UNE PLANÈTE UNE SANTÉ

Contribution de l'observation de la Terre aux pratiques en santé publique

Atelier le 21 juin 2017

ONE EARTH ONE HEALTH

Contribution of Earth observation to public health practices

Workshop on June 21, 2017

Agence de la santé publique du Canada | Public Health Agency of Canada

CSA ASC

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L'AQT L'ASSOCIATION QUÉBÉCOISE DE TÉLÉDÉTECTION

CEOS

GEO BON

IRD Institut de Recherche pour le Développement

NASA

NOAA

SUSTAINABLE DEVELOPMENT GOALS

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UNIVERSITÉ DE SHERBROOKE

VetAgro Sup

World Health Organization

ONE EARTH ONE HEALTH WORKSHOP

Contribution of Earth observation to public health practices

June 21, 2017, Montreal, Quebec, Canada, 9h00-17h30 Eastern Time

DESCRIPTION

Infectious diseases and chronic conditions are issues of concern for public health. The development of evidence-based knowledge is essential for the management of these issues. Research needs to identify factors that foster the appearance, spread and persistence of diseases and clarify the mechanisms at work. These factors may be environmental, climatic, demographic, socio-economic or behavioral. In this context, integrated approaches focusing on One Health and EcoHealth concepts have to be developed to investigate the close and complex relations between the environment, ecosystems and etiological agents responsible for disease in human, animal and plant populations. Some drivers such as forest density, presence of wetlands, agricultural areas, climate and urban areas can be identified from space. However, efficient methods and relevant partnerships need to be developed to turn remote sensing into a tool suitable for the characterization, mapping and monitoring of risk factors.

This workshop is an invitation to the Earth observation (EO) and remote sensing community at large to seek their expertise and potential contribution in terms of technology, applications, and methods to address public health issues. The workshop will unfold in three stages. First, prominent members of the national and international communities will give presentations on current EO applications, tools & solutions for public health issues. Then the workshop participants will discuss different scenarios related to five public health themes. They include vector, water & air borne diseases, vulnerable human populations, and emergency management. An expert in the field will facilitate the discussion for each scenario and help the participants address a set of key questions and issues. A final discussion will focus on potential new contribution of space-based EO to public health. The results will be summarized in a report.

The workshop will take place during the EO Summit 2017 in Montreal, Canada. This event is co-lead by the Canadian Space Agency and the Public Health Agency of Canada, in partnership with the Centre National d'Études Spatiales (CNES, France), the CEOS Working Group on Capacity Building & Data Democracy (WGCapD), the department of Applied Geomatics from Université de Sherbrooke (Canada), the Institut de recherche pour le développement (IRD, France), and VetAgro Sup (France), and with the participation of the GEO (Group on Earth Observation) and UN-COPUOS Space and Global Health expert team. This event is directly aligned with and in support of Sustainable Development Goal 3 *Ensure Healthy Lives and Promote Well-Being for All Ages* and the GEO strategic objectives and Societal Benefit Area *Public Health*.

OBJECTIVES

To bring together leaders and experts in EO and public health to explore, discuss, establish or strengthen collaborations and partnerships on novel EO applications, products and services to support public health.

To better understand the links between environment, climate, society and public health in the Earth observation context.

To demonstrate the relevance of existing applications derived from satellite EO in the public health sector.

To identify existing or potential data, indicators, methods and technologies developed from EO that can support the public health sector.

CO-ORGANISERS

- Public Health Agency of Canada (PHAC)
- Canadian Space Agency (CSA)

IN PARTNERSHIP WITH

- Association Québécoise de Télédétection (L'AQT)
- Centre National d'Études Spatiales (CNES)
- Committee on Earth Observation Satellites (CEOS) / Working Group on Capacity Building & Data Democracy (WGCapD)
- GEO BON
- Institut de Recherche pour le développement (IRD)

- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)
- Université de Sherbrooke
- Universitat Wien
- Vet Agro Sup
- World Health Organization

REGISTRATION

On-site participants (Canada):

Please note the places for on-site workshop participation are limited. Registered EO Summit participants will have access to the workshop. In order to maximize your chance to participate to the workshop, we invite you to register for the EO Summit (https:/crss-sct.ca/conferences/csrs2017/registration/). The organizers expect that workshop participants have all their expenses (travel, meals, etc.) covered.

