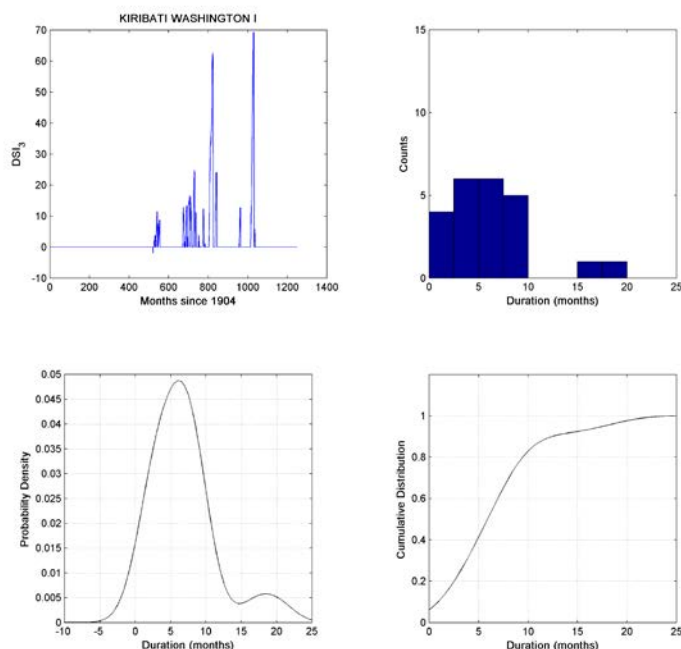
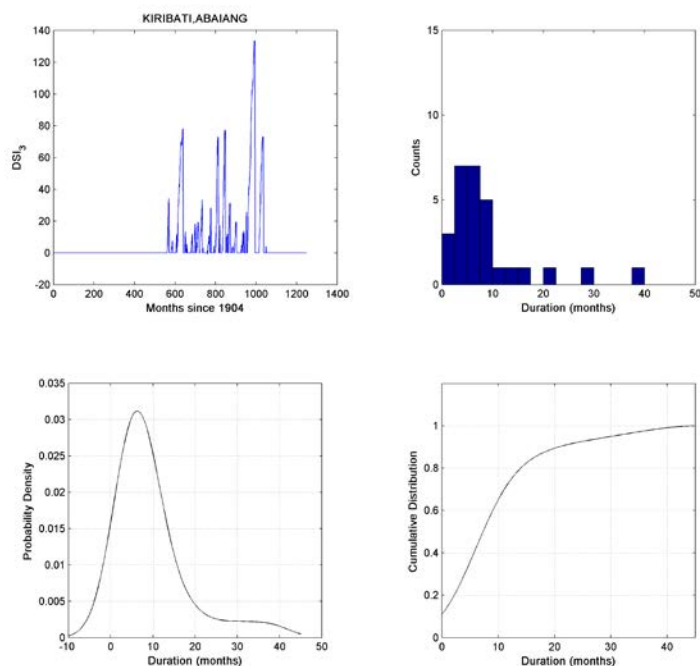


12. Appendix 6: Diagrams of Drought Severity Index, Drought Duration histograms, Empirical Probability Density Function of Drought Duration, and Cumulative Distribution of Drought Duration

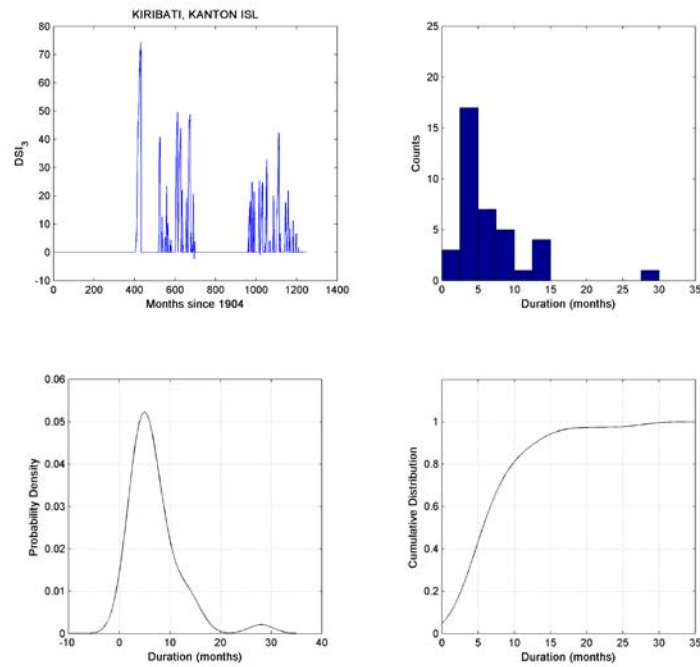
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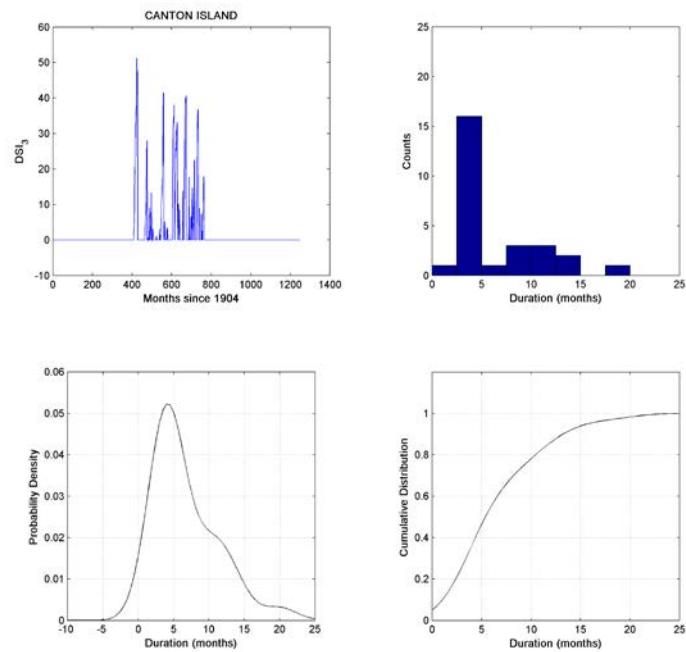
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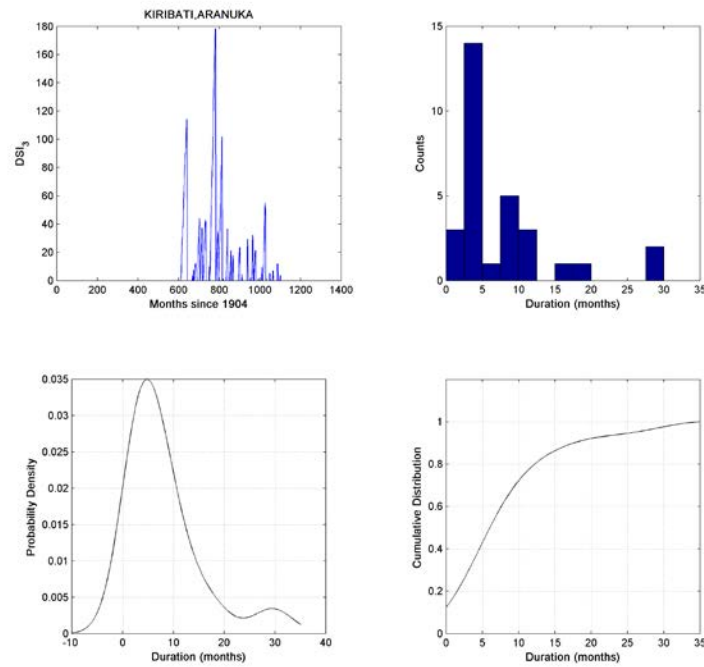
Kanton Island



