What is the ALERT System?

ALERT is an acronym for Automated Local Evaluation in Real Time, and denotes a collection of specifications that manufacturers can follow to build compatible environmental monitoring equipment. It was developed by the National Weather Service in the late 1970s.

An ALERT station may contain several gages or sensors measuring different environmental parameters. ALERT gages send their information by radio to a central base station computer where it is stored in a database. The computer evaluates the data and can sound preset alarms. A typical ALERT system is made up of rain, stream and weather gages spaced throughout a watershed to optimally measure those weather variables necessary in the prediction of flooding.

The Flood Control District began installing ALERT stations in 1980 after the late 1970’s floods. Gages were first placed to monitor the major rivers - later they were installed on District dams and flood control structures. After the 1993 floods, more gages were placed in washes and to fill holes where rainfall information was sparse. Today we monitor and maintain over 310 stations in much of central Arizona that contributes to flooding in Maricopa County.
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</tr>
</tbody>
</table>
Description: These are maps of Maricopa County and surrounding areas showing the locations of ALERT stations owned by the Flood Control District of Maricopa County. They are updated when an ALERT station is installed, retired or moved. Stations are shown with different symbols representing the sensors installed. Clicking on either map will transport you to its interactive location where you can click on a station symbol for more detailed sensor information. These Station Location Maps are often a necessary first-step in searching for sensor data since the station name and/or sensor numbers are regularly required to query the ALERT database.
This Report Generator can be used to extract raw or statistical data from the ALERT database. Since the database is live, the data extracted is as up-to-date as possible.

The upper portion of the form is used to generate statistical or period data. Some examples are rainfall in one-hour periods, minimum daily temperatures, maximum daily wind gusts, volume of flow past a point, and highest 1-hour rainfall intensity during a 24-hour period. The lower portion of the form is used to retrieve the raw data from a sensor. Raw data represents each report from a sensor stacked from newest to oldest as it is received. It is reported in engineering units (inches, mph, etc.) and may also be assigned a rated value (ft \( \rightarrow \) cfs, Fahrenheit \( \rightarrow \) Celsius).

Rainfall and water-level sensor data are available from the live database for their complete periods of record. Weather sensor data are available for at least the past 365 days. Older weather data can be retrieved from the archive database - contact a member of the Flood Warning Branch for archived data.

A help file is available for both sections of the Report Generator form. It is especially helpful when attempting to extract maximum rainfall intensity values.
Rainfall Data and Products
Click on the text link to generate or locate the product

Product Name: Interactive Data Map

Description: The Interactive Data Map shows the current rainfall, streamflow, impoundment, weather, wind, and air quality data for the entire county. By selecting a dataset at the left of the webpage you can display the data you are interested in. The map is updated automatically every 5 minutes. You can also check when a station had its last check-in by clicking on any of the markers.

Other available options provide weather radar, historic data and general information as well as various overlays such as watersheds and FCD flood control structures. The map can also display watches and warnings issued by the National Weather Service.
Product Name: Storm Isohyetal Rainfall Distribution Maps

Description: These maps are built by loading the rainfall data into a GIS program that creates surfaces of equal rainfall. Ranges are spatially distributed and represented by the different colors. The maps are created for significant storms and wet periods back to July of 2001. To view them, go to the Rainfall Data page and look for “Past Contoured Rainfall Maps by Storm Date” in the Historic Precipitation Data section.

Product Name: Annual Isohyetal Rainfall Distribution Maps

Description: These maps are built by loading the precipitation data into a GIS program that creates surfaces of equal rainfall. Ranges are spatially distributed and represented by the different colors. The maps are created for water-years back to 1993. To view them, go to the Rainfall Data page and look for “Annual Rainfall Total maps by Water-Year” in the Historic Precipitation Data section.

Product Name: Maximum Period Rainfall Amounts

Description: These maps are built by loading the precipitation data into a GIS program that creates surfaces of equal rainfall. The data points used are the highest value recorded through the gage record for the duration specified. Maps are available for 15-min and 1, 3, 6 and 24 hour, and 72 hour durations for any gages with 10 or more years of record. To view them, go to the Rainfall Data page and look for on “Maximum Period Recorded Rainfall Amounts” in the Historic Precipitation Data section.
Product Name: Daily Precipitation Report
Description: A tabular report listing daily, monthly and annual precipitation totals. It is generated at 5:00 AM each day and scans the previous 24 hours. A location description for each gage is included. The reported values are sorted in descending order by the day, then month, then year.

