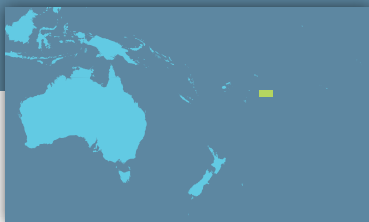


Pacific Climate Change Science Program



**Ko e matagi ha Niue he
magaaho nai mo e anoiha**



- > Niue Department of Meteorology and Climate Change
- > Australian Bureau of Meteorology
- > Commonwealth Scientific and Industrial Research Organisation (CSIRO)



Australian Government

Ko e matagi ha Niue he magaaho nai

Ko e tūaga vevela ha Niue ma e tau taha, ko e tau kavi 24 tikulī (°C). Nākai hiki lahi e vevela mai he taha magahala ke he taha magahala (4 tikulī he kehekehe he tau mahina mafana ke he tau mahina hahau) ka kua muihua nī ke he hikiaga he mao he mafana ki luga he puke tahi. Ua e magahala he motu kua mahani lahi ki ai – ko e magahala mafana mo e uha mai he tau atu mahina Novema ki a Apelila mo e magahala hahau mo e magomago mai he tau atu mahina Me ki a Oketopa.

Kua laua e magahala uha ha Niue ha ko e holoaga he putuputuaga aolū lahi he Pasifika Toga. Lagā mai e putuputuaga uha nai hā ko e ea kua hake ai ki luga he tau vala tahi mafana ne maluia ai e tau matagi, ti moua mai ai e tau pakūlagi. Kua maluia ai e Moana Pasifika Toga mai he tau Atumotu Solomona ke he Atu Kuki Aelani (Fakakiteaga 2). Kua laua lahi e matagi ha Niue he tau pūhala

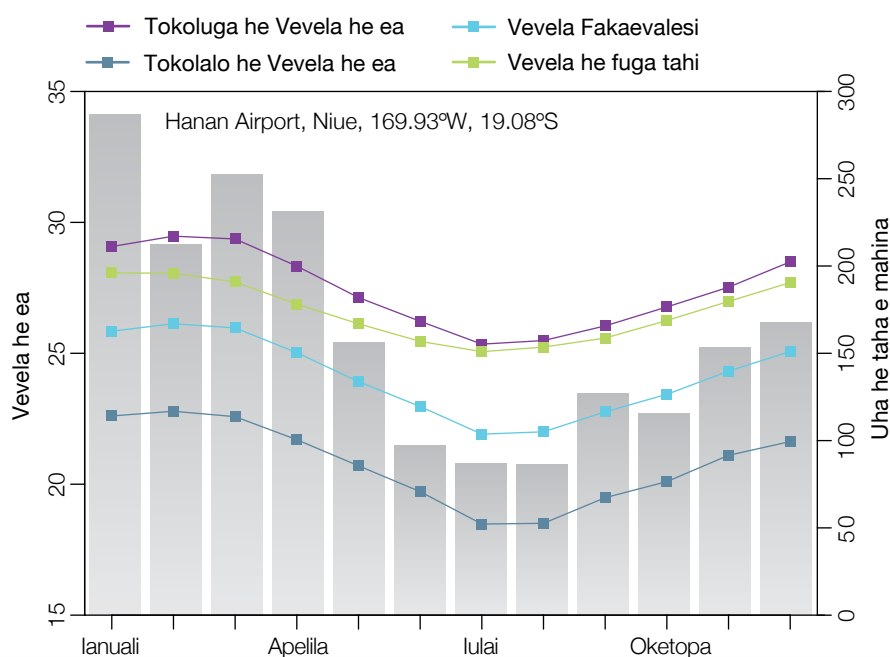
mao tokoluga ne tu ke he faahi toga he motu mo e tau matagi aga mau ne fā mahani ke agi mai i toga-uta.

