

Climate Change and Sea level Rise: Mapping the threat in the Caribbean

The Puerto Rico Science Technology and Research Trust (PRSTRT), AmeriGEO¹, the NOAA Office of International Projects, the NASA Disaster Program, and the USGS group are organizing a Caribbean Mapathon 2022. The PRSTRT realizes that Disaster Risk Reduction (DRR) requires (1) **Sustainable** efforts, and (2) **Resilient** efforts. The PRSTRT has created the Caribbean Center for Rising Seas (CCRS) to add (3) **Adaptation** Tools to enhance the DRR methodology. **Resilience** relays on existing studies that have failed to convince decision-makers of the need to invest in reducing the underlying factors of risk and to take measures for the next centuries.

Different countries have focused mainly on reactive and compensatory investments such as funds for post-disaster response and recovery, the insurance of public assets, and catastrophic bonds to finance reconstruction as part of their sustainability efforts. Adaptation measures will be the next rung of enhancements to DRR. Adaptation will pivot the actions by our elected officials, who are tied to their tenure thus failing to plan for future generations, to embrace a future based approach. Regional resilience and disaster risk reduction programs should be strengthened in the Americas, the Caribbean being an integral part, among inter-institutional and international partners and non-governmental organizations to ensure the timely availability of relevant data the integration of earth observations for the benefit of society.

Adaptation tools that allow customer centric built-in scenarios can generate meaningful and risk specific disaster patterns. These scenarios can best be captured in maps, a readily available tool to build Adaptation scenarios. The scenarios can be constructed as nature based, and socio-natural hazards that interact with increasing frequency with technological and biological hazards, projecting the effects of climate change in complex risk patterns, sea level increases to reveal the catastrophic effects for coastal residents. The CCRS recommends looking at one, two or three meters over the next hundred years to be considered in all scenario generation. This range of extreme scenarios is what is described in the book *Moving to Higher Ground*, p 56-58 and 131 by John Englander, and in the citations from the US Dept of Defense and the Swiss Insurance industry (Geneva Association).

¹ AmeriGEO is a cooperative effort of twenty (20) countries, created in 2014 as an Initiative of the Group on Earth Observations (GEO). AmeriGEO focuses its main activities on Agriculture, Disaster Risk Reduction, Water, Ecosystems – Biodiversity, and health. <https://amerigeoss.org/>

The Caribbean Region is totally exposed to the Sea Level Rise effect that is a slow progressing disaster with permanent effects that will not allow for a period of response and recovery unless we begin to adapt the infrastructure, the supply chains, the visitor economy and critical facilities for commerce and energy distribution to survive the SLR expected in this century. Overall, regional efforts still have a long way to go to advance prospective risk reduction measures — that is, until disaster risk reduction is fully incorporated into the planning of both public and private investments, from conception to design.

To map the disasters risk, the Caribbean countries need to build a Community of Practice that has regional representation and addresses all phases of the cycle and types of disasters. The Mapathon in the Caribbean will allow the countries, academia, communities, and end-users to make a leap in the geospatial data use. Carrying out Hackathons and Mapathons has been good practice for disaster management agencies, the scientific community, and academia to converge in the search for real solutions to real problems in disaster risk reduction. These events allow for capacity building by solving research questions established by the end-users of the information and by the communities challenged by disaster events. Some examples of Mapathons in the Americas were the Mapatón carried out between the District University of Bogotá and the NASA Disaster Program focused on finding solutions to information gaps in disaster risk reduction in the municipalities of economic development priority in Colombia. [La Mapatón de la Universidad Distrital de Bogotá y el Programa de Desastres de la NASA Produce Nueve Prototipos Para el Manejo de Riesgos de Desastres | NASA Applied Science](#). Innovation for disaster risk reduction in Central America led to a Mapatón coordinated by CEPREDENAC, ESRI, Amazon (AWS), and the NASA Disaster Program, that produced diverse prototypes and solutions to strengthen capacities in seven countries of Central America and the Dominican Republic.

The Mapathon in Peru made it possible to geo-reference thousands of new structures in Open-Street-maps that can be used to understand risk and land use planning [Peru Mapathon 2021 \(arcgis.com\)](#).

Methodologies and models to quantify the damage must be accessible to non-specialist audiences. Blockchain and the tokenization of information and its immutable quality will reduce the loss of information and improve its quality and validity. We invite the application of this

technology as part of the adaptation measures for the next generation of DRR intelligent information.