Event Extractor

User Guide - Significant Rainfall Event Detection

Supported by: eThekwini Municipality | ICLEI | University of KwaZulu-Natal | Obscape

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Contents

1. Overview

Quick Summary: The Event Extractor identifies significant rainfall events from a rain gauge record. Set depth and duration thresholds, and the tool finds all events that exceed them - ranked by total rainfall.

This tool scans continuous rainfall data for periods where accumulated rainfall exceeds a user-defined threshold within a specified time window. It is useful for identifying storms for post-event analysis, calibrating flood models, or documenting significant weather events.

2. Data Requirements

Quick Summary: Same CSV format as the Rain Data Viewer. See the Rain Analysis Guide for full details on the expected file format.

The Event Extractor uses the same Obscape CSV format with Unix timestamp, time string, and rainfall columns. If you have already loaded data in the Rain Data Viewer tabs, the same data is available here - no need to reload.

3. Setting Thresholds

Quick Summary: Set a depth (mm) and duration (minutes) to define what counts as a "significant" event.

Parameters

Parameter	Default	Description
Depth (mm)	10	Minimum total rainfall for an event to be considered significant
Duration (min)	60	Time window over which rainfall is accumulated

How to choose thresholds

- **Flash flood events:** Use a short duration (30-60 min) with moderate depth (10-20mm).
- **Major storm events:** Use a longer duration (120-360 min) with higher depth (25-50mm).
- **All notable rainfall:** Use a lower threshold (5mm in 60 min) to capture a broader set of events.
- **Extreme events only:** Use high thresholds (50mm in 60 min) to isolate only the most severe events.

Start with the defaults (10mm in 60 min) and adjust based on what you see.

4. Processing Events

Quick Summary: Click "Process" to detect events. Results appear as a ranked list alongside an overview chart highlighting detected events.

- **Overview Chart:** The complete rainfall record with detected events highlighted in colour.
- **Events List:** A ranked table showing each event's date, total rainfall (mm), duration (minutes), and peak intensity. Click any event to view its detail.

Events are detected using a sliding window algorithm: the tool scans the time series, accumulating rainfall over the specified duration window, and flags periods where the total exceeds the depth threshold. Overlapping detections are merged into single events.

5. Event Detail View

Quick Summary: Click an event in the list to see a detailed hyetograph showing the rainfall time series and cumulative rainfall for that specific event.

- **Rainfall bars:** Individual rainfall readings during the event.
- **Cumulative line:** Running total of rainfall through the event.
- **Intensity windows:** Peak rainfall intensities for 5-minute, 15-minute, and 60-minute windows within the event.

6. Satellite Imagery

Quick Summary: When you select an event, satellite imagery for that date is displayed on a map. Switch between EUMETSAT (default) and NASA GIBS imagery.

Satellite Sources

Source	Product	Description
EUMETSAT	MSG SEVIRI IR 10.8µm	Infrared cloud top temperatures. Bright = cold tops = heavy rain potential.
NASA GIBS	MODIS Cloud Top Temp	Similar infrared product from NASA Terra satellite. Daily resolution.

The satellite image is overlaid on an OpenStreetMap base with the rain gauge location marked. This helps confirm whether the detected rainfall event corresponds to visible storm systems.

Note: Satellite imagery may not be available for all dates, particularly for older events. The imagery covers Southern Africa and is fetched via free public APIs (no account required).

7. Exporting Results

Quick Summary: Export your results as CSV (data table) or PDF (full report with charts and satellite images).

CSV Export

Click **"Export CSV"** to download a file containing: event rank, start/end date/time, total rainfall, duration, peak intensity, and peak reading for each detected event.

PDF Report

Click **"Export Report"** to generate a PDF containing:

- Summary of detection parameters and total events found
- Events summary table
- Per-event detail pages with hyetograph charts
- Satellite imagery for each event (using whichever source is currently selected)
- Overview chart of the complete record

8. Tips & Troubleshooting

- **Too many events?** Increase the depth threshold or decrease the duration.
- **Too few events?** Decrease the depth or increase the duration window.
- **Satellite image blank?** Try switching between EUMETSAT and NASA GIBS. Some dates may not have imagery from one source.
- **Events seem merged?** The algorithm merges overlapping detections. Try a shorter duration window to separate closely-spaced events.
- **PDF generation slow?** The report captures chart images and satellite maps for each event. With many events (20+), generation may take 30-60 seconds.
- **Data already loaded?** If you loaded data in the analysis tabs, it is already available in the Events tab. No need to reload.