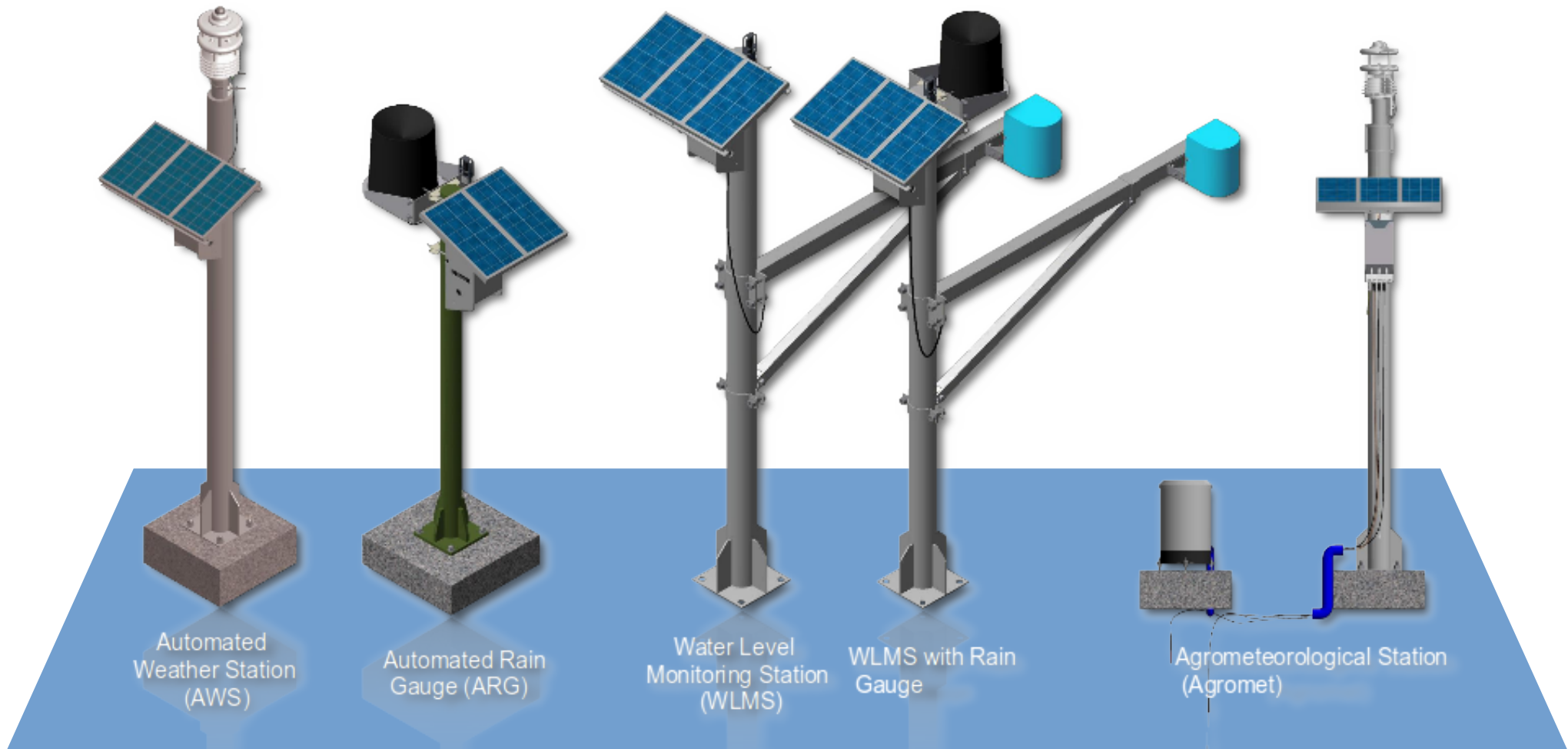


Philippine Case Study
**Quality control on observations
from the ASTI-developed
weather stations**

Jay Samuel Combinido

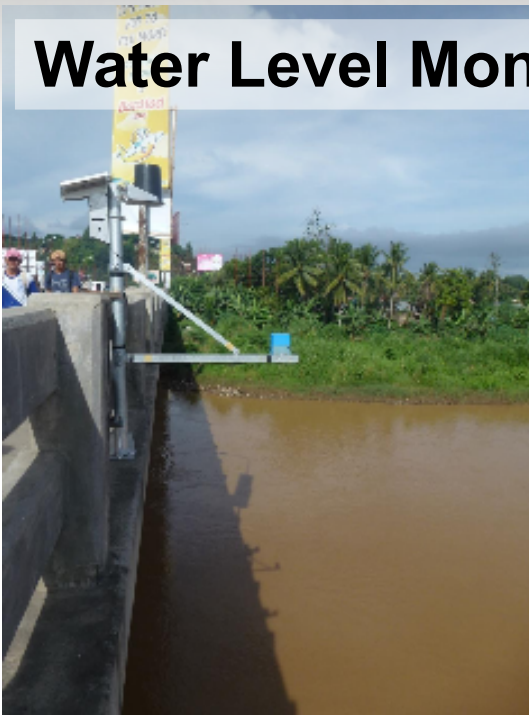
Advanced Science and Technology Institute
Department of Science and Technology
Quezon City, Philippines



