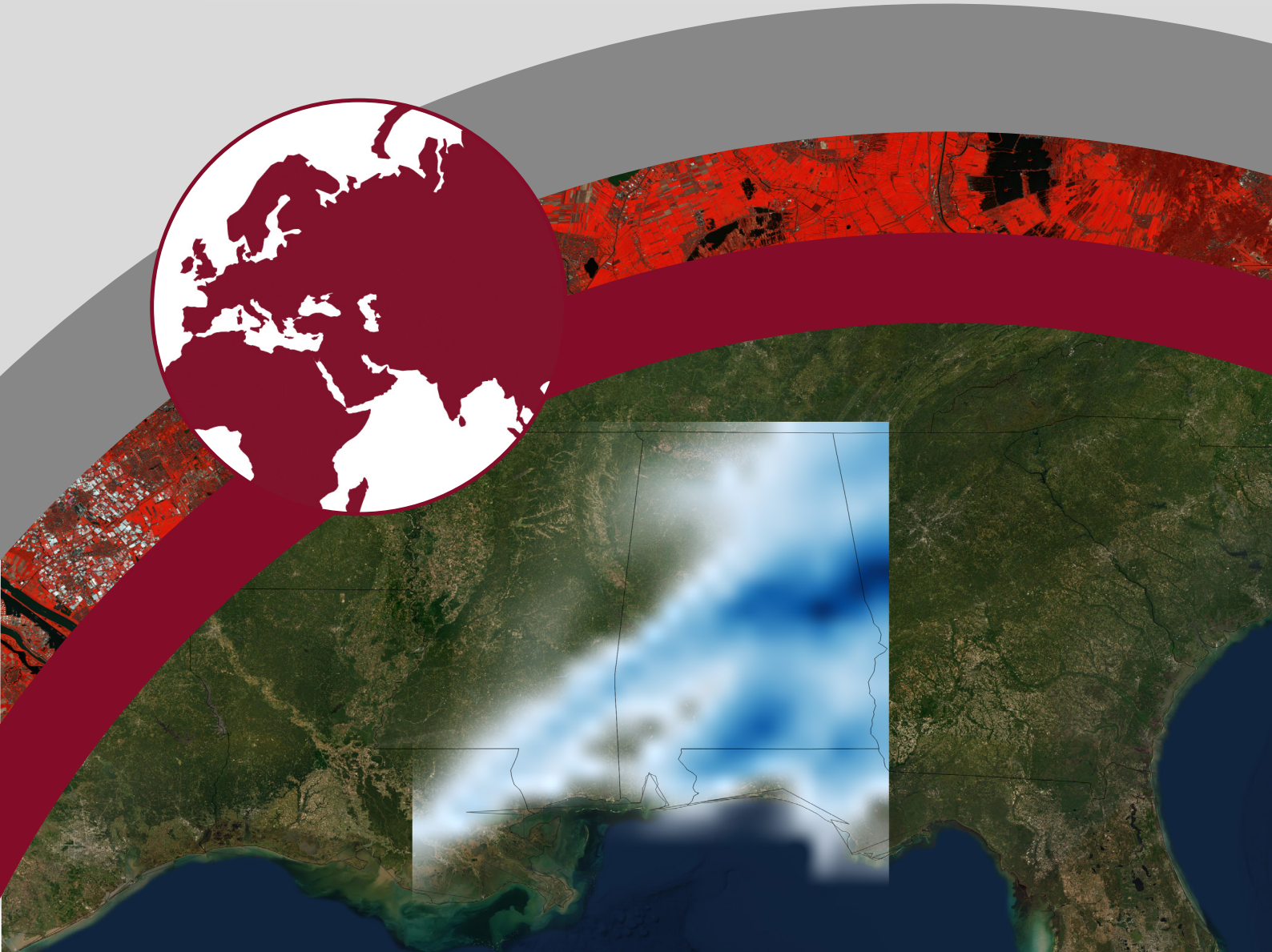
→ EO4SD - EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

Climate Resilience | IFC & MIGA Risk Tools

Earth Observation for International Finance Corporation (IFC) and World Bank's Multilateral Investment Guarantee Agency (MIGA) Risk Tools



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1. INTRODUCTION

The European Space Agency's (ESA) Earth Observation for Sustainable Development Climate Resilience (EO4SD CR) cluster, is providing Earth observation (EO) data to some of the most well-known and established climate change data platforms and tools.

