# Acquisition of Validation Dataset of GCOM-C Coastal Products and Coastal Research


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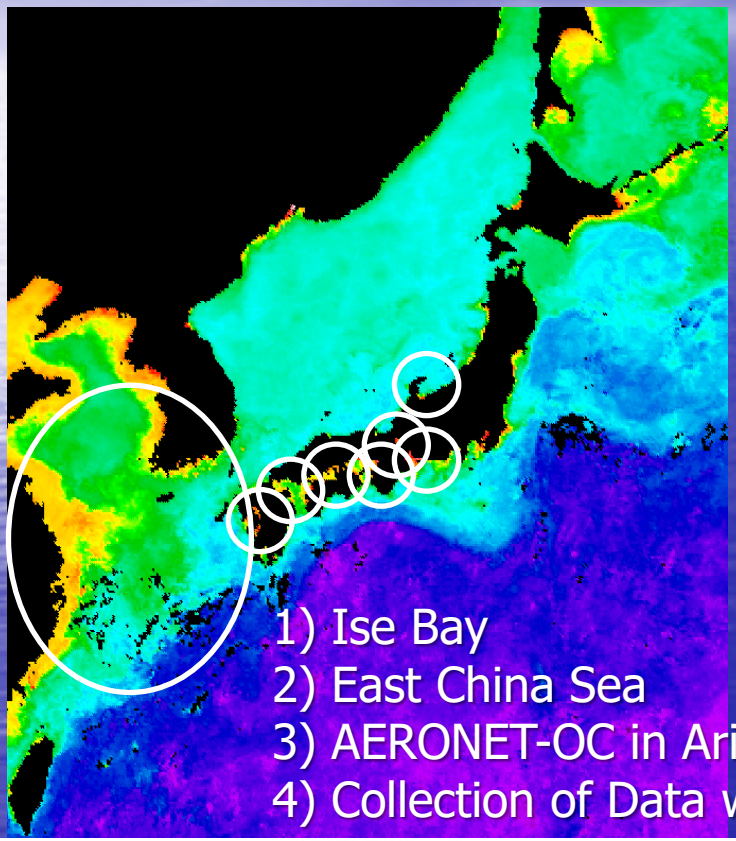


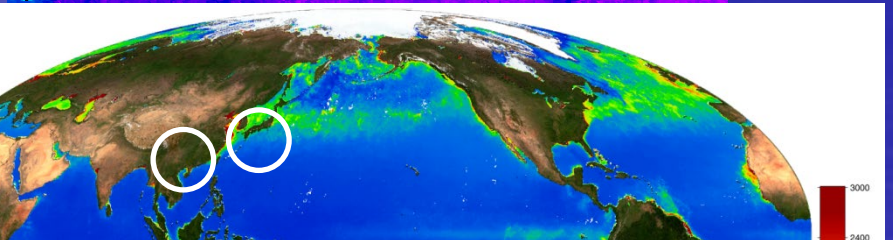

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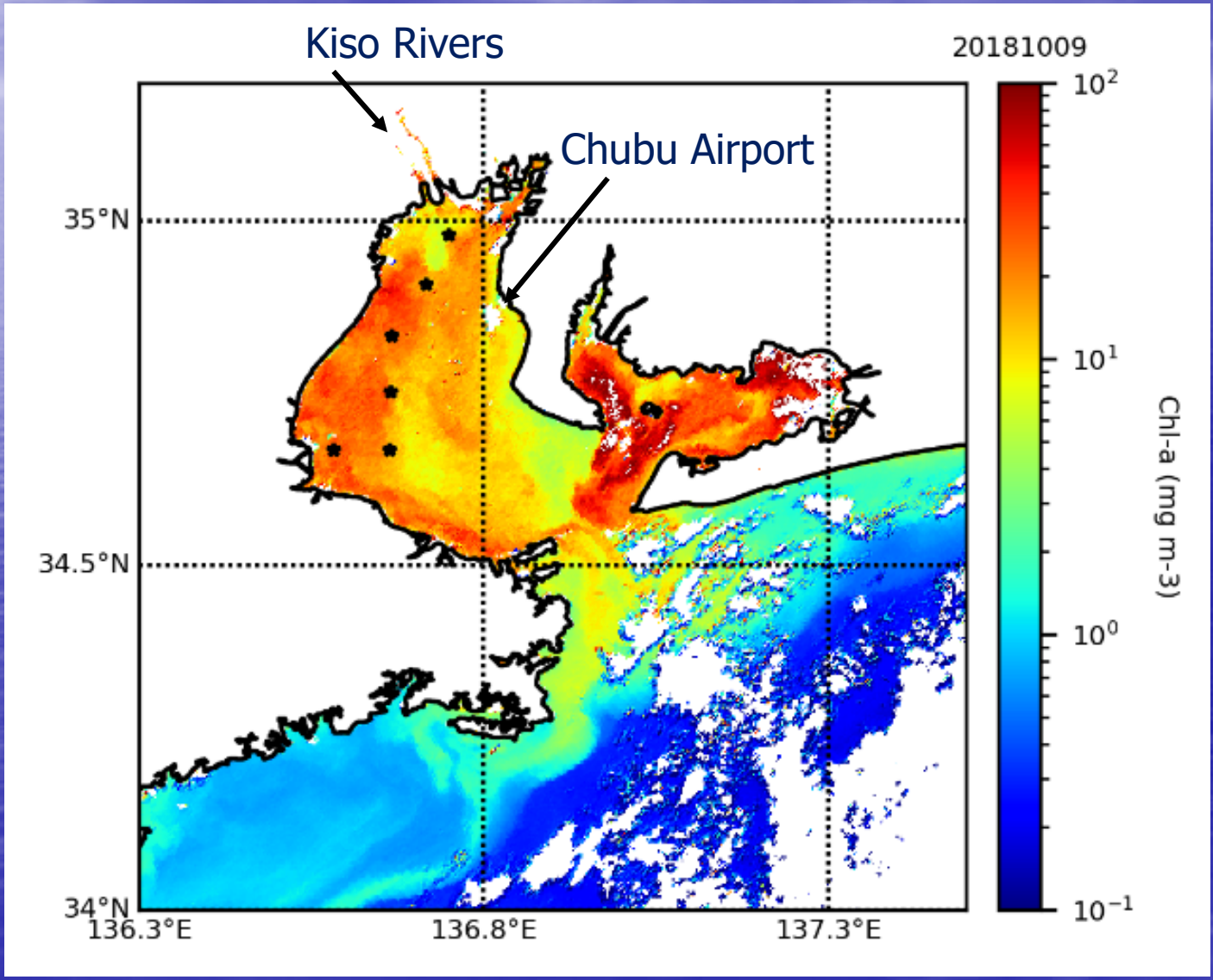
# 1) Ise Bay

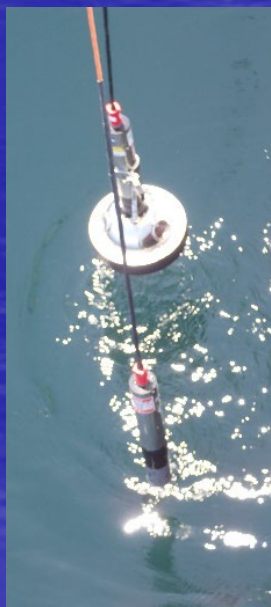

Kiso Rivers
Chubu Airport
20181009
35°N
34.5°N
34°N
136.3°E
136.8°E
137.3°E
$10^2$
$10^1$
$10^0$
$10^{-1}$
Chl-a (mg m-3)

# Data

- Chlorophyll-a (Chl-a)
- Total Suspended Matter (TSM)
- Colored Dissolved Organic Matter (CDOM)
- Rrs: RAMSES (Dome)
- Rrs: PRR (Underwater)

- AFRI (Aichi Pref. Fisheries Research Institute) :Chl-a

SGLI: JASMES V1 and V2



# 1) Ise Bay

- Only 2019 data was taken.
- SGLI data was verified.
- Rrs was underestimated in short wavelength (reported in PI 2020).
- Chl-a, TSM, CDOM should be improved.

- Chl-a verification data was published by Matsuoka.
- IOP algorithm was evaluated by Higa.

