Climate Engine (ClimateEngine.org) is a free web application powered by Google Earth Engine that can be used to create on-demand maps and charts from publicly available satellite and climate data using a standard web browser.

Climate Engine provides access to a variety of geospatial datasets that track vegetation, snow, and water across the planet, as well as climate datasets that track temperature, precipitation, winds, etc. Datasets are stored and processed in the cloud, eliminating the need for users to download, store and process large data files on their computers. Climate Engine was developed by a team of scientists at DRI, University of Idaho, and Google.
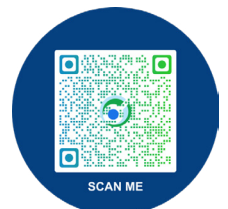
DROUGHT ANALYSIS CAPABILITIES

Climate Engine can be used to create drought assessments that are place-based and near real-time. Users select from datasets and variables, and can view raw data or data expressed as a deviation from some baseline or expected value (e.g., long term averages). Available drought metrics include: U.S. Drought Monitor (USDM), Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI), Evaporative Demand Drought Index (EDDI), Palmer Z-index, Palmer Drought Severity Index (PDSI), and Drought Blends (Note: Some metrics available only in the U.S.). Users can choose from a set of variables and time periods, examine percentiles or anomalies, and further customize maps.
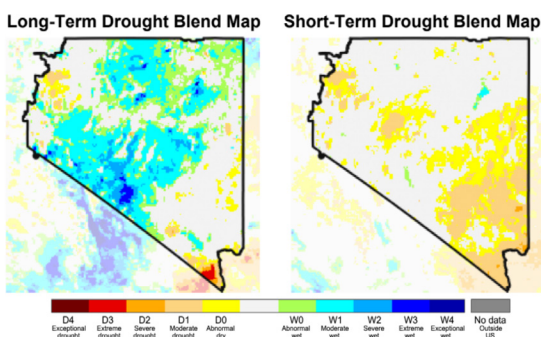
EXAMPLE: DROUGHT BLENDS FOR DECISION MAKING

Climate Engine maps of long- and short- term blends (left) can help decision makers by informing delegation of resources, management decisions, etc. The short-term blend is indicative of vegetative drought and is more sensitive to individual precipitation events. The long-term blend is indicative of drought on the landscape, i.e. groundwater and lake levels.

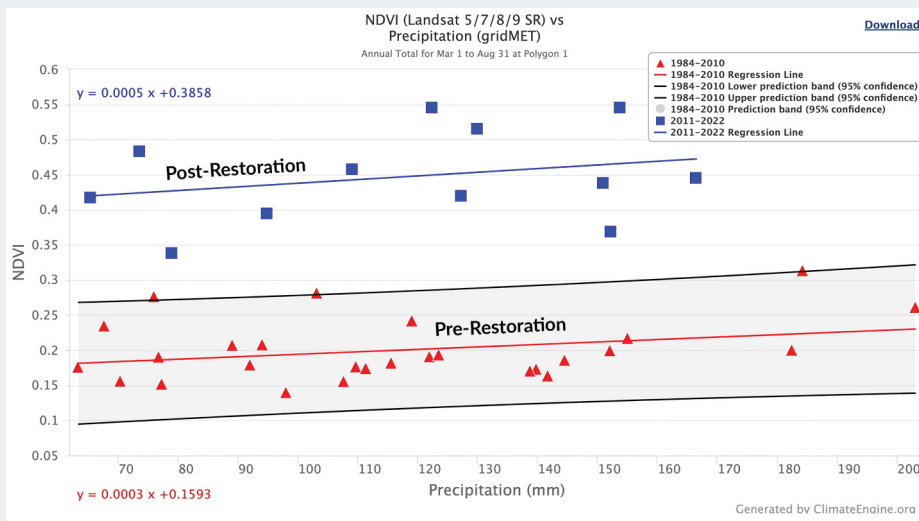For a video tutorial on making maps in Climate Engine, scan me.

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SUSIE CREEK, 1991

SUSIE CREEK, 2012

MONITORING APPLICATIONS

Climate Engine can be used to monitor the effectiveness of various management decisions. The App allows users to explore 70+ datasets and quickly unpack the information they provide for areas of interest. For example, by plotting both remote sensing and climate data time series summaries users can start to separate out the impact of climate vs. policy or management decisions. Climate Engine can support monitoring across various domains including land management, agriculture, conservation, etc. Relevant metrics include vegetation indices, drought indices, snow and water indices, and land surface temperature.

NDVI (Landsat 5/7/8/9 SR) vs Precipitation (gridMET)
Annual Total for Mar 1 to Aug 31 at Polygon 1

Download

y = 0.0005 x +0.3858

Post-Restoration

Pre-Restoration

y = 0.0003 x +0.1593

NDVI

Precipitation (mm)

Generated by ClimateEngine.org

- ▲ 1984–2010
- ― 1984–2010 Regression Line
- ― 1984–2010 Lower prediction band (95% confidence)
- ― 1984–2010 Upper prediction band (95% confidence)
- 1984–2010 Prediction band (95% confidence)
- ■ 2011–2022
- ― 2011–2022 Regression Line

EXAMPLE: EVALUATING RESTORATION OUTCOMES AT SUSIE CREEK

Climate Engine two variable scatter plot (left) illustrates the relationship between precipitation and the Normalized Difference Vegetation Index (NDVI) both pre- and post-restoration efforts. We can see that the restored stretch of stream shows more productive vegetation for the range of precipitation values after restoration efforts. By plotting the 95% prediction interval for the pre-restoration period, we see that every year since 2010 has been more productive than could have been expected during the pre-restoration period.
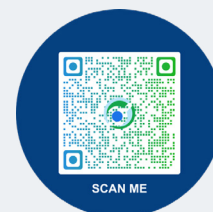
SCAN ME

For a video tutorial on making this chart in Climate Engine, scan me.

RESOURCES

To get support using the Climate Engine App or API visit support.climateengine.org. For more tutorials, check out our Youtube page @ClimateEngineOrg. To keep up-to-date on new datasets and functionalities, follow us on Twitter @ClimateEngOrg.

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