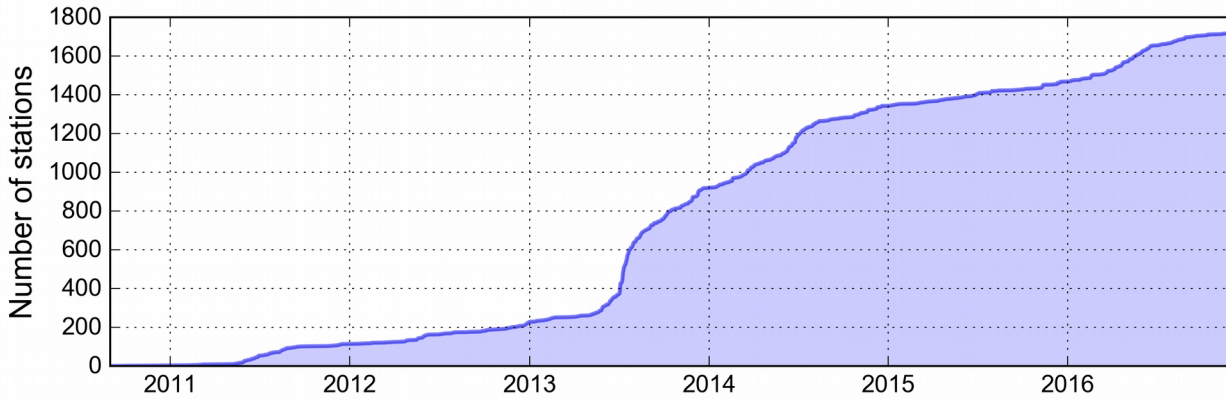
Automated Rain Gauge (ARG)



Water Level Monitoring Station (WLMS)

