ISAR – Denmark

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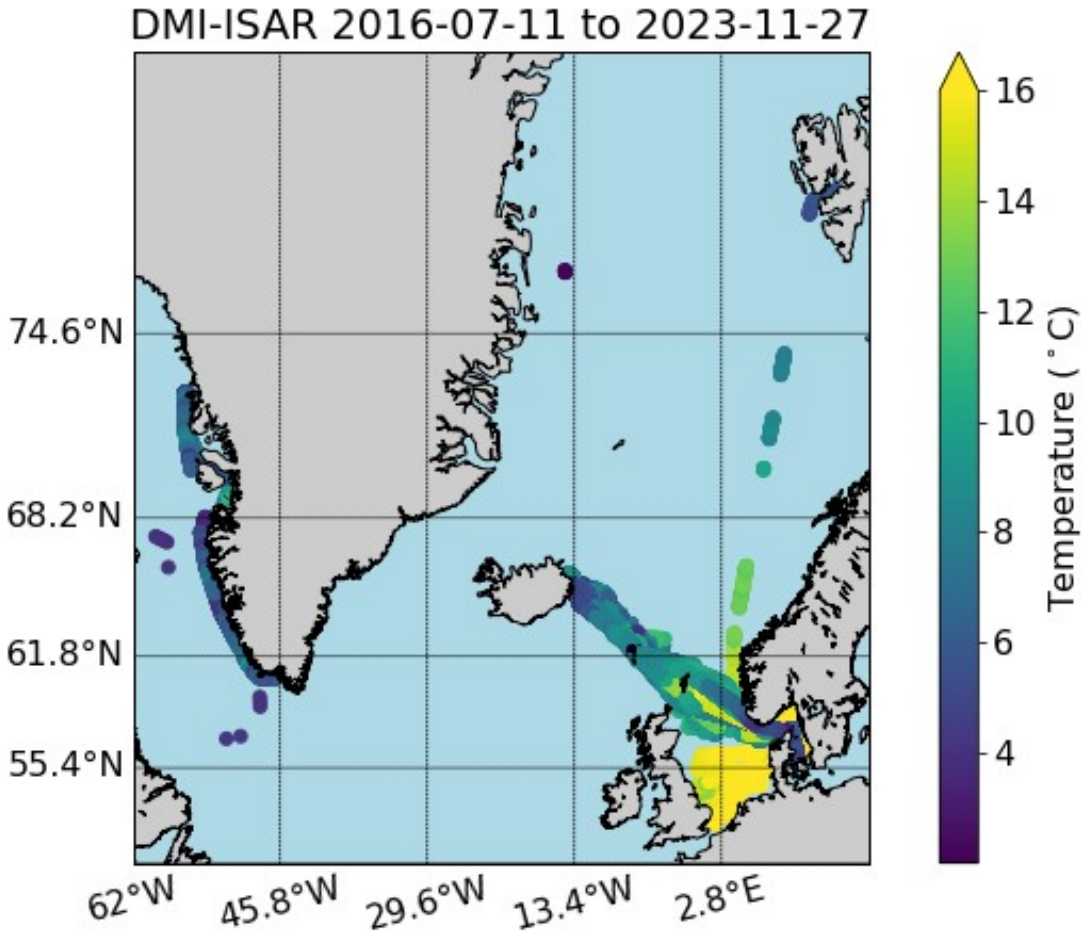
Outline

- Motivation and Scope
- FRM4STS results
- Ships4SST
- Future plans
- Conclusions