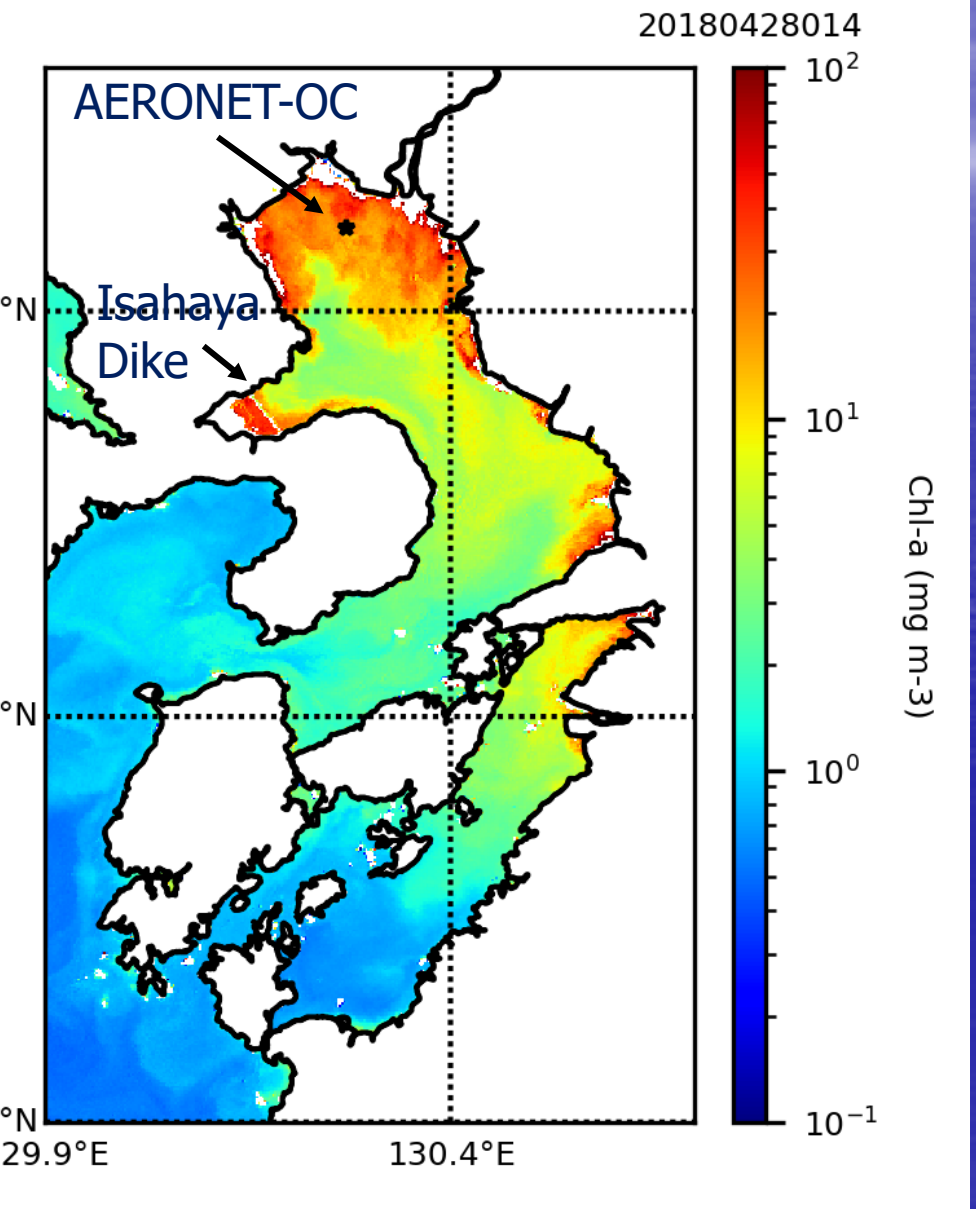
# 2) East China Sea

Only few data in 2019.

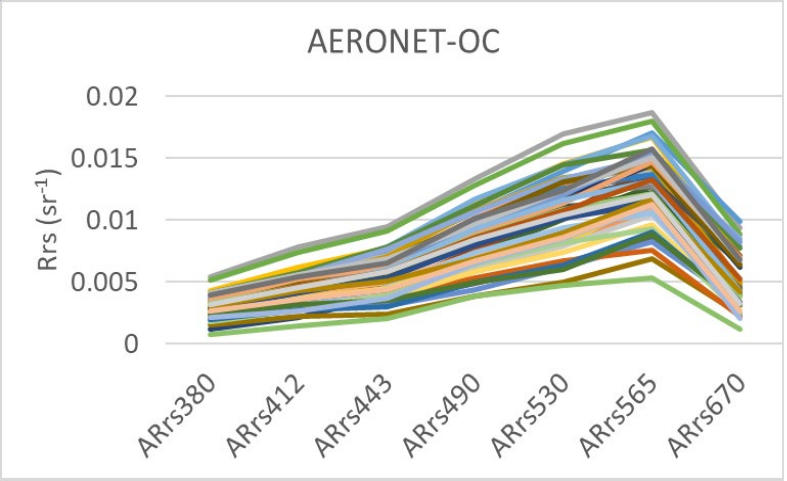
Processed optical data from
Japanese Fisheries Research Institute.

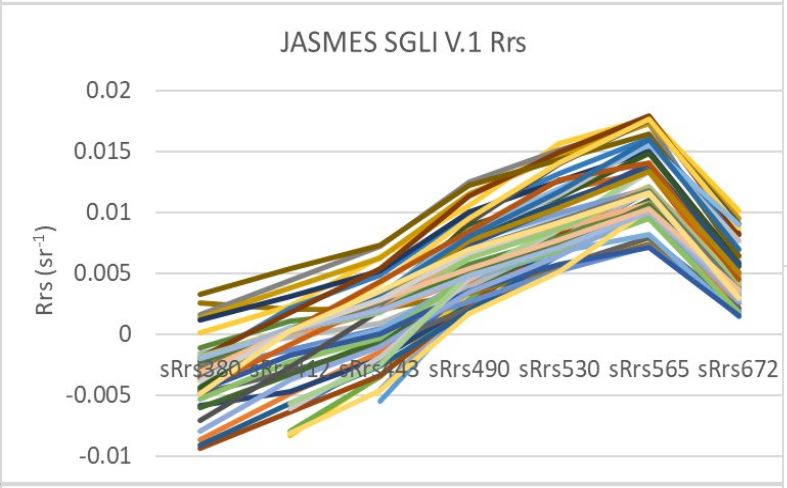
Some application research.
- >Primary Production
- >Phytoplankton Community
- >Review

