GEO Health Community of Practice Special Edition: AmeriGEO

September 13, 2022

John Haynes, NASA (USA)
Juli Trtanj, NOAA (USA)
Helena Chapman, NASA (USA)
Angelica Gutiérrez (NOAA) (USA)
Agenda

11:00AM – 11:15AM EDT/GMT
❖ Welcome & Opening Words

11:15AM – 12:10PM EDT/GMT
❖ Flash Talks (4-min talks)

12:10PM – 12:30PM EDT/GMT
❖ Moderated Q&A discussion
Flash Talks

John Haynes, NASA (USA)
Juli Trtanj, NOAA (USA)
Helena Chapman, NASA (USA)
Angelica Gutiérrez (NOAA) (USA)
Flash Talks: Environmental Health

- **An Integrated Approach to Air Quality Management in Urban Areas in Latin America**
  - Ana Prados (University of Maryland Baltimore County, USA)

- **An Overview of CDC’s Environmental Public Health Tracking Program**
  - Angela Werner (CDC Environmental Public Health Tracking Program, USA)

- **Environmental Justice and Indigenous People**
  - Natalia Bermudez (NASA SERVIR, USA)

- **Social Media and Earth Observations in San Manuel, Cortés: El Zate Project**
  - Luis Herrera Maldonado (Universidad Tecnológica Centroamericana, Honduras)

- **ARSET: Building Remote Sensing Capacity throughout the Americas through Bilingual, Online Trainings**
  - Jonathan O’Brien (NASA Goddard Space Flight Center, USA)
An Integrated Approach to Air Quality Management in Urban Areas in Latin America

Ana I. Prados¹, Bryan Duncan², Kevin Cromar³, Maria Valeria Díaz Suarez⁴, and Christoph A. Keller².⁵

¹University of Maryland Baltimore Co.
²NASA GSFC
³New York University
⁴City of Quito
⁵Morgan State University

September 13, 2022

Contact: aprados@umbc.edu
Combining the Strengths of Multiple Monitoring Technologies for Better Air Quality Management

NASA Forecast

Machine Learning

Ground Obs.

Air Quality Management

Satellite Data

Low Cost Sensor Data

Improved Air Quality Health Indices and Communications

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Outcomes and Use of NASA Resources: Quito, Ecuador

- Shared information on NASA capacity building resources and web portals
- Developing tailored training in Spanish on the use of NASA data products for monitoring urban air pollution and particulate pollution from fires
- Producing localized air quality forecasts daily to support decision-making
- Conducted health analysis of the associations of short-term pollution exposures with acute respiratory morbidity health risks and evaluated the local air quality index (IQCA), using Quito’s extensive monitoring network
- Quito is considering using the health analysis results to improve its IQCA so that it is more representative of air pollution risks to the public within the city.
Outcomes and Use of NASA data: Rio de Janeiro, Brazil

- Provided training on exposure assessment methodologies for use in health research.
- Built capacity to enable local stakeholders to conduct analysis of the adverse health impacts of outdoor air pollution
- Also providing daily localized air quality forecasts
- It is expected that this research and remote sensing observations will be used to inform the location of additional PM$_{2.5}$ monitors.
Updates from the CDC Environmental Public Health Tracking Program

GEO Health Community of Practice
September 13, 2022 Meeting

Angela Werner, PhD, MPH
Environmental Public Health Tracking Program
Emergency Management, Radiation, and Chemical Branch
Division of Environmental Health Science and Practice
Tracking empowers people to make information-driven decisions to protect and improve health.

The findings and conclusions in this presentation have not been formally disseminated by the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.
Tracking makes standardized data easier to use.

