

SATREPS SYMPOSIUM

on iDEWS

For establishment of an early warning system for infectious diseases in southern Africa
incorporating climate prediction

10 years of successful corporation in science and technology
between the Republic of South Africa and Japan



Organized by
Institute of Tropical Medicine (NEKKEN), Nagasaki University

Supported by
Japan Science and Technology Agency (JST)
Japan International Cooperation Agency (JICA)
Embassy of the Republic of South Africa

Nagasaki, Japan, January 27, 2015

iDEWS

(infectious Disease Early Warning System)

Infectious diseases including malaria, pneumonia and diarrheal diseases are major contributors to mortality and morbidity in southern Africa, exacerbated by a high prevalence of HIV in the population. Although malaria incidence in South Africa has declined markedly since the last major malaria epidemic in 1999/2000, the disease remains a major health burden, particularly in the north-eastern malaria endemic regions of South Africa. During the 2010/2011 malaria season over the 8600 cases and 119 malaria-associated deaths were reported in South Africa. In the same regions where the highest incidence of malaria occurs (in the Lowveld areas of Limpopo, Mpumalanga and KwaZulu-Natal), the mortality rates from diarrheal disease especially in children are highest in South Africa. In addition, pneumonia and other respiratory diseases are also disproportionately high in impoverished areas such as these. They all have a significant weather and climate link. There is a need for a finer understanding of the nature of these relationships, to improve prevention and management, especially in the light of climate change.

The collaboration among South African and Japanese scientists, “the Project for Prediction of Climate Variations and its Application in the Southern African Region” (from April 2010 to March 2013), has resulted in the capacity to deliver climate predictions at very fine temporal and spatial scales suitable for application in the health sector. While climate variability is a key driver of infectious disease, absence of utilization of long-term climate prediction information has rendered infectious disease management sub-optimal. Current management is reactive and not proactive in the sense that many responses to outbreaks are mobilized during or after the event. With an effective climate-based infectious disease early-warning system, an improved precision of climate prediction, coupled with local disease transmission models, will allow for more proactive management of these diseases. The climate-based infectious disease early-warning system will enable program managers to anticipate potential epidemics in a timely manner so as to minimize the local spread of the diseases.

About SATREPS

(Science and Technology Research Partnership for Sustainable Development)

SATREPS (<http://www.jst.go.jp/global/english/index.html>) is a Japanese government program that promotes international joint research that is structured as a collaboration between the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA).

Many of the greatest threats that we face today including global warming, infectious diseases, and natural disasters are global issues that are intractable without further advances in science and technology. In order to resolve such issues it is essential to have an active commitment from the research community to develop and apply new technology, acquire new knowledge, and encourage innovation and economic development. Global issues affect more than a single country or region, and cannot be resolved without international collaboration. Developing countries tend to be hit particularly hard by such issues, and have a strong need for research and development based on local needs. Many developing countries also have an urgent need to enhance their independent capacity to comprehensively handle global issues and train appropriate human resources.

Based on the needs of developing countries, the program aims 1) to enhance international cooperation in science and technology between Japan and developing countries, 2) to acquire new knowledge and technology that lead to the resolution of global issues, and 3) to boost capacity development (i.e., encouraging self-reliant research and development capacity in developing countries with constructing sustainable research systems, networking between researchers, and training future human resources in developing countries and in Japan).

Main Participating Organizations

JAPAN

Institute of Tropical Medicine (NEKKEN), Nagasaki University

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

SOUTH AFRICA

Applied Centre for Climate and Earth System Science (ACCESS)

South African Medical Research Council (MRC)

South Africa Council for Scientific and Industrial Research (CSIR)

Department of Health: Limpopo (DoHL)

University of Cape Town (UCT)

University of Limpopo (UL)

University of Pretoria (UP)

University of the Western Cape (UWC)

