



# ships4sst

shipborne radiometers for sea surface temperature

## Status ISFRN

Werenfrid Wimmer

Tim Nightingale, Arrow, Lee, Jacob Høyer, Sotirios Skarpalezos, Hugh Kelliher, Ruth Wilson, Steffen Dransfeld, Silvia Scifoni, Craig Donlon

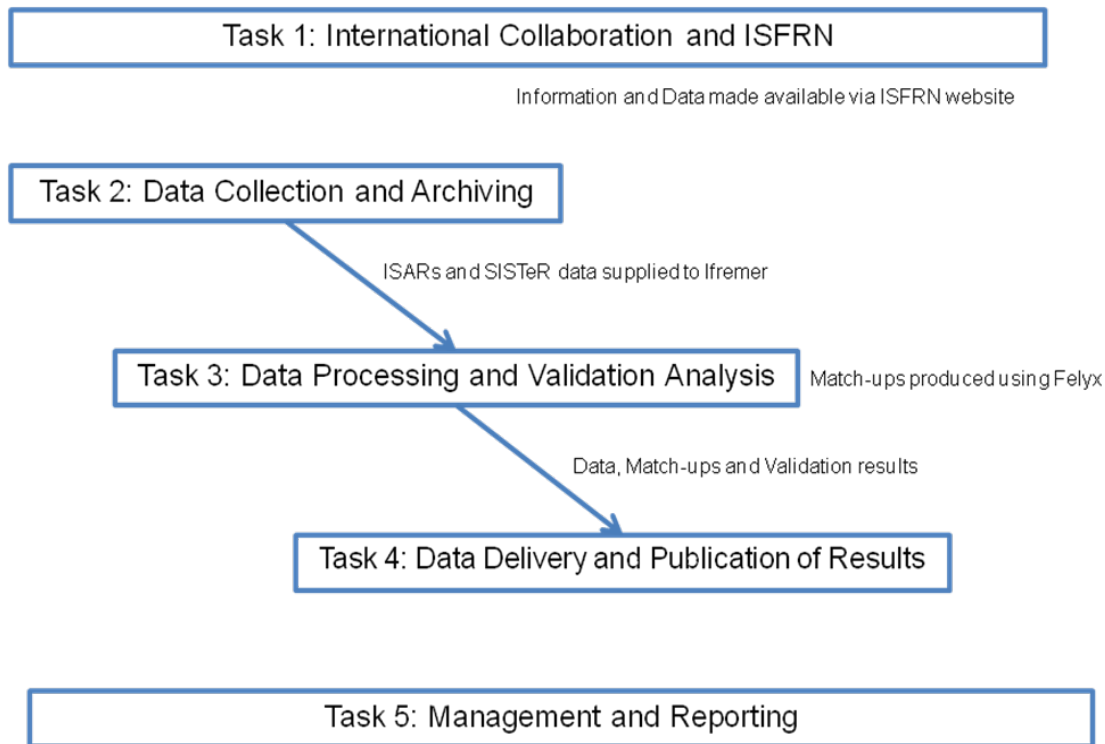
# Overview

- 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 and **at NOCS (Vaisala)**
  - Online Training with China
  - **Collaboration with South Africa with training and instrument loan.**
  - GHRSSST Task team
  - **Inter-comparison at NPL and Boscombe**
- webpage
  - [www.ships4sst.org](http://www.ships4sst.org)
  - Information, protocols, data format, archive
- Twitter
  - @ships4sst
- Outreach
  - Conferences (GHRSSST, Living Planet, s3vt, EUMETSAT satellite conference)

**ships4sst**    Aim Instruments Partners Documents News Services

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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TAKE A LOOK AT OUR INSTRUMENTS

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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

NERC SCIENCE OF THE ENVIRONMENT    This website is hosted by the National Oceanography Centre (NOC) on behalf of The International Shipborne Radiometer Network. © Copyright 2019 the National Oceanography Centre (NOC), the Natural Environment Research Council (NERC) or partners own copyright of the material available at this site, unless otherwise stated. All rights reserved. [Disclaimer](#) | [Privacy and cookies](#) | [Contact Us](#)

