領域目標達成のための海外研究者の招聘による国際共同研究打ち合わせ及び国際シンポジウム

東京大学大気海洋研究所　総括班代表　安田一郎　（報告者）
Michael Gregg(A01-1 班招聘)
Chuanyu Liu(A01-2 班招聘)
Alessandro Tagliabue(A02-3 班招聘)
Sen Jan(A02-4 班招聘)
Kelvin Richards(A03-5 班招聘)
Tony Koslow(A03-6 班招聘)
Robert Pinkel(A04-7 班招聘)
Andy Hogg(A04-8 班招聘)

１．要旨

2017年3月16-17日東京大学山上会議所において、科研費新学術領域「海洋混合学の創設OMIX(URL: http://omix.aori.u-tokyo.ac.jp)」主催の国際シンポジウムが行われました。米国、オーストラリア、英国、中国、台湾から著名な研究者８名を招き、海洋混合学に関係する講演が行われたほか、各計画研究班代表からの研究進捗状況の講演、４０のポスター発表が行われ、100名を超える参加者による、活発な議論が行われました。招待講演者や領域アドバイザからの研究に対するコメント、シンポジウム前後の共同研究の打ち合わせ等を含め、交流を深めることができ、今後の共同研究や新しい研究領域を拓く、大変有意義な会議となりました。

２．会議の報告

下記の Program に沿って国際シンポジウムが行われるとともに、各計画研究班において、招聘者との研究打ち合わせを別な日程で行った。

March 16 (Thu.)

9:00—9:30 Registration and coffee

9:30—10:00 Opening

Hiroyasu Hasumi (The University of Tokyo): Welcome and logistics

Ichiro Yasuda (The University of Tokyo): Introduction to the OMIX project

10:00—11:40 Session 1 (Chair: Toshiyuki Hibiya)

Michael Gregg (University of Washington): Turbulence observations: past, present and future

Ichiro Yasuda (The University of Tokyo): Development of methods and systems for vertical mixing and observations: overview of A01-1 results in 2015-2016

Chuanyu Liu (Chinese Academy of Science): Deep-reaching thermocline mixing in the equatorial Pacific cold tongue

Shuhei Masuda (Japan Agency for Marine-Earth Science and Technology): Pacific Ocean state estimation and clarification of mechanism of ocean circulation by data synthesis of global observations

11:40—13:00 Lunch

13:00—14:00 Poster (with coffee)

14:00—15:40 Session 2 (Chair: Shuhei Masuda)

Robert Pinkel (Scrips Institution of Oceanography): Deep ocean mixing by breaking internal tides

Toshiyuki Hibiya (The University of Tokyo): Revisiting fine-scale parameterizations for enhanced tidal mixing over a rough ocean bottom

Andy Hogg (The Australian National University): Lee waves, spontaneous generation and ocean mixing

Hiroyasu Hasumi (The University of Tokyo): Model development and impact assessment for ocean circulation, marine material cycles and climate by incorporating the effect of oceanic vertical mixing

15:40—16:10 Break and Poster (with coffee)

16:10—17:50 Session 3 (Chair: Shin-ichi Ito)

Kelvin Richards (University of Hawaii): Shear-driven turbulence in the natural environment

Sen Jan (National Taiwan University): Interleaving, internal tides, and instability waves in the Kuroshio east of Taiwan

Xinyu Guo (Ehime University): Mixing processes, nutrient transport, fundamental structure of ecosystem in the Kuroshio and its origin area

Naomi Harada (Japan Agency for Marine-Earth Science and Technology): Study on the change in lower trophic ecosystem and its complex mechanism in the North Pacific

18:30—20:30 Reception (at Hotel Forest Hongo)

March 17 (Fri.)

9:30—10:00 Coffee

10:00—11:40 Session 4 (Chair: Naomi Harada)

Tony Koslow (Scripps Institution of Oceanography): Patterns of change in fish communities of the California Current and relationship with ocean forcing

Shin-ichi Ito (The University of Tokyo): Challenges on elucidation of climate variability impacts on living marine resources

Alessandro Tagliabue (University of Liverpool): The integral role of iron in ocean biogeochemistry

Jun Nishioka (Hokkaido University): Macro- and micro-nutrient cycles in the western north Pacific –Importance of marginal seas and North Pacific Intermediate Water–

11:40—12:30 Closing (Chair: Ichiro Yasuda)

Discussion

Comments from the 8 invited speakers

Comments from the advisory board of the OMIX project

Prof. Masaaki Wakatsuchi

Prof. Mitsuo Uematsu

Posters

(Only the first authors are listed. Presenting authors might be different.)