Interactive Data Explorer (maps, charts, and tables)

Dashboards

Application Program Interface (API)

DELIVERS DATA RELEVANT TO YOUR NEEDS

Tracking makes standardized data easier to use.
North American Land Data Assimilation System (NLDAS)

Modern-Era Retrospective Analysis for Research and Applications, Version 2 (MERRA-2)

Moderate Resolution Imaging Spectroradiometer (MODIS)

Light at Night (collaboration in early stages)

Goddard Earth Observing System composition forecast (GEOS-CF)

Visible Infrared Imaging Radiometer Suite (VIIRS)

Air Quality System Ambient Air Monitor Data

Landsat 8 – Normalized Difference Vegetation Index (NDVI)

Cyanobacteria Assessment Network (CyAN; in progress)

Climate Prediction Center (CPC) Climate and Health Monitor and Outlook (CHMO)

GridMet Standardized Precipitation Evapotranspiration Index (SPEI)

National Land Cover Database (NLCD)

United States Drought Monitor (USDM)

Gridded 5km GHCN – Daily Temperature and Precipitation (nCLIMGRID)

Data & Expertise

Other Partners

Contact info: Angela Werner, PhD, MPH awerner@cdc.gov
Environmental Justice and Indigenous Communities

Natalia Bermudez
NASA/SERVIR

Wednesday, 17 of August, 13:30pm a 15:30pm PYT
Universidad Americana
AmeriGEO Week 2022
Agencia Espacial del Paraguay -AEP-
Objectives

Focusing on indigenous communities from a gender perspective during AmeriGEO Week 2022 was an important action that led discussion on preserving biodiversity, ecosystems, and cultural diversity as well as equitably protecting indigenous people from marginalization, food insecurity, environmental hazards, and human displacement. Earth Observation has an important role to play in this situation and it can pave the way for a better understanding of the issues, fair formulation of public policies adjusted to indigenous communitarian needs, and a more effective decision-making process.

1. Identify and address environmental and social challenges that are disproportionality impacting specific communities and provide insights that can link their conditions to social vulnerability and migration.

2. Recognize the use of Earth Observation and remote sensing technologies that had been previously used to monitor natural and social systems, improve decision-making, and address adaptive community-based measurements in rural, and indigenous territories.

3. Identify the connection between Earth Observation and other disciplines as well as find engagement with academia, non-scientific communities, indigenous knowledge holders, stakeholders, and local or national decision-makers.

4. Exchange and promote discussions that lead to the understanding of the equal use of Earth Observations and accelerate the interaction between participants to strengthen integrative Earth Observation-based solutions.

5. Present case studies that highlight best practices and success stories involving the use of Earth Observations in relation to environmental justice and indigenous communities.

#AmeriGEOWeek2022
What were the key outcomes of your project?

16 Speakers

8 Indigenous Tribes
- Shuar
- Maya Kaqchikel
- Mbya Guaraní
- Ashéninka
- Yaminahua
- Sikuani

7 Countries
- Colombia
- Guatemala
- Ecuador
- Peru
- Panama
- Paraguay
- USA

#AmeriGEOWeek2022
Considerations

1. Recognize and advocate that indigenous people play a key role in the conservation of valuable remaining ecosystems, biodiversity management, and reforestation programs.

2. Advocate for open access to data, democratize EO, and digital inclusion in the Americas. This open data will promote free access to information, apps, and websites that can help communities of the Americas to lead and communicate their priorities. Some of the priorities discussed during the session were: Land delimitation, land use management, forest monitoring, forest carbon estimates, tracking illegal use, deforestation, and violation on their communal territories and rights.

3. The combination of science and traditional knowledge has incredible potential if designed carefully and equitably with a great deal of patience, respect, and research. Both Western and Indigenous approaches and perspectives have their strengths and can greatly complement one another.

4. Indigenous land is experiencing intense pressure by deforestation and forest degradation due to external forces. Economic benefits for Indigenous peoples to conserve and reforest should be an alternative worthy of implementation. The proper engagement and empowerment of indigenous communities with economic projects in preservation efforts must be deeply embedded in their rights, participatory community plans and land management tools.

5. Delivery of services on capacity development should promote the inclusion of Indigenous youth and women in training activities tied to communal priorities and participatory projects. An applied science approach bringing training on basic GIS, open data, software licensing, leadership, and land use management needs to also be accompanied by cultural empowerment and environmental education to ensure that traditional values do not lose their power.

#AmeriGEOWeek2022
Thank You

Collaborate and communicate with AmeriGEO:

#AmeriGEOWeek2022
Social media and Earth observation in San Manuel, Cortés: El Zate Project

Luis Herrera Maldonado
Centro Universitario Tecnológico, Universidad Tecnológica Centroamericana, UNITEC, San Pedro Sula, Honduras

luis.herrera@unitec.edu.hn

Thematic area: Biodiversity and Ecosystems

Part of the Cortés Data Hub
During hurricanes Eta and Iota in 2020, Honduras suffered considerable impacts at river and mountain levels.

