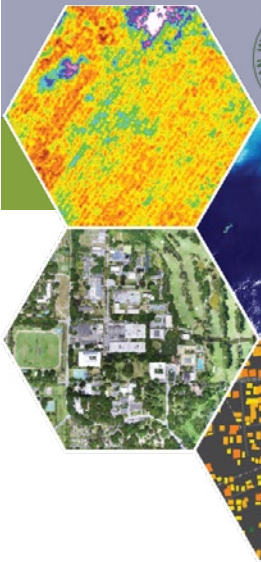# HAPPY NEW YEAR 2021

WISHING ALL THE BEST TO YOU AND YOURS

GEOINFORMATICS CENTER

GIC drone image from a campus-wide survey at AIT, Thailand (above)

AIT GEOINFORMATICS CENTER
January 2021 NEWSLETTER

PyAEZ Python Module Online Training Course

Agriculture officers from six Asia-Pacific countries prepared for climate change's effects on agriculture by participating in a GIC online training course focused on the Python for Agro-ecological Zonation (PyAEZ) Python package to create detailed AEZ data products.

Twenty-two participants from Lao PDR, Myanmar, Bangladesh, India, Cambodia, and Thailand attended the five-day training course which took place from 30 November – 04 December, 2020.

PyAEZ has roots in Global Agro-ecological Zonation (GAEZ), a program that uses global datasets to quantify impacts on land productivity based on historical climate variability and future climate change. GIC's intent in developing PyAEZ was twofold: 1) to make GAEZ more accessible to users by transcribing it into an approachable scripting language, in this case Python; 2) and to provide users the capability to input their own datasets (finer than global scale, at national scale or better) to create AEZ data products with higher detail.

The training course was aimed at enhancing participants' skills necessary to operate PyAEZ. Beyond basic tasks including running the package and loading input data, adequate time was provided to address each of PyAEZ's modules - Climate Regime, Crop Simulations, Climate Constraints, Soil Constraints, Terrain Constraints, and Economic Suitability Analysis.

The December 2020 event marks GIC's second AEZ training course for 2020. The first training course, which took place at GIC in February 2020, was a 3-day overview of the GAEZ program led by

Online PyAEZ Training Course (cont.)

Dr. Freddy Nachtergaele and Gianluca Franceschinini from FAO.

GIC Research Associate and training course co-lead Thaileng Thol said that training participants intend to implement PyAEZ in their home countries in order to understand how climate change will affect nation-wide agriculture in the crucial years to come.

PyAEZ was developed at GIC by Lakmal Deshapriya (GIC Research Associate) and Thaileng Thol from 2019-2020. PyAEZ is openly shared and can be accessed at GIC's Github page.

Understanding Risk Forum 2020

GIC and ITC, University of Twente (Netherlands) introduced a new open-source risk assessment and decision-making tool (platform) called *RiskChanges* in a session at the 2020 Understanding Risk Forum on 03 December 2020.

Session attendees gained insight into multi-hazard risk assessment, especially regarding how risk changes over time, and how it can be used for an effective disaster risk management. The session also explored *RiskChanges*, a new platform which allows both end-users and stakeholders to assess and evaluate the prevailing risks in a designated area. RiskChanges helps users make informed decisions in order to adopt the best available risk reduction alternatives.

The session was conducted by Dr. Manzul Kumar Hazarika (GIC Director), Prof. Cees van Westen (ITC - University of Twente, Dept. of Earth Systems Analysis), and Ashok Dahal (Developer & ITC Masters Student).

The Understanding Risk Forum is a biennial conference that brings together disaster professionals from around the world to share the latest innovations in the field of disaster risk assessment and its management. For 2020, the forum was held online due to the global COVID-19 pandemic.

For more information including the agenda for the 2020 Understanding Risk Forum please visit the Understanding Risk Forum website.

UN ESCAP Compendium

GIC was recognized as a key player for space applications in a new United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) publication on the implementation of geospatial data for sustainable development in the Asia-Pacific Region.

The publication, titled *Geospatial Practices for Sustainable Development in Asia and the Pacific 2020: A Compendium* (hereinafter referred to as the Compendium), was released online in November 2020.

