



# ships4sst

shipborne radiometers for sea surface temperature

## Status ISFRN

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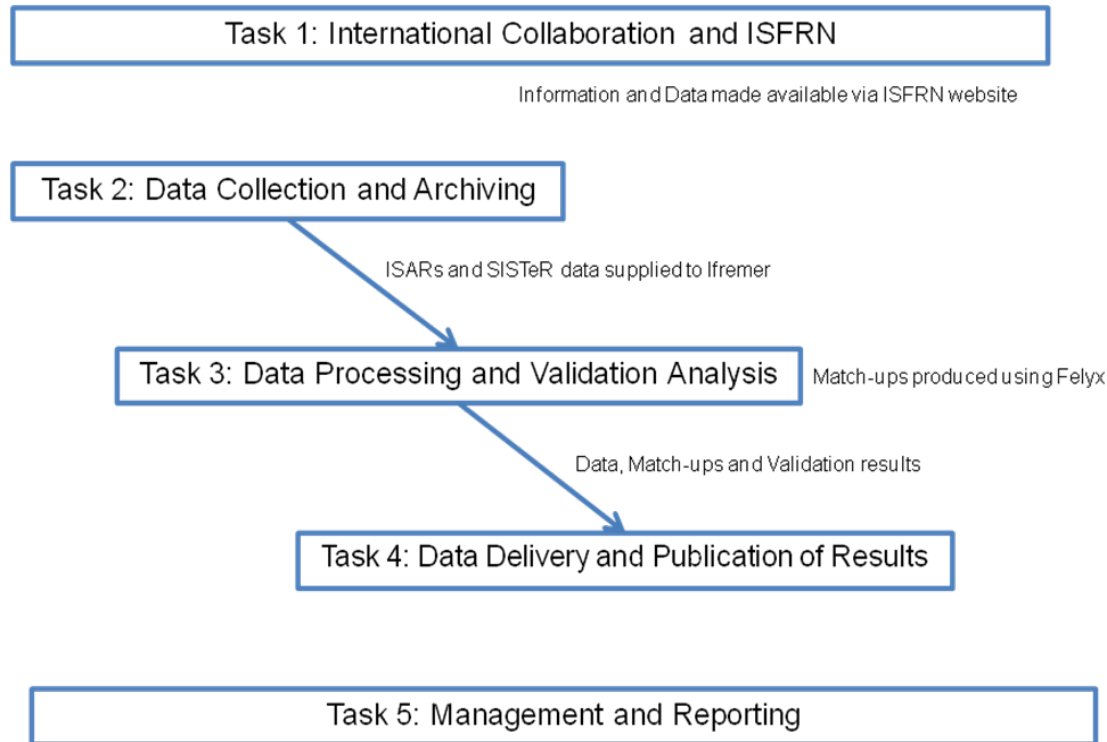
# Overview

- Objectives
- Tasks
- International collaboration
- Data Collection
- Archive
- Processing and Validation
- Conclusion

# Objectives

- OBJ-1: Validate Sentinel-3A and Sentinel-3B SLSTR L1, L2 and higher order SST products to FRM standards.
- OBJ-2: Maintain and deploy on a continuous basis Thermal Infrared Radiometers (TIR) FRM and necessary supporting instrumentation to validate Sentinel-3 SLSTR SST products.
- OBJ-3: Process, archive and quality control all data following documented FRM procedures that approve their use for FRM satellite validation.
- OBJ-4: Deliver approved data sets and uncertainty budgets to Copernicus and the Sentinel-3 Mission Performance Centre.
- OBJ-5: Collaborate with appropriate International Scientists and Agencies using TIR for satellite validation as an International SST FRM Radiometer Network.
- OBJ-6: Prepare and submit peer-reviewed journal articles.
- OBJ-7: Conduct communications and outreach material promoting Copernicus Sentinel-3 SLSTR and the SLSTR-SST-FRM-Validation project.

# Project Tasks



# Task 1

- International collaboration
  - Invite other TIR operators to convert/produce data in L2R format and upload it to the ships4sst archive.
  - RSMAS, CISRO have produce L2R data for M-AERI and ISAR
  - ISAR Training in Korea
  - Potential collaboration with South Africa on instrument loan.
  - Discussions with AIR and SemSAS
- webpage
  - [www.ships4sst.org](http://www.ships4sst.org)
  - Information, protocols, data format, archive
- Twitter
  - @ships4sst
- Outreach
  - talks with Cunard about publicity (i.e. contributing to Cunard's magazine)
  - Conferences
    - GHRSSST, Living Planet, s3vt

**ships4sst**    Aim Instruments Partners Documents News Services

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## SHIPBORNE RADIOMETER FOR SEA SURFACE TEMPERATURE

Welcome to the Shipborne Radiometer Network!

The International Sea Surface Temperature (SST) Fiducial Reference Measurement (FRM) Radiometer Network (ISFRN) sets out to develop and promote an international network of ocean and remote sensing scientists who share a particular interest in promoting and improving the use of shipborne infrared radiometers for measuring skin SST at the surface of the ocean, comparable to measurements made by satellite infrared radiometers. This includes operators, designers and builders of such instruments as well as the user of the data.