San Manuel is a small city located in the Department of Cortés, in the northern part of Honduras. It has a population of 60,000 people living in 11 small villages around the Ulúa River and several mountains.

One of the most important mountains is the hill named “El Zate” (15°20’31"N, 87°55’28"W), which surrounds the urban zone of this city. “El Zate” is 262 meters above sea level and has about 6 kilometers of the surface according to the application named “Relive”.

To develop a pilot project to stimulate a culture of appreciation and care towards nature as present in “El Zate”.

Awareness campaign about the ecological conditions of the Zate Hill to promote disaster prevention, the care of natural resources and the touristic potential of the region.

Google Earth is used to monitor river flows, landslides, and deforested zones.

Starting in 2021, it has 295 followers, ranging in ages are from 18 to 65 years old, connecting people from Honduras, Costa Rica, the USA, Canada, Spain, and Nicaragua. Every week, images and videos of earth data, flora, and fauna are uploaded. As well as, updated information on the ecological conditions of the hill.
Google Earth showed the deforested zones and perimeter, and takes aerial views of the hill “El Zate” from space.

The touristic potential of the hill could play an important role in generating economic opportunities and jobs.
This pilot project stimulates a culture of appreciation and care towards nature as present in “El Zate”.

A project for bird watching is being developed.

The Municipality of San Manuel is interested in supporting the project and the neighbours are helping the reforestation initiative, they send videos to report issues in the communities (including the recent floodings).

Since it is part of UNITEC’s Earth Observation Project in Cortés, that will help the visibility of “El Zate” (see the [Cortés Data Hub](#)).
ARSET – Building Remote Sensing Capacity Throughout the Americas Through Bilingual, Online Trainings

Jonathan O’Brien

September 13, 2022
What is ARSET?

• ARSET provides accessible, relevant, and cost-free training on remote sensing satellites, sensors, methods, and tools.

• Our trainings are:
  – Online and *in-person
  – Open to anyone
  – Live, instructor-led or self-guided
  – Tailored to those with a range of experience in remote sensing, from introductory to advanced
  – Training materials available in English and Spanish with some delivered live in Spanish
Impact in the Americas

- To date, ARSET has trained over 86,000 participants worldwide (not including YouTube views).
- We currently have 26 online trainings in Spanish, broadening our reach to include all of the Americas.
How are these trainings being used in the Americas?

- Management of Newfound Oil and Gas Deposits in Colombia
- Estimating Surface Water Balance and Volume in South American Basins
- Assessing Impacts to the Environment and Sanitation after Disasters in Ecuador

- The ARSET Website
  - appliedsciences.nasa.gov/arset

- Link to Spanish Trainings
  - https://appliedsciences.nasa.gov/join-mission/training?program_area=All&languages=5&source=All&page=0

Sign up for our Newsletter to get email updates on new trainings.
Flash Talks: Infectious Diseases

- **Effects of Climatic, Social and Policy Factors on SARS-CoV-2 Reproduction Number in Three Contiguous Countries of Tropical Andean South America**
  - Josh Colston (University of Virginia, USA)

- **Mapping the Impact of Hurricanes Iota and Eta and the COVID Pandemic in San Pedro Sula, Honduras**
  - Rafael Delgado Elvir (Universidad Tecnológica Centroamericana, Honduras)

- **Can Carbon Dioxide be used as an Indicator of Bioaerosol Activity and Promote Human Health?**
  - Mayank Gangwar (University of Florida, USA)

- **A Socio-environmental Framework for Developing Predictive Intelligence for Water-borne Diseases**
  - Moiz Usmani (University of Florida, USA)

- **Use of Soil Moisture Active Passive Satellite Data (SMAP) to Predict the Potential Distribution of Visceral Leishmaniasis and its Vector Lutzomyia longipalpis in Bahia, Brazil**
  - Moara Rodgers (Louisiana State University and Meraki Solutions LLC, USA)
Effects of hydrometeorological and other factors on SARS-CoV-2 reproduction number in three contiguous countries of Tropical Andean South America

