# Environmental Monitoring System – EMS 2.0

Data collection and analysis at your fingertip

The EMS serves the growing need to better understand and manage climate related risks and opportunities. The system allows analysts, risk managers and claims officers to access, analyze, visualize and download climate, vegetation and Nat Cat data from different providers on one single platform. Automated reports can be customized to visually summarize the data and provide a global risk overview.

Features

➢ Easy data access via online frontend or technical interface
➢ Data aggregation on all administrative hierarchy levels
➢ Monitoring of current conditions vs climatology for anomaly detection
➢ Customized automated reporting including alert function
➢ Crop Yield Forecast for most important crops on different admin units
➢ Data import and export in different formats like csv or shapefiles
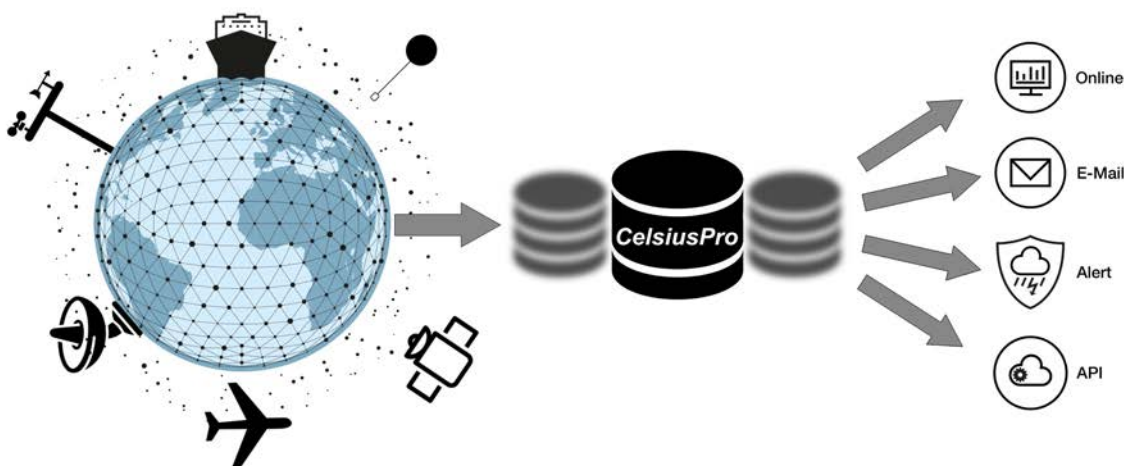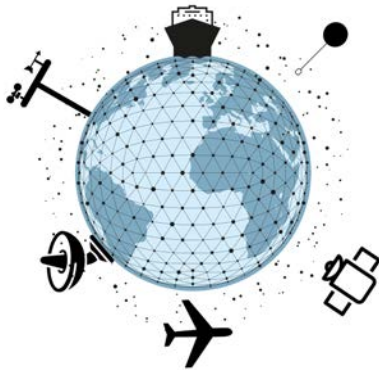

Users

➢ Insurers
➢ Brokers
➢ Consultants
➢ Corporations
➢ Financial institutions
➢ Governments and NGOs

Benefits

➢ Interpreting large datasets
➢ Real-time climate monitoring
➢ Multiple data providers in one portal
➢ Detecting anomalies and areas at risk
➢ Automated reports and alerts
➢ Basis for decision making

Analyse and track climate and vegetation data globally

Single Source Platform

EMS facilitates access to data provided by various meteorological agencies, space agencies and other independent data providers. The web based platform is designed to track the latest developments and trends and compare it with historical climate and vegetation data locally and globally.

Reporting and Alerts

Customized reports for defined regions and parameters are generated automatically and updated on specified time intervals (daily, weekly or monthly). Based on defined thresholds alert emails will be sent to highlight the regions at risk.

Multiple Access

Data and reports can be accessed via the web browser or a technical interface (API) for easy integration into an existing IT environment. Own data can be uploaded, quality controlled and visualized. The upload of GIS files with points or polygons of areas of interest allow intersections with the data.