The scope of the ISFRN activity can cover all aspects of the science and technology of shipborne radiometers used to measure SST. This includes

- exchange of operating advice and information that promote best practice for radiometer deployments,
- establishing protocols for shipborne radiometry including the validation of observations traceable to NMI reference standards,
- agreeing formats for skin SST data retrieved from ship radiometers,
- setting procedures for quality control in order to meet agreed standards of accuracy, and
- provide a single access point of the data collected around the world.

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Sign up to the Shipborne-radiometer network    JOIN

Department for Business, Energy & Industrial Strategy    ESA European Space Agency    fiducial reference temperature measurements

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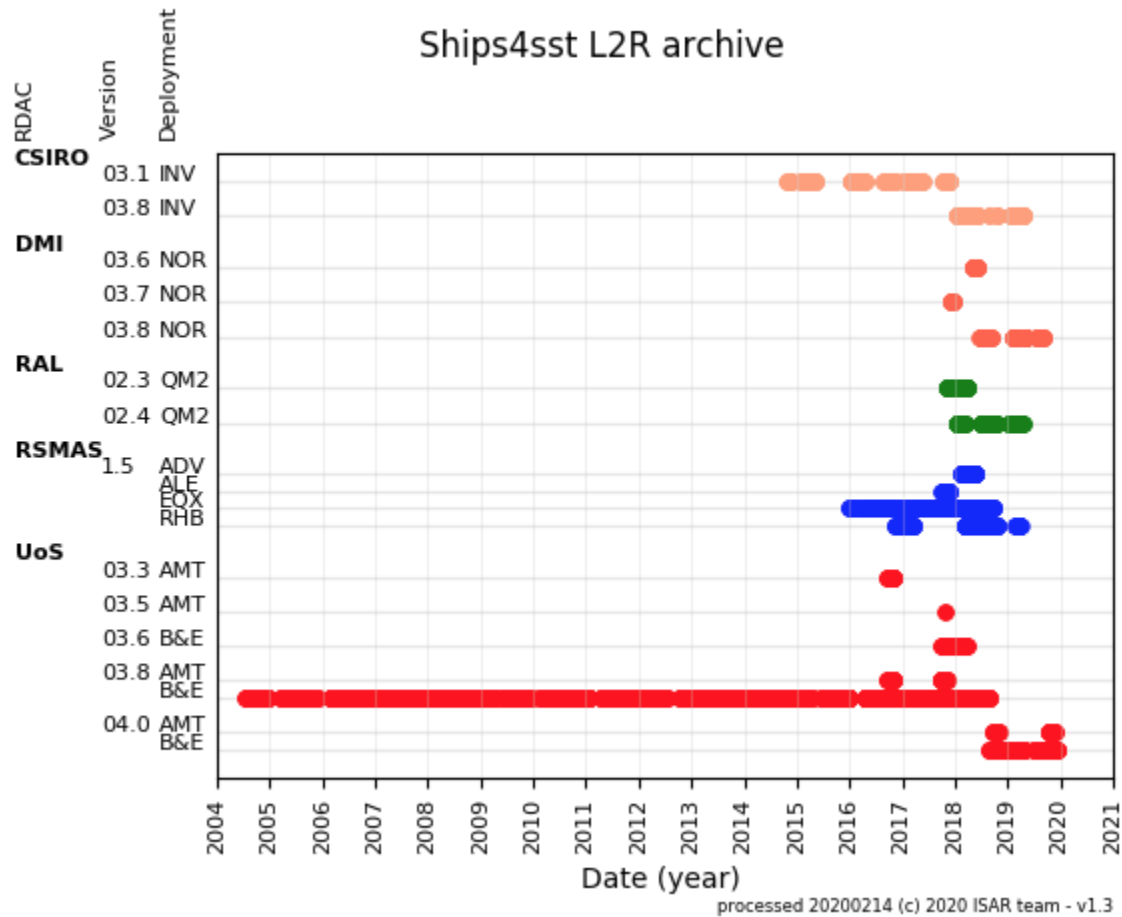
17 September 2020

# Task 2

- Data Collection
  - UoS – 12 deployments
  - DMI – 8 deployments
  - RAL – 8 deployments
  - COVID-19 impact in 2020
    - Ships being moored
    - No access to instruments
  
- Archive
  - <ftp.ifremer.fr>
  - Instrument -> RADC-> software version -> year
  - Data

