

→ E04SD - EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

Climate Resilience | Climate Change Knowledge Portal

Earth Observation data for the Climate Change Knowledge Portal (CCKP)

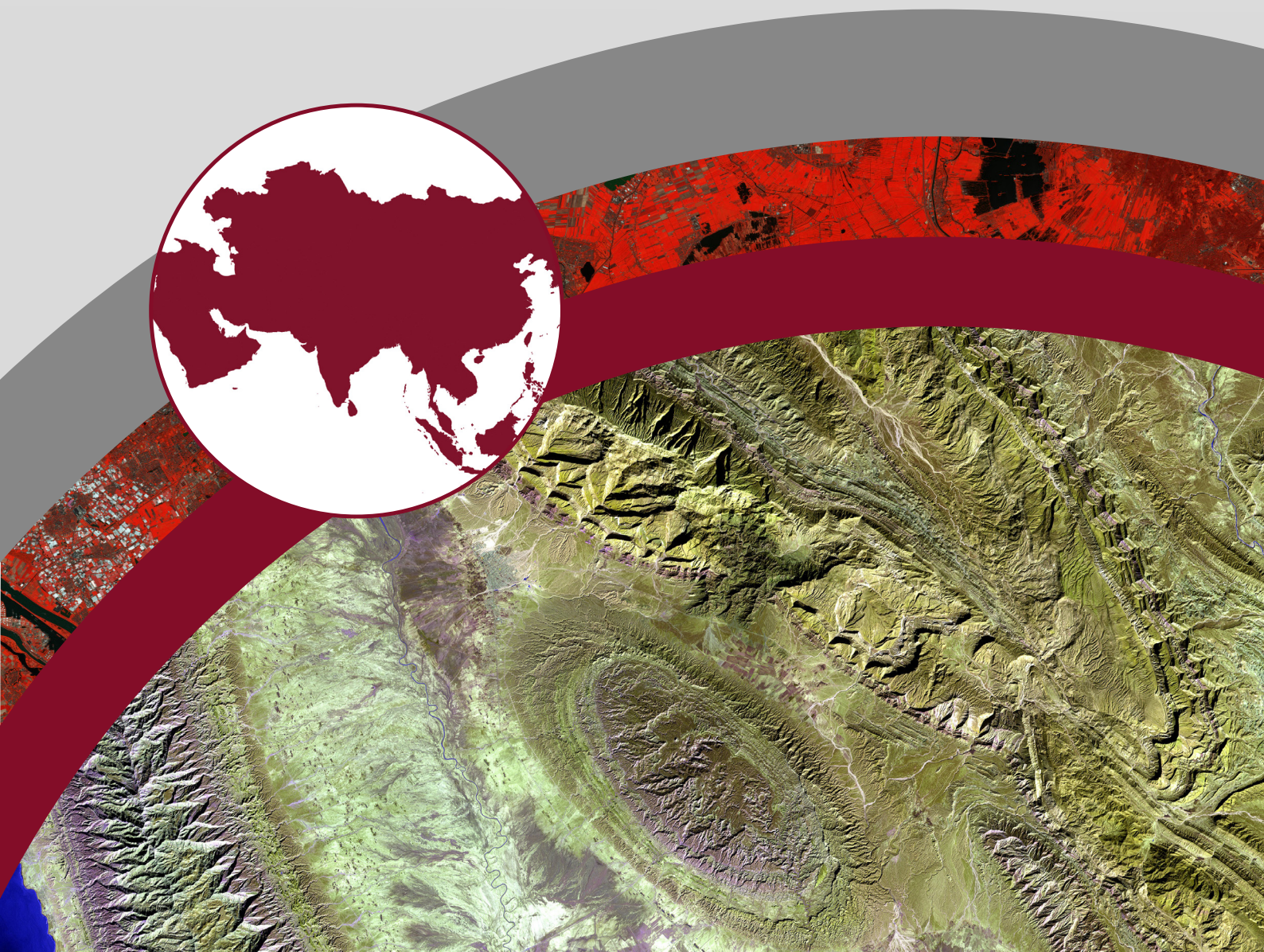


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1. INTRODUCTION

The World Bank's Climate Change Knowledge Portal (CCKP)¹ is one of the most high-profile, publicly accessible, climate data platforms in the world. Developed to service the needs of expert and non-expert users, the CCKP provides global data on past climate and future climate change projections, as well as socio-economic data, to support users in their climate-resilient decision-making.