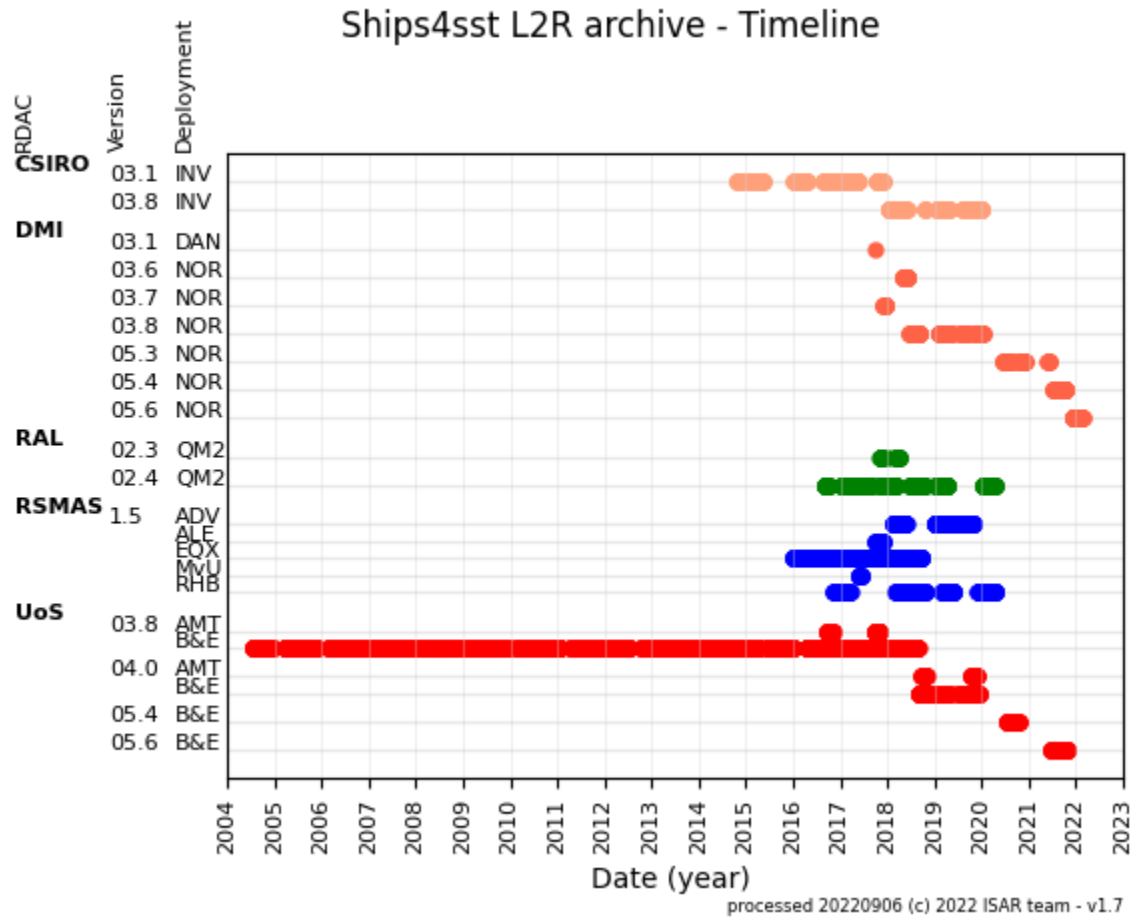
17 September 2022

# Task 2

- Data Collection
  - UoS – 10 deployments
  - DMI – 8 deployments
  - RAL – 8 deployments
  - COVID-19 impact in 2020 and 2021
    - Ships being moored
    - No access to instruments
  
- Archive
  - <ftp.ifremer.fr>
  - Instrument -> RADC-> software version -> year
  - Data

