Introduction → CS → what CS does → what they will use CS for
Hello everyone ,

My name is Micky Maganini, and I work for SERVIR, a U.S. Government organization and partner of ITC. Today I am going to introduce you to a web-based tool called ClimateSERV that was developed by SERVIR. ClimateSERV allows users to visualize and analyze geospatial datasets. You will be using ClimateSERV to estimate the relative soil moisture in your region of interest. Then, you will use that estimate as an input to your radiative transfer models in your final project.

Context

Before we learn more about ClimateSERV, I want to provide some context about What SERVIR is.

joint program → hubs

SERVIR is a joint program between NASA and the US Agency for International Development. We develop solutions to address environmental challenges using earth observation data. We work with organizations around the world in five regional hubs to create these solutions.

SERVIR network → ITC & SERVIR

Beyond these regional hub institutions, we partner with organizations in the private sector, Intergovernmental organizations, NGOs, and research institutions like ITC. ITC and SERVIR have partnered with each other since 2018 as both institutions apply earth observations to sustainable development on a global scale.

Transition to ClimateSERV

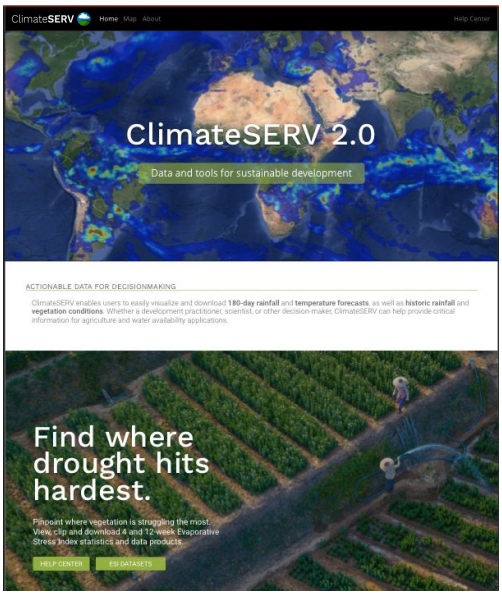
Now that you have some context on who we are at SERVIR and why we are partnered with ITC, let's learn about ClimateSERV, a tool developed by SERVIR.

ClimateSERV Increases Global Access to Critical Agricultural, Drought Information

SERVIR

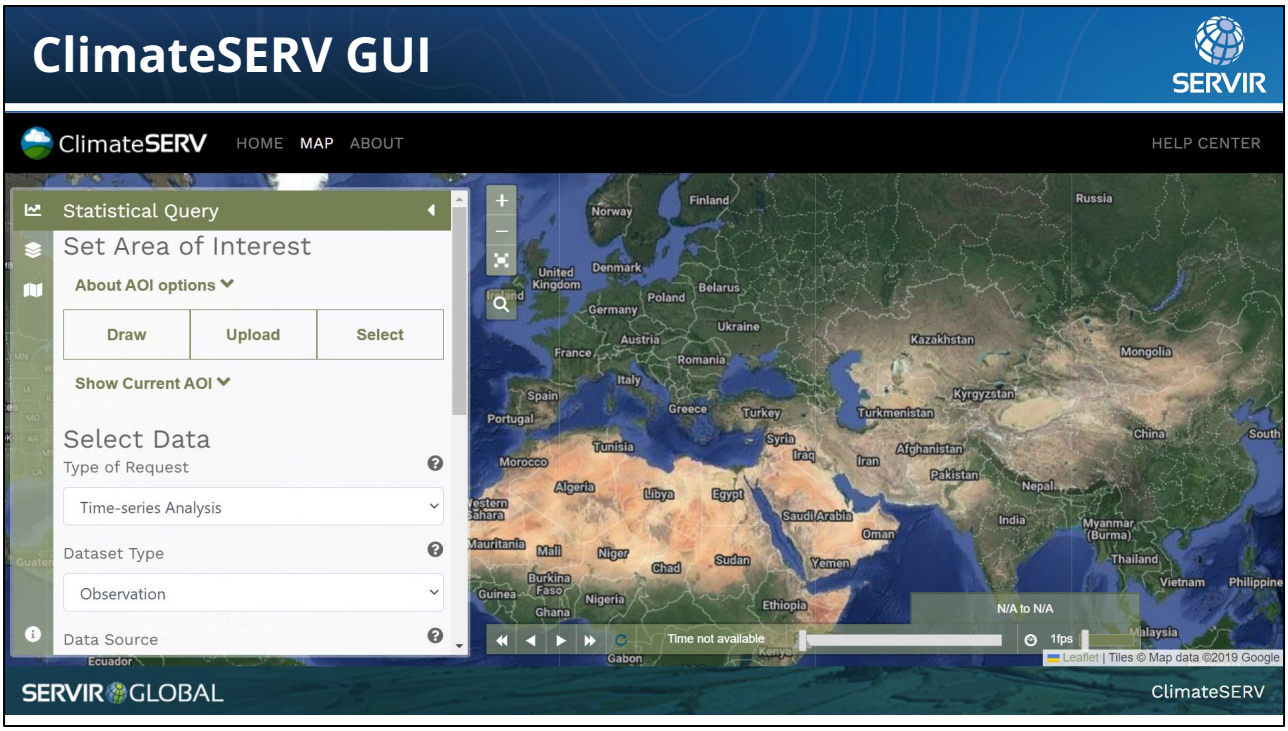
ClimateSERV provides actionable climate information for regional and local decision makers:

- Enables easy access to **180-day rainfall and temperature forecasts**, along with historic rainfall and vegetation conditions
- Includes **key datasets and visualizations** from CHIRPS, NMME, and MODIS without the need for extensive local monitoring
- Currently in use by Kenya Meteorological Service field offices to develop in-season **crop selection guidance** and **suggested planting times**



web-based tool → regions where we work → satellite data → Now

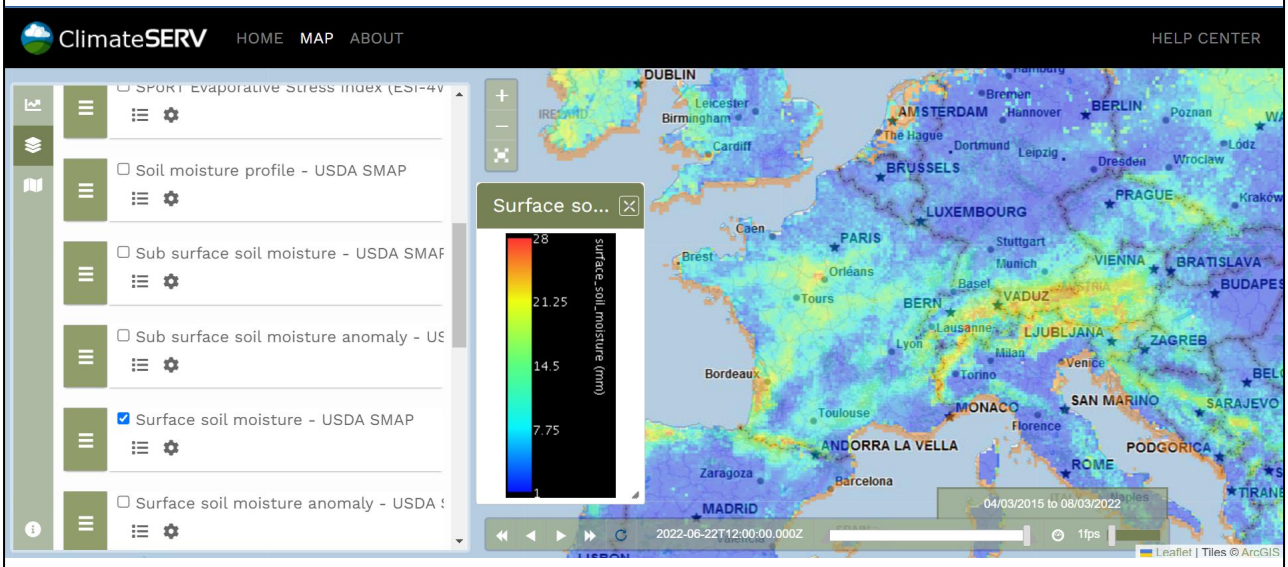
ClimateSERV is a free web-based tool that allows users to download, analyze, and interpret historical and forecasted geospatial data. ClimateSERV was developed because practitioners and government decision makers in the regions SERVIR works need a way to accurately assess how severe a drought will be and its potential effect on crop yields. But in these regions, long-term ground observations of rainfall and soil moisture are sparse. Thus there is a critical need for satellite and model-derived rainfall data.



GUI → Different Panels

This is what the ClimateSERV Graphical User Interface (or GUI) looks like when you first enter ClimateSERV. There are two main panels we can use within climateSERV, the Statistical Query mode and the Layers mode. The statistical query panel is useful for analyzing how data varies over a period of time, and the layers panel is useful for viewing how data varies in space, or viewing how it varies over both space and time simultaneously.