The European Space Agency's (ESA) EO4SD Climate Resilience (EO4SD CR) cluster has worked with the World Bank to integrate EO services into the portal, providing high-resolution global observed datasets for three climate variables. For CCKP, the EO4SD CR cluster provided twenty climate indicators that use ERA5 Reanalysis data (e.g. maximum 1-in-100 year daily rainfall and number of summer days) and two indicators based purely on earth observation data (sea level rise and soil moisture). Additionally, the EO4SD CR cluster is providing projected sea level rise data for three scenarios to 2100. The EO4SD CR cluster has also developed a tool that ensures that EO data can be seamlessly integrating into the existing CCKP. This additional data adds depth to the portal's information and enhances the accessibility of reliable data to supports climate-resilient project design.

About ESA's EO4SD Climate Resilience Cluster

Since 2008, the European Space Agency (ESA) has worked closely with International Financing Institutions (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 new ESA initiative which aims at increasing the uptake of EO-based information in regular development operations at national and international level.

The ESA EO4SD Climate Resilience Cluster aims to provide insight about the potential of EO to support of 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 WORLD BANK'S CCKP AND THE NEED FOR EO DATA

The CCKP has been successful in serving as a hub for climate-related information, data, and tools to inform policy and practice, providing online access to comprehensive global, regional, and country data related to climate change and development.

The online platform is organised by 'country', 'region', and 'watershed' data, and is made up of spatially and temporally referenced data (such as shown in Image 1). Users are able to evaluate climate-related vulnerabilities, risks, and actions for a particular location by searching for and interpreting climate and climate-related data, which are available at different levels of detail. The users can then assess, visualise, and download the climate data and information.

The EO4SD CR cluster worked with the World Bank during its most recent upgrade of the CCKP. One of the key challenges the Bank faced is broadening and deepening the available data, whilst ensuring that it remained accessible and relevant to the CCKP's user base. To do this successfully, the CCKP makes data available in wide range of formats and levels of complexity. The data is presented on an interface that allows users of all levels of skill to be able to access the information they require.

The EO4SD CR cluster has therefore identified EO data that is complementary to that which was already on the CCKP. The EO data had to be seamlessly integrated into the existing CCKP architecture, so that it could be accessed instantly, on-demand, by users.

¹ World Bank (2020) Climate Change Knowledge Portal: <https://climateknowledgeportal.worldbank.org/>

Sea Level Anomaly of Georgia (1993-Jan)

