



NATIONAL WEATHER SERVICE

Building a Weather-Ready Nation

Reaching the Last Mile in the Pacific

Hydrographic Services Research Panel

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***If there is magic on this planet
it is contained in water
- Loren Eiseley***



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What is the Risk?

- The World Risk Index 2021 assesses the disaster risk for 181 countries. This covers almost 99 percent of the world's population.
- A total of ten island states are among the 15 countries with the highest disaster risk. Their risk profile is increasingly also determined by sea-level rise.
- Vanuatu (#1), Solomon Islands (#2), Tonga (#3), Phillippines (#8), Fiji (#14), and Kiribati (#19)

Reaching the last mile in the Pacific

- Communication
- Resources
- Traditional Knowledge

Communication - Language

- Difficulty of translating meteorological phenomena and scientific terminology into local languages and dialects.
- Translation of phenomena often tied to location and time of year – *Hānau Ka Ua*, a collection of Hawaiian rain names (1 chapter – 282 pages!)
- Papua New Guinea alone has over 800 languages and dialects
- Many languages are related and similar though not exact
- Words which are spelled the same...or pronounced the same, have different meanings in different locations

Tale of Two Samoas – Wind Terminology

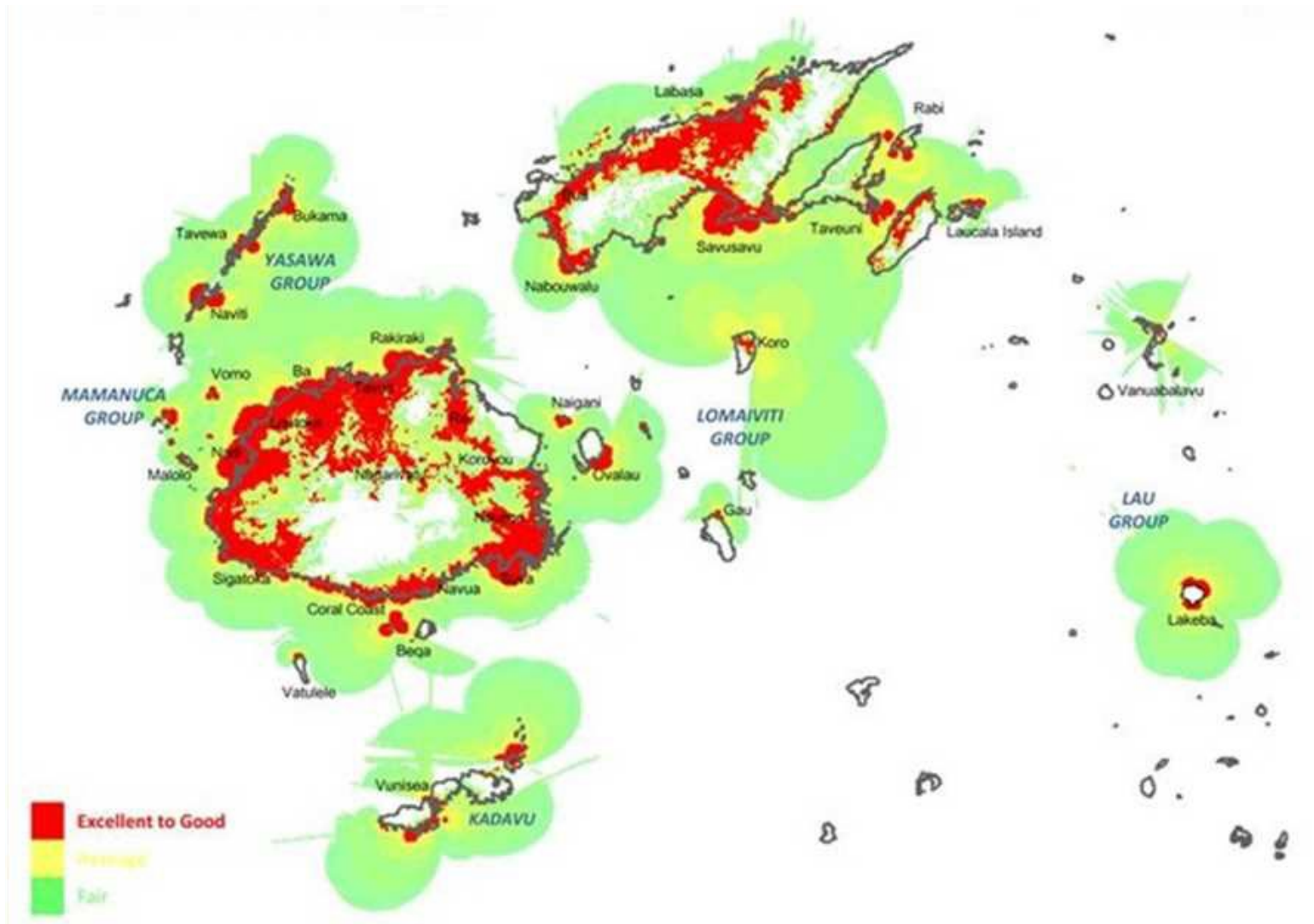
AMERICAN SAMOA						INDEPENDENT STATE OF SAMOA					
WINDS		TERMINOLOGY				WINDS			TERMINOLOGY		
1-Minute Mean KT	MPH	ENGLISH		SAMOAN		10-Minute Mean Wind KT MPH km/hr			ENGLISH	SAMOAN	
15-20	15-25	Tropical Disturbance		Taaviliga o Savili							
20-33	23-38	Tropical Depression	Small Craft (Marine Only)	Taaviliga o Savili Malolosi	Fautuaga mo Vaa Laiti (Gataifale)	20-25	25-30		Small Craft & Alia Fishing Boats Advisory	Fautuaga mo paopao ma alia fagota (Gataifale)	
			Wind Advisory 25-35 KTS (30-40 MPH) (Land Only)		Fautuaga mo Savili Malolosi 25-35 NOTE (30-40 MPH)					Fautuaga mo Savili Malolosi	
34-47	39-54	Tropical Storm Watch/Warning	Gale (Watch/Warning): Marine Only	Matagi Malolosi (Nofo Vaavaaia/Lapataiga)		34-47	39-54	63-87	Tropical Cyclone Category 1 Warning	Lapataiga o Matagi Afa Vaega 1	
48-63	55-73		Storm (Watch/Warning) Marine Only			48-63	55-72	88-117	Tropical Cyclone Category 2 Warning	Lapataiga o Matagi Afa Vaega 2	
64-82	74-95	Hurricane Watch/Warning Cat 1		Afa (Numera 1)		64-85	73-98	118-158	Severe Tropical Cyclone Category 3 (64-85 kt) Warning	Lapataiga o Matagi Afa Vaega 3	
83-95	96-110	Hurricane Warning Cat 2		Afa (Numera 2)		86-110	99-127	159-204	Severe Tropical Cyclone Category 4 (86-110 kt) Warning	Lapataiga o Matagi Afa Vaega 4	
96-112	111-129	Hurricane Warning Cat 3		Afa (Numera 3)		111+	128+	205+	Severe Tropical Cyclone Category 5 (110+ kt) Warning	Lapataiga o Matagi Afa Vaega 5	
113-136	130-156	Hurricane Warning Cat 4		Afa (Numera 4)							
137+	157+	Hurricane Warning Cat 5		Afa (Numera 5)							



