

PAG Spring Meeting 2016 (13 March 2016, UAF, Fairbanks, Alaska)

Planning of PAG Joint Field and Modeling Activities - Atmosphere and Sea Ice -

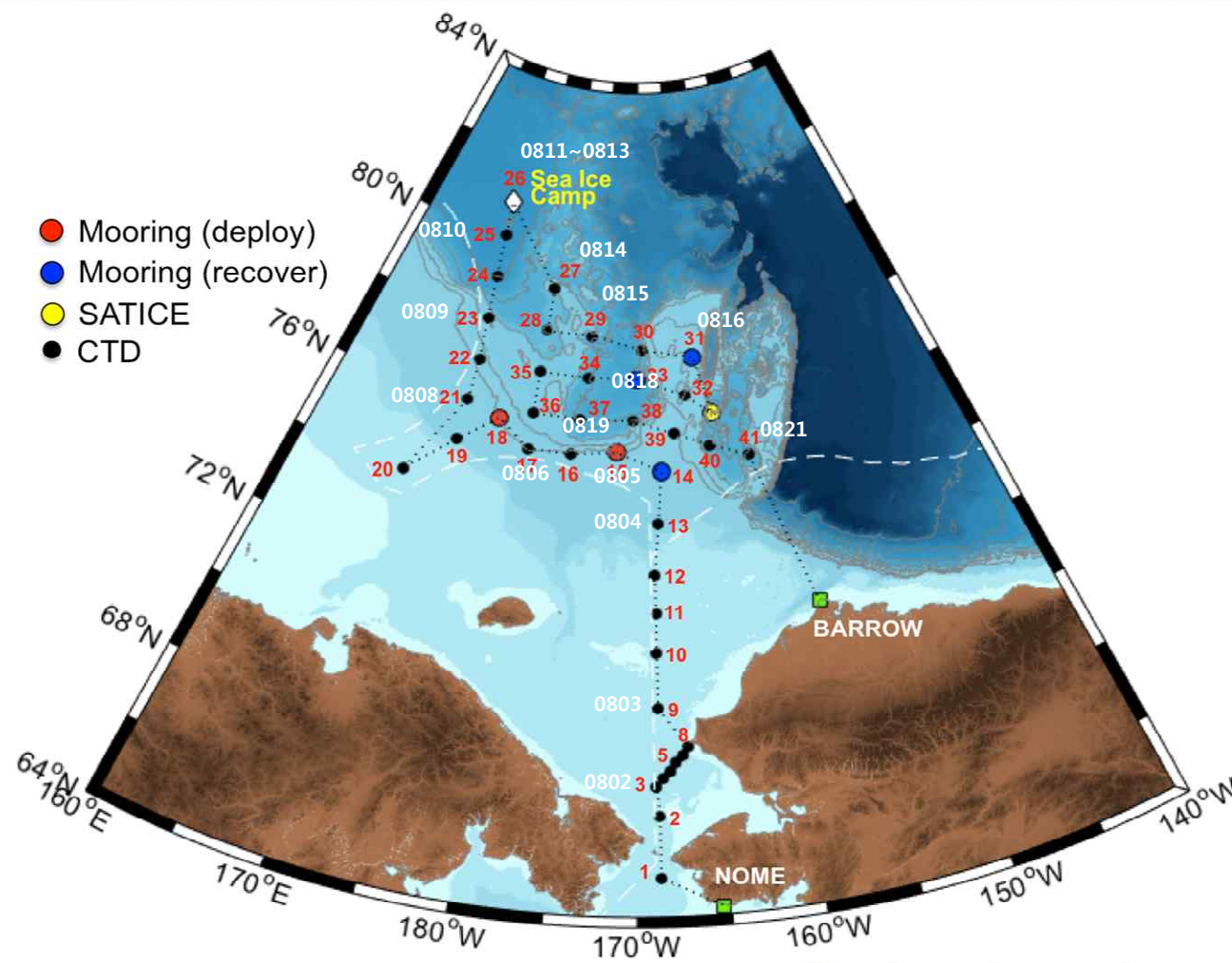
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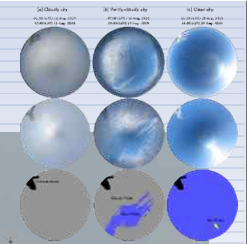


2015 ARAON Arctic cruise (Leg 1)

- ARA06B (2 August to 21 August)