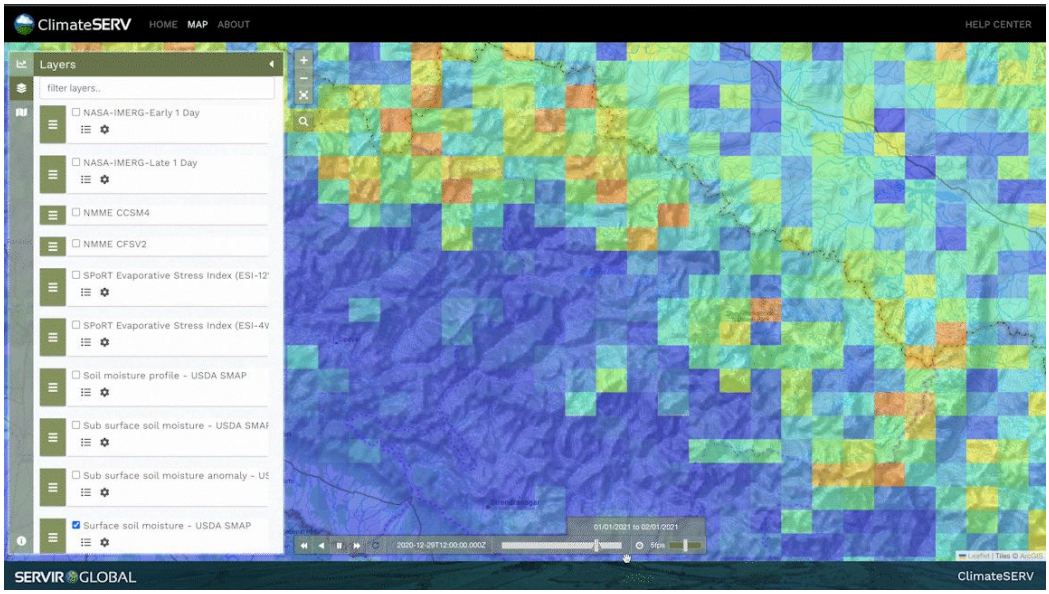
ClimateSERV GUI: Layers Panel



Layers Panel → Displaying Datasets → Legend → single point in time

Here you see how data will appear when using the Layers Panel. As you can see on the left hand side, I have toggled the box next to “Surface Soil Moisture – USDA SMAP”, so that dataset is displaying on our map. As we can see from the legend, warmer colors like red and yellow indicate wetter soil conditions, whereas cooler colors like blue and green indicate drier soil conditions. This represents the data obtained from a single point in time. But what if we want to view how data varies across both space and time?

ClimateSERV GUI: Layers Panel



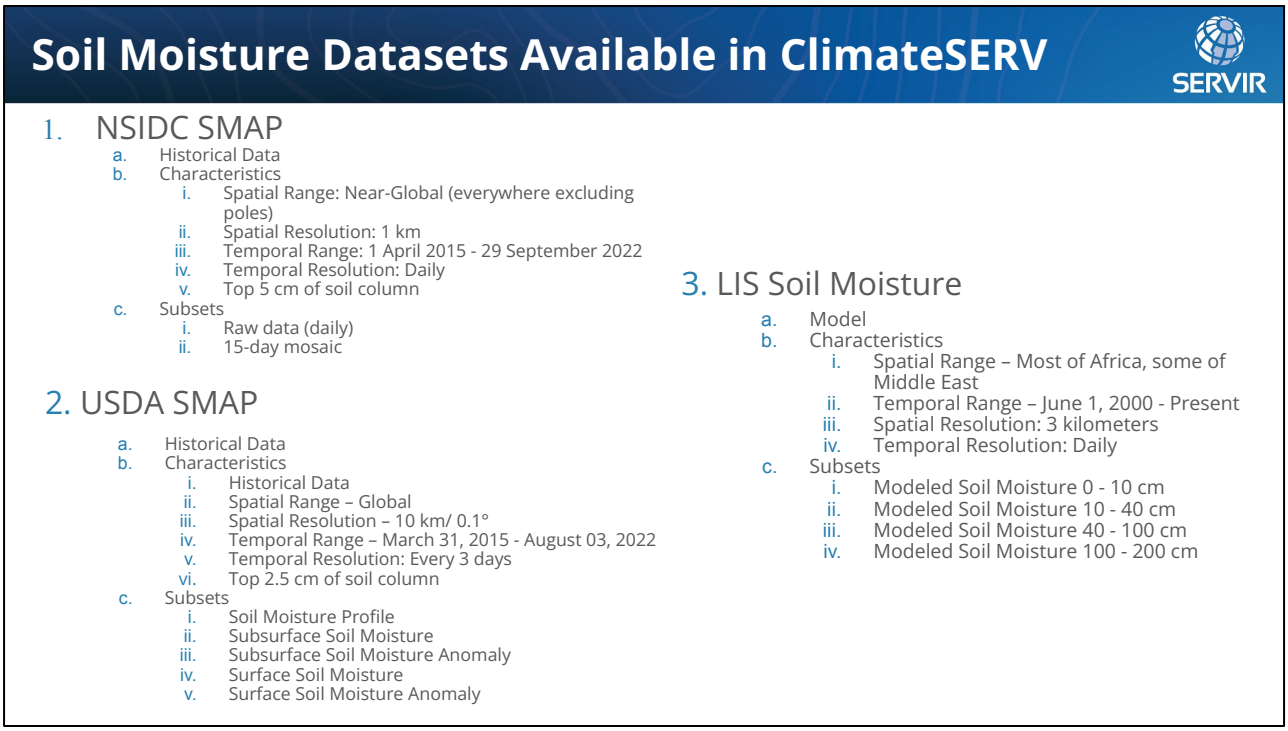
Animation

In that case, we can use the animation feature in ClimateSERV to animate the data over a period of time.

ClimateSERV GUI: Statistical Query Panel

Statistical Query panel → graph

To perform a more in-depth analysis of how your data varies over time for your period of interest, you can use the Statistical Query tab. Here you can see the graph that ClimateSERV displays for a soil moisture dataset over the course of a year.



NSIDC SMAP → What is SMAP → Downscaled → USDA SMAP → Downscaled → LIS product

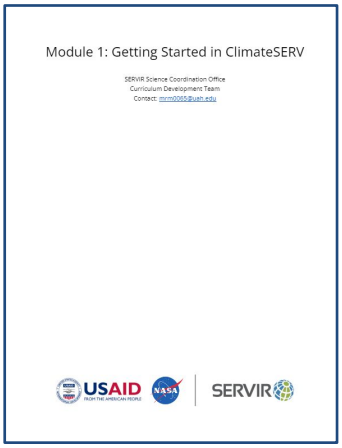
But what you'll be using climateSERV for is to determine the relative soil moisture in your region of interest in order to determine a reasonable soil moisture input for your radiative transfer model. So there are actually three different soil moisture datasets for you to choose from. The first is the NSIDC SMAP dataset, where NSIDC stands for the National Snow and Ice Data Center and SMAP stands for Soil Moisture Active Passive mission. The Soil Moisture Active Passive Mission is an orbiting observatory that measures the amount of water in the surface soil everywhere on Earth. NSIDC takes the raw SMAP data, which has a spatial resolution of more than 10km, and downscales it to a spatial resolution of 1 km using a downscaling algorithm. This data represents approximately the top 5 cm of the soil column.

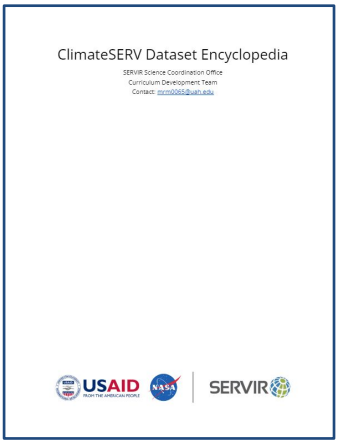
The USDA SMAP dataset, which stands for the United States Department of Agriculture, uses the same SMAP dataset, integrated into a soil moisture model that uses in situ soil moisture measurements, but keeps it at the native resolution of 1 degree, or about 10 kilometers. the surface soil moisture product represents the top 2.5 cm of the soil column.

Finally, ClimateSERV offers the Land Information System, or LIS product, which was created by NASA's Short-term Prediction and Transition Center. So this dataset is a model, so it doesn't use the SMAP data, but rather is a run of a land surface model whose inputs are forced by meteorological, precipitation, and vegetation information

that come from other models as well as satellite observations, providing the soil moisture at various depths which you can see on the right. As you can see, these datasets have differing temporal ranges and resolutions, as well as differing spatial ranges and resolutions.

ClimateSERV Materials





materials → Module 1 → Module 2 → CSDE → Asynchronous Design

To help you learn how to use ClimateSERV, we at SERVIR have created some materials to help. These documents include Module 1, which will show you how to navigate the different panels in ClimateSERV Graphical User Interface (or GUI), Module 2 which will show you how to explore soil moisture in climateserv, and the ClimateSERV Dataset Encyclopedia, which provides information about the datasets on ClimateSERV, which we will use in both Modules 1 and 2. These Materials are designed so you can work with ClimateSERV completely asynchronously.

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Live Demonstration

So let’s go to ClimateSERV and see how these different panels and modes work in action, and see the differences between these soil moisture datasets.

So with that I'd like to end here and take any questions. We at SERVIR are happy to help with any questions you may have when working with ClimateSERV, so don't hesitate to reach out if you have any questions or face any issues when working with ClimateSERV.


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