

The *Sensor Point*[™] System

Weather Analytics' core technology is *Sensor Point*[™] - a web-based, on-demand system that can produce highly-accurate, hourly data for over 35 weather variables for any location in the world. *Sensor Point*'s accuracy comes from integrating the best available **input data** with proven **focusing technologies**.

Input Data

Sensor Point's[™] input mechanism accepts the **best sources available** for a given task and incorporates improved data sources as they become available, including **proprietary sensors**.

Input Data for Forecasts

- *Sensor Point*[™] receives continuous feeds of NOAA's latest Numerical Weather Prediction (NWP) model data as soon as they are updated, including the regional Rapid Update Cycle (RUC) and the Global Forecast System (GFS) output.
- Weather Analytics continuously receives complete real-time, current official weather station observations covering the entire globe.
- *Sensor Point*[™] also supports the direct input of private, on-site sensors.

Input Data for Historical Weather

- NOAA historical forecast trend information is 're-analyzed' and verified based on historical observations to produce the Global Reanalysis System (GRS) and the Climate Forecast System Reanalysis (CFSR) data...providing a focused, consistent, unbiased history of trend data.
- We also have complete historical, official weather station hourly surface observations
- Weather Analytics banks, cleans and pre-processes all of this data for the entire world (beginning in 1979) and keeps it current.

Sensor Point[™] System Input Data Sources

Data Type / Mandate	Deep History	Current, Forecast & Short-Term Archive
Model Data / <i>GDAS in support of WAFS Centers (UK, US)</i>	CFSR, GRS <ul style="list-style-type: none"> • Source: NCAR, NOAA/NCEP • Resolution: ~ 35 km, 1 h • Update frequency: 1 – 10 dy 	GFS, RUC <ul style="list-style-type: none"> • Source: NOAA/NCEP • Resolution: 13 – 25 km, 6 h • Update frequency: 1 – 6 h
Surface Observations / <i>GDAS in support of WAFS (Freely distributed under UN/ICAO treaty)</i>	ISH (Variable standards < 1996, METAR standard >= 1996) <ul style="list-style-type: none"> • Source: NOAA/NCDC • Resolution: discrete, 1 – 12 h • Update frequency: 1 – 12 h 	METARs or private sensors <ul style="list-style-type: none"> • Sources: NOAA/NWS, variable • Resolution: discrete, variable • Update frequency: variable (~1 h)

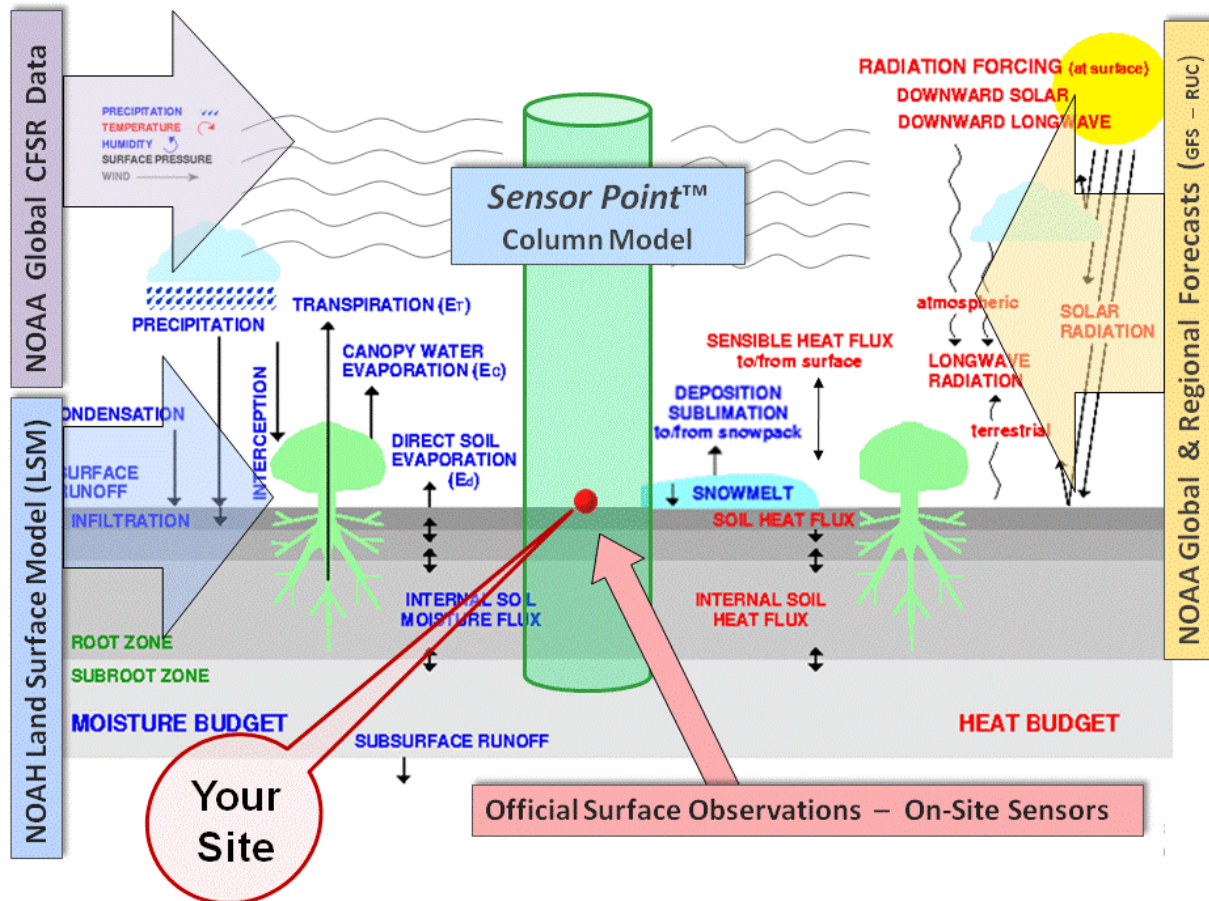
Acronyms:

GDAS: Global Data Assimilation System
 WAFS: World Aviation Forecast System
 CFSR: Climate Forecast System Reanalysis
 GFS: Global Forecast System
 GRS: Global Reanalysis System
 ISH: Integrated Surface Hourlies
 NOAA: National Oceanographic and Atmospheric Admin.

ICAO: International Civil Aviation Organization
 NCAR: National Center for Atmospheric Research
 NCEP: National Centers for Environmental Prediction
 NCDC: National Climatic Data Center
 METAR: Météorologique pour l'Aviation Régulière
 RUC: Rapid Update Cycle

Focusing Technologies

Weather is dynamic and global - a very complex result of radiation, dynamic atmospheric conditions and surface interactions. Weather data to support modeling, monitoring, planning, managing, or controlling a building, site or situation must be **precise, consistent and focused on your site**...this is the purpose of **Sensor Point™**



Sensor Point™ Focusing Technology

The **Sensor Point™** system contains a one-dimensional NWP (Numerical Weather Prediction) “column model” that has been coupled with a three-dimensional NWP model and is built on the full-physics land-surface model (NOAH-LSM) resulting from ongoing research and development by NOAA’s National Centers for Environmental Prediction (NCEP), Oregon State University, the US Air Force Research Lab, and the Hydrologic Research Lab (OHD-NWS). Site-specific column model forecasts can be updated much more

frequently and provide a higher sampling rate than the NOAA models, making column models particularly well suited for supporting specific sites and proprietary sensor networks.

By further augmenting the **Sensor Point™** system input with on-site or nearby sensor observations, site-specific column model forecasts can be precisely calibrated for individual sites as small as 1 square kilometer. They can also adapt to changes in local surface conditions. Verification analyses have shown **Sensor Point™** system data to be more accurate than both NOAA and competitor models (see *Accuracy and Comparisons*).

Data Delivery - Your Way

All data from **Sensor Point™** and our **Virtual Sensor Stations™** is delivered **on-demand**, so you can:

- **Pick exact sites of interest**
 - Define a fixed address or location, or
 - Send our web data service longitudinal coordinates
 - Virtual sensor data is available worldwide
- **Specify what you want to see**
 - Weather variables (Standard or Specialized)
 - Design calculated or custom variables
- **Control how you want the data delivered**
 - Direct web access links for each of your sites
 - XML web data service response
 - Select the units and formats you require
- **Request historical weather and TMY files for anywhere in the world**
 - Use our web data service to access any or our worldwide **Virtual Sensor Stations™**
 - Generate up to 30 years of hourly weather details and TMY files for any site
- **Get easy access and delivery**
 - The **Sensor PortalSM** provides easy access to current condition, forecast and historical weather data for your sites, allowing you to:
 - Monitor sites
 - Add/Edit sites
 - Preview downloads
 - Set e-mail and text alerts
 - Graphically compare data
 - Specify delivery mechanisms
 - Specify units and output formats
- **Employ private sensors and arrays**
 - Use one or more private sensors for very precise, higher frequency forecasts for
 - Wind forecasting
 - Solar radiation forecasting
 - Building energy management

Standard Variables	Specialized Variables
Site Id/Location code	Potential Evapotranspiration
Valid GMT date-time	Soil moisture
Valid local date-time	Soil temperature
Forecast hour	Water run-off previous hour
Air temperature	Wind mixing height
Dew point temperature	Direct normal irradiation (DNI)
Wet bulb temperature	Diffuse horizontal irradiation (DHI)
Relative humidity	External terrestrial horizontal radiation
Surface pressure	External terrestrial direct normal radiation
Cloud cover	Downward terrestrial radiation
Wind chill	Upward solar radiation
Apparent ('feels like') temperature	Upward terrestrial radiation
Wind speed	Net radiation
Wind from direction	Degree hours
Precipitation within last hour	Heat index
Snow depth	Environmental heat content index
Solar radiation (GHI)	Maximum air temperature within last hour
	Minimum air temperature within last hour
	Maximum air temperature within last 24 hours
	Minimum air temperature within last 24 hours
	Degree days - last 24 hours
	Heating degree days - last 24 hours
	Cooling degree days - last 24 hours
	Precipitation (liquid equiv) within last 24 hours
	Snowfall within last 24 hours
	- Custom & calculated variables (min, max, avg, mean)