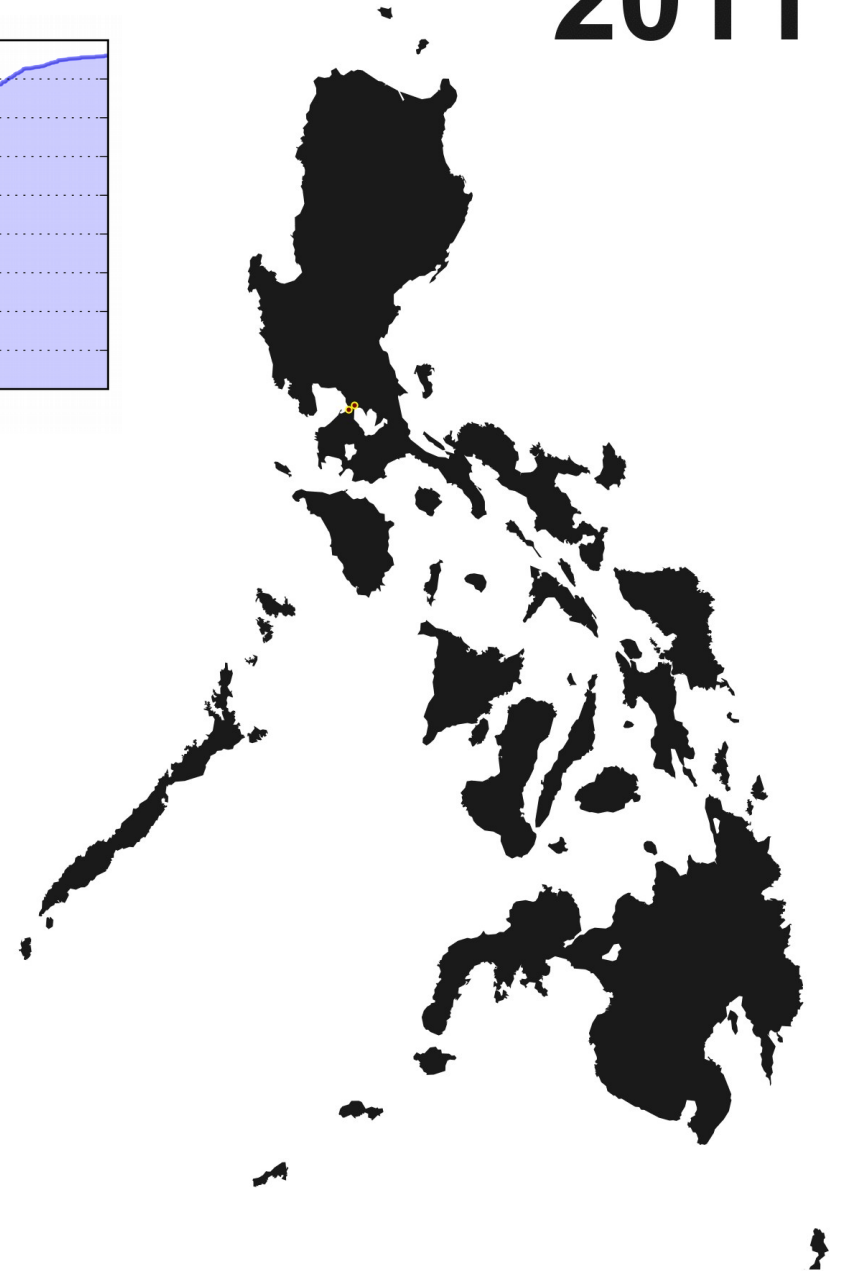


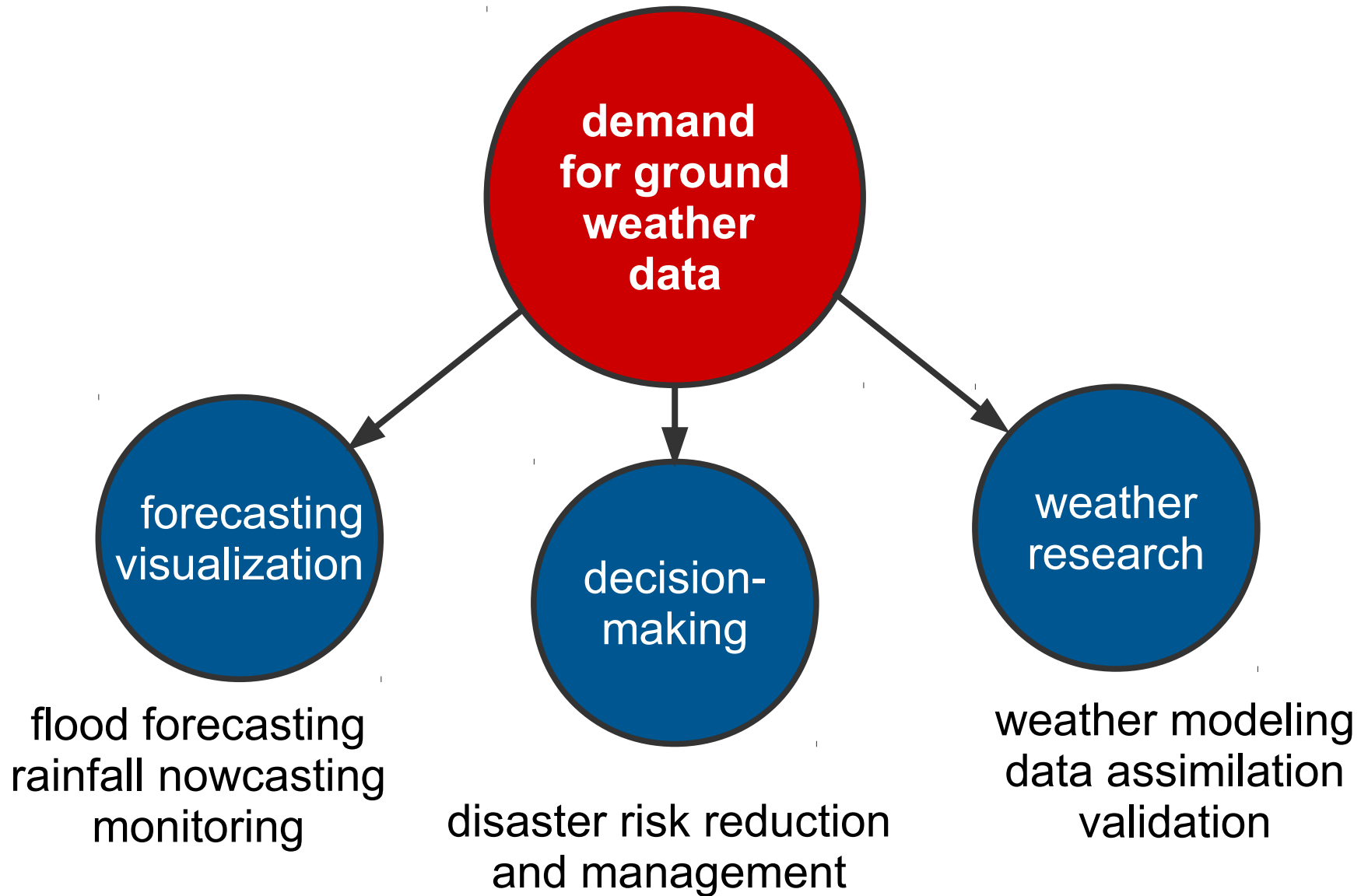
2011

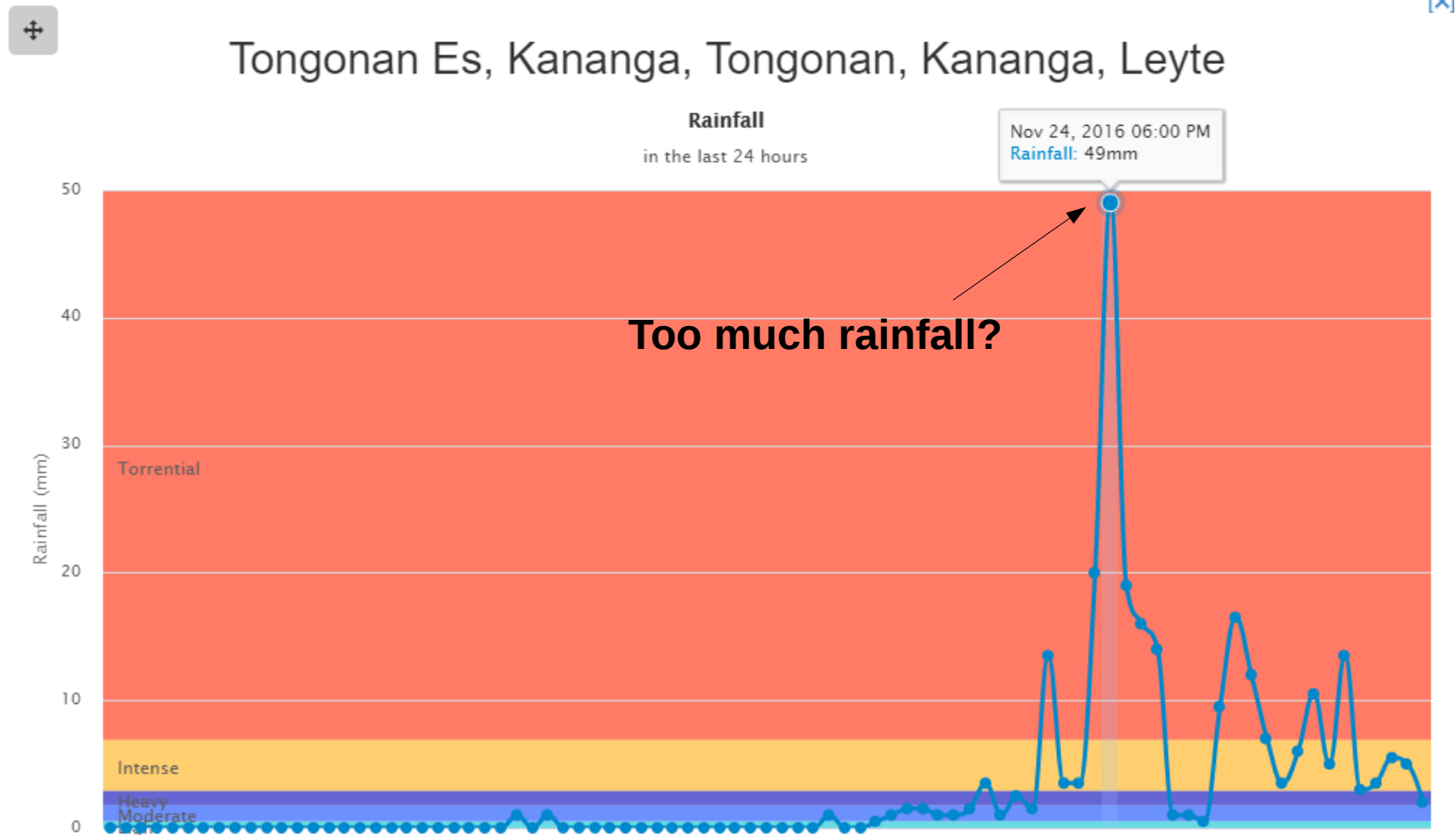


**~1800
stations**

**400 million
records**





