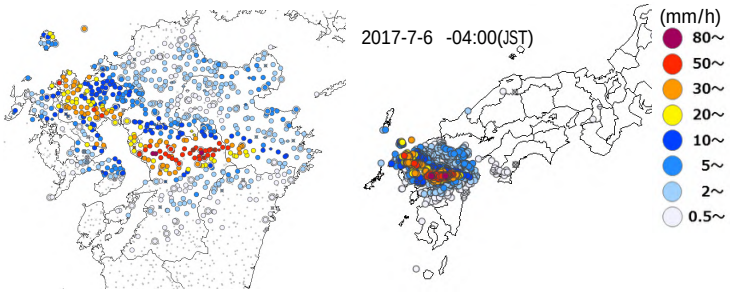
INTEGRATED UTILIZATION OF RAIN GAUGE

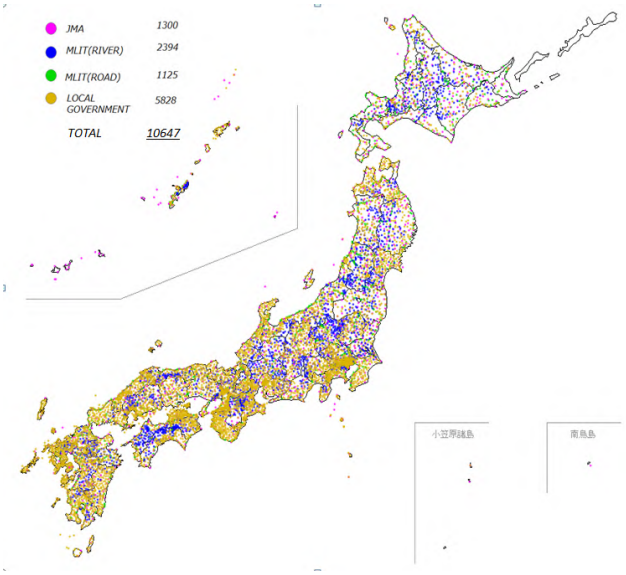
Outline

Online real-time rain observation data have been provided to JMA by local governments and other organizations since 2003. JMA uses this information for precise, detailed monitoring, prediction of localized weather phenomena such as heavy rainfall, and issuance of weather warnings (e.g., Storm Warnings) to mitigate disaster risk.
In addition to warnings, if extremely heavy rain is recorded within a short period, observation data are immediately provided to local governments and media outlets to advise of potentially disastrous situations. All rain gauge data are also used to create products such as Radar/Rain gauge-Analyzed Precipitation reports, which enable JMA to clarify the exact two-dimensional distribution of precipitation in combination with radar data.



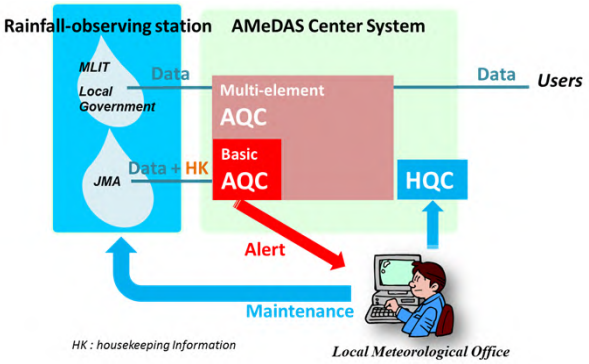
Rain gauge distribution

JMA's AMeDAS (Automated Meteorological Data Acquisition System) network of AWSs (automatic weather stations) spans the whole of Japan and incorporates around 1,300 rain gauges. More than 9,000 other rain gauges are managed by local governments and MLIT (Japan's Ministry of Land, Infrastructure, Transport and Tourism). The millimeter-precision data collected by these gauges are sent to JMA online every 10 minutes, enabling pinpoint monitoring of heavy rain.



MLIT : Ministry of Land, Infrastructure, Transport and Tourism (National Government)

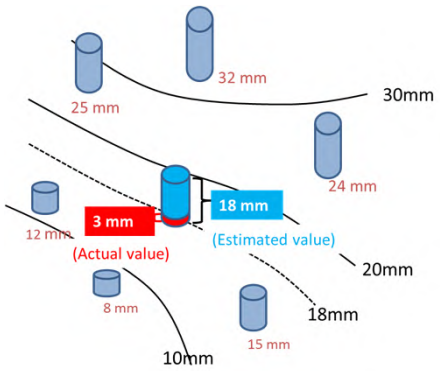
Quality control



Rain gauge data from AMeDAS stations and external organizations are collected in JMA's AMeDAS Center System. Basic AQC (automatic quality control) is first conducted for AMeDAS data, and multi-element AQC is then applied to all data, including those from external organizations. The validated data are then delivered to users within JMA and elsewhere. When an issue is detected in AQC for JMA rain gauge data, a real-time alert message is sent to the Local Meteorological Office managing the gauge.

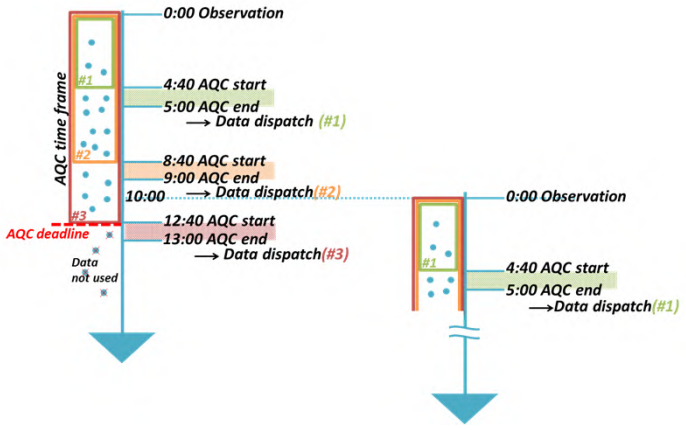
Multi-element AQC

Multi-element AQC is conducted for JMA data and external data. This involves comparison of data with those from neighboring JMA stations and radar observation, and various weather elements and observation stations are used in the process. As an example of AQC judgment, an error is flagged when the 24-hour precipitation total is much lower than that indicated by neighboring stations.



Data dispatch

Rain gauge data provided from external organizations are collected three times for each observation time. AQC is conducted 5, 9 and 13 minutes after the observation time, and the data are delivered immediately after each round of AQC is complete. Any data collected after the start of the third round are not included.



Local Meteorological Office staff receiving an AQC error message regarding JMA rain gauge data check the relevant gauge. If AQC reveals an error in external-organization rain gauge data, JMA staff configure the AMeDAS Center System to exclude the relevant information. JMA staff also conduct daily HQC (human quality control) on all data to identify any outliers that may have been missed in AQC. The rain gauge administrator is informed of the anomaly and asked to service the instrument in question. These quality-controlled data are also used in other JMA systems to make various products for disaster risk mitigation, such as Radar/Rain gauge-Analyzed Precipitation reports.