Big Data

EMS provides access to a growing number of data sets. With more than 20 different data sets all relevant weather, vegetation and NatCat parameters are covered in every corner of the world. Every single day, more than 120 million new data points are loaded into our database.

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Multiple data layers and aggregation

Monitoring and risk analysis on various spatial levels is key. We aggregate data for all administrative hierarchy levels. Additional layers like land use, street map or satellite view put the data in context.
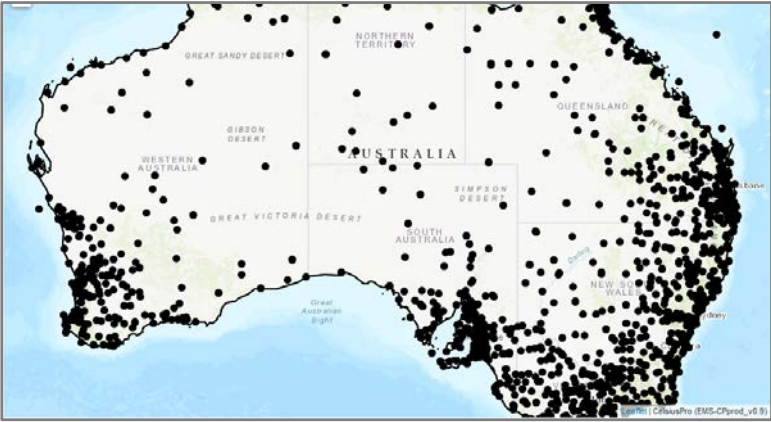

Weather Stations

For weather stations the most common parameters reported are rainfall and daily (min/max) temperature. Depending on the country/data provider more parameters are available.

Gridded Data

Gridded data sets are typically either satellite datasets (remote sensing) or blended datasets (remote sensing and weather stations). Typical parameters are rain, temperature and vegetation.
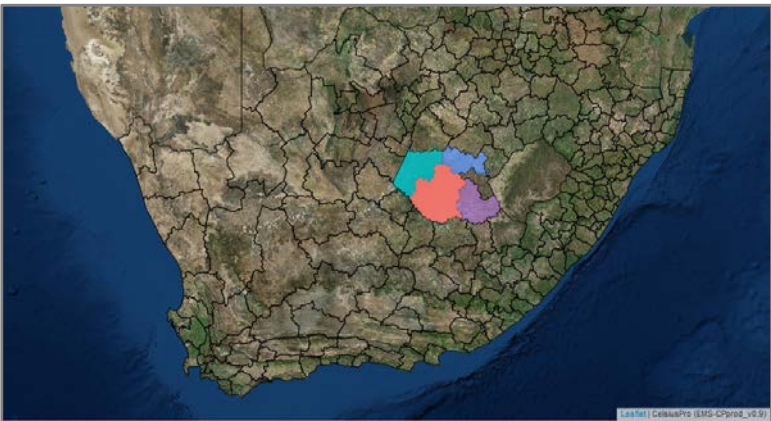
Spatial Aggregation

Gridded data is aggregated for all administrative hierarchy levels like district, county and village to provide the user with data per geographic area rather than individual pixels.


Multi Layer

Various standard maps and layers from open street map, satellite view to land use data allow better orientation and put the data in context.

Maps

Maps are the best way to get an overview of the situation at a glance. We provide maps to visualize current weather and vegetation and put it in perspective with the climatological average for the reference period and region.
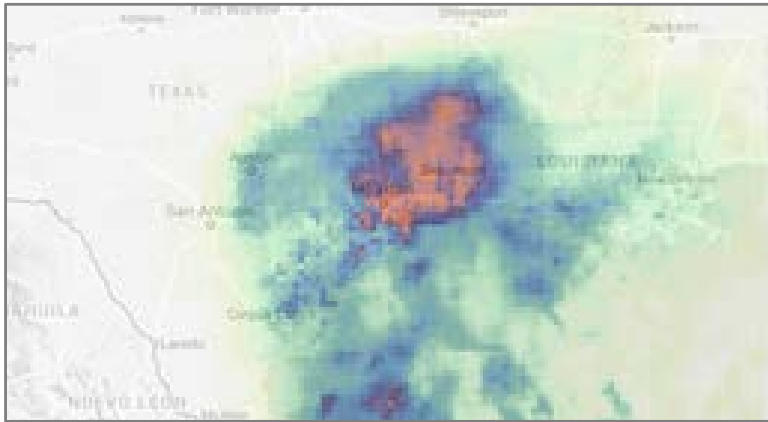