Maeke e matagi ha Niue ke hiki lahi mai he taha tau ke he taha tau hā ko e Southern Oscillation he El Niño. Ko e agaaga mahani mau a nai he matagi ke he Moana Pasifika ti laua ai e matagi he lalolagi katoa. Ua lā e veveheaga

he Southern Oscillation he El Niño: ko e El Niño mo e La Niña. Hā i ai foki e veveheaga tūtaha po ke lotouho. Fā mahani e El Niño ke laua a Niue ke he tau magahala magomago lahi a Niue mai he tūaga mahani mau, mua atu ke he magahala uha. Fā mahani ke hahau e tau magahala magomago. Fā mahani e La Niña ke lahi e uha mai he tūaga mahani mau. Ko e tau magaaho magomago he tau tau El Niño kua fā mahani ke moua mai ka hiki atu e putuputuaga aolū lahi he Pasifika Toga ki tokelau ki uta. He tau tau La Niña kua hiki ki toga ki uta e putuputuaga aolū lahi he Pasifika Toga ti fā mahani ke lahi e uha ka moua mai.

Ko e lahi he uha he tau tau uha kua teitei ke fakalahi fā he tau tau magomago.

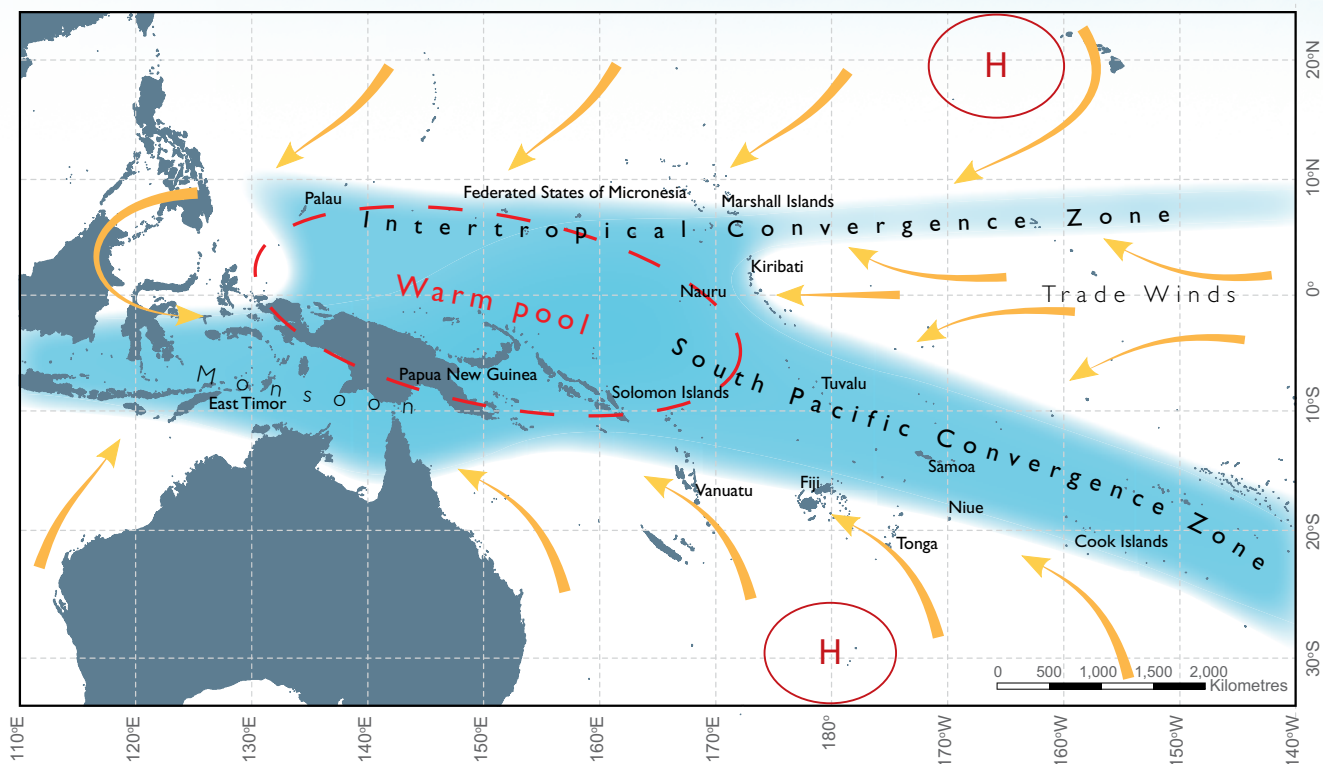
Ne fā mahani ke tō laā ai a Niue tuga he tau 1983, 1991 mo e 1998.