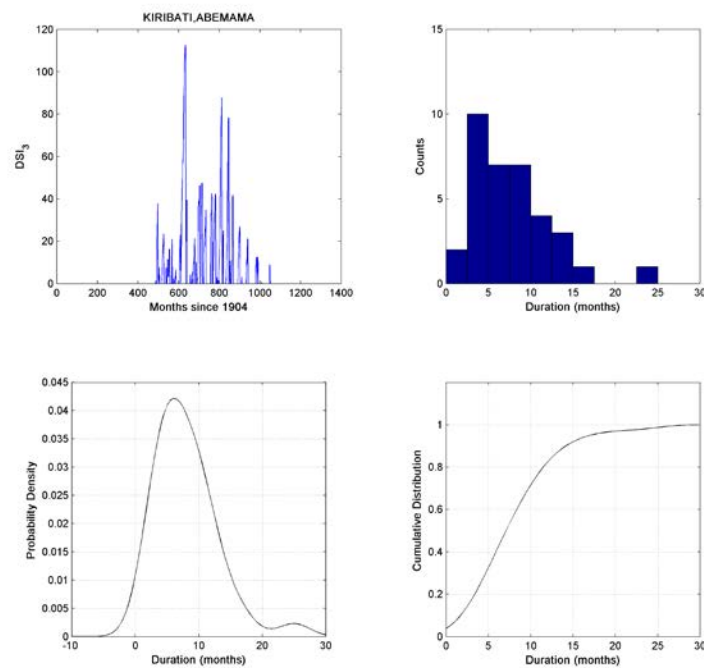
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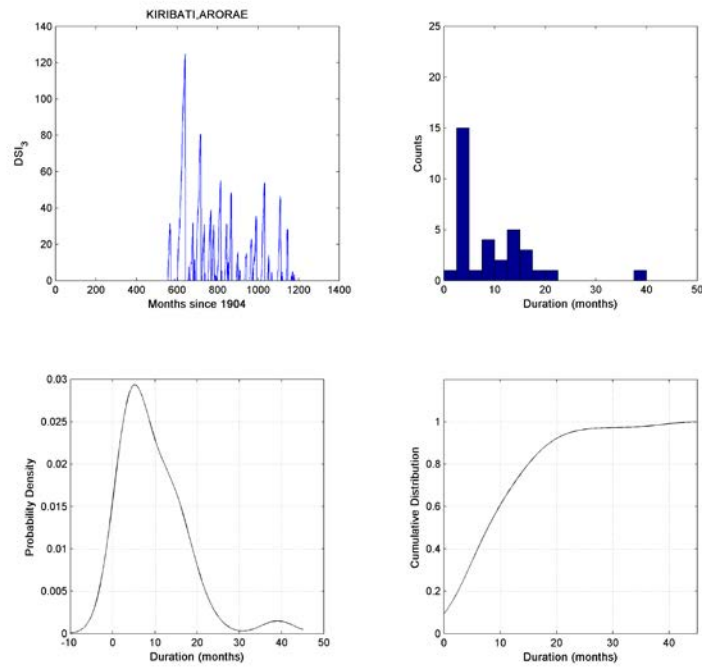
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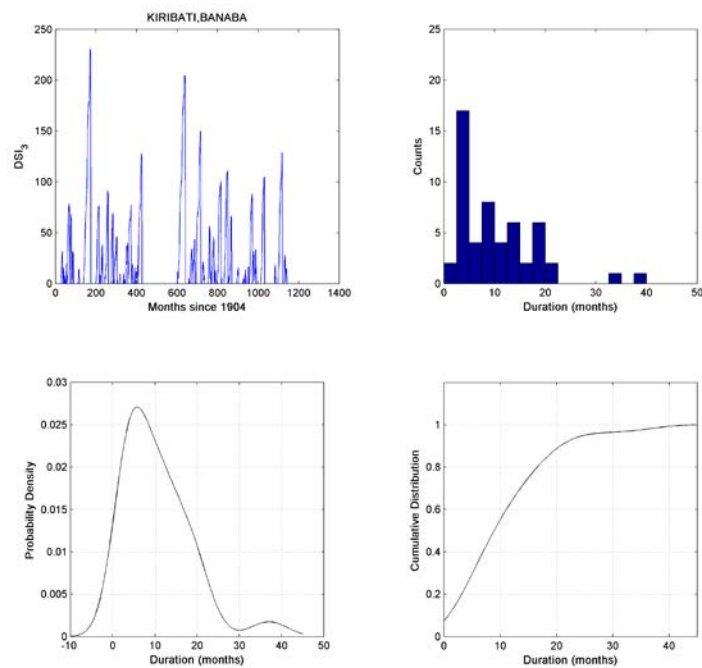
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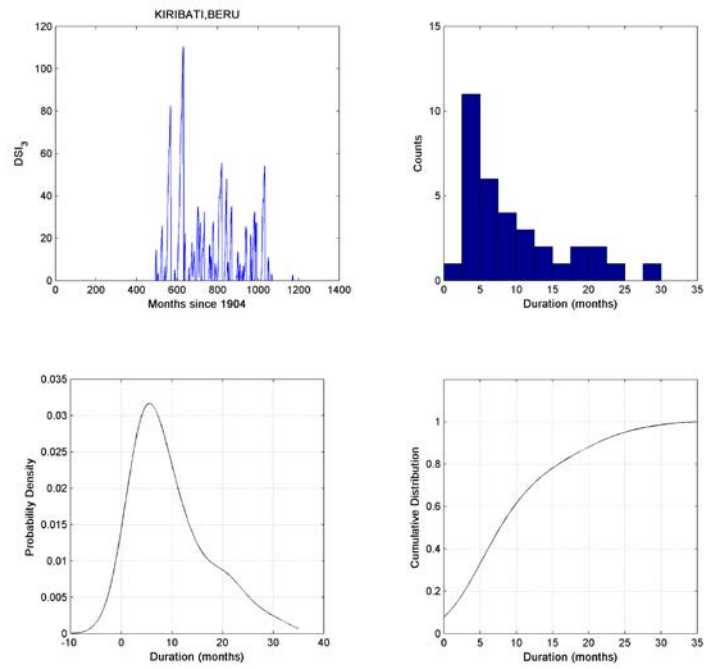
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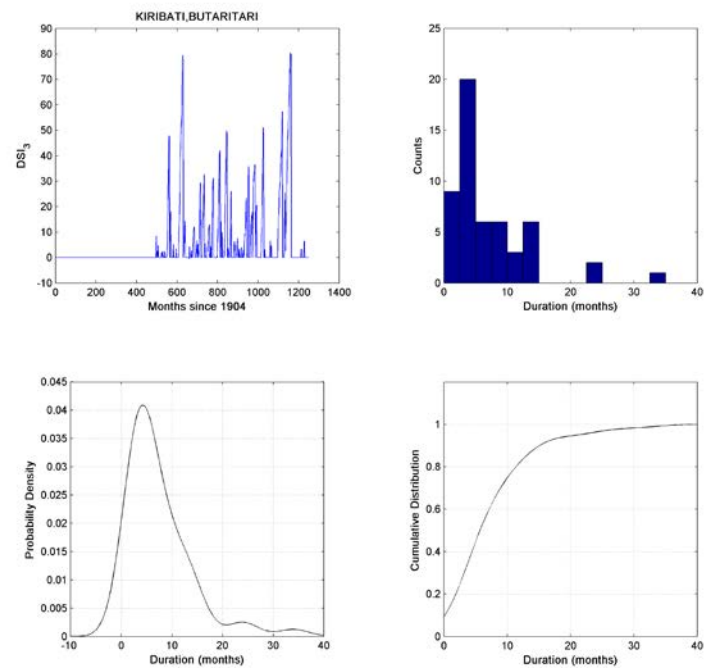
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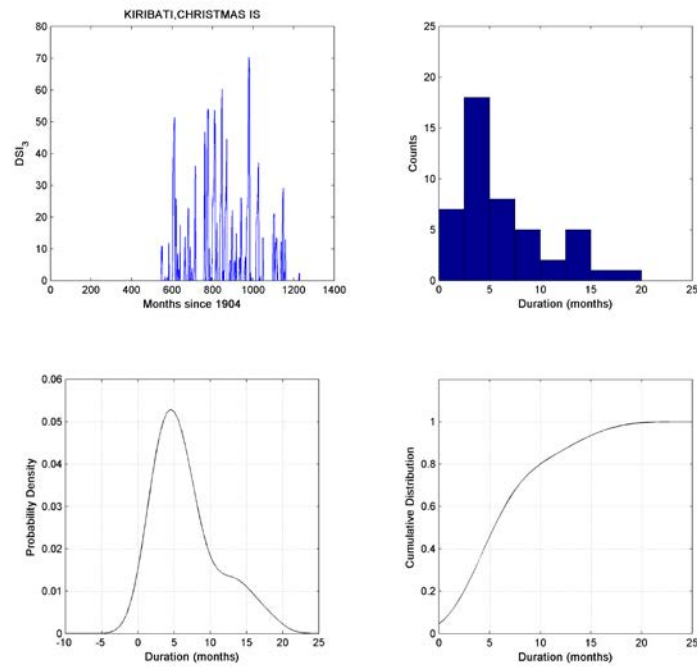
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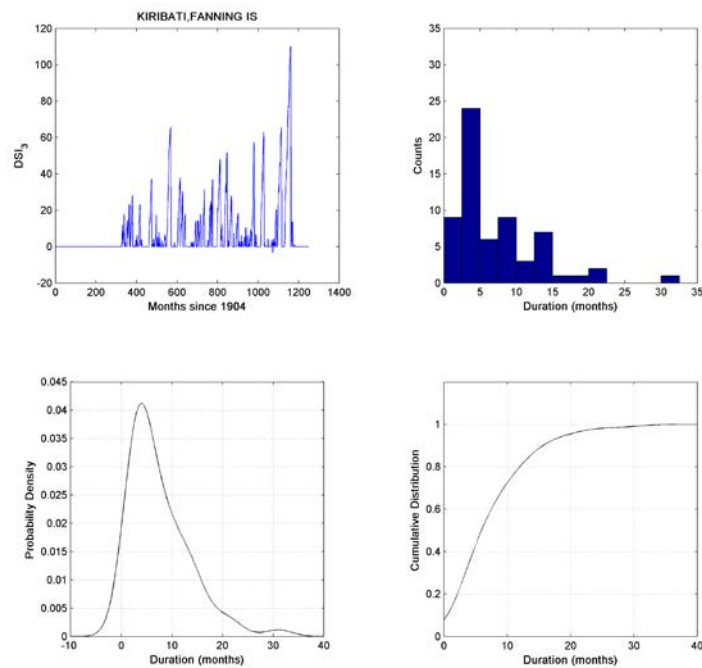
Butaritari