Event Footprint

Which areas are affected after a severe weather event? The map shows e.g. rainfall intensity on a particular day or over a limited period. This provides insight into the footprint of extreme events.
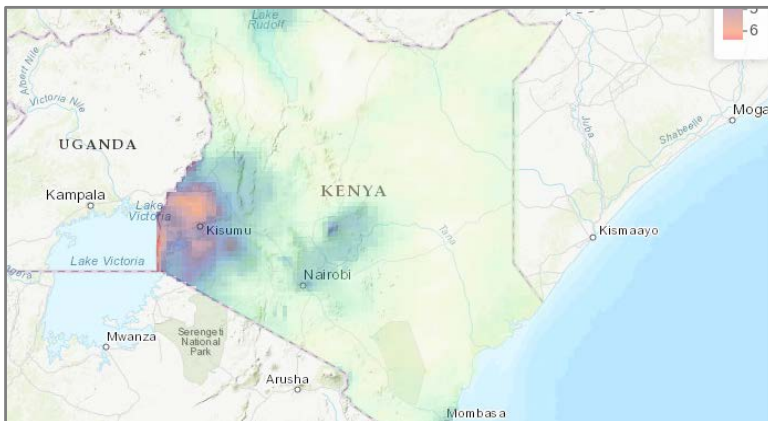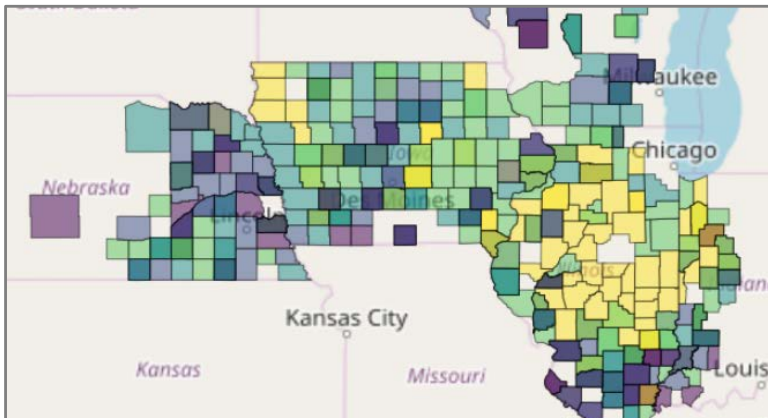

Climatology View

Understanding risk exposure needs long time series of reliable data. Visualized on a map like average rainfall shows the distribution across large areas.
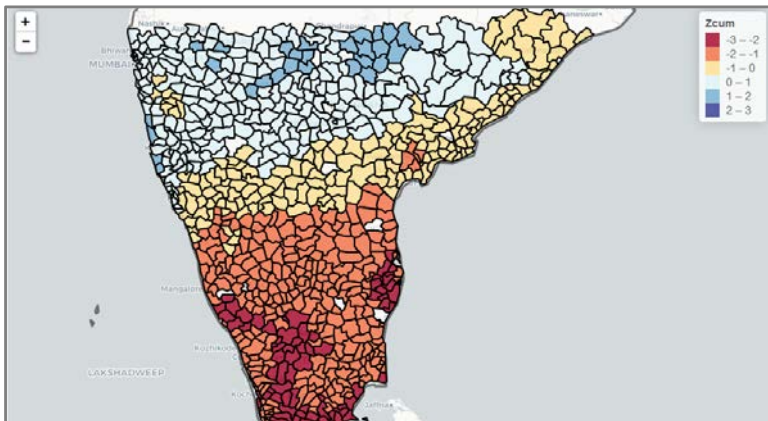
Anomalies per Region

Tracking and comparing the actual cumulative time series with the climatology provides insight into the actual state of the climate and vegetation.


