HARMONIZE: Harmonizing multi-scale spatiotemporal data for health in climate

Description

Extreme climatic events, environmental degradation and socio-economic inequalities exacerbate the risk of infectious disease epidemics. We lack the evidence-base to understand and predict the impacts of extreme events and landscape changes on disease risk, leaving communities in climate change hotspots vulnerable to increasing health threats. This is in part due to a lack of ground truth data describing environmental change in remote and under-resourced areas, as well as a lack of trained research software engineers and data scientists.

HARMONIZE will convene a transdisciplinary community of stakeholders, software engineers and data scientists to develop cost-effective and reproducible digital infrastructure for stakeholders in climate change hotspots, including cities, small islands, highlands and the Amazon rainforest. HARMONIZE will strategically undertake one-off longitudinal ground truth data collection using drone technology and low-cost weather sensors, to improve classification algorithms and downscaling of coarser-resolution environmental datasets (e.g. satellite images, climate re-analysis and forecasts). We will then harmonize this post-processed data with socio-economic and health data in an automated workflow packaged for users in bespoke hotspot-specific toolkits. These sustainable tools will facilitate generation of actionable knowledge to inform local risk mapping and build robust early warning and response systems to build resilience in low-resource settings.

Objectives

Our mission is to develop a cost-effective and reproducible digital infrastructure, comprising a data integration platform, new data collection, a calibrating and downscaling module, and tailored digital toolkits for stakeholders operating in climate change hotspots.

The workflow comprises four key infrastructural packages (IP):

- IP1 Data architecture co-design: to build capacity through co-production and training activities to ensure HARMONIZE digital infrastructure and toolkits meet the needs of the community.
- IP2 Data audit, field data collection and post-processing: to identify existing environment, climate and health digital infrastructure, collect new ground truth (drone and weather sensor) data, and produce classification and downscaling algorithms to enhance the resolution and quality of global Earth Observation, climate reanalysis and forecast data for health impact modelling.
- IP3 Data integration and harmonization: to link, integrate and harmonize Earth Observation, climate reanalysis and forecast data with disease surveillance data via an automated workflow.
- IP4 Proof of concept: to test HARMONIZE digital infrastructure and toolkits are fit for purpose and will have a lasting impact, to help protect communities from the harmful impacts of climate change.

Find out more: https://www.bsc.es/news/bsc-news/new-bsc-project-will-develop-digital-tools-predict-the-risk-disease-outbreaks-climate-change

About the team

The team is coordinated by the Barcelona Supercomputing Center- Centro Nacional de Supercomputacion (BSC) in collaboration with the Fundação Oswaldo Cruz and the Instituto Nacional de Pesquisas Espaciais in Brazil; the Universidad Peruana Cayetano Heredia in Peru; the Universidad de los Andes in Colombia; the Oficina Nacional de Meteorología in the Dominican Republic; and the Inter-American Institute for Global Change Research in Uruguay.

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