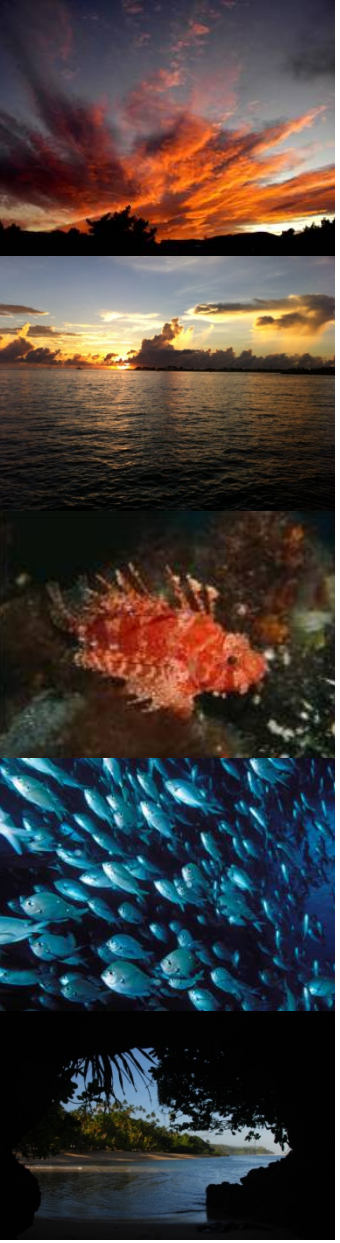

Ua 'afa le Aso Stormy weather today: traditional ecological knowledge of weather and climate. The Samoa experience

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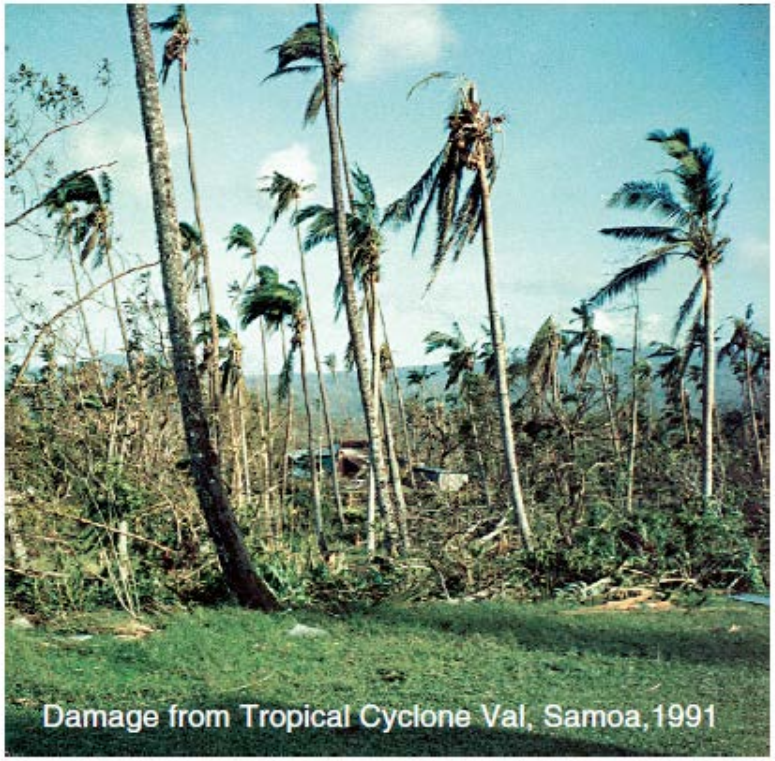
Abstract This paper examines traditional ecological knowledge of weather and climate in Samoa, a Polynesian community in the South Pacific. The research found Samoans have their own unique seasonal calendar. The Samoan seasonal calendar is predominantly based on the observations of local environmental changes, which are in turn influenced by weather and climate. Monitoring changes in plants and animal behaviour, for example, are key indicators used by the Samoans to forecast changes in weather and climate. In addition, their communal and family social activities like hunting, fishing and feasting are driven by the seasonal calendar. The Samoans knowledge of cloud formation, conditions conducive to the formation and onset of severe weather systems and seasonal changes in climate, helped them anticipate, plan and adapt to extreme weather and climate events. The ability and knowledge of the Samoans to forecast the onset of extreme weather and climate events, relying predominantly on local environmental changes are vital tools that should be incorporated in the formulation of human induced climate change adaptation strategies.

Goals



- To examine and document traditional ecological knowledge of weather and climate in Samoa
- To identify opportunities to understand what had helped indigenous communities like the Samoans to successfully adapt to climate variability in the past – particularly to weather and climate extremes and using this knowledge to formulate locally appropriate adaptation response measures and policies to anthropogenic climate change

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Key research questions

- Is there a role for traditional ecological knowledge of weather and climate in improving our scientific understanding of climate change?
- Do Pacific Islands indigenous people's knowledge systems incorporate ideas and concepts of anthropogenic climate change?
- How do Pacific Islands indigenous people manage changes in extreme events in the past?
- What lessons can we learn from these communities?

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Methodology

- Qualitative – generally examines people's words and actions in narrative or descriptive ways more closely representing the situation as experienced by participants

- Quantitative – based on observations that are converted into discreet units that can be compared to other units by using statistical analysis – statistical is an essential component

- Talatalanoa fa'asamasamanoa

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Some key Findings (1)

Table 1 Samoan names and descriptions of the various types of clouds and their western scientific equivalents

Scientific	Samoan	Group of clouds	Forecast weather and climate conditions
Cirrus	Ao lele	Streak cloud	Indicates warmer weather coming
Cirrostratus	?	Layer of streak cloud	
Cirrocumulus	?	Billowy streak cloud	Indicates rain is likely later
Altocumulus	?	Medium level cloud	
Stratus	Ao po'a	Layered cloud	Indicates rain tomorrow
Cumulus	Ao fa'auliuli	Heap, dark cloud	Indicates heavy rain soon
Stratocumulus	Ao fulifao	Cross between layer and heap	Indicates a warm sunny day
Nimbostratus	Ao to'a	Mainly layer cloud	Probably drizzle
Cumulonimbus	Ao valevale	Mainly heaped cloud. Inauspicious, threatening cloud.	Thunder and lightning




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Some key Findings (2)

Table 2 Names and descriptions of wind types

Scientific	Samoan	Direction	Forecast weather and climate conditions
North	Matu	N	This wind is a nuisance, it will cause many tempests
South	Tuaoloa	S	Bad winds. In American Samoa, folklore described Tuaoloa as the wind that will stop blowing when the quotas of deaths are met.
Easterly	Mata Upolu	E	Indicates bad weather, accompanied by heavy rain
Westerly	La'i	W	Cool climate associated with clear skies
South Easterly	Tua Upolu	SE	Good weather
?	Laufala	?	?
?	Faati'u	?	?
?	Piipapa	?	?
South-South-West	Tonga	SSW	Bring rain and inducing drowsiness
Gentle breeze	Fisaga	NE trade winds	Gentle, pleasant wind associated with good weather.

Some key Findings (3)

Table 4 The Samoan seasonal calendar and its origin (Adapted from Turner (1861) with additional inputs by Lefale)

European month	Samoan month	Origins	European seasons	Samoan seasons
February	Toeutuva	Digging yams again	Summer	Vai To'elau – the 'north easterly winds' season
March	Fa'aafu	Withering of the yams		
	Ta'afanua	Walk or Roam the land		
	Aitu iti	Small Gods		
April	Lo	Small fish	Autumn	
	Fanoga	Destruction.		
May	Au nunu	Stem crushed.		
	Sina	Goddess white		
June	Ologa manu	The singing of birds		
July	Palolo mua	The first palolo—virides	Winter	Vai Palolo—the 'virides' season
August	Palolo muli	The last palolo		
September	Muli fa	End of the stem of a taro—colo cassia esculenta		
October	Lotu O Uaga	Rain players		
November	Taumafa mua	The first of plenty	Spring	
December	Taumafa muli	The final meal/feasting		
	Toe Taumafa	The final supper		
January	Utuvamua	Digging of the first yams		

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Some key Findings (4)

Table 6 Samoan methods of climate and weather observations and possible western scientific equivalent

Samoan indicator/phrase	English	Possible scientific tool equivalent
Mogamoga	Cockroaches	Barometer
O le malio/kupa ma lona lua	The Hermit Crabs and its hole	Anemometer
O le Atafa	Frigate Bird	Anemometer
Ua oso foi le gugu o le toeaina o le a sau le timu	The old man's gout is back, rain is on the way	Barometer
Tulisi'a foi moa ua lata mai le timu	Chickens are running scared the rain is on its way	Anemometer Solarimeter Thermometer

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Some key Findings (5)

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Conclusions

7 Conclusions

The findings from this research confirm there is definitely a major role for traditional ecological knowledge of weather and climate to play in advancing our western understanding of climate and weather. In view of the accurate naming and predicting of changes in weather and climate by the Samoans, similar research should be carried out in other indigenous Pacific Island communities to further advance our understanding of changes in weather, climate and climate change throughout the region. This research has identified some of this knowledge in Samoa. However, there is a good chance there is still more unknown and only careful long-term studies will begin to reveal this wealth of knowledge.

This research demonstrates that traditional ecological knowledge of weather and climate is just as important as western scientific knowledge in planning for future climate change. The ability and knowledge of indigenous communities, as demonstrated by the Samoans, to accurately predict the onset of extreme climate events, relying solely on local knowledge and environmental changes, should be further investigated as part of the human dimensions of climate change research. However, Samoans appear not to have a broader knowledge of key meteorological features like the ENSO, SPCZ, IPO, ITCZ, driving climate and weather of the tropical western Pacific region. Their knowledge is highly likely to be predominantly rooted in local environmental changes and conditions.