



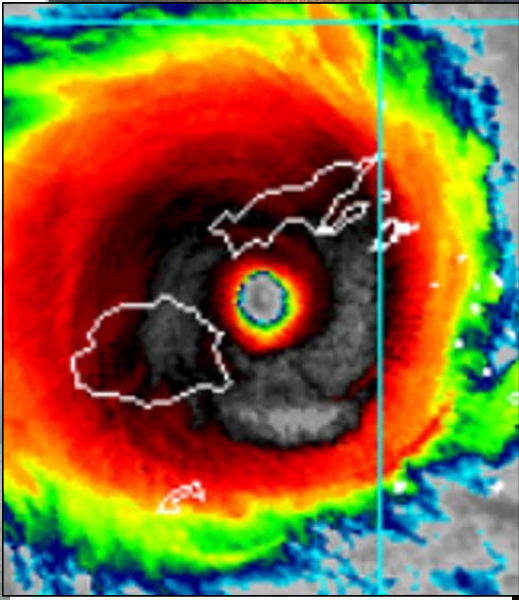
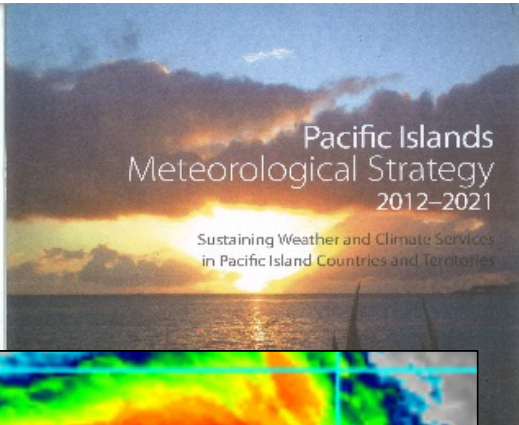
Experiences with donor funded climate monitoring in the Pacific

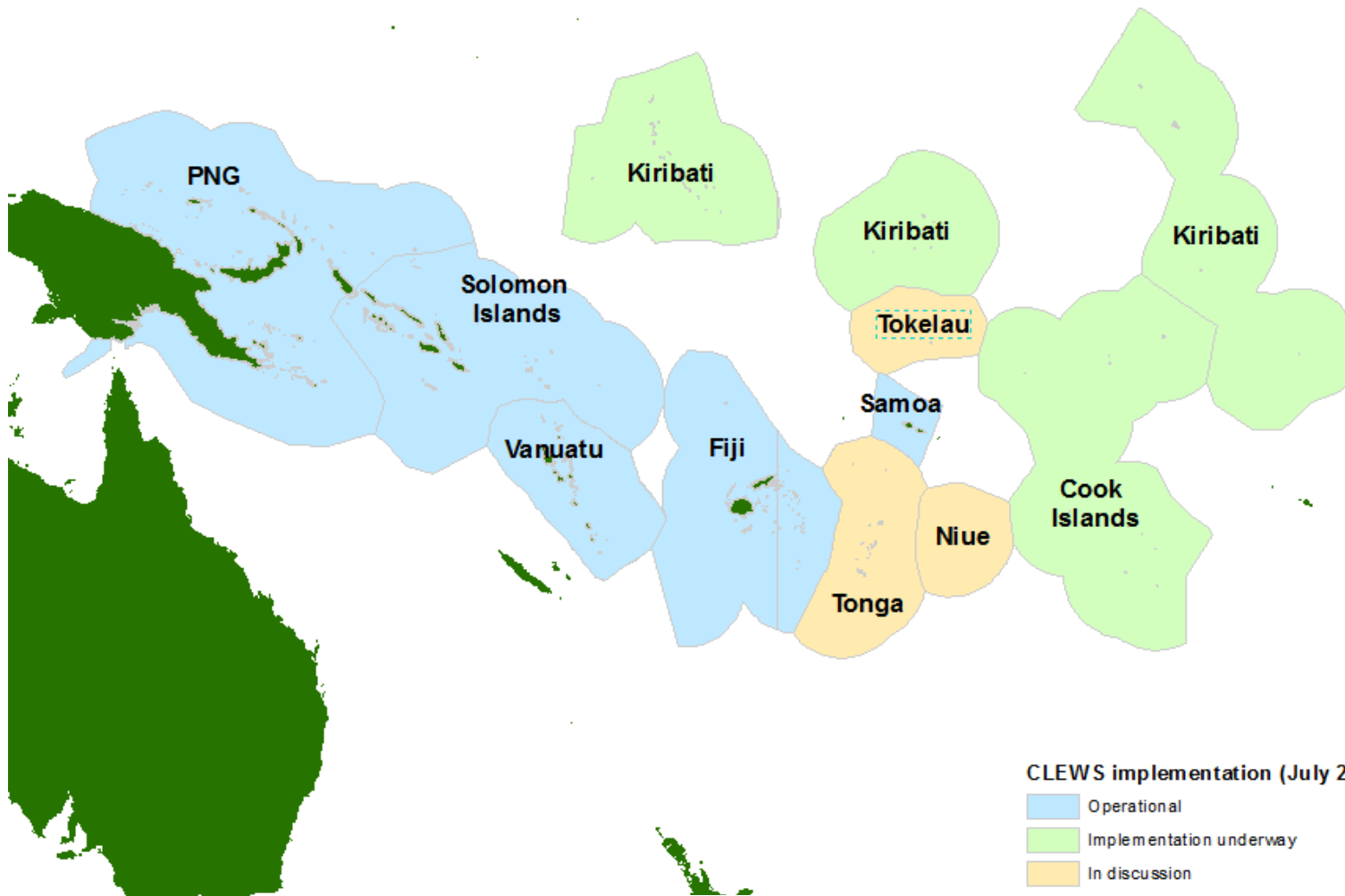
Andrew Harper, Alan Porteous, Graham Elley