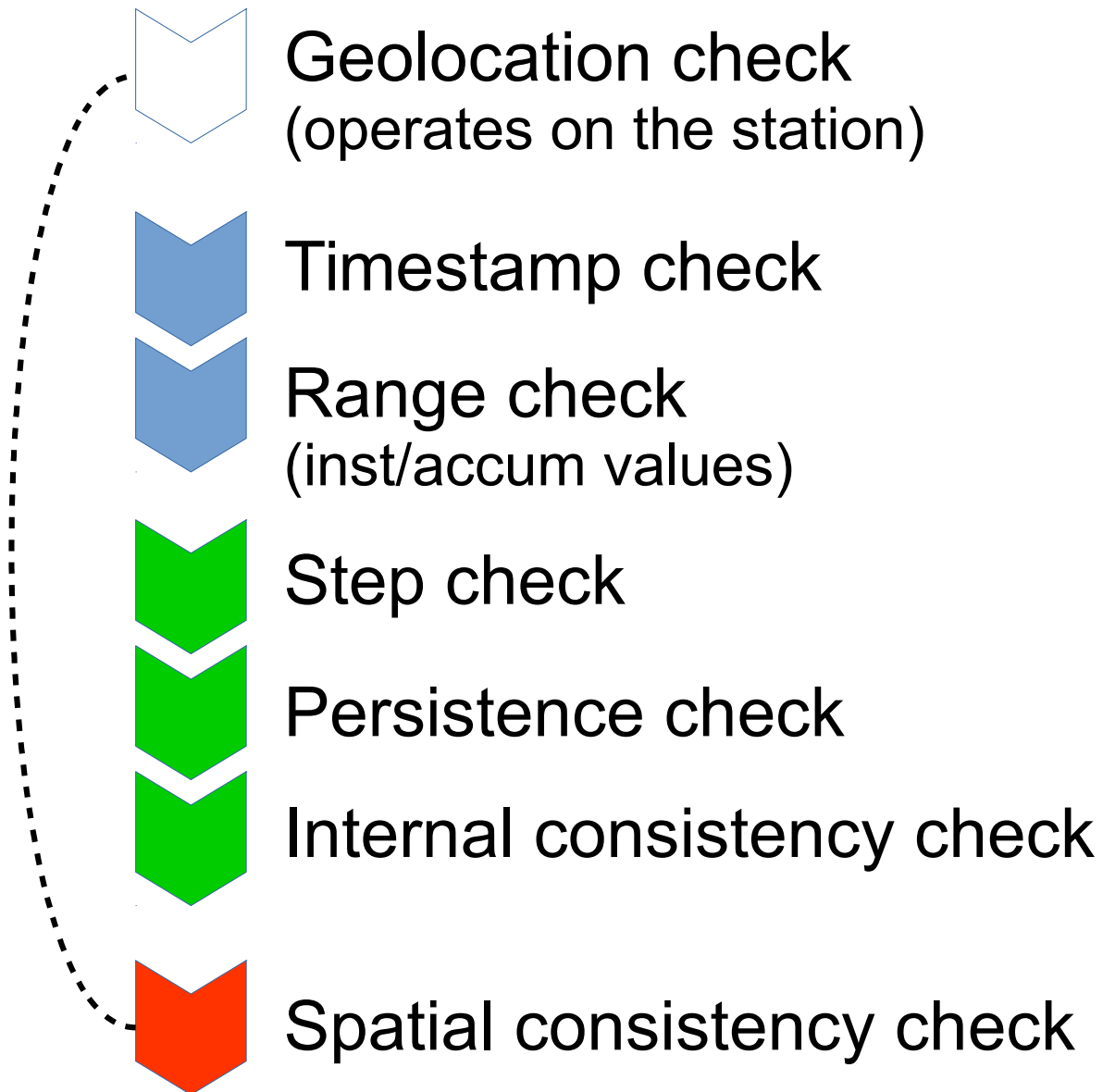


* NOAH Program

- Logistically difficult to maintain and monitor all stations
- (On the end-user side) correctness of the measurements matter

