

NATIONAL FLOOD INTELLIGENCE · INDIA & THE HINDU KUSH HIMALAYA

FloodCast

Measured first, modelled second. Every river gauge, glacial lake and rainfall cell on one map, with the basis of every number printed beside it.

flood.aipower.guru · credentialed access · live data only · US Patent 10,468,883

A flood platform that tells you what it knows and what it is guessing

FloodCast watches India's rivers and the glacial lakes above them, continuously and unattended. It separates two kinds of information that most products blur: what has been *measured* by a gauge or a satellite, and what has been *modelled* from rainfall. The first is served the moment it arrives. The second is scored against the record every day, so what reaches the map has earned its place.

Measured **OBSERVED**

- CWC river gauges polled hourly, compared with each station's own official warning and danger levels.
- Glacial lakes measured on Sentinel-2 every day, with the usable-footprint fraction stored beside every reading.
- Mass-movement events from the USGS feed every five minutes, matched to the nearest lake and its downstream valley.
- Rainfall analysis and 48-hour forecast on 11,532 grid points, every unit forced from inside its own boundary.

Modelled **MODELLED**

- A national rainfall-to-runoff chain over 6,494 sub-basins, run three times a day to a 46-hour horizon.
- Scored every morning against the gauges and against a persistence null on identical pairs.
- Released to the map as it clears that bar: the release is earned on the scoreboard, not assumed.
- A daily 07:30 IST digest that carries observed alerts and forecast crossings, never modelled ones on their own.