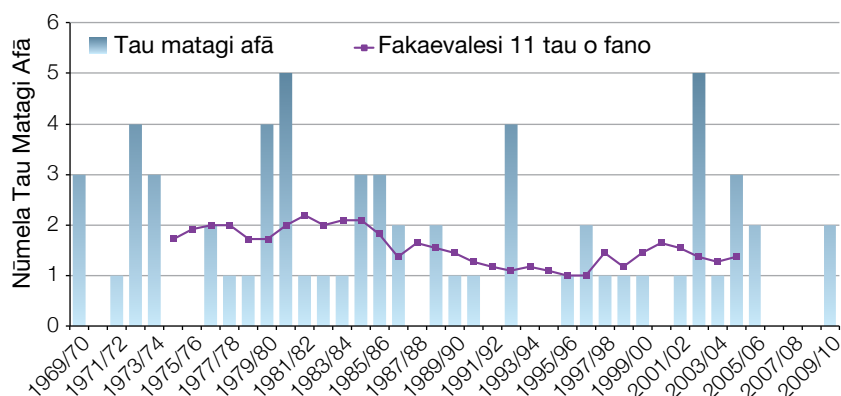
Fakakiteaga 1: Magahala uha mo e vevela he ea he Malē Vakalele Hanana.



Kaukau tahi i Limu.



Fakakiteaga 2: Ko e tūaga fakaealesi he tau hagahaga matapatu matagi i a Novema ki a Apelila. Kua fakaaoga e lanu moana he tau matatao ke fakakite aki e tau putuputuaga uha, he tau convergence zones, ka e fakaaoga e fakatino fufua moa ke fakakite aki e Putuputuaga Tahī Mafana he Pasifika Lalo mo e fakaaoga e H ke fakakite aki e tūaga mahani mau he tau puhala ofano he mao tokoluga.



Fakakiteaga 3: Nūmela matagi afā ne tata mai ke he 400 km ha Alofi. Fakaealesi hogofulumataha-tau he lanu fuahoi.

Tau matagi afā

Lauia a Niue he tau matagi afā he tau atu mahina Novema ki a Apelila. Ke he 41 e tau tau mai he 1969 mo e 2010, 63 e matagi afā ne tata mai ke he 400 kilomita ha Alofi, ka fakaealesi ko e taha ke he ua e matagi afā he taha e magahala. Ko e tau magaaho ia, loga lahi e tau matagi afā he tau tau El Niño. Lauia lahi e pūhala muhu koloa ha Niue he tau matagi afā mo e tau uhalolo ne fakatauō mo e Afā ko Heta ne tō ki Niue he aho 5 Ianuali 2004. Ko e fakakatoatoaaga he tau mena ne malona, ko e molea e NZ\$37.7 miliona, ko e fakalahi tolu e GDP ha Niue he tau.

Ko e matagi hikihi ha Niue

Kua malikiti ki luga e vevela he ea

Kua malikiti hake e tokoluga mo e tokolalo he vevela he ea he tau he malē Vakalele Hanana tali mai he tau 1950 (Fakakiteaga 4). Ko e 0.15 tikulī he hogofulu e tau e malikiti he vevela. Muiua e tau malikiti nai ke he tau vevela he lalolagi.

Nā kai fai hiki e lahi he uha he taha e tau.

Nā kai kitia mahino e ha fakahihigaaga ke he uha he magahala po ke tau (Fakakiteaga 5). Mailoga ai e lahi he fekehekeheaki he uha mai he taha tau ke he taha tau.