- **Make it easier for data users to identify suspicious and erroneous data, and to highlight corrected values**
- avoid the issuance of warnings or advisories based on anomalous data [1]
- Minimize analysis and weather prediction errors [2, 3]
- Identify calibration, measurement, and communication errors
- Detect deterioration and malfunction of sensors

1. Nagata, K. (2010), The importance of data quality control in disaster prevention and mitigation, JMA/WMO workshop on quality management in surface and upper-air observations in RA II (Asia), Tokyo, Japan.
2. Bertrand, C., Gonzales Sotelino, L., and Journee, M. (2013) Quality control of 10-min air temperature data at RMI, Adv. Sci. Res., 10, 1-5.
3. Qin, Z.K., Zou, X., Li, G., and Ma X.L. (2010) Quality control of surface station temperature data with non-Gaussian observation-minus-background distributions, J. Geophys. Res., 115, D16312.



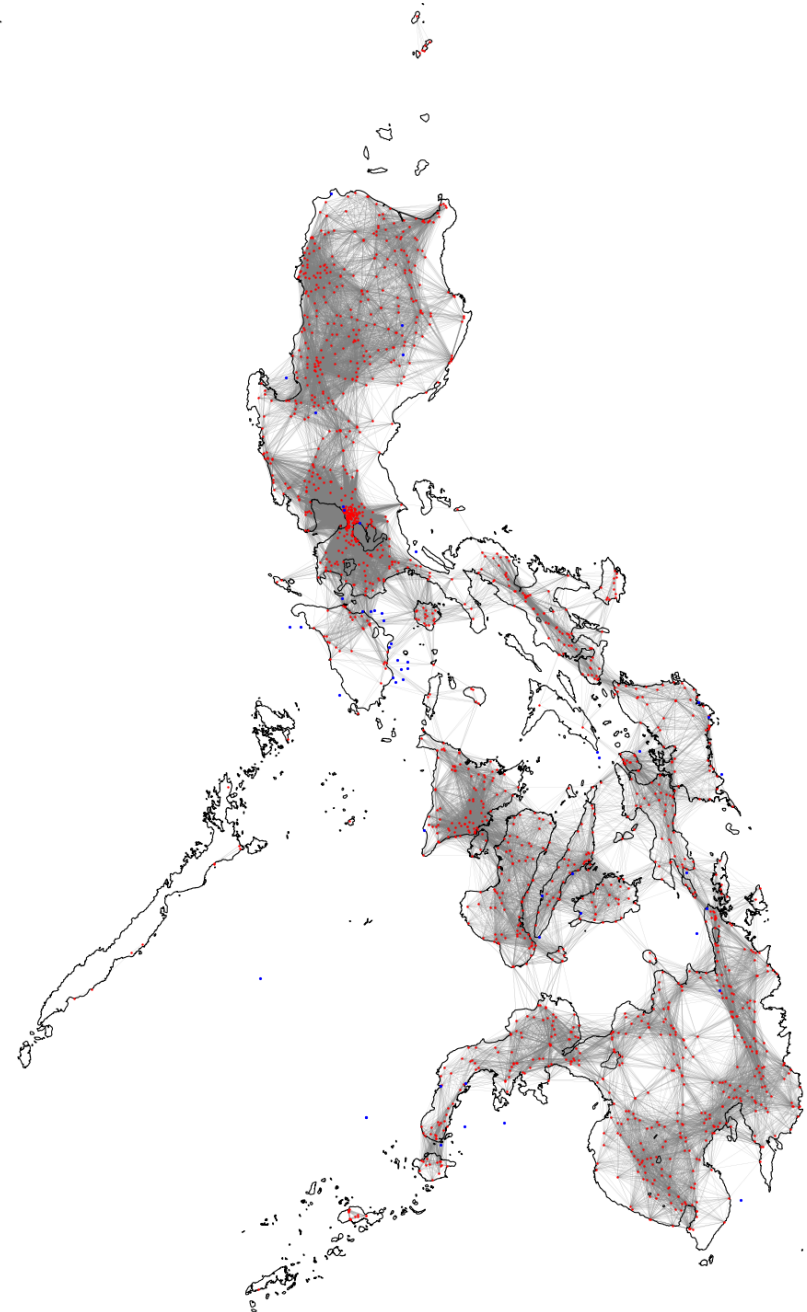
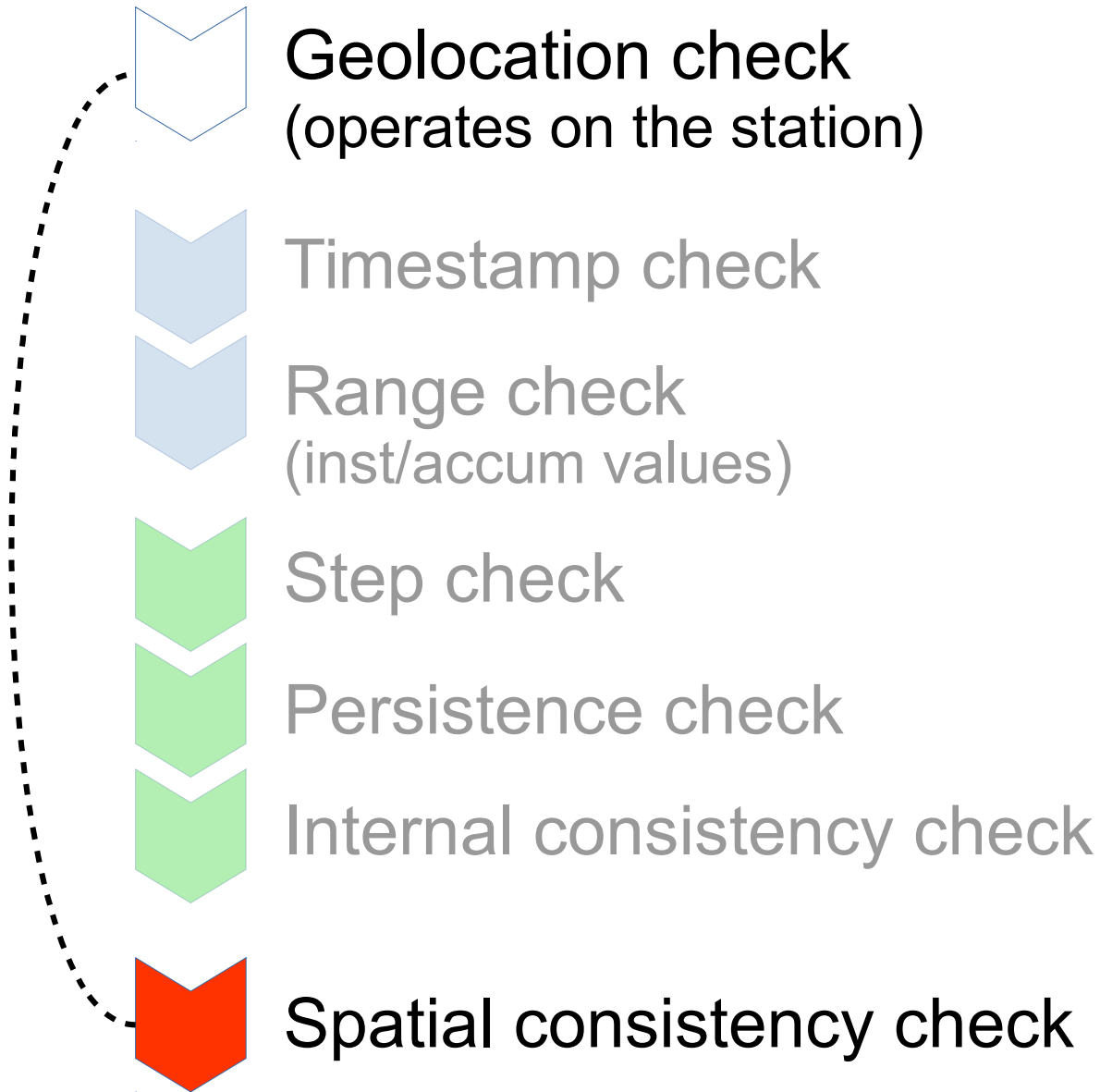