On-board atmospheric observations



2D sonic anemometer



Short-wave radiation sensor



2D sonic anemometer

Long-wave radiation sensor

Temperature & humidity sensor

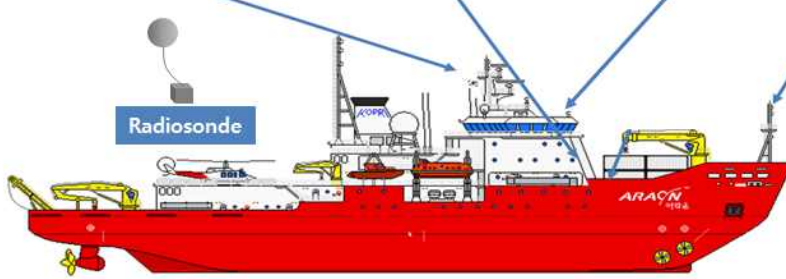


Radarmast (38m)
 Short wave radiometer (Pm)
 Long-wave radiometer (PIR)
 Temperature & RH (HMP45D)
 Pressure sensor (PTB100)
 Quantum sensor (LI-200)
 Data logger (CR3000)
 2D sonic anemometer

Atmospheric Sciences Lab. (03Deck)
 CPC
 Aethalometer
 Nephelometer

Compass Deck (30m)
 All-sky Camera (Eko SRF-02)
 Radiosonde Receiver (Jinyang)

Foremast (29.8m)
 Net Radiometer (CNR1)
 Windmill Anemometer (031050-L)



* Heights in parenthesis are the distance of instruments from design load waterline (DLWL)



<Objectives>

- Surface basic meteorological variables: physical understanding of weather events, numerical weather prediction, assessment of reanalysis data
- Radiosonde launch: physical understanding of weather events, numerical weather prediction, assessment of reanalysis data, cloud and radiation
- Cloud and radiative fluxes: cloud radiative effect on surface, assessment of reanalysis data, physical understanding of weather events

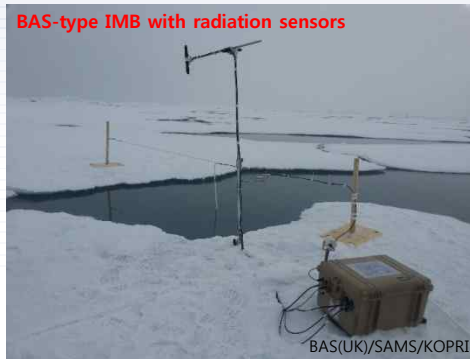
Buoy deployments on sea ice

SAMS-type Ice Mass Balance Array (SIMBA)



KOPRI/SAMS(UK)

BAS-type IMB with radiation sensors



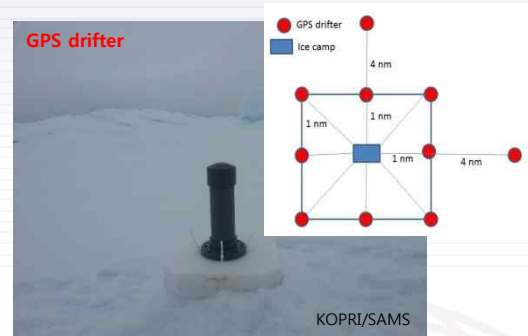
BAS(UK)/SAMS/KOPRI

CRREL-type Seasonal IMB (SIMB)



CRREL(US)/SAMS/KOPRI

GPS drifter



KOPRI/SAMS

Wave buoy



WB221

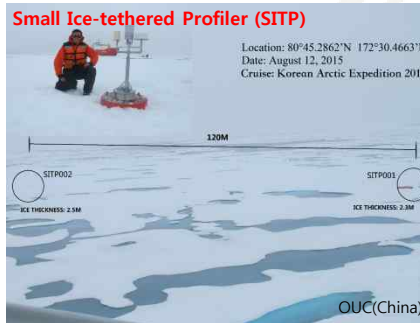
ONR(US)/BAS/SAMS

SATICE buoy



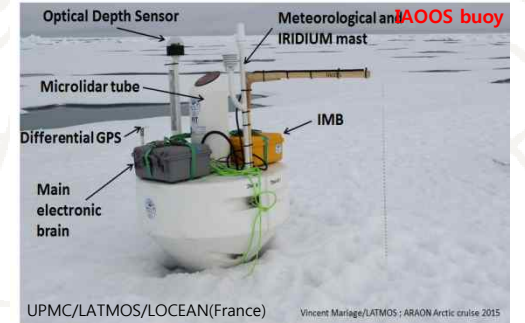
CSIC(Spain)/SAMS

Small Ice-tethered Profiler (SITP)