# Task 2

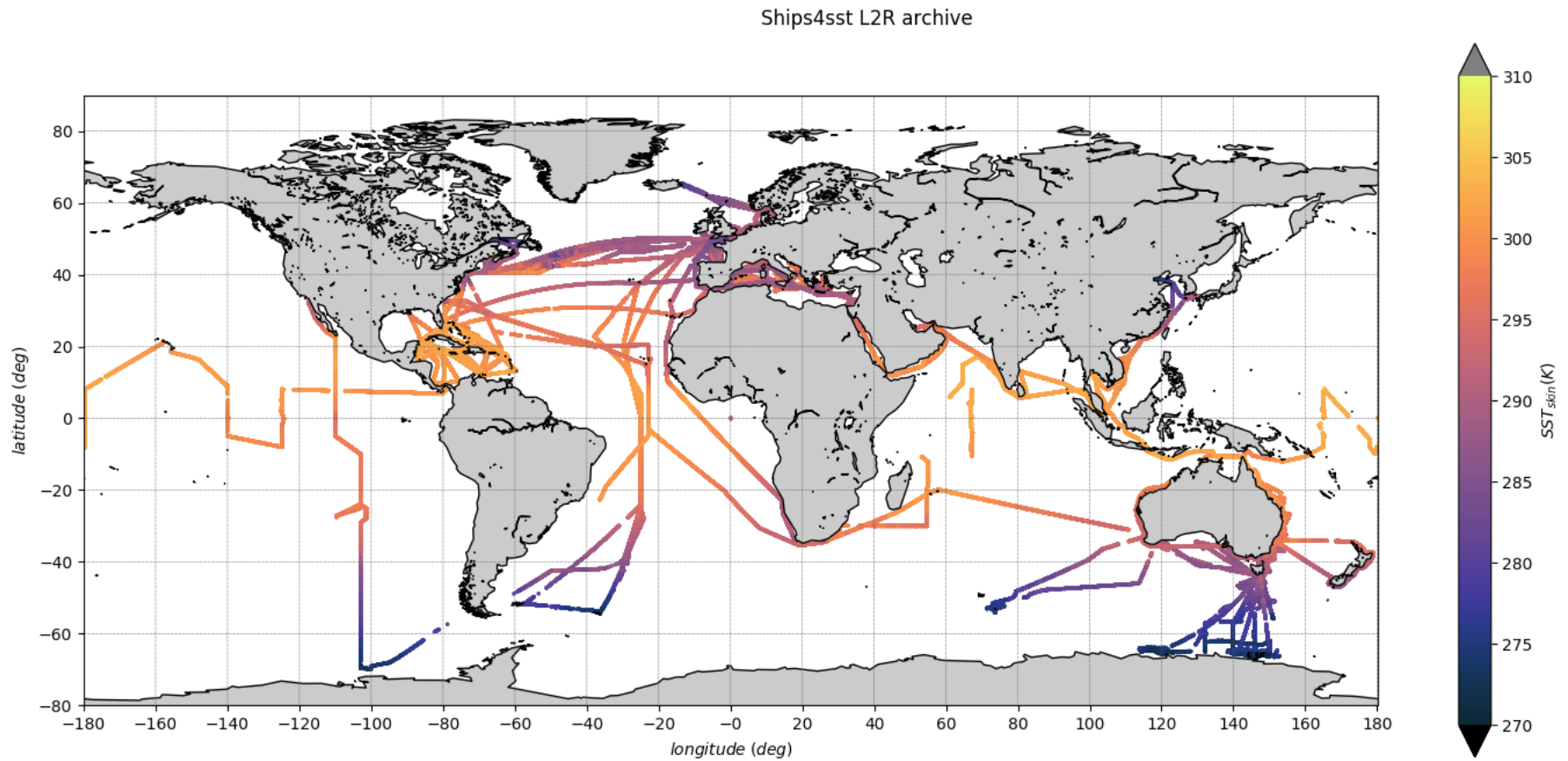
- Archive





# Task 2

- Archive



# Task 3

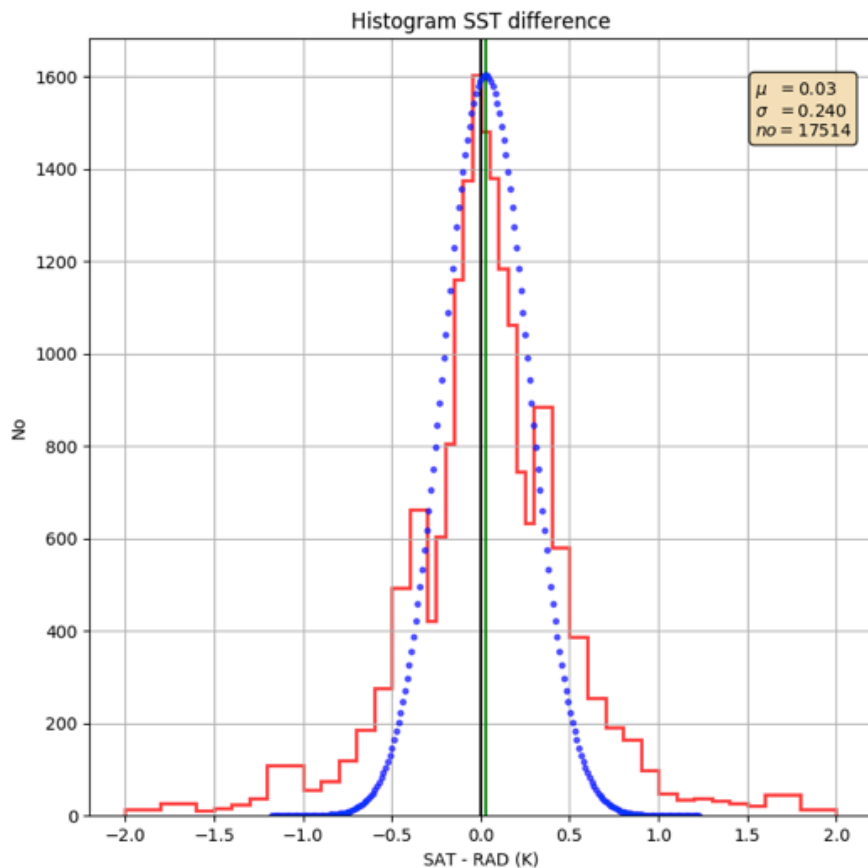
- Data processing and validation
  - Felyx MDB generation at Ifremer/EUMETSAT
    - SLSTR L1b and L2 data within 400x400 pixels of matchup
    - L2R data within 6hrs of matchup
  - MDB analysis tool
    - Uses Wimmer et.al 2012 approach
    - Now python 3
  - All SST fields
    - 2016, 2017, 2018

