

Agriculture Analytics

AI is only as useful as the data it has access to. To solve this challenge, Athenium has now made available their unsurpassed historical Weather, Severe Event, Trend and Risk intelligence as an AI Connector using MCP. These datasets are designed to support correlations and analysis of the impact of weather conditions, both normal and severe, to inform a wide range of agriculture planning and operations including site and crop selection, harvest planning, and commodity trading. AI tools are taking the power to correlate and analyze data to a whole new level, but are missing the global, precise, reliable, consistent, and localized weather data that can be time- and space-aligned to feed an accurate analysis. Athenium's AI Connector provides access to the best available weather and event history data and includes an expert layer which understands the meaning of the meteorological variables that impact agriculture, and which is trained to specifically support agriculture-based analysis and reporting. This expert layer will continue to get smarter with use.

Athenium Weather & Climate Data Included: *[See attached for details on each of these data sets]*

- **Core Global Weather** - Deep global hourly historical & 7-day hourly forecasts.
- **Enhanced Global Precipitation** - Global high-resolution precipitation.
- **U.S. Severe Event Historical Forensics** - Precise, high-resolution details of extreme events.
- **Global Climate Risk & Trends** - Detailed, localized trending for up to 70 years and In-depth statistics and analytics for hazard, & exposure analysis.

Sample Variables for Agriculture:

Below is a sampling of variables which may be most applicable to agriculture-related analytic queries. All are available hourly across the entire globe from as early as 1951, with most of the additional severe event data centered in the US. The variables presented here are meant to provide a sense of the depth and breadth of reporting and analysis possible. The datasets contain well over 200 specific weather variables detailing all aspects of weather and ground conditions.

Base Agriculture Group Variables

- Temperature & humidity, including surface air temperature, relative humidity & dewpoint temperature.
- Soil moisture, surface & at depths.
- Soil temperature, surface & at depths.
- Wind speed & direction.

- Precipitation.
- Solar radiation, incoming and net.
- Evaporation & water balance, soil moisture, surface water runoff, potential & actual evaporation.
- Vegetation Indices for high and low vegetation.
- Cloud cover percentage.
- Derived variables, such as Growing Degree Days (GDD) & modified GDDs.

Additional Trend Variables

- Daily - minimum, maximum, & average for all of the above variables.
- Monthly - all daily variables plus: total wet days, heavy precipitation days, snow & heavy snow days, frost free days, & growing days.
- Annual - all monthly plus: last spring & first autumn frost date, frost free season. days, first spring & last autumn growing date, & growing season days.

Additional Specialized Variables

- Specialized temperature variables, such as wind chill temperature, apparent temperature, minimum & maximum instantaneous temperature.
- Visibility and cloud cover variables, such as fractional coverage at various heights, visibility & cloud base height.
- Wind and precipitation variables, such as sustained & gusting wind, air density, freezing rain, sleet & snow, snow depth, snow melt, & ice cover.
- High resolution hourly severe event data for temperature, hail, sustained wind, wind gusts, rainfall, snowfall, & freezing rain.

Leveraging the Connector Expert Layer:

All of these variables are understood by the imbedded expert layer, allowing users to extract information in their own words and enable smart, AI-driven results and follow-up prompts. Further, users may leverage the expert layer to configure use case-specific definitions of derived variables by crop type, such as Growing Degree Days, and structure their own pattern of interest for repeat queries. For example, the solution will equip users to design their own templates of ideal growing season weather for selected crops and will deploy such templates in queries across a number of global growing locations.