Foreign participants (outside Canada):
If you cannot attend the workshop in Montreal, it will be possible to attend it virtually. Session 1 and 2 of the workshop (9:00AM – 12:10PM EST) will be accessible to virtual attendees via *GoToMeeting* thanks to CEOS WGCapD. The registration for and participation in the *GoToMeeting* session is free, but you must register for it before June 21, 2017 is mandatory. Please complete the registration form at hhttp://ceos.org/meetings/wgcapd-one-earth-one-health-workshop/and email it to Hilcéa Ferreira at ceos.inpe@dpi.inpe.br, with copy to Guy Aubé at guy.aube@canada.ca.

PROGRAM

9:00 to 9:05 Welcome

Space Utilization and Applications, Canadian Space Agency

9:05 to 9:45 Session 1: Context

Moderator: TBD

9:05 to 9:25 **Tele-epidemiology: which contribution for Earth Observation satellite data?**

Cécile Vignolles
Program manager
Direction de l'Innovation, des Applications et de la Science / Terre-Environnement-Climat
CNES - Centre National d'Etudes Spatiales,
France
UN-COPUOS Expert group on Space and Global Health.

Cécile Vignolles holds an engineering degree in Agriculture and a doctorate degree in Remote Sensing and Agriculture. From 1998 to 2001 she served as research assistant at the Space Applications Institute of the EU Joint Research Centre, contributing to the development of the agrometeorological bulletin within the "Monitoring Agriculture with Remote Sensing" project. From 2002 to 2005 she worked as a research engineer on R&D in Agriculture and Remote Sensing projects at SCOT, a subsidiary of the French Space Agency CNES. From 2005 to 2008, she worked as a research engineer at the GIP Medias-France in charge of R&D projects in tele-epidemiology. She joined CNES in 2009, where she is affiliated with the Directorate of Innovation, Applications and Science in the 'Earth-environment-climate' team in charge of the Earth observation programs within this team; she is responsible of the "Tele-epidemiology" and "Forests" programs.

9:25 to 9:45. Title to follow

Dr. Ramesh Krishnamurthy
Senior Advisor
Health Systems and Innovation cluster
World Health Organization Headquarters

Dr Ramesh S. Krishnamurthy currently serves as a Senior Advisor within the Health Systems and Innovation cluster of WHO Headquarters in Geneva, Switzerland. Prior to this assignment, he had worked as Senior Advisor and Health Scientist at the Coordinating Office of Global Health at U.S. Centers for Disease Control and Prevention in the United States. He also serves as Associate Professor and Assistant Dean at the University of Pacific in California. Dr Krishnamurthy holds a PhD degree in Physical Anthropology from University of Oregon with MPH in Health Services Management from University of California, Los Angeles in the United States. In addition, he holds two other Master of Science degrees in biological sciences from the United States.

9:45 to 12:10 Session 2: Technical presentations

Moderator : Guy Aubé and TBD

9:50 to 10:10 Juli Trtanj, NOAA Climate Program Office, NOAA One Health and Integrated Climate Research Lead

- Topic: Air and Water-borne diseases
- Documents to follow

10:10 to 10:30 Break

10:30 to 10:50 **Earth Observations for Health and Air Quality**

John Haynes
Program Manager for Health and Air Quality Applications
Applied Sciences Program
NASA Earth Science Division