Grade	Time	Spatial
1	±0.5 h	±1km
2a	±0.5 h	±20km
2b	±2 h	±1km
3	±2 h	±20km
4	±6 h	±25km

Wimmer, W., Robinson, I. S., & Donlon, C. J. (2012). [Long-term validation of AATSR SST data products using shipborne radiometry in the Bay of Biscay and English Channel](#). *Remote Sensing of Environment*, 116, 17-31. DOI: [10.1016/j.rse.2011.03.022](https://doi.org/10.1016/j.rse.2011.03.022)

# Task 3

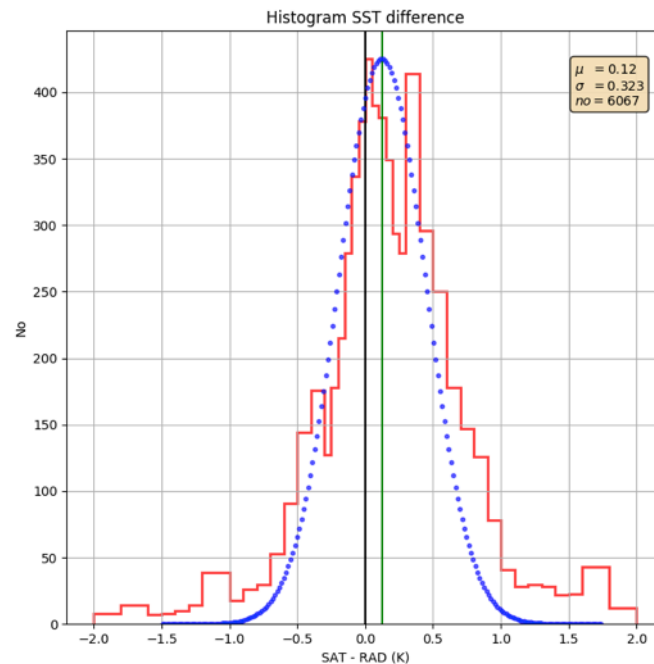
WST - August 2016 – April 2018, grade 2b



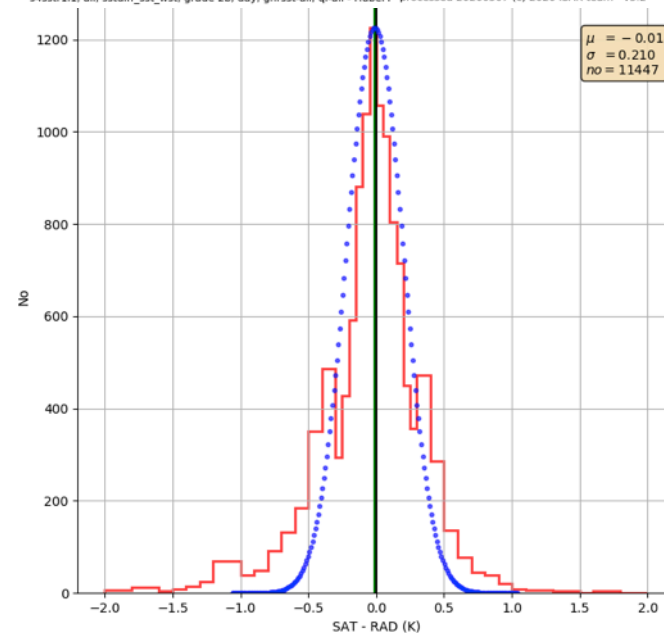
s4sstr111, all, sstdiff\_sst\_wst, grade 2b, all, ghrsst-all, qi-all - HuberT processed 20200507 (c) 2020 ISAR team - v5.2