Kua malikiti hake e tokoluga he tahi

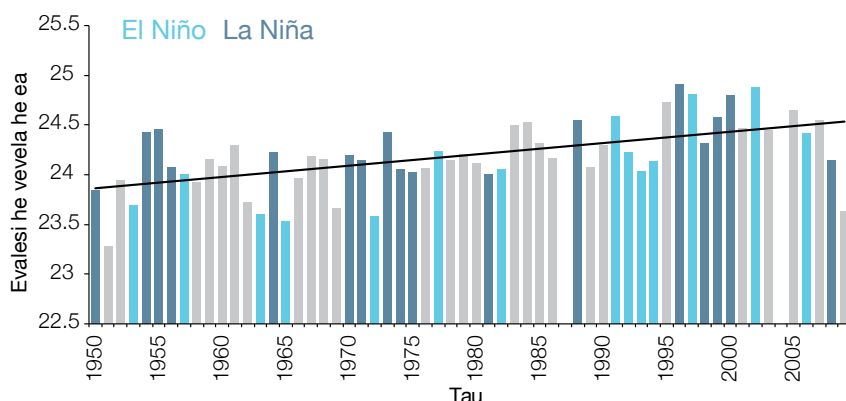
Ka mafanafana e puke tahi he moana ti puke lahi ai mo e malikiti hake ai e tokoluga he tahi. Kua lalafi ki luga e tataka he tau matapatu aisa ke he tokoluga nai he tahi.

Ko e tau koloa ne fakatūtū ai ke he tau setalate mo e ke fuafua aki e tahi ne kua fakaaoga ke fuafua aki e tokoluga he tahi. Kua fakakite ai he tau fakakiteaga fakasetalate e tokoluga fakahaga he tahi tata mai ki Niue ko e 5 milimita he taha e tau mai he tau 1993. Lahi e hikiaga nai ka fakatai atu ke he fakaealesi he lalolagi ko e 2.8 – 3.6 milimita he taha e tau. Liga fai talahauaga foki nī

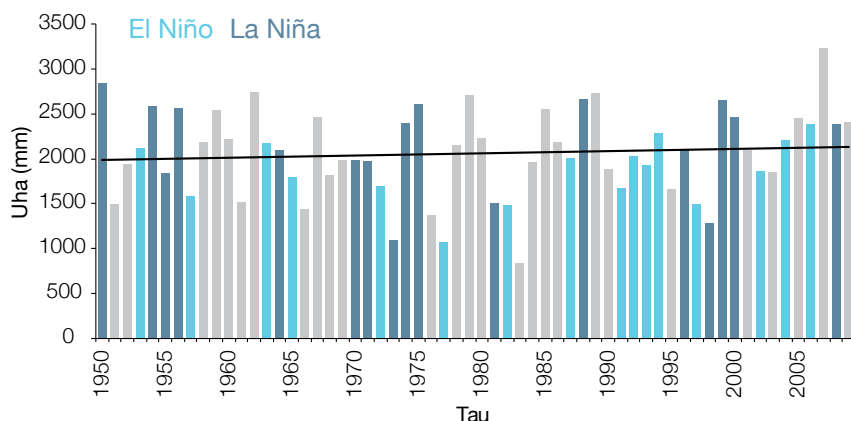
e tokoluga nai ke he hake mo e hifo pauaki mai he taha tau ke he taha tau ne puna mai hā ko e tau mena tuga e El Niño-Southern Oscillation. Kitia ai e kehekeheaga he tokoluga he tahi he Fakakiteaga 7 ne fakakite ai foki e fakamauaga he tahi he matakavi tata ki Niue kua fuafua ai e tahi (Rarotonga he Atu Kuki Aelani) mo e fakamauaga fakasetalate tali mai he tau 1993.

Kua malikiti fakahaga e konakona he tahi

Fakatai ko e taha e kuata carbon dioxide mai he tau gahua he tau tagata he tau tau takitaha kua fakatomo ai ke he tahi. Ko e magaaho ke lalafi e carbon dioxide nai mo e tahi ti konakona lahi fakahaga ai e tahi. Ko e mena nai kua laua ai e tupuaga he tau feo mo e falu a moko ikiiki kua momoui hā ko e tau miniloloa pehē nai. Kua aoga lahi e tau vahega moko pehē nai ma e maopoopaga he tau nonofoaga manu ke he tau uluulu mafana pehē nai. Kua kitia ai ke he tau fakamauaga numela kua malikiti hake fakaneene e konakona he tau tahi ha Niue tali mai he tau tau ke hogofulumavalu aki.



Fakakiteaga 4: Fakaealesi he vevela he tau he Malē Vakalele Hanana. Ko e tau fakamailoga lanu māmā ke fakakite aki e El Niño, ko e tau fakamailoga lanu uhi ke fakakite aki e tau tau La Niña mo e tau fakamailoga efuefu ke fakakite aki e tau tau ne toe noa.