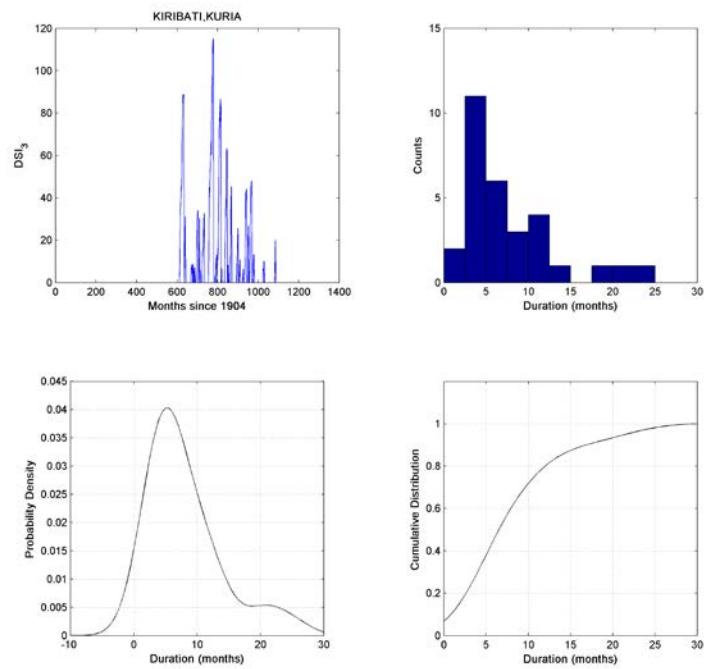
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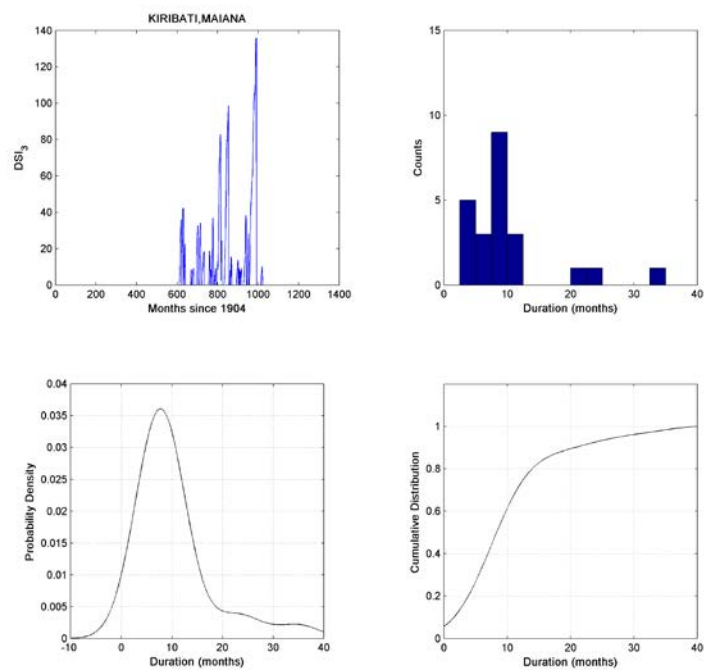
Fanning Island



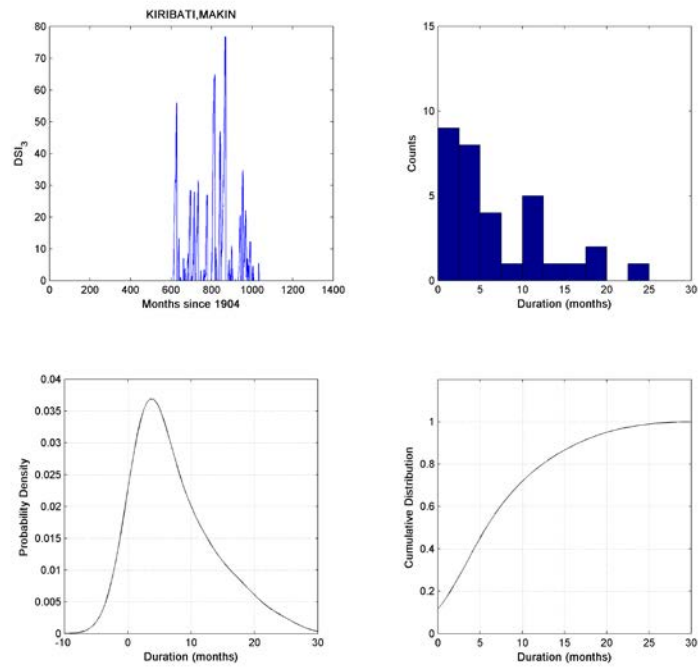
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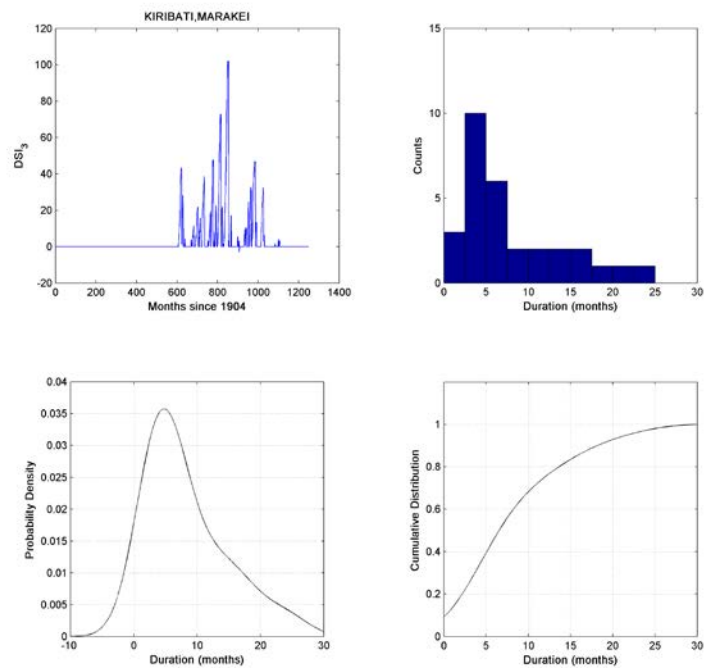
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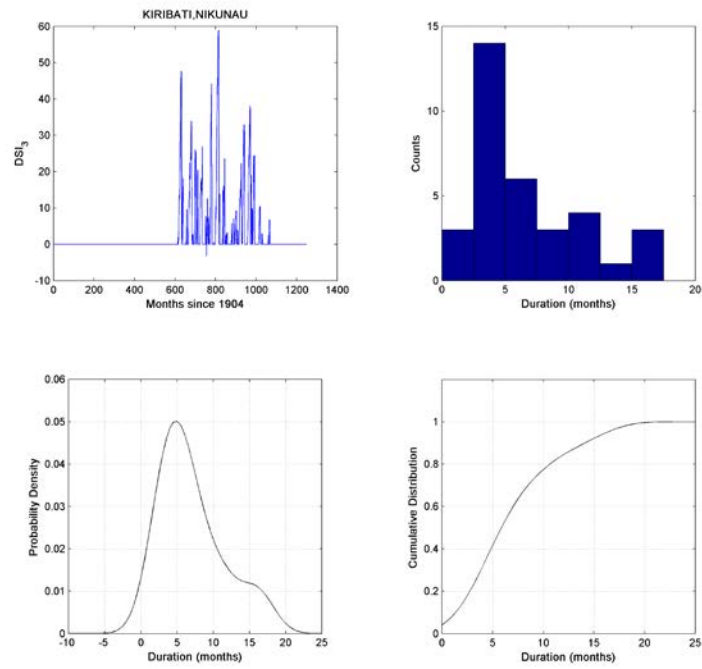
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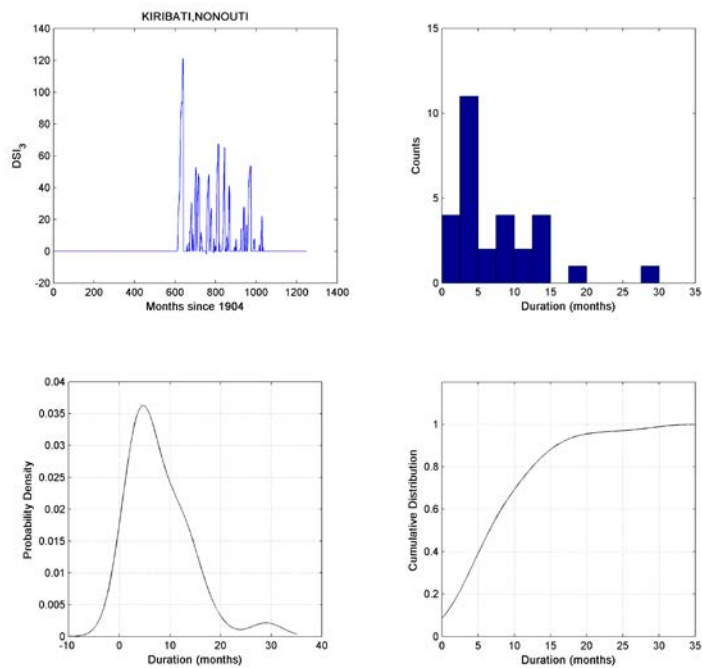
Marakei