# Task 2

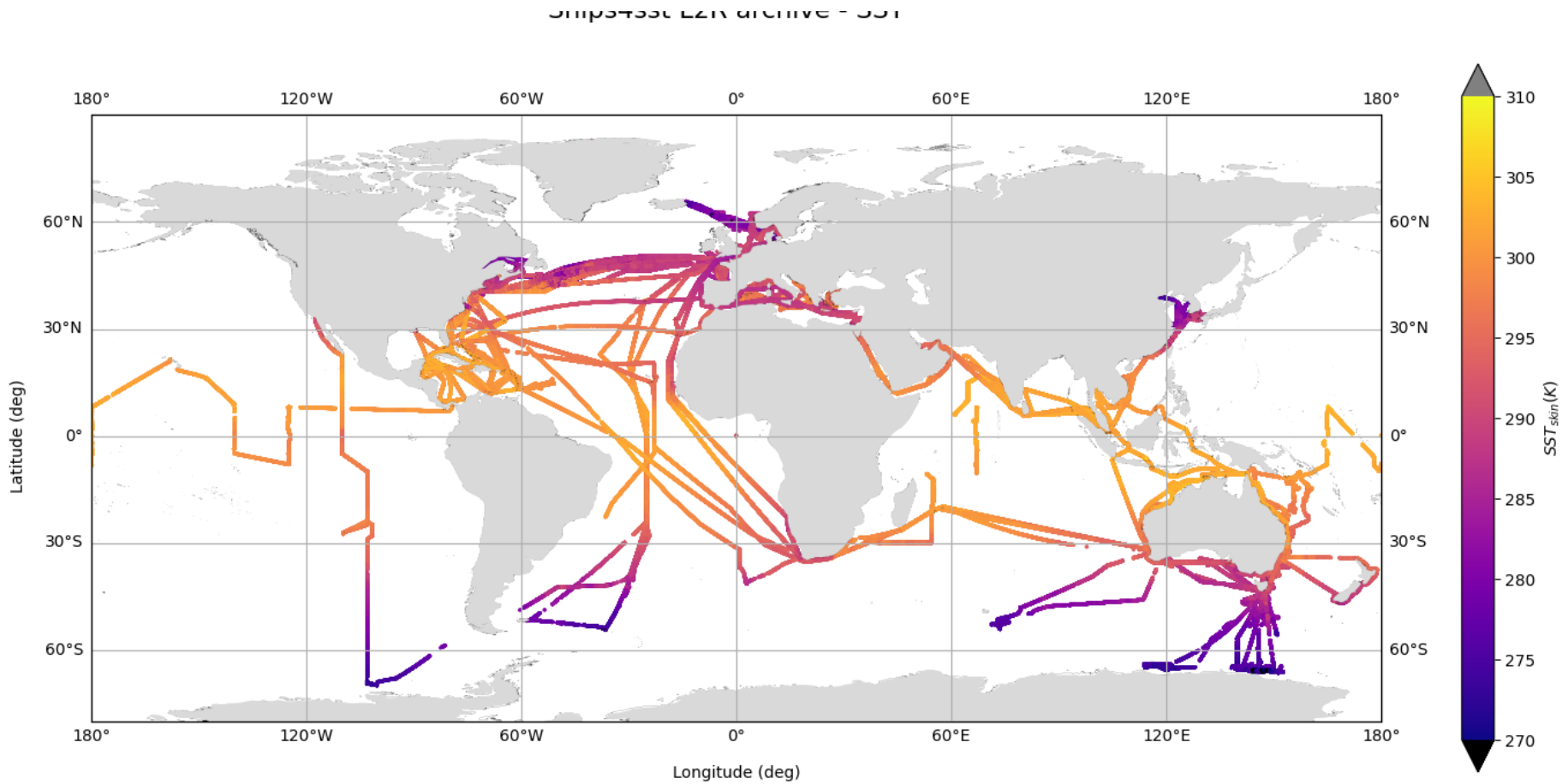
- Archive





# Task 2

- Archive



# Task 3

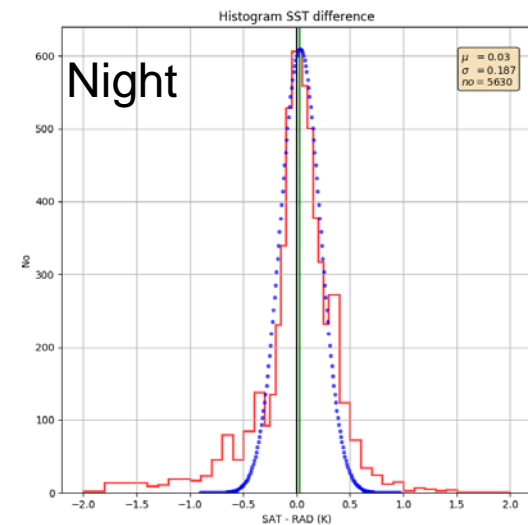
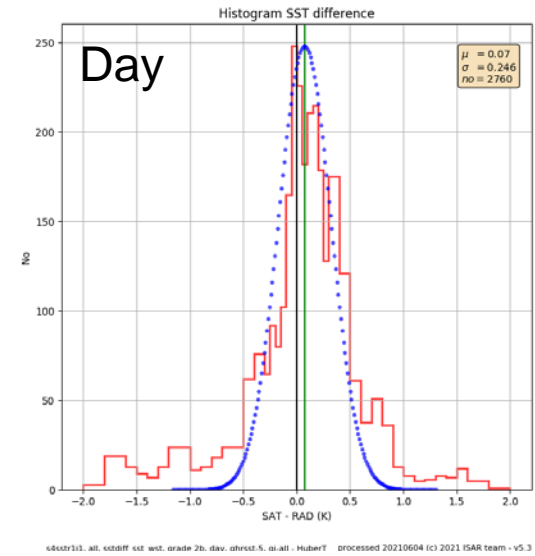
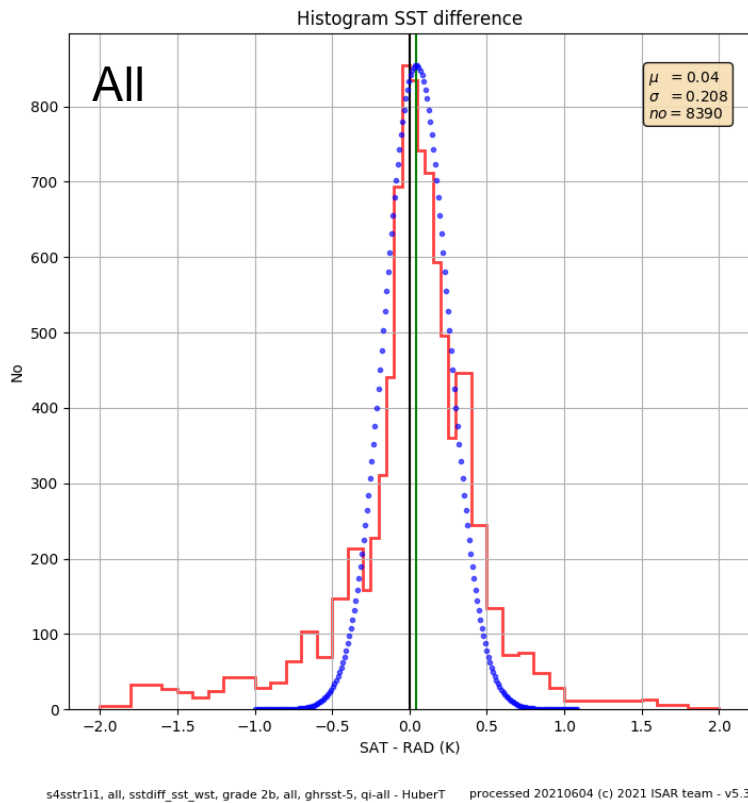
- Data processing and validation
  - Felyx MDB generation at Ifremer/EUMETSAT
    - SLSTR L1b and L2 data within 400x400 pixels of matchup
    - L2R data within 6hrs of matchup
  - MDB analysis tool
    - Uses Wimmer et.al 2012 approach
    - Now python 3
  - All SST fields
    - 2016, 2017, 2018

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)