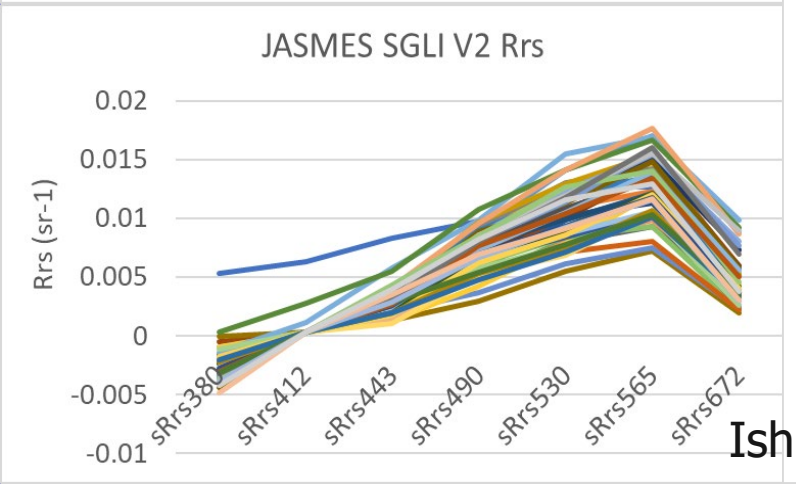
# 3) Ariake Bay

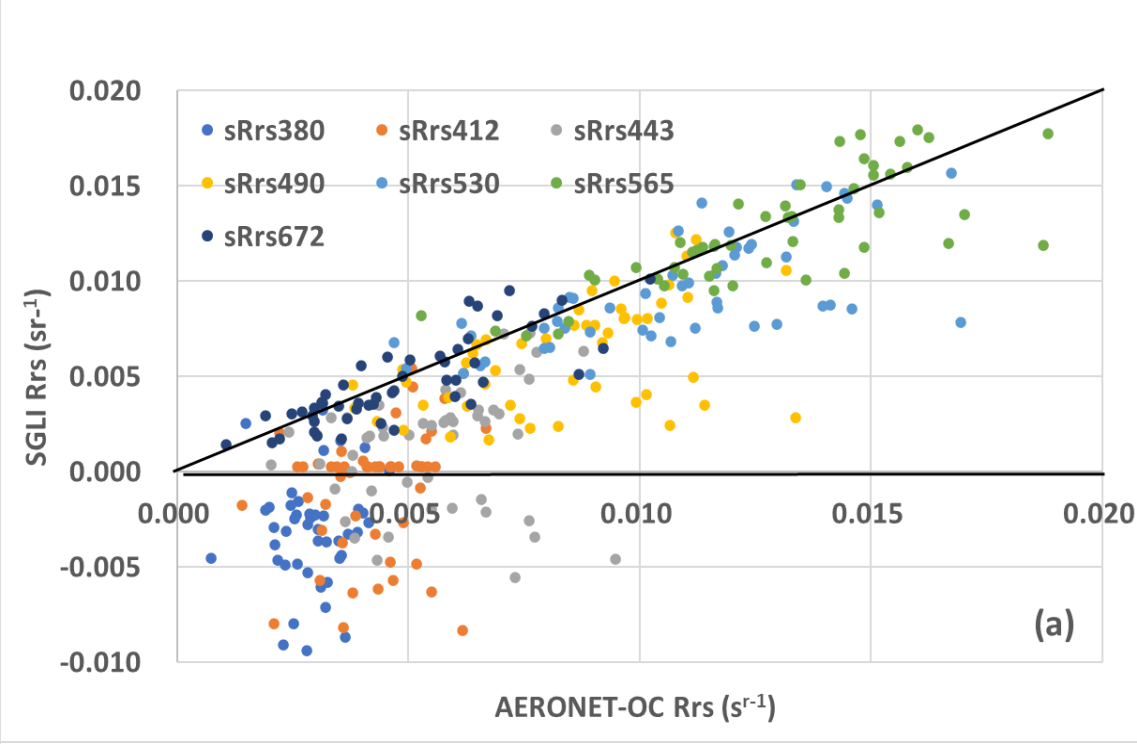

20180428014
AERONET-OC
Isahaya
Dike
°N
°N
°N
29.9°E
130.4°E
$10^2$
$10^1$
$10^0$
$10^{-1}$
Chl-a (mg m-3)

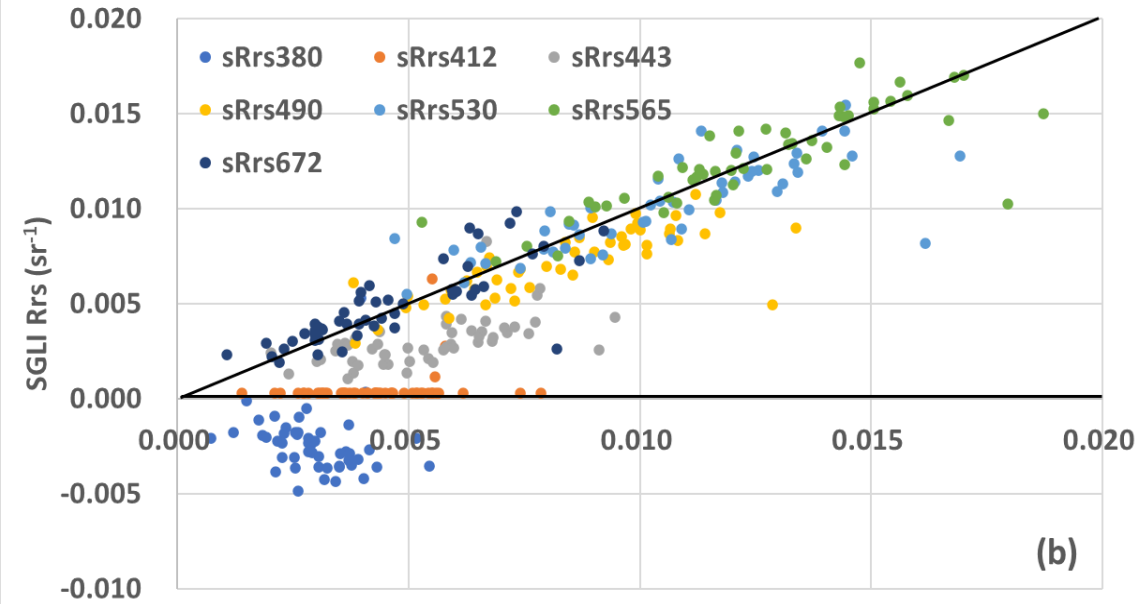

Saga Univ. Ariake Tower
AERONET-OC: 2018 Apr. 20
West
South



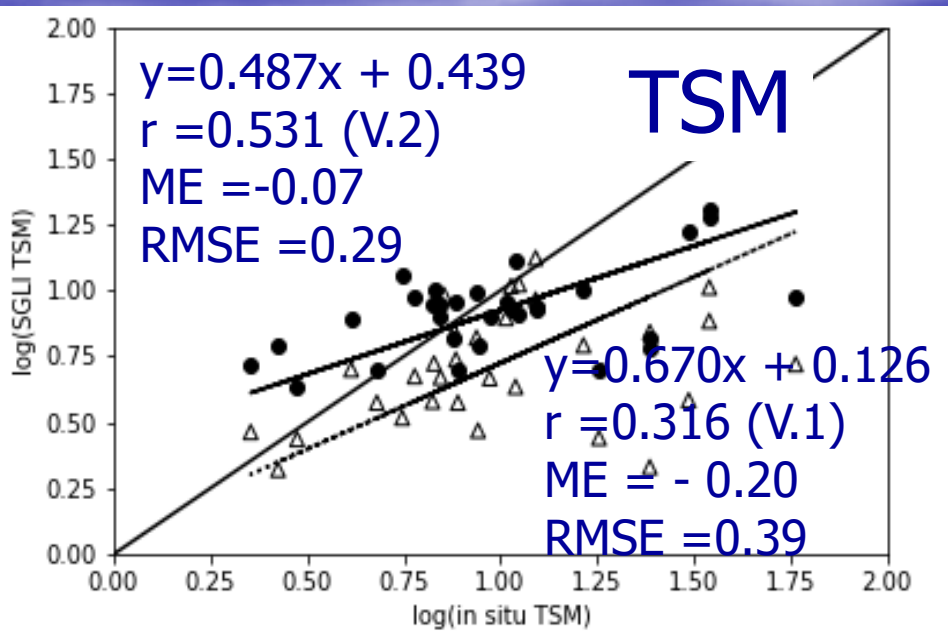



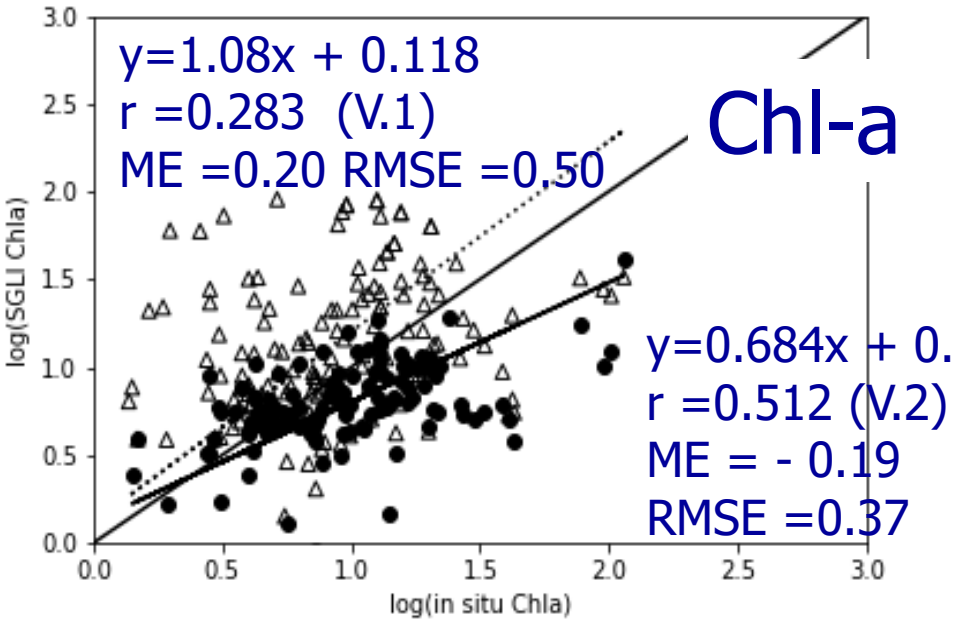



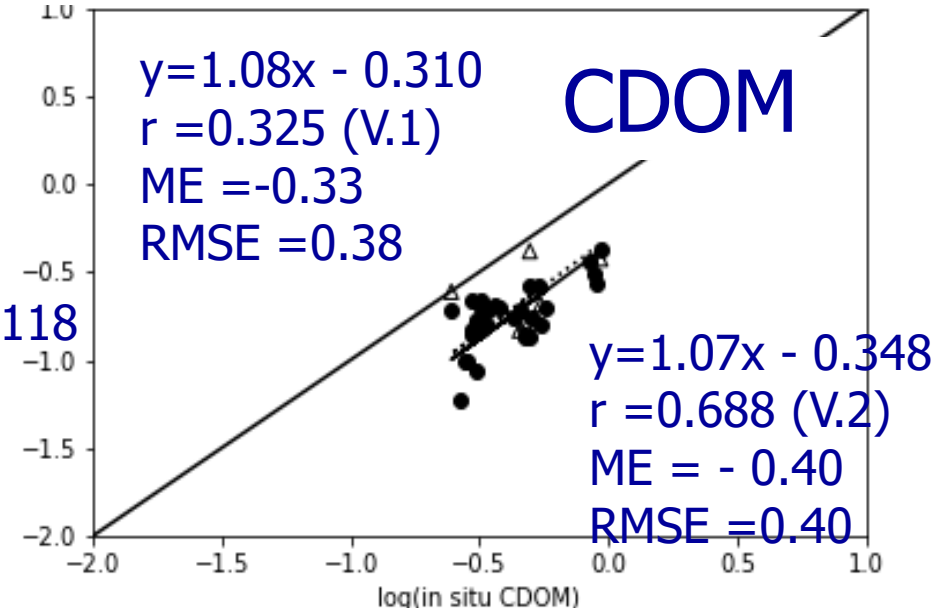

Ishizaka et al. (Submitted)

# Verification of Chl-a, TSM, CDOM (JASMES V1&V2)

Ishizaka et al. (Submitted)



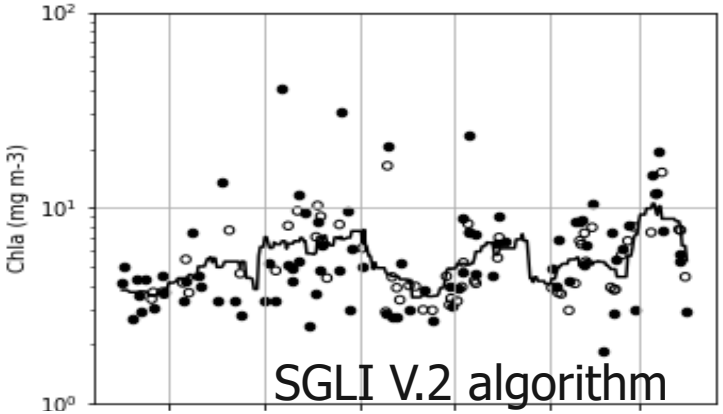