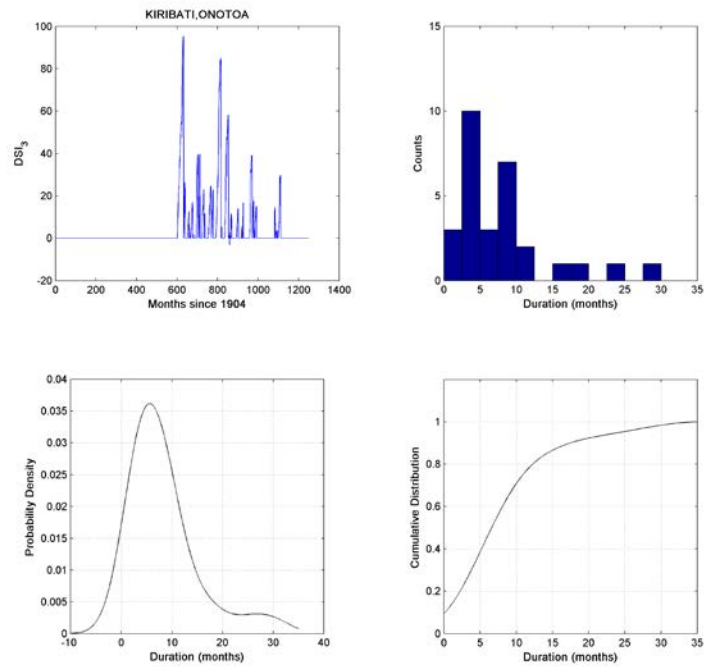
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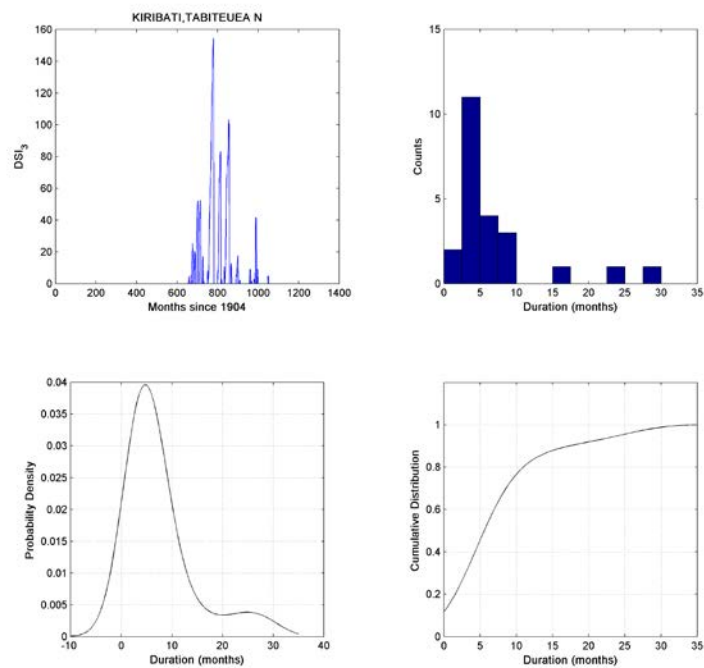
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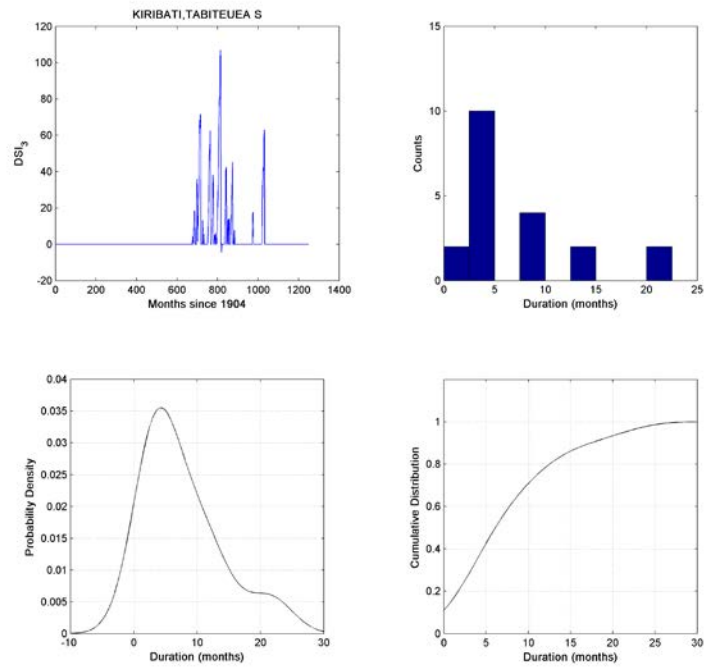
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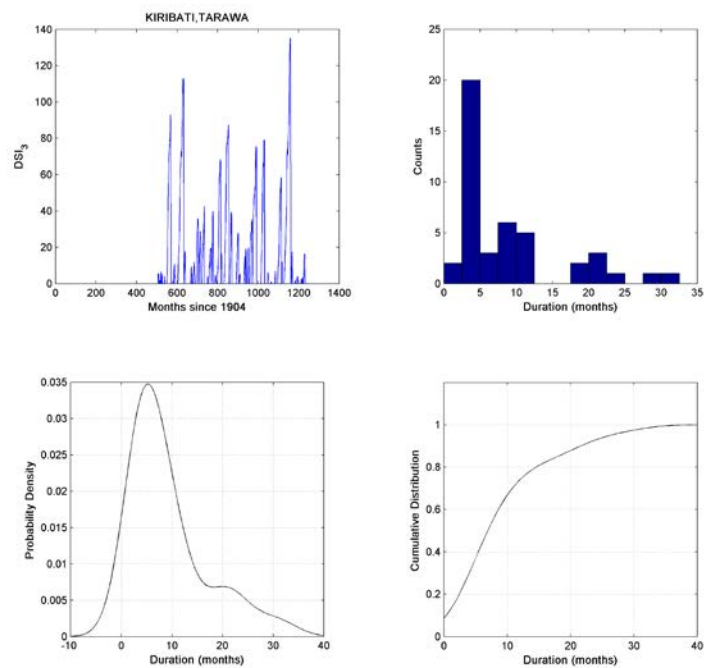
Tabiteuea North



