

Program of the Workshop
Marine Atmospheric Research on Boundary Layers
over East China/Yellow Seas (MARBLES)

Prime Sponsor:

Office of Naval Research (Global)

Rationale for the Workshop

Marine Atmospheric Boundary Layer (MABL) over Marginal Seas is a relatively unexplored area in boundary layer meteorology, in part due to complexity of underlying dynamics and thermodynamics as well as observational difficulties due to rapid space-time variability. Unique hydrographic conditions characterized by shallow-water, tides, rotationally affected (Poincaré) waves, topographic features, boundary and benthic processes including turbulent mixing, surface waves and wave boundary layers, coastal currents, river inputs, and variable wind forcing all contribute to the oceanography of marginal seas. MABL communicates with upper ocean across the air-sea interface, and is swayed by myriad of processes, e.g., synoptic weather systems, cold-air outbreaks and intraseasonal and interseasonal variability. This workshop intends to review the state-of-the-science of MARBLES, identify critical knowledge gaps, and discuss prospects of an international research effort to study such boundary layers. A composite of marginal seas - Yellow Sea (YS) and East China Seas (ECS) - will be considered as a possible testbed. The YS/ECS region is populated by a rich variety of biophysicochemical phenomena arising from boundary currents (e.g., Kuroshio, Tsushima Current, Taiwan Warm Current, West Korea Coastal Current and Chinese Coastal Currents), river outflows (e.g., Han, Geum and Yangtze), significant sea surface temperature gradients, cold air outbreaks, weather systems of continental and oceanic origins and strong seasonality (e.g., monsoons or jangma). Availability of extensive arrays of observing platforms in YS/ECS, including Korea Ocean Research Stations (KORS), satellites, coastal observatories, marine-meteorological buoys, island meteorological and ocean stations, cloud physics observing networks as well as research drones, aircraft and vessels operated by partnering institutions will be the appeal of a YS/ECS campaign.

Dates: June 25-26, 2025 (Wednesday-Thursday)

Venue: Oakwood Premier COEX Center (Oak Room), Seoul, Republic of Korea

Address:

Oakwood Premier COEX Center, 46, Teheran-ro 87-gil, Gangnam-gu, Seoul 06164, Korea

Homepage: <https://www.homehmc.com/en/oakwood-seoul-coex/>

Hotel:

Same as above (Oakwood Premier COEX Center)

(Breakfast is included in the hotel fare.)

Conveners:

- GeoSystem Research Corporation (Dr. Kyung-Il Chang, kichang@geosr.com)
- Korea Institute of Ocean Science and Technology (Dr. Kyeong Ok Kim, kokim@kiost.ac.kr)
- Korea Hydrographic and Oceanographic Agency (Dr. Gwang-Ho Seo, sgh777@korea.kr)
- University of Notre Dame (Prof. Harindra Joseph Fernando, Fernando.10@nd.edu)
- Naval Postgraduate School (Prof. Qing Wang, qwang@nps.edu)

Zoom link:

<https://us06web.zoom.us/j/82267377686?pwd=A2eqjYMb3cDa2TVzie5eZSIVZblxGp.1>

Transportation information (from ICN to Oakwood) is provided in the following page.

Lunch boxes during the workshop will be provided.

Dinner from 6:30 pm on June 24th at Yihwawon in the hote (3rd floor)

Dinner on June 25th at Oak Restaurant in the hotel (5th floor)

POC in Korea: Kyung-Il Chang (KI), +82-10-9080-6120;