Fakakiteaga 5: Ko e uha he Malē Vakalele Hanana he tau. Tau fakamailoga lanu moana māmā ke fakakite aki e tau tau El Niño, ko e tau fakamailoga lanu uhi ke fakakite aki e tau tau La Niña mo e tau fakamailoga efuefu ke fakakite aki e tau tau ne toe noa.



Tofola he tahi i Tamakautoga.

Tūaga he matagi a Niue anoiha

Teitei e tau vahega koloa momoui oti ha Niue ke fakalauia he matagi. Kua aoga lahi ke maama e matagi ha Niue anoiha ke maeke he tau tagata mo e fakatufono ke taute e tau fakatokatokaaga ke lata ma e tau hikihihiaga.

Tālaga fēfē he tau saienetisi e tau ononoaga ke he matagi?

Ko e tau fakafifitakiaga matagi he lalolagi ko e tau koloa mahuiga haia ke maama aki e tūaga he matagi anoiha. Ko e tau fakakiteaga fakamatanumela e tau fakafifitakiaga matagi ke lata ma e pūhala matagi kua lata ke fakaaoga e tau vahega komopiuta malolō lahi. Muiua e tau mena nai ke he tau fakatufono fisiki fakalataha mo e tau talahauaga ke he pūlagi, tahi, kekekele mo e aisa.

Loga e tau fakafifitakiaga matagi kehekehe he lalolagi ti igatia a lautolu mo e fakakite fakakehekehe e matagi. Kua fitā e tau saienetisi mai he Pacific Climate Change Science Program (PCCSP) he liu kitekite ke he 24 e tau fakafifitakiaga mai he lalolagi mo e kitia ai ko e 18 kua fakakite fakamitaki e matagi he tau atumotu Pasifika Lalo. Kua fakaaoga e tau fakafifitakiaga nai ne 18 ke tālaga aki e tau ononoaga matagi ke lata mo Niue.

To fakapiki ua e tau kakano fakatufugatia mo e tau kakano fakatagata ke tauteute aki e tau matagi anoiha. Hā kua nākai iloa e tautolu e tau mena ka

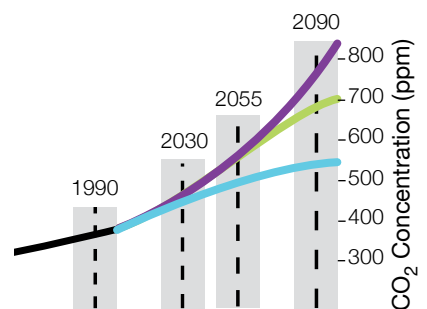
tutupu anoiha, kua lata i a tautolu ke mailoga e tau vahega mena kehekehe he tau fakafifitakiaga matagi.

Ne talaga ai he matakau Gahua he tau saienetisi ko e Intergovernmental Panel on Climate Change (IPCC) e tau vahega kitekiteaga muiua ke he tau fakataitaiaga ke he tau hikihihiaga puke tagata anoiha, tau atihakeaga uku koloa mo e holoaga ki mua he tau tekenoloti. Tuga a nai, ko e tau fakakiteaga mao kona fakafano atu ke ke pūlagi, kua fakataitai ai ke tokoluganea e puke tagata he lalolagi ke he lotoga he teau tau mo e tō hifo fakahaga ai mai he magaaho ia, ka e holo ki mua e tupu he tau pūhala muhu koloa mo e mafiti foki e tāmataaga he tau tekenoloti foou mo e mitaki.

Kua fakaaoga ai e mao kese kona mo e tau ahua pamu he tau fakataitaiaga matagi ke moua aki e tau ononoaga ke moua mai e tau kitiaaga ke he anoiha.

Fakavē e tau ononoaga matagi ha Niue ke he tolu e IPCC ahua pamu: Tokolalo (B1), Vahāloto (A1B) mo e Tokoluga

(A2), ke he tau 2030, 2055 mo e 2090 (Fakakiteaga 6). Hā kua kehekehe e tau fakahikuaga he tau fakataitaiaga takitaha, kua fakakite ai e tau ononoaga ke he loga he tau fuafuaaga.