200

CWC river stations, observed hourly

6,494

modelling units, HydroSHEDS level 8

3,553

glacial lakes registered · 746 watched daily

11,532

rainfall forcing points, zero interpolated

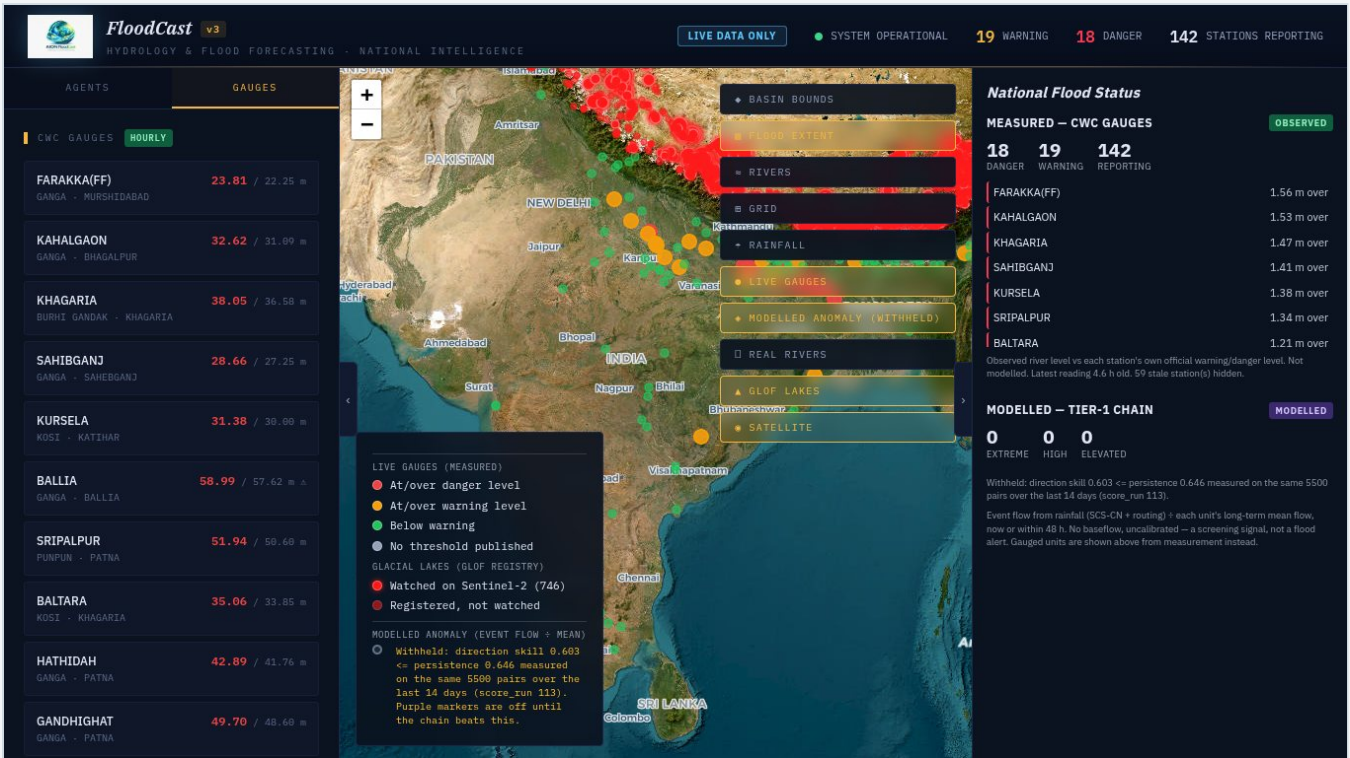
5 min

seismic feed cadence for GLOF triggers

07:30 IST

daily digest, delivered unattended

One screen, every source, each labelled by what it is



Live screenshot, 13 Sep 2026. Red: the 3,553 registered glacial lakes, brighter where watched on Sentinel-2. Green, amber and red dots: CWC gauges below warning, over warning, over danger. Left: hourly gauge feed. Right: national status, with the observed and modelled panels side by side.

Layers

Live gauges	Observed level against the station's own datum OBSERVED
GLOF lakes	Hi-MAG 2017 registry, ICIMOD REGISTRY
Flow direction	Reach chain 60 km below each watched lake TERRAIN
Rainfall	Analysis and 48 h forecast per unit OBSERVED
Real rivers	HydroRIVERS, mean discharge in m³/s TERRAIN
Modelled anomaly	Event flow ÷ long-term mean MODELLED

Rules the map keeps

- A station with no published threshold is shown as *unknown*, never as *normal*.
- A reading older than the staleness window is hidden from alerting, not silently reused.
- River stage in metres and reservoir inflow in m³/s can never be compared; the database refuses the row.
- Every API response carries a basis field. Nothing synthetic is served.

The Ganga and Kosi plains, gauge by gauge



Bihar, 13 Sep 2026 morning. Nineteen stations over danger level, each shown with metres over its own official mark.

What a gauge alert means here

The Central Water Commission publishes observed water levels for about two hundred river stations together with each station's warning level, danger level and highest flood level. FloodCast reads that feed hourly and derives the alert from the measurement alone: over the warning mark is *warning*, over the danger mark is *danger*. No model sits between the gauge and the colour.

Each morning at 07:30 IST a digest lists every station at danger or warning, any new crossings since the previous day, and the forecast crossings CWC itself has published. It is sent whether or not anyone is watching.



NDRF relief operations in a Bihar flood. Photo: Wikimedia Commons, CC BY-SA 3.0.

The scoreboard behind it

CWC's own published forecasts are scored on the same basis as ours, one pair per distinct forecast statement. Over the last fortnight their direction-of-change skill is 0.85. That is the bar the modelled chain is scored against every morning.

Scored by machine. The scoreboard is generated by the scorer, not written by hand, and it decides what reaches the operational map.



04 · GLACIAL LAKES

The GLOF agent: from the lake to the valley below

A glacial lake outburst has no pathway in a rainfall model. Nobody predicted the 26 August 2026 Bhote Koshi event from rain. FloodCast therefore watches the lakes directly, and watches the ground that can dam or breach them.

Registry

3,553 lakes over 0.05 km² from the ICIMOD Hi-MAG 2017 inventory, with elevation, dam type and the 40 ranked potentially dangerous lakes.

Seismic watch

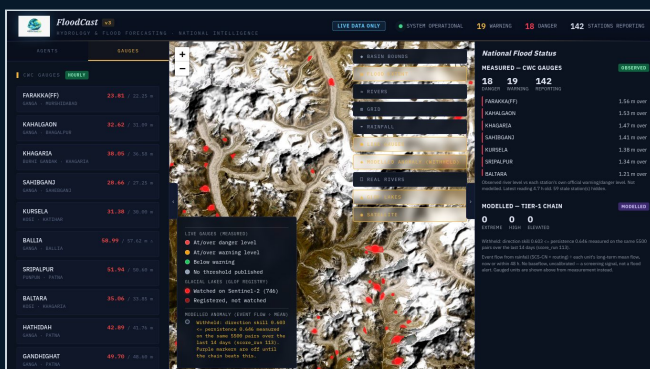
The USGS feed polled every five minutes. Any earthquake or landslide within the Himalayan hull is classified, matched to its nearest lake and unit, and alerted once.

Optical monitor

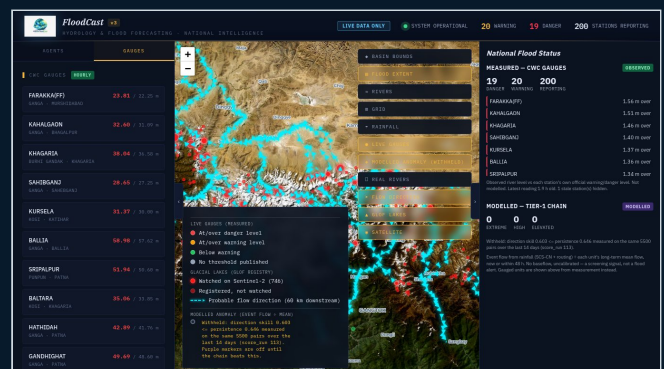
746 watched lakes measured daily on Sentinel-2 NDWI. Every scene read is stored, including the unusable ones, so "we could not see it" is auditable.

