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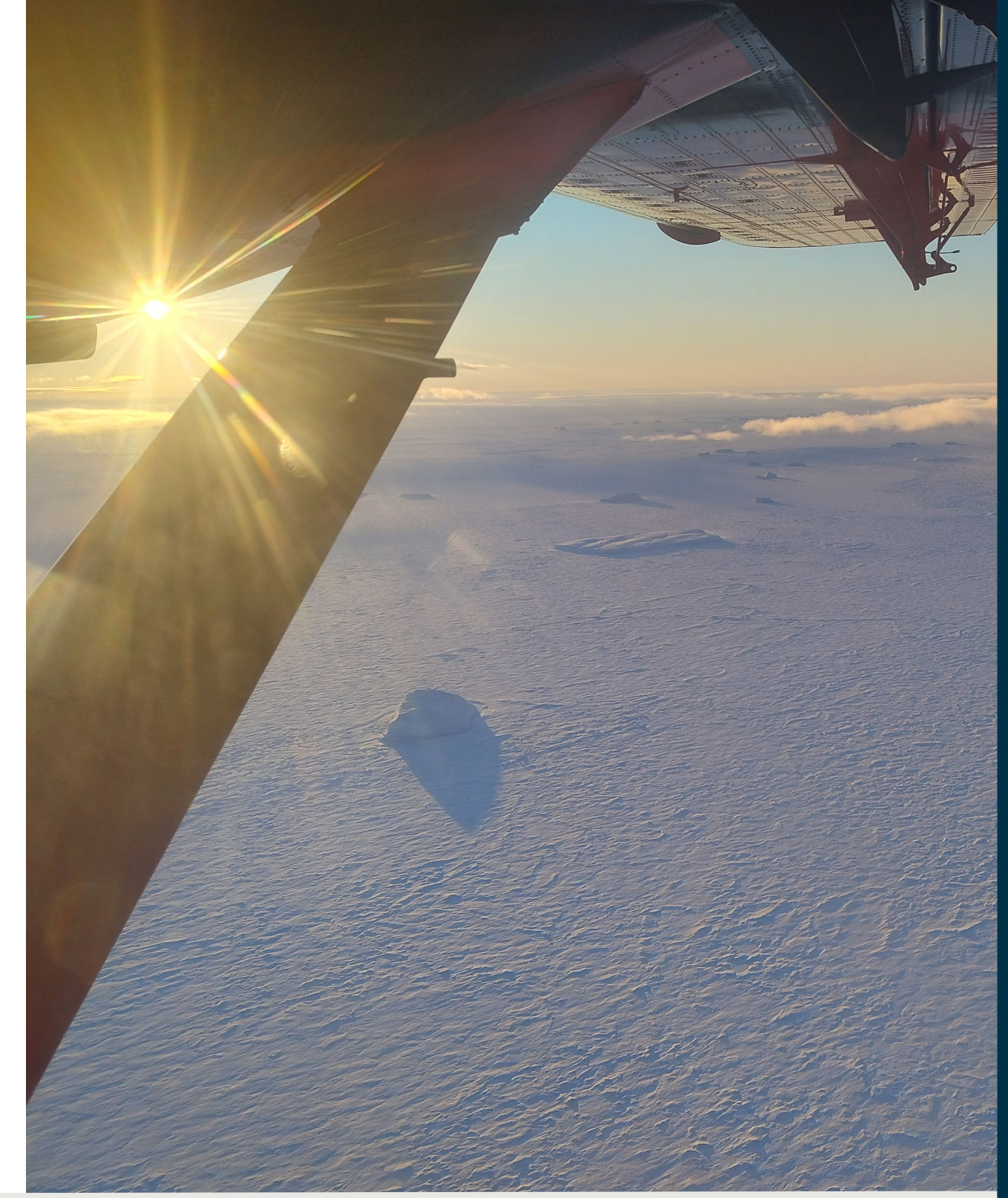


CRISTALair Instrument

- Airborne altimeter in Ku and Ka-band
- Bandwidth: 1 GHz
- Interferometric capability in both bands
- Supporting instruments:
 - RIEGL VQ-580II laser scanner (1064 nm)
 - MicaSense RedEdge-P multispectral camera
- Installed on **gimballed platform** inside Twin Otter aircraft
- Open-source L1B processor by isardsat
 - L1A, Pulse-limited (LR-OS), Delay Doppler (HR) and Fully Focused (FF) products can be generated