Research Item A01 (microstructure measurement and synthesis)

01 Yasutaka Goto (The University of Tokyo): Development of CTD-attached microstructure measurements and observations in the western North Pacific

02 Ryuichiro Inoue (Japan Agency for

Marine-Earth Science and Technology): Variability of wind-induced mixing in the western North Pacific inferred from Argo floats and turbulence measurements under storms by micro-EM-APEX floats

03 Ryuichiro Inoue (Japan Agency for Marine-Earth Science and Technology): Preliminary report on microstructure and mooring observations in the Kerama Gap

04 Takahiro Tanaka (The University of Tokyo): Preliminary report on the observations of turbulence and vertical nitrate flux in the Kuroshio through the Tokara Strait and Izu Ridge

05 Takahiro Tanaka (The University of Tokyo): Turbulence and current observations in the Kuril Straits with underwater glider and moorings

06 Daigo Yanagimoto (The University of Tokyo): Mooring and turbulence observations around the Emperor seamounts and gaps

07 Masaaki Kikuchi (The University of Tokyo): Development of deep profiling floats with turbulence sensors

08 Daisuke Hasegawa (Tohoku National Fisheries Research Institute): Direct measurement of vertical turbulent nitrate flux

09 Satoshi Osafune (Japan Agency for Marine-Earth Science and Technology): On-going development of a global ocean state estimation system using tidal mixing parameterizations

10 Yusuke Kawaguchi (Japan Agency for Marine-Earth Science and Technology): Double-diffusion and energetic internal waves observed in Arctic Ocean vortices

11 Shinya Kouketsu (Japan Agency for Marine-Earth Science and Technology): An application of tracer inverse methods on neutral density surfaces in the North Pacific, and the impacts of mixing on the decadal property changes

12 Daisuke Sasano (Japan Meteorological Agency): Decline and bidecadal oscillation of dissolved oxygen in the Oyashio region and their propagation to the western North Pacific

Research Item A02 (Kuroshio, Oyashio and their source regions)

13 Takuya Hara (The University of Tokyo): Neodymium isotopic composition and rare earth elements in surface water of the North Pacific Ocean, the Bering Sea and the Chukchi Sea

14 Naoto Kudo (Kagoshima University): Seasonal change in vertical mixing inferred from water-mass modification along PN repeat hydrographic section in East China Sea

15 Eisuke Tsutsumi (Kyushu University): Turbulent mixing within Kuroshio in Tokara Strait

16 Jing Zhang (University of Toyama): What can we learn from rare earth elements and Nd isotope: material transport and interaction between the East China Sea and the western North Pacific

17 Hiromichi Ueno (Hokkaido University): Influence of mesoscale eddies on biogeochemical cycle and lower trophic ecosystem in the western subarctic North Pacific

18 Toshikazu Tatematsu (Hokkaido University): Structure of surface mixed layer analyzed by temporal change of vertical distribution of photodegradable organic iodine gases

19 Yoshio Kondo (Nagasaki University): Dissolved Fe speciation in the western North Pacific
20 Akira Oka (The University of Tokyo): A modelling study on global distribution of rare earth elements in the ocean
21 Kazuhiro Misumi (Central Research Institute of Electric Power Industry): Roles of ocean mixing and iron cycling on climate and marine ecosystem variations in the western North Pacific
22 Humio Mitsudera (Hokkaido University): Modeling of iron circulation in the western North Pacific
23 Takeyoshi Nagai (Tokyo University of Marine Science and Technology): Observations of submesoscale bands of turbulence associated with high wavenumber internal wave shear below the Kuroshio origin using the tow-yo microstructure profiler

Research Item A03 (ecosystem and fisheries)

24 Megumi O. Chikamoto (Utah State University): Marine ecosystem variability under the ocean dynamical constrain
25 Kotaro Shirai (The University of Tokyo): Decadal climate variability recorded in shell growth pattern of long-lived bivalve *Mercenaria stimpsoni*
26 Tomihiko Higuchi (The University of Tokyo): Stable isotope analysis of otolith in chub mackerel (*Scomber japonicus*) juvenile
27 Takaaki Yokoi (The University of Tokyo): Development of a physical-biogeochemical-fish coupled model for the western North Pacific
28 Toyoho Ishimura (National Institute of Technology, Ibaraki College): Stable carbon and oxygen isotopic analysis of microscale fish otolith: applications to archived larval *Scomber japonicas*
29 Akira Kuwata (Tohoku National Fisheries Research Institute): Mechanism and long-term change of massive spring bloom of diatoms in the Oyashio region

Research Item A04 (numerical model development and mixing effect assessment)

30 Yuki Tanaka (The University of Tokyo): Downward lee wave radiation from tropical instability waves in the central equatorial Pacific Ocean: a possible energy pathway to turbulent mixing
31 Anne Takahashi (The University of Tokyo): Assessment of fine-scale parameterizations of deep ocean mixing in the presence of geostrophic current shear –From the results of microstructure measurements in the Antarctic Circumpolar Current region–
32 Takashi Ijichi (The University of Tokyo): Estimating mixing efficiency in the deep ocean through microstructure measurements
33 Yoshihiro Niwa (the University of Tokyo): Generation of baroclinic tide energy in a global three-dimensional numerical model with different spatial grid resolution
34 Yusuke Ushijima (Kyoto University): Diurnal cycle effects of surface heat flux on the ocean mixed layer depth and sea surface temperature
35 Taira Nagai (The University of Tokyo): The impacts of tidal mixing and sub-mesoscale eddies on the water-mass transformation of the Indonesian Throughflow
36 Takao Kawasaki (The University of

Tokyo): High resolution modeling on deep Pacific Ocean circulation

37 Kaoru Ito (Hokkaido University): Interaction of a vortex and internal gravity waves: classification by a non-dimensional parameter

38 Tomoki Tozuka (The University of Tokyo): Climate variability simulated by a coupled climate model with the 18.6-year modulation of tidal mixing