ICAWS-2017, Offenbach, 24-26 October 2017

enhancing the benefits of New Zealand's natural resources





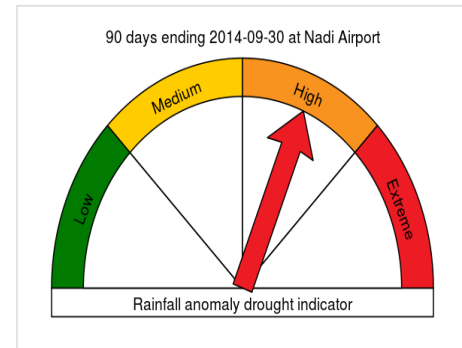
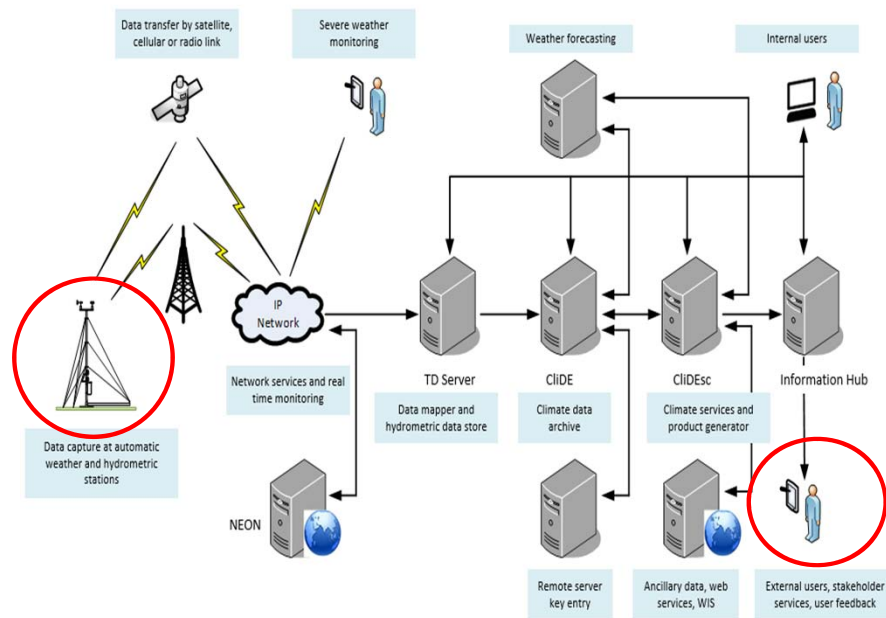


CLEWS implementation (July 2017)