One such collaboration is with the International Finance Corporation (IFC) which is looking to enhance its existing climate risk screening tools. The EO4SD CR cluster is working with the IFC and the World Bank's Multilateral Investment Guarantee Agency (MIGA) to integrate EO data into its climate risk screening tool providing evidence of climate risks to its investments. The outputs of the tool are used by the International Finance Institutions (IFI) to support the business case for investments in resilience and to reduce the overall risk to its projects.

With the support of the EO4SD CR cluster, the IFC has introduced new extreme rainfall indicators to improve its assessment of future flood impacts. Updated EO-based extreme rainfall return levels was seamlessly integrated into IFC's existing climate risk tool. In addition, working with MIGA, the EO4SD CR cluster produced a rainfall explorer tool that provides reliable insights into potential climate risks to existing and future investments.

This document provides an overview of the EO4SD CR cluster's engagement with the IFC and MIGA, providing insight into how EO-derived data are applied in practice.

About ESA's EO4SD Climate Resilience Cluster

Since 2008, ESA has worked closely with IFIs and their client countries to harness the benefits of EO in their operations and resources management. Earth Observation for Sustainable Development (EO4SD) is a recent ESA initiative that aims at increasing the uptake of EO-based information in regular development operations at the national and international level.

The ESA EO4SD Climate Resilience Cluster aims to provide insight about the potential of EO to support climate resilient decision making at the regional and national scale. In collaboration with several IFIs, the EO4SD CR cluster has developed EO-based integrated climate screening and risk management products and services to help manage climate-related risks and capitalise on the opportunities that climate resilience can create. The EO4SD CR cluster is also working to build the capacity of IFI staff and IFI client states, allowing stakeholders to autonomously use EO-based information for climate resilience decision making.

2. THE IFC, MIGA AND CLIMATE RESILIENCE

The IFC is a member of the World Bank Group but is financially and legally independent of the World Bank. One of the principle distinguishing features of the IFC is that its lending is focused on the private sector. In common with many IFIs, the IFC has internal investment risk screening processes and tools that are routinely used to evaluate investment risks. These tools increasingly include the risks posed by a changing climate.

The IFC has an internal climate risk screening tool, however it faces challenges when projecting the future risk of drought, flooding, and related impacts of extreme rainfall. These climate risks are not currently well captured by climate modelling for many of the regions where the IFC operates, and are often not presented at the required resolutions.

MIGA, the political risk insurance arm of the World Bank, faces similar problems when assessing climate risk to its projects. "MIGA evaluates potential climate risks to its projects and we are very much looking to align our financial flows with these long-term climate resilient development pathways. Simply put, our team looks to identify appropriate climate resilience responses to reduce the likelihood of financial or environmental underperformance of our projects" explains MIGA's Manu Sharma.

"In conducting our project assessments, we make use of climate change projections and have found it challenging to very quickly interpret the significance of shifts in various rainfall indicators, specifically as it relates to flood risk."

Understanding how small changes in rainfall projections might affect flood risk in a particular location has, in the past, required detailed and costly flood risk assessments to be carried out, but this is not always possible. “In practice, we don’t have these resources” says Sharma, “we want to be able to just look at precipitation indicators and see if we can derive some consensus on what we think the flood risk may be. Depending on what the flood risk is we are then able to define appropriate responses to help limit those impacts.”

As a result, the EO4SD Climate Resilience Cluster has worked with the IFC and MIGA to upgrade its capacity to assess the materiality of climate impacts to its investments.

Image 1 Screenshot of the IFC Climate Risk Management Tool version 2.3 (http://ifcclimatetool.ihcantabria.com/#/exposition).[1]

3. INTEGRATING EO DATA INTO THE IFC AND MIGA’S RISK SCREENING TOOLS

The EO4SD CR cluster worked with IFC to explore how EO data can be integrated into its climate risk screening tool. This entailed providing new datasets at higher resolutions to improve the tools’ accuracy, in a format that could be seamlessly integrated into the existing tools.

EO data product: Extreme precipitation return levels

A prototype indicator of extreme precipitation that uses EO-derived data, was developed by Telespazio VEGA UK. The maximum 1-day precipitation return level[2] indicator was integrated into the tool allowing IFC and MIGA to better understand the relative scale of precipitation events compared to historical records.

