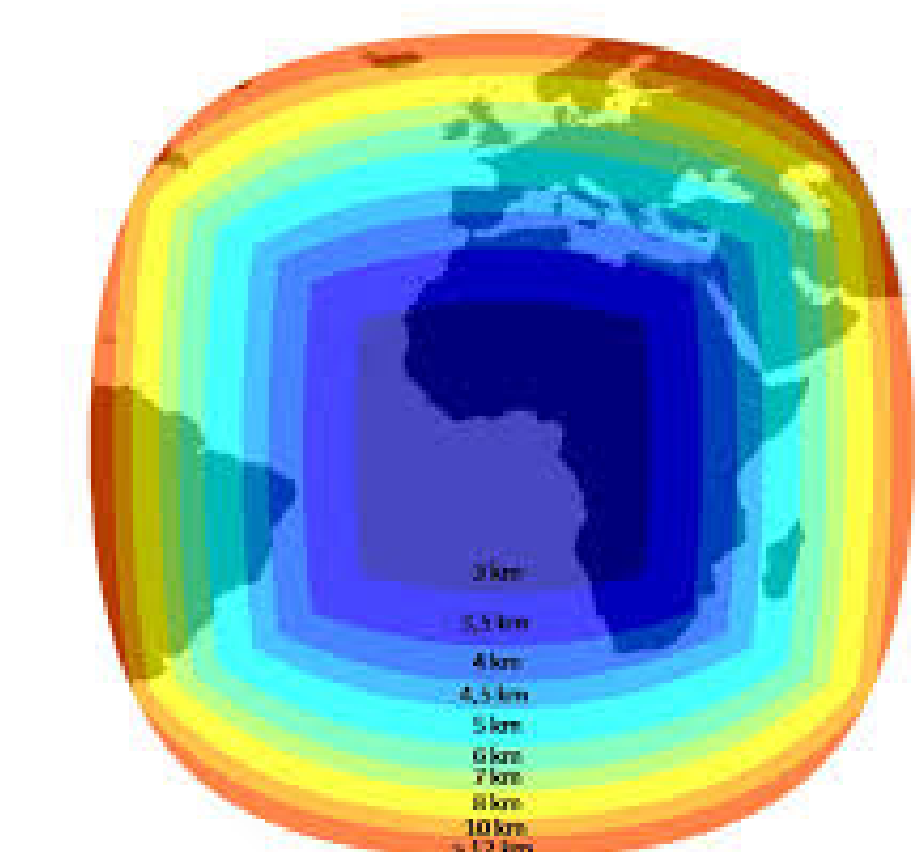
1 Motivation

- Sea Surface Irradiance is recognized as **Essential Climate Variable**
- High quality** and **high resolution** (spatial and temporal) **irradiance data** are needed for a good representation of climate system
- Satellitederived surface irradiance data** have these characteristics, but are **not extensively validated for ocean domain**
- This study **compare** different satellite dataset against in situ measurements made on buoys
- Challenges :**
 - Soiling (including sea salt and dust)
 - Buoy roll and pitch
 - Missing periods, due to maintenance issues

2 In situ sea surface irradiance measurements : PIRATA network and ePIRATA database



- PIRATA: mooring network of **17 ATLAS buoys** with 20+ years of data
- Measure **near-surface meteorological and subsurface oceanic parameters** (temperature, salinity, downward solar irradiance...)
- Quality check using NASA procedure
- Resolution: 2 min, on 1997 - 2016**
- Correction of PIRATA dataset for aerosol : **ePIRATA** database
- Resolution: daily**