- Operational
- Implementation underway
- In discussion



An end to end CLEWS



Pacific Key Outcomes

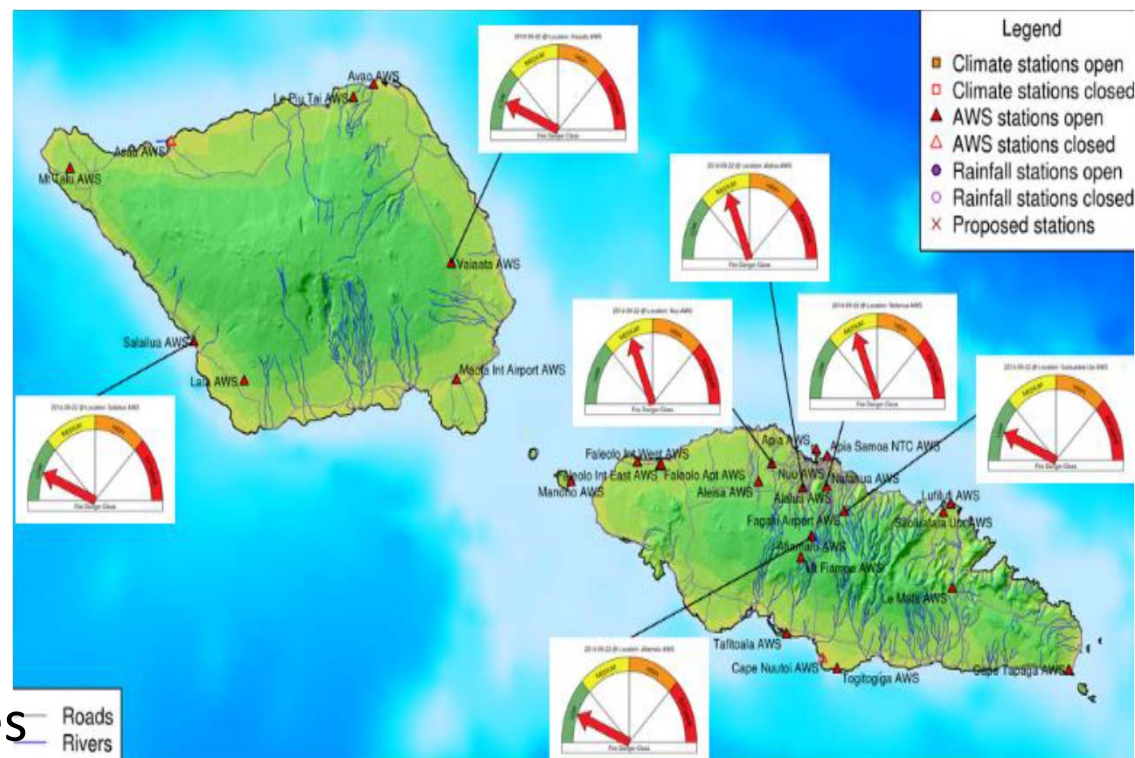
- Aviation weather services are improved
- Marine weather services are improved
- Public weather services are improved
- ✓ Multi-Hazard Early Warning Systems (MHEWS) for tropical cyclones, storm surges, waves and tsunami in the PICTs' region are implemented and improved
- ✓ Improved early warning system for floods (EWS-Floods)
- ✓ Climate information and prediction services, including drought prediction are improved
- ✓ Improved quality of observations and coverage of networks
- ✓ Historical data are preserved
- ✓ National Meteorological Service is more capable and effective
- ✓ Education, training and capacity development activities in the field of meteorology and climatology are coordinated and improved
- ✓ Donor funding is coordinated efficiently and effectively
- ✓ Enhanced strategic partnerships and collaboration with UN, regional and national organisations and agencies.

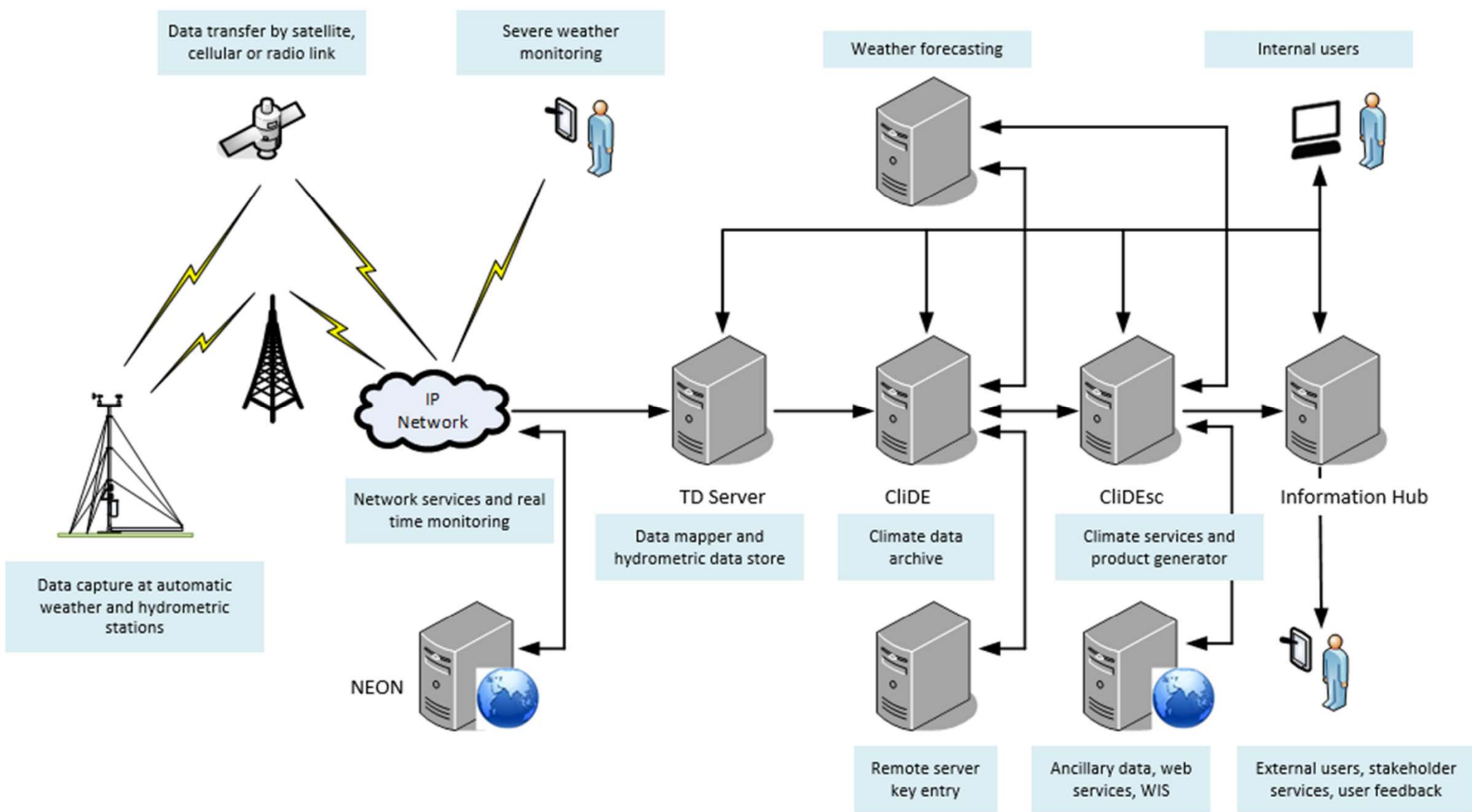
Challenges to address

- Maintenance
- Calibration
- Developing and changing technology
- Parallel observations. Can the climatology be preserved for important sites?
- Fatigue



- Large NMHS variation
 - Capacity
 - Size
 - Infrastructure
 - Resourcing
 - Training
- Build on experience
- Basic requirements
 - Dipstick vs full evap kit
- Useful data to communities





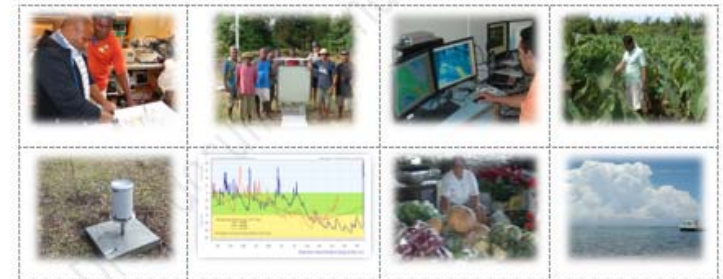
Evolution of a Training Workbook

1. Climate services – strategic and technical overview
2. **Instruments and measurements**
3. Data transfer, telemetry and integration
4. Data storage and quality management
5. Climate monitoring, reporting and client services
6. Sector engagement, decision support and risk management

Climate Network and Operational Services

Workbook for Operational Competencies





Draft under development




August 2017. Version 1

Sourcing guidance material

- Hyperlinked where possible
- >30 WMO docs
- Includes WMO information portal

	<p>Automatic weather stations operations manual</p> <p>NIWA technical guide to AWS operations</p>		<p>Electronic weather stations inspection and calibration manual</p> <p>NIWA guide to maintain systems to optimal standards</p>
	<p>Data to ClIDE User Guide</p> <p>V1.8 September 2013</p>		<p>ClIDE User Guide</p> <p>A guide for administrators of the Climate Environment ClIDE management system</p>
	<p>ClIDesc User Guide</p> <p>A guide to using the ClIDesc product generator system, including building and installing new products and services</p>		<p>Unidata NRT User Manual</p> <p>Should be read in conjunction with associated Station Manual</p>

	<p>Guide to Meteorological Instruments and Methods of Observation</p> <p>WMO-No 8 2014</p>		<p>Technical Regulations</p> <p>Vol 1 – General Meteorological Standards and Recommended Practices</p> <p>WMO-No 49 2012</p>
	<p>Technical Regulations</p> <p>Vol 2 – Meteorological Services for International Air Aviation</p> <p>WMO-No 49 2004</p>		<p>Technical Regulations</p> <p>Vol 3 - Hydrology</p> <p>WMO-No 49 2006</p>
	<p>Implementation Plan of the Global Framework for Climate Services</p> <p>2014</p>		<p>Pacific Islands Meteorological Strategy</p> <p>2012-2021</p>

Module 1 Climate services – strategic and technical overview

- Objectives
- Who should be involved
- Topics
- Background information

Objectives of this module

- Understand and implement the strategic objectives for developing climate and hydrological information and early warning services.
- Understand the technical scope and operations of climate information systems – from observations to decision-making.
- Introduce and outline the technical training programme for operational competencies.

Recommended participants

All technical and operations staff who are operating any part of the climate information and services system.

Topics addressed

PART 1: BACKGROUND

1. National objectives and framework for climate services.
2. Technical infrastructure and operations for climate services.
3. How to use this Workbook: Building operational skills and support: Introduction to the workbook for operational competencies; certification for operational competencies.

PART 2: GETTING STARTED

4. Implementing the system – planning and design, community engagement, user needs.
5. Maintenance and sustainability: staffing; budgets, operational costs; revenue.
6. Health and safety.
7. International collaboration and alignment; Pacific Meteorological Strategy; Global Framework for Climate Services.



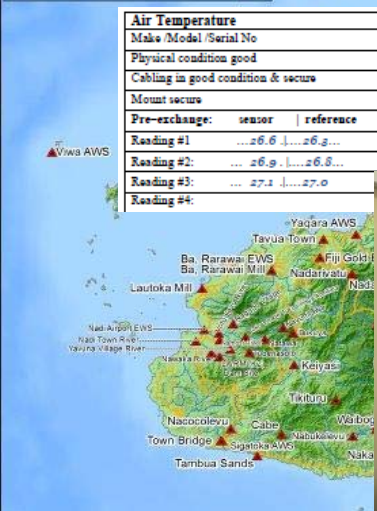
OBJECTIVE: Collate and discuss the strategic objectives supported by this project.

Strategic alignment		Ref.	Date completed
List and discuss key objectives of the NAPA supported by this project		1	
List and discuss Pacific Key Outcomes supported by this project		2	
List and discuss outcomes of the GFCS supported by this project		3	
List and discuss recommendations of the VFCS supported by this project		4	
REFERENCES	<ol style="list-style-type: none"> 1. Vanuatu National Adaptation Programme of Action 2. Pacific Islands Meteorological Strategy, 2012-2021 3. Global Framework for Climate Services 4. Vanuatu Framework for Climate Services 		

Example table from Module 1, Topic 7 for Vanuatu with references



Air Temperature		
Make / Model / Serial No		Vaisala HMP155A, M4340486
Physical condition good	✓	
Cabling in good condition & secure	✓	
Mount secure	✓	
Pre-exchange: sensor reference		Ref 2
Reading #1: ... 26.6 ... 26.3 ...	✓	26.5
Reading #2: ... 26.9 ... 26.8 ...	✓	27.2
Reading #3: ... 27.1 ... 27.0 ...		
Reading #4:		



Objectives of this module

- Understand key principles of climate network design and purpose in Solomon Islands.
- Improve skills and knowledge to select, install and calibrate instruments, including suitability for the observing environment and measuring the required variables.
- Plan and implement a programme for sustainability – trouble shooting, instrument rotation and maintenance, documentation and metadata.

Recommended participants

Climate services technical officers, instrument technicians

Topics addressed

- Climate and hydrometric networks of Solomon Islands
- Site location and exposure criteria
- Selecting instruments
- Installing a station
- Station commissioning and documentation
- Storing and preserving station records
- Station inspections and routine maintenance
- Trouble shooting and fault diagnosis

Module 2 Instruments and measurements



2010

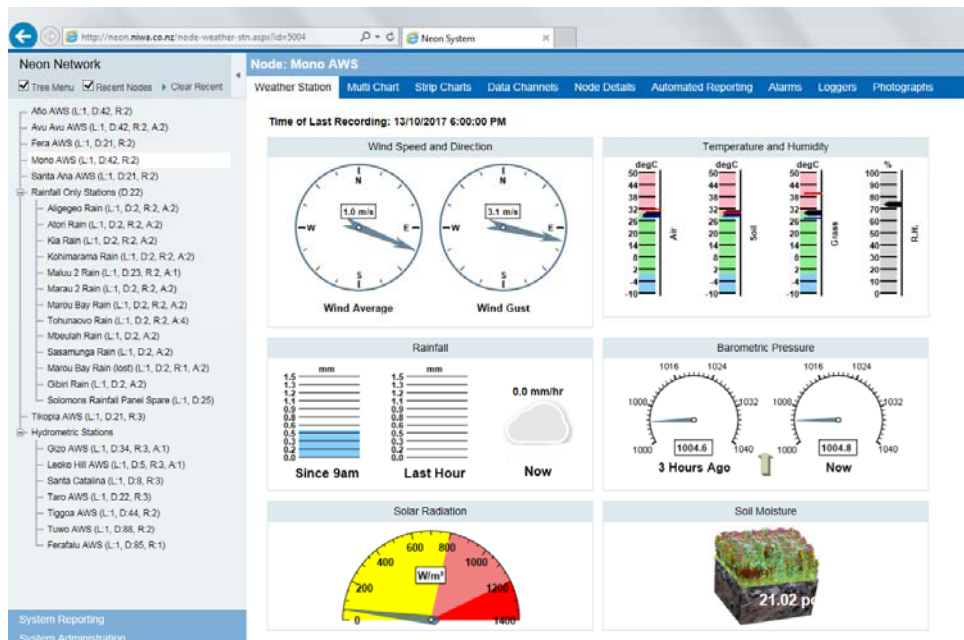


2017

OBJECTIVE: The principles of network design and climate monitoring are understood, and considered prior to new stations being established or network changes being made.

Selection of station location		Completed
Station location complements and strengthens network design and purpose	Network design considers and incorporates measurements that <u>take into account</u> : urban areas; different climate zones; different land-use; range of altitudes; spatially representativeness.	
	As far as possible, any network changes and additions assist the continuity and homogeneity of the climate record.	
	A period of overlap (preferably two years) between new and old observing systems and instruments has been undertaken to assist continuity and homogeneity of records.	
Select suitable locations for stations	Priority has been given to data-sparse regions and poorly observed parameters, for example places exposed to change and/or extreme conditions, or where improved time resolution is needed.	
	The collected data will adequately representative the local environment and climate, including both air and ground (e.g. soil temperature, soil moisture) conditions.	
	Local effects are fully considered ('exposure').	
	Ground surface is suitable for construction.	
Consider issues related to long-term site suitability and access	Siting classification tool has been applied (is site 'fit for purpose'?)	
	Exposure will not change (e.g. due to growth of trees, new buildings) or there will be minimum change.	
REFERENCES	Site access will be available for servicing – may need to establish protocols to give <u>advance notice</u> of access.	
	WMO-No 8 Guide to Meteorological Instruments and Methods of Observation WMO 100 Guide to Climatological Practices WMO 1185 Guidelines on Climate Observation Networks and Systems	

Example table from Module 2, Topic 2 Site location and exposure and criteria



- Some overlapping with Module 2
- Larger ICT component

Objectives of this module

- Understand, operate and maintain data logging, transfer by telemetry, and processes for data ingest into the climate data archive.
- Ensure data transfer and integration to all operational services and as required.

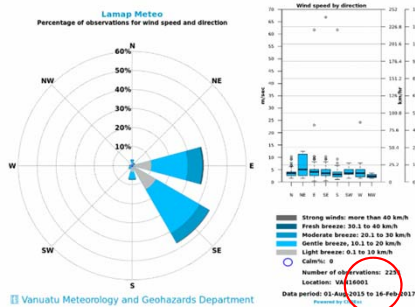
Recommended participants

IT staff, instrument technicians, weather and hydrological monitoring and forecasting operational staff.

Topics addressed

1. Options for telemetry systems – cellular and satellite
2. At the AWS site – the sensor-logger interface
3. NEON configuration: Data logging and transmission
4. NEON operations: Data viewing and applications
5. Data integration with national climate and weather services
6. Data integration with Global systems – GTS/WIS

Module 3 Data transfer, telemetry and integration



- Some overlap with 2 and 3
- Roles clearly defined?

Objectives of this module

- Improve proficiency in monitoring and maintaining all data entry and ingest services.
- Ensure all operational data are up to date and quality assured.
- Maximise the capability and services of the CiIDE data management system.

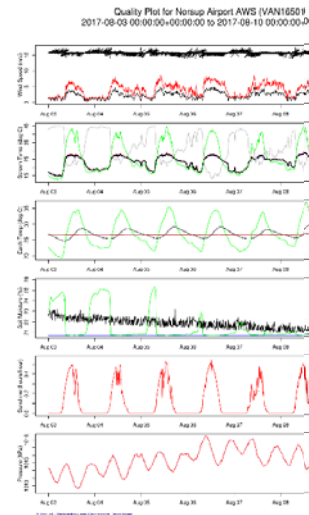
Recommended participants

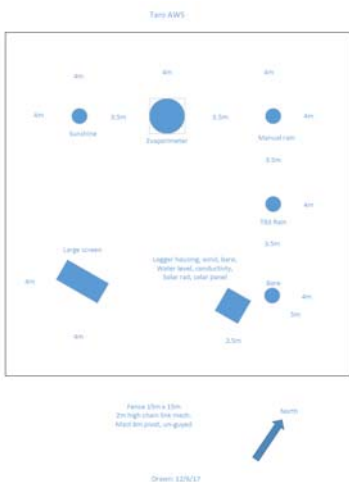
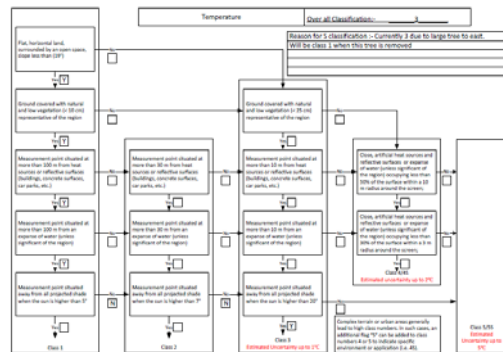
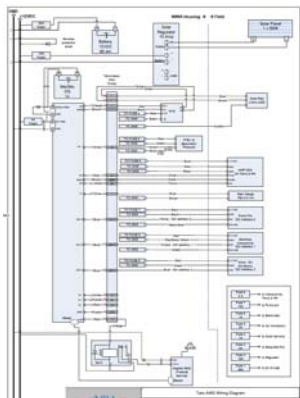
Staff involved in key entry, automatic data ingest, data quality assurance and climate reporting; database administrators.

Topics addressed

1. CiIDE administration
2. Station set up and registration, including metadata
3. Data tables and types
4. Data entry processes; automatic data ingest; monitoring data services.
5. Data quality assurance and data modification
6. Data reports and quality plots; identifying data quality issues.

Module 4 Data storage and quality management





General Exposure of Station: Lincoln is some 16km southwest of Christchurch City in a direct line and 10km north of the northern end of Lake Ellesmere. The area is very flat fertile farm land with many shelter belts and hedge rows as wind breaks. The Port Hills begin to rise 5.5km away to the east and reach a height of 573m AMSL at Coopers Knob. 12km away. The foothills of the Southern Alps are 60km to the west and northwest.

The enclosure is a 20m x 20m grass plot surrounded by an open mesh 1m high fence. The site is very exposed but is typical of large areas of the Canterbury Plains. There are now obstructions near this site.

There is a shallow dip to the SW.

Exposure is very good.

The Canterbury Nor'wester strikes this area. The rotor generated by this airflow sometimes reaches the ground as a very gusty east to south-easterly.

Local Effects / other information: The Canterbury Nor'wester strikes this area. This airflow sometimes curls to strike the ground as a very gusty east to south-easterly wind

AUTOMATIC WEATHER STATION RECORD SHEET

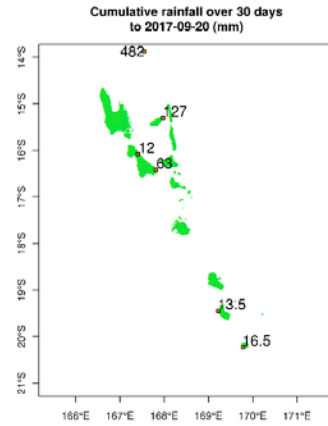
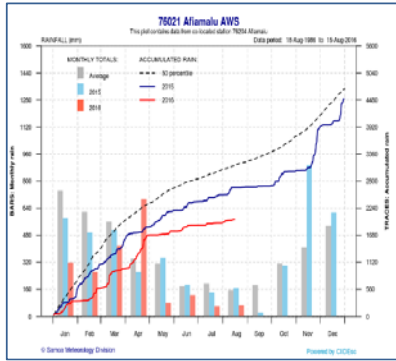
Station Name: ANEITYUM AWS VMGD No. VAN03005
 WMO No: 91569 WIGOS No: 0-20000-0-91569
 ICAO: NVVA

Date Station Established: 24 May 2017
 Latitude: 20.23447 deg S Longitude: 169.78219 deg E
 Height above MSL: 7 m Point used: Rain gauge
 Observer: Vannam Meteorological and Geo-Hazards Department
 Phone No: +678 24686

OBJECTIVE: Data entry staff are familiar with station setup, prior to entry of data.

Set up stations in CiIDE		Completed
Set up station metadata	<ul style="list-style-type: none"> Check station information correct and up to date Set up new station for data entry Complete station metadata check list (refer to CiIDE station setup) Complete instrument metadata check list and consistent with administration standards Upload station information files and photographs 	
Manage manual entry of data records	<ul style="list-style-type: none"> Key entry daily data Key entry sub daily data Conduct post-entry data checks 	
Upload spreadsheet data to CiIDE	<ul style="list-style-type: none"> Set up csv files in native CiIDE ingest format Submit and upload spreadsheet data Check upload complete and correct 	
Manage automatic data ingest (see also Section 4.5)	<ul style="list-style-type: none"> Set up DataToCiIDE for an automatic station Edit data channel thresholds as needed Switch data channels on/off as needed 	
Data rescue: Identify and collate station paper records, and upload data from historic records	<ul style="list-style-type: none"> Identify stations missing from the electronic data archive Locate and organise/collate paper records Check quality and reliability of paper records metadata Key enter data from historic paper records 	
REFERENCES	<ul style="list-style-type: none"> CiIDE User Guide DataToCiIDE WMO 100 Guide to Climatological Practices WMO 1185 Guidelines on Climate Observation Networks and Systems WMO 1186 Guidelines on Climate Metadata and Homogenisation 	

Example table from Module 4, Topic 2 Station set up and registration, including metadata



Objectives of this module

- Monitor the climate in real time and recognise climate variations and extreme events.
- Develop and generate routine climate reports for public distribution.
- Respond to key clients to develop and routinely generate customised services.

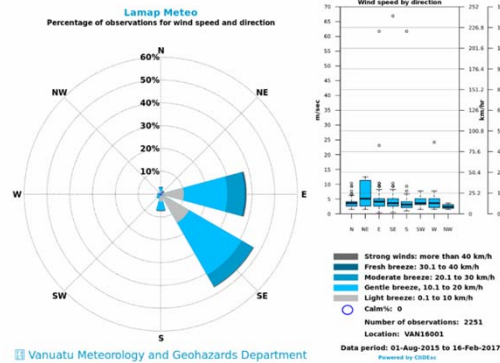
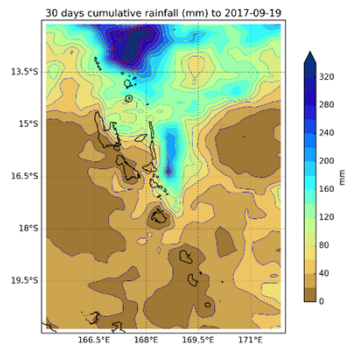
Recommended participants

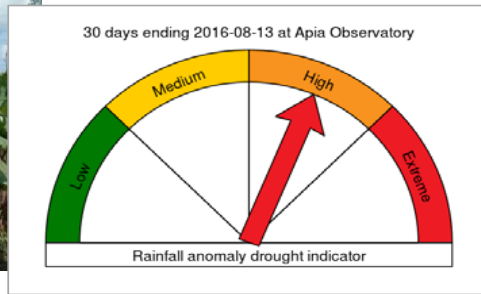
Climate services staff.

Topics addressed

1. CliDE data downloads and reports
2. Design and generate products and services with CliDEsc
3. Regular climate reports and advisories – monthly, seasonal, ENSO
4. Public data services and requests – data tables, data visualisation (time series and maps).
5. Advanced data analysis and products.

Module 5 Climate monitoring, reporting and client services





Objectives of this module

- Work with sectors of government, business, civil societies and communities to determine climate vulnerabilities and needs for information.
- Develop the scope and range of national climate services.
- Develop and apply advanced interpretation and application of climate data.

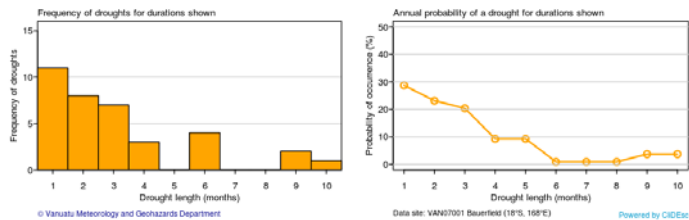
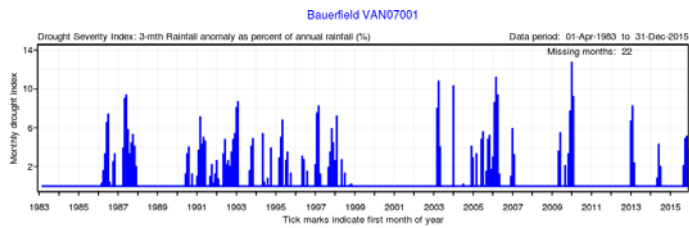
Recommended participants

Climate science and services staff.

Topics addressed

1. Engaging with end uses and identifying climate vulnerabilities and information needs
2. Data interpretation and reporting for decision making and risk management
3. Designing and implementing improved public bulletins, climate products and services
4. Improved data analysis and interpretation.
5. Developing sector partnerships and joint responsibilities

Module 6 Sector engagement, decision support and risk management



Key Messages

- Planning dialogue
- Consistency - design, method, nationally, regionally
- Long-term sustainability – Financial and capability
- Preventive maintenance must be a priority
- Competencies
- Training, training, training - all stages, targeted, regularly reinforced
- Technical agencies and regional partners need to sustain their collaborative engagement to continue to improve the sustainability and resilience of Pacific communities

But ...

- Lots of work to do
- Still knowledge gaps
 - WIGOS
 - Number allocation (local, international)
 - Same number?
- Share experiences and learn off each other
- Start small and grow
- Don't be frightened to ask for help/advice

Thank you