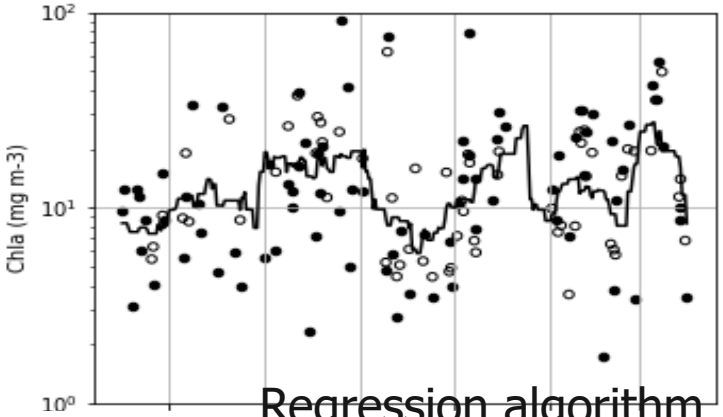



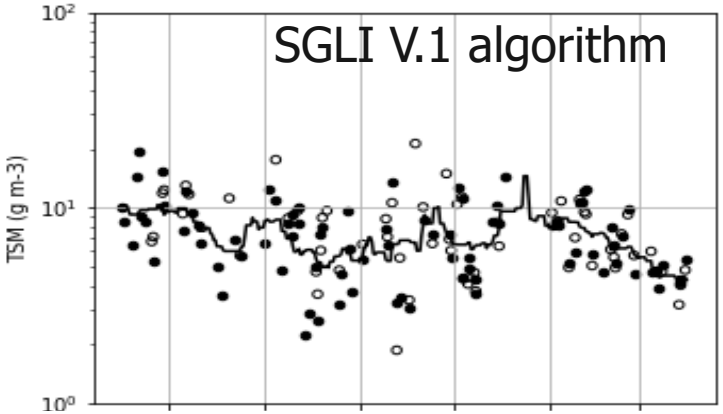
Chl-a (mg m$^{-3}$)

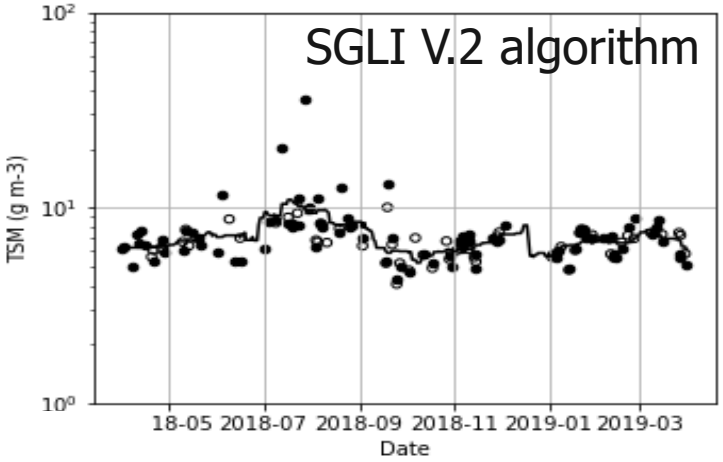
TSM (g m$^{-3}$)

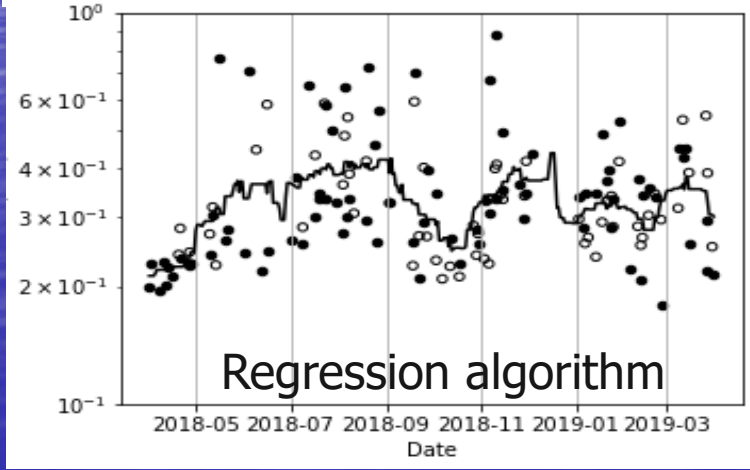
CDOM (m$^{-1}$)




Time Series of Chl-a, TSM, CDOM With AERONET-OC and SGLI Rrs Druing 2018-2019

Ishizaka et al. (Submitted)

# Red Tide Phytoplankton Group Classification Algorithm for SGLI

Feng et al. (2020) MODIS
Feng et al. (2021) GOCI

$R_{rs}(555)$ ~ Rrs(530, 565) 懸濁物質（光散乱）

~~$SS(645)$ 生物量~~
~~$= R_{rs}(645) - R_{rs}(555)$~~
~~$- \left(R_{rs}(667) - R_{rs}(555)\right) * \frac{(645-555)}{(667-555)}$~~

