

ESA-Future Earth Joint Programme

The European Space Agency and Future Earth have partnered to facilitate the development and uptake of Earth observation data by Future Earth's research networks. The partnership includes seed funding to stimulate new collaborations around the climate datasets provided under ESA's Climate Change Initiative. New for 2020, proposals were invited from across the Future Earth community to demonstrate the benefits of ESA's long-term climate records for climate mitigation and adaptation. Four projects were selected. The teams will hold user workshops and develop online demonstration tools to tackle the threats posed by increasingly frequent cholera outbreaks, storm damage and flooding, and extremes of urban heat. They will be showcased at the UNFCCC COP-26 meeting in November 2021 in Glasgow, UK.

CHOLERA OUTBREAKS UNDER A WARMING CLIMATE

Cholera is a waterborne disease with up to 143,000 reported fatalities each year. Global warming and an increase in extreme weather drives pathogen emergence and associated disease outbreaks. This web-based analysis tool for climate-driven hotspots of *Vibrio cholerae* aims to meet user needs in the northern Indian Ocean. It will include maps of environmental, climate, and health information modelled from CCI data, in-situ and clinical data from publicly available archives.

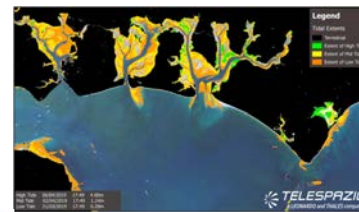


Habitat suitability, *Vibrio cholerae*, northern Indian Ocean inferred from (a) an ecological niche model, (b) a satellite water marker (SWM) model applied to ESA Ocean Colour-CCI reflectance data. In (c) the relationship between chlorophyll-a and satellite water marker is shown. The high positive correlations found in coastal waters suggest a connection between oceanic plankton abundance and cholera incidence in the post-monsoon season (Racault et al 2019).

COASTAL MANAGEMENT UNDER EXTREME STORMS

On the Australian Gold Coast, storms frequently flood streets and erode the beaches that provide a natural protective barrier for coastal inhabitants. To address critical data gaps, this project will investigate the relationship between wave height, length, and propagation, and net erosion and accretion, and anticipate how this may evolve through a changing climate scenario. It will use Copernicus Sentinel-1 data and ESA CCI Sea State to derive time series tidal information and reference these against observations of storm events and calm conditions.

Example visualisation of tidal extent data. Credit: Telespazio UK 2020



futur^{earth} coasts
land-ocean interactions in the coastal zone

ENHANCING RESILIENCE ALONG WEST AFRICA COASTS

Communities along the West Coast of Africa face multiple hazards made worse by climate change, including coastal erosion, storm-surge flooding and pollution events. This project led by early-career researchers in the Future Earth's Ocean Knowledge Action Network will assess coastal vulnerability and at-risk locations, providing hazard early warnings on a seasonal basis.

The project is working with a range of stakeholders to co-design and develop a dashboard to improve response coordination and decision making of local and regional authorities, and self-preparedness and anticipation of at-risk communities.

The project is supported by Future Earth Coasts, and advised by local network members.

ECOSYSTEM SERVICES FOR CLIMATE-RESILIENT CITY PLANNING

Green and blue spaces in urban areas can ameliorate the negative impacts of climate change, such as flooding and extreme urban heat, and benefit human health by improving air quality and reducing traffic noise. The City Explorer tool will show how CCI data can be used to address urban problems. It will be an interactive planning support tool that will take into account spatial patterns in socio-demographic demand for ecosystem services and will calculate ecosystem service metrics that reflect local context.

Example mapping app with slider bars to define layer weightings. Credit: CEH UK