Available from 3:00 pm on June 24th in the hotel

MARBLIS: List of Korean Participants

NO.	Name	Affiliation	E-mail	Remark
1	Dong-Jin Kang	KIOST	djocean@kiost.ac.kr	Vice President of KIOST, Welcoming remarks
2	Kyeong Ok Kim	KIOST	kokim@kiost.ac.kr	Convener
3	Jin-Yong Jeong	KIOST	jyjeong@kiost.ac.kr	
4	Seok Lee	KIOST	lees@kiost.ac.kr	
5	Seung-Woo Lee	KIOST	lsw.ocean@kiost.ac.kr	
6	Go-Un Kim	KIOST	gukim@kiost.ac.kr	
7	Young Taeg Kim	KHOA	kyt5824@korea.kr	Attending on behalf of convener
8	Hyun-Suk Kang	NIMS	hyunskang@korea.kr	
9	Hee Choon Lee	NIMS		
10	Somang Song	SNU	smhopesong@snu.ac.kr	
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24	Kwang-Yul Kim	GeoSR	kimky@geosr.com	
25	Kyung-Il Chang	GeoSR	kichang@geosr.com	Convener
26	Jae-yong Lee	GeoSR	jaeyl@geosr.com	Supporter
27	Jay Hong Kim	GeoSR	jhkim@geosr.com	Supporter
28	Soonmi Hwang	GeoSR	smhwang@geosr.com	Supporter

GeoSR: GeoSystem Research Corporation; GWNU: Gangneung Wonju National University; INU: Incheon National University; IU: Inha University; KHOA: Korea Hydrographic and Oceanographic Agency;

KIOST: Korea Institute of Ocean Science and Technology; KNA: Republic of Korea Naval Academy;

NIMS: National Institute of Meteorological Sciences; PKNU: Pukyong National University

PNU: Pusan National University; SNU: Seoul National University; YU: Yonsei University

MARBLES: List of Overseas Participants

NO.	Name	Affiliation	E-mail	Country	Remark
1	Shoshiro Minobe	HU	minobe@sci.hokudai.ac.jp	JAPAN (3)	
2	Atsuyoshi Manda	MU	am@bio.mie-u.ac.jp		
3	Hirohiko Nakamura	KU	nakamura@fish.kagoshima-u.ac.jp		
4	Ismail Gultepe	OTU	ismail.gultepe@gmail.com	CANADA (1)	
5	Harindra Joseph Fernando	UND	Fernando.10@nd.edu	USA (5)	Convener
6	Chris Fairall	NOAA	bruneaux00@gmail.com		Key note
7	Qing Wang	NPS	qwang@nps.edu		Convener
8	Anne Dowling	UND	adowlin2@nd.edu		
9	Hyodae Seo	UH	hyodae@hawaii.edu		
10	Ming-Huei Chang	NTU	minghueichang@ntu.edu.tw	TAIWAN (4)	
11	Je-Yuan Hsu (Andy)	NTU	jyahsu@ntu.edu.tw		
12	Yiing Jang Yang	NTU	yjyang67@ntu.edu.tw		
13	Sen Jan	NTU	senjan@ntu.edu.tw		
14	Nicola Stecchetti	UB	nstecche@nd.edu	Italy (1)	

HU: Hokkaido University

KU: Kagoshima University

MU: Mie University

NOAA: National Oceanic and Atmospheric Administration

NPS: Naval Postgraduate School

NTU: National Taiwan University

OTU: Ontario Tech University

UB: University of Bologna

UH: University of Hawaii

UND: University of Notre Dame

YU: York University

Presentations:

Canada

Ismail Gultepe (Ontario Tech University): Marine Boundary Layer: Aerosols and microphysics

Trevor VandenBoer (York University): Potential of marine boundary layer sulfur, nitrogen, iodine, and oxidized organics to new particle formation, growth, and chemical transformation (cancelled)

EU

Nicola Stecchetti (University of Bologna): Modification of lower marine boundary layer by swell and waves

Japan

Atsuyoshi Manda (Mie University): Oceanic influence on mesoscale convective systems during the Baiu rainy season

Shoshiro Minobe (Hokkaido University): Influence of the Kuroshio in the East China Sea on the atmosphere in Baiu/Meiyu Season

Hirohiko Nakamura (Kagoshima University): Response of the speed of the Kuroshio current to Asian Monsoon wind stress variability

Republic of Korea

Kyung-Ja Ha (Pusan National University): Influence of sea surface temperature and aerosol on Korean Peninsula precipitation

Jin-Yong Jeong (Korea Institute of Ocean Science and Technology): Marine atmospheric boundary layer observations at the Korea Ocean Research Stations (KORS)

Hyun-Suk Kang (National Institute of Meteorological Sciences): From dropsonde to deep float: A stereoscopic approach for observing high impact weather systems in Korea