Communication - Connectivity

- Sheer distance/remoteness and lack of modern communication infrastructure
- Lack of television, radio, cellular coverage for many islands
- Reliance on VHF/HF radios
- Tuvalu Meteorological Service – physically ships seasonal outlooks to outer-islands
- Tokelau Met Service – uses town criers to disseminate warnings

Cellular Coverage Map for Fiji



Resources – Physical and Human

- Extreme remoteness of some Pacific Islands and limited accessibility
- Supplies – scarcity, limited supply lines, timeliness
- Challenge of maintaining observation platforms
- Lack of trained meteorologists / forecasters/IT/technicians
- National Meteorological and Hydrological Services are not 24/7

Niue Meteorological Service



- NMS has 10 staff including Director
- Niue Met Service is not 24/7 operation unless in an event of a cyclone
- Air NZ flights, Monday & Friday 12am to 4pm
- Tuesday-Thursday are normal govt working hours 8am-4pm
- Saturday, Sunday and public holidays are 8:30am to 10:00am.

“There’s no beer on the island...”

- Most supplies are delivered to Kiritimati Island via monthly barge service from Fiji...ocean conditions permitting.
- Once weekly commercial flight between Honolulu and Nadi.
- Kiritimati Island weather office and outstanding staff – making the most of what they have.