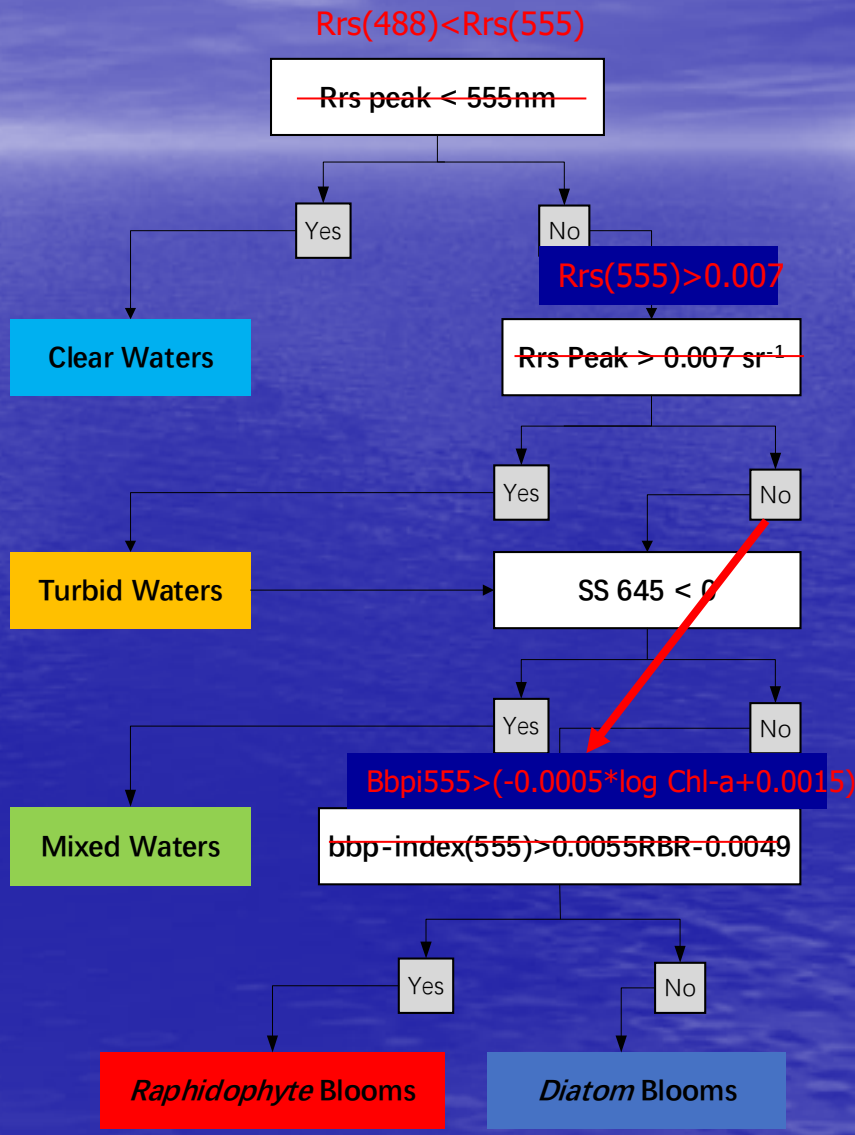
生物量 *Chl-a*

~~$\mathrm{RBR} = \frac{R_{rs}(678) - R_{rs}(555)}{R_{rs}(667) - R_{rs}(555)}$~~

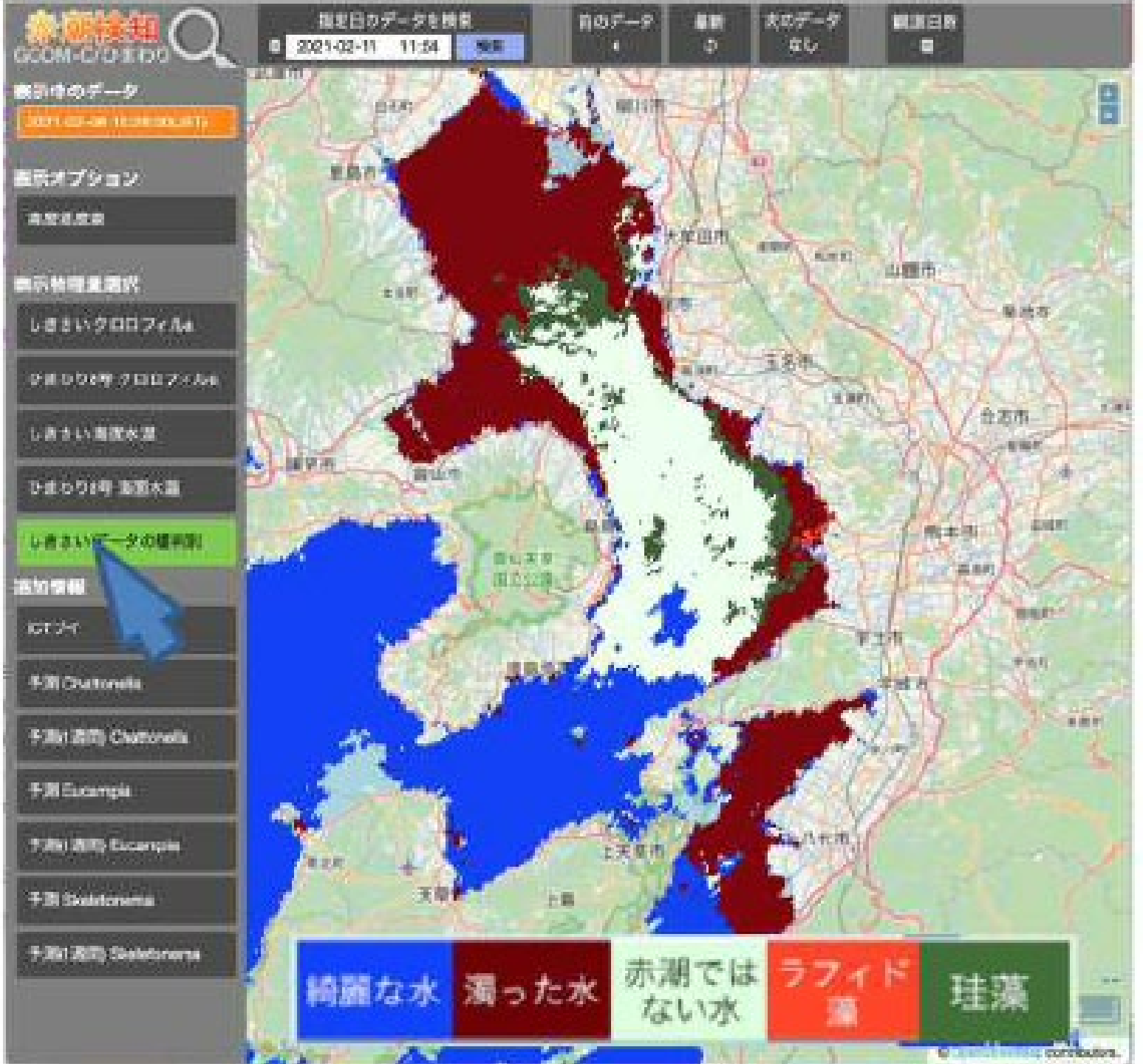
$R_{rs}(667)$ ~ Rrs(674)

光散乱

$$b_{bp-index}(555) = 0.26 \times \frac{R_{rs}(555) R_{rs}(667)}{R_{rs}(555) - R_{rs}(667)}$$