Crop Model

Visualization of crop yield estimates per administrative region, as well as anomalies of projected yields provide actionable information for risk managers.

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Graphics

A variety of graphics and charts next to statistical values provide key insights into large datasets. The charts for the selected areas are easy to read and part of every report.
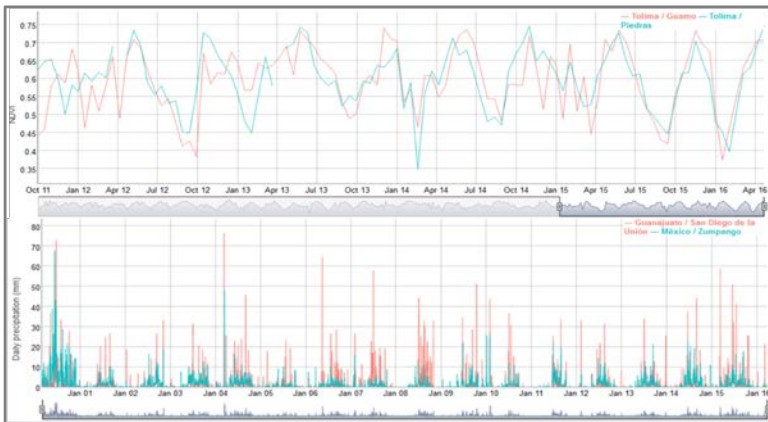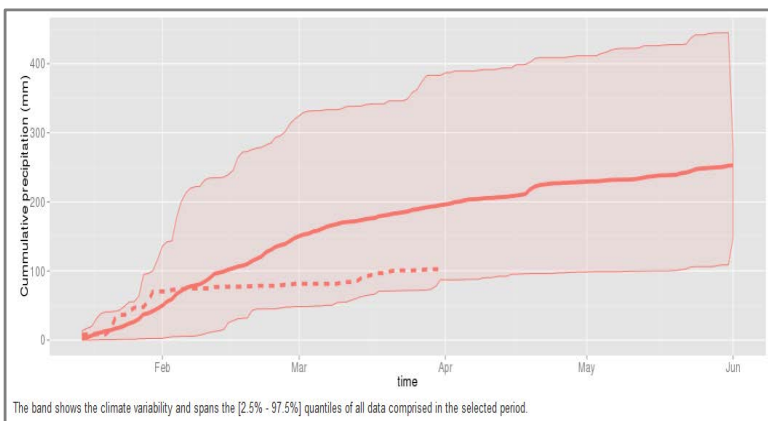

Time Series Analysis

The time series analysis provides an overview of the data range and seasonality. Data can be analyzed on a standalone basis, or as part of a multiple selection.
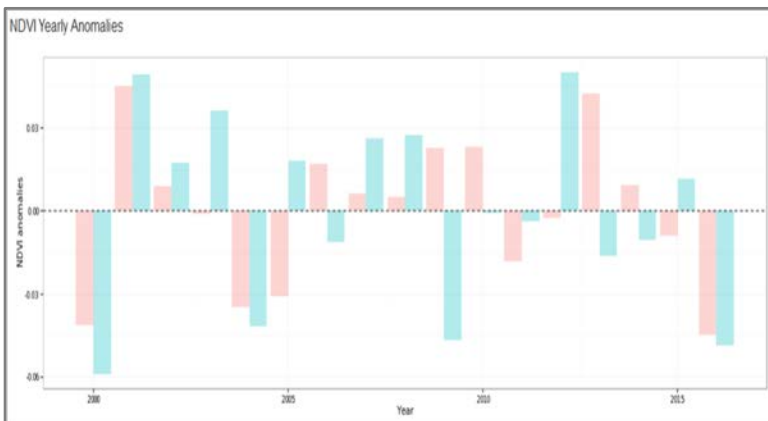

Anomalies

The anomaly-graph identifies values below or above average for a defined time period for a parameter in respect to weather stations, grids or administrative units.

The band shows the climate variability and spans the [2.5% - 97.5%] quantiles of all data comprised in the selected period.