ships4SST

FRM4SST: ISFRN workshop – Status ISFRN



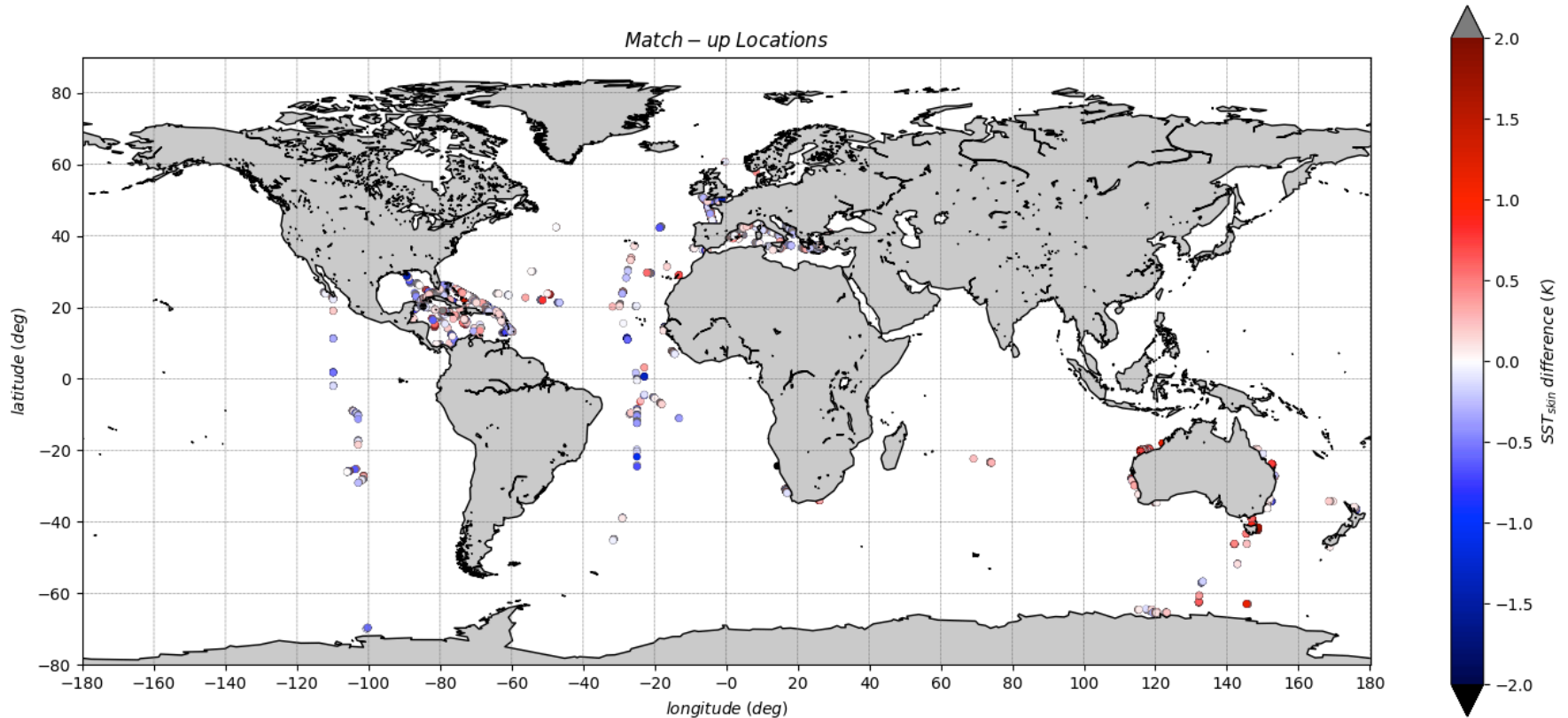
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s4sstr111, all, sstdiff\_sst\_wst, grade 2b, night, ghrsst-all, qi-all - HuberT processed 20200507 (c) 2020 ISAR team - v5.2