Product Name: Precipitation Report for All FCDMC Rain Gages
Description: A tabular report listing 6-hour and 24-hour precipitation totals, sorted by jurisdiction and generated every 30 minutes. A location description for each gage is included. Within a city the gages are sorted alphabetically.

Product Name: Rainfall Values at All FCDMC Rain Gages
Description: A tabular report listing 15-minute, 1-hour, 3-hour, 6-hour, 24-hour, and 72-hour precipitation totals, generated every 15 minutes. Gages are sorted by ID number.

Product Name: Monthly Rainfall Summary
Description: These reports list the daily precipitation values at each gage by month, and are available back to October 2010. Each page contains eight gages. Data is quality checked before the reports are produced, and footnotes are added to explain missing or questionable data. To view them, go to the Rainfall Data page and look for “Daily Totals at All Precipitation Gages” in the Historic Precipitation Data section.
**Product Name:** Spreadsheet – Summary of Severe Rainfall Events at ALERT Stations

**Description:** This workbook contains a wealth of information about annual and extreme rainfall events at our rain stations. The sheets contain:

- A summary of the most intense storms recorded for selected durations
- History of operation by month
- Annual means and statistics for complete water years
- Plots of period maximums vs. elevation
- Plots of period maximums vs. years of record

This workbook can be located at the bottom of the Rainfall Data page under “Compiled Data Products.”

---

**Product Name:** Rainfall Station Summary

**Description:** These Spreadsheet files are updated annually for all precipitation stations with at least one complete water-year of record. The documents contain:

- A picture of the station
- A general station location map
- Meta data – date installed, location information, quality of record, period of record maximums
- A bar chart and table of annual rainfall amounts
- Annual tables with all rainfall
- A table and graph of return period values from NOAA Atlas 14 vs. recorded events (for stations with 10 or more complete water years)
- A sheet of daily values and statistics for each water-year
- A sheet explaining downtime
- A sheet showing the maximum recorded amounts for selected time intervals for the entire period of record.

These workbooks are located at the bottom of the Rainfall Data page under “Rainfall History Documents…” all listed in a dropdown menu.
Streamflow and Impoundment Data and Products
Click on a text link to generate or locate the product

Product Name: Streamflow Summary Tables
Description: This table lists the current stage and discharge measured at the water-level stations. All gages are shown but you’ll likely need to scroll down to see them all. Go to the Water-level Data page and look for “Quick Water-level Summaries...” and click the link “Gages on Rivers, Streams, Washes, Channels, etc.”

Product Name: Impoundment Summary Tables
Description: This table lists the current stage, storage, percent filled and discharge at dams and basins. Go to the Water-level Data page under “Quick Water-level Summaries...” and click the link “Gages on Dams, Flood Retarding Structures and Basins.”

Product Name: Current Stage and Discharge values
Description: This table lists the current stage and discharge values at all stream and impoundment gages. It is generated every 15 minutes, and is comma-delimited for easy import to spreadsheet or database programs. It is located in the “Custom Reports, Maps & Plans” section.
Product Name: Daily Water-Level Report

Description: This table lists the current stage, storage, discharge, capacity and percent filled at all streamflow and impoundment gages. Also included are the peak stage and discharge values in the past 24 hours. The product is generated daily at 7:10 AM.

Product Name: Summary Statistics and Complete Records for Each Water-level Station

Description: These pages are updated annually for all water-level stations. The pages contain:

- A picture(s) of the station
- A general station location map
- Meta data – date installed, location information, quality of record, sensor elevations
- Station rating curve(s) and table(s)
- A table of water-year peaks
- A runoff or impoundment event history
- A gage cross-section
- Staff and crest gage information
- Flood flow frequency and watershed maps at selected stations

Go to the Water-level Data page and look for “Summary Statistics and Complete Records for each Water-level Station.” Then select a station from the dropdown menu.
Weather Station Data and Products
Click on a text link to generate or locate the product