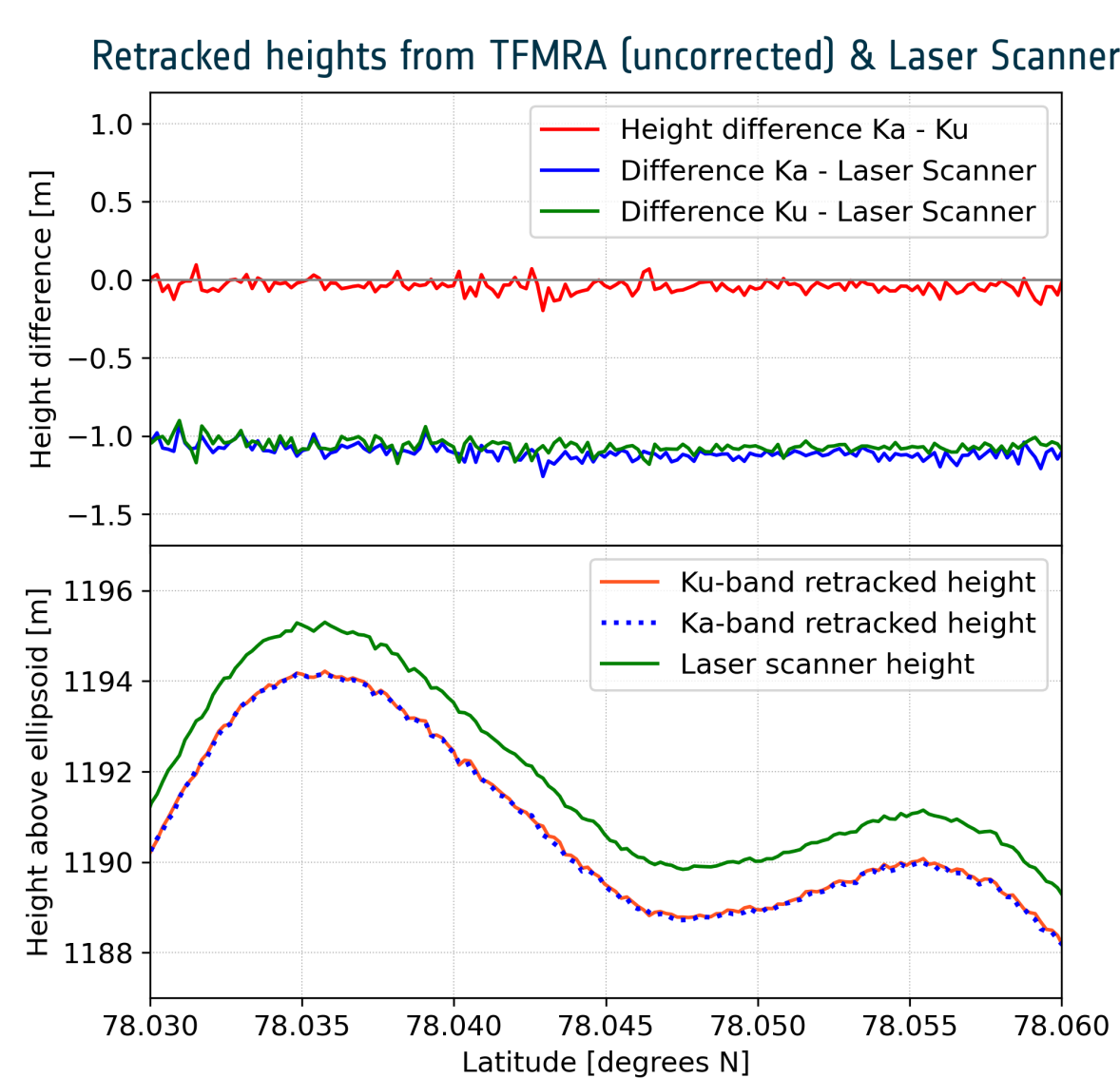
Functional Flight Campaign

- Flights over natural targets (sea ice, land ice, ocean, fjords) and corner reflectors
 - **266 total datasets**, 11 TB of raw data
- Validation of function and performance
 - Main objective to test instrument, not scientific data acquisition
 - no in-situ measurements
- 14. - 20. September 2025**, 4 flight days
- Based in Akureyri, Iceland
- 2-day trip to Station Nord, Greenland
- Data have restricted release, as only for validation and not meant for scientific analysis
 - further info: contact paolo.cipollini@esa.int