John Haynes serves as Program Manager for Health and Air Quality Applications in the Applied Sciences Program of the NASA Earth Science Division. John entered NASA Headquarters in 2002 through the Presidential Management Fellowship (PMF) program. As required by the PMF program, John completed two detail assignments during his fellowship (NOAA and the U.S. House of Representatives). John converted to a civil service position at NASA Headquarters in August 2004 upon graduation from the PMF program. John Haynes graduated from the University of South Alabama in 1999 with a B.S. in meteorology. In 2002, he graduated with an M.S. in meteorology from the University of Oklahoma. The first portion of his thesis work ("Analysis of Warm Season Morning Convection across the Southern Great Plains") was published in the December 2003 edition of *Weather and Forecasting*. The second portion of his thesis work ("The Evolution of Morning Convective Systems over the U. S. Great Plains during the Warm Season. Part II: A Climatology and the Influence of Environmental Factors) was published in the March 2008 edition of *Monthly Weather Review*. John has received several awards during his tenure including a NASA Aviation Safety and Security Program Award, NASA Group Achievement Awards, and a One NASA Award. In 2006, John was honored by his alma mater (the University of South Alabama) as an Exceptional Alumnus of the School of Meteorology.

10:50 to 11:10 **Climate change and Mosquito-borne diseases in Americas: Toward dynamical modelling and prediction at local scale using Earth observation**

* Thibault CATRY1, Serge Olivier KOTCHI2, Nadine DESSAY1, Antoinette LUDWIG2, Emmanuel ROUX1, Zhichao LI1, Stéphanie BRAZEAU2
1. ESPACE-DEV, UMR 228 IRD/UM/UR/UG/UA, Institut de Recherche pour le Développement (IRD), 500 rue Jean-François Breton, 34093 Montpellier, France,
2. National Microbiology Laboratory (NML), Infectious Disease Prevention and Control Branch (IDPC), Public Health Agency of Canada (PHAC), Canada,

Thibault Catry
Ingénieur de Recherche en Télédétection
Institut de Recherche pour le développement
UMR Espace-Dev

Thibault Catry est ingénieur de recherche en Télédétection basé à la Maison de la Télédétection, Montpellier. Il est titulaire d'un master en Sciences de la Terre de l'Université de Clermont-Ferrand II (obtenu en 2007) et d'un doctorat européen en Modélisation Physique pour la Protection de l'Environnement de l'Université de Bologne (Italie) et de l'Université de La Réunion (cotutelle, obtenu en 2011). Après avoir été ingénieur d'étude à l'Université de La Réunion en 2012, il a rejoint l'IRD en Février 2013, en intégrant l'UMR ESPACE-DEV, Unité Mixte de Recherche Espace au service du Développement, d'abord à La Réunion (station de réception satellite SEAS-OI) puis à Montpellier depuis 2015. Il est spécialiste de la télédétection RADAR et s'intéresse aux applications des traitements des images RADAR (RADARSAT-2, TerraSAR-X, Sentinel 1) et optique (SPOT, Sentinel 2, Pléiades) pour des thématiques liées à la santé (zones humides et maladies vectorielles), aux risques naturels (surveillance volcanique, inondations…) ou à l'hydrologie spatiale.

Serge Oliver Kotchi
Medical Geographer
Public Health Risk Sciences Division
National Microbiology Laboratory
Infectious Diseases Prevention and Control Branch
Public Health Agency of Canada

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Dr. Serge Olivier Kotchi a obtenu un diplôme de géomètre de l'Institut National Polytechnique Félix Houphouët-Boigny (INP-HB), Yamoussoukro, Côte d'Ivoire, en 2000, une maîtrise en sciences géomatiques de l'université Laval, Québec QC, en 2004, et un doctorat en sciences géographiques de la même université en 2015. Il a exercé comme Géomètre dans plusieurs cabinets privés en Côte d'Ivoire entre 1998 et 2001. Il a offert des services de consultation en Télédétection pour plusieurs organismes privés et publiques au Québec et à l'international entre 2003 et 2007. Il a été assistant de recherche et d'enseignement de 2003 à 2009 à l'université Laval. Depuis 2009 il est Géographe médical à l'Agence de la santé publique du Canada (ASPC), Saint-Hyacinthe QC. Ses intérêts de recherche incluent la télé-épidémiologie, la géomatique de la santé, les géostatistiques, l'évaluation d'incertitude des données et des indicateurs dérivés de la télédétection, et plus spécifiquement le développement d'indicateurs dérivés de la télédétection et reliés aux déterminants de la santé en vue de supporter les études épidémiologiques et l'évaluation des risques en santé publique. Il a reçu plusieurs prix et distinctions dont le prix national 2015 de la meilleure thèse de doctorat au Canada, octroyée par la Société canadienne de télédétection, une bourse d'excellence de l'Agence canadienne de développement international (ACDI), et une bourse d'études supérieures à incidence industrielle du Conseil de recherches en sciences naturelles et en génie du Canada (CRSNG).

11:10 to 11:30 **Integrating EO-based data into vulnerability assessments; Case study and reflection on urban health research**

Marion Borderon
Assistant professor in geography
University of Vienna, Austria

Marion Borderon is an assistant professor in geography at the University of Vienna, Austria. Her research interests include public health, population, and development studies. Much of her work focuses on contributing to the development of concepts and methods for the spatial assessment of vulnerability and risk in the context of environmental transformation. She has conducted research in limited data settings and gained significant experience in population-based surveys and data analysis in Congo, Senegal, Mauritania, India, and Algeria. Her research is also concerned with decision-making, policy implementation and the provision of spatial decision-support systems in the context of public health, climate change, and post-disaster situations. Previously, she had worked as a researcher and project leader at the University of Salzburg, Austria. She holds a PhD in geography from Aix-Marseille University, France, with a focus on malaria in Dakar, Senegal."

11:30 to 11:50 **Healthy Societies and Healthy Ecosystems: An Integrated Monitoring Approach for Biodiversity and Human Health**

Michael J. Gill
Co-chair of GEO BON – Group on Earth Observations, Biodiversity Observation Network

For the past 25 years, Mike has led the design and implementation of user-driven and results-oriented biodiversity conservation, research, and monitoring programs. These programs have spanned the Arctic, North America, Eurasia, Antarctica and Latin America and have involved partnerships with Aboriginal, national and sub-national governments, academia, industry and NGOs. Mike has advised multiple governments, senior officials, and Environment Ministers on conservation issues and published over 50 scientific publications, books and book chapters. Mike lives with his family in Wolfville, Nova Scotia, Canada.

11:50 to 12:10 Ravi Shankar Santhana Gopala Krishnan: Lead GIS support, Ebola response & Global Polio eradication initiative, WHO

- Topic: Health Emergency
- Documents to follow

World Health Organization

12:10 to 13:10 Lunch

13:10 to 16:00 Problem solving using scenarios (in small groups)

Animator : Richard Fournier

Scenario 1: **Pandemic**
Geospatial data and assessments as a response element in a pandemic: What are the lessons, and are we prepared?

Scenario 2: **Mosquito-borne diseases**
What are the environmental determinants regarding the risk of transmission of mosquito borne diseases?

Scenario 3: **Microbial water contamination**
There are several gaps that impede progress in using remote sensing to observe bacteria in water and to contribute effectively to early warning or reporting activities. What are the critical EO data requirements for addressing coastal-marine and inland microbial contamination?

Scenario 4: **Air quality and chronic conditions**
Outdoor air pollution affects large swaths of the general population in urban areas. What are the critical EO data requirements for addressing human exposure related issues of air-borne diseases and chronic conditions?

Scenario 5: **Vulnerable human population**
The capacity of human to respond to and recover from adverse events or health threats will depend on many factors, such as social, behavioral, natural and engineered systems. What EO data and tools can be used to identify vulnerable human population?

Scenario 6: **Tick-borne diseases - Lyme**
Lyme is the most commonly reported vector-borne disease in the temperate climatic regions. Can we identify suitable EO-derived information sources that can help predicting timing (seasonality, climate change) and geographic occurrence of Lyme disease risk?

Each scenario discussion will be facilitated by an expert in the field. A predefined list of questions will be addressed during the scenario discussion

16:00 to 16:50 Discussion on the scenarios & upcoming report
(i.e. EO potential contributions to public health)

16:50 to 17:00 **Conclusion**

Matthew W. Gilmour, PhD FCCM ARMCCM
Scientific Director General
National Microbiology Laboratory

Public Health Agency of Canada |
Government of Canada

Public Health Agency of Canada | Agence de la santé publique du Canada

Dr. Matthew Gilmour is the Scientific Director General of Canada's National Microbiology Laboratory (based in Winnipeg, Guelph, Lethbridge, St. Hyacinthe, and other satellite locations). These laboratories lead the national outbreak response and surveillance activities for infectious diseases, including those caused by respiratory and foodborne pathogens. The national programs for diagnostic and reference testing services and research reside at these laboratories, including for high-priority pathogens such as viral hemorrhagic fevers, arboviruses, tick-borne pathogens, sexually-transmitted infections and vaccine-preventable diseases.

Dr. Gilmour and his team innovated a whole genome sequencing approach that brings the power of whole genome sequencing to outbreak response activities. The first demonstration for the power of genomics came during the 2008 nationwide listeriosis outbreak, as this team is recognized as completing one of the first applications of whole-genome sequencing of a bacterial pathogen during the scope of a public health investigation. The transformative nature of genomics and other high-resolution technologies continue to be explored and implemented to improve diagnostic testing and epidemiological investigations.

Dr. Gilmour previously served as a Clinical Microbiologist with Diagnostic Services Manitoba based at the Health Sciences Centre, adjacent to the NML in Winnipeg, where he was the laboratory lead for Infection Prevention & Control, and he remains interested in the transmissibility of antibiotic resistant organisms.

Dr. Gilmour received his PhD at the University of Alberta under Dr. Diane Taylor, and his thesis work was awarded the Izaak Killam Memorial Scholarship, the Canadian Society of Microbiologist's Graduate Student Microbiologist of the Year Award, and the Governor General's Gold Medal. Dr. Gilmour is an Associate Editor with the Journal of Medical Microbiology and BMC Microbiology, and he also serves as Secretary-Treasurer for the Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID).

17:00 – 17:30 Dr Nicholas Ogden keynote speaker

One Health - Contribution of Earth observation to public health issues

Nick Ogden
Director and Senior research scientist
Public Health Risk Sciences division
National Microbiology Laboratory
Public Health Agency of Canada

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Dr. Nick Ogden is a UK-trained veterinarian (University of Liverpool, 1983). After 10 years of mixed clinical practice, he then completed a doctorate in Lyme disease ecology at the Department of Zoology, University of Oxford in 1996. During the six years he spent as a lecturer at the Faculty of Veterinary Science, University of Liverpool, he continued his research into the ecology and epidemiology of tick-borne diseases of public health importance in Europe and those of importance to livestock production in Africa. In 2002 he moved to Canada, where he continued research on the ecology of Lyme disease and other zoonoses and climate change as a research scientist at the Public Health Agency of Canada. As interim Director of the Environmental Issues Division of the Public Health Agency of Canada he directed a program on climate change and vector and water-borne disease risks, and community adaptation to these risks. As Director of the Zoonoses Division he directed programs on national coordination, surveillance and prevention of zoonoses including Lyme disease and West Nile virus. He is now a senior research scientist and Director of Public Health Risk Sciences division within the National Microbiology Laboratory of the Public Health Agency of Canada focusing on the ecology, epidemiology and genetic diversity of vectors and zoonotic and vector-borne micro-organisms, assessing impacts of climate change and developing tools for public health adaptation in the field of zoonoses.

ORGANIZING COMMITTEE

Guy Aubé, Earth Observation Applications and Utilizations, Canadian Space Agency

Stéphanie Brazeau, Head of the Public Health Geomatics Unit, Public Health Risk Sciences Division, National Microbiology Laboratory, Public Health Agency of Canada

Antoinette Ludwig, Veterinary epidemiologist, mathematical modeler; Public Health Risk Sciences Division, National Microbiology Laboratory, Infectious Diseases Prevention and Control Branch, Public Health Agency of Canada

Marie-Josée Champagne, Chief Population and Environmental Determinants Section, Public Health Risk Sciences Division, National Microbiology Laboratory, Public Health Agency of Canada

Cécile Vignolles, Program manager, Tele-epidemiology, CNES and UN-COPUOS Space and Global Health expert team.

Nadine Dessay, Remote sensing expert, ESPACE-DEV, UMR 228 IRD/UM/UR/UG, Institut de Recherche pour le Développement (IRD), Montpellier, France

Émmanuel Roux, Mathematical modeler, ESPACE-DEV, UMR 228 IRD/UM/UR/UG, Institut de Recherche pour le Développement (IRD), Montpellier, France

Thibault Catry, Remote sensing expert ESPACE-DEV, UMR 228 IRD/UM/UR/UG, Institut de Recherche pour le Développement (IRD), Montpellier, France

Dominique Bicout, Mathematical modeler, BioMathematiques et Epidemiologie - EPSP/TIMC UMR 5525 VetAgro Sup Campus Vétérinaire de Lyon

Richard Fournier, Professor in geomatics and remote sensing, Département de géomatique appliquée, Université de Sherbrooke.

Serge-Olivier Kotchi, Medical geographer, Public Health Risk Sciences Division, National Microbiology Laboratory, Public Health Agency of Canada

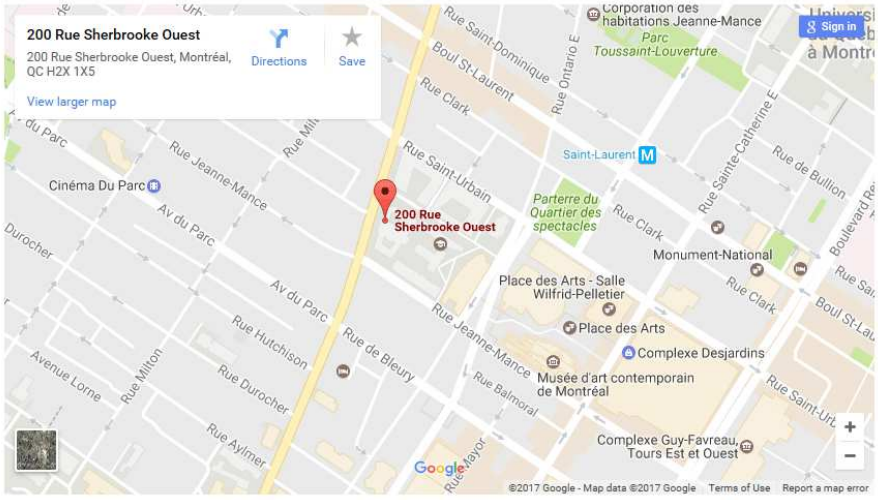
Yann Pelcat, Medical geographer, National Microbiology Laboratory, Public Health Risk Sciences Division, Public Health Agency of Canada

Hilcea Ferreira, National Institute for Space Research, CEOS Working Group on Capacity Building & Data Democracy (WGCapD)

Dirk Werle, Geographer, Ærde Environmental Research, Halifax, Canada

VENUE

The workshop will be held at the UQAM in Montreal, Canada. Conference entrance, registration and information kiosk will be located on: 200 rue Sherbrooke Ouest, Montreal (Quebec, Canada), H2X 3P2.



CERTIFICATE OF PARTICIPATION

All participants will receive a certificate of participation. The certificates will be prepared and issued by the Quebec Remote Sensing Association (AQT).

WORKING LANGUAGE

English

INFORMATION

https://crss-sct.ca/conferences/csrs2017/one-earth-one-health-workshop/

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