HelioClim and CAMS-RAD

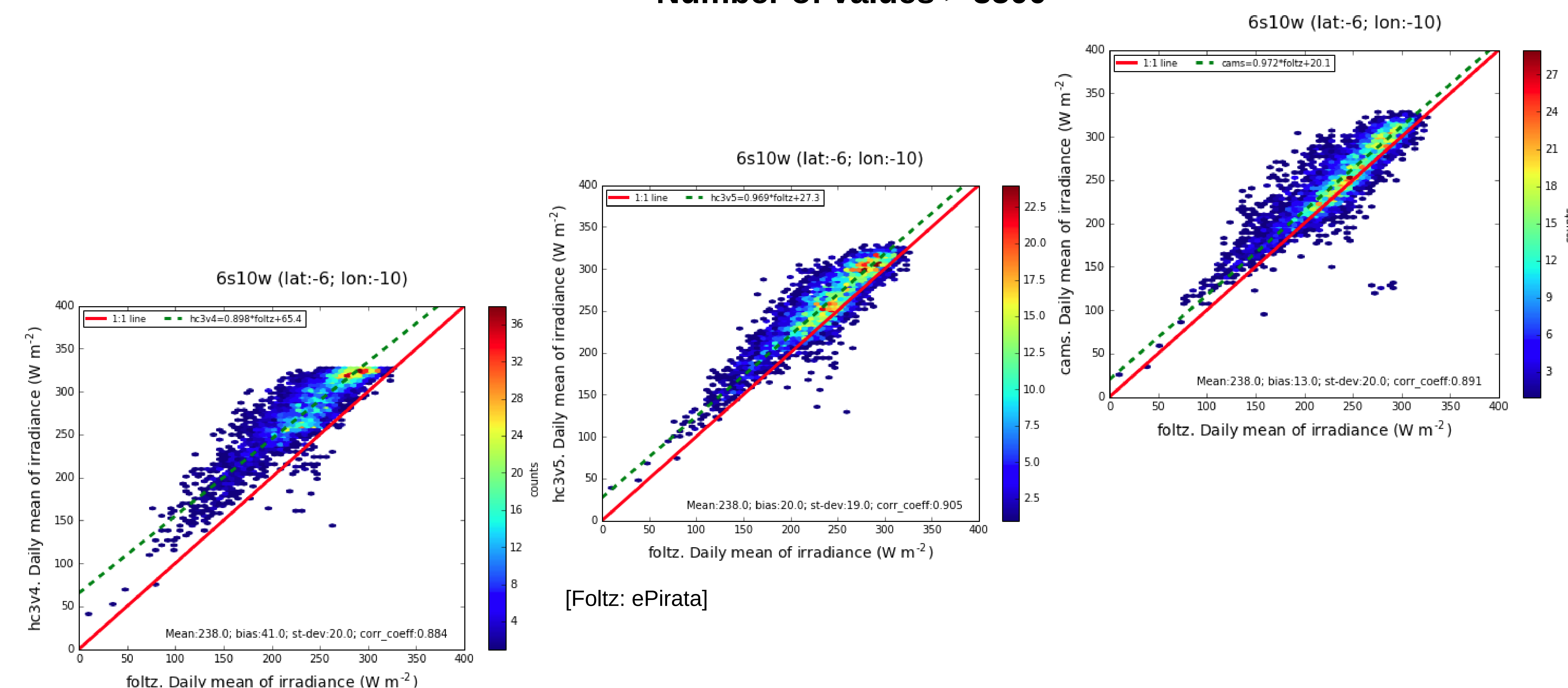
- HelioClim-3** and **CAMS RAD** databases are derived from **Meteosat images**, using **Heliosat-2** and **Helosat -4** methods
- Resolution: 15 min, on 2004 - 2016**

3 Results

Mean 17 stations	Bias W/m ² (relative)	RMSE W/m ² (relative)	Cor Coef
HC – 3 v4	29 (13 %)	45 (20 %)	0.812
HC – 3 v5	14 (6 %)	35 (15 %)	0.831
CAMS RAD	8 (4 %)	29 (13 %)	0.862

More detailed description
of atmospheric
constituent
(aerosol and water vapor)
Change in modelling
cloud proprieties

Number of values > 3500



Conclusion

In taking **ePirata dataset as reference :**

Each dataset exhibits a tendency to **underestimate the irradiance**
For a given station, performances vary notably from a dataset to another
Conversely, for a given dataset, performances vary from station to station

CAMS RAD dataset is more appropriate for describing the downwelling solar radiation at ocean surface in this region



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