The indicator is delivered through the EO4SD CR Platform[3] which means that IFC and MIGA staff are able interact with the prototype products and provide feedback on the development. The service has now been extended to include 1-day, 5-day and 30-day maximum

1 IFC Climate Risk Management Tool: http://ifcclimatetool.ihcantabria.com/#/exposition
2 Based on ERA5 reanalysis and GPCP daily precipitation data
3 EO4SD CR EO platform: https://explorer-eo4sdcr.adamplatform.eu/

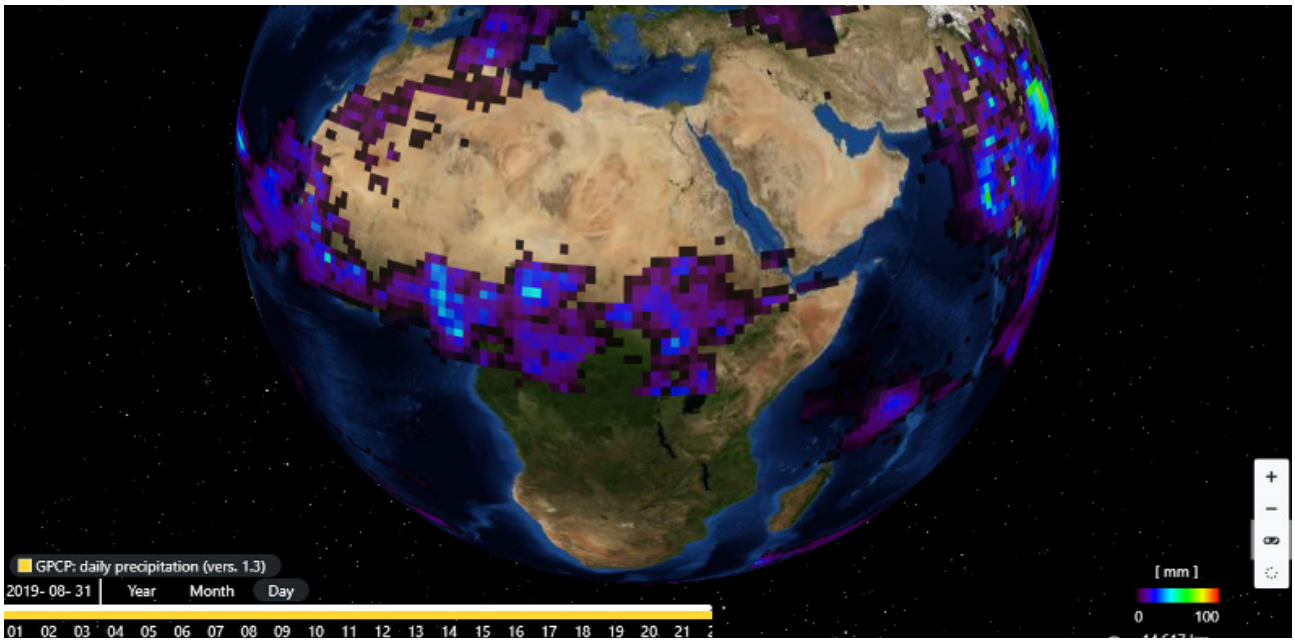

Image 2 Precipitation from GPCP for 31st August 2019, presented on the EO4SD Climate Resilience Cluster's EO platform.

In addition, global NetCDF products for extreme precipitation return levels at the required spatial resolution for IFC and MIGA have been delivered provided. This allows for detailed analysis of how well the indicators reflect expected rainfall trends. The products were also delivered through the EO4SD CR Platform,[4] which enables users to visualise the data at global scale and conduct spatial and temporal analysis. Image 3 presents a snapshot of the precipitation return level indicator, visualised on the EO4SD CR platform.