Traditional Knowledge

- Risk information is usually found in proverbs, story telling, legends, myths, songs, dance, traditional place names
- Communications and dissemination
- Local resources and subsistence lifestyle (farming, fishing, construction) creates resiliency
- Food preservation

Great Frigate Bird

- Tonga. *Lofatalamatangi* - The frigate tells of bad weather
- Hawaii. *He 'iwa ho'ohaehae nāulu* - An 'iwa that teases the rain clouds.



Tonga Meteorological and Coast Radio Services and the Kiribati Meteorological Service feature the frigate bird in their logo as a symbol of early warning



The Great Frigate Bird also appears in the Nauru Coat of Arms and the Kiribati National Flag



What happens if the great frigate birds disappear?

- <https://www.sciencenews.org/article/massive-marine-heat-wave-blob-unprecedented-seabird-die-off>

Communication and Dissemination



Communication and Dissemination

- Wooden drums - Lali
- Conch shells
- Fire/smoke – Interisland
- Falehanga – women weaving tapa
- Faikava – kava drinking
- Fono/lotu – community meetings and church
- Coconut wireless

Stone Money Bank – Yap State, FSM



My two cents on the path forward

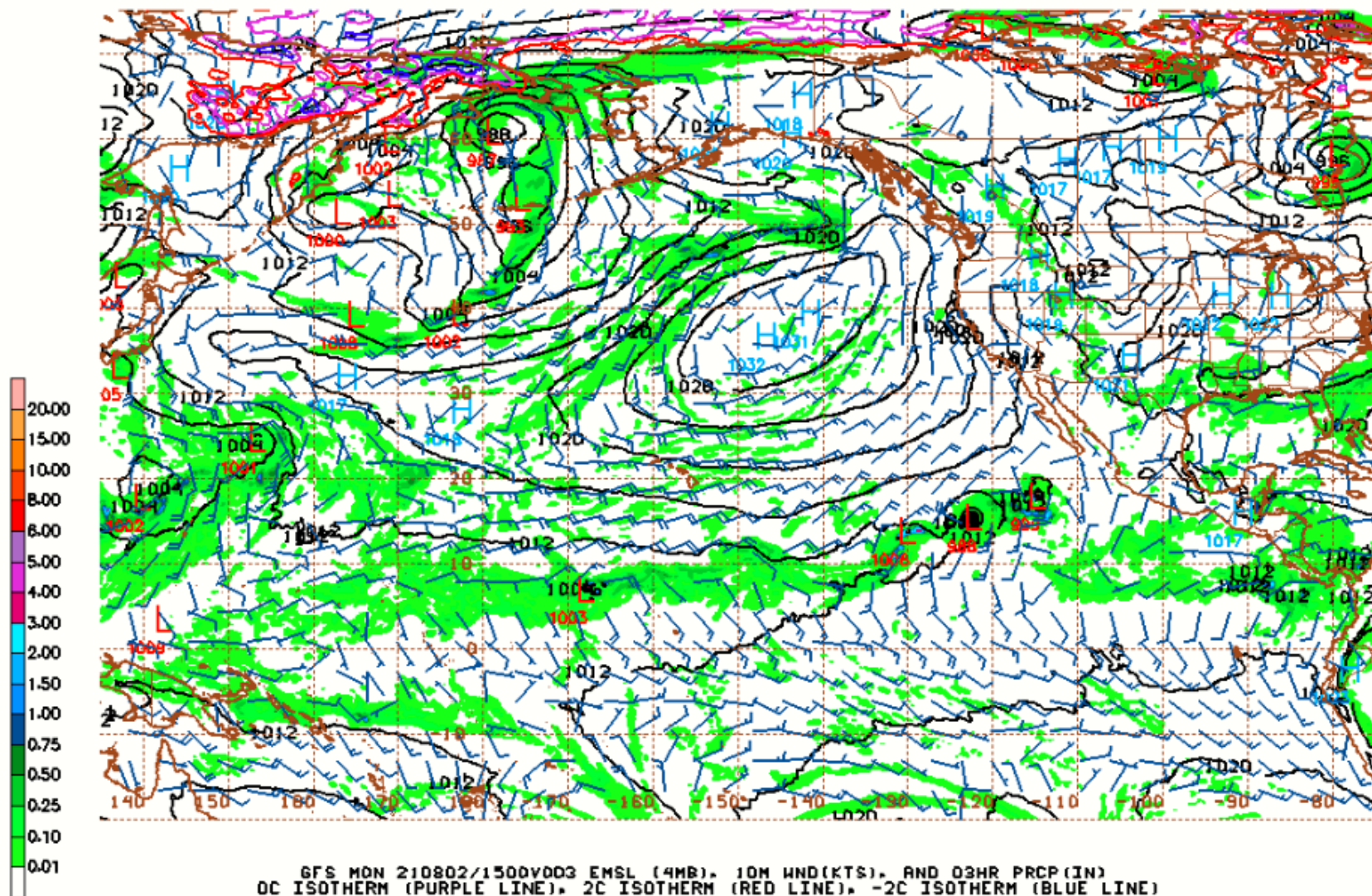
- Much of the risk and vulnerability for Pacific Island Countries relates to water security
- Security *through* water
- Security *from* water
- Climate change and extreme weather events have tremendous impacts