Ariake Red Tide Site by JAFIC

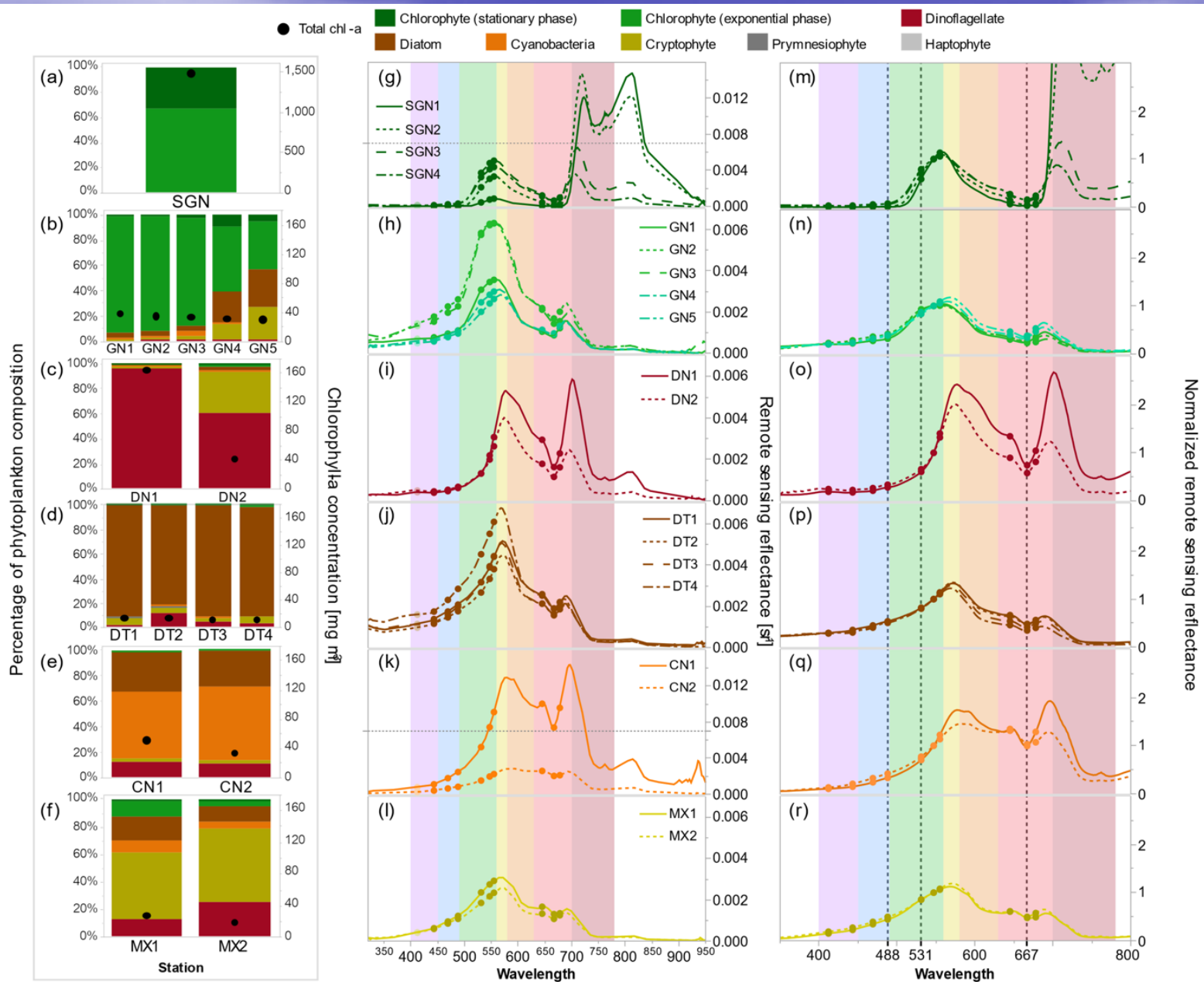


# 4) Collaboration with CoI's

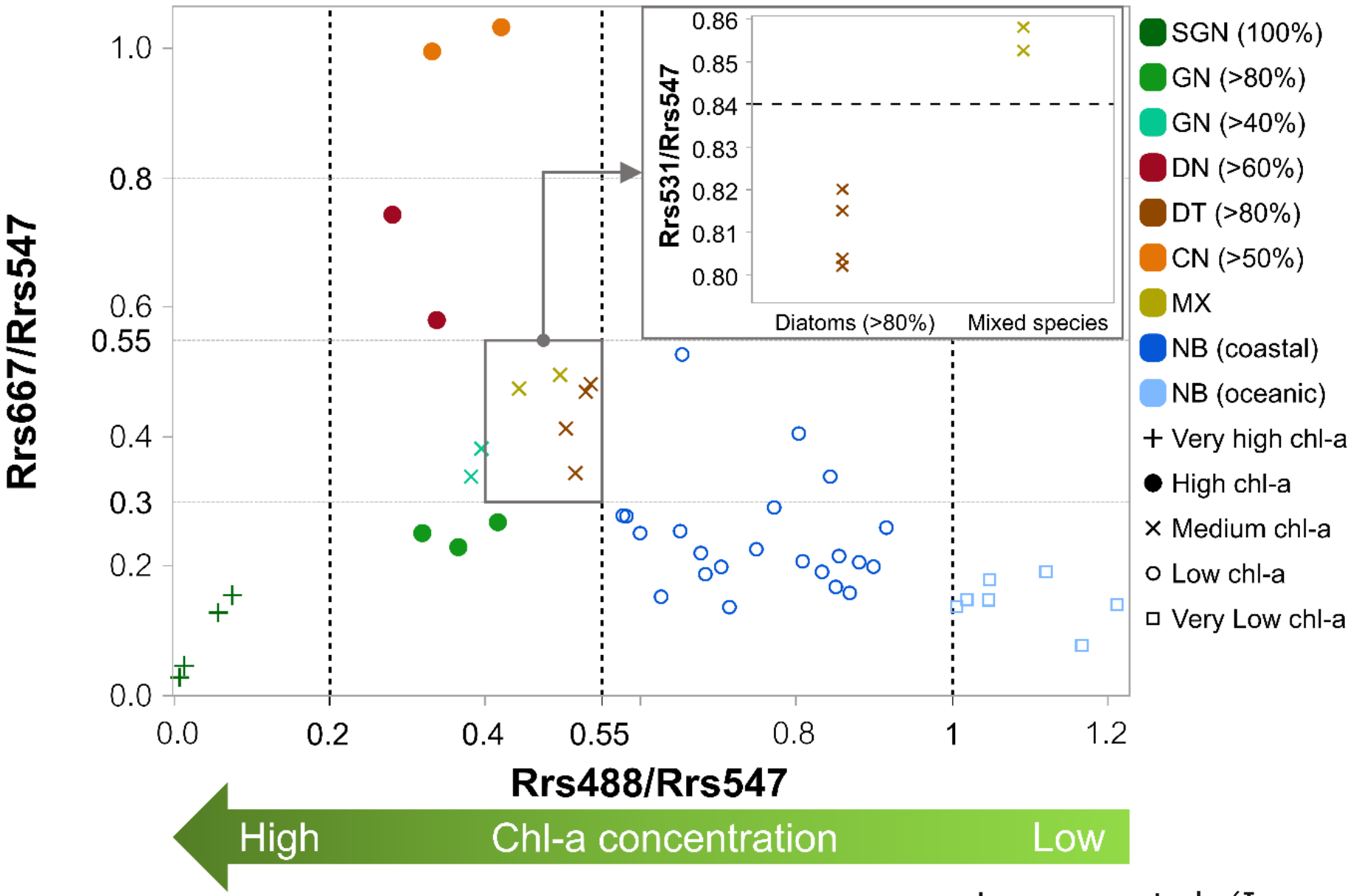
- Rrs data collection and verification in Toyama Bay (Terauchi, NPEC)
- Rrs data collection and verification in Biwa Lake (Goto, Shiga Pref. Univ.)
- Rrs data collection in Bisan Seto (Tada, Kagawa Univ.)
- Papers in Gulf of Thailald (Buranaprathpra, Burapa Univ.)