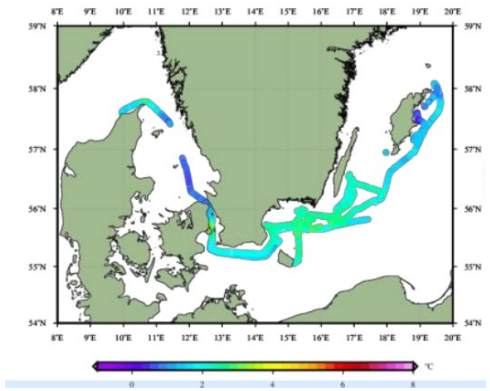
Motivation and Scope

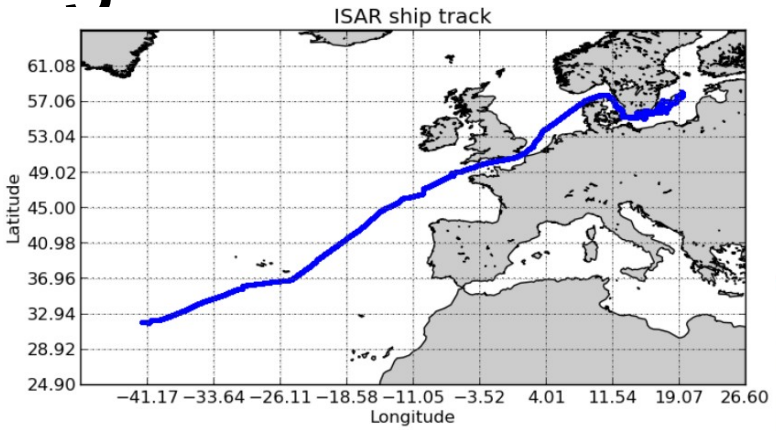
- Need for FRM SST at high latitudes
  - Uncertainty
  - Cloud cover
  - Sparse in-situ observations (drifting buoys and Argo floats)

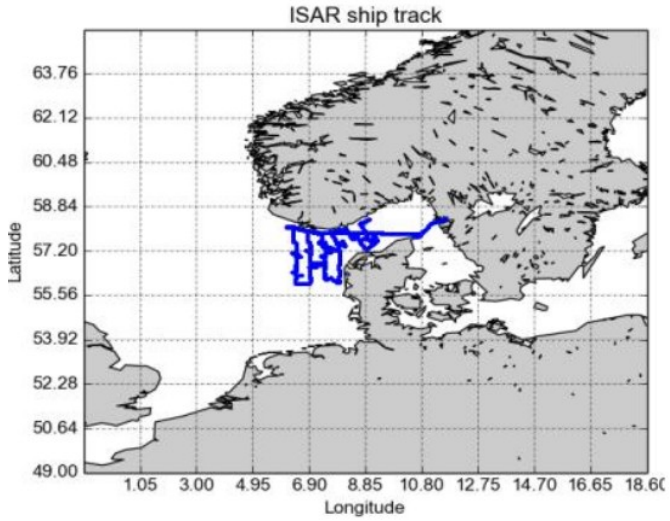


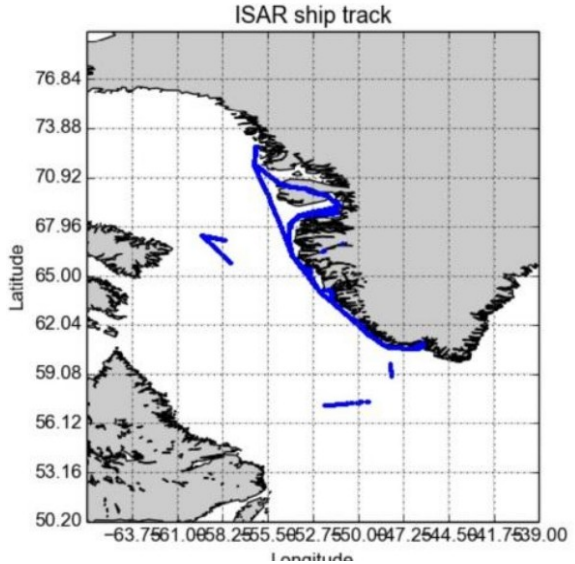
Past scientific campaigns:

- RAL vessel: Irena Arctica
- Danish research Vessel, DANA
- Oden Icebreaker
- Danish Defence Vessel: Einar Mikkelsen