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

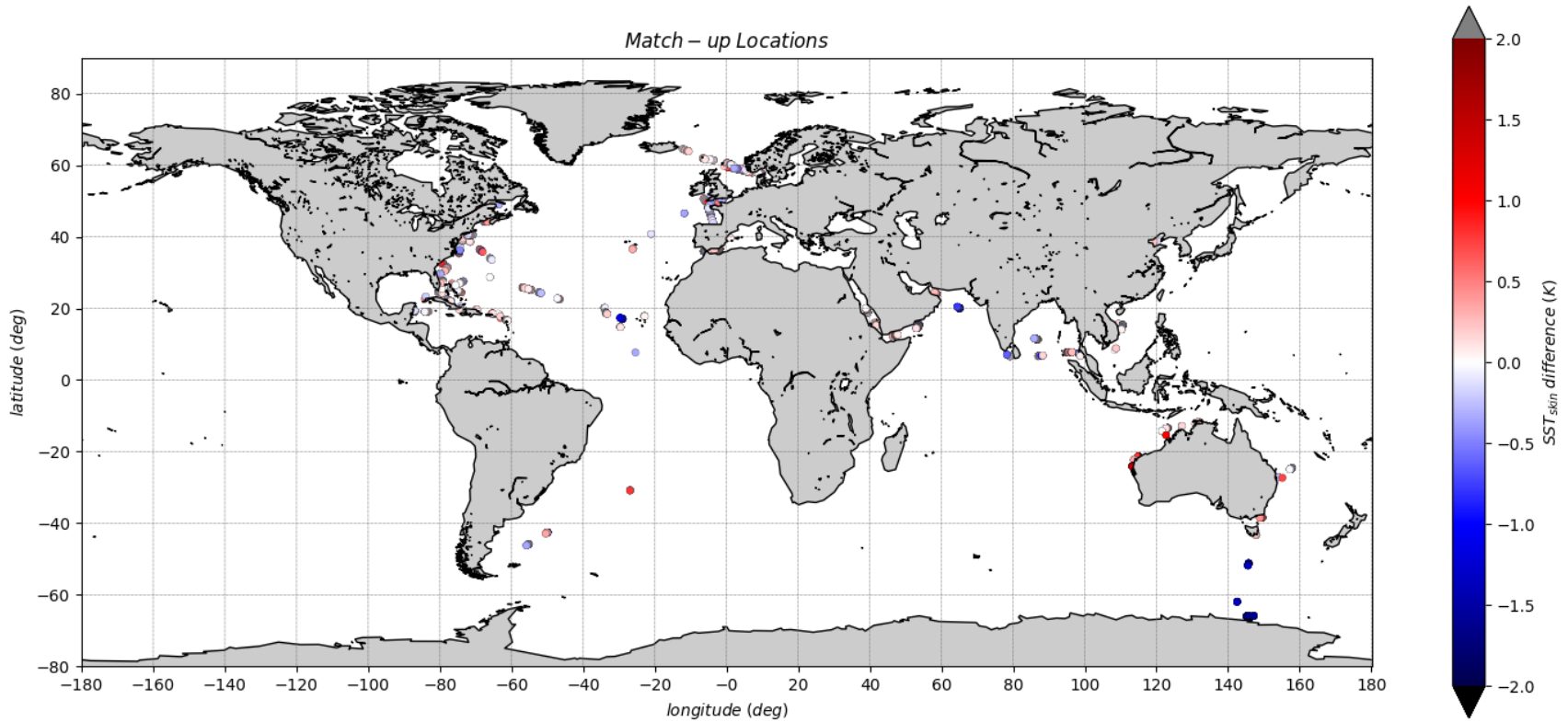
# Task 3

## 2019 - CV 5 - S3A



# Task 3

WST - 2019 - CV 5 - S3A



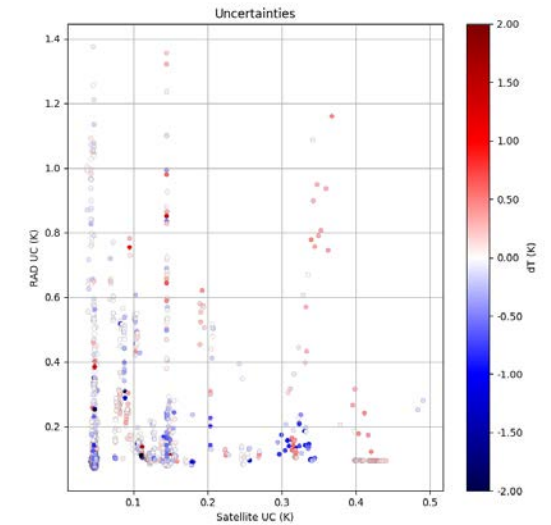
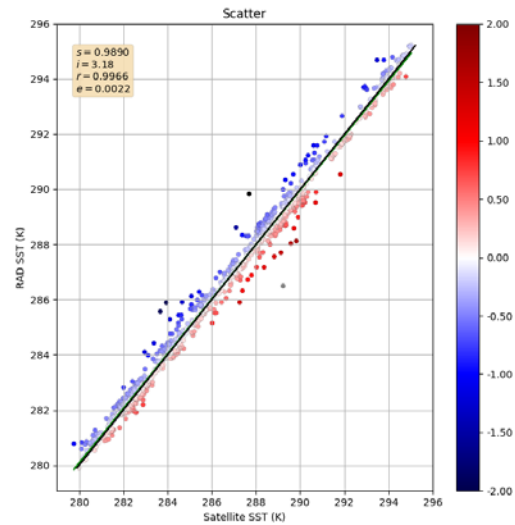
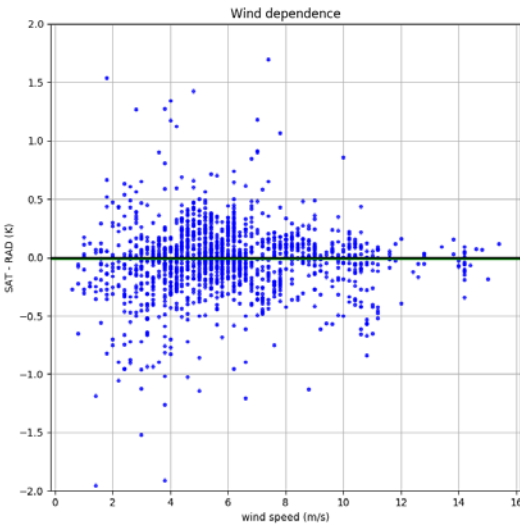
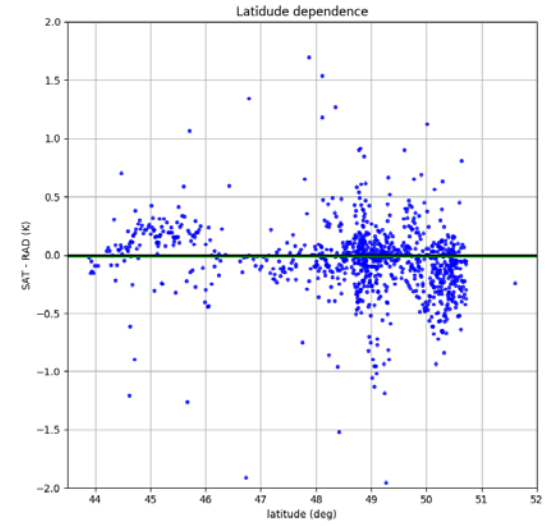
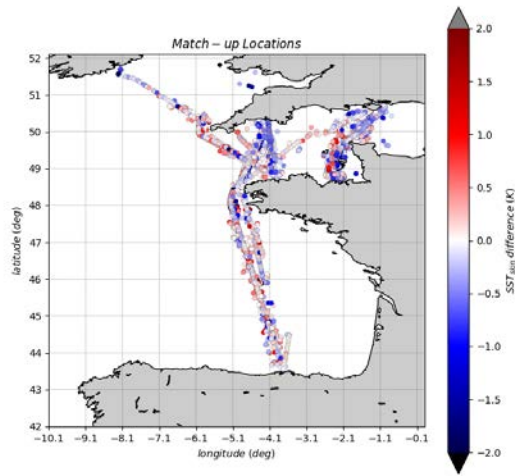
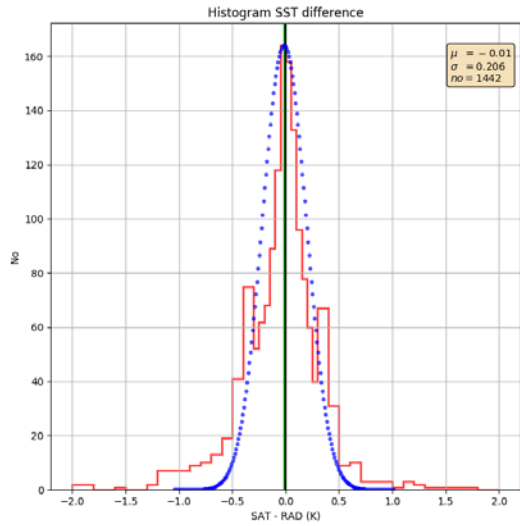
# Task 3

- WST - 2019 - CV 5 - S3A

WST						
Day						
Grade	MDif f	RSD	No	Overpass	Min Temp	Max Tem
1	0.07	0.26	832	100	275.57	306.53
2a	0.04	0.44	3346	209	270.61	306.53
<b>2b</b>	<b>0.07</b>	<b>0.31</b>	<b>3483</b>	<b>162</b>	<b>272.97</b>	<b>306.53</b>
3	0.02	0.47	12915	266	270.16	307.54
4	0.01	0.51	38087	375	270.15	316.10

WST						
ALL						
Grade	MDif f	RSD	No	Overpass	Min Temp	Max Tem
1	0.03	0.21	2462	273	273.22	306.53
2a	0.02	0.31	8035	504	270.61	306.53
<b>2b</b>	<b>0.04</b>	<b>0.23</b>	<b>9626</b>	<b>413</b>	<b>271.08</b>	<b>306.53</b>
3	0.02	0.34	31130	621	270.16	307.54
4	-0.01	0.38	87601	813	270.15	316.10