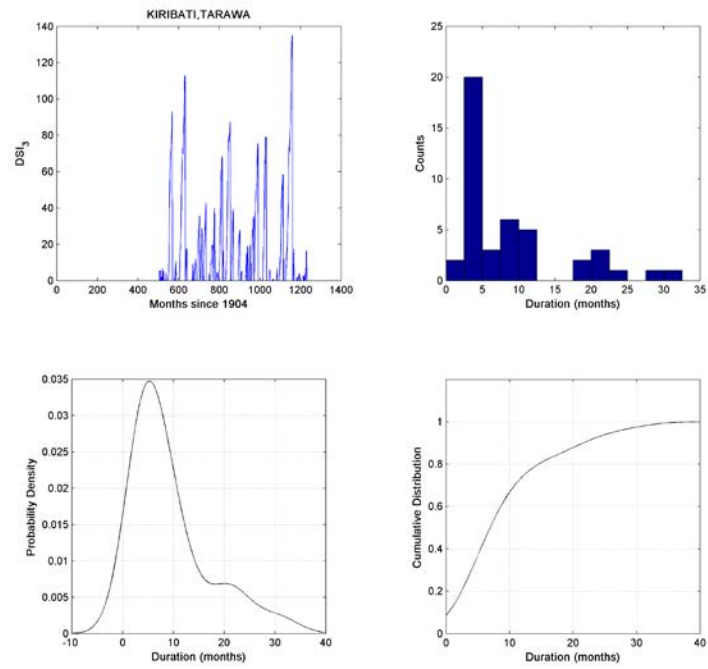
Tabiteuea South



Tamana



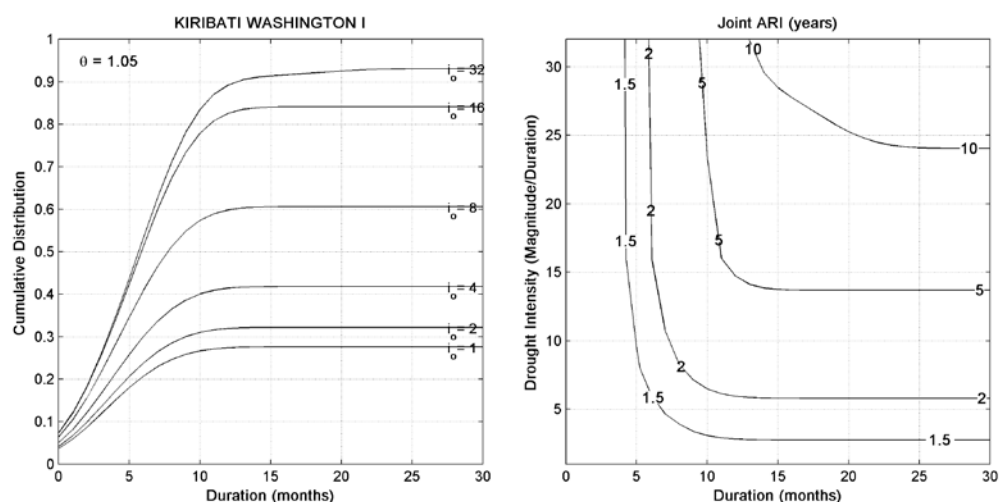
Tarawa



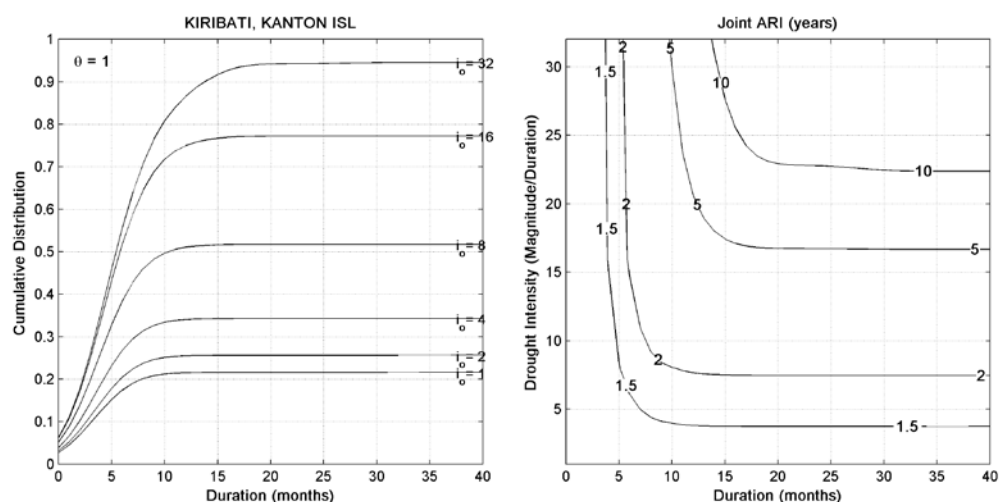
13. Appendix 7: Joint Distribution of Drought Duration and Intensity for Kiribati

The left hand panel shows the cumulative distribution of drought duration for specified drought intensities, i_0 , and the right hand panel shows the joint average recurrence interval in years.