OUC(China)

AOOS buoy



UPMC/LATMOS/LOCEAN(France)

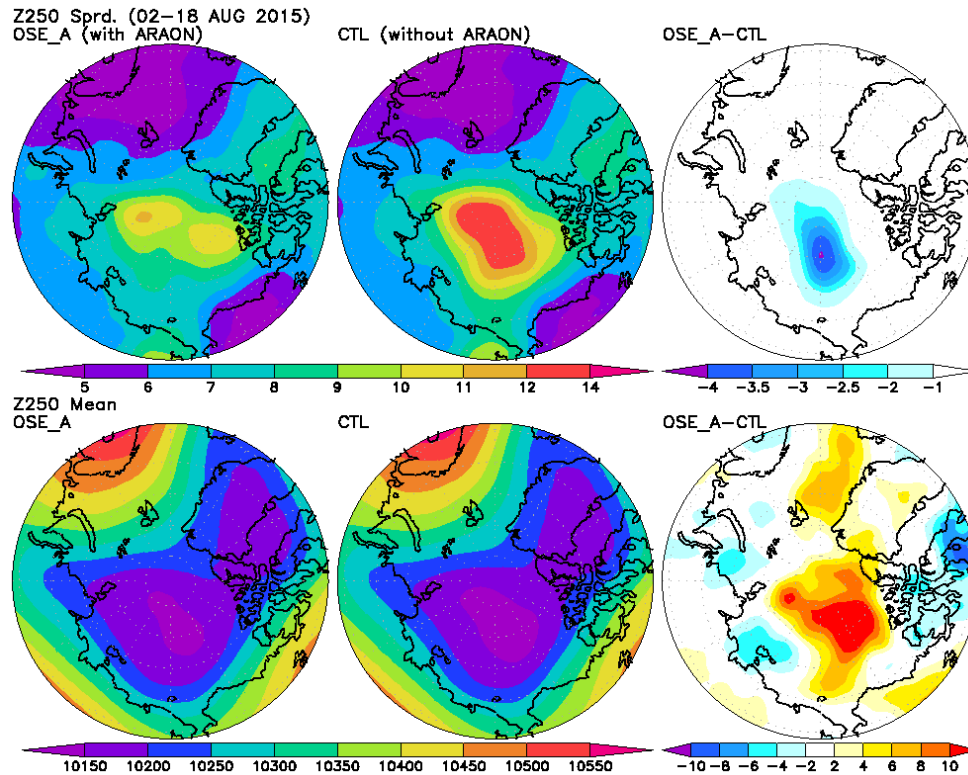
Vincent Mariage/LATMOS ; ARAON Arctic cruise 2015

Plans for 2016 ARAON Arctic cruise

- **Leg 1: 7 August to 19 August (12 days)**
 - Region: Bering, Chukchi and East Siberian Seas
 - Ship-borne atmospheric observations
 - Surface: Air temperature, Humidity, Winds, SW/LW Radiations, Aerosols, etc.
 - Vertical sounding: Radiosonde launch (4-times daily: 00, 06, 12, 18 UTC)
 - Buoy deployments during sea ice camp
 - BAS-type IMBs in various melt ponds
- **Leg 2: 25 August to 6 September (12 days)**
 - Region: Chukchi and East Siberian Seas
 - Ship-borne atmospheric observations
 - Surface: Air temperature, Humidity, Winds, SW/LW Radiations, Aerosols, etc.
 - Vertical sounding: Radiosonde launch (4-times daily : 00, 06, 12, 18 UTC)
- **International collaborations**
 - Radiosonde program: UAF, Yonsei Univ., NIPR
 - Buoy deployments: SAMS, BAS, etc.

Modeling activities

- Impact of radiosonde observations
 - JAMSTEC global model and data assimilation system (AFES and ALEDAS2)



Reference (Inoue et al. 2015)

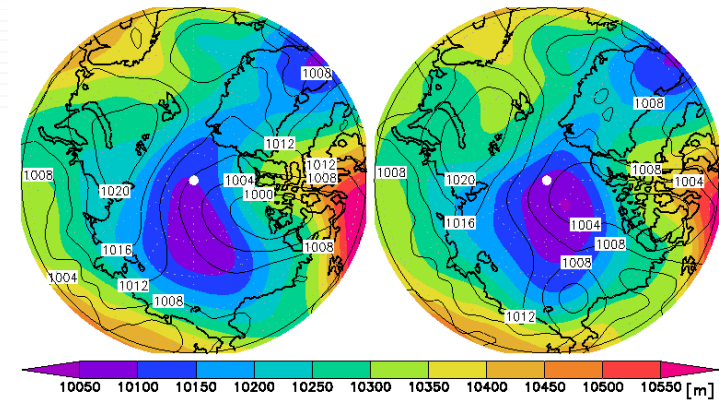
SCIENTIFIC REPORTS

OPEN Additional Arctic observations improve weather and sea-ice forecasts for the Northern Sea Route

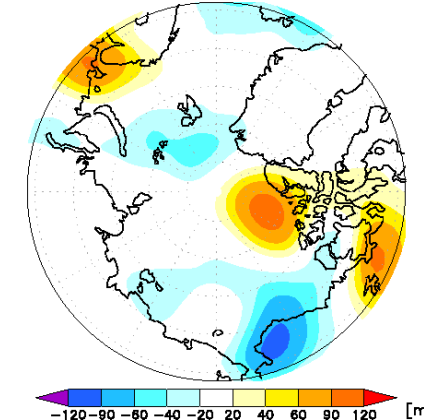
Received: 22 May 2015
Accepted: 21 October 2015
Published: 20 November 2015

Jun Inoue^{1,2,3}, Akira Yamazaki², Jun Ono², Klaus Dethloff⁴, Marion Maturilli⁵, Roland Neuber⁶, Patti Edwards² & Hajime Yamaguchi⁶

Initial time: 08AUG2015
CTL: Z250, SLP (12AUG2015) OSE: Z250, SLP (12AUG2015)



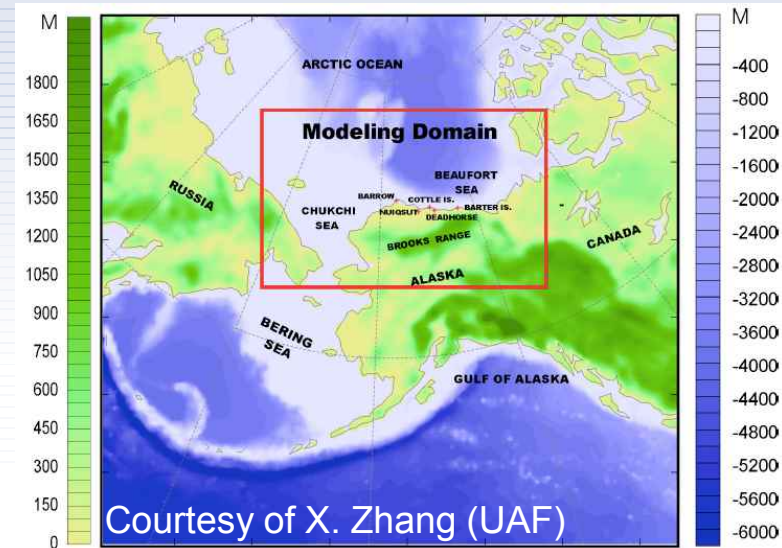
Z250, SLP (12AUG2015) (OSE-CTL)



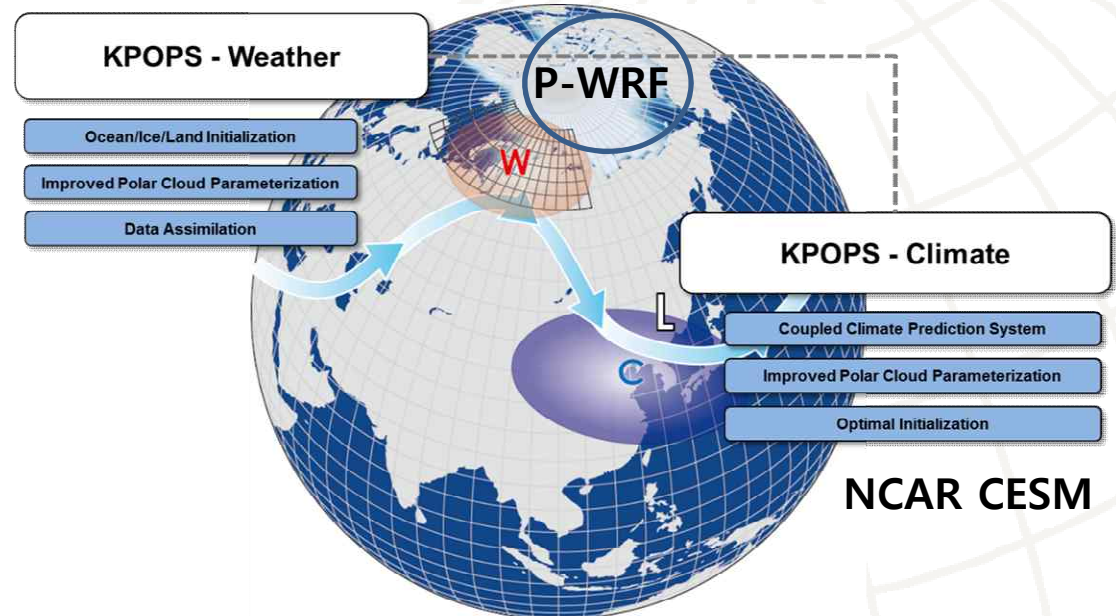
Data from Sato, Inoue (NIPR) and Yamazaki (JAMSTEC)

Modeling activities

- CBHAR (Chukchi-Beaufort Seas High-resolution Atmospheric Reanalysis) and Alaska WRF weather forecast



- Weather and climate forecast systems (2016-2020)



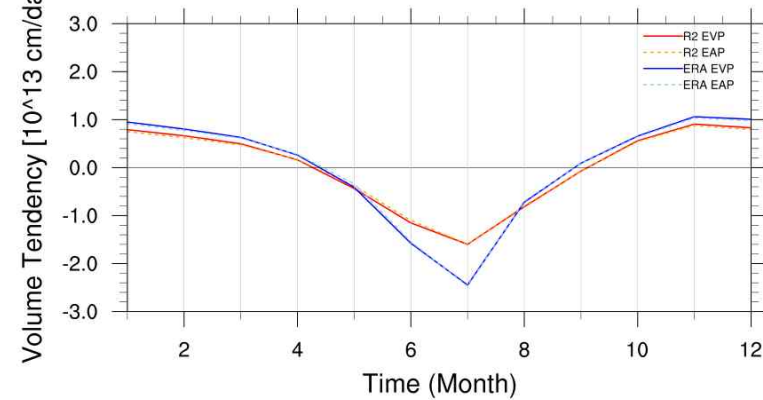
Modeling Activities

- Sensitivity simulation with NCAR CICE5
 - A preliminary example

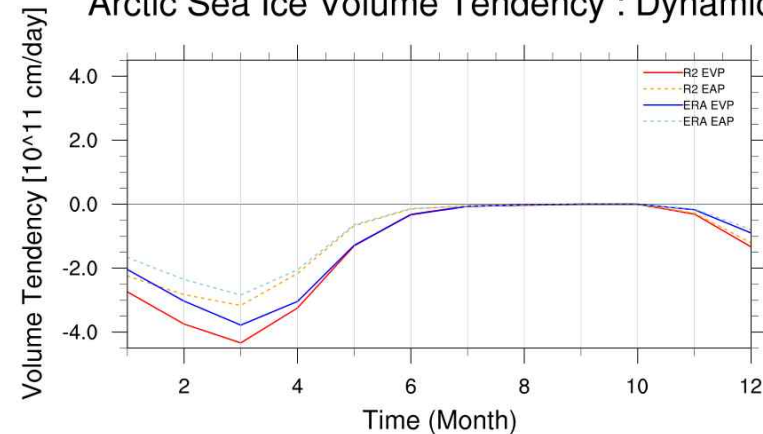
Model	CICE5 stand alone	
Initial Condition	No ICE	
Initial Condition	No ICE	
Atm. Boundary Condition	1) NCEP R2 2) ERA Interim 6hourly : T,U,V,Q, Air Density Monthly : Downward Longwave Rad, Downward Shortwave Rad, Precipitation	
Initial Condition	No ICE	
Dynamics	1) EVP (Elastic-Viscous-Plastic) 2) EAP (Elastic-Anisotropic-Plastic)	
Initial Condition	No ICE	
Integration Period	1979-2014	
	Atm Forcing	
Dynamics	NCEP R2	ERA Interim
EVP	R2 EVP	ERA EVP
EAP	R2 EAP	ERA EAP

- Sea ice forecast system (2016-2020)
 - Included in the KPOPS
 - Ice and ocean initialization based on EnOI

Arctic Sea Ice Volume Tendency : Thermodynamics



Arctic Sea Ice Volume Tendency : Dynamics





Thank You