Josh Colston, Research Scientist
UVA School of Medicine, Division of Infectious Diseases and International Health
josh.colston@virginia.edu, @jmcolston
South America hit hard by COVID-19:  
- 58m confirmed (>256m estimated) cases  
- 1.3m confirmed (>1.7m estimated) cases  
Relative role of climate, social and policy factors on SARS-CoV-2 transmission unclear  
Disproportionate emphasis on HICs and temperate latitudes

**Rationale**

**Objective**

Model the effects of weather on the district-level SARS-CoV-2 reproduction number (Rt) for three contiguous countries of Tropical Andean South America  
Scope: Colombia, Ecuador, Peru; May – Dec 2020  
Outcome: Daily district- (admin2/3) level reproduction number (Rt) calculated from reported cases using EpiNow2  
Approach: Spatiotemporally disaggregated time series GAMM with EO and other data

**Epidemiological data**

**Hydrometeorological data**

**Covariate data**
Potential uses

SARS-CoV-2 transmission associated with:
- Dry atmospheric conditions
- Lower solar radiation
- Higher population density
- Lower healthcare accessibility
- Increased mobility (less time spent at home)

Weather has a similar sized effect to NPI compliance

Negligible effects of:
- Temperature
- Age structure
- Government response
- Broad ecological regions

All effect sizes were modest

Weather monitoring could be incorporated into disease surveillance

Interventions could encourage greater precaution on cloudy or dry days

High proportion of variance in COVID-19 transmission left unexplained

Thanks!

Research team: Patrick Hinson, Nhat-Lan H. Nguyen, Yen Ting Chen, Hamada Badr, Gaige Kerr, Lauren Gardner, Antonio Quispe, Margaret Kosek, Ben Zaitchik, Josh Colston

Josh Colston, Research Scientist, UVA School of Medicine, Division of Infectious Diseases and International Health, josh.colston@virginia.edu, @jmcolston
Mapping the impact of hurricanes Iota and Eta and the COVID pandemic in San Pedro Sula, Honduras

Rafael Delgado Elvir, a Reyna M. Durón, b Gracia M. Pineda, a,b Javier Hernández, c Maloy Portillo, d Francisco Torres e

aFaculty of Social and Administrative Sciences, Universidad Tecnológica Centroamericana (UNITEC), Tegucigalpa y San Pedro Sula, Honduras
bObservatorio de COVID-19, Universidad Tecnológica Centroamericana (UNITEC), Tegucigalpa, Honduras
cDepartamento de Investigación y Estadística Municipal (DIEM), Municipality of San Pedro Sula, Cortés, Honduras
dDirección de Plan Maestro, Municipality of San Pedro Sula, Cortés, Honduras
eDirección de C3I Smart City, Municipality of San Pedro Sula, Cortés, Honduras

Contact: rafael.delgado@unitec.edu.hn & reyna.duron@unitec.edu.hn
OBJETIVE AND RATIONALE

BACKGROUND
The COVID-19 pandemic as well as hurricanes Eta and Iota, marked the history of Honduras, showing the high vulnerability present nationwide, but especially in the population of San Pedro Sula.

METHODS
As part of the new Cortés Hub Center on Earth Observations, we conducted a survey to map the impact of COVID and hurricanes suffered by citizens and their communities. The survey requested information about COVID, biosecurity measures, jobs, businesses and other socioeconomical aspects during and after the hurricanes.

EXPECTED BENEFIT
Mapping can help identify impacts geographically; interventions are focused in population with higher vulnerability and impacts.

RESULTS AND MAPS
Using ARcGIS Survey and PowerBI, we mapped the responders’ answers.

Contact: rafael.delgado@unitec.edu.hn & reyna.duron@unitec.edu.hn
KEY OUTCOMES

<table>
<thead>
<tr>
<th>61% female, 39% male</th>
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<tbody>
<tr>
<td>12% had COVID during the hurricanes</td>
</tr>
<tr>
<td>Feel in risk of contagion 92%</td>
</tr>
<tr>
<td>3rd dose of anticovid vaccine 61%</td>
</tr>
<tr>
<td>Unemployment and hurricanes 38% before 47% after</td>
</tr>
<tr>
<td>Plan to emigrate 22%</td>
</tr>
<tr>
<td>Would like to start some business* 48%</td>
</tr>
</tbody>
</table>

*mostly related to shops and grocery stores.