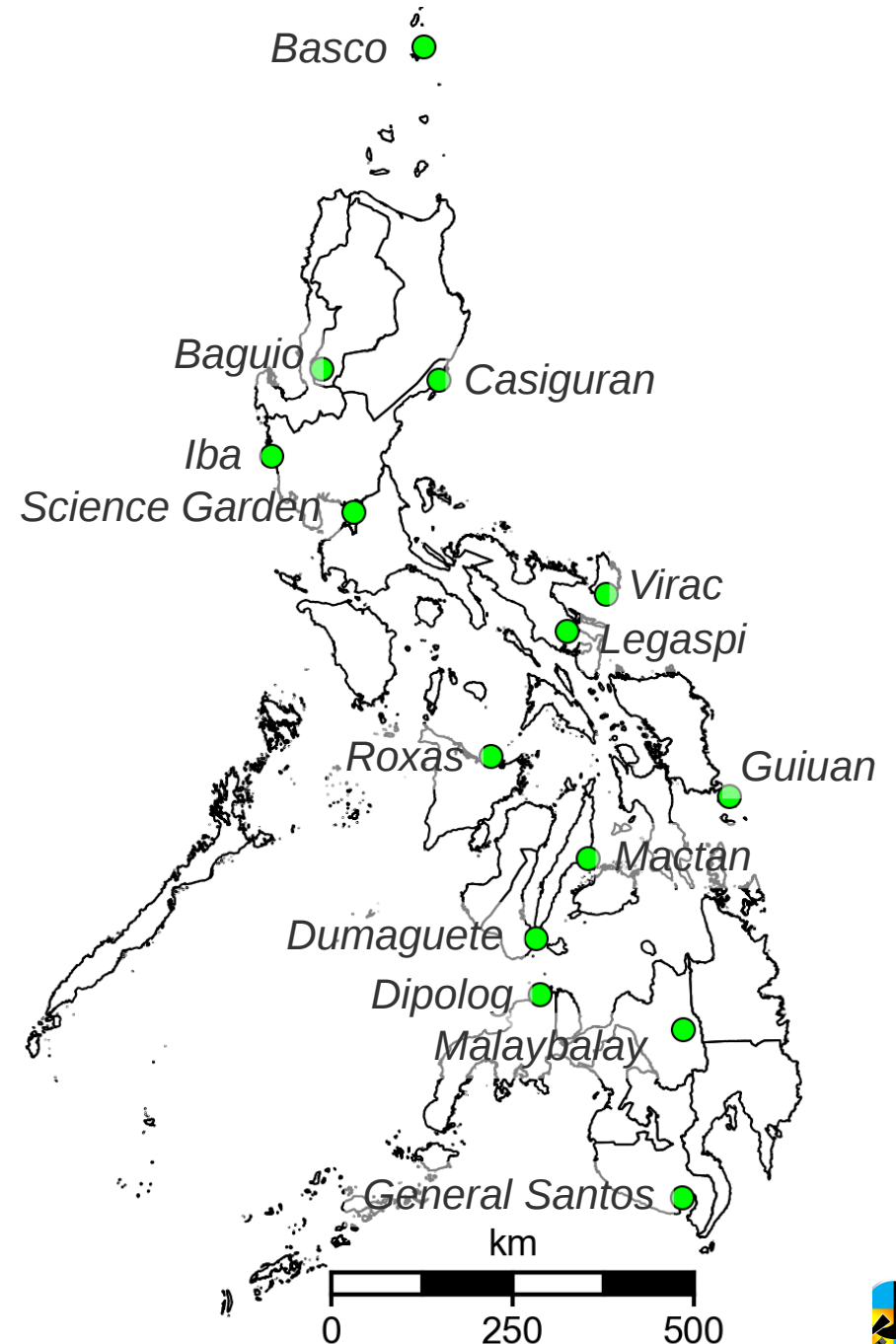
Table 10: Percentage of meteorological data flagged as potentially erroneous by the QC system. Data were collected from all automated weather stations from January 1, 2012 to January 1, 2017. [TC: Timestamp check; VC: value check; SC: step check; PC: persistence check; ICC: internal consistency check; SCC: spatial consistency check]

