The Corn Belt Storm Hail Activity Signal, A Wet-Regime Weather Lens

Reading the 30-day rolling count of NOAA-reported hail events across eight Corn Belt states, z-scored on 1,260-day rolling window. CONTRARIAN interpretation: elevated hail is a wet-regime signature (bearish corn via comfortable-moisture setup), not a crop-damage bullish signal. Daily Spearman IC minus 0.155 at p-value 2.9e-49.

David Stendahl · Market Lab Analytics · November 2, 2026

What this signal is, with the limits stated upfront

Hail events across the US Corn Belt are a weather signature. A naive reader sees hail reports and reaches for the crop-damage story: hail destroys corn plants, so elevated hail should be bullish for corn. The historical data says otherwise. Severe-weather regimes that generate hail also bring persistent moisture, cooler temperatures, and the “wet signature” that is historically associated with comfortable corn growing conditions.

The signal reads 30-day rolling counts of NOAA-reported hail events across eight Corn Belt states (Iowa, Illinois, Indiana, Nebraska, Minnesota, South Dakota, Ohio, Missouri). The count is z-scored on a 1,260-day (5-year) rolling window and tanh-bounded to a range of minus 1 to plus 1. Composite above plus 0.5 is Hail Activity High. Composite below minus 0.5 is Hail Activity Low. The middle band is Neutral.

CONTRARIAN INTERPRETATION. Daily Spearman IC against CBOT Corn fwd 60-day return is minus 0.155 at p-value 2.9e-49 across 8,984 observations. Elevated hail reads a wet-regime signature; corn drifts lower historically. Low hail reads a dry-regime signature; corn rallies on drought-era yield concerns.

Current reading, as of October 30, 2026: composite minus 0.73 (deep Hail Activity Low band). The 30-day rolling hail-event count is well below baseline. Per the contrarian interpretation, this is a dry-regime signature, aligned with the parallel Z4339 El Nino setup.

Limits upfront: the signal reads severe-weather regime, not direct crop damage. Isolated hail events on prime corn acreage CAN produce localized damage with price impact, but the aggregate 30-day count captures the broader weather regime, which dominates the price signal in historical data.

• • •

How the hail activity composite composes

Direct observation: NOAA Storm Prediction Center daily storm reports. Hail events with reported hail-stone size greater than 0.75 inch (standard NWS severe-weather threshold). Eight Corn Belt states included.

Derived comparison: 30-day rolling sum of hail event counts. Z-score on 1,260-day (5-year) rolling window. Tanh-bound to minus 1 to plus 1.

State thresholds. Composite above plus 0.5 is Hail Activity High. Composite below minus 0.5 is Hail Activity Low. The middle band is Neutral.

The CONTRARIAN interpretation reflects the compositional interpretation of hail events. Hail-producing storms require moisture-laden air masses, atmospheric instability, and strong updrafts. These conditions coincide with wet-regime synoptic patterns across the Corn Belt. The crop-damage mechanism (localized hail destroying plants) is overwhelmed in aggregate by the wet-regime signal (favorable overall growing conditions).

• • •

What the state-conditional returns have actually done

> **Reference baseline, CBOT Corn fwd 60-day unconditional**
>
> CBOT Corn back-adjusted continuous forward-60-day return baseline over the full sample window of 1990-11-29 through 2026-10-30: mean plus 0.29 percent, median minus 1.01 percent, standard deviation 10.89 percent, percent negative 56.6 percent.

Hail Activity Low (composite below minus 0.5) covers 52.5 percent of the sample. Per-day mean plus 0.38 percent, edge plus 0.09 pp above baseline. The dry-regime signature; mildly supportive of corn.

Hail Activity Neutral (composite between minus 0.5 and plus 0.5) covers 15.6 percent of the sample. Per-day mean minus 0.25 percent, edge minus 0.54 pp below baseline. The transitional band.