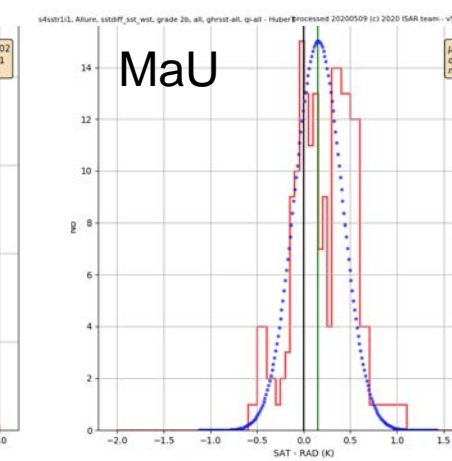
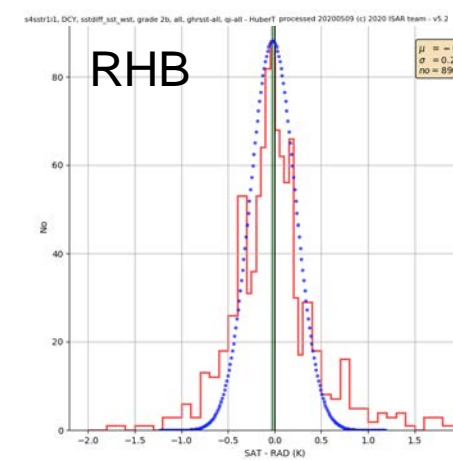
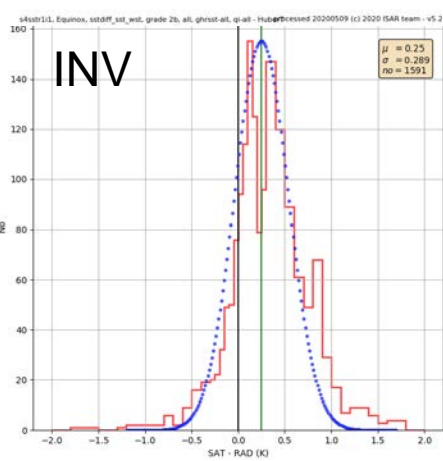
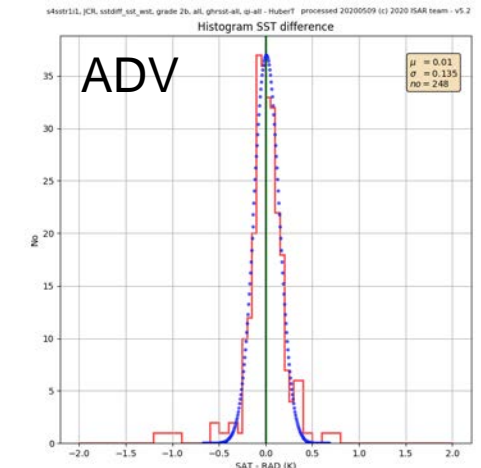
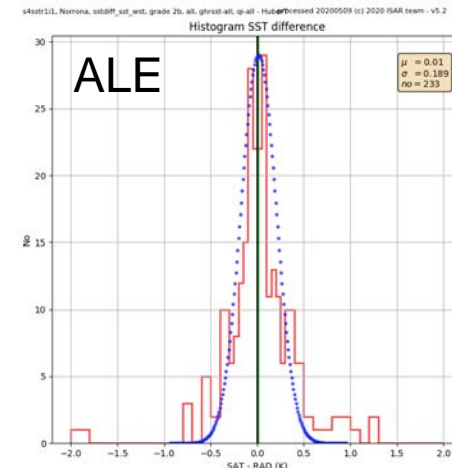
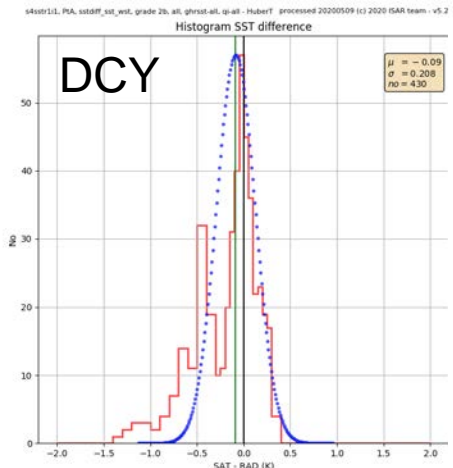
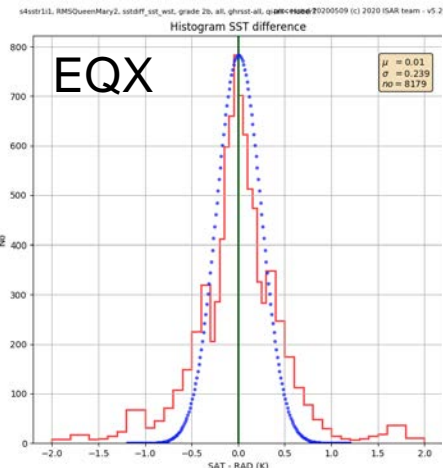
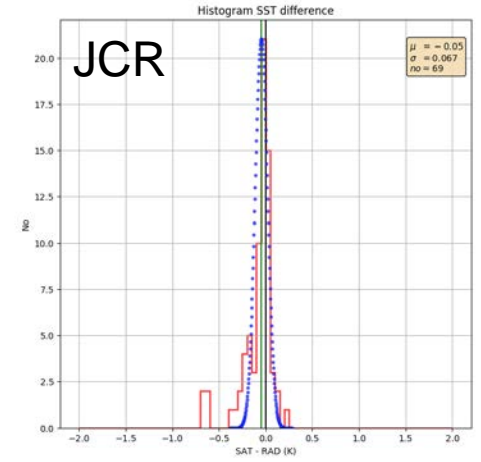
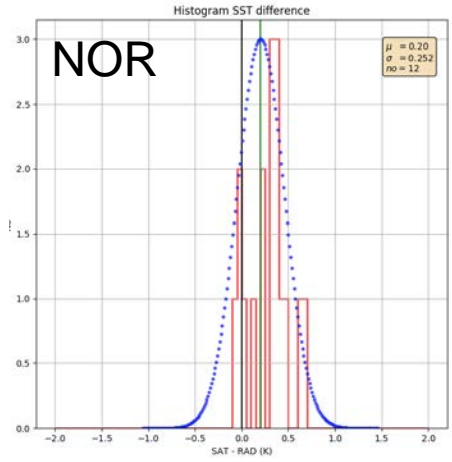