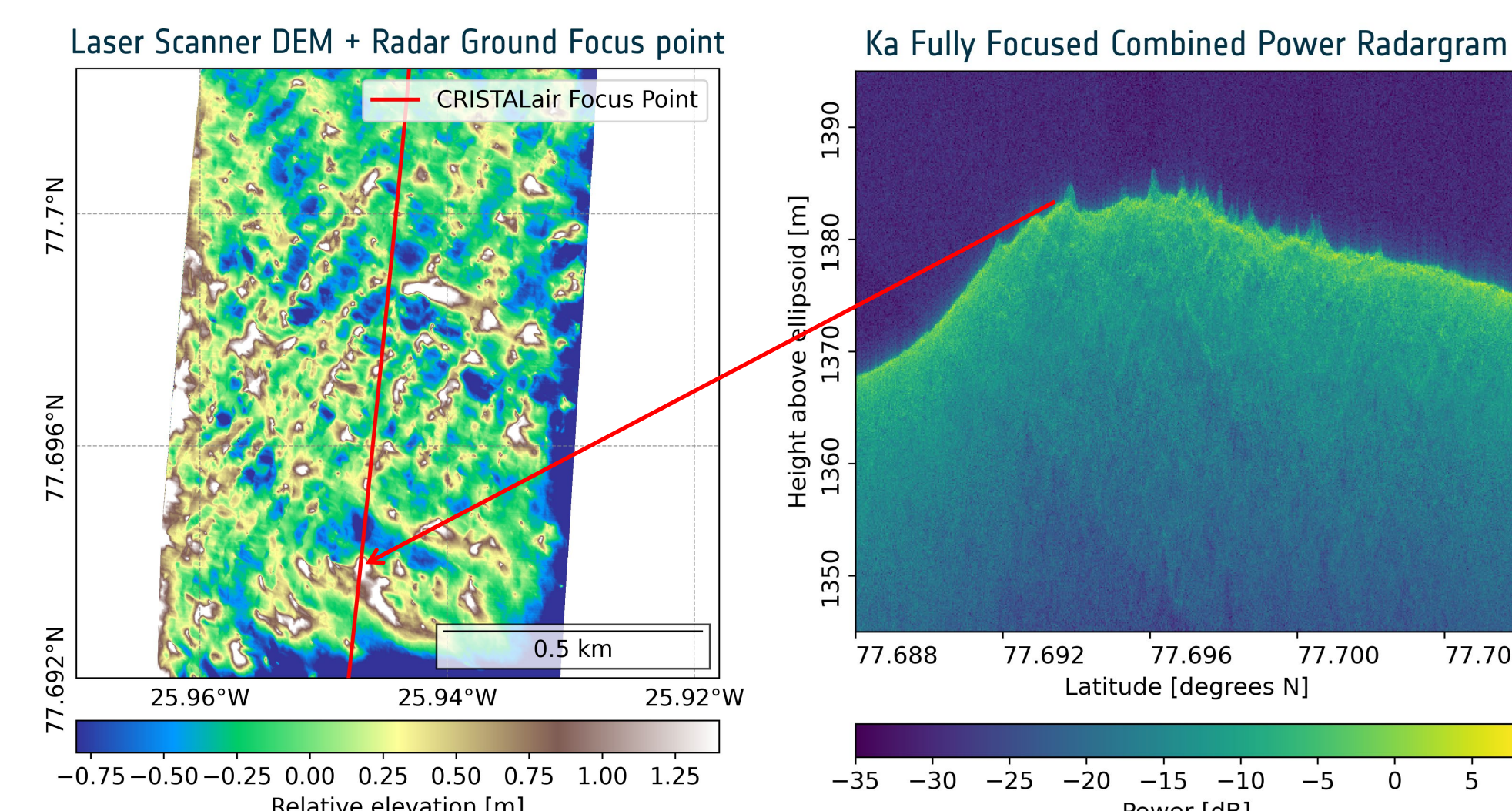
LAND ICE

Retracker heights and onboard laser scanner comparison



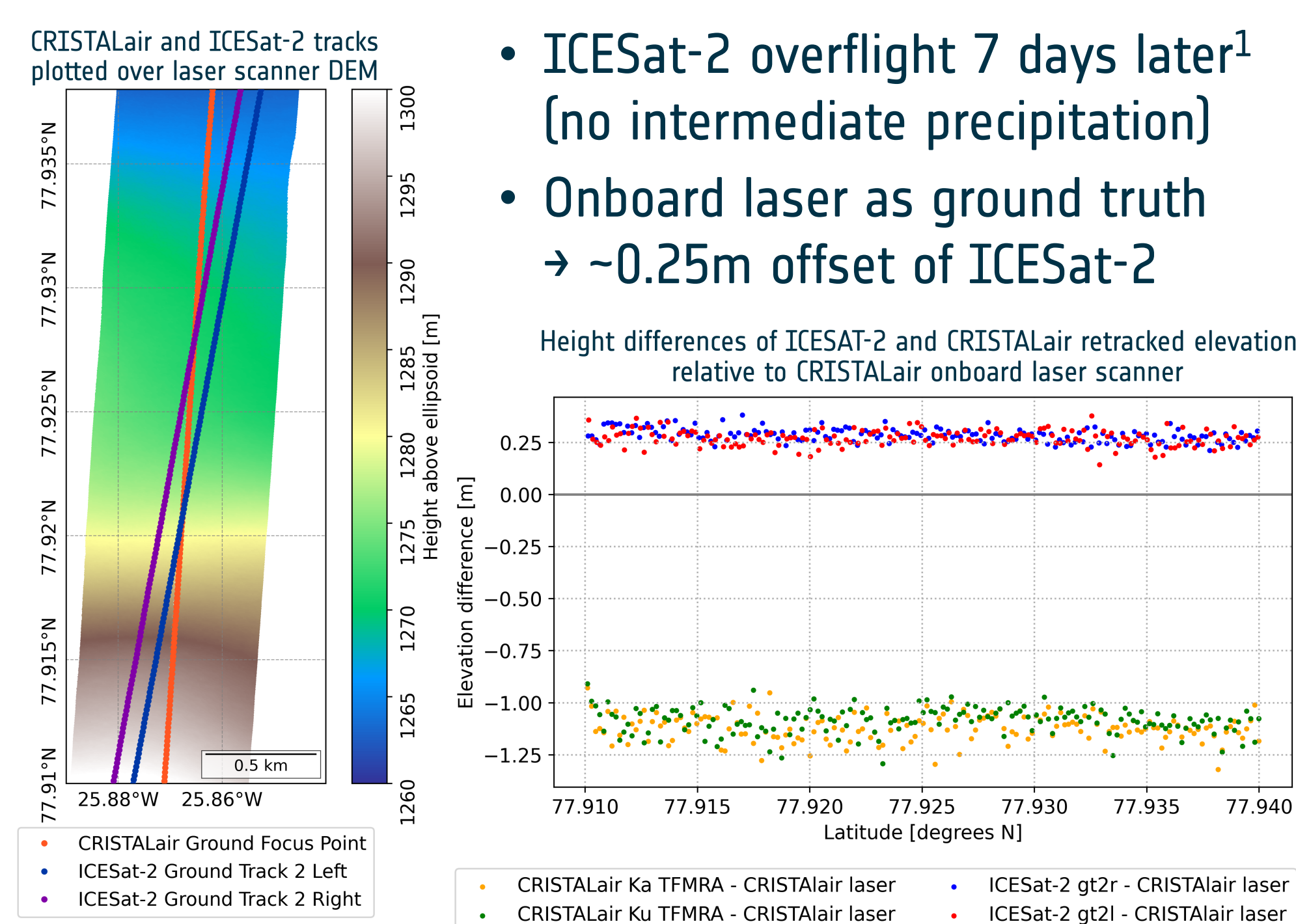
- Retracted height with 50%-TFMRA shows no difference between Ku and Ka
- ~1m offset to height from onboard laser scanner
- Similar results for OCOG retracker

