

## Supplementary material for:

Fauchereau N., Ramsay D., Noll B.E. and Lorrey A.M.: “Open data and open source software for the development and validation of multi-model monthly-to-seasonal probabilistic forecasts for the Pacific Islands” (submitted to *Climate Services*). Hereafter FRNL2022.

**A1**, Supplementary Table 1: Accuracy (or “hit rate”) expressed in percentage for the C3S MME seasonal tercile probabilistic forecasts derived for each of the 73 Island Climate Update (ICU) administrative areas (see **Figure 2** in FRNL2022). The column labels indicate the leadtime (in months) so that 3 refers to 1-season ahead forecast (*e.g.* a forecast initialized on the 1<sup>st</sup> of January for the February-March period). The validation is based on the 1993-2016 hindcast period, with the MME including 7 GCMs (ECMWF, UKMO, Météo-France, CMCC, DWD, NCEP and JMA, see **Table 1** in FRNL2022). The table is sorted by the 1-season ahead accuracy. Accuracy exceeding 40% is shaded in green, note that for tercile probabilistic forecasts, a climatological forecast would have an accuracy of 33%.

Country	District	3	4	5
Kiribati	Gilberts-South	78%	74%	69%
Kiribati	Gilberts-North	75%	72%	72%
Nauru	Nauru	75%	69%	63%
Kiribati	Ocean Island	74%	68%	64%
Kiribati	Northern Line Islands	71%	69%	70%
Kiribati	Phoenix Islands	66%	63%	60%
Tuvalu	Northern Tuvalu	66%	63%	63%
French Polynesia	Marquesas Islands	61%	55%	56%
Kiribati	Southern Line Islands	59%	57%	55%
Vanuatu	Torba	59%	56%	53%
Tokelau	Tokelau	59%	55%	52%
Cook Islands	Northern Cook Islands	58%	56%	56%
Tuvalu	Southern Tuvalu	58%	55%	55%
Palau	Babeldaob region	57%	57%	51%
Palau	South-west Islands	57%	50%	43%
FSM	Kapingamarangi	57%	54%	49%
Vanuatu	Penama	55%	55%	57%
Papua New Guinea	Southern Region	55%	53%	50%
Fiji	Western	54%	54%	53%
Vanuatu	Sanma	54%	57%	53%
FSM	Pohnpei	54%	54%	54%
New Caledonia	Loyalty Islands Province	54%	55%	54%
FSM	Yap	54%	55%	48%
Papua New Guinea	Highlands Region	53%	46%	47%
Tonga	Vavau	53%	53%	49%
Vanuatu	Tafea	53%	55%	53%
Marshall Islands	Southern Marshall Islands	53%	52%	47%

Fiji	Central	53%	51%	49%
Vanuatu	Shefa	53%	54%	52%
Vanuatu	Malampa	52%	51%	52%
New Caledonia	South Province	52%	49%	51%
Fiji	Eastern	52%	54%	51%
Papua New Guinea	Momase Region	52%	46%	45%
Solomon Islands	Choiseul Province	51%	48%	47%
New Caledonia	North Province	51%	47%	47%
American Samoa	Swains	51%	48%	48%
Tonga	Haapai	51%	52%	52%
FSM	Chuuk	51%	51%	49%
Solomon Islands	Temotu Province	50%	50%	42%
FSM	Kosrae	50%	49%	48%
Guam	Guam	50%	47%	51%
Northern Mariana Islands	Northern Islands	49%	41%	40%
Solomon Islands	Isabel Province	49%	50%	45%
Niue	Niue	49%	48%	49%
Papua New Guinea	Islands Region	49%	45%	46%
Northern Mariana Islands	Southern Islands	49%	45%	46%
Solomon Islands	Makira-Ulawa Province	48%	46%	44%
Tonga	Tongatapu-Eua	48%	48%	49%
Kiribati	Central Line Islands	48%	46%	43%
Fiji	Northern	47%	47%	45%
Solomon Islands	Rennell and Bellona	47%	45%	45%
American Samoa	Manua	47%	43%	42%
Marshall Islands	Northern Marshall Islands	46%	43%	40%
Marshall Islands	Central Marshall Islands	46%	42%	42%
Samoa	Savaii	46%	44%	43%
Solomon Islands	Central Province	46%	44%	42%
Fiji	Rotuma	46%	45%	46%
Tonga	Niuas	46%	46%	46%
American Samoa	Tutuila	46%	44%	42%
French Polynesia	Tuamotu Archipelago	45%	48%	43%
Solomon Islands	Malaita Province	45%	43%	41%
Samoa	Upola	45%	43%	40%
Pitcairn	Ducie	45%	41%	43%
Solomon Islands	Western Province	44%	44%	43%
Solomon Islands	Guadacanal Province	44%	41%	41%
Pitcairn	Pitcairn, Henderson & Oeno	44%	38%	40%
Wallis et Futuna	Futuna	43%	46%	47%
Wallis et Futuna	Wallis	41%	42%	42%
French Polynesia	Austral Islands	40%	37%	37%
French Polynesia	Gambier Islands	39%	31%	38%

Cook Islands	Southern Cook Islands	38%	41%	37%
French Polynesia	Windward-Society Islands	38%	35%	32%
French Polynesia	Leeward-Society Islands	33%	32%	33%

**A2**, Supplementary Table 2: Same as **A1** but for seasonal quartile probabilistic forecasts. Accuracy exceeding 30% is shaded in green. Note that for quartile probabilistic forecasts, a climatological forecast would have an accuracy of 25%.