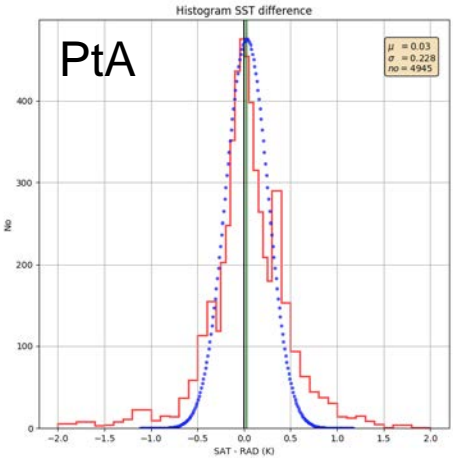
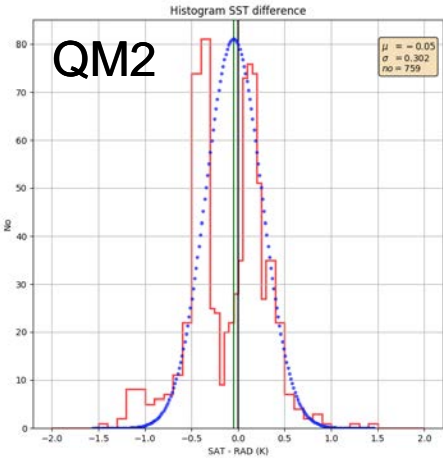
WST						
Night						
Grade	MDif f	RSD	No	Overpass	Min Temp	Max Tem
1	0.01	0.19	1630	173	273.22	303.28
2a	0.02	0.25	4689	296	270.90	305.80
<b>2b</b>	<b>0.03</b>	<b>0.20</b>	<b>6143</b>	<b>253</b>	<b>271.08</b>	<b>304.47</b>
3	0.02	0.27	18215	357	270.51	305.80
4	-0.01	0.31	49514	441	270.20	305.80