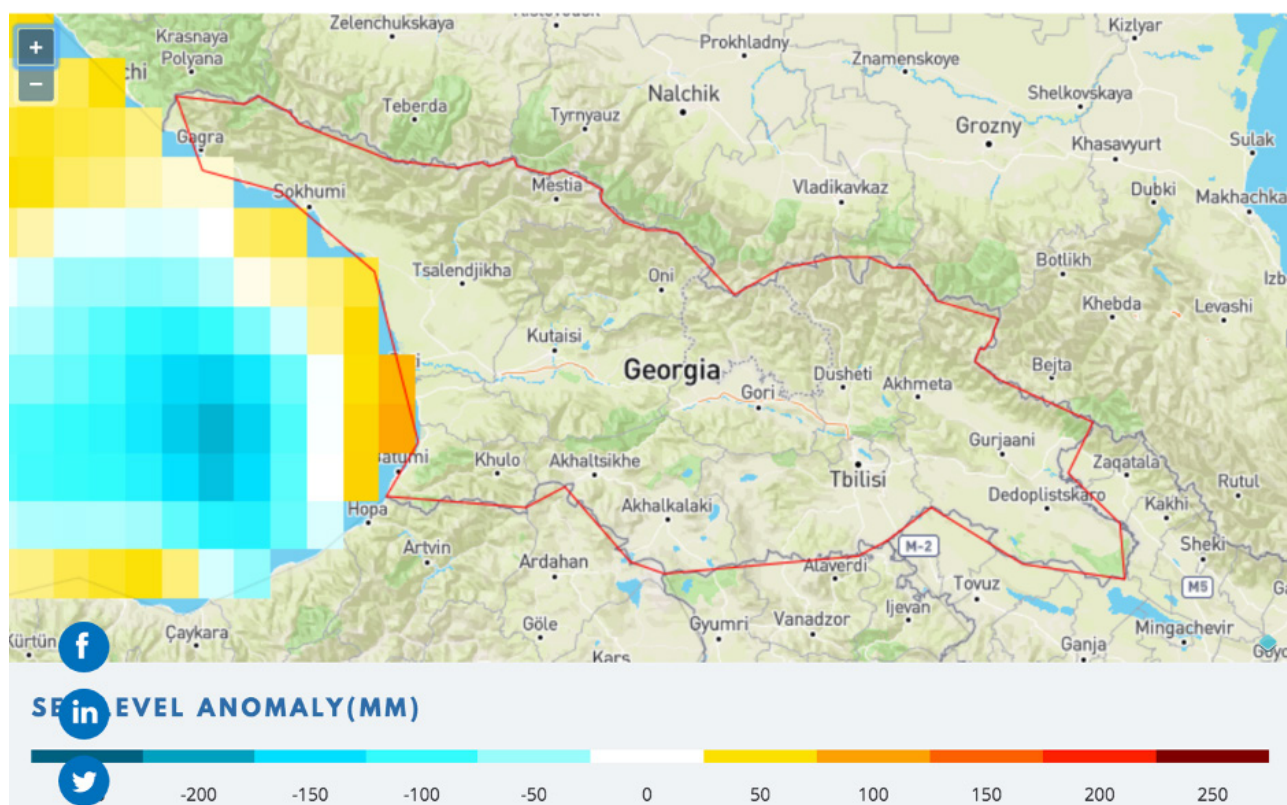


Image 1 Screenshot of the World Bank's CCKP showing Sea Level Anomaly of Georgia between (1993-2015). Source: World Bank

3. EO DATA PRODUCTS PROVIDED TO THE CCKP

The E04SD CR cluster provided EO-based Essential Climate Variable (ECV) data in map and time-series formats, allowing for images and time-series data to be easily interrogated and overlaid seamlessly. EO-based air surface temperature (1979-2018) (Image 2), sea surface temperature (1991-2018) (Image 3) and sea level anomaly (1993-2015) (Image 4) have been provided.

The data are provided in both raster and time-series formats allowing images and time-series data to be used and overlaid. As shown in the figures below, the data can be displayed as a map, and several data points can be selected and compared using time series data, showing clearly the levels of variation across different geographies and times.

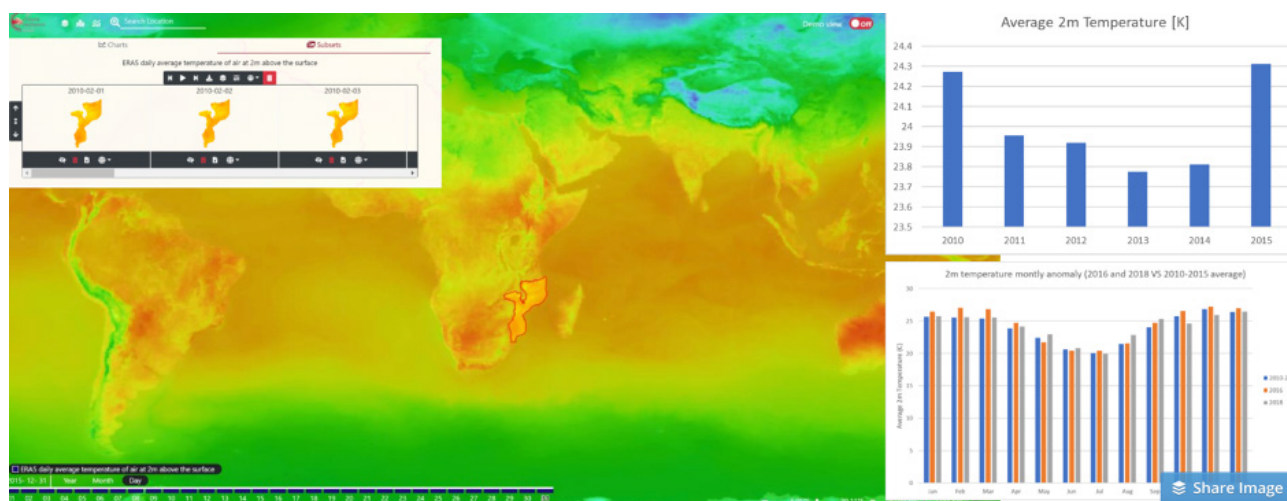


Image 2 Graphic representation of data provided to CCKP (surface air temperature aggregated over Mozambique) as displayed in the E04SD climate platform. The surface air temperature is obtained from the ERA5 meteorological reanalysis provided by the Copernicus program. Source: E04SD CR cluster