# 4) Collaboration with CoI's

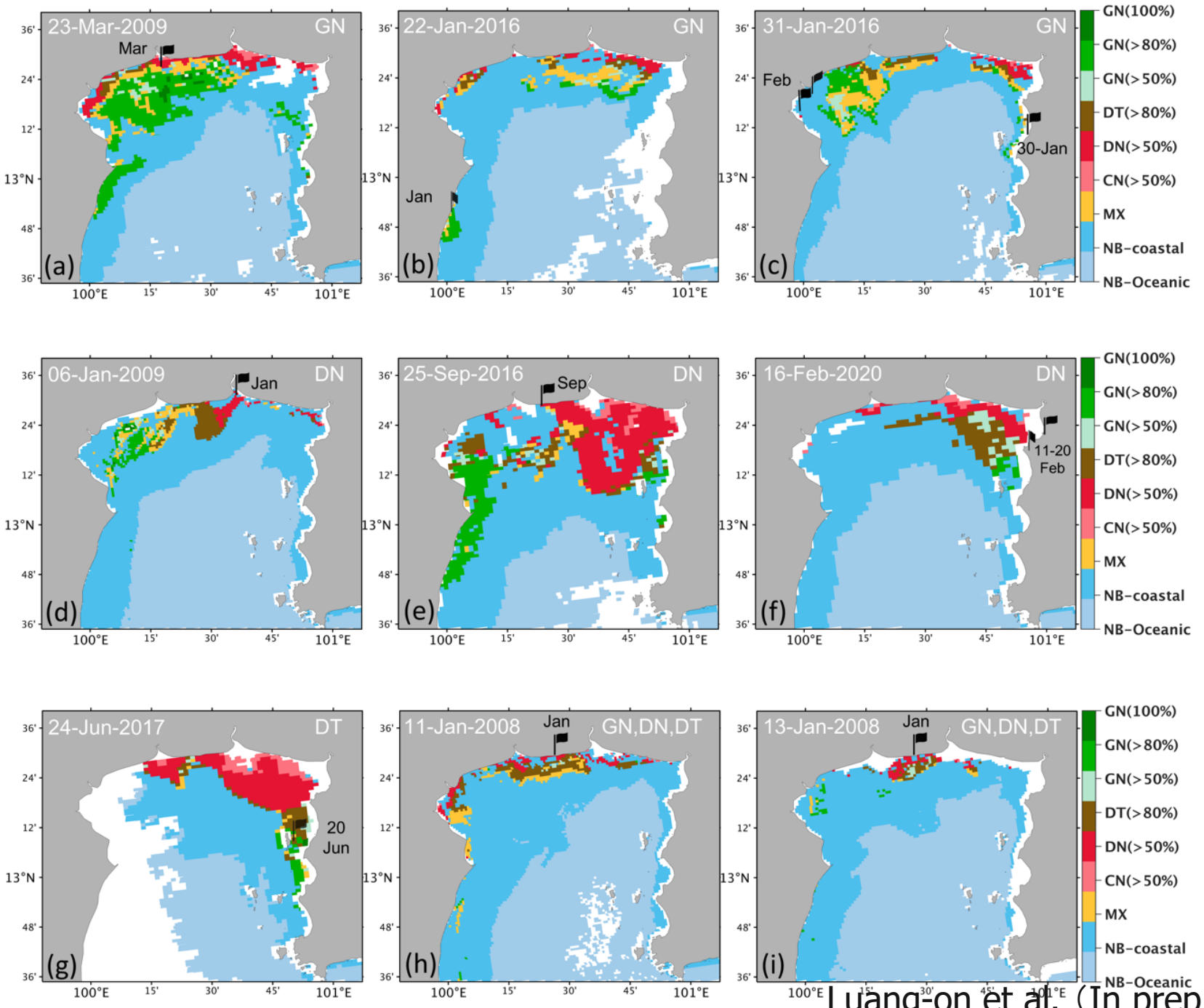
(Buranaprathpra
Burapa Univ.,
Thailand)




Luang-on
et al.
(In prep.)