Fakakiteaga 6: Ko e lahi he Carbon dioxide (CO₂) ke he vala milliona (parts per million) ke lata ma e 3 e IPCC tau fakataitaiaga fakafano ke he pūlagi: Tokolalo (B1 – lanu), Vahāloto (A1B – lanu laufuti) mo e Tokoluga (A2 – lanu fuahoi). Kua vetevete he PCCSP e tau fakaotiaga ke he fakafifitakiaga matagi ke he tau tau 1990, 2030, 2055 mo e 2090 (valivali).



Ko e fale ne malona he Afā Heta, Ianuali 2004.



Feutu mo e tofolata tata ki Alofi.

Tūaga he matagi ha Niue anoiha

Hanai e fakamaopoopoaga ke he tau ononoaga he matagi ke lata mo Niue. Ke moua foki falu a talahauaga laulahi, kikite ke he Volume 2 he *Climate Change in the Pacific: Scientific Assessment and New Research*, mo e koloa ononoaga matagi ke he tau komopiuta (web-based – *Pacific Climate Futures*) moua ke he initanete (www.pacificclimatefutures.net).

To fakatumanu ke malikiti ki luga e tau vevela he ea

Ko e tau ononoaga ma e tau ahua kona kua mailoga ai ke holo hake ki luga e vevela fakaevalesi he matagi mo e fuga tahi a Niue anoiha (Fakatātā 1). Ka hoko atu ke he tau 2030, ki lalo hifo he talahauaga tokoluga e tau ahua kona, kua fakataitai ai ko e vevela nai ke he vahālotō he 0.3 – 1.1 tikulī.

To loga e tau aho vela lahi

To moua mai foki he tokoluga he tau vevela nai e loga he tau aho vela lahi mo e tau po mafana mo e to hifo he tau matagi hahau.

Fakatātā 1: Tau ononoaga fakaevalesi he vevela ke lata mo Niue ke he tolu e fakataitaiaga fakafano atu ke he pūlagi ke he tolu e magaaho. Ko e 90% he fuafuaaga he tau vahega fakatātā mo e tau hikihihiaga fakatatai atu ke he magahala 1980-1999.

	2030 (°C)	2055 (°C)	2090 (°C)
Fakataitaiaga tokolalo mao kese kona fakafano atu ke he pūlagi	0.2–1.0	0.5–1.5	0.7–1.9
Fakataitaiaga vahālotō mao kese kona fakafano atu ke he pūlagi	0.2–1.2	0.7–1.9	1.2–2.8
Fakataitaiaga tokoluga mao kese kona fakafano atu ke he pūlagi	0.3–1.1	0.9–1.7	1.8–3.2



Feutu mo e tofola i Tamakautoga.

Hikihihiaga he mahani he uha

Nakai fai iloaaga tonu ke he tau ononoaga ki mua ke lata ma e uha ha Niue ha kua nakai holo tatai e tau kitiaaga fakatata. Ka e pete ia, mai he tau kitiaaga ia, puhala mai e talahauaga to tō hifo e uha ke he magahala laā ka e lahi e uha he magahala uha ke he teau tau 21 aki. Fetataiaki e tokoluga nai he uha he magahala uha mo e tau kitiaaga he putuputuaga aolū lahi he Pasifika Toga. Mailoga foki ke he tau kitiaaga to tokolalo e tau magahala tō laā he teau tau nai.

Loga atu e tau aho to lahi e uha

Fakakite mai he tau fuafuaaga to loga e tau aho ke tō lahi ai e uha.

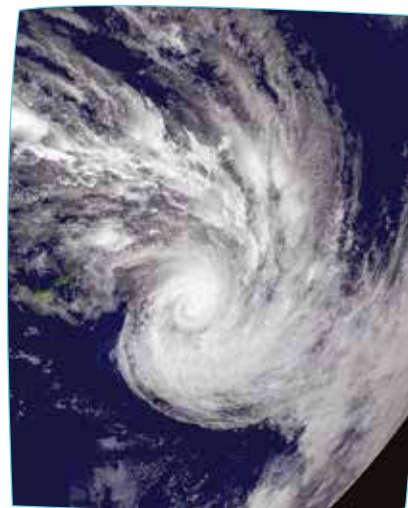


Malona he Afā ko Heta, Ianuali 2004.