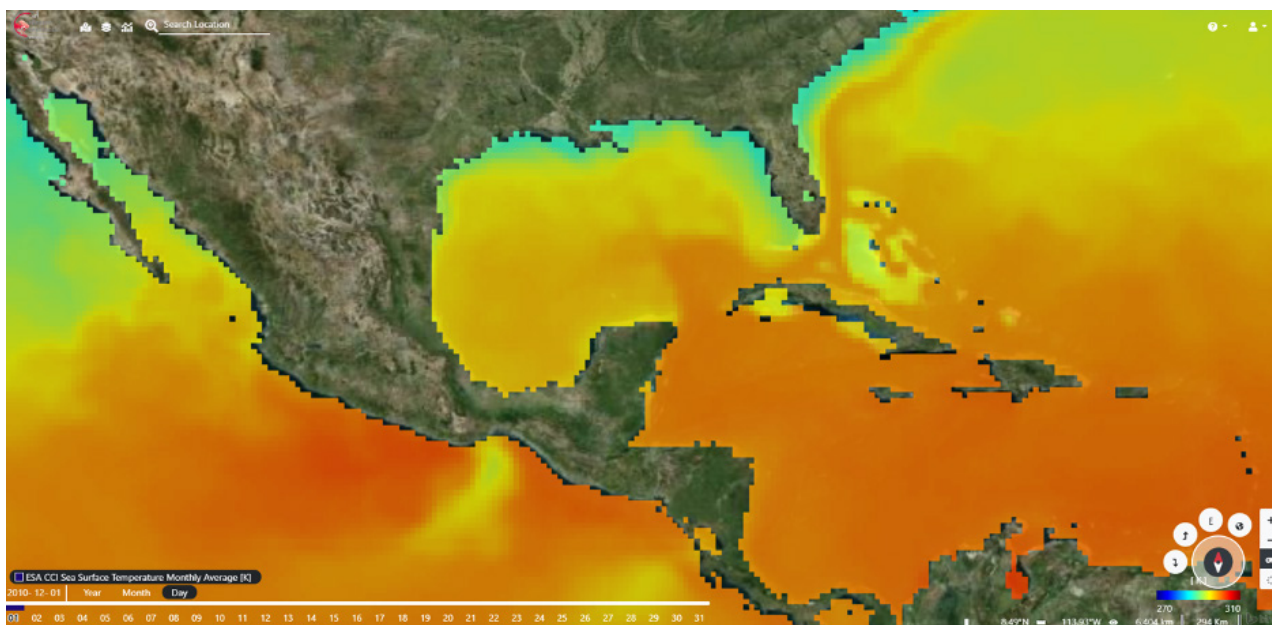


Image 3 Graphic representation of data provided to CCKP (sea surface temperature time series 1991 - 2018 over the Caribbean region) as displayed in the E04SD climate platform. The sea surface temperature is obtained from the ESA SST CCI project. Source: E04SD CR cluster