Barrier check

After a mass movement, the valley 25 km downstream is compared before and after for new water: a landslide dam forming behind a valley.



Zoomed to the Khumbu. At close range the red markers become the lakes' real outlines.



--- Flow direction below every watched lake in Sikkim: the river network walked 60 km downstream. Topology, not a forecast.

The national chain: rainfall to river, three times a day

Rainfall analysis and forecast arrive on 11,532 grid points, enough that every one of the 6,494 sub-basins is forced from points inside its own boundary rather than interpolated from a neighbour. Runoff is generated with curve numbers from the published GCN250 dataset and terrain from Copernicus GLO-90, then routed downstream through the HydroSHEDS network three times a day to a 46-hour horizon.

Each morning the chain is scored on every gauge: did the river rise or fall over the next 24 hours, and did the model call it? The same question is put to a persistence null, on the identical station-and-time pairs.

Scored on 5,500 station-hours a fortnight.

Direction of change over the next 24 hours, on identical pairs for the chain, for persistence and for CWC's published forecast. The chain is recalibrated from that record, not from assumptions.



Tsho Rolpa, Rolwaling valley. Photo: Wikimedia Commons, CC BY-SA 4.0.

Every unit, every event

Every one of the 6,494 sub-basins carries real curve numbers and real slope, and every forecast is archived at issue time. The archive is what lets the chain be scored honestly and improved from evidence rather than tuned by eye.

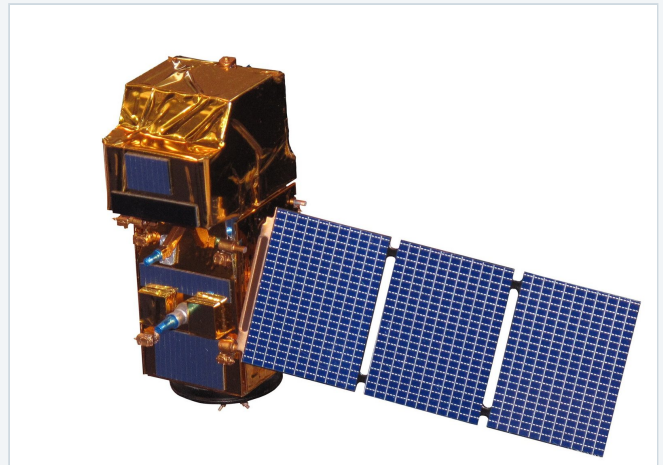
Open data, own infrastructure, no keys in the browser

Data sources

River levels	Central Water Commission, observed hourly
Rainfall	Open-Meteo professional tier, analysis and forecast
Basins and rivers	HydroSHEDS HydroBASINS and HydroRIVERS v1
Curve numbers	GCN250, CC BY 4.0
Terrain	Copernicus DEM GLO-90
Glacial lakes	ICIMOD Hi-MAG 2017, CC BY 4.0
Lake imagery	Copernicus Sentinel-2 L2A, via Earth Search
Seismic	USGS real-time feed
Reservoir level	NASA ICESat-2 ATL13, validation only

How it runs

Eleven scheduled services on AION's own cloud fleet: hourly gauge crawl, rainfall and chain three times a day, seismic watch every five minutes, lake monitor, scorer and digest daily. PostGIS holds everything, with constraints that reject a wrong unit or a threshold on the wrong kind of station. The dashboard reaches the engine only through an authenticated gateway; the browser never holds a data key.



Sentinel-2, the optical eye on 746 lakes. Photo: Wikimedia Commons, CC BY-SA 2.0 FR.



The agents console: seven services, each with its heartbeat and last run.

Built in the open, extended where the data allows

Next

- **Radar.** Sentinel-1 SAR for cloud-proof lake and barrier detection; the 26 August barrier lake was invisible to optical imagery in every one of eight scenes.
- **Reservoir levels.** ICESat-2 altimetry validated at Hirakud to within 0.14 m of the published full reservoir level; used for storage trends, never for alerting because of its latency.
- **3D terrain view.** The Himalayan arc in relief, with lakes and flow paths draped on real elevation.
- **The modelled layer.** Next iteration shaped by the scoreboard: an anomaly product for the plains and a dedicated GLOF pathway for the mountains.

Access

FloodCast is live at flood.aipower.guru behind a credentialed gate. Access is granted per organisation to emergency managers, water authorities, insurers and researchers. The observed layers and the daily digest are available today; modelled layers follow as they clear their bars.

AION Pvt Ltd

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