Glacier ridged surface features



→ small structures identifiable in both datasets

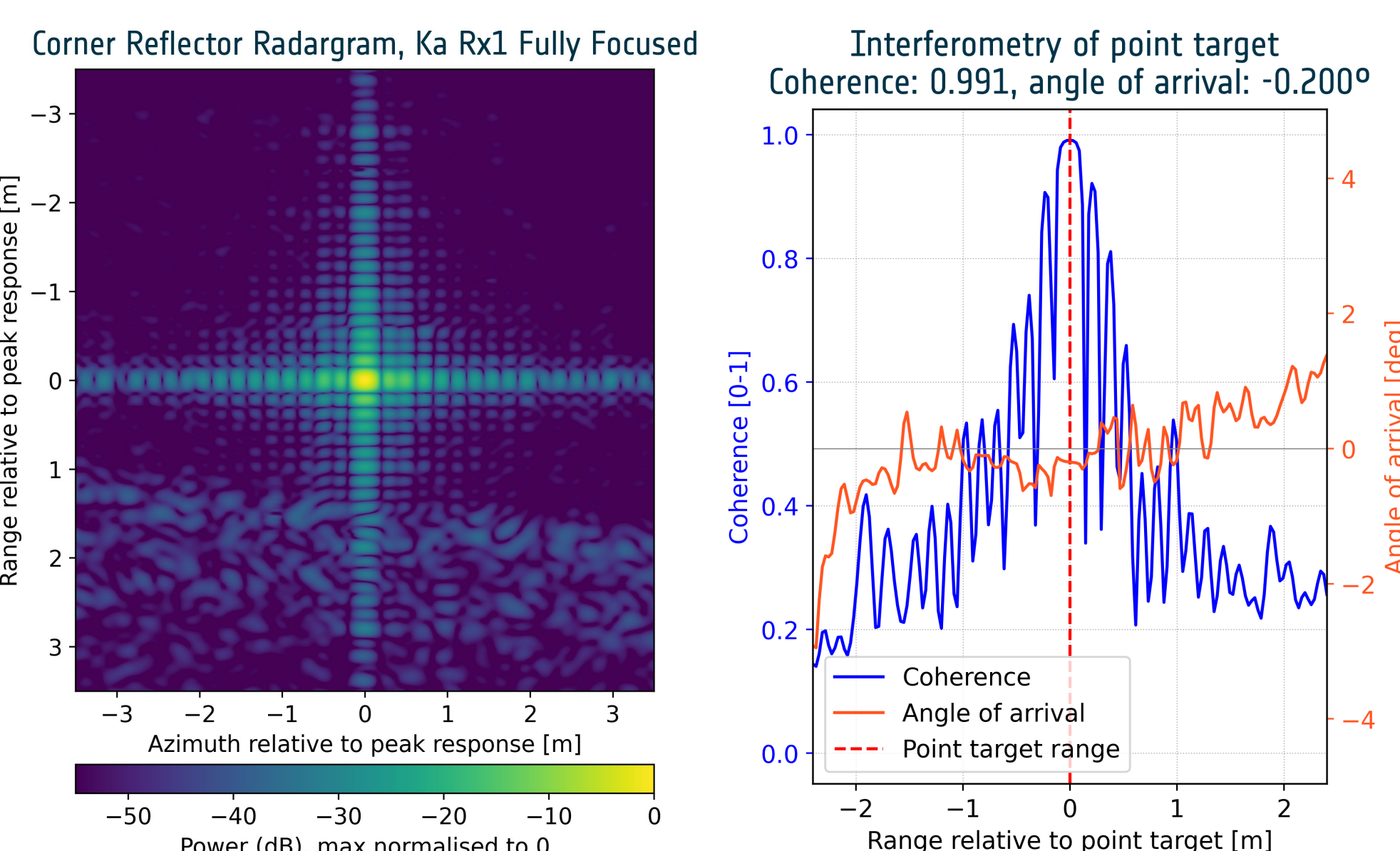
Crossover with ICESat-2



- ICESat-2 overflight 7 days later¹ (no intermediate precipitation)
- Onboard laser as ground truth
 - ~0.25m offset of ICESat-2

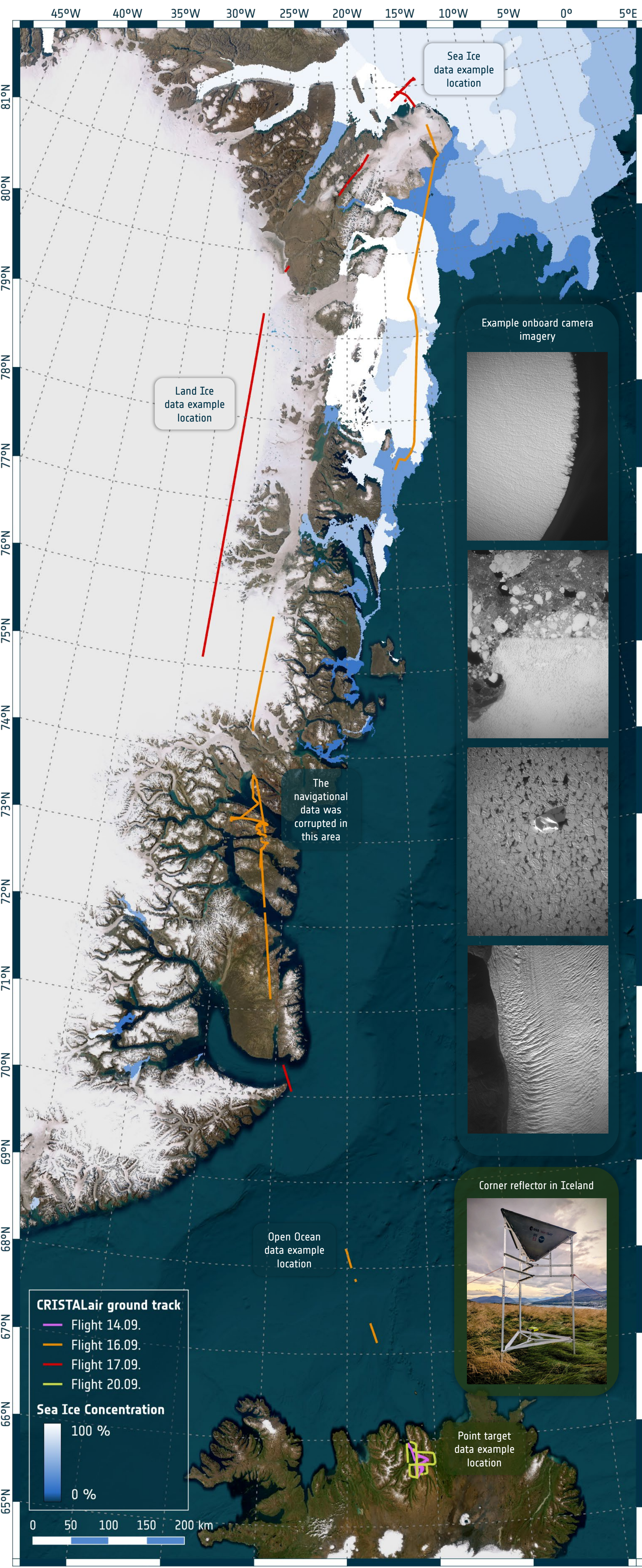
POINT TARGET

- Overflight of corner reflector in Iceland, 1700 m altitude



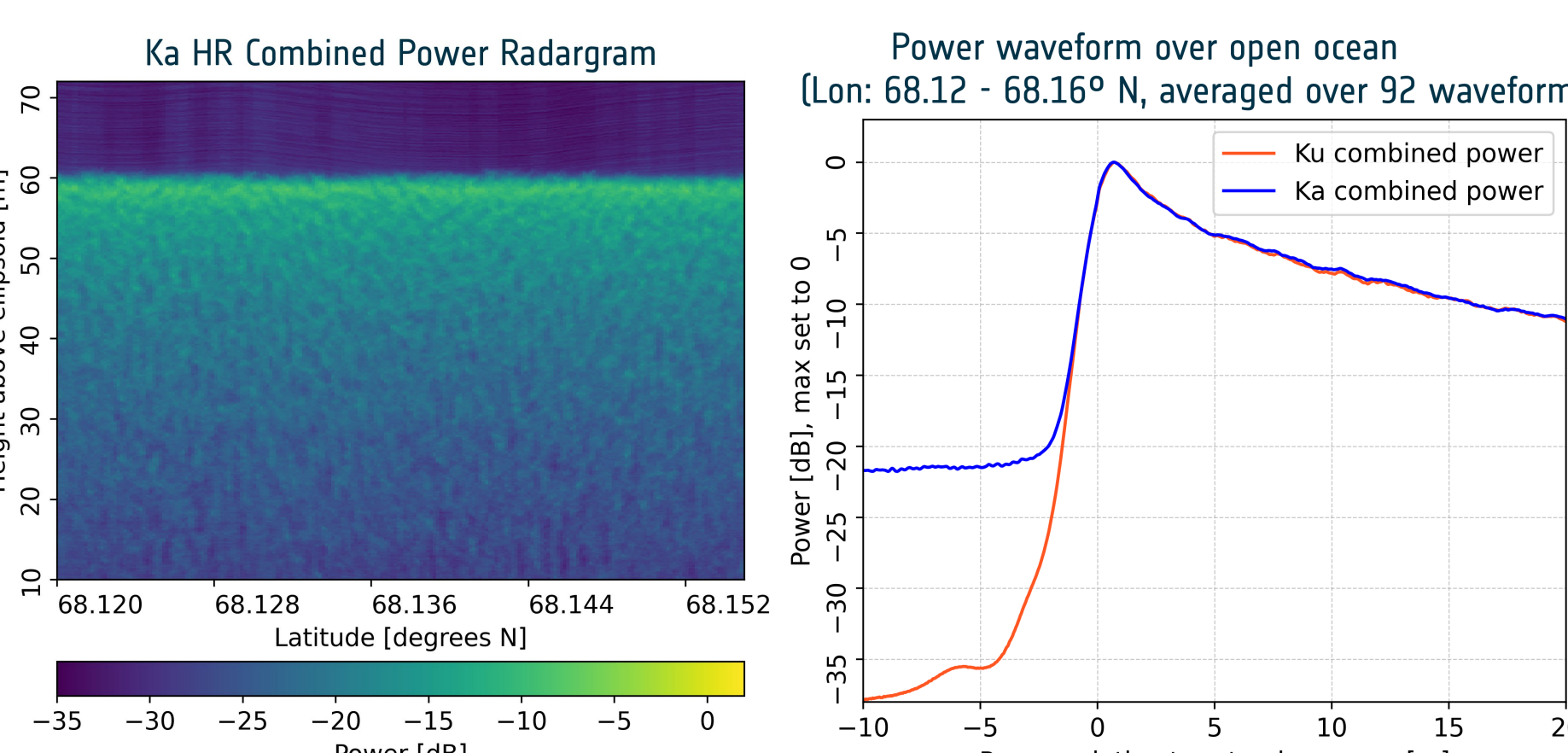
GROUND TRACKS

Location of data acquisitions during the four flights



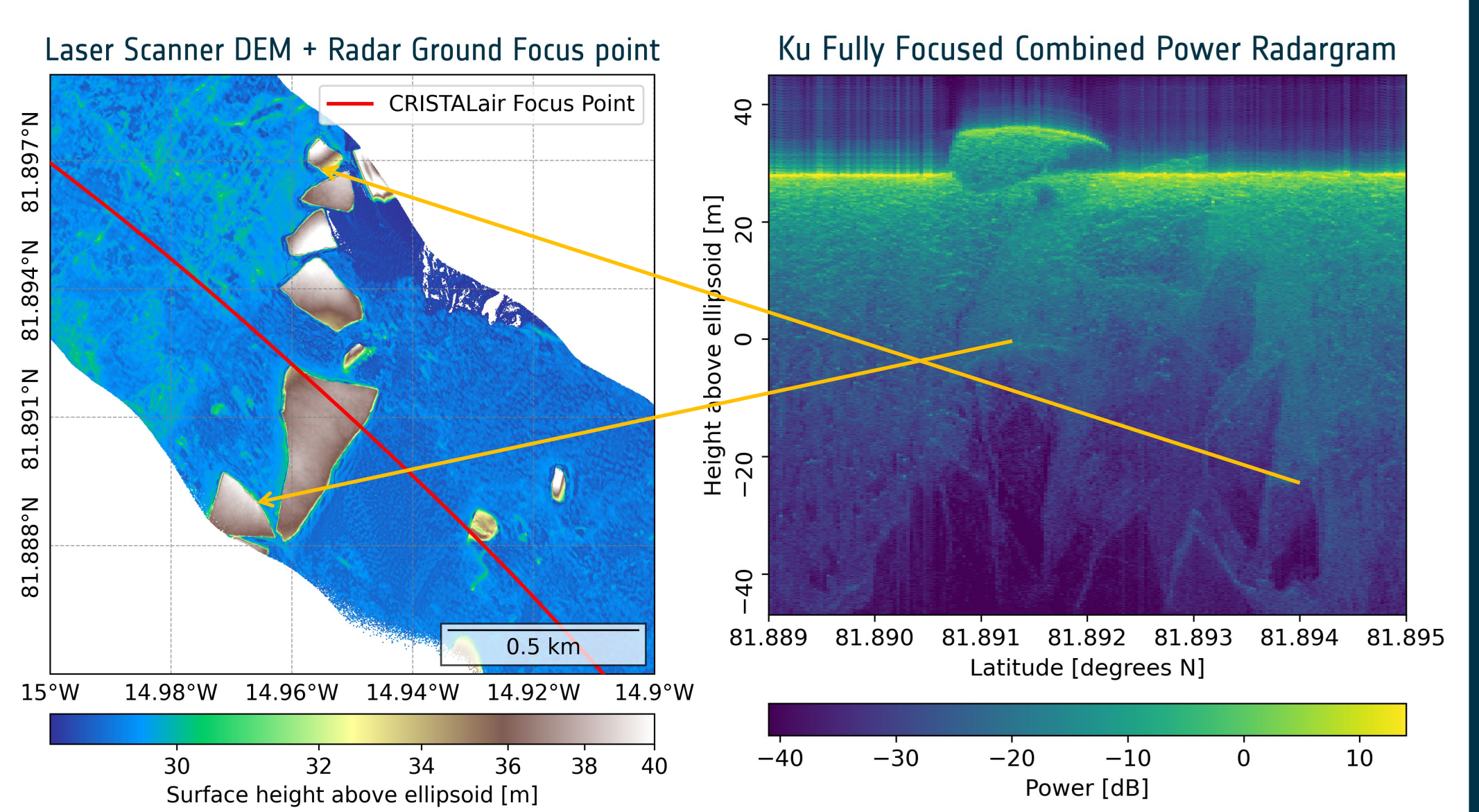
OPEN OCEAN

- Reference acquisitions over ocean targets

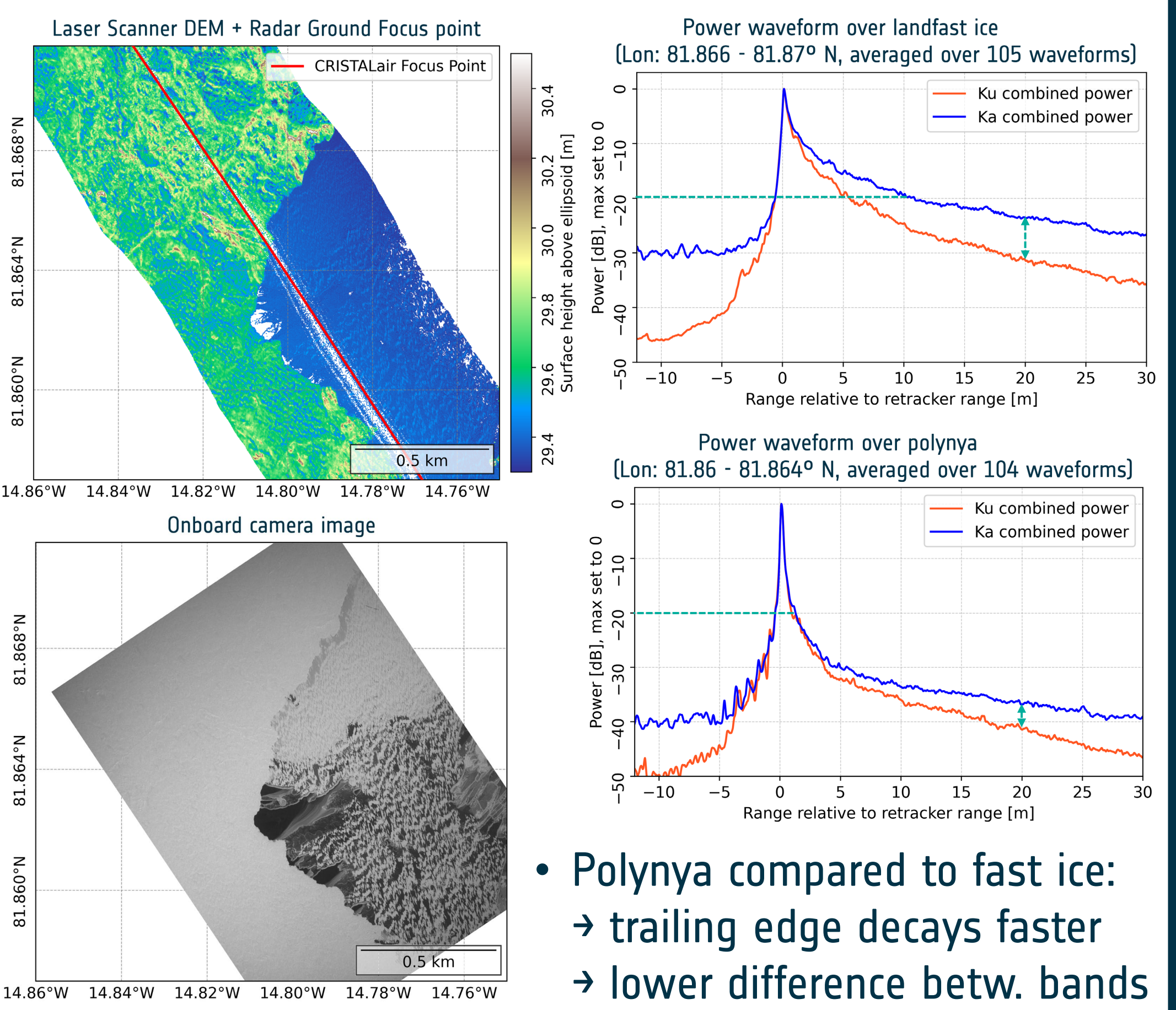


SEA ICE

Icebergs in Radargram and onboard laser scanner DEM

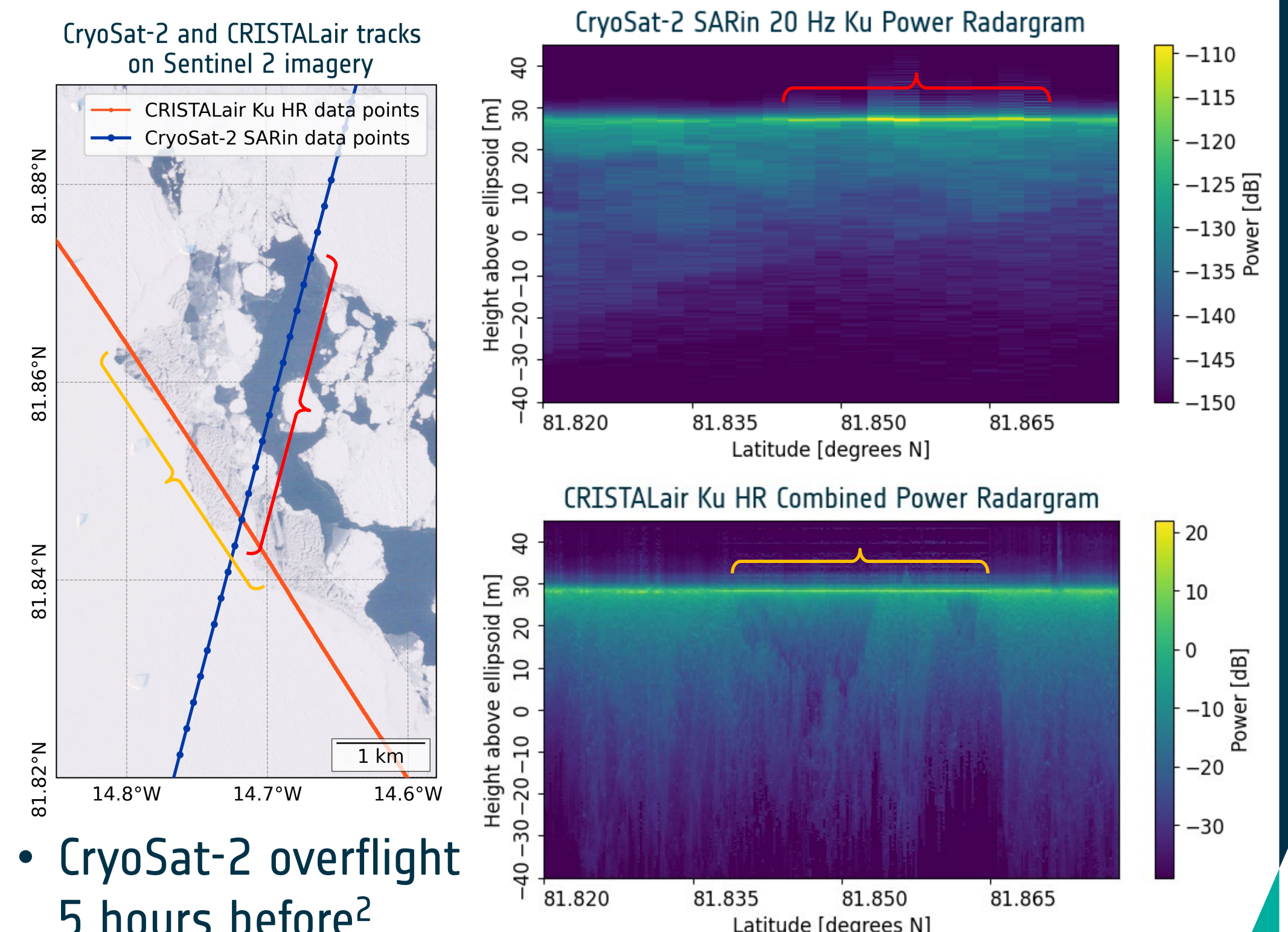


Waveforms over landfast ice and polynya with nilas ice



- Polynya compared to fast ice:
 - trailing edge decays faster
 - lower difference betw. bands

Crossover with CryoSat-2



- CryoSat-2 overflight 5 hours before²
- Polynya visible in both L1B products
 - higher level of detail in CRISTALair, even without FF

USED DATA

¹ATLAS/ICESat-2 L3A Land Ice Height, Version 7.
 File used: ATL06_20250924044434_01472905_007_01.h5
²CryoSat-2 L1B SARin Product, Version Baseline E.
 File used: CS_OFFL_SIR_SIN_1B_20250917T041451_20250917T041843_E001.nc