Country	District	3	4	5
Kiribati	Gilberts-North	59%	56%	56%
Nauru	Nauru	58%	56%	52%
Kiribati	Gilberts-South	58%	56%	51%
Kiribati	Ocean Island	53%	51%	49%
Kiribati	Northern Line Islands	48%	47%	48%
FSM	Kapingamarangi	47%	44%	42%
Kiribati	Phoenix Islands	45%	41%	38%
Tuvalu	Northern Tuvalu	43%	42%	44%
Palau	South-west Islands	42%	37%	35%
Vanuatu	Torba	42%	41%	39%
Papua New Guinea	Momase Region	41%	35%	40%
Vanuatu	Penama	41%	38%	38%
Tuvalu	Southern Tuvalu	41%	42%	42%
FSM	Chuuk	41%	39%	40%
Palau	Babeldaob region	41%	39%	35%
Papua New Guinea	Southern Region	40%	39%	37%
Papua New Guinea	Islands Region	40%	41%	39%
Tokelau	Tokelau	40%	40%	38%
FSM	Pohnpei	39%	41%	40%
Vanuatu	Sanma	39%	38%	39%
Solomon Islands	Makira-Ulawa Province	39%	37%	33%
French Polynesia	Marquesas Islands	39%	38%	36%
Solomon Islands	Rennell and Bellona	39%	42%	38%
Northern Mariana Islands	Southern Islands	39%	35%	33%
FSM	Yap	39%	38%	36%
Tonga	Vavau	38%	37%	35%
Papua New Guinea	Highlands Region	38%	35%	33%
Cook Islands	Northern Cook Islands	38%	38%	35%
Guam	Guam	37%	34%	33%
Marshall Islands	Southern Marshall Islands	37%	34%	35%
FSM	Kosrae	37%	38%	38%
Fiji	Eastern	37%	35%	35%
Fiji	Central	37%	32%	35%
Fiji	Western	37%	36%	40%

Vanuatu	Shefa	36%	35%	36%
Kiribati	Southern Line Islands	36%	36%	37%
Solomon Islands	Choiseul Province	36%	37%	35%
Tonga	Haapai	36%	37%	37%
Vanuatu	Malampa	36%	36%	38%
Solomon Islands	Isabel Province	36%	38%	36%
Solomon Islands	Central Province	36%	35%	31%
Vanuatu	Tafea	36%	35%	35%
Tonga	Tongatapu-Eua	35%	39%	40%
American Samoa	Tutuila	35%	30%	33%
New Caledonia	Loyalty Islands Province	35%	35%	36%
Fiji	Rotuma	35%	32%	34%
New Caledonia	South Province	35%	34%	36%
Niue	Niue	35%	33%	34%
New Caledonia	North Province	35%	34%	38%
Solomon Islands	Guadacanal Province	34%	33%	32%
American Samoa	Swains	34%	35%	34%
American Samoa	Manua	34%	34%	30%
Solomon Islands	Western Province	33%	35%	32%
Fiji	Northern	33%	32%	32%
Kiribati	Central Line Islands	33%	30%	32%
Solomon Islands	Temotu Province	33%	37%	35%
Samoa	Savaii	33%	28%	31%
Wallis et Futuna	Futuna	32%	30%	29%
Marshall Islands	Central Marshall Islands	32%	29%	29%
Pitcairn	Pitcairn, Henderson&Oeno	32%	31%	30%
Wallis et Futuna	Wallis	32%	29%	34%
Samoa	Upola	31%	29%	29%
Solomon Islands	Malaita Province	31%	30%	30%
Northern Mariana Islands	Northern Islands	31%	32%	31%
Marshall Islands	Northern Marshall Islands	30%	32%	30%
French Polynesia	Gambier Islands	30%	32%	30%
Tonga	Niuas	30%	32%	29%
French Polynesia	Tuamotu Archipelago	30%	29%	29%
Pitcairn	Ducie	29%	30%	31%
French Polynesia	Austral Islands	29%	25%	25%
French Polynesia	Windward-Society Islands	27%	25%	26%
French Polynesia	Leeward-Society Islands	27%	26%	26%
Cook Islands	Southern Cook Islands	24%	30%	31%