Schedule

Morning Session

- 9:00-9:30 **Registration**
- 9:30-9:35 **Welcome address**
Prof. Noboru Minakawa
Institute of Tropical Medicine, Nagasaki University (NEKKEN)
- Opening remarks**
- 9:35-9:40 Prof. Shigeru Katamine, President of Nagasaki University
- 9:40-9:45 Dr. Mohau Pheko, Ambassador Extraordinary and Plenipotentiary
Republic of South Africa
- 9:45-9:50 Ms. Modiegi Selematsela, Deputy Director

Department of Science and Technology, Republic of South Africa
- 9:50-9:55 Dr. Neville Sweijd, Acting Director
Applied Centre for Climate and Earth System Science (ACCESS)
- 9:55-10:00 Mr. Masayuki Sato, Senior Research fellow, Department of International Affairs

Japan Science and Technology Agency (JST)
- 10:00-10:05 Mr. Yoshiharu Yoneyama, Deputy Director General, and Group Director for Health Group 1

Japan International Cooperation Agency (JICA)
- 10:05-10:30 **Coffee break**
- 10:30-11:15 **Special lecture I**
Dr. Mohau Pheko, Ambassador Extraordinary and Plenipotentiary
Republic of South Africa
- 11:15-11:35 **Special lecture II**
Mr. Koichiro Fukase, Research Group Chief Curator
Nagasaki Museum of History and Culture
- 11:35-12:05 **Special lecture III**
Prof. Satoshi Hirose, Vice Director
Research Center for Nuclear Weapons Abolition, Nagasaki University
- 12:05-13:30 **Lunch break**

Afternoon Session

- 13:30-13:40 **Overview of iDEWS project**
Dr. Ataru Tsuzuki
Institute of Tropical Medicine, Nagasaki University (NEKKEN/JICA)
- 13:40-14:20 **Disease surveillance**
Mr. Philip Kruger, Department of Health: Limpopo (DoHL)
Prof. Angela Mathee, South African Medical Research Council (MRC)
Prof. Rajendra Maharaj, South African Medical Research Council (MRC)
Dr. Brilliant Petja, University of Limpopo (UL)
- 14:20-15:00 **Disease modeling**
Prof. Masahiro Hashizume
Institute of Tropical Medicine, Nagasaki University (NEKKEN)
Dr. Shingo Iwami, Kyusyu University
Prof. Peter Witbooi, University of the Western Cape (UWC)
Prof. Noboru Minakawa
Institute of Tropical Medicine, Nagasaki University (NEKKEN)
- 15:00-15:40 **Climate modeling**
Dr. Swadhin Behera
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Dr. Francois Engelbrecht
South Africa Council for Scientific and Industrial Research (CSIR)
Dr. Takeshi Doi
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Dr. Yushi Morioka
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Dr. Jayanthi Ratnam
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
- 15:40-16:00 **Coffee break & Posters**
- 16:00-17:00 **Panel discussion**
Chaired by Neville Sweijd
Applied Centre for Climate and Earth System Science (ACCESS)
Co-chaired by Noboru Minakawa
Institute of Tropical Medicine, Nagasaki University (NEKKEN)
- Closing remarks**
- 17:00-17:05 Prof. Angela Mathee, South African Medical Research Council (MRC)
- 17:05-17:10 Prof. Kiyoshi Kita, Japan Science and Technology Agency (JST)

Participants Profiles



Shigeru Katamine graduated Nagasaki University School of Medicine in 1976, and was granted Ph.D. by Tohoku University in 1982. Since he got a tenure position of Nagasaki University in 1984, he has participated in education and research in the field of Virology. During his research carrier, he spent 3 years (1985-1988) at National Institute of Health, Bethesda, Md, USA to learn modern life science. His research interest, in particular, has been human retroviruses and prion, and his scientific contributions were published in the Journals with the major impact, such as Lancet, Nature, Science, and so on. In 2002, he joined the administrative office of the University as the Vice-President, and since 2008, he has been the President of Nagasaki University.



Mohau Pheko began her tenure as The Republic of South Africa's Ambassador Extraordinary & Plenipotentiary to Japan. 20+ years of progressive professional accomplishments in the areas of economic planning, development, public health, budget planning, training and facilitation, international development, health economics, rural development, organizational design, gender development, analysis and training. She has served as a consultant for development assistance programmes for various United Nations agencies, expert in project formulation, and transformational strategies to promote economic and social development in Africa. Known for acting as a mentor and engaging teams, keeping them motivated, fresh, and focused especially on high-profile, high-stress assignments. Ability to deconstruct development information and discourse, compelling policy makers, corporate sector & NGO's to engage with development issues effectively. Mohau Pheko is a rare breed of person. Throughout her career, she has shown a strong commitment to all facets of equitable global relationships, enlightened governance, gender equity and engagement with issues of global regimes involving international trade, globalization, human rights, climate change and democracy. Pheko joined the Department of International Relations & Cooperation August 2010. 2010 -2011 served as The Republic of South Africa's High Commissioner to Canada.



Modiegi Selematsela is currently employed by the Department of Science and Technology (DST) as Deputy Director: Health Innovation and her responsibilities include the development of strategies and policies relevant to health innovation for South Africa with a focus on infectious diseases, HIV/AIDS, TB and Malaria. She has extensive research management experience and has contributed towards the establishment of the DST's priority innovation programmes aimed at the discovery/development of drugs, diagnostic and vaccines for HIV/AIDS, TB and Malaria. She also manages some of the health-related collaborative projects with foreign partners. Prior to joining the DST, Ms Selematsela served an Assistant Director in the Department of Health where she was responsible for the development of policies for the safety and labelling of foods derived from modern biotechnology as well as compiling new and amending existing regulations with respect to pesticide and veterinary drug residues in foodstuffs.



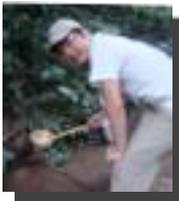
Neville Sweijd is the Acting Director and Operations Manager at ACCESS having joined the programme full time in January 2011, having been the part time manager of the programme for two years prior to that. His main tasks are to ensure that the development, management, implementation of the ACCESS programme (governance and activities) run smoothly and to liaise among the partners and principals of the programme. Neville has a PhD in marine science which he obtained from the University of Cape Town, Neville is passionate about people and development and the role of science in creating new opportunities.



Koichiro Fukase is a senior researcher at the Nagasaki Museum of History and Culture. He is a historian specialized in the modern history of Japan and the history of trading and culture exchange in East Asia. After working for Waseda University for three years, he joined the museum in 2008.



Satoshi Hirose born in Fukushima Prefecture in 1961, graduated from International Christian University in 1985 then proceeded to the Graduate School of Public Administration of ICU. He is currently serving as a Professor and the Vice Director of Research Center for Nuclear Weapons Abolition, Nagasaki University (RECNA). He is a member of the Board of Directors of JAUNS and a co-editor of 'Disarmament Review', an academic journal issued by the Japan Association of Disarmament Studies. He used to serve for the United Nations Development Programme as a programme officer and for the Ministry of Foreign Affairs of Japan as a legal adviser to the Japanese Delegation to the Conference on Disarmament. He also participated in the Review and Extension Conference of the Nuclear Non-proliferation Treaty held in New York in 1995 as a member of Japanese Delegation.



Ataru Tsuzuki is an assistant professor at the Institute of Tropical Medicine, Nagasaki University. After his degrees of BSc and MSc for health science from University of the Ryukyus, he has participated malaria control project in Laos as a volunteer between 2000 and 2002. He has mainly worked for establishment of entomological studies to measure the impact of insecticide treated bed-net distribution under close collaboration with Laotian health officials at rural villages. He also worked for International Vaccine Institute (IVI) in Korea after his MSc degree for Epidemiology obtained from London School of Hygiene and Tropical Medicine at 2003. As a field epidemiologist in IVI, he worked for multi-country Typhoid vaccine trial to supervise local health workers maintaining appropriate surveillance system. In 2006, he moved to Nagasaki University and obtained PhD on his study of dengue ecology and epidemiology in Vietnam. He was recently dispatched to South Africa as a JICA Expert for the iDEWS project.



Philip Kruger is the Head of the Malaria control programme in Limpopo, a province in South Africa, with the highest incidence of malaria. He has been involved in malaria control for the past 25 years. Over the years, he has collaborated with a number of tertiary institutions on research projects related to malaria control. In this regard, he has authored and co-authored numerous research papers published in peer-reviewed journals. Outside South Africa, he has provided technical assistance in setting up control programmes in various African countries eg Angola, Mozambique, Zimbabwe, Uganda, Cameroon and Tanzania.



Angela Mathee has a Ph.D. in Public Health from the University of the Witwatersrand and a Master of Science in Environmental Epidemiology and Policy from the London School of Hygiene and Tropical Medicine. She currently serves as Director of the MRC Environment & Health & Research Unit and Director of the World Health Organization Collaborating Centre for Urban Health. She is a Visiting Professor at the University of Johannesburg and an Associate Professor at the University of the Witwatersrand. Her main research interests are lead exposure and poisoning in developing countries and the public health aspects of climate variability.



Rajendra Maharaj is the inaugural Director of the Medical Research Councils Office for Malaria Research. He has a PhD in Entomology from the University of KwaZulu-Natal as well as a Master's Degree in Infectious Disease Control from the London School of Hygiene and Tropical Medicine. He is an extraordinary Professor at the University of Pretoria. He has over 23 years of experience in malaria research and control and his main area of research is innovative technologies for the control of malaria vectors. He serves on a number of national and international committees whose focus is malaria elimination.



Brilliant Petja is a Research Associate at the Risk and Vulnerability Centre of the University of Limpopo, South Africa. He is also a Scientific Manager in the Research Directorate of the Limpopo Department of Agriculture. He obtained a Bachelor of Environmental Sciences (University of Venda), a Master of Science (Remote Sensing) from University of the Witwatersrand and a Doctor of Philosophy in GIS and Remote Sensing from University of Limpopo. His research interests involve applications of GIS and Remote Sensing across different aspects including climate change, rural development, public health and epidemiology amongst others.



Masahiro Hashizume is a professor of environmental epidemiology in the Institute of Tropical Medicine, Nagasaki University. After earning a PhD from the London School of Hygiene & Tropical Medicine, he conducted epidemiological studies to estimate the impact of climatic factors and flooding on the incidence of infectious diseases in Asia and Africa. His current topics of interest focus on the health impacts of weather and global climate change but also include the health risks of air pollution including Asian dust. He is an editor-in-chief of Tropical Medicine and Health, official journal of the Japanese Society of Tropical Medicine, and a contributing author for the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report.



Shingo Iwami is an associate professor of mathematical modeling in Department of Biology, Kyushu University. Along with the rapid development of experimental techniques in molecular and cell biology, important results have been achieved in the field of virological and immunological disease. In many studies, however, these experimental techniques have focused on elucidating only one aspect of the disease. Mathematical modeling, in tandem with rigorous experimental work, offers an opportunity to analyze disease progression more comprehensively. He is currently working to establish a new field in Japan called "Computational virology and immunology" which combines experimental analyses, mathematical modeling and analysis, and computational simulation to understand the dynamical systems of disease.



Peter Witbooi obtained his doctoral degree in Mathematics from the University of Cape Town, 1995, and held postdoctoral positions at Princeton University and Vrije Universiteit Brussel. He joined the University of the Western Cape in 1980. He is presently a Professor in the Department of Mathematics and Applied Mathematics.



Noboru Minakawa is a professor of vector ecology in the Institute of Tropical Medicine, Nagasaki University. He was trained as an aquatic entomologist and fish biologist. He started malaria vector research when he worked for International Centre for Insect Physiology and Ecology in Kenya 20 years ago. Since then, African malaria vectors have been his main research subjects. Through the field research in various parts of Africa, he has been convinced that climate is the main driver of malaria outbreaks. He is the principal investigator of the iDEWS project.



Francois A. Engelbrecht is a principal researcher at the Council for Scientific and Industrial Research (CSIR) in South Africa, where he leads the Climate Studies, Modelling and Environmental Health (CSM&EH) research group. He specializes in the fields of climate model development and climate dynamics, and currently leads the development of an African-based Earth System Model at CSIR, in collaboration with national and international partners. Engelbrecht has published widely in the fields of climate modelling and the projection of future climate change over Africa. He is a member of the Working Group on Numerical Experimentation (WGNE) of the World Climate Research Programme (WCRP) and a Honorary Research Associate of the University of the Witwatersrand in South Africa, where he leads the research of a number of post-graduate students specializing in climate modelling.



Yushi Morioka is a climate researcher working at JAMSTEC, who investigates physical processes of climate variability in mid-high latitudes of the Southern Hemisphere and its potential sources of predictability. His particular interest is air-sea interaction in the southern Indian and South Atlantic Oceans, which strongly affects southern African climate. Since his PhD, he has been involved in the JICA/JST project (SATREPS) related to the climate variability over southern Africa. Currently, he is working on development of next-generation climate model by incorporating ocean data assimilation system toward a better understanding of climate variability at decadal timescale.



Takeshi Doi is a researcher in the Application Laboratory at Japan Agency of Marine-Earth Science and Technology (JAMSTEC). He is working for developing dynamical seasonal prediction systems. He earned his Ph.D. in Climate Dynamics from the University of Tokyo in 2009. After that, he was selected as a Princeton University AOS postdoctoral research fellow, and worked at GFDL/NOAA, U.S in 2010-2012. From May 2012, he joined JAMSTEC. He received an Editor's Award for the Journal of Climate from the American Meteorological Society, Jan. 2012 and FY2013 JAMSTEC outstanding research award, Apr. 2014.



Jayanthi Venkata Ratnam has been working at JAMSTEC as a research scientist since 2008 on climate variability using regional models and global models. Main interests are in understanding the affects of various climate

modes like Indian Ocean Dipole, El Nino Modoki on the global climate especially the climates of southern Africa, Australia and Japan.



Swadhin K. Behera is a principal researcher and a group leader in the Application Laboratory of JAMSTEC. He has been associated with various centers and programs after getting his Ph. D. in India and joining JAMSTEC in early 1998. He also serves as a visiting professor for the Department of Ocean Technology, Policy and Environment at the University of Tokyo and as a guest professor at the Graduate School of Global Environmental Studies in Sophia University. He has the distinction of doing world-class scientific research and publications in climate variation research such as the

Indian Ocean Dipole, the Indian Ocean Subtropical Dipole, the El Nino Modoki and the recently identified Ningaloo Nino. Together with his group he is also involved in the climate prediction and its societal applications studies. He has obtained distinguished reviewer's award from AGU and distinguished researcher awards from JAMSTEC.



Ms Gcino Mlaba is currently employed at the Department of Science and Technology (DST) as Deputy Director: Development Partnerships (DP) in the section: International Resources and Cooperation (ICR). Her responsibilities include developing strategies and action plans to leverage strategic Official Development Assistance (ODA) in support of South Africa's (SA) science and technology (S&T) system and to manage relationships between the DST and its development partners. She is also responsible for mediating the flow of ODA to

regional and sub-regional initiatives and co-ordinating projects between the DST and S&T national and international stakeholders.

Previously, she was an intern and later Assistant Policy Analyst at the Presidency where she developed a good understanding of South Africa's political landscape, governance system, and foreign policy. Her main responsibilities included policy research, analysis, and coordination and providing advisory and programmatic support to the Social Sector Office which was responsible for advising the President, Deputy President and Ministers in the Presidency on matters pertaining to poverty eradication, social assistance, and youth development. She has contributed to various policy and strategy documents such as the Fifteen Year Review (2008) and the National Youth Policy (2009-2014). She is a Political Science graduate.