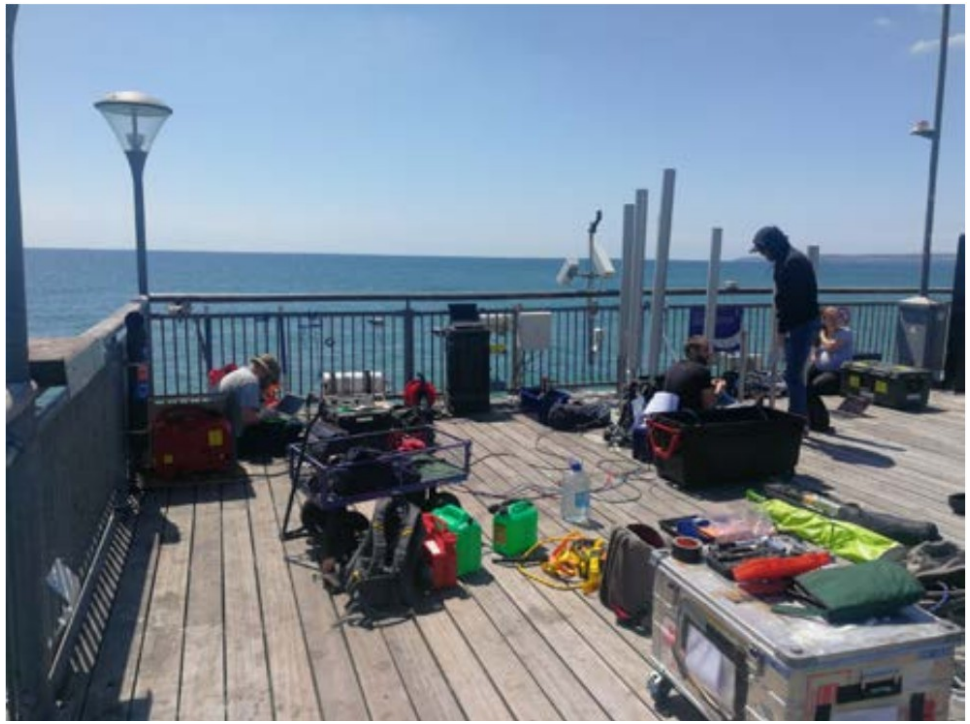




FRM4STS water inter-comparisons

- 2016 CEOS Laboratory IR Intercomparison, NPL, Hampton UK:

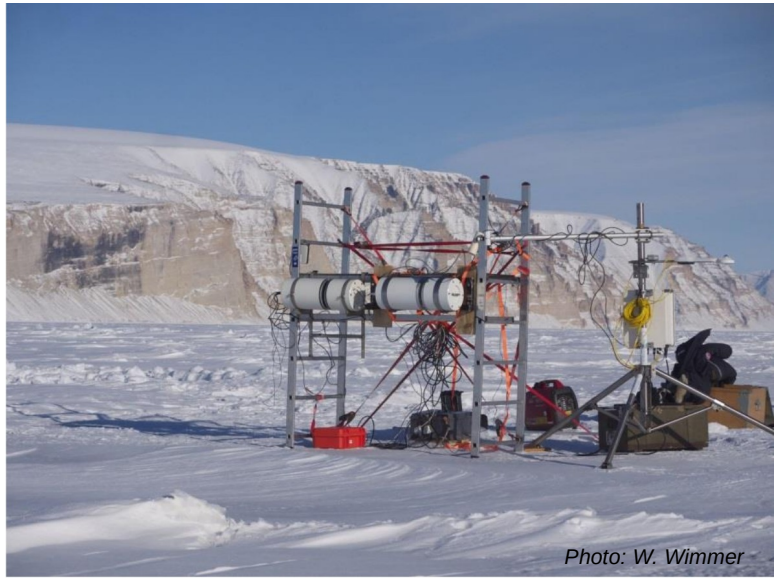
- 2022 CEOS WGCV intercomparison campaign:



FRM4STS sea ice inter-comparison

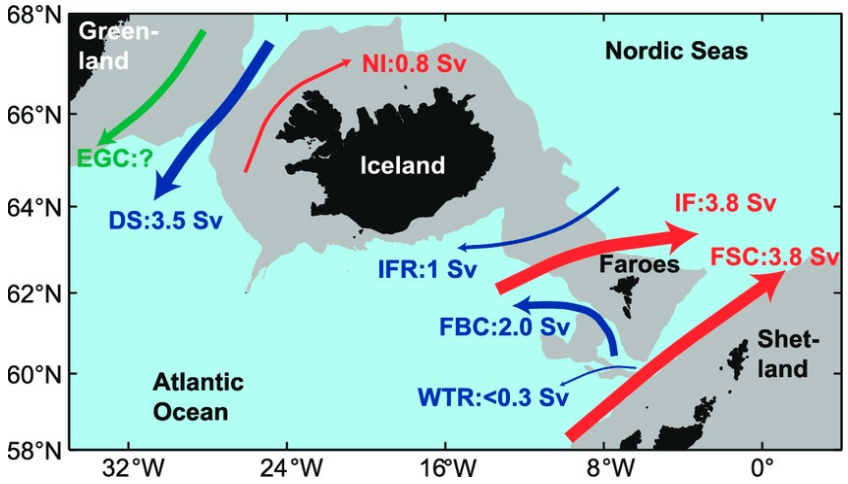
March 30 – April 7, 2016

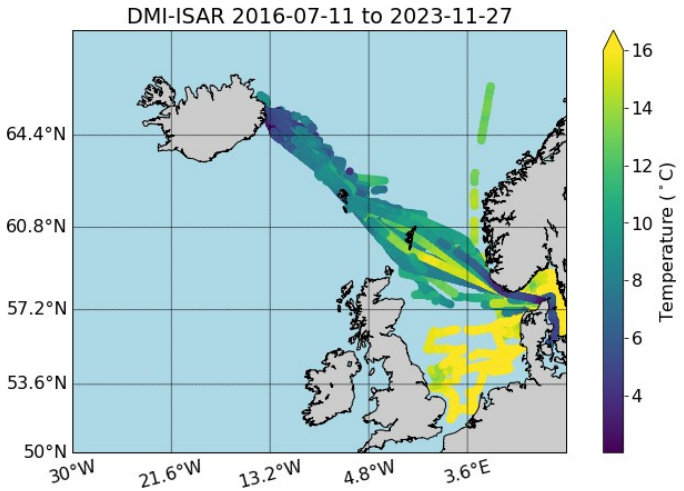
- 3 research teams and 6 TIR radiometers
- Other instruments:
  - Automatic Weather stations
  - Ice Mass balance buoys
  - Ocean buoys (T,S, Currents)
- Additional experiments:
  - Spatial variability
  - Freeze up experiment
  - Angular emissivity experiment



Ships4SST – Operational Deployments

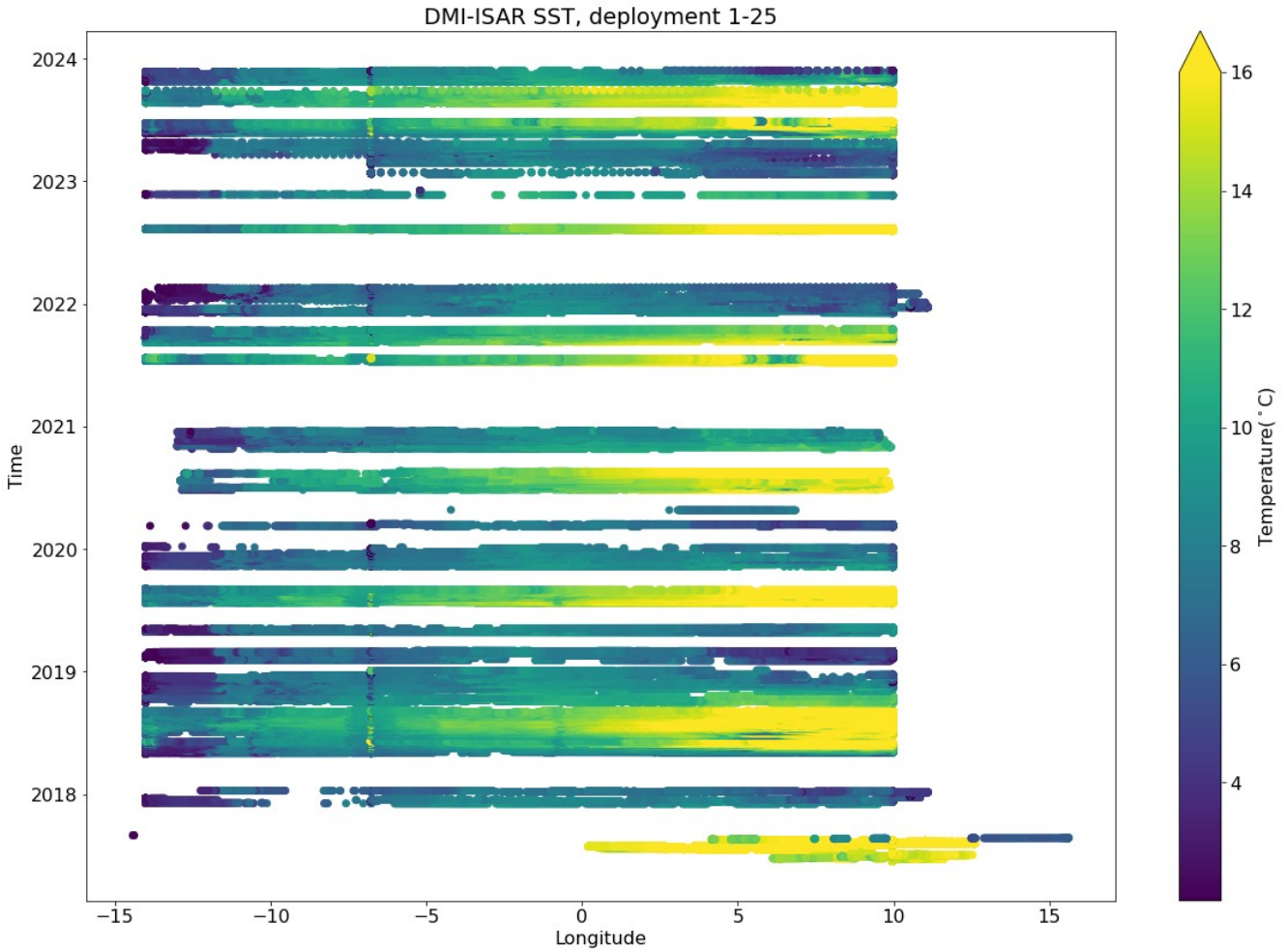
- Ongoing since December 2017
- DMI ISAR installed on Smyril line ferry Norröna
- Routine operations between Denmark, The Faroe Islands and Iceland
- Monitoring the Atlantic inflow to the Nordic Seas, AMOC