Outstanding findings:

The closer to flooded regions, living in poorest sectors, or the highest impact of hurricanes

Were related to

More impact in family, jobs, properties, business loss, risk of contagion &

higher intention to emigrate to other countries or municipalities.

Contact: rafael.delgado@unitec.edu.hn & reyna.duron@unitec.edu.hn
How are the findings currently being used, and what are the potential future uses?

1. To promote the importance of Earth Observations for decision makers.

2. To provide a demonstration project for the Municipality and the Comission for the Valle de Sula that maps the impact of disasters and COVID-19, as well as the behavior of communities.

3. They requested for this information and are getting ready to use is to focus efforts to mitigate emigration and unemployment in selected communities aided by international cooperation agencies and other funding sources.

4. To prepare the capture of massive data in order to advance from a pilot project to a larger one that helps focus interventions for the benefit of communities in need.

Contact: rafael.delgado@unitec.edu.hn & reyna.duron@unitec.edu.hn
Can Carbon Dioxide be used as an Indicator of Bioaerosol Activity and Promote Human Health?

Mayank Gangwar, Moiz Usmani, Antarpreet Jutla

Geohealth and Hydrology Laboratory, Department of Environmental Engineering Sciences, University of Florida, USA
Overview

- How environmental impact can be monitored on the incidence of respiratory infections?

- Apart from direct contact, respiratory infection transmission is driven by temperature, humidity, and population density in outdoor environments and by pollutants and aerosol in controlled indoor environments.

- The impact of bioaerosol activity in indoor environments on acute respiratory diseases

- Can there be a low-cost and safe alternative to determine the risk of respiratory diseases in indoor environments?
Key Outcomes

- **Outdoor environment** - virus transmission appears to decrease within range of 17 to 24°C ambient air temperature was identified*

- **Indoor environment** – CO₂ levels are associated with microbes, ventilation rate, and airborne time of bioaerosols.

- **School buildings** found to have elevated CO₂ concentrations.

Similar approach can be used in the future to determine the transmission risk of emerging or past respiratory infections in an outdoor environment.

IAQ would be incomplete without directly or indirectly monitoring for pathogens.

CO\textsubscript{2} sampling can be regarded as a preliminary step for determining the viral load.

Future research may establish critical CO\textsubscript{2} thresholds to probability of infectious doses of pathogen
A Socio-environmental framework for developing predictive intelligence for water-borne diseases

Moiz Usmani
Juan Chaves-Gonzalez
Rita Colwell
Antarpreet Jutla
Objective and Rationale

- Develop anticipatory decision framework for waterborne diseases.
- Use of earth observation data to predict risk of cholera by integrating hydrological, environmental, epidemiological, microbiological and sociological data.
Outcomes

- Predictive intelligence to save or reduce the disease burden.
- Predictive risk were produced and provided for intervention, in Haiti.
- Possible “paradigm shift” to the anticipatory decision-making process.
Use & Future

- Determine the intervention point.
- Development of anticipatory decision-making framework for prone regions.
- A dominant strain of cholerae O1 El Tor reported globally.
USE OF SMAP DATA TO PREDICT THE POTENTIAL DISTRIBUTION OF VISCERAL LEISHMANIASIS AND ITS VECTOR IN BRAZIL

John Malone, Rebecca Christofferson, Jeffrey Luvall, Jennifer McCarroll, Moara Rodgers*, Prixia Nieto, Elivelton Fonseca

LSU: School of Veterinary Medicine, Electrical Engineering and Computer Sciences; NASA Marshall Space Flight Center; Federal University of Bahia, Sao Paulo State University, Federal University of Uberlandia, Brazil

Moara Martins (mmart66@lsu.edu)
To map and model potential risk areas for VL and *Lu. longipalpis* in Bahia state using SMAP data to identify patterns and/or similarities with environmental risk factors that can promote transmission and dispersal of disease;

Implement dissemination and training programs to promote geospatial mapping and modelling for vector-borne diseases;
The Maxent models for VL in Bahia suggest a seasonal high for SMAP in the months of September, November and January. For the sand fly model, SMAP for the months of October, November, January

