

Integrated Climate-Corn Dataset Data Dictionary

Column	Description	Source/Derivation	Units	Interpretation
year	Calendar year of observation	Derived from GSOM date column	Year	Primary temporal identifier linking climate and agricultural data
temp_avg_f	Mean growing season temperature	Mean of monthly averages (April-September)	°F	Overall thermal conditions during corn growing season
temp_max_f	Average maximum temperature	Mean of monthly mean maximums	°F	Typical daytime heat exposure
temp_min_f	Average minimum temperature	Mean of monthly mean minimums	°F	Typical nighttime temperatures
temp_extreme_max_f	Highest recorded temperature	Maximum of monthly extreme maximums	°F	Peak heat stress indicator
temp_extreme_min_f	Lowest recorded temperature	Minimum of monthly extreme minimums	°F	Frost or cold stress indicator
precip_total_mm	Total growing season precipitation	Sum of monthly totals (April-September)	mm	Total moisture available during growing season
precip_max_daily_mm	Maximum single-day precipitation	Maximum of monthly daily maxima	mm	Extreme rainfall event intensity
days_max_gte_90f	Heat stress days	Count of days with max temp ≥ 90°F	Days	High-temperature stress frequency
days_min_lte_32f	Frost days	Count of days with min temp ≤ 32°F	Days	Frost event frequency
gdd_base50	Growing Degree Days	$\Sigma(\max(T_{avg} - 50, 0))$ across growing season	°F-days	Cumulative heat units for corn development
temp_range_f	Average diurnal temperature range	Mean difference (temp_max_f - temp_min_f)	°F	Daily thermal amplitude
months_available	Data completeness indicator	Count of non-missing months in growing season	Months	Number of valid monthly observations
complete_season	Season completeness flag	Boolean: True if ≥ 6 months available	Boolean	Indicates sufficient data for analysis
data_quality_score	Composite quality metric	Weighted score based on completeness and flags	0-100	Overall data reliability indicator
acres_planted	Corn acreage planted	USDA NASS Quick Stats	Million acres	Total corn area planted in Illinois
acres_harvested	Corn acreage harvested	USDA NASS Quick Stats	Million acres	Total corn area harvested in Illinois
production_bushels	Total corn production	USDA NASS Quick Stats	Million bushels	Total corn output for Illinois
yield_bu_per_acre	Corn yield per acre	Calculated: production_bushels / acres_harvested	Bushels/acre	Productivity metric; primary response variable