Central to the focus of the Compendium are six thematic areas which were identified in a UN ESCAP 2019 publication that support both the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction; those six areas include: Disaster Risk Reduction and Resilience, Social Development, Energy, Connectivity, Natural Resource Management, and Climate Change.

The Compendium uses examples of geospatial data in action by UN-ESCAP's regional partner institutions to deliver a survey of Asia-Pacific progress in the fore mentioned thematic areas. A section which explored activities related to the Disaster Risk and Reduction theme highlighted GIC's recent innovative efforts in Uttarakhand, India.

In that project, GIC and partners completed a state-wide, multi-hazard disaster risk assessment for Uttarakhand. Big data analysis allowed disaster exposure for Uttarakhand communities and infrastructure to be quantified, a first for the state. The multi-hazard risk maps created for the project are currently utilized in a decision support system that facilitates better disaster management for Uttarakhand state officials.

Click here to access the Compendium to learn more about GIC's involvement in Uttarakhand as well as the sustainability-focused geospatial activities of other agencies in the region.

AIT Marine Plastics Abatement Program - GIC Lab Sessions

GIC led two lab sessions on innovative macro plastic waste sampling techniques for AIT's Marine Plastics Abatement (MPA) Masters Program on October 27 & 30, 2020.

Dr. Dan Tran, GIC research specialist, initiated a discussion on applications of machine learning for plastic waste identification. Following a quick introduction to machine learning principles, Dr. Tran demonstrated GIC's current progress in using deep learning to identify macroplastics from 360° camera images.

GIC senior research associate Frank Yrle introduced MPA students to unmanned aerial vehicles (UAV) as data collection tools. Students explored recent case studies in which UAV were used to estimate beachside plastic waste. These concepts were put into practice during a lab exercise where students identified plastic waste in UAV images for varying altitudes and waste sizes. As it was a web-based activity, both students present in class and those attending virtually from their home countries were able to participate. Collective results were displayed in real-time and served as a basis for a follow-up discussion with GIC's Associate Director, Dr. Kavinda Gunasekara.

A hands-on practical session at the AIT sports ground afforded MPA students an opportunity to operate a multirotor UAV. Students practiced basic aerial maneuvers and image capture under the supervision of licensed UAV pilots including Rajitha Athukorala from GIC.

The two GIC-led lab sessions served as a component of *Identification and Collection of Marine Plastic Waste*, a requisite course for AIT's MPA Masters Program.

The MPA Masters Program is a new offering at AIT from the Environmental Engineering and Management Program's Department of Energy, Environment, and Climate. MPA launched in August 2020 with a focus on management of wastes, recovery of marine litter, innovation, and empowerment. Follow this link for more information on AIT's 1-year MPA Masters Program.

GIC at Sea of Solutions 2020 Online Conference

GIC participated in the United Nations Environment Program's second annual Sea of Solutions conference from 24-26 Nov 2020.

Due to the ongoing COVID-19 pandemic, Sea of Solutions 2020 was held online as a virtual event.

Dr. Kavinda Gunasekara, Associate Director of the Geoinformatics Center, gave a lightning talk during a parallel session on Environmental innovation, digital transformation and frontier technologies to tackle plastic pollution. Dr. Gunasekara's presentation focused on GIC's development of deep learning algorithms for identification of

riverside plastic waste from 360° camera images.

GIC was one of 19 exhibitors who created a virtual booth for conference participants to interact with. Similar to a physical booth, participants had the opportunity to "stop-by" and engage GIC staff on the center's ongoing plastic research via video chat.

One benefit of Sea of Solutions' online platform is the capability to conveniently present participants with information in multiple media formats. GIC's booth featured videos clips and digital format posters which highlighted the center's diverse array of research. Related projects of interest featured

at the virtual booth included a GIS analysis to create Marine plastic density maps of the Mekong River Basin and custom smart device applications for citizen science-based plastic data collection.

The theme for Sea of Solutions 2020 was "Wasting less plastic and keeping it out of the ocean – Has the needle moved?".