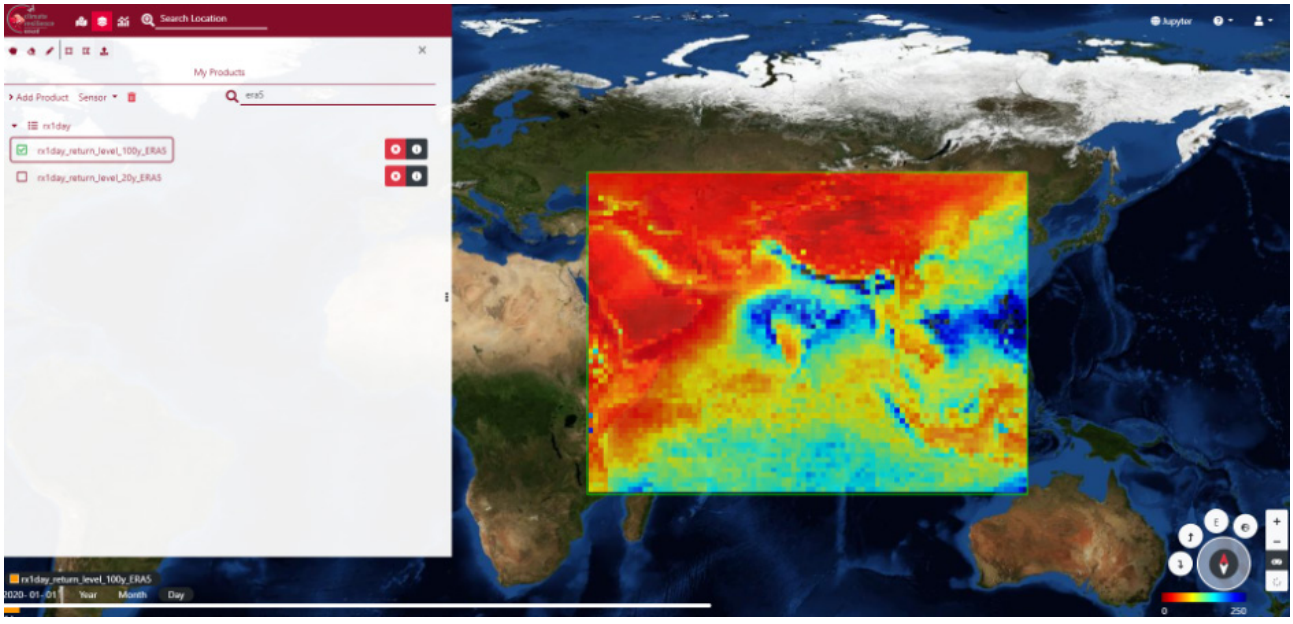

Image 3 Precipitation from GPCP for 31st August 2019, presented on the EO4SD Climate Resilience Cluster's EO platform.

4 EO4SD CR platform: https://explorer-eo4sdcr.adamplatform.eu/

EO data product: The Rainfall Explorer

MIGA needed to access the information on precipitation extent and return periods in a user-friendly way. To facilitate this, the Rainfall Explorer tool was developed. An interactive cloud-based tool, the rainfall explorer enables users to:

1. Quickly find the 5-day cumulative rainfall return level and return period preceding past major flood events;
2. Find the 5-day rainfall return period and return level for any terrestrial location globally and any date between 1979 and near-real time; and
3. Visualise data via interactive maps and box plots covering a given flood footprint or user-defined area.

> *"We are very much focussed on finding ways to assess how resilient our projects can be… we need to make sure that funds are being spent in the right way, tools like the rainfall explorer really help us move the needle".*
>
> *- Manu Sharma, Multilateral Investment Guarantee Agency (MIGA)*

The Rainfall Explorer is powerful as it allows the user to assess the statistical significance of near-real time rainfall events. This means that the IFC and MIGA can understand the likely flood risk associated with a particular level of rainfall, compared to historical events in the same area.

"[The Rainfall Explorer] really provides several benefits to climate adaptation practitioners across the Multilateral Development Banks" said Manu Sharma, "it allows us to look up any event that has occurred anywhere on the planet and we can work out the duration of that event, as well as the significance of that event. The significance is based on the historical record for that specific location."