s4sstr31j, PIA, sstdiff\_sst\_wst, grade 2b, all, ghrsst-5, qi-all - HuberT processed 20210604 (c) 2021 ISAR team - v5.3

s4sstr31j, PIA, sstdiff\_sst\_wst, grade 2b, all, ghrsst-5, qi-all - HuberT processed 20210604 (c) 2021 ISAR team - v5.3

s4sstr31j, PIA, sstdiff\_sst\_wst, grade 2b, all, ghrsst-5, qi-all - HuberT processed 20210604 (c) 2021 ISAR team - v5.3



Abbreviation	Ships name	Operator
ADV	MV Adventure of the Seas	RSMAS
ALE	MV Allure of the Seas	RSMAS
DCY	RRS Discovery	UoS
EQX	MV Celebrity Equinox	RSMAS
JCR	RRS James Clark Ross	UoS
NOR	M/V Norrana	DMI
PtA	MV Pont Aven	UoS
QM2	MV Queen Mary 2	RAL
MaU	RV Minerva Uno	RSMAS
RHB	RV Ronald H. Brown	RSMAS
INV	RV Investigator	CSIRO

# 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
    - EUMETSAT metrological conference
    - CIMR from Science to Operations
    - TRUSTED workshop



# 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)
- GHR SST Task Team