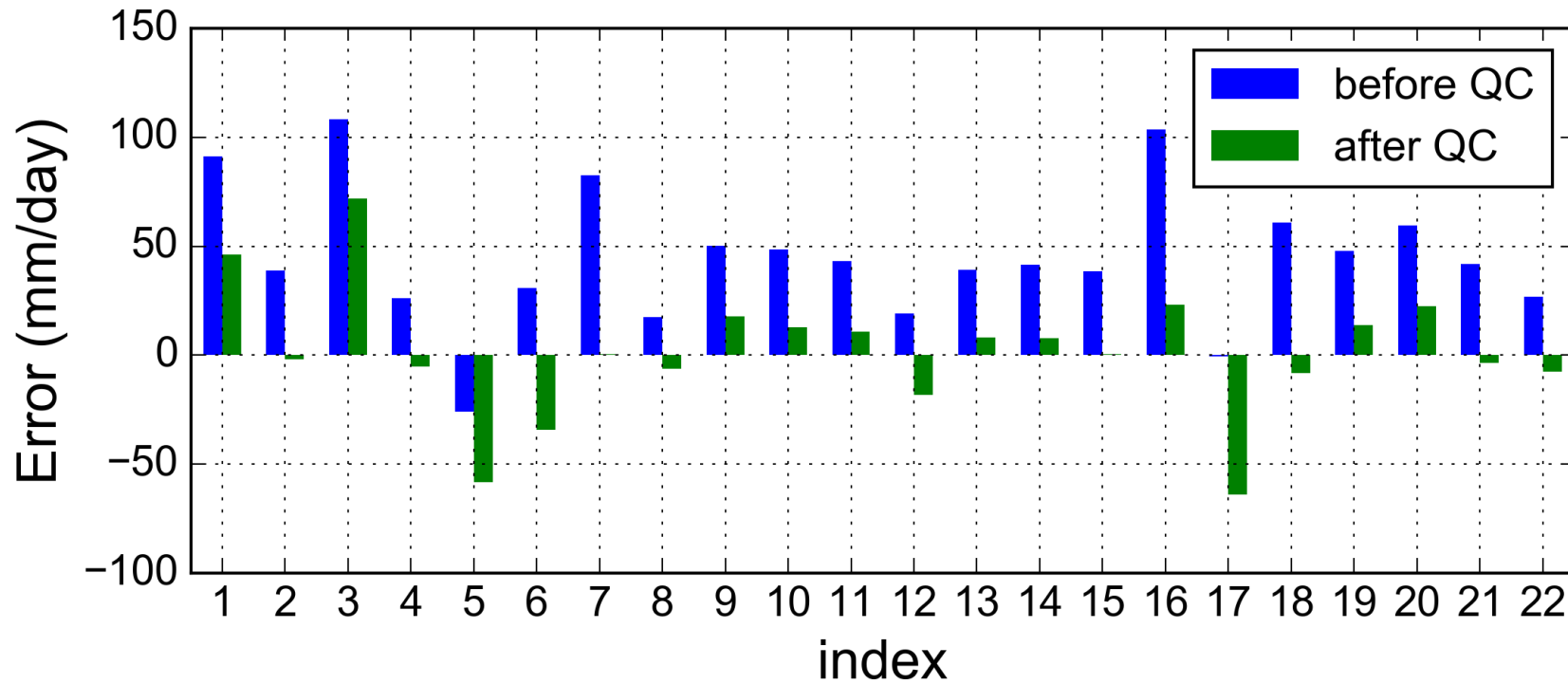
Variables*	Total obs	Quality control checks					
		TC	VC	SC	PC	ICC	SCC
Air pressure	96,189,676	8.15%	2.73%	1.56%	0.12%	—	0.01%
Air temperature	5,798,174	0.72%	1.61%	0.53%	0.25%	0.00%	0.00%
Relative humidity	5,798,174	0.72%	2.96%	0.11%	1.99%	0.46%	0.00%
Rainfall	98,992,287	8.52%	0.04%	—	—	0.35%	—
Wind speed @2m	5,798,174	0.72%	0.00%	0.01%	65.61%	4.97%	0.00%
Total	212,576,485						

* Only QC flag percentage statistics on selected variables were shown for brevity.