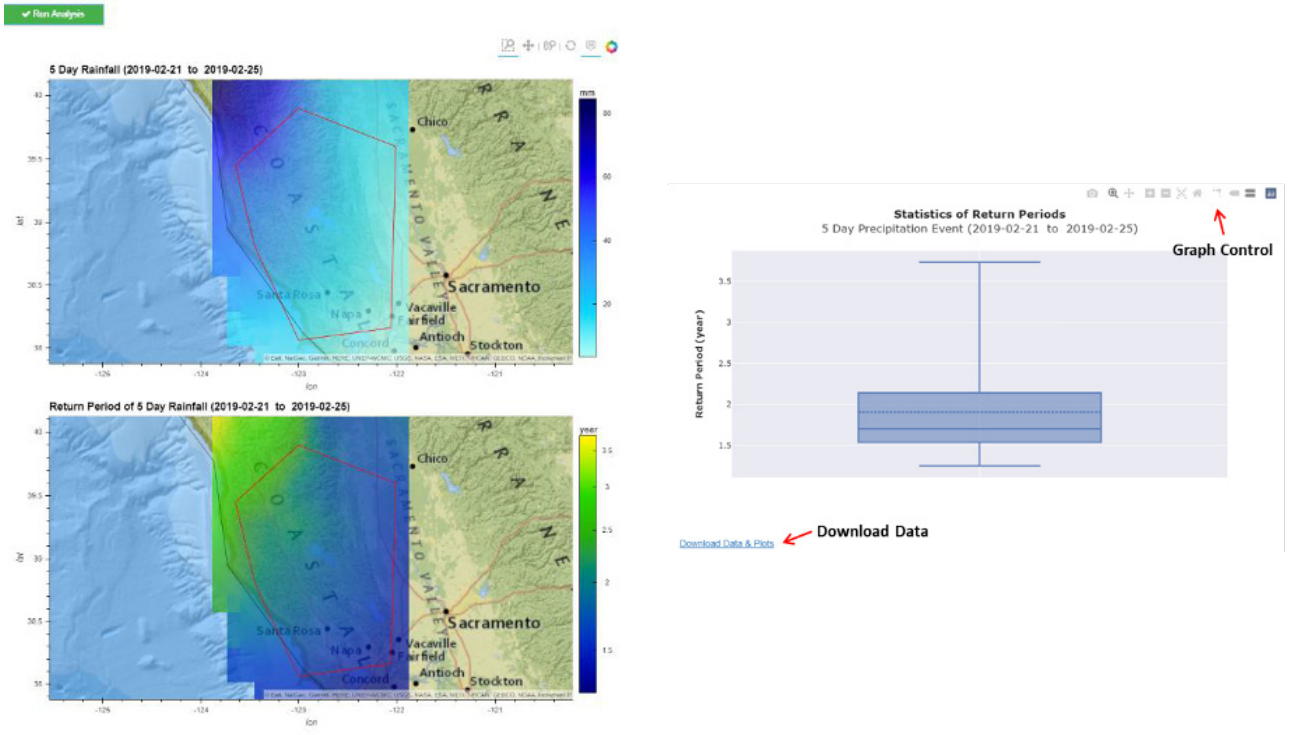

Image 4 Outputs from the Rainfall Explorer tool allow users to visualise rainfall events, the return periods of those events, and their statistical significance.

Users are able to define any geographic region and time between January 1979 until 5 days before present and determine the statistics for the rainfall. The tool reports statistics based on 5-day accumulated precipitation obtained from ERA5 reanalysis dataset. It could also depict 1-day and 30-day in future. The information includes the return period of the rainfall amount as well as return level statistics for any return period specified by the user.

"When that is tied to a dataset on floods, we can work out what size rain resulted in what sized flood and based on that we can develop some understanding of what the materiality would be of various shifts in precipitation data" says Sharma. "As a next step we are hoping to tie in some more information on historical flood damages and losses, so that we can develop a better view of estimates of value at risk to flood impacts."

4. CAPACITY BUILDING

Alongside the EO service provision, the EO4SD Climate Resilience Cluster delivers capacity building support to foster the sustained uptake of EO-based data and services by IFIs and Client States to support climate change resilience. The goal of the capacity building is to enable the sustainable and autonomous application and use of the provided services and data.

Led by the National Observatory of Athens' Centre of Excellence BEYOND with support from EO4SD Climate Resilience Cluster partners GMV, Acclimatise, Telespazio VEGA UK and GeoVille, the capacity building activities provide both targeted support through practical training, and awareness raising and knowledge transfer through online courses and webinars.

Alongside the prototype development, the EO4SD CR cluster is also developing capacity building activities to be delivered in 2020. After the successful development of the Rainfall Explorer, there will be a dedicated capacity building session for MIGA and World Bank staff in autumn 2020.

In addition to targeted support and training, the EO4SD Climate Resilience Cluster also delivered a webinar series to raise awareness, acceptance and understanding of EO-based information services and the associated benefits, impacts and usefulness with regard to the specific priorities of the stakeholders.[5]

The seven-part webinar series, in which MIGA's Manu Sharma participated, was delivered in June and July 2020. It is aimed at all those interested in developing a foundational knowledge of EO and how it can be applied practically in the context of climate-resilience projects and programmes.

The series draws on the EO4SD Climate Resilience Cluster's experience working with IFIs including the Asian Development Bank, The World Bank, the International Finance Corporation, Africa Risk Capacity and the European Bank for Reconstruction and Development, to provide 'hands-on' sessions and guided tutorials for existing climate resilience platforms.

Over the course of the series, participants learned the basics of EO data in the context of climate resilience; how, why and when to use EO data to inform decision making; how to apply EO data to manage key climate risks including flooding and drought; and practical skills about accessing and using EO data tools and platforms.

5 The presentations and recordings from the webinar series is available from the EO4SD CR website's "Capacity" section.
Visit here: http://eo4sd-climate.gmv.com/

Partners of the Climate Resilience Cluster

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Cover image: Extent of flash flooding in Iraq in November 2018, generated from modified Copernicus Sentinel-1 data (2018), processed by ESA, CC BY-SA 3.0 IGO