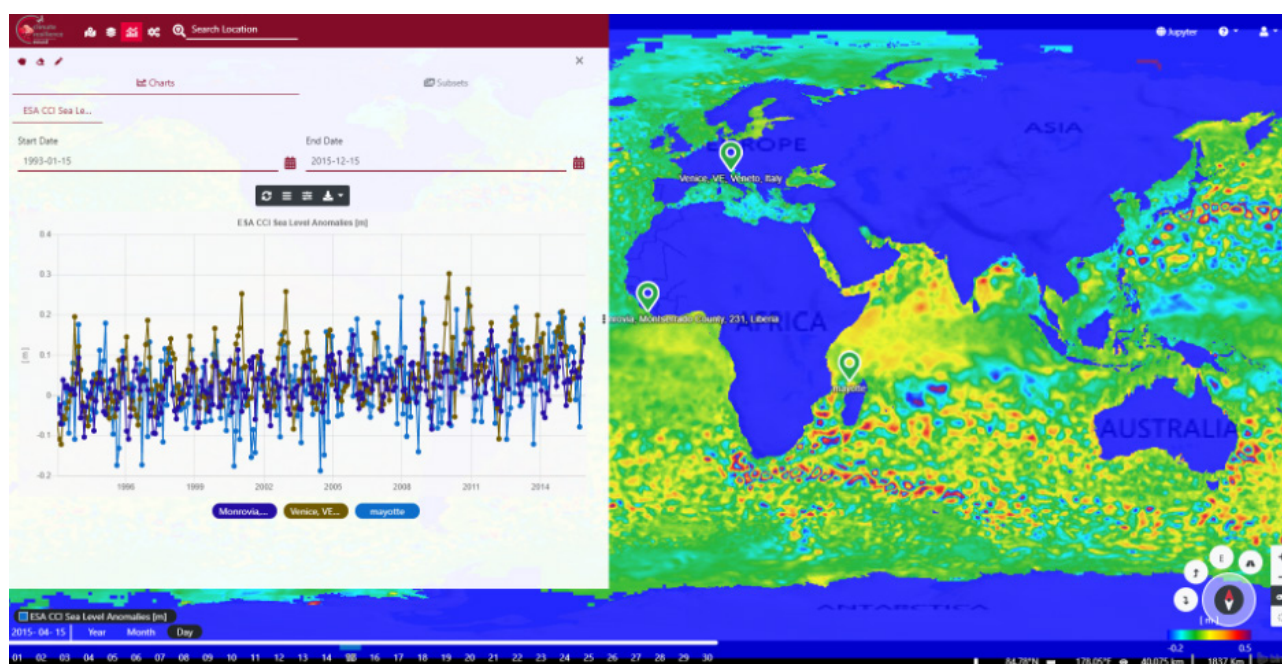


Image 4 Graphic representation of data provided to CCKP (sea level anomaly time series 1993 - 2015 over Liberia, Madagascar, Italy) as displayed in the [E04SD climate platform](#). The sea level anomaly is obtained from the ESA Sea Level CCI project. Source: E04SD CR cluster

Using existing products, such as CCKP, provides good opportunities for putting EO data to work in the near term, tapping into an existing user base, and meeting their needs via the platform they have already been using. EO data covering a wide range of climate indicators have been considered for integration into the CCKP (Table 1).

Table 1 EO-derived climate indicators considered for integration into the CCKP.

| Climate indicator type | Indicators |
|-----------------------------|--|
| Temperature and heat stress | No. days > 35°C |
| | No. events of >5°C above monthly average for 5+ days |
| | No. days > 99 th percentile °C |
| | No. tropical nights (min temp > 20°C) |
| | Relative humidity |
| Precipitation and flooding | 1-in-50 maximum 1-day rainfall |
| | 1-in-50 maximum 1-day rainfall |
| | 1-in-50 maximum 5-day rainfall |
| | No. days >95 th percentile precipitation |
| | Max. no. consecutive wet days |
| | Runoff |
| Water scarcity and drought | Max consecutive dry days (1mm) |
| | No. >5 day consecutive dry day events |
| | Water stress |
| | Warm Spell Duration Index |
| | Vegetation Productivity |

4. CAPACITY BUILDING

Alongside the EO service provision, the E04SD 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 E04SD 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.

For the World Bank, the capacity building will provide government officials and the World Bank's Task Team Leaders with information on how to access and test EO- derived data, helping users to make sense of EO data and understanding how it can be useful for them. This training showcases examples of how EO-derived information can be a crucial part of relevant investments and also how it can be utilised in assessment and awareness activities.

In addition to targeted support and training, the E04SD Climate Resilience Cluster has 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.

Several World Bank CCKP experts participated in the seven-part webinar series, which was delivered in June and July 2020, 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 E04SD 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 applying EO data to manage key climate risks including flooding and drought; and practical skills about accessing and using EO data tools and platforms.

Partners of the Climate Resilience Cluster



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