Cumulative Time Series

Tracking and comparing the actual cumulative time series with the climatology provides insight into the current development of weather compared to the average.
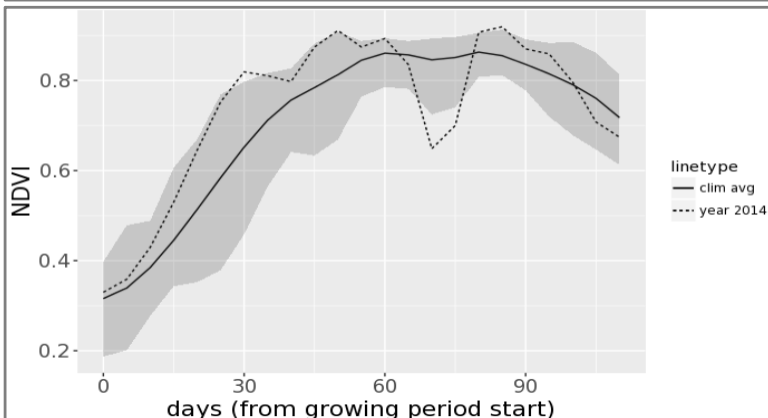

Vegetation Deficit

Comparing the current vegetation development during the growth period with normal vegetation cycles provides crucial insight into the state of crop health.

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Nat Cat

Earthquakes and Tropical Cyclones are significant catastrophes. We provide detailed data indicating time, location and intensity of the events. The data is automatically updated supporting disaster aid coordination, loss adjustment or settlement.
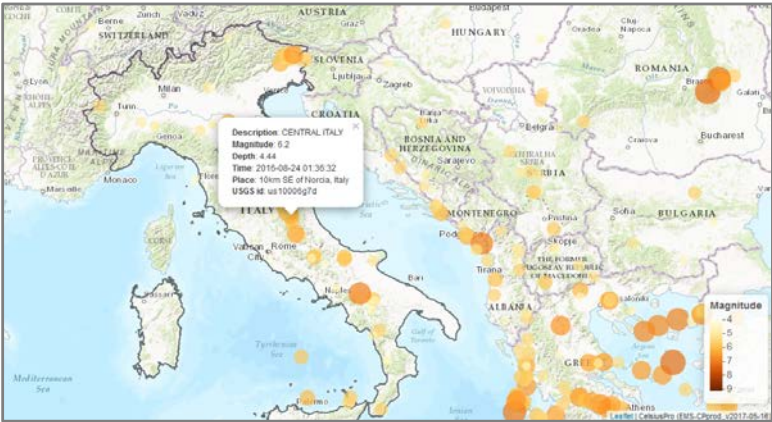
Earthquakes

Maps show all earthquakes globally during selected reference periods and for a certain magnitude. The latest events are automatically added.
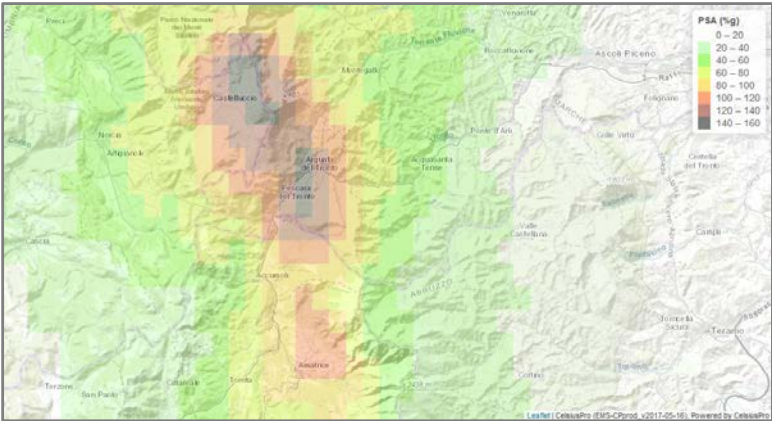
Shake Maps

The effective intensity of the earthquake is visualized in shake maps for peak spectral acceleration data on a granular level per event.