Baek-Min Kim (Pukyong National University): Rapid intensification of tropical cyclones and the role of air-sea interaction via sea spray physics

Sok Kuh Kang (Seoul National University / Korea Institute of Ocean Science and Technology):

Observed air-sea interactions during typhoon passage in the Western North Pacific

Song-Lak Kang (Gangneung Wonju National University): Convective boundary layer responses to multiscale surface thermal forcing: Insights from LES experiments toward understanding the marine boundary layer

Jeonghoe Kim (Seoul National University): Understanding the generation mechanisms of sea fog events in the eastern Yellow Sea based on numerical simulations and available observations

Kwang-Yul Kim (GeoSystem Research Corporation): Diurnal and seasonal variation of PBL height over East Asia and its climate change

Young-Taeg Kim (Korea Hydrographic and Oceanographic Agency): Introduction to the Jeodo Ocean Research Station - What we measured

Seok Lee (Korea Institute of Ocean Science and Technology): Review on the ocean circulation and the physical properties of the Yellow and East China Seas

Hanna Na (Seoul National University): Time series observations of Kuroshio Current variability in the East China Sea and its implications for the MARBLES study

Jae-Hyoung Park (Pukyong National University): Research plan for air-sea interaction in the frontal zone southwest of Jeju, Korea

Somang Song (Seoul National University) Improvements of observing systems for ocean-atmosphere interaction processes at the Jeodo Ocean Research Station (I-ORS), East Sea Real-time Ocean Buoy (ESROB), and others

Seong Soo Yum (Yonsei University): Ship and aircraft measurements of aerosols and CCN over the Yellow Sea

Taiwan

Ming-Huei Chang (National Taiwan University): Air-sea observations using a simple free-drifting buoy: Some preliminary results

Je-Yuan Hsu (Andy) (National Taiwan University): From observations of near-surface ocean stratification to air-sea interaction

Sen Jan (National Taiwan University): Physical oceanography in Taiwan: Recent progress and future prospects

Yiing Jang Yang (National Taiwan University): Insights from typhoon observations by buoys in the Western North Pacific subtropical ocean

U.S.A.

Chris Fairall (Key note speaker): Atmospheric boundary layers in the coastal region: Waves, fluxes, and near-surface mean profiles

Harindra Joseph Fernando (University of Notre Dame):

1. From FATIMA to MARBLES
2. Marine Atmospheric Boundary Layer - Some Recent Developments

Qing Wang (Naval Postgraduate School): Air-sea interaction in the YS/ECS from ERA5 and innovative measurements for air-sea interaction studies

Anne Dowling (University of Notre Dame): Variation of the Yellow Sea MABL structure over a tidal mixing front

Hyodae Seo (University of Hawaii): Wave-mediated air-sea flux parameterizations in non-equilibrium sea states and high winds

Workshop Program

Day 1. Wednesday 25 June, 2025

Time	Speaker	Title
08:30-09:00		Registration
Chair	Kyung-Il Chang	
09:00-09:10	Daniel Eleuterio (on-line)	Introductory words
09:10-09:20	Dong-Jin Kang	Welcome remarks
09:20-09:30	Kyung-Il Chang	Opening remarks
09:30-09:50	Harindra Joseph Fernando	From FATIMA to MARBLES
09:50-10:20	Group photo & break	
Chair	Kyung-Il Chang	
10:20-10:50	Chris Fairall (Keynote Speaker)	Atmospheric boundary layers in the coastal region: Waves, fluxes, and near-surface mean profiles
10:50-11:10	Harindra Joseph Fernando	Marine Atmospheric Boundary Layer: Some Recent Developments
11:10-11:30	Ismail Gultepe (on-line)	Marine Boundary Layer: Aerosols and microphysics
11:30-11:50	Je-Yuan Hsu	From observations of near-surface ocean stratification to air-sea interaction
11:50-12:10	Trevor VandenBoer (cancelled)	Potential of marine boundary layer sulfur, nitrogen, iodine, and oxidized organics to new particle formation, growth, and chemical transformation
12:10-13:30	Lunch	School type (Lunch box)
Chair	Kyeong Ok Kim	
13:30-13:50	Sen Jan	Physical oceanography in Taiwan: Recent progress and future prospects
13:50-14:10	Seok Lee	Review on ocean circulation and physical properties of the Yellow Sea and East China Sea
14:10-14:30	Qing Wang	Air-sea interaction in the YS/ECS from ERA5 and innovative measurements for air-sea interaction studies
14:30-14:50	Sok Kuh Kang	Observed air-sea interactions during typhoon passage in the Western North Pacific
14:50-15:10	Yiing Jang Yang	Insights from typhoon observations by buoys in the Western North Pacific subtropical ocean
15:10-15:30	Back-Min Kim	Rapid intensification of tropical cyclones and the role of air-sea interaction via sea spray physics
15:30-15:50	Break	
Chair	Qing Wang	
15:50-16:10	Jin-Yong Jeong	Marine atmospheric boundary layer observations at the Korea Ocean Research Stations
16:10-16:30	Young-Taeg Kim	Introduction to the Jeodo Ocean Research Station - What we measured
16:30-16:50	Somang Song	Improvements of observing systems for ocean-atmosphere interaction processes at the Jeodo Ocean Research Station (I-ORS), East Sea Real-time Ocean Buoy (ESROB), and others
16:50-17:10	Atsuyoshi Manda	Oceanic influence on mesoscale convective systems during the Baiu rainy season
17:10-17:30	Shoshiro Minobe	Influence of the Kuroshio in the East China Sea on the atmosphere in Baiu /Meiyu Season
18:30-	Dinner	Hotel (Oak Restaurant, 5th floor)

Day 2. Thursday 26 June, 2025

Time	Speaker	Title
Chair	Sen Jan	
09:00-09:20	Hanna Na	Time series observations of Kuroshio Current variability in the East China Sea and its implications for the MARBLES study
09:20-09:40	Ming-Huei Chang	Air-sea observations using a simple free-drifting buoy: Some preliminary results
09:40-10:00	Hirohiko Nakamura	Response of the speed of the Kuroshio current to Asian Monsoon wind stress variability
10:00-10:20	Nicola Stecchetti	Modification of lower marine boundary layer by swell and waves
10:20-10:40	Break	
Chair	Shoshiro Minobe	
10:40-11:00	Seong Soo Yum	Ship and Aircraft measurements of Aerosols and CCN over the Yellow Sea
11:00-11:20	Hyun-Suk Kang	From dropsonde to deep float: A stereoscopic approach for observing high impact weather systems in Korea
11:20-11:40	Jae-Hyoung Park	Research plan for understanding air-sea interaction in the frontal region southwest of Jeju, Korea
11:40-12:00	Anne Dowling	Variation of the Yellow Sea MABL structure over a tidal mixing front
12:00-13:30	Lunch	Round table (Served bibimbap set)
Chair	Jae-Hyoung Park	
13:30-13:50	Kyung-Ja Ha	Influence of sea surface temperature and aerosol on Korean Peninsula precipitation
13:50-14:10	Jeonghoe Kim	Understanding the generation mechanisms of sea fog events in the eastern Yellow Sea based on numerical simulations and available observations
14:10-14:30	Kwang-Yul Kim	Diurnal and seasonal variation of PBL height over East Asia and its climate change
14:30-14:50	Song-Lak Kang	Convective boundary layer responses to multiscale surface thermal forcing: Insights from LES experiments toward understanding the marine boundary layer.
14:50-15:10	Hyodae Seo	Wave-mediated air-sea flux parameterizations in non-equilibrium sea states and high winds
14:10-15:30	Break	
Chair	Harindra Joseph Fernando	
15:30 – 17:00	Discussion Session on Future Actions	
Wrap-up	Kwang-Yul Kim	
Closing	Kyung-Il Chang	

Key Note Presentation

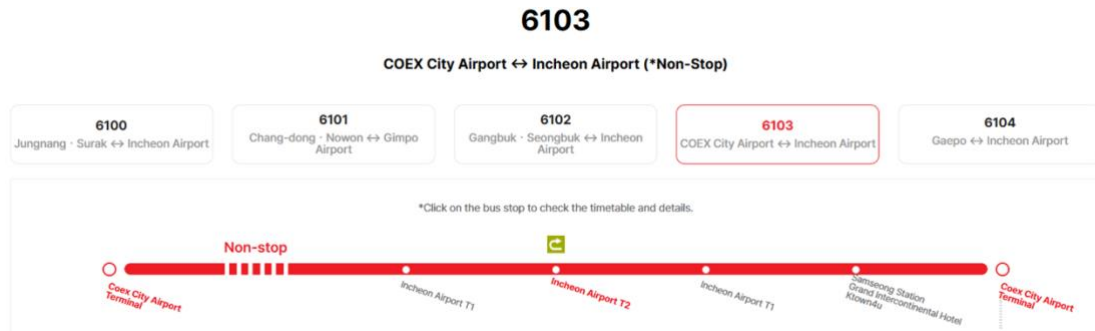
Atmospheric Boundary Layers in the coastal region:
Waves, fluxes, and near-surface mean profiles

C.W. Fairall
NOAA (retired)
Boulder Co, USA

This talk will focus on air-sea interaction aspects of turbulence and mean atmospheric profiles in regions influenced by proximity to land. I will begin with some background on previous field programs and a generic discussion contrasting Western and Eastern ocean boundary physics including the role of internal boundary layers, the diurnal cycle, seasonal cycle, and the horizontal scale of the coastal region. The limitations of simple idealizations and scaling relationships will be briefly described. The near-surface boundary layer will be described in terms of a surface-based zone with wave coherent properties, a Monin-Obukhov similarity layer, and an upper layer. Wind-wave coupling/modeling will be discussed in terms of various modeling approaches and the difference between explicit wave vs wave spectral dynamics. The difficulties of observational approaches will be highlighted.

Transportation (ICN <--> Oakwood Premier COEX Center)

<Bus 6103: ICN (Incheon International Airport → COEX City Airport)>



<Time table>

6103 (COEX City Airport ↔ Incheon Airport)
to the airport

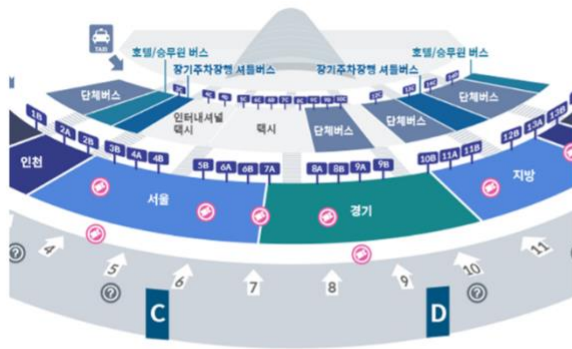
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3	05:10	06:15	06:30
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30	20:00	21:30	21:45

bound for the city

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29	21:35	21:55
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Incheon Airport Terminal 1



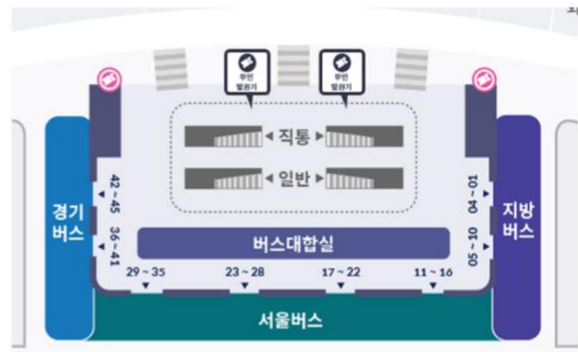
Platform 7A-1 6102 Gireum/Jeongneung

Platform 7A-2 6100 Jungnang/Surak

Platform 7A-3 6103 COEX City Airport
6104 Gaepo

Ticket counter Inside: Next to the Gate No.4 and No.9
Outside: Next to the Gate No.6, No.8, and No.11

1F Incheon Airport Terminal 2



Platform 21 6103 COEX City Airport
6104 Gaepo

Platform 22 6100 Jungnang/Surak
6102 Gireum/Jeongneung

Ticket counter B1 Transportation Center

<COEX City Airport → Oakwood COEX>