Hail Activity High (composite above plus 0.5) covers 31.9 percent of the sample. Per-day mean minus 1.59 percent, edge minus 1.88 pp below baseline. The wet-regime signature; corn underperforms baseline. This is the author-thesis-aligned contrarian firing.

Directional spread: plus 1.97 pp from Hail High to Hail Low. Clean monotone contrarian pattern.

• • •

Three cases that frame how to read this signal

Case 1: July 2012. Low hail during the drought-era rally.

The 2012 drought summer brought exceptionally dry conditions. Hail event counts fell well below baseline; the signal fired into Hail Activity Low. Corn rallied strongly through this period on the drought-era yield loss. The contrarian interpretation confirmed: low hail equals dry regime equals bullish corn.

Case 2: Spring 2019. High hail during Prevent-Plant.

The 2019 flooded-planting season brought persistent severe weather across the Corn Belt. Hail event counts spiked; signal fired into Hail Activity High. Corn initially rallied on prevent-plant concerns, then drifted lower as the acreage collapse was priced and the wet-regime signature dominated. The contrarian firing anchored the bearish-corn resolution.

Case 3: Current. Hail Activity Low in the post-growing-season window.

As of October 30, 2026, the signal reads composite minus 0.73 (deep Hail Activity Low band). The 30-day rolling hail-event count is well below baseline. Combined with the parallel Z4339 El Nino signature (comfortable 2027 US summer outlook), the current reading supports the dry-regime interpretation.

• • •

How to use the signal today

As of November 2, 2026, the composite reads minus 0.73 and the state is Hail Activity Low. Historical Low firings deliver plus 0.38 percent per-day mean fwd 60-day, mildly above baseline.

Pair with three confirming reads:

- **Z4339 NOAA Nino 3.4 SST Anomaly.** The ENSO climate lead. ENSO modulates the hail-activity regime; current El Nino supports the dry-regime-signature contrarian interpretation.
- **Z4381 Corn Silking Pace.** The pollination-vulnerability phenology signal. Hail activity physically affects silking conditions.
- **Z2900 Corn Condition Week-over-Week Delta.** The downstream condition response signal.

Hail activity is a weather-regime signature; use alongside the phenology and condition signals.

• • •

Methodology notes

Data sources. NOAA Storm Prediction Center daily storm reports. Hail events with reported hail-stone size greater than 0.75 inch.

Signal construction. 30-day rolling sum of hail event counts across eight Corn Belt states. Z-score on 1,260-day rolling window. Tanh-bound to minus 1 to plus 1. State thresholds plus or minus 0.5 extreme and plus or minus 0.2 moderate. Target: CBOT Corn back-adjusted continuous. INTERPRETATION: contrarian (elevated hail = wet-regime signature = bearish corn).

Validation statistics. Daily Spearman IC against CBOT Corn fwd 60-day return is minus 0.155 at p-value 2.9e-49 across 8,984 live-signal days. Three-regime per-day means: Hail Low plus 0.38 percent (edge plus 0.09 pp vs plus 0.29 percent baseline), Hail Neutral minus 0.25 percent (edge minus 0.54 pp), Hail High minus 1.59 percent (edge minus 1.88 pp). Clean monotone contrarian structure.

• • •

What this signal does not cover

First, the CONTRARIAN interpretation is a historical-aggregate reading. Localized hail events on prime corn acreage can produce catastrophic damage with price impact that this aggregate signal does not isolate.

Second, hail activity has strong seasonal patterns (peak May-July). Winter readings carry less-informative aggregate counts.

Third, climate change trends in severe-weather frequency may shift the 5-year rolling baseline faster than the signal updates.

Fourth, non-hail severe weather (tornadoes, derechos, straight-line winds) that affect corn differently are not captured.

This research brief is for informational purposes only and does not constitute investment advice. Data sources: NOAA Storm Prediction Center hail event reports, CBOT Corn back-adjusted continuous target. State-conditional statistics computed through 2026-10-30.