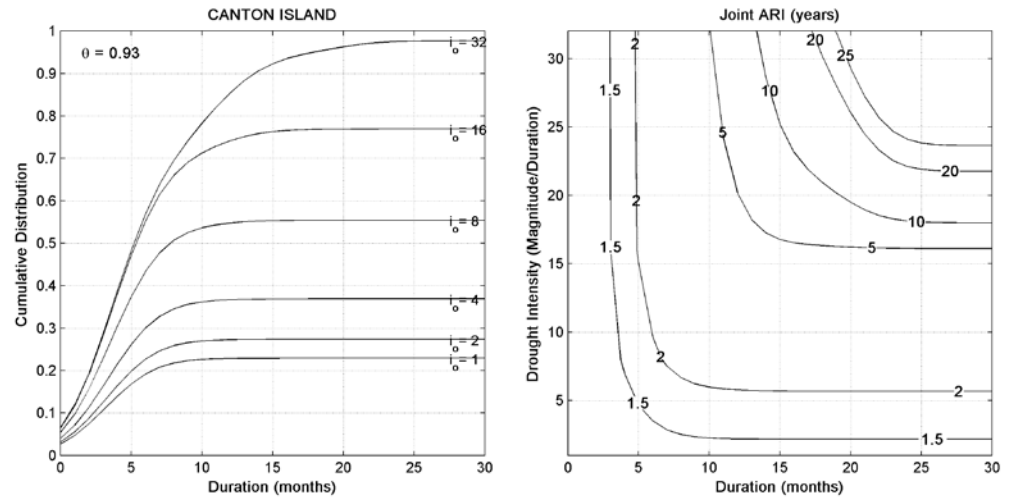
Washington Island



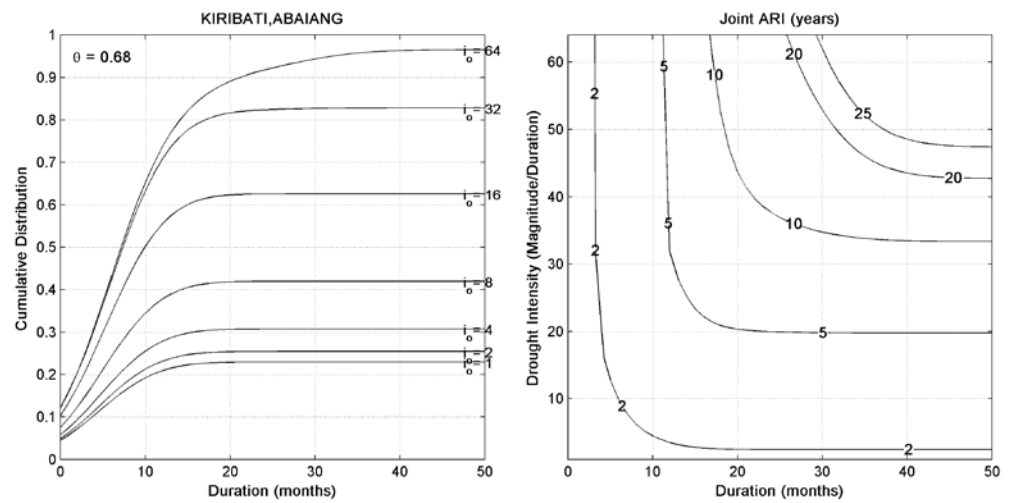
Kanton Island



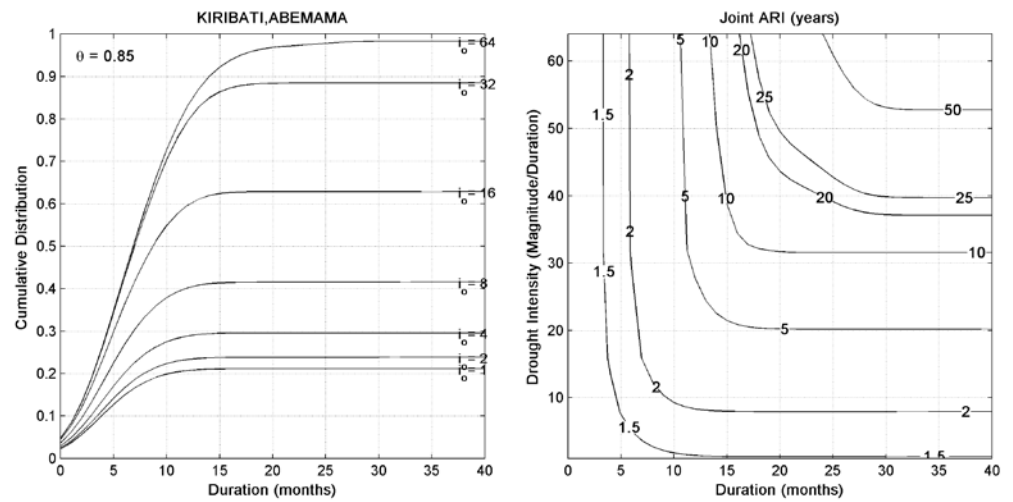
Canton Island



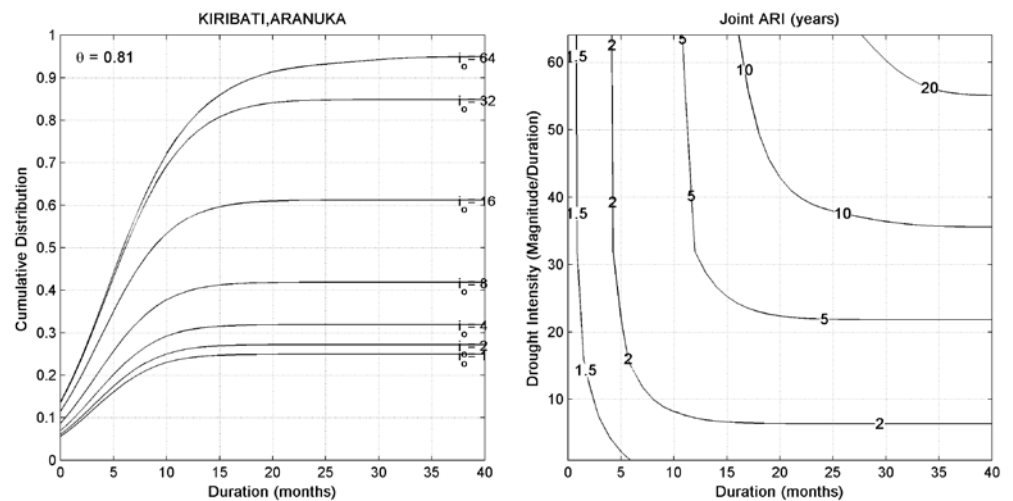
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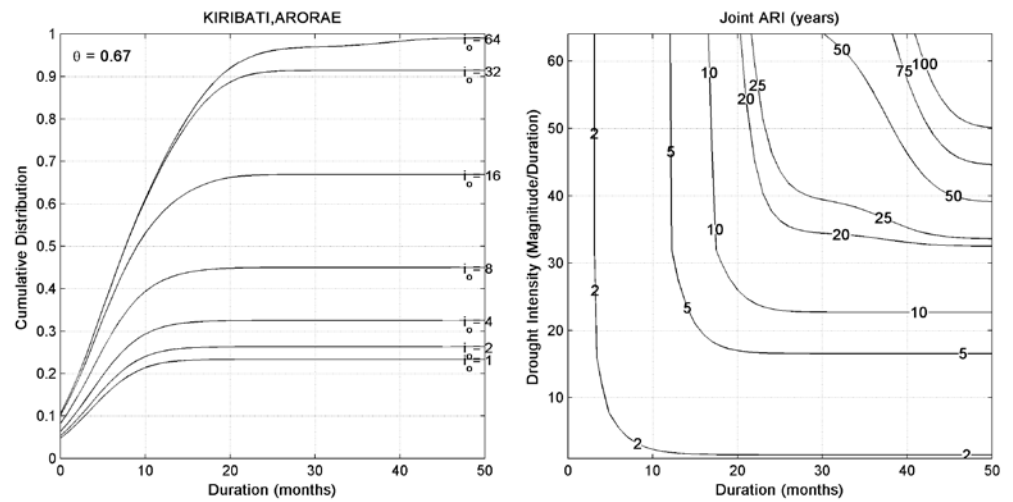
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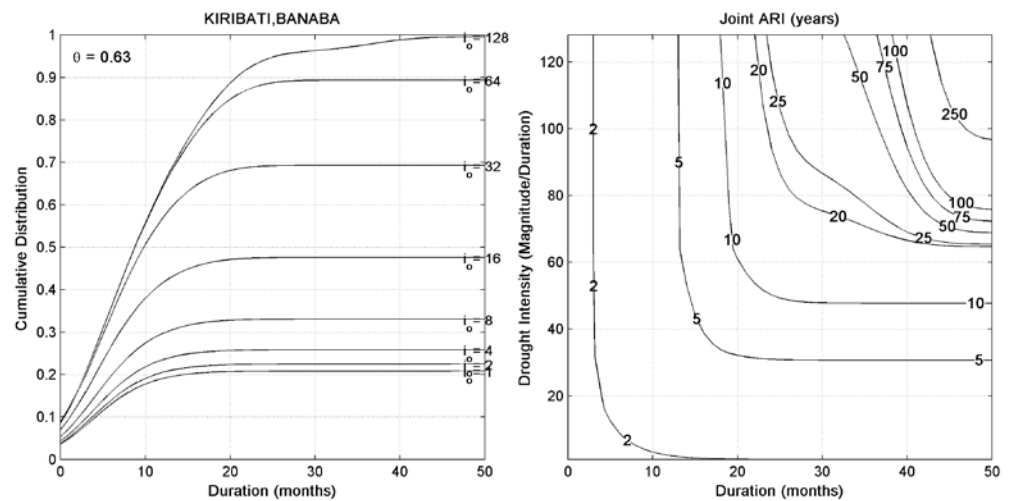
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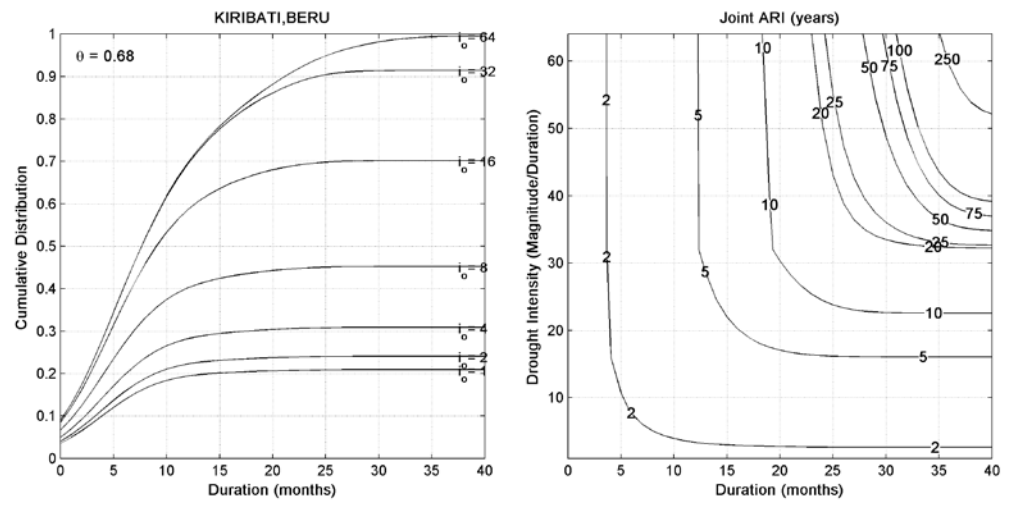
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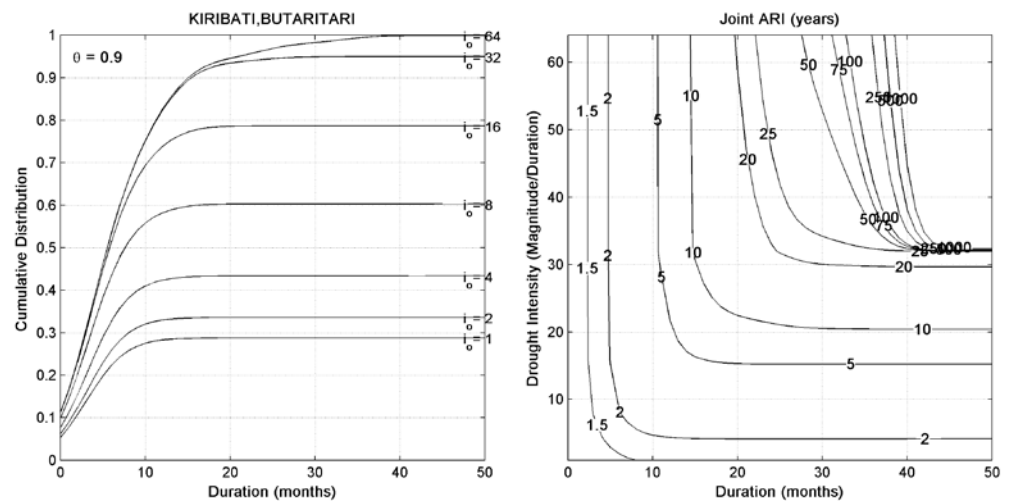
Banaba



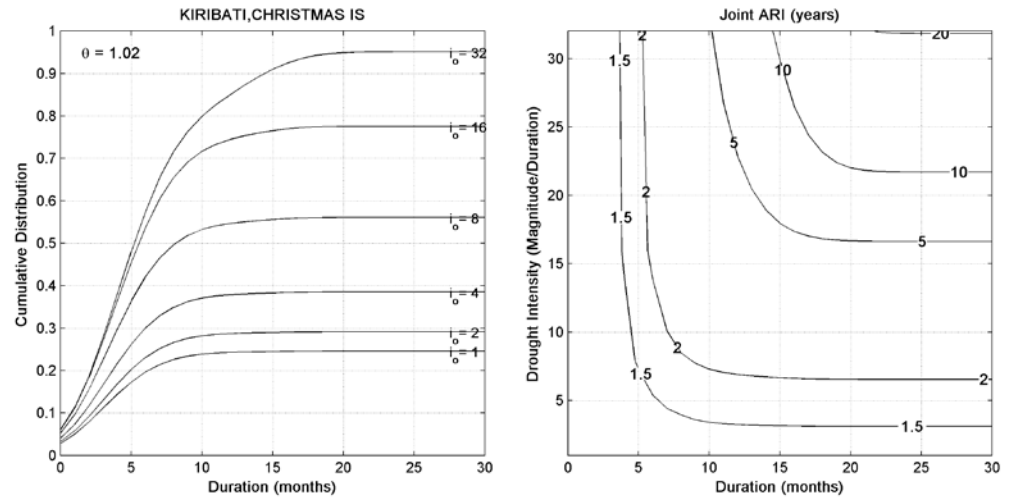
Beru



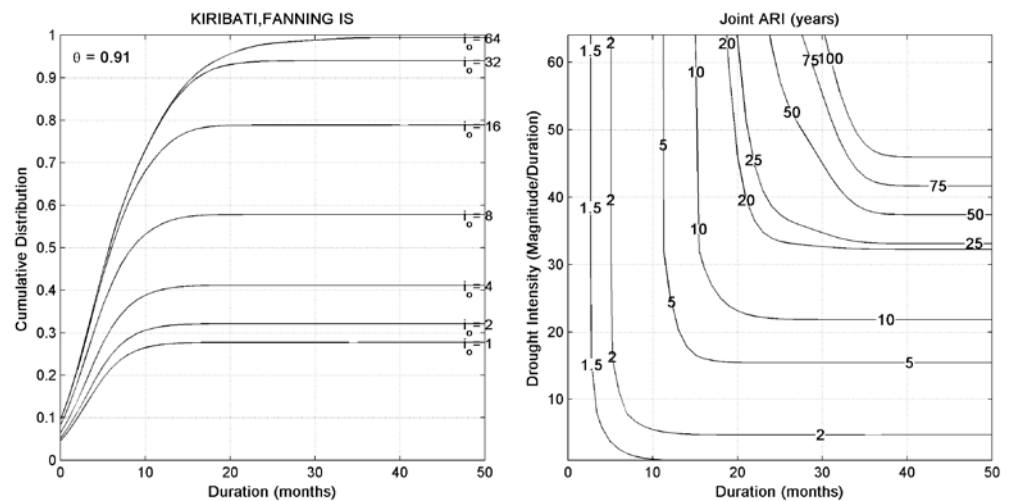
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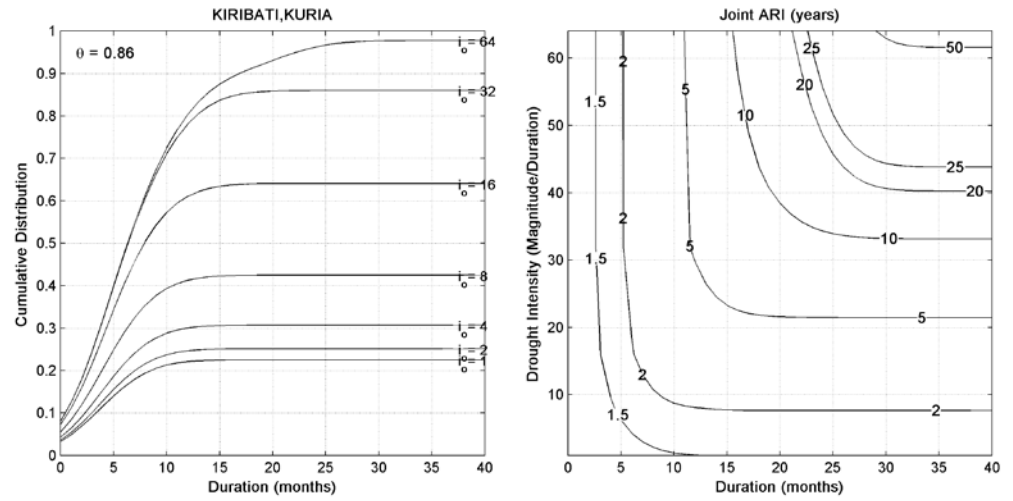
Christmas Island