Tropical Cyclone Paths

The tracs and intensities of all Tropical Cyclones (Hurricanes and Typhoons) are available for all basins. The latest events are continuously updated.
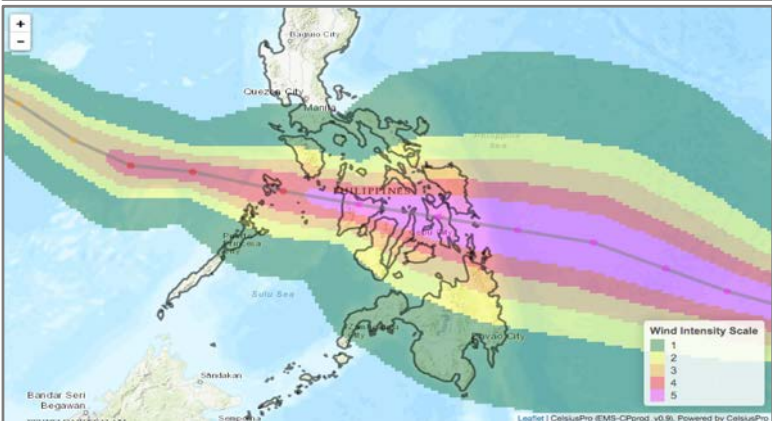
Wind Footprint

The footprint of Tropical Cyclones is calculated automatically providing a spatial view of maximum wind speeds for the region affected by the storm.

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Data

While our database is constantly growing, clients can upload their own datasets as well. A subset of the datasets currently accessible contains:

Source	Attributes	
CHIRPS2	Variable Spatial resolution Period covered Update frequency	Precipitation 0.05° (5x5km) 1981 – now monthly
IMERG	Variable Spatial resolution Period covered Update frequency	Precipitation 0.1° (10x10km) 2017 – now daily
ARC2	Variable Spatial resolution Period covered Update frequency	Precipitation 0.1° (10x10km) / Africa only 1960 – now daily
TAMSAT	Variable Spatial resolution Period covered Update frequency	Precipitation 0.04° (4x4km) / Africa only 1983 – now 3 times a month
MODIS	Variable Spatial resolution Period covered Update frequency	NDVI 0.05° (5x5km) 2000 – now 16 days
Land cover	Variable Spatial resolution Period covered Update frequency	Land cover type 500m 2001 – 2014 yearly
VHP	Variable Spatial resolution Period covered Update frequency	Vegetation Health (VHI), Vegetation Condition Index (VCI), Temperature Condition Index (TCI) 0.04° (4x4km) 1981 – now weekly
BOM	Variable Spatial resolution Period covered Update frequency	Temperature, precipitation, solar radiation 5x5km / Australia only 1911 - now daily
Era interim	Variable Spatial resolution Period covered Update frequency	all meteorological parameters 0.8° 1980 - now 2 months
GHCN Weather stations	Variable Spatial resolution Period covered Update frequency	all meteorological parameters More than 10`000 weather stations > 10 years daily
USGS, Earthquakes	Variable Spatial resolution Period covered Update frequency	Peak Spectral Acceleration at 0.3s 2x2km 1973 - now daily
JTWC, NHC, JMA, BOM, Tropical Cyclones	Variable Spatial resolution Period covered Update frequency	TC track, cyclone intensity, maximum wind speed 10x10km (based on interpolation model) 2005 - now daily

Who we are, what we do

Insurance Tech Solutions for Climate Risks and Natural Catastrophes

Founded in 2008, CelsiusPro is a Swiss Insurtech company that specializes in industrializing index insurance solutions to mitigate the effects of adverse weather, climate change and natural catastrophes. We aim to:

➢ Increase resilience against NatCat and weather events,
➢ Combine risk management with data science,
➢ Simplify, digitalize and automate the risk management process.

We are a global leader as full service provider for risk modelling, underwriting and the administration of index-based risk management products and consultancy in the context of weather risk and natural catastrophes.

Winner of the 2009 Swiss Insurance Innovation Award
Winner of the 2014 Australian Insurance Industry Awards (Innovation of the year)

Some of our Partners and Clients: