IOMASA
PM4

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Where are we now?

- Results
  - Melt-refreeze analysis
  - Emissivity modelling and sensitivity studies
  - Thermodynamic model
  - Book keeping model
  - AMSR-E OSISAF processing chain
- √ Deliverables
  - √ Day 0 data and reports (4.1)
  - √ Ice concentration algorithm (4.2)
    - √ Method(s) ok, report to be delivered
    - √ Firm conclusions need reference data, therefore we retain OSISAF algorithm until d4.4
  - √ Sea ice dataset for investigation period (4.3)
  - √ Validation and final conclusions (4.4)
    - √ Synthesis of the various theoretical and observed characteristics
    - √ Method used in 4.2 is not necessarily the final recommendation

Validation methods

Ship/in-situ observations
- +Excellent ice type distinction possible
- -Problematic viewing geometry and subjectivity
- Area observed no more than 1-2 km

Aerial observations
- +Relatively good observation geometry
- -Subjective concentration estimates, clouds, possible surface type ambiguities

Satellite VIS/IR
- +Objective ice concentration estimates and good resolution
- -Clouds, ice type ambiguities (thin ice)

Satellite SAR
- +all-weather, semi-objective classification, excellent resolution
- -ice type ambiguities (thin ice)

High res. Ice dynamics (RGPS)
- +Independent method, allows estimation of ice age spectra
- -Uncertainties in ice growth parameterisations, not snapshots

Kaleschke vs. Meier

Kaleschke dissertation

- Comparison of Polarstern ice concentations ($C = 87 \pm 13$ %) and SSM/I ice concentrations based on 54 days of about eight observations each day

Algorithm	Difference [%]	Correlation
ARTIST (ASI3)	-4 ± 12	0,66
NASA-TEAM	12 ± 15	0,20
NASA-TEAM-2	-3 ± 17	0,04

Summer data agreement

0 correlation for NT2

CV and N2 show best results during winter and high IC due to overshoot

Possible conclusion: IC>~90 best approximated by const.

Meier 2005

TABLE VII
SUMMER REGIONAL BREAKDOWN OF SSM/I
ICE CONCENTRATION ERROR (PERCENT)

Region	# 25 km pixels	Mean				St. Dev./RMS			
		BT	CV	N2	NT	BT	CV	N2	NT
Baffin	777	-14.6	-1.4	-7.6	-13.4	13.5/19.9	14.7/14.8	13.4/15.4	14.9/20.0
Barents	2670	-4.4	4.7	-2.7	-11.3	13.6/14.3	17.3/[illegible]	15.7/15.9	15.6/19.3
Greenland	678	-3.2	9.0	3.6	-4.2	15.9/16.2	16.0/18.4	16.2/16.6	16.9/17.4

TABLE VIII
WINTER REGIONAL BREAKDOWN OF SSM/I
ICE CONCENTRATION ERROR (PERCENT)

Region	# 25 km pixels	Mean				St. Dev./RMS			
		BT	CV	N2	NT	BT	CV	N2	NT
Baffin	2386	-2.8	1.9	0.1	-4.3	12.1/12.4	12.3/12.4	12.1/12,1	12.5/13.2
Barents	2951	-3.4	1.8	0.3	-4.1	11.1/11.6	11.2/11.3	12.2/12.2	13.9/14.5
Greenland	4435	-7.3	-0.6	-1.5	-13.4	12.5/14.5	12.9/12.9	13.2/13.3	12.8/18.5

TABLE IX
SSM/I ICE CONCENTRATION ERROR (PERCENT)
FOR AVHRR CONCENTRATION RANGES

AVHRR Conc. Range (%)	# 25 km pixels	Mean				St. Dev./RMS			
		BT	CV	N2	NT	BT	CV	N2	NT
90-100	10639	-7.3	-1.2	-4.0	-11.7	8.9/11.5	7.8/7.9	7.8/8.8	10.1/15.5
0-90	3258	0.9	11.5	7.9	-0.3	20.1/20.1	22.6/25.4	22.3/23.7	21.7/21.7
50-100	13228	-6.6	0.5	-2.7	-10.6	10.7/12.6	11.3/11.3	10.4/10.7	11.5/15.6
0-50	669	19.9	26.9	28.7	22.4	23.1/30.5	29.5/39.9	28.7/40.6	27.1/35.2

Kwok 2002

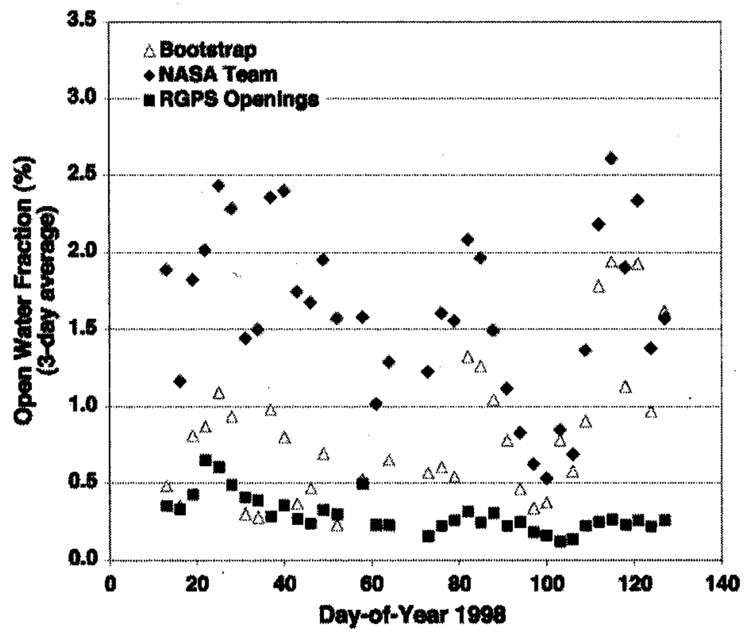
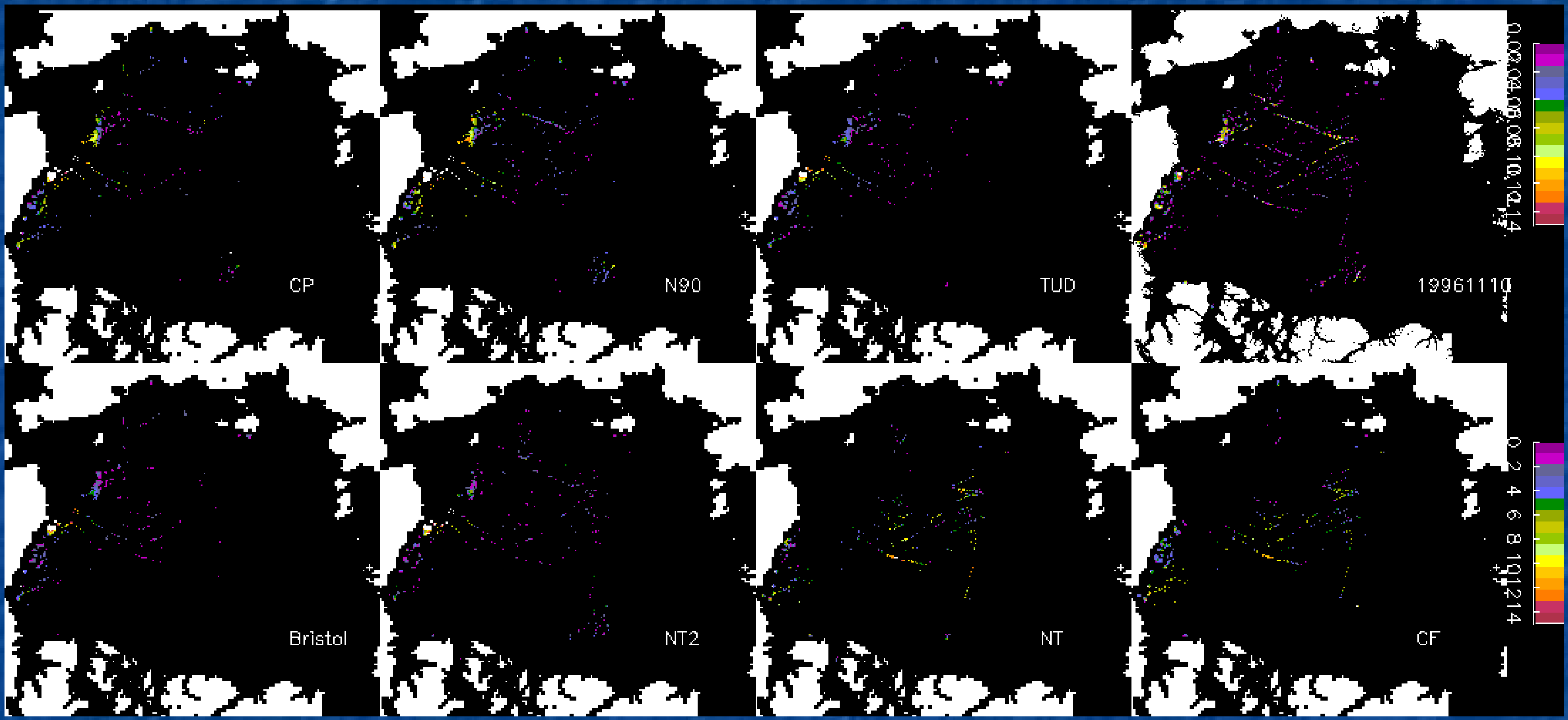


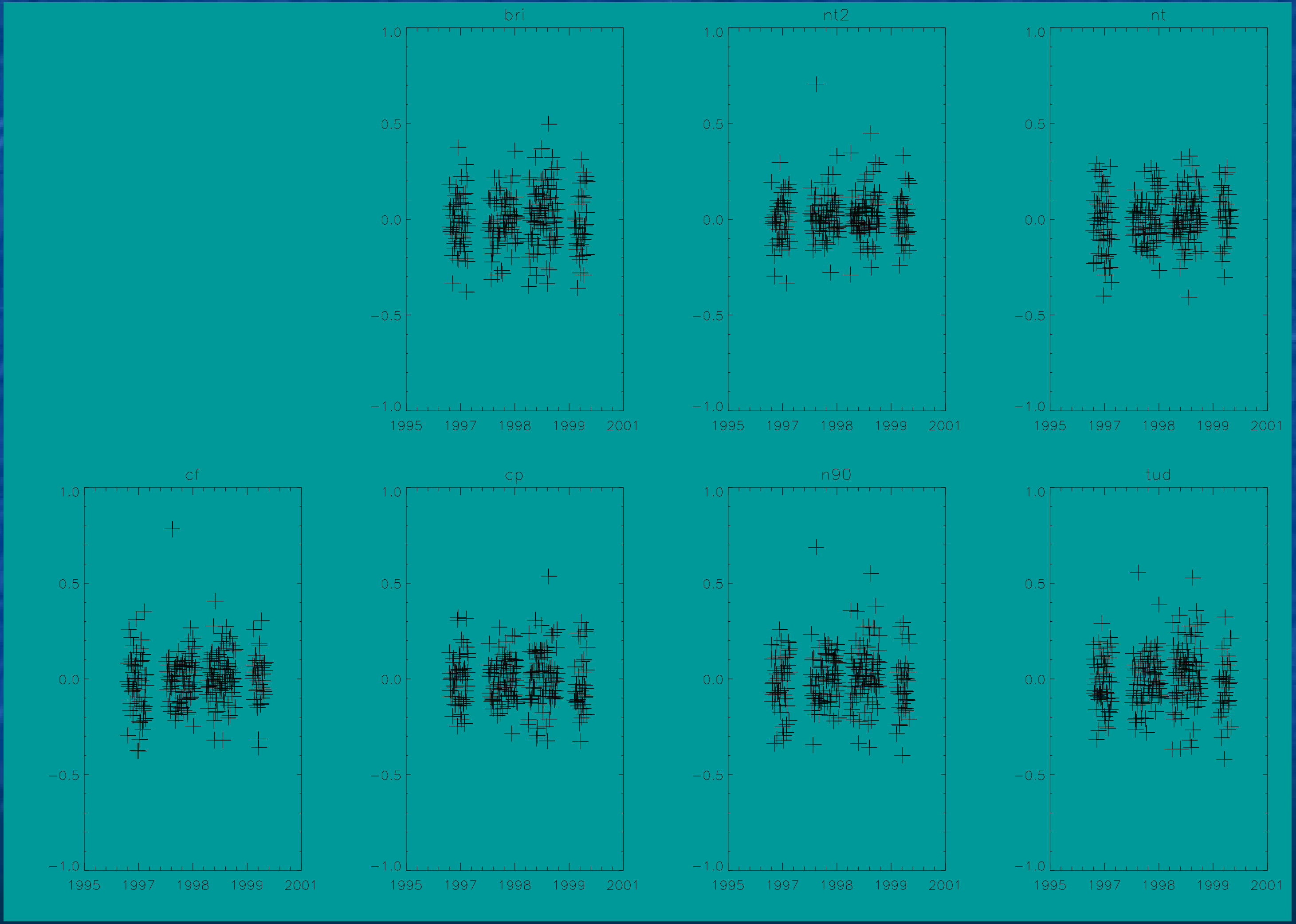
Figure 4. Comparison of four months of open water fraction estimates from the Bootstrap and Team algorithms with ice motion derived openings computed within the RGPS domain. Areas without RGPS observations are not used.

RGPS divergence fields



3-day gridded RGPS data (almost undocumented)
Divergence (threshold 0.02) vs. ice concentration decreases
Correlations are erratic and mostly low

Correlations



Contingency analysis

bri	falling	rising
Divergence:	46	54
Convergence:	47	53

nt2	falling	rising
Divergence:	51	49
Convergence:	50	50

nt	falling	rising
Divergence:	52	48
Convergence:	48	52

cf	falling	rising
Divergence:	49	51
Convergence:	46	54

cp	falling	rising
Divergence:	46	54
Convergence:	49	51

n90	falling	rising
Divergence:	47	53
Convergence:	49	51

tud	falling	rising
Divergence:	47	53
Convergence:	49	51

Divergence results probably dependent on thin ice sensitivity
Convergence situations show more similar performance
Area is known to be favorable for the NT algorithm

Raw RGPS deformations

Correlation between area change and concentration change (07012000-01022000), min ΔT =2.9d

	$2.9 < \Delta T < 3.5$ NP=3522	$3.5 < \Delta T < 7$ NP=2888
Bri	0.01	-0.02
NT2	0.02	-0.02
NT	-0.11	-0.04
CF	-0.05	-0.04
CP	0.04	-0.01
N90	0.05	0.00
TUD	0.02	0.00

What is next

- Coupled thermodynamic and emissivity model
- Analyse SAR validation dataset
- Use Polarstern ice diaries
- RGPS raw deformation analysis?
- Analyse RGPS age spectra or summer backscatter dataset?
- Conclude/Report
  - Coupled thermodynamic and emissivity model paper
  - Validation/algorithm comparison paper
  - Book-keeping and sea ice morphology
- OSISAF reanalysis November