Nāakai tumau ka e to malolō atu e tau matagi afā

Ka fakatatai atu ke he lalolagi, kua mailoga ai ke he tau fuafuaaga to tō hifo e loga he tau matagi afā he fakahikuaga he teau tau 21aki. Ka e liga to fai malikiti hake ki luga e malolō he tau matagi afā ke he 2% mo e 11% mo e to malikiti hake foki e lahi he uha ke he 20% ki loto he 100 kilomita he matakavi matagi afā.

Ke he tau fakafaahi motu ha Niue, kua fakakite he tau fuafuaaga to tō hifo e lahi he tau matagi afā ke he matahiku he teau tau mo e to malikiti hake e lahi he tau matagi malolō.



Afā Heta Fufuta 5 ne lauia ai a Niue Ianuali 2004 mo e malona kelea e motu. Ko e tau ata setalate ne taute ai he Australian Bureau of Meteorology mai he Geostationary Meteorological satellite GOES-9 ne fakagahua he taha ofisa Gahua lahi he lalolagi ne fakahigoa ai ko e National Oceanic and Atmospheric Administration (NOAA) ma e Japan Meteorological Agency.

To fakatumau e tahi ke tokoluga

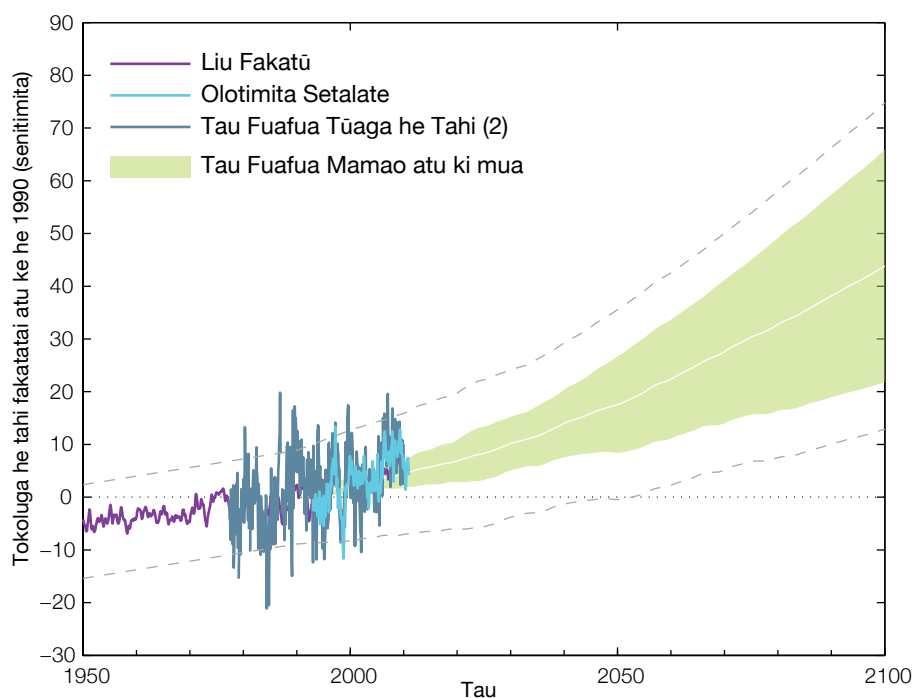
To tumau e tahi ha Niue ke tokoluga fakahaga (Fakatātā 2 and Fakakiteaga 7). Ka hoko atu ke he 2030, ki lalo hifo he Fakataitaiaga Tokoluga fakafano atu ke he pūlagi, kua fuafua ai e tokoluga nai he tahi ke 4 – 17 senitimita. Ko e tokoluga he tahi fakalataha mo e tau hikihihiaga he-taha-tau-ke-he-tau to malikiti hake e matagi malolō mo e tau tafia he tau kaukau tahi. Hā kua loga lahi agaia e tau mena ke iloa, mua atu ko e laua fēfē e tokoluga he tahi hā ko e tau aisa lalahi he Enetakatika mo Kulinilene, kua hataki mai e tau pulotu saienetisi to hake lahi e tokoluga he tahi nākai tuga he kua fakataitai ki ai.