- 14 selected stations
- Ground truth obtained from PAGASA synoptic station measurements
- Period: 2012 – 2015
- Variables: rainfall and temperature





	RMSE (before QC)	RMSE (after QC)	RMSE Difference
Temperature(C)	1.77	1.01	0.76 ↓
Rainfall (mm/d)	14.36	12.04	2.32 ↓



Automated quality control of ASTI automatic weather station (AWS) meteorological measurements: Quality control algorithm Version 2.0

Jay Samuel Combinido *¹, Marjon De Paz¹, and Jeanette Carlos¹

¹Advanced Science and Technology Institute, Department of Science and Technology,
C.P. Garcia, U.P. Campus, Diliman, Quezon City

Version 2.0 from August 25, 2017

Revision History

Revision	Date	Author(s)	Description
1.0	June 22, 2017	JSC	Created
2.0	August 25, 2017	JSC	Added spatial consistency check



The screenshot shows a web browser window with the CoARE Data Catalog interface. The browser's address bar shows the URL `asti.dost.gov.ph/coare/data/datasets/aws-qc-monthly-aggr-prod`. The website has a navigation menu with 'Home', 'Datasets', 'Organizations', 'About', and 'Contact'. A search bar is located in the top right. The main header features the CoARE logo and the text 'Computing and Archiving Research Environment Data Catalog' and 'Advanced Science and Technology Institute, Department of Science and Technology'. The breadcrumb trail is 'Home / Datasets / ASTI Automated Weather Stations Meteorological Data, Monthly Aggregated Product'. The main content area is titled 'ASTI Automated Weather Stations Meteorological Data, Monthly Aggregated Product' and has two tabs: 'Description' (selected) and 'Data Access'. The 'Description' tab contains the following text: 'This dataset contains monthly-aggregated quality-controlled (QC'd) meteorological observations from ASTI automated weather stations (AWS). The data is packed into a gzipped NetCDF format.' Below this is a section for 'Data specifications:' with a bulleted list: 'Filename convention: **agws.plm.vn.yyyymm.nc.gz** (agws: ASTI ground weather station; pl: processing level; m: monthly aggregation; vn: quality-control algorithm version; yyyymm: year and month of the collected data; nc: netcdf file format; gz: gzipped); Format: NetCDF; Meteorological Variables: Relative humidity(%); Surface air pressure (hPa); Air temperature at 2m (deg-C); Dew-point temperature (deg-C); Ground-water temperature (deg-C); Leaf wetness (dimensionless); Total rainfall amount (mm); Rainfall duration (seconds); Rainfall rate (mm/h); Rainfall amount (mm); Soil moisture content @15cm|30cm|45cm (vwc); Soil temperature @15cm|30cm|45cm (deg-C); Solar radiation (Wm-2); Ultraviolet index (dimensionless); Waterlevel (m); Waterlevel measured from MSL (m); Wet bulb temperature (deg-C); Wind chill (deg-C); Wind direction @2m|10m (m/s); Wind speed @2m|10m'. Below the description are three rows of metadata: 'Organization: Advanced Science and Technology Institute', 'License: [Creative Commons Attribution](#)', and 'Last Modified: Aug 7, 2017, 8:05:07 AM'.


CoARE Data Catalog - Google Chrome

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asti.dost.gov.ph/coare/data/datasets/aws-qc-monthly-aggr-prod

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Advanced Science and Technology Institute
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ASTI Automated Weather Stations Meteorological Data, Monthly Aggregated Product

Description Data Access

Description This dataset contains monthly-aggregated quality-controlled (QC'd) meteorological observations from ASTI automated weather stations (AWS). The data is packed into a gzipped NetCDF format.

Data specifications:

- *Filename convention:* **agws.plm.vn.yyyymm.nc.gz** (agws: ASTI ground weather station; pl: processing level; m: monthly aggregation; vn: quality-control algorithm version; yyyymm: year and month of the collected data; nc: netcdf file format; gz: gzipped)
- *Format:* NetCDF
- *Meteorological Variables:* Relative humidity(%); Surface air pressure (hPa); Air temperature at 2m (deg-C); Dew-point temperature (deg-C); Ground-water temperature (deg-C); Leaf wetness (dimensionless); Total rainfall amount (mm); Rainfall duration (seconds); Rainfall rate (mm/h); Rainfall amount (mm); Soil moisture content @15cm|30cm|45cm (vwc); Soil temperature @15cm|30cm|45cm (deg-C); Solar radiation (Wm-2); Ultraviolet index (dimensionless); Waterlevel (m); Waterlevel measured from MSL (m); Wet bulb temperature (deg-C); Wind chill (deg-C); Wind direction @2m|10m (m/s); Wind speed @2m|10m

Organization Advanced Science and Technology Institute

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Last Modified: Aug 7, 2017, 8:05:07 AM




- ground work in place but needs parameter tuning
- continuous improvement to the algorithm
- algorithm optimization



← → ↻ https://www.jst.go.jp/global/english/kadai/h2812_pilipinas.html ☆ 11 m ABP

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▼ Disaster Prevention and Mitigation

Development of Extreme Weather Monitoring and Information Sharing System in the Philippines


Principal Investigator (Affiliation)	Prof. TAKAHASHI Yukihiro (Faculty of Science, Hokkaido University)	  
Research Institutions in Japan	Hokkaido University	
Research Institutions in Philippines	Advanced Science and Technology Institute (ASTI, DOST)	
Adoption fiscal year	FY 2016	

Key Information 

FY2017 SATREPS Invitation for Research Proposals
CLOSED
Sept. 13th - Oct. 31st (at noon), 2016

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- Data quality control is important
- Correct observation data is crucial to forecasters, researchers and decision makers
- Garbage in, garbage out



Thank you for listening. :)