# Task 3

- WST - August 2016 – April 2018, grade 2b



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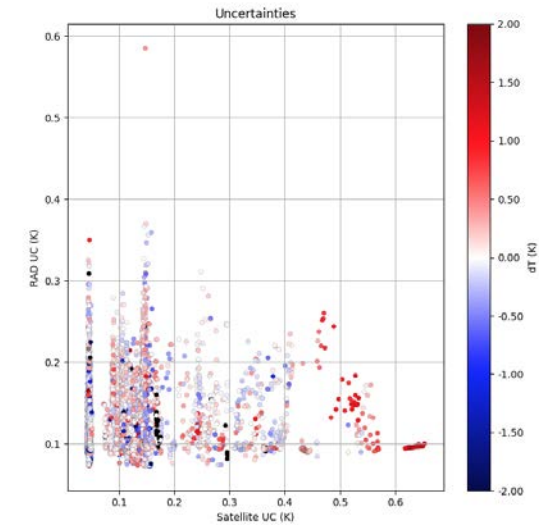
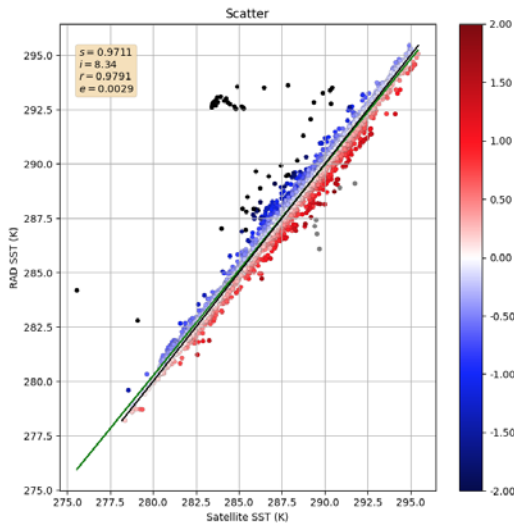
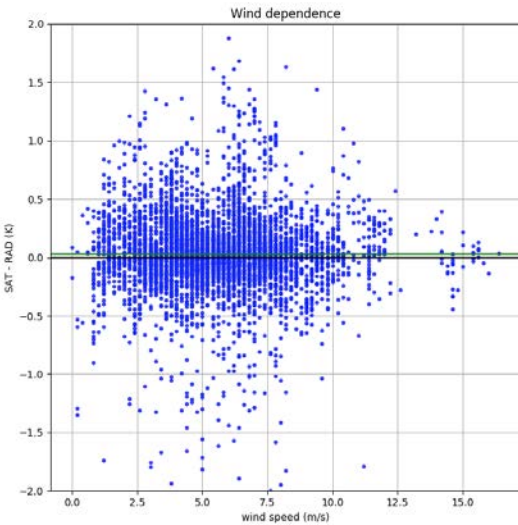
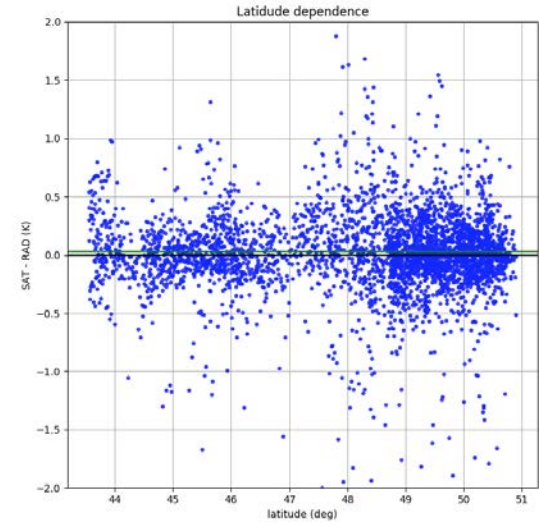
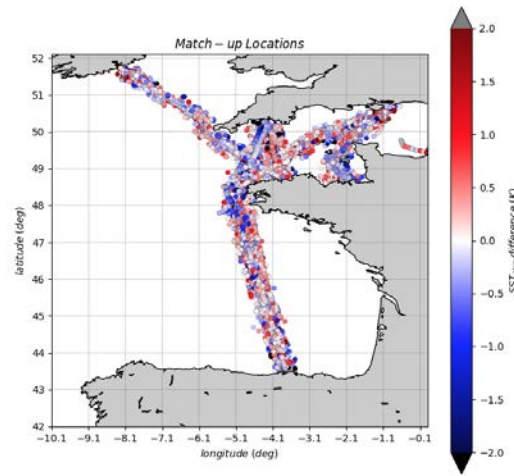
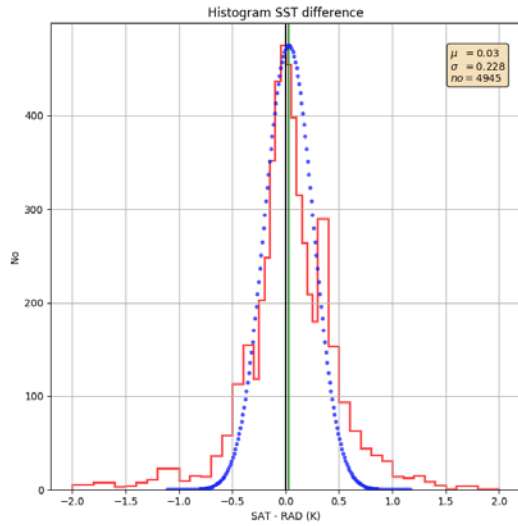
processed 20200507 (c) 2020 ISAR team -

# Task 3

Day						
Grade	MDiff	RSD	No	Overpass	Min Temp	Max Temp
1	0.12	0.28	1521	193	271.95	304.30
2a	0.11	0.40	4888	367	270.48	307.29
<b>2b</b>	<b>0.12</b>	<b>0.32</b>	<b>6067</b>	<b>318</b>	<b>271.80</b>	<b>306.95</b>
3	0.12	0.43	18663	458	270.20	307.34
4	0.09	0.50	54823	643	270.20	307.48

WST						
ALL						
Grade	MDiff	RSD	No	Overpass	Min Temp	Max Temp
1	0.03	0.22	4518	542	271.95	304.30
2a	0.04	0.32	12548	967	270.48	307.29
<b>2b</b>	<b>0.03</b>	<b>0.24</b>	<b>17514</b>	<b>819</b>	<b>271.80</b>	<b>306.95</b>
3	0.04	0.33	48138	1161	270.20	307.34
4	0.03	0.38	132206	1475	270.20	307.48