To tumau ke konakona fakahaga e tahi

Ki lalo hifo he tau fakataitaiaga oti ne tolu (Tokolalo, Vahāloto mo e Tokoluga) to tumau ke malikiti hake e konakona he tau vala tahi ha Niue he teau tau 21 mo e mahomo atu e hikiaga ki lalo hifo he fakataitaiaga tokoluga fakafano atu ke he pūlagi. To fatualoga e tau lekua he malikiti hake e konakona he tahi ke he tau koloa momoui he tau uluulu fakalataha mo e falu a lekua pihia mo e kona he tau feo, tau malona hā ko e tau matagi malolō mo e tau matagahua takafaga ika.

Fakatātā 2: Tau fuafuaaga he tokoluga he tahi ha Niue ke he tau fakataitaiaga fakafano ke he pūlagi ne tolu ke he tolu e tau magaaho. Ko e 90% he fuafuaaga he tau vahega fakatātā mo e tau hikihihiaga fakatatai atu ke he magahala 1980-1999.

	2030 (°C)	2055 (°C)	2090 (°C)
Fakataitaiaga tokolalo mao kese kona fakafano atu ke he pūlagi	5–16	10–27	17–46
Fakataitaiaga vahāloto mao kese kona fakafano atu ke he pūlagi	5–15	10–30	19–57
Fakataitaiaga tokoluga mao kese kona fakafano atu ke he pūlagi	4–17	10–30	20–60



Fakakiteaga 7: Kua kitia mo e fuafua e hikiaga he tūaga tokoluga he tahi tata ki Niue. Kua fakakite aki e lanu moana uhi e tau fakamauaga tūaga tokoluga he tahi ne kua kitia ki ai (tau kitiaaga tūaga he tahi) mo e lanu māmā (ko e fakamauaga fakasetalate tali he 1993). Ko e fakamauaga tūaga he tahi mai i Rarotonga he Atu Kuki Aelani, ko e fuafuaaga tahi kua tata mai ki Niue. Tau fatifatiaga Liu Fakatū ma e tūaga he tahi tata ki Niue (tali he tau 1950) kua fakakite aki e lanu fuahoi. Ko e tau ononoaga ke lata ma e A1B (Vahāloto) fakataitaiaga fakafano atu ke he pūlagi (90% he tau fakataitaiaga kehekehe) kua fakakite aki e lanu lafuti ata mai he 1990 ke he 2100. Ko e laini fakailaila ko e fatifatiaga 90% he kehekehe he tūaga he tahi he taha tau ke he taha tau.

Tau hikihihiaga ke he matagi ha Niue

- > Kua mao vela e motu mo e to tumau ke mafana mo e amanaki ke loga atu e tau aho vela anoiha.
- > Nākai fai kitiaaga fakamahino ke he tau matanumela he tali mai he 1950. Fakataitai ai to fai hikihiaga ke he mahani he uha he teau tau nai mo e loga atu e tau aho uha lahi ka e gāhoa e tau magaaho tō laā.
- > Ke he fakahikuaga he teau tau nai, kua fakakite mai he tau fakataitai to gāhoa e tau matagi afā ka e to hiki atu ke mahomo atu e tau matagi.
- > Kua tokoluga e tūaga he tahi tata mai ki Niue mo e tumau ke malikiti hake he teau tau nai.
- > Kua malikiti hake e konakona he tau tahi ha Niue mo e to tumau ke pihia mo e fakalavelave atu ke he tau koloa momoui oti he uluulu.

Ko e tau matakupu ki loto he tohi nai kua pūhala mai hā ko e tau kau fakalataha he Faahi Fuafua Matagi ha Niue mo e Pacific Climate Change Science Program – ko e taha vala he International Climate Change Adaptation Initiative he Fakatufono Ausetalia. Ko e tau talahauaga mo e kumikumiaga ne taute he Pacific Climate Change Science Program mai he tau kumikumiaga he 2007 IPCC Fourth Assessment Report. Ke moua foki falu a talahauaga ke he matagi ha Niue ko e Pasifika kikite ke he: *Climate Change in the Pacific: Scientific Assessment and New Research. Volume 1: Regional Overview. Volume 2: Country Reports.*

www.pacificclimatechangescience.org

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