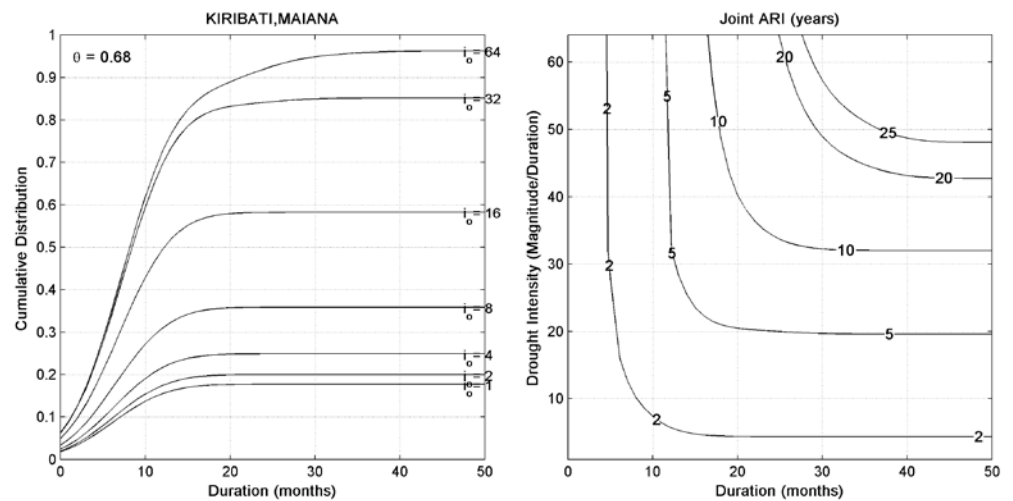
Fanning Island



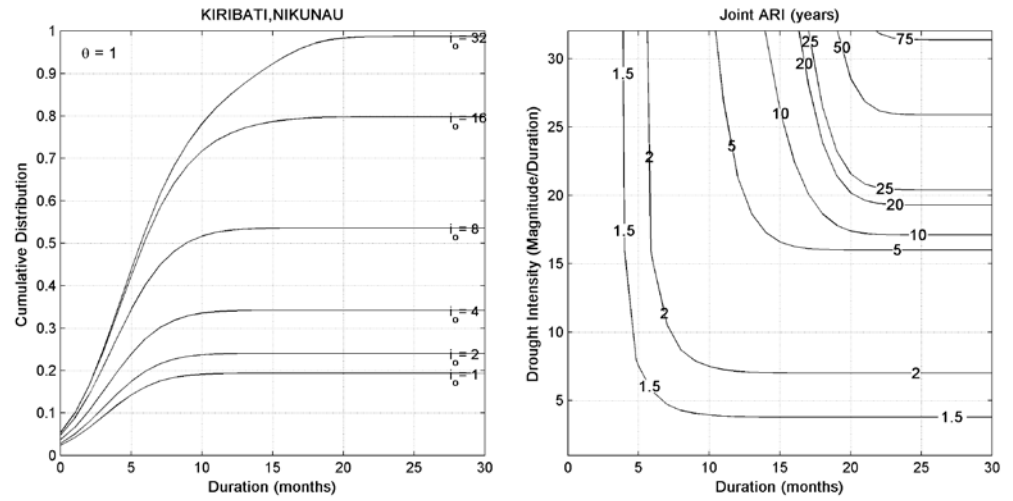
Kuria



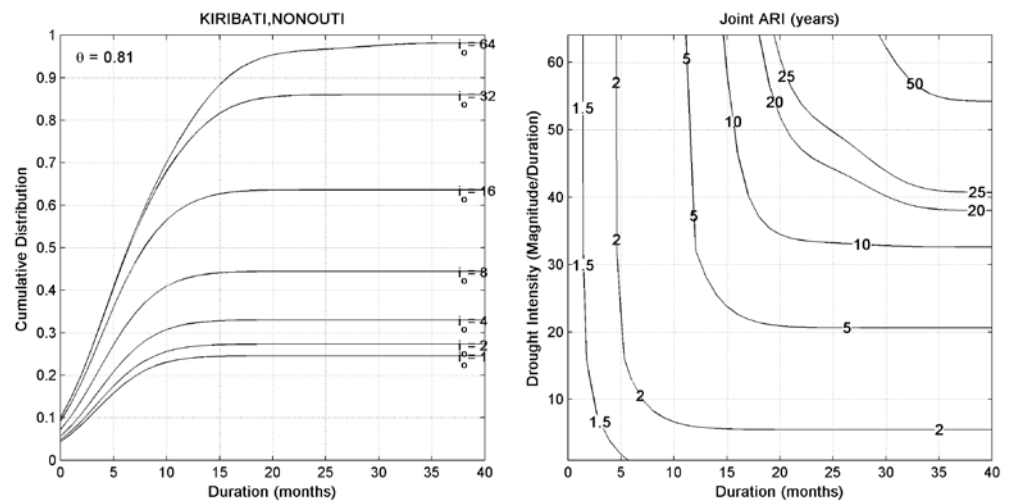
Maiana



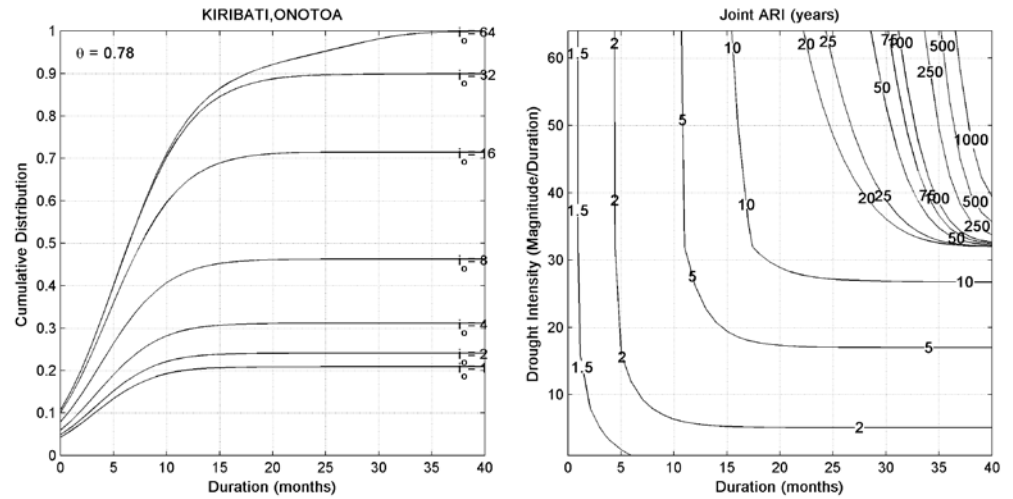
Nikunau



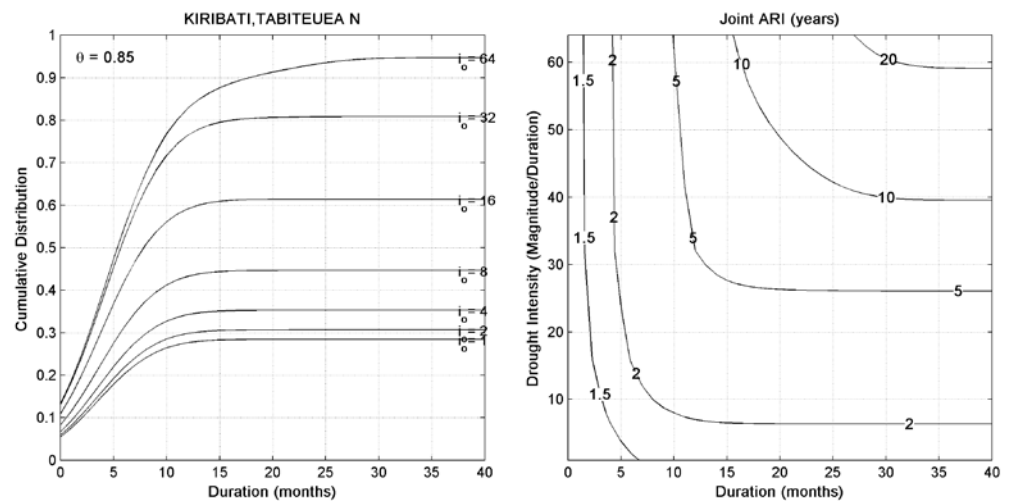
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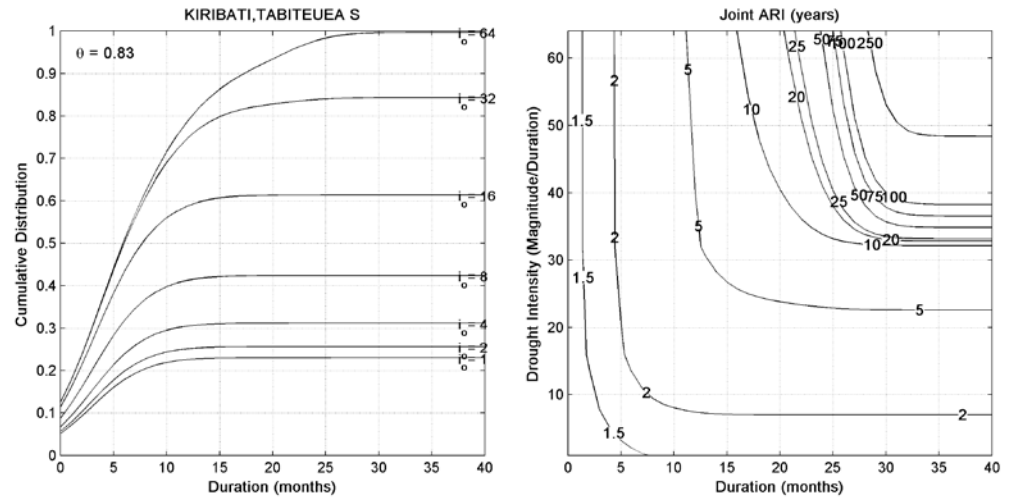
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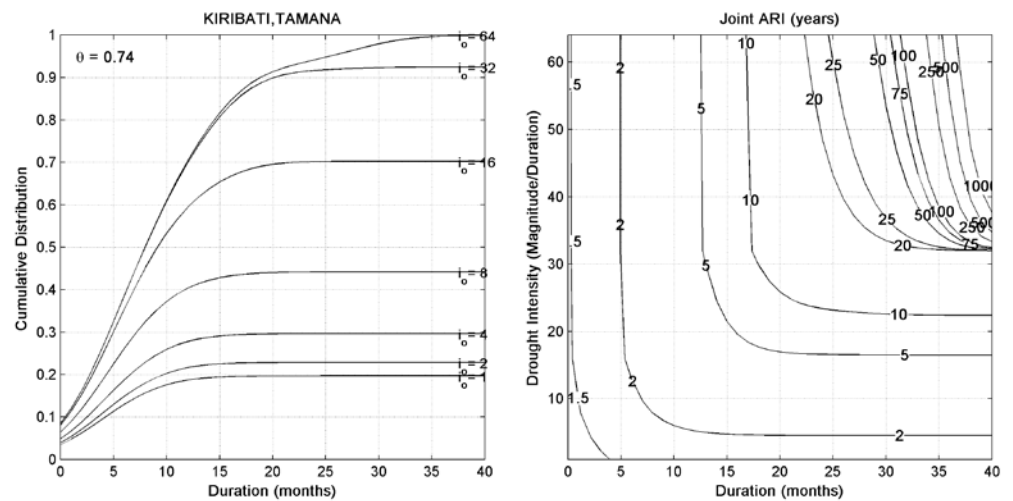
Tabiteuea North



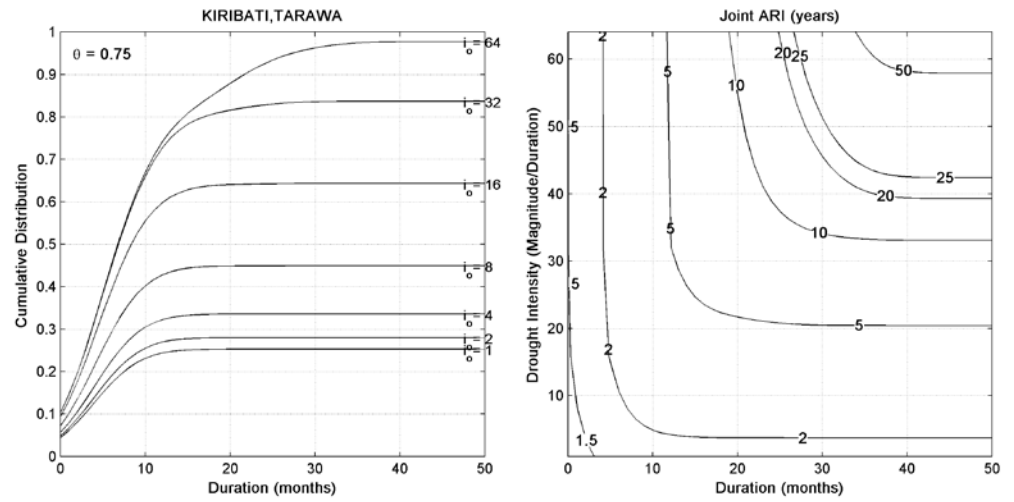
Tabiteuea South



Tamana



Tarawa



14. Appendix 8: Depth-Duration-Frequency Tables for Rainfall Stations in Kiribati for given Climate Warming Scenarios

14.1 High Intensity Rainfall Tables for Banaba and Tarawa derived from annual maximum rainfalls for durations from 10 minutes to 72 hours and for average recurrence intervals from 2 – 100 years

Table 8.1: Depth – duration – frequency tables for three temperature projections for 2025s for Banaba.

Lowest (0.1C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	19	30	37	60	75	99	121	134	157	179
5	20%	22	36	45	78	107	144	177	192	217	247
10	10%	25	40	51	90	129	174	214	230	257	292
20	5%	27	43	56	101	149	203	249	267	296	335
50	2%	29	48	63	116	176	241	296	314	346	390
75	1.3%	31	50	66	123	188	257	316	335	367	415
100	1%	31	51	68	127	196	269	330	350	383	432
Mid-Range (0.7C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	20	32	38	63	77	101	124	137	160	183
5	20%	23	37	47	81	111	149	182	197	223	253
10	10%	26	41	53	94	133	181	221	237	266	301
20	5%	28	45	58	106	155	211	259	277	307	347
50	2%	31	50	66	121	183	251	308	327	360	407
75	1.3%	32	52	69	128	196	268	329	349	383	432
100	1%	33	53	71	132	204	280	344	365	399	450
Highest (1.9C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	22	34	41	67	82	107	130	143	166	189
5	20%	25	40	50	87	118	158	193	208	234	265
10	10%	28	45	57	101	143	193	236	253	282	319
20	5%	30	49	63	114	167	227	278	297	329	371
50	2%	33	54	71	131	198	271	333	354	389	439
75	1.3%	34	56	74	138	211	290	355	377	413	467
100	1%	35	58	77	143	221	303	371	394	431	486

Table 8.2: Depth – duration – frequency Tables for three temperature projections for 2025s for Tarawa.

Lowest (0.1C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	19	29	37	50	64	101	116	129	150	164
5	20%	25	39	47	64	82	134	158	176	204	222
10	10%	29	45	53	73	94	157	185	208	240	260
20	5%	32	51	59	82	106	178	212	238	274	297
50	2%	37	58	67	93	121	206	246	277	319	345
75	1.3%	39	62	71	98	127	218	261	294	338	365
100	1%	40	64	73	102	132	226	272	306	352	380
Mid-Range (0.7C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	20	31	38	52	66	103	119	132	153	