Weather Data Types:

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Abbreviation</th>
<th>Units</th>
<th>Rated Units</th>
<th>Sampled</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (air)</td>
<td>temp, T</td>
<td>degrees F</td>
<td>degrees C</td>
<td>10-13 ft. agl</td>
<td>15 min.</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>Rhumid, RH</td>
<td>%</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>15 min.</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>TD</td>
<td>degrees F</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>Calc’d. 15 min.</td>
</tr>
<tr>
<td>Peak Wind</td>
<td>pkwind</td>
<td>mph</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>15 min.</td>
</tr>
<tr>
<td>Average Wind Speed</td>
<td>wind</td>
<td>mph</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>15 min.</td>
</tr>
<tr>
<td>Wind Direction</td>
<td>wdir</td>
<td>0-359 degrees</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>15 min.</td>
</tr>
<tr>
<td>Barometric Pressure</td>
<td>baropr, BP</td>
<td>millibars</td>
<td>inches Hg</td>
<td>6-8 ft. agl</td>
<td>30 min.</td>
</tr>
<tr>
<td>Solar Radiation</td>
<td>solrad</td>
<td>watts/sq. meter</td>
<td>none</td>
<td>10-13 ft. agl</td>
<td>30 min.</td>
</tr>
<tr>
<td>Evapotranspiration</td>
<td>ETO</td>
<td>inches</td>
<td>none</td>
<td>varies</td>
<td>Calc’d. hourly</td>
</tr>
</tbody>
</table>

Product Name: Weather Station Statistical Reports

Description: This tool will generate a statistics table based on input to a form. The user can select the station, end date/time of the display period, report period length and the number of reports to display. The values reported will be the most recent recorded prior to the reported time(s).

Product Name: Trend Charts

Description: These charts are selected from a map, and show the past 24 hours of real-time data. Current values appear in the upper-left corners of the charts. 24-hour statistics are given in the column at right.
**Product Name:** Quick Weather Sensor Readout Maps

**Description:** These maps show the current readings from weather sensors of the same type. Choose from (air) Temperature & Dewpoint, Wind Gusts & Direction, (barometric) Pressure and Solar Radiation, or Relative Humidity. Go to the Weather Sensor Data page and look for “Quick Weather Maps”.

---

**Product Name:** Daily High/Low Statistics

**Description:** This table lists, by station for the past 24-hours, the:
- Maximum and Minimum temperature
- Maximum and Minimum humidity
- Maximum and Minimum Dewpoint
- Peak wind gust

Station names, locations and elevations are listed along with the time that the report was compiled. The table is generated every 30 minutes.

---

**Product Name:** Evapotranspiration Index

**Description:** Evapotranspiration is calculated hourly for six of our stations. The table lists 24 one-hour periods and sums the periods at the bottom. ETO is calculated from solar radiation, humidity temperature, barometric pressure and wind run using the Penmann equation. Locations and elevations of the stations are listed at the bottom of the table.
Product Name: Hourly Weather Sensor Readings

Description: This file contains a listing of hourly values for each sensor by station. It is generated every 30 minutes and covers the previous 24 hours. The values are the latest received prior to the listed times, except for rainfall, which is the accumulation between times. Only full weather stations are listed.

Product Name: Latest Weather Sensor Readings

Description: This text matrix contains a listing of station names and elevations down the side and sensor types across the top. The most recent data value for each sensor is displayed. Dashes appear if data is more than an hour old, or if the sensor is not installed at a station. Some data notes are included. The table is generated every 15 minutes. It is produced in two versions – sorted Alphabetically by Station Name and sorted by Station Elevation.

Product Name: Daily Weather Sensor Statistics by Month

Description: These reports list daily weather sensor statistics for each station by month, and are available back to October 2009. Max/Mean/Min temperature, Max/Mean/Min dewpoint, Max/Min humidity, Max peak wind, Max/Min pressure and Max solar radiation are compiled for each day of the month. Data is quality checked before the reports are produced, and footnotes are added to explain missing or questionable data.

To view the file, go to the Weather Sensor Data page and look near the bottom for the product name. Then choose a month from the dropdown menu.
**Product Name:** Weather Station Climate Summaries

**Description:** These PDF files are updated annually for all weather stations with 10 or more years of record. The documents contain:

- A general station location map
- A picture of the station
- Meta data – location and sensor information
- All – Time Records tables
- Bar chart of Annual Temperature Statistics
- Annual Statistics tables include max/mean/min temp, peak wind, average wind and max dewpoint (all that are applicable to station)
- Monthly Statistics for All Years- tables include max/mean/min temp, peak wind (all that are applicable to station)

Go to the Weather Sensor Data page and look for “Climate Summaries at Selected Weather Stations” near the bottom of the page. Then choose a station from the dropdown menu.

---

**Product Name:** Historic Trend Charts

**Description:** The Quick Weather Maps and Trend Charts were designed to show real-time data, but you can use this form to generate a historic map or chart. Simply select the map or chart you want, enter the ending date/time according to the format shown, and click on “Display”. Trends will show back in time from the date/time shown in the timestamp box.
Custom Products and Reports
Click on a text link to generate or locate the product

These custom products and reports are produced for use by response agencies, and as such may be of limited use for general or educational purposes.

Product Name: Discharge / Storage Forecast Locations

Description: This interactive map shows approximately 50 flood forecast points in and around Maricopa County. Clicking on a point will call a forecast package from the National Weather Service’s Colorado Basin River Forecast Center. For streams, a plot of recorded data is shown up to the current time, followed by a forecast plot out several days. Current stage, flood stage, and bankfull stage are also shown. For dams, plots are presented showing past and future inflow, outflow and storage.
Product Name: Online Flood Response Plans

Description: These are interactive data maps for areas in the County with active flood response plans. Many of the maps contain warning criteria and indicators for alarms. Plans exist for:

- Aguila
- Bullard Wash
- Cave Creek
- Fountain Hills
- Indian Bend Wash
- Peoria
- Phoenix Dams
- South Phoenix/Laveen
- Skunk Creek / New River
- Spookhill FRS / Loop 202
- Sunflower Fire/Upper Sycamore Creek
- Thunderbird Paseo Park – Glendale
- Wickenburg

Product Name: MCDOT Flooded Roadway Info. Map

Description: This interactive map serves as a primary information source for MCDOT’s Flooded Roadway Response Program. Green dots indicate that a road is passable – red dots mean the road should be closed. Real-time data can be viewed by clicking on a site location (magenta dots). The map will refresh itself every 5 minutes when kept in an active window.
Publications – Annual and Storm Reports
Click on a text link to locate the product

Product Name: **Annual Reports**

**Description:** Our Annual Hydrologic Data Report is divided into three volumes: Precipitation Data (I), Streamflow/Storage Data (II) and Weather Data (III). Each volume contains summarized statistics for one water-year (Oct.1st – Sep. 30th). Volume I is available back to water-year 1992, Volume II to 1994 and Volume III to 1996. Each volume contains data for all FCD ALERT sensors installed in or previous to that year, plus footnotes that document the times and reasons that sensors are inoperative.

Product Name: **Storm Reports**

**Description:** Our Storm Reports document significant storms that have occurred in Maricopa County since 1988. They vary in content and detail according to the impact of the storm, but most contain sections on meteorology, rainfall, runoff, damage and losses, and ALERT System performance. Most are available as PDF files, but a few are in HTML.
Station Description Files
Click on a text link to generate or locate the product

Product Name: All Sensor Reports
Description: These tables present the meta data, or “data about data” for all of our ALERT sensors. Meta data are descriptors like name, ID number, date installed, latitude and longitude, jurisdiction and general location descriptions. The lists are arranged by sensor type, and are sorted by name, ID number, or by the city / jurisdiction in which they reside. The tables are in spreadsheet form for easy download. The can be found on the “Station Meta Data” page accessed via the above link.

Product Name: Weather Station Meta Data Sheets
Description: These PDFs present detailed meta data, or “data about data” for all of our ALERT weather stations. The files include location information, dates that the different sensors were installed, heights above ground level for all sensors, sensor types and manufacturers and photos of the station and of the ground surface in four directions. The link above will Transport you to FCD’s “Station Meta Data” page where you will find a dropdown menu under the product name. Click on a station to view the report.
Our ALERT web server (alert.fcd.maricopa.gov) maintains a current database of hydrological and meteorological real-time and historic data. Tabular and graphical products may be produced from this data. This information may not be modified in content by any private or public party. This server is available 24 hours a day, 7 days a week, but timely delivery of data and products from this server through the Internet is not guaranteed.

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## Glossary of Terms Used In This Catalog

The terms presented in this glossary are defined based on their use in this document or on our web site. They may have different meanings in different contexts or when used by other agencies.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acre-foot</strong></td>
<td>The volume of water necessary to cover an acre of land to a depth of one foot. It equals 43,560 cubic feet or 325,851 gallons.</td>
</tr>
<tr>
<td><strong>Agency Users</strong></td>
<td>Users employed by federal, state or local government agencies who generally have some technical knowledge in the fields of hydrology or meteorology.</td>
</tr>
<tr>
<td><strong>Alarm</strong></td>
<td>Criteria can be set in the ALERT computer to notify operators when a particular threshold has been reached, such as a rainfall rate or water elevation. When the threshold is reached, the computer executes an alarm action. This may be a flashing box on the computer screen, turning on a light on a map, or a text message sent to a pager.</td>
</tr>
<tr>
<td><strong>ALERT</strong></td>
<td>An acronym for Automated Local Evaluation in Real Time. ALERT was developed in the late 1970s as a format for data transmission and for the manufacture of compatible hardware and software. ALERT systems are used primarily as flood warning systems, but provide useful data for many other applications.</td>
</tr>
<tr>
<td><strong>ALERT Database</strong></td>
<td>The ALERT database is a collection of 10 files stored on two of the ALERT computers. The files contain the actual ALERT data, plus indexes, calibrations, tables, alarms, alarm settings, headers and sensor types. It is often referred to as the “live” database to distinguish it from archived data.</td>
</tr>
<tr>
<td><strong>Archive Files</strong></td>
<td>Archive files contain ALERT data and calibrations separate from the live database. Each file contains the data for one sensor for a one-month period of time.</td>
</tr>
<tr>
<td><strong>Average Wind Speed</strong></td>
<td>ALERT wind sensors sample the wind run past the station for a length of 15 minutes. The average wind speed is calculated knowing the length of wind (wind run) that travelled past the instrument in that time. Instantaneous wind speed may vary considerably during the time that the average wind speed is measured.</td>
</tr>
<tr>
<td><strong>Bankfull Stage</strong></td>
<td>The point at which the water level in a stream overtops the banks and spreads out onto the floodplain.</td>
</tr>
</tbody>
</table>
**Barometric Pressure**  
The pressure exerted by a column of air from the sensor to the top of the atmosphere. It is most commonly measured in millibars or inches of mercury (Hg).

**Capacity**  
The volume of water stored by a dam at the emergency spillway elevation, usually expressed in acre-feet. It differs from storage, which is the volume of water stored at any specific elevation.

**Crest Gage**  
A gage that measures the peak stage of a rising stream or impoundment. Our crest gages consist of a length of 2” galvanized pipe with a wooden stick inside. The bottom of the pipe is perforated to allow water inside. As water enters and rises, it carries with it powdered cork which adheres to the stick at the highest point. At a later time the cork level on the stick is measured and compared with the fixed datum in order to calculate the peak stage.

**Dam vs. Basin**  
A dam and a basin serve the same function – to store floodwater and release it at a non-hazardous rate. Basins use engineered banks to confine the floodwater, while dams use the natural contour of the land. Basins may drain by gravity or by pumping.

**Data – Historic**  
Historic data is generally more than 30 days old and has been quality checked. It may exist in the live ALERT database or in archive files.

**Data – Real-time**  
Real-time data is generally less than 30 days old and has not been quality checked. It exists only in the live ALERT database.

**Data vs. Product**  
Data are the actual reports from the ALERT sensors and their translation to engineering units, that are stacked in descending order in the ALERT database. Products are maps, tables, graphs, reports, etc. created using the ALERT data.

**Dewpoint**  
The temperature at which water vapor condenses into droplets. When the dewpoint is at or above the surface air temperature, relative humidity is 100% and dew or fog can form. When the dewpoint is below the surface air temperature, relative humidity will be less than 100%, and the base of any clouds will be at an elevation where the dewpoint and air temperatures are equal.

**Discharge**  
The volume of water passing a particular point in a given amount of time, aka flow. It is usually expressed in cubic feet per second or cfs.

**Display Period**  
In a statistical report, the display period is the time between each generated statistic. The report period is the time between the first and last display period. For example, if viewing a report of 24- one hour values, the display period is 1 hour and the report period is 1 day.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>A water-level expressed in terms of mean sea level. It differs from stage, which is a water-level in terms of some local datum.</td>
</tr>
<tr>
<td>Evapotranspiration</td>
<td>Evapotranspiration is the sum of water lost to the air via transpiration by plants and evaporation from water surfaces.</td>
</tr>
<tr>
<td>FCDMC</td>
<td>Acronym for Flood Control District of Maricopa County.</td>
</tr>
<tr>
<td>Flood Flow Frequency</td>
<td>A statistically derived table of discharge vs. return period for a particular point on a stream or within a flood storage facility.</td>
</tr>
<tr>
<td>Flood Response Plan</td>
<td>A plan developed for a particular waterway, watershed or jurisdiction that identifies flood hazards and defines methods for avoiding them and for minimizing losses to property.</td>
</tr>
<tr>
<td>Flood Stage</td>
<td>The point at which the water level in a stream begins to cause damage to structures. It may be below bankfull stage if structures are located in a floodway.</td>
</tr>
<tr>
<td>Forecast Point</td>
<td>A point along a watercourse or at an impoundment structure for which a flood forecast is generated. Current and future conditions for upstream areas only are considered in the forecast.</td>
</tr>
<tr>
<td>FRS</td>
<td>An acronym for Flood Retarding Structure – most commonly used to describe earthen dams built by the Soil Conservation Service between 1950 and 1985 to protect agricultural lands.</td>
</tr>
<tr>
<td>Full Weather Station</td>
<td>An ALERT station that contains at a minimum a rain gage, temperature/humidity sensor, and wind speed and direction sensors. A station with a rain gage and a temperature/humidity sensor only is not considered “full”.</td>
</tr>
<tr>
<td>Gage</td>
<td>An instrument that measures some property in the environment, like temperature, wind speed or precipitation. It is used interchangeably with “sensor”. We spell it g-a-g-e because that’s how the USGS spells it.</td>
</tr>
<tr>
<td>Gage Record</td>
<td>The period of time for which data is collected at a gage. Gage records may have gaps in the record when no data is collected – these should be documented.</td>
</tr>
<tr>
<td>Impoundment</td>
<td>Floodwater stored in a basin or behind a dam. It can be described in terms of a water depth (ft) or a volume (acre-ft).</td>
</tr>
</tbody>
</table>
Intensity

When applied to rainfall, intensity is the depth of rain in a specified time. Examples are 1 inch per hour or ½ inch in 20 minutes.

Isohyetal

Isohyets are lines on a map connecting points of equal precipitation amounts. Colors are often used to shade areas between isohyetal lines.

Meta Data

Meta data can be thought of as “data about data”. Meta data can answer questions about a sensor such as “when was it installed”, “where is it located” and “who owns it”.

NOAA Atlas 14

From the NOAA Atlas 14 documentation series: “NOAA Atlas 14 contains precipitation frequency estimates with associated confidence limits for the United States and is accompanied by additional information such as temporal distributions and seasonality. The Atlas is divided into volumes based on geographic sections of the country. The Atlas is intended as the official documentation of precipitation frequency estimates and associated information for the United States. It includes discussion of the development methodology and intermediate results. The Precipitation Frequency Data Server (PFDS) was developed and published in tandem with this Atlas to allow delivery of the results and supporting information in multiple forms via the Internet. NOAA Atlas 14 Volume 1 contains precipitation frequency estimates for Arizona, Nevada, New Mexico, Utah, and southeastern California (Imperial, Inyo, Eastern Kern, Eastern Los Angeles, Riverside, San Bernardino and Eastern San Diego counties). These areas were addressed together in a single project focused on the semiarid southwestern United States. The Atlas supersedes information contained in Technical Paper No. 49 “Two- to ten-day precipitation for return periods of 2 to 100 years in the contiguous United States” (Miller et al., 1964), NOAA Atlas 2 “Precipitation-Frequency Atlas of the Western United States” (Miller et al., 1973), “Short Duration Rainfall Frequency Relations for California” (Frederick and Miller, 1979) and “Short Duration Rainfall Relations for the Western United States” (Arkell and Richards, 1986). The updates are based on more recent and extended data sets, currently accepted statistical approaches, and improved spatial interpolation and mapping techniques. The work was performed by the Hydrometeorological Design Studies Center within the Office of Hydrologic Development of the National Oceanic and Atmospheric Administration’s National Weather Service”.

PDF

An acronym for Portable Document Format. It is a cross-platform compatible document format developed by Adobe Systems, Inc. Many of our documents are made available in PDF format for the convenience of our users.
<p>| <strong>Peak Wind</strong> | Our wind sensors sample the wind speed every 3 seconds and store that data for a 15-minute period. At the end of that period the on-board computer determines the maximum wind speed stored in that stack and transmits it as the peak wind value. |
| <strong>Precipitation</strong> | All forms of water that fall to the earth’s surface - including rain, snow, sleet and hail. |
| <strong>Rating Curve</strong> | A mathematical relationship between two values expressed as a continuous line. The most common ratings we use are stage versus discharge for streams and stage versus volume for reservoirs. |
| <strong>Rating Table</strong> | A mathematical relationship between two values expressed as a table. The most common ratings we use are stage versus discharge for streams and stage versus volume for reservoirs. |
| <strong>Raw Data</strong> | Data collected from ALERT sensors that has not been altered by statistical analysis. Raw data consists of a date, time and value. The value can be the original integer delivered by the sensor or a value calibrated in engineering units. |
| <strong>Relative Humidity</strong> | The amount of water in a volume of air divided by the amount of water that volume of air could hold in a vapor state at a given temperature. It is expressed as a percentage from 0 to 100. |
| <strong>Report Period</strong> | In a statistical report, the report period is the time between the first and last display period. The display period is the time between each generated statistic. For example, if viewing a report of 24- one hour values, the display period is 1 hour and the report period is 1 day. |
| <strong>Solar Radiation</strong> | Our solar radiation sensors measure global radiation, which is the total radiation from the sun and reflected from the sky. The reported units are watts/square meter. |
| <strong>Staff Gage</strong> | A fixed pole, staff or structure upon which graduated measurements are painted or affixed for the purpose of visually determining water depth. |
| <strong>Stage</strong> | A water-level expressed in terms of some local datum. It differs from elevation, which is a water-level in terms of mean sea level. |
| <strong>Station</strong> | An ALERT station is a local collection of sensors at a common geographic point. Stations have an ID number corresponding to the precipitation sensor if there is one, or to the water-level sensor at stage-only stations. |</p>
<table>
<thead>
<tr>
<th><strong>Statistical Data</strong></th>
<th>Raw ALERT data that is altered in form by a statistical or graphical program.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage</strong></td>
<td>The volume of water stored in a basin or behind a dam – usually expressed in acre-feet. It differs from capacity, which is the volume of water stored at the emergency spillway elevation.</td>
</tr>
<tr>
<td><strong>Tipping Bucket</strong></td>
<td>A sensor for measuring precipitation. Two “buckets” tip on an axle as they fill with water. One bucket empties as the other one fills. Each “tip” represents a calibrated depth of water over the collection area, such as 0.01 inches or 1 millimeter.</td>
</tr>
<tr>
<td><strong>Watershed</strong></td>
<td>The geographic region from which all drainage features conduct surface runoff to a particular point on a watercourse.</td>
</tr>
<tr>
<td><strong>Water-year</strong></td>
<td>The 12-month period from October 1st through September 30th. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. For example, the year ending September 30, 2002 is called the &quot;2002 water-year&quot;.</td>
</tr>
<tr>
<td><strong>Wind Direction</strong></td>
<td>Wind direction is measured from true north either by compass direction (NE, SW, etc.) or by 0-359 degrees azimuth. Wind direction is described by the direction from which the wind blows, i.e. wind blowing from the northeast would have a measurement of 45° or NE.</td>
</tr>
</tbody>
</table>