EO4SD WEBINAR SUMMARY

climate resilience eo4sd

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Water world: How EO data is deepening our knowledge of flood risk and water resource management.

This document presents a short summary of and key lessons from the European Space Agency's Earth Observation for Sustainable Development (EO4SD) Climate Resilience Cluster's recent webinar **"Water World: How EO data is deepening our knowledge of flood risk and water resource management"**. The webinar, the fourth in a series of seven held by the EO4SD Climate Resilience Cluster in June and July 2020, presented in detail how Earth Observation (EO) data with different spatial and temporal resolution can contribute to flood risk, water and wetness management.

FRANÇOIS KAYITAKIRE

Director of Research and Development, African Risk Capacity (ARC) Agency

François presented the advances in EO that have led to improved flood risk modelling and gave an overview of **African Risk Capacity's** (ARC) flood risk insurance. ARC identify areas of risk, create an index for monitoring that risk, and also identify decision support and possible pay-outs arising from that risk being triggered. Ever-improving EO data, in terms of temporal and spatial resolution, greatly enhances the capacity of modelling flood risk and increases the quality of disaster risk modelling outputs. The **ARC Flood Extent Depiction Model** (AFED) uses satellite remote sensing from microwave sensors that maeasure the earth's radiation to detect rising flood levels.

In order to effectively estimate risk, one needs to fully understand the assets at risk due to exposure. ARC uses EO services to map the exposure of land use and cover areas, including all urban areas and agricultural areas. Additionally, EO services are used to develop **high-resolution Digital Surface Model (DSM) products** in order to have a more detailed characterisation of the urban environment (e.g. building heights). In-season monitoring is valuable for forecasting, and EO services provide a centralised source of targeted detailed spatial information and decision support for interested parties.

Norman presented EO4SD's **Water and Wetland Monitoring Service** citing EO services as essential for the large-scale monitoring of water resources. EO data about water can help support the implementation, monitoring, and evaluation of **Sustainable Development Goals** (SDGs). Water scarcity affects more than 40% of the world's population, creating the need for accurate and timely information on water availability. In large, remote, and inaccessible regions, existing monitoring can benefit from EO data, as the more you monitor, the better the results. The Water and Wetland Monitoring Service can identify water bodies, asses how permanent water bodies change over time, as well as changes in surface water bodies.
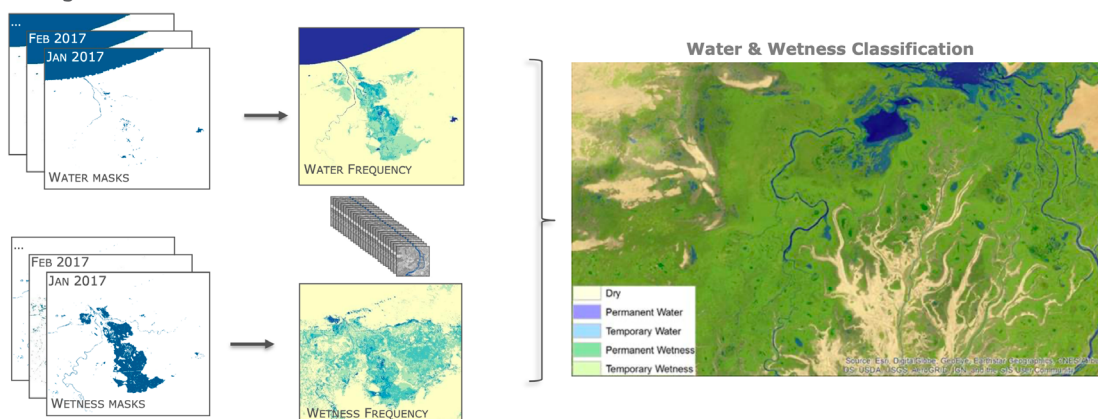
NORMAN KIESSLICH

Senior Project Manager, GeoVille

Diagram showing the methodology for building a Water and Wetness Classification using EO data.

MANU SHARMA

Climate Change Specialist, Multilateral Investment Guarantee Agency

Manu provided a brief testimonial from the collaboration between the EO4SD CR cluster and the Multilateral Investment Guarantee Agency (MIGA) and how EO data is essential to multilateral banks. MIGA evaluate potential climate risks to projects and align their financial flows with these long term climate resilience pathways. They use climate projections and aim to identify appropriate climate resilience responses to **reduce the likelihood of financial or environmental underperformance of their projects**. As sophisticated flood modelling cannot always be done, precipitation indicators can be used instead for looking at flood risk. The EO4SD CR Cluster helped by looking at historic as well as present day rainfall events, and flood data sets for historic flood events. As a result, the **Rainfall Explorer** was created. The benefit of this tool for practitioners are that it allows them to look at any rainfall events anywhere on the planet and calculate the duration of that event as well as the physical significance of that event, enabling them to understand the amount of flooding that can be caused by any amount of precipitation in an area. As a next step, they are hoping to tie in information about historic flood damages and losses to develop better view of potential estimates of value at risk to flood impacts.

Mohamad discussed the danger of extreme precipitation and its effects on people across the globe. The main challenge posed by these extreme events is in gathering observations from which a credible and reliable analytical model can be built. **Generalized Extreme Value** (GEV) distribution enables calculating the return level of such events. EO4SD-CR Precipitation Return Level products provide the return level for precipitation events at 10-, 20-, 50- and 100-year return periods. Additionally, Mohamad introduced the EO4SD-CR Rainfall Explorer – a Jupyter Notebook that allows the user to assess the statistical significance of near-real time rainfall events. The Rainfall Explorer can also be used to **explore the statistical characteristics** of major rainfall events which resulted in flooding, as tracked by global flood repositories.

MOHAMAD NOBAKHT

Senior Earth Observation System Engineer, Telespazio Vega

Key Takeaways

· Advances in EO and climate modelling provide the opportunity to construct long-term records of precipitation on a global scale.

· The return period, a measure of rareness of extreme events which might cause huge damages to society and the environment, lies at the heart of risk assessment problems.

· EO4SD-CR return level products provide valuable information on global scales for assessment of historical risks.

· The more you monitor, the better your results.

"EO is increasingly being recognized as an essential tool, especially for large-scale monitoring of water resources".

- Norman Kiesslich, Senior Project Manager, GeoVille