Night						
Grade	MDiff	RSD	No	Overpass	Min Temp	Max Temp
1	-0.01	0.20	2997	349	272.38	304.28
2a	0.00	0.27	7660	600	271.80	304.68
<b>2b</b>	<b>-0.01</b>	<b>0.21</b>	<b>11447</b>	<b>501</b>	<b>272.38</b>	<b>305.55</b>
3	0.00	0.28	29475	703	271.30	305.55
4	0.00	0.31	77383	832	271.30	305.55

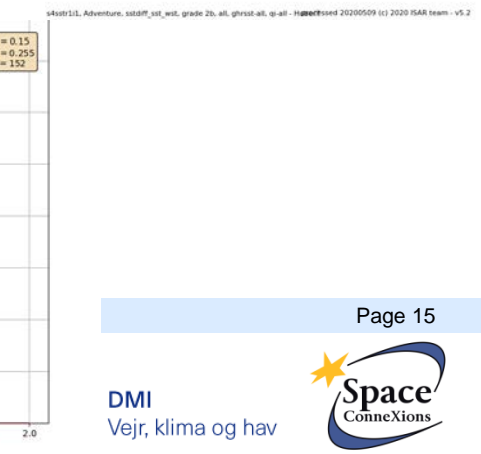
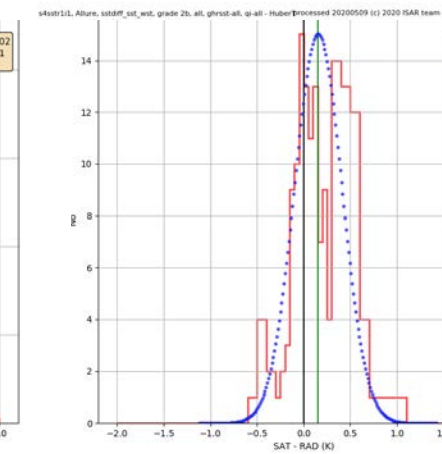
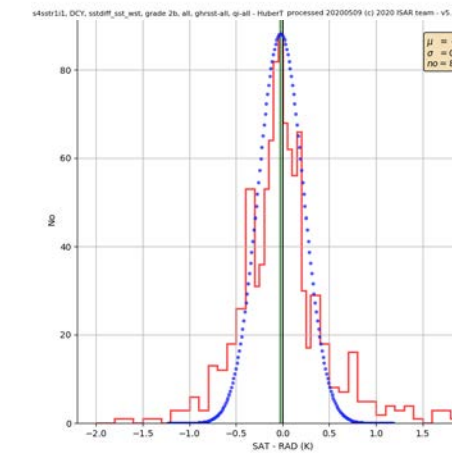
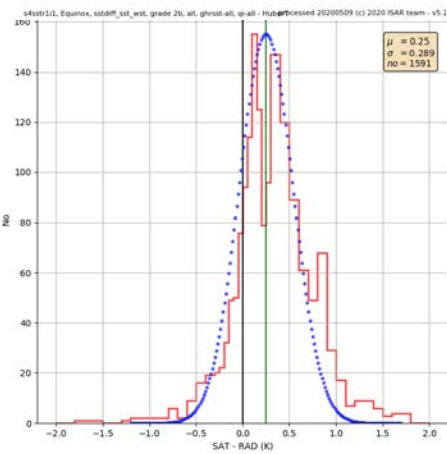
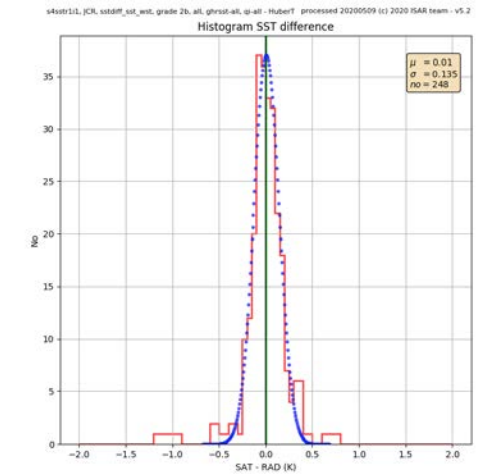
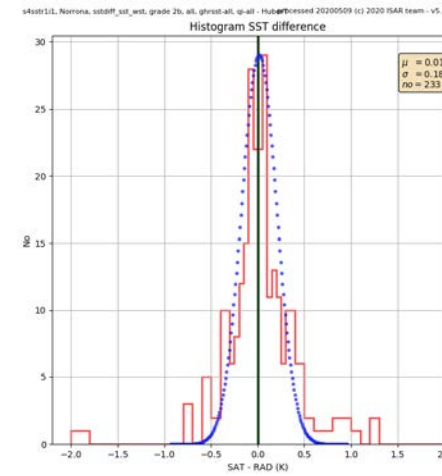
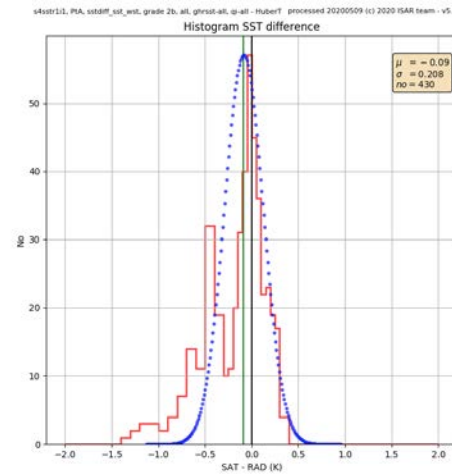
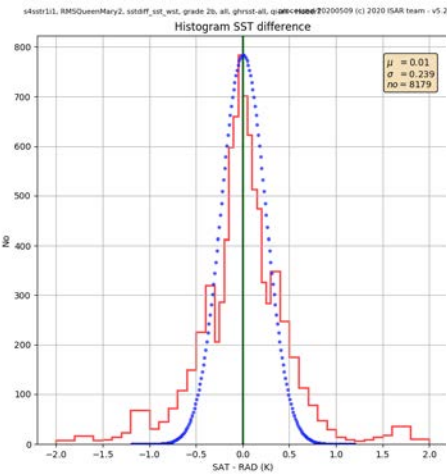
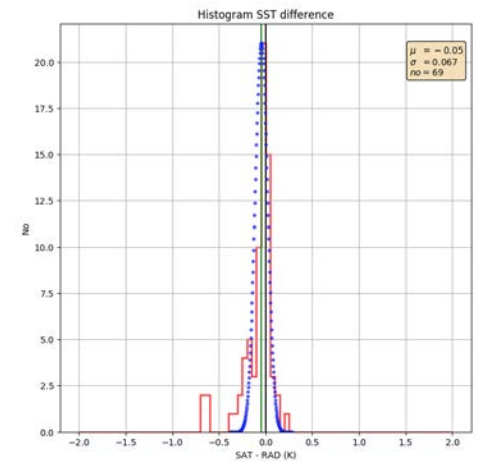
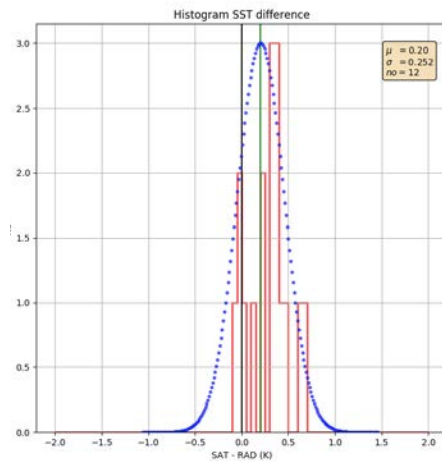
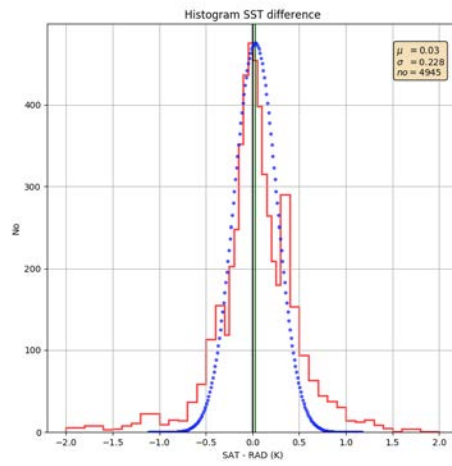
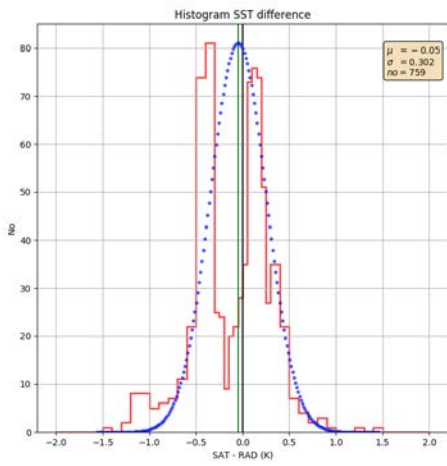


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s4sdr1i3PA, sstdiff\_sst\_wst, grade 2b, all, ghrsst-all, qi-all - HuberT processed 20200505 (c) 2020 ISAR team - v5.1

s4sdr1i3PA, sstdiff\_sst\_wst, grade 2b, all, ghrsst-all, qi-all - HuberT processed 20200505 (c) 2020 ISAR team - v5.1





# Task 4

- Data Delivery
  - On archive
  
- Publications
  - Papers in preparation
    - A comparison between AATSR and SLSTR SST data using ISAR observations
    - The International SST FRM Radiometer Network
    - SISTeR
    - SLSTR validation using ships4SST data, including high latitudes.
  - Conferences
    - GHRSSST
    - Living Planet
    - S3VT



# Conclusion

- International Collaboration
  - Good progress
- Data Collection
  - Issues due to COVID-19
- Archive
  - Partners data (RAL, DMI, UoS)
  - M-AERI and CISRO ISAR data
- Data Processing and Validation
  - Good WST results
  - Now results for D3, D2, N3, N2 (see validation talk)