A unique match of the VL niche and the surface soil moisture measured by SMAP was observed and defines seasonality for disease occurrence and vector abundance based on soil moisture data.
CURRENT AND FUTURE USE

Dissemination through publications and conferences

Recommendations report and maps presented to the local health agency

Training and technology transfer: workshop and short courses
Flash Talks: Data Integration

- **GeoAI to Advance Global Public Health**
  - Ajay Gupta (Health Solutions Research, USA)

- **Cortés Data Hub: A Pilot Project for Data Integration and Earth Observations for the Cortés Department, Honduras**
  - Reyna Durón (Universidad Tecnológica Centroamericana, Honduras)

- **Spatial Distribution of Energy Demand in Cortés, Honduras**
  - Gabriela Munguía (Universidad Tecnológica Centroamericana, Honduras)
LEVERAGE DATA

Leverage Geocoded Social Determinants of Health and Health Data to understand the impact on health outcomes & health equity.

ANALYZE

Offer location intelligence to the health community and industry broadly.

PREDICT

Improved public health and emergency response efforts resulting in reduced costs and saved lives.
Outcomes

- Anticipates case counts & disease outcomes over a specified period of time & from global to local levels.

- Aids resource allocation decisions – staffing, pharmaceuticals, devices, supplies needed to treat the infected/exposed.

- Increased Visibility into Future Health Outcomes & the Opportunity to Intervene.

- Provide actionable guidance on mitigation measures, e.g., NPI including quarantines, lockdowns, masking, capacity restrictions – from national to hyper-local levels.

- Enables What If Analysis to aid public health decision making.
Leveraging Actionable Insights

US COVID-19 Mortality Risk Index, with risk visualization both color coded and numerically identified.

Africa Mortality Risk Index, for the World Health Organization.

Social Determinant of Health Risk Index, depicting Maryland.
## HSR. health

**Ajay K Gupta, CISSP, MBA**  
Co-Founder & CEO  
240-731-0756 | agupta@hsr.health

**General inquiries:**  
impact@hsr.health

**Careers:**  
https://hsr.health/careers/

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
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<tr>
<td><img src="esri.png" alt="esri" /></td>
<td>HSR.health leverages the broad, global reach of the Esri's ArcGIS Marketplace to market its GeoAI solutions for public health.</td>
</tr>
<tr>
<td><img src="xentility_corporation.png" alt="xentility_corporation" /></td>
<td>Xentity and HSR.health collaborate on designing enterprise ready solutions responsive to the needs of the emergency response and public health communities.</td>
</tr>
<tr>
<td><img src="gideon.png" alt="gideon" /></td>
<td>Data curation and technical collaboration to develop and communicate global infectious disease risks.</td>
</tr>
<tr>
<td><img src="open_geospatial_consortium.png" alt="open_geospatial_consortium" /></td>
<td>A close and historied partnership focusing on broad industry collaboration to leverage geospatial technologies in addressing global public health challenges.</td>
</tr>
<tr>
<td><img src="portals.png" alt="portals" /></td>
<td>Portals LLC and HSR.health are proud to have responded to the shifting needs of governments in addressing COVID-19 response needs.</td>
</tr>
<tr>
<td><img src="aws.png" alt="aws" /></td>
<td>AWS provides promotional credits and technical cloud resources supporting the growth and expansion of our GeoAI suite of solutions.</td>
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<tr>
<td><img src="skymantics.png" alt="skymantics" /></td>
<td>Skymantics and HSR.health collaborate on the extraction of health risk information from EO data in real time.</td>
</tr>
<tr>
<td><img src="RSS-Hydro.png" alt="RSS-Hydro" /></td>
<td>RSS-Hydro and HSR.health collaborate on the extraction of health risk information from EO data in real time.</td>
</tr>
</tbody>
</table>
Reyna M. Durón, Gracia M. Pineda, José Bardales, Héctor Villatoro, Gabriela Munguía, Rafael Delgado Elvir, Luis Herrera Maldonado (Universidad Tecnológica Centroamericana)

Javier Hernández, Maloy Portillo & Francisco Torres (Municipalidad, SPS)

Contact: grac.pineda@unitec.edu & reyna.duron@unitec.edu.hn
• Proper territorial data management is critical for territorial planning projects, research, innovation, and the appropriate follow-up to act for the well-being of populations.