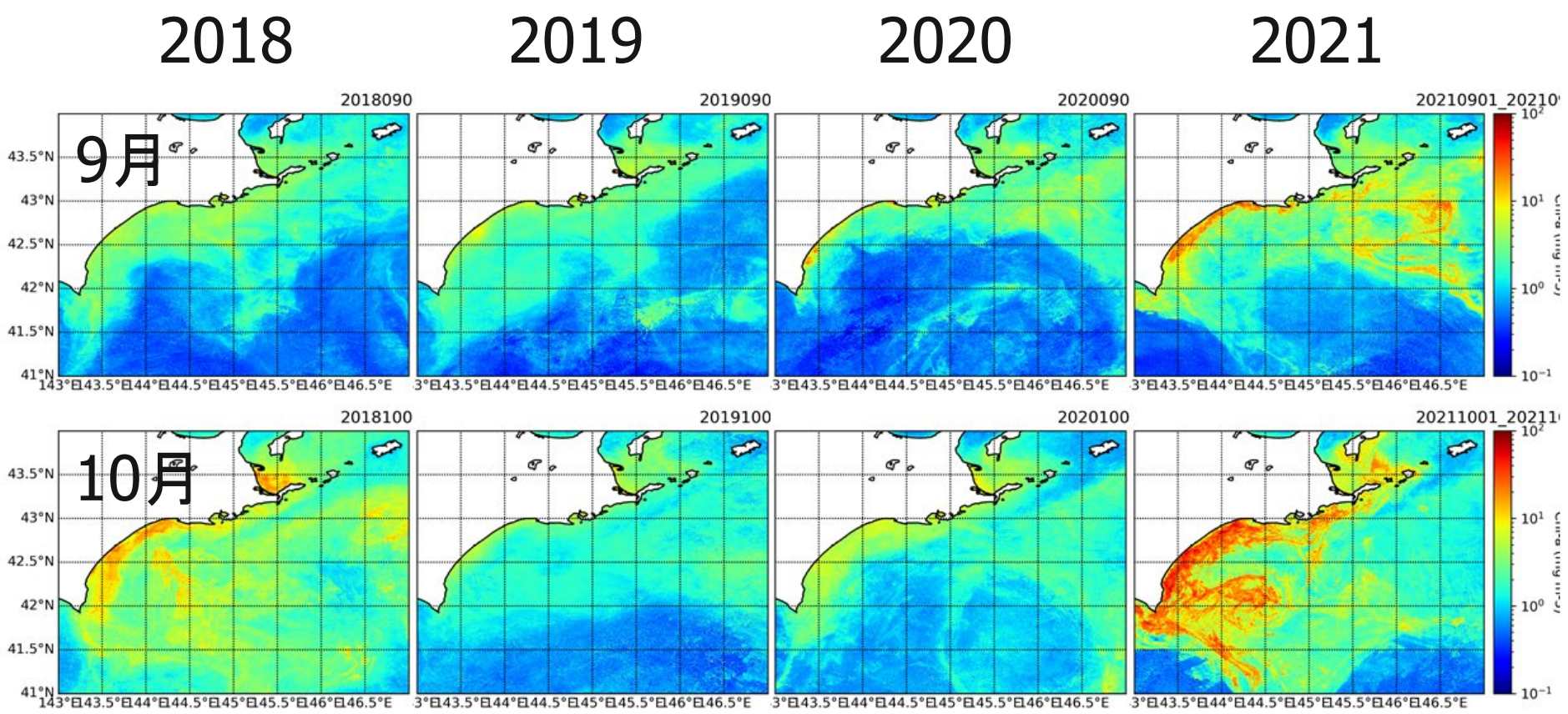


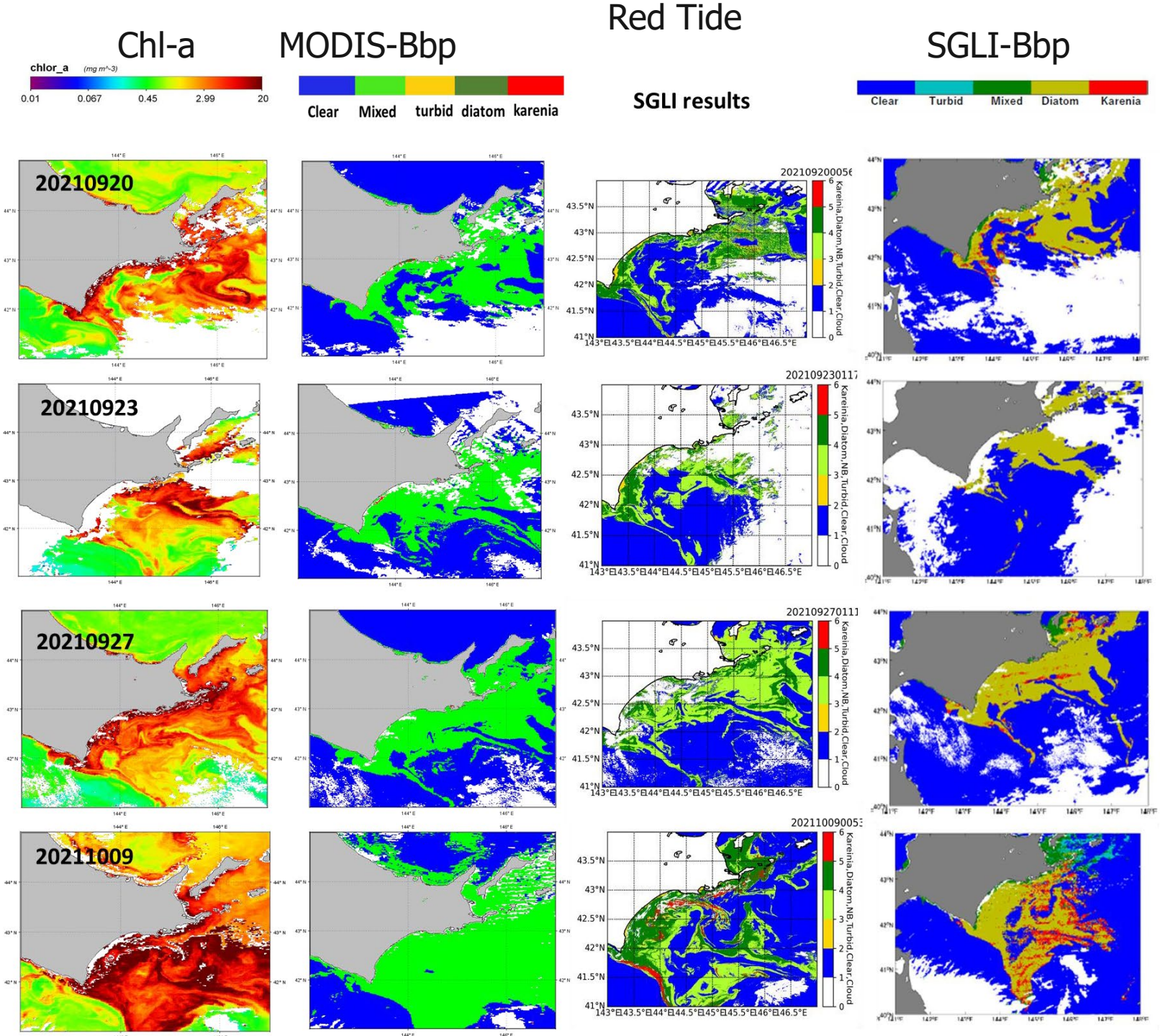

Luang-on et al. (In prep.)




Luang-on et al. (In prep.)

# SGLI Chl-a in Southeast Hokkaido Sept. and Oct. in 2018-2021




Red Tide
Chl-a
MODIS-Bbp
SGLI-Bbp
chlor_a (mg m^-3)
0.01
0.067
0.45
2.99
20
Clear
Mixed
turbid
diatom
karenia
SGLI results
Clear
Turbid
Mixed
Diatom
Karenia
20210920
20210923
20210927
20211009
Karenia,Diatom,NB,Turbid,Clear,Cloud

# 1) Ise Bay, 2) East China Sea


- Matsuoka et al. (2021) Performance of JAXA's SGLI standard ocean color products for oceanic to coastal waters: chlorophyll a concentration and light absorption coefficients of colored dissolved organic matter. J. Oceanogr.
- Yoo, S., C.E. Kong, Y.B. Son, and J. Ishizaka (2019) A critical re-assessment of the primary productivity of the Yellow Sea, East China Sea and Sea of Japan/East Sea Large Marine Ecosystems, Deep-Sea Res. II. 163, 6-15 Doi:10.1016/j.dsr2.2018.05.021.
- Xu, Q., Wang, S., Sukigara, C., Goes, J. I., Gomes, H. do R., Matsuno, T., et al. (2022) High-Resolution Vertical Observations of Phytoplankton Groups Derived from an In-Situ Fluorometer in the East China Sea and Tsushima Strait. Frontiers in Marine Science, 8, 1–14. doi.org/10.3389/fmars.2021.756180
- Ishizaka, J. (2021) 3.2 Phytoplankton, Oceanography of the Yellow Sea and East China Sea. Eds. Ishizaka, J. et al. PICES Sci., Sidney, BC, Canada, pp. 224–243.

# 3) Ariake Bay (AERONET-OC, SGLI)


- Fan, Y., W. Li, N. Chen, J.-H. Ahn, Y.-J. Park, S. Kratzer, T. Schroeder, J. Ishizaka, R. Chang, K. Stamnes, 2021. OC-SMART: A machine learning based data analysis platform for satellite ocean color sensor, Remote Sens. Env., 253 https://doi.org/10.1016/j.rse.2020.112236
- Pahlevan, N., Mangin, A., Sunadarabalan Balasubramanian, Brandon Smith, Alikas, K., Barbosa, C., et al. (2021) ACIX-Aqua: Global assessment of atmospheric correction methods for Landsat-8 and Sentinel-2 over lakes, rivers, and coastal waters. Remote Sens. Environ., 258. doi.org/10.1016/j.rse.2021.112366
- Ishizaka, J., Mengmeng, Y., Fujii N., Katano, T., Hori M., Mine, R., Saitoh, K., Murakami, H. (Submitted) Use of AERONET-OC for Validation of SGLI/GCOM-C Products in Ariake Sea, Japan, J. Oceanogr.

# 3) Ariake Bay (Red Tide)


- Yang, M., J.I. Goes, H. Tian, and J. Ishizaka. (2020) Effects of Spring–Neap Tidal Cycle on Spatial and Temporal Variability of Satellite Chlorophyll-A in a Macrotidal Embayment, Ariake Sea, Japan. Remote Sensing, 12: 1–19. https://doi.org/doi:10.3390/rs12111859.
- Feng, C., J. Ishizaka, K. Saitoh, T. Mine, and H. Yamashita (2020) A Novel Method Based on Backscattering for Discriminating Summer Blooms of the Raphidophyte (Chattonella spp.) and the Diatom (Skeletonema spp.) Using MODIS Images in Ariake Sea, Japan. Remote Sensing, 12 (9): 1504. https://doi.org/10.3390/rs12091504.
- Feng, C., Ishizaka, J., Saitoh, K., Mine, T., & Zhou, Z. (2021) Detection and tracking of Chattonella spp. and Skeletonema spp. blooms using Geostationary Ocean Color Imager (GOCI) in Ariake Sea, Japan. J. Geophysic. Res.: Oceans, 126, e2020JC016924. doi.org/10.1029/2020jc016924

# 4) CoI

- Zhu, Y., D.J. Suggett, C. Liu, J. He, L. Lin, F. Le, J. Ishizaka, J. Goes, Q. Hao (2019) Primary productivity dynamics in the summer Arctic Ocean confirms broad regulation of the electron requirement for carbon fixation by light-phytoplankton community interaction, Front. Mar. Sci., Doi.org/10.3389/fmars.2019.00275.
- Tsukamoto, H, N. Goto, A, Yoshihara, Y. Takagi, N. Nari, M. Hayashi, J. Ishizaka (2019) An assessment of chlorophyll-a concentration using satellite remote sensing in Lake Biwa, J. Remote Sensing Soc, Japan, 39, 2, 103-111 (In Japanese with English abstract).
- Asaoka, S., S. Nakada, A. Umehara, J. Ishizaka, and W. Nishijima. 2020. Estimation of Spatial Distribution of Coastal Ocean Primary Production in Hiroshima Bay, Japan, with a Geostationary Ocean Color Satellite. Estuarine, Coastal and Shelf Science, 244: 106897. https://doi.org/10.1016/j.ecss.2020.106897.
- Luang-on, J., Ishizaka, J., Buranapratheprat, A., Phaksopa, J., Goes, J. I., Kobayashi, H., et al. (2021) Seasonal and interannual variations of MODIS Aqua chlorophyll-a (2003–2017) in the Upper Gulf of Thailand influenced by Asian monsoons. J. Oceanogr.. doi.org/10.1007/s10872-021-00625-2

# Others


- Lee, Z., S. Shang, Y. Wang, J. Wei, J. Ishizaka (2019) Nature of optical products inverted semi-analytically from remote sensing reflectance of stratified waters. Limnol. Oceanogr. 1-14, doi: 10.1002/lno.11307.
- 樋口篤志, 本多嘉明, 中島孝, 石坂丞二, 弓本桂也, 堀之内武, et al. (2021) 次期静止ミッション検討分科会における次期ひまわり搭載イメージャに関する検討. 日本リモートセンシング学会誌, 41(4).
- 作野裕司，斎藤克弥，石坂丞二，虎谷充浩，比嘉紘士，向井田明，et al. (2021) 海洋可視化のための衛星センサの現状と将来展望. 日本リモートセンシング学会誌, 41(2), 181–188. doi.org/10.11440/rssj.41.181
- Maúre, E.R., Terauchi, G., Ishizaka, J., Clinton, N., DeWitt, M. (2021). Globally consistent assessment of coastal eutrophication. Nature Comm., 12(1), 1–9. doi.org/10.1038/s41467-021-26391-9