The United Nations Environment Program and the Coordinating Body on the Seas of East Asia created Sea of Solutions to seek out possible answers to the ever-increasing plastic problem facing our oceans and waterways. The conference is held annually to ignite collaboration and idea exchange between stakeholders with the goal of reducing plastic waste in waterbodies. GIC participated in the first annual conference in 2019 which was held at UN-ESCAP, Bangkok, Thailand. For more information on Sea of Solutions please visit this link.
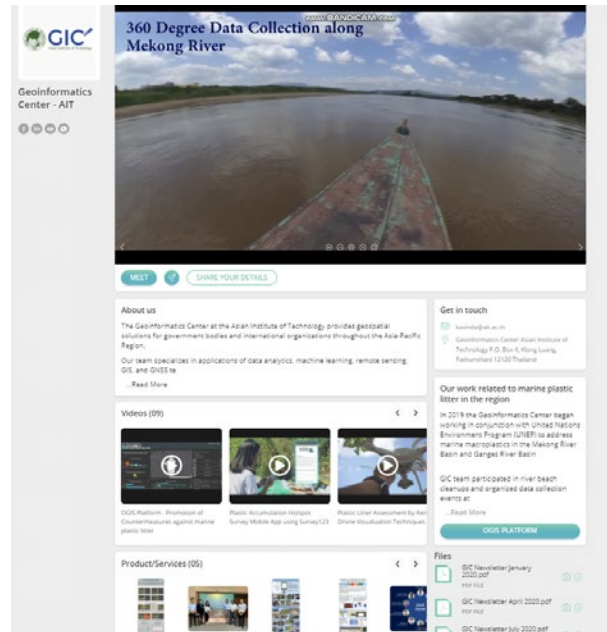
Click here for a playlist of videos featured at GIC's Sea of Solutions virtual booth.

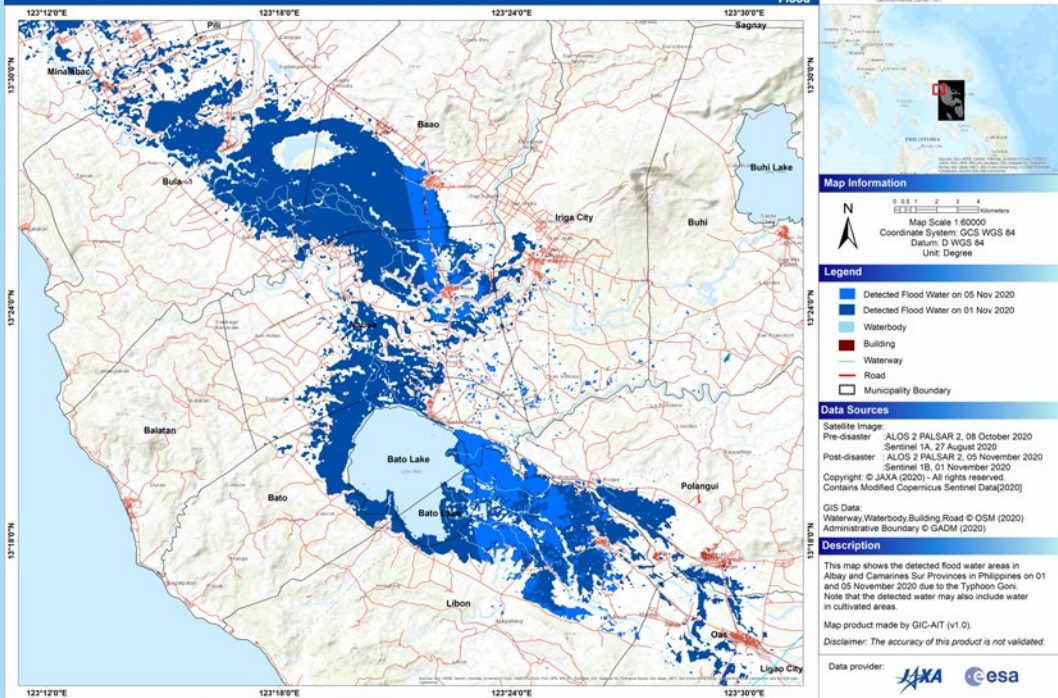## Featured Sentinel Asia Value Added Product

Philippines Flood: November 2020

Typhoon Goni
- Gusts up to 310 km/h
- Landfall on 01 Nov
- Exit early on 02 Nov

DETECTED FLOOD WATER IN CAMARINES SUR PROVINCE, PHILIPPINES
As observed by ALOS-2 PALSAR 2 image on 05 November 2020 and Sentinel 1B image on 01 November 2020

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14.08247° N, 100.6132° E

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