• Data integration is an approach to combining data from varied sources to create unified sets of information that can be used for analysis and decision-making.

• This approach could help the regional development, sanitary control, and disaster mitigation in Cortés.

• Cortés is in Northern Honduras and is considered the industrial region of the country, and continually faces hurricanes, storms, floods, and landslides.
Several offices of the San Pedro Sula Municipality joined in a study about the impact of hurricanes and the COVID-19 pandemic on its population. Data will be used to allocate funding for interventions.

Cortés Data Hub initial page. An interactive environment is available to navigate into the different sections.
• To bring together researchers with decision makers.

• To promote the training of more academics, government teams, and decision-makers in the use of new tools for earth observations and data integration are important for the Cortés development.

• To identify and discuss about the challenges to overcome are the quality and timing of data.

• To educate decisión makers of the región about the use of data integration and technological tools to improve governance.

• An institutional agreement is about to be signed with the San Pedro Sula Municipality, and it includes these type of projects and the participation of students in them.

Contact: gracia.pineda@unitec.edu & reyna.duron@unitec.edu.hn
Spatial Distribution of Electricity Demand in Cortés, Honduras

Gabriela Munguía (a), Gracia Pineda (b), and Héctor Villatoro (a)
(a) Faculty of Engineering, Universidad Tecnológica Centroamericana (UNITEC), San Pedro Sula, Honduras
(b) Faculty of Social and Administrative Sciences, Universidad Tecnológica Centroamericana (UNITEC), Tegucigalpa, Honduras
Guaranteeing a continuous and reliable energy supply for everybody is of vital importance for energy companies, and to achieve this objective, good energy planning work is necessary. For this planning, knowing the location of the demand is crucial to know how to allocate the resources where they are most needed and to develop solutions based on decentralized generation energy systems. However, when studying the electricity consumption geographically in Honduras the disaggregation level reaches only a division of the country in three main regions: Atlantic Littoral Region, Central South Region, and Northwestern Region.

This research is developing an interactive map that shows different energy indicators by municipality in Honduras, Central America. The focus is on electricity demand which is the most versatile energy carrier.

Information provided by the national electric distribution utility is being used combined with public demographic information of the country by a disaggregation level of municipality.
Spatial Distribution of Electricity Demand in Cortés, Honduras

Gabriela Munguía (a), Gracia Pineda (b), and Héctor Villatoro(a)

(a) Faculty of Engineering, Universidad Tecnológica Centroamericana (UNITEC), San Pedro Sula, Honduras
(b) Faculty of Social and Administrative Sciences, Universidad Tecnológica Centroamericana (UNITEC), Tegucigalpa, Honduras

RESULTS

The results presented in this preview are for the department of Cortés, which is where the city of San Pedro Sula, considered the industrial capital of the country, is located. Among the results presented are the electricity consumption per capita, per area, and per sector for each of the twelve municipalities in the department. Additionally, a graph with the Human Development Index (HDI) versus the electricity consumption per capita is shown. In addition to contributing to UNITEC’s Earth Observatory initiative (Cortés Data Hub), this work seeks to play a part in the energy planning work of the country. Please find the interactive dashboard for Cortés at the following webpage: https://tabsoft.co/3Jc8CPg
The data visualization tool in Tableau can be applied so that the public in general, but above all, decision makers can inspect the consumption of their municipality and, with respect to it, make energy planning decisions focused on the decentralization of energy generation.

The capacity of distributed generation needed near the demand for each municipality can be estimated with the help of the geographical tool developed through this research in Tableau because it allows to explore the electricity consumption for each municipality.

The consumption per sector is available in the geospatial information tool in Tableau. When the draft of law: "Law for the Rational and Efficient Use of Energy" becomes public in La Gaceta the top priority must be that the sector that consumes the most in each municipality must be the one that makes the greatest efforts towards energy efficiency.
Q&A Discussion

John Haynes, NASA (USA)
Juli Trtanj, NOAA (USA)
Helena Chapman, NASA (USA)
Angelica Gutiérrez (NOAA) (USA)