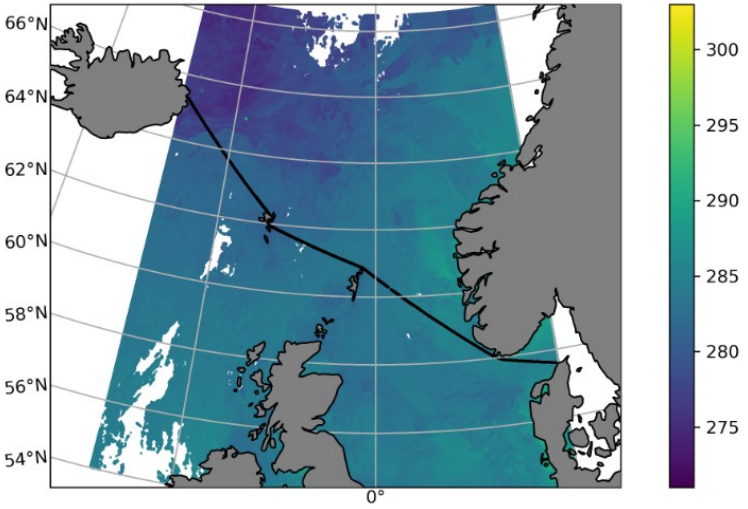
Ships4SST – Operational Deployments

- Round time: 1 week
- Year round service
- Servicing and calibration: 2-3 months
- 26 deployments to date
- Routine calibration and data processing
- Deliver to Ifremer ftp server

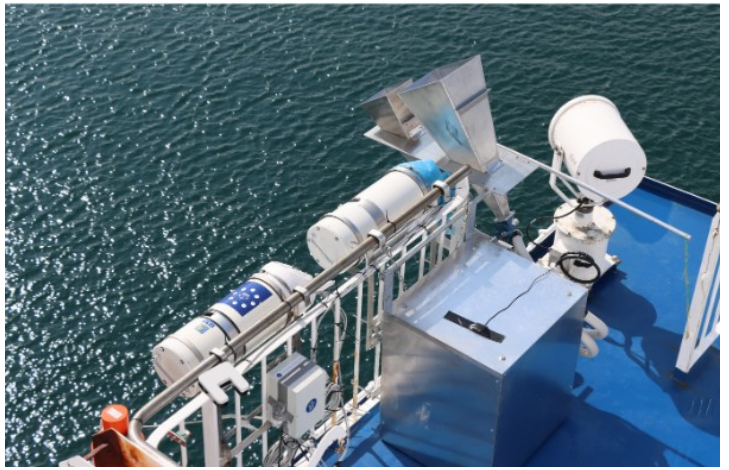


TIR-PMW inter-comparison

- Important for existing CDRs and for homogenisation of future reference missions (e.g. SLSTR vs CIMR)
- TIR and PMW → Skin vs. subskin
- Pilot inter-comparison performed over brackish waters in Copenhagen, Denmark, Jan. 2021
- Special focus on cold waters
- Analyzed data characteristics and uncertainty estimations of SST_{MW}



Qty.	Radiometer type	Name	Wavelength μm	Frequency GHz	Bandwidth	Sea-view angle
2	TIR	ISAR	10.55	–	9.6–11.5 μm	25°
1	PMW	EMIRAD-C	–	7.05	7.0365–7.0635 GHz	55°
1	PMW	EMIRAD-X	–	10.69	10.59–10.79 GHz	55°



Poster: “Shipborne Intercomparison of TIR and PMW Instruments for SST Measurements”

Future plans

- Continue the high latitude FRM SST collection and validation of the SLSTR SST products
- Working on optimizing DMI ISARs
- Collect more data from scientific campaigns for other ship routes and for IST
- Spatial temperature variability assessments

Thank you

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