EO4SD WEBINAR SUMMARY

Is this drought normal? How EO data can help you understand drought hazard and benchmark your risk.

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 **"Is this drought normal? How EO data can help you understand drought hazard and benchmark your risk"**. The webinar, the fifth in a series of seven held by the EO4SD Climate Resilience Cluster in June and July 2020, presented how Earth Observation (EO) data with different spatial and temporal resolution can provide information on drought events.

MARKUS ENENKEL

Risk Consultant, Disaster Risk Financing and Insurance Program, World Bank

Markus introduced the World Bank's Disaster Risk Financing and Insurance Program and its three focus areas: i) pre-arranged financing/risk layering; ii) financial instruments to curtail the escalation into crisis; and iii) reduction of fiscal disaster impacts on governments, households, and businesses. Active in sixty countries, the program is working to establish a system that is based on **training and capacity building** for designing, calibrating, and validating an EO-based insurance index, and is driven by EO data.

Markus then described how **disaster risk financing**, from a drought perspective, is complicated. There is no common definition for drought and its various indices and variables can cause confusion for users without a technical background. The World Bank's **Next Generation of Drought Index Project** (NGDI) aims to transform insurance development through the development of a set of indicators that will better monitor and trigger financial responses to severe drought events. Markus explained that they rely on a **collaborative development process** to ensure that end users are satisfied. The role of EO in the NGDI project includes multiple satellites covering the main elements of the hydrological cycle.

MOHAMAD NOBAKHT

Senior Earth Observation System Engineer, Telespazio Vega

Mohamad explained that droughts can have a serious impact on health and agriculture and are a major cause of economic damage. An estimated 55 million people globally are affected by droughts every year, with water scarcity impacting 40% of the world's population. EO time-series data sets can **build understanding about the scale of effects associated with different drought impacts**, enabling contingency planning and emergency preparedness. Quantitative drought indices are the most widespread approach for drought analysis and monitoring. Most early studies relating to drought and monitoring systems have been conducted using either the **Palmer Drought Severity Index** (PDSI) or the **Standardised Precipitation Index** (SPI).

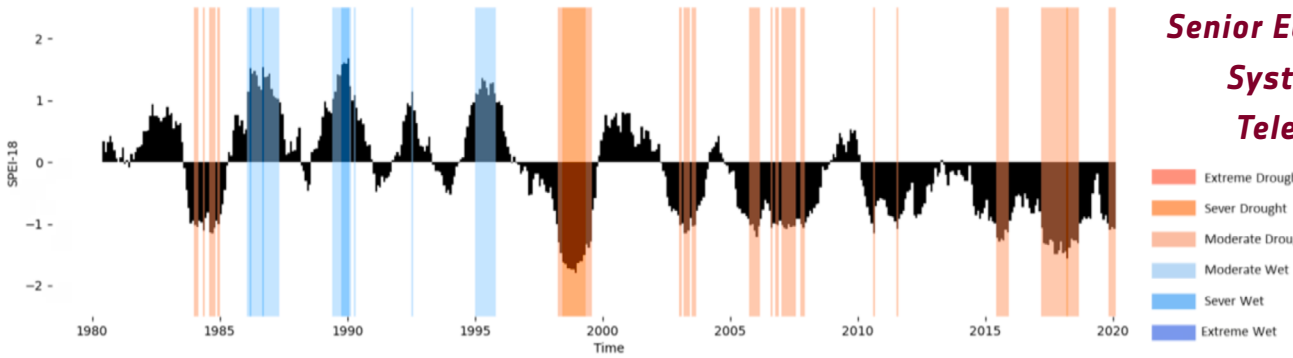


Image of a SPEI-18 Timeseries for Senegal.

The PDSI is a standardised index that uses readily available temperature data to estimate relative dryness. It incorporates prior precipitation, moisture supply, runoff and evaporation demand at the surface level, and is based on the supply and demand concept of the water balance equation. The SPI **characterizes meteorological drought** on a range of timescales, comparing drought severity. Additionally, it can be calculated for different timescales to monitor droughts with respect to different water resources. Combining the two creates the **Standardised Precipitation Evapotranspiration Index** (SPEI), an index that can measure drought severity, according to its intensity and duration, and enables the identification of different drought types. Mohamad then walked through the various SPEI products and demonstrated the accessibility of information at a variety of time scales.

Norman provided an introduction to the drought and **Surface Soil Moisture** (SSM) products available. He explained that using EO data to analyse soil moisture allows for timely, spatially continuous, and a large-scale observation of the variable during all weather conditions. Surface soil moisture accounts for the top layer of soil, which serves as an **early indicator of onset drought**. By measuring the SSM, the **Soil Water Index** (SWI) can be modelled, which quantifies moisture conditions at various depths in the soil. In turn, the SWI is monitored over long periods of time to detect anomalies. Norman then walked through the various SSM datasets available to users.

NORMAN KIESSLICH

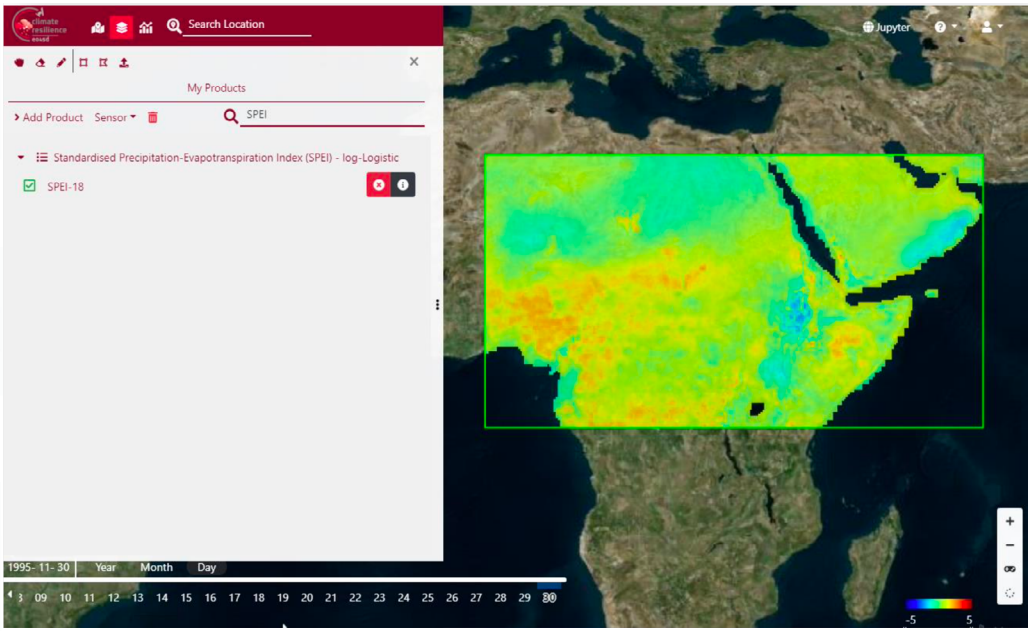
Senior Project Manager, GeoVille

RESOURCES

Further Reading:

- **EO4SD CR Capacity Building Material here.**
- **EO4SD Delivery Document - Precipitation Return Level here.**

Full webinar recording available here.



Screenshot of the SPEI-18 visualisation on the EO4SD-CR Platform Explorer.

Key Takeaways

- **EO time-series data sets can help build understanding about the scale of effects associated with different drought impacts, allowing for contingency planning and emergency preparedness.**

- **The SPEI fulfils the requirements of a drought index since its multi-scalar character enables identification of different drought types.**

- **Soil Moisture is an essential climate variable.**

"Surface soil moisture is a variable that we can monitor using earth observation to define the density, duration, and severity of droughts".

- Norman Kiesslich,
Senior Project Manager, GeoVille

For more information about the EO4SD Climate Resilience Cluster, visit the website here: http://eo4sd-climate.