What can we do?

- Sustained observing systems - simple and sustainable, not shiny
- Access to high resolution modeling
- Ultimate goal is for National Meteorological and Hydrological Services to improve services for water, agriculture, health and tourism sectors
- Drives economies
- Provides resources to pay for communication and connectivity
- Builds resiliency

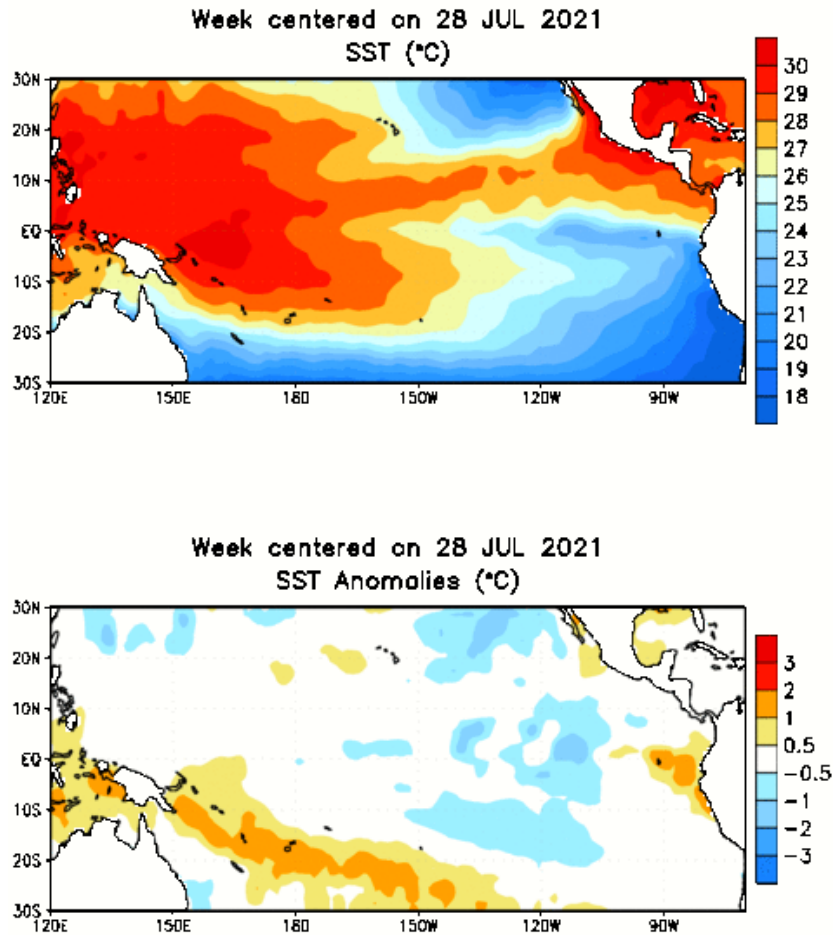


GFS 08/02/21 12UTC 03HR FCST VALID MON 08/02/21 15UTC NOAA/NWS/NCEP



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Not even a speck on the maps



8,635 miles

**Approximate distance between
NCWCP and WSO Palau**

Zoom in and see the Countries...



Zoom in and see the Islands...



Zoom in and see the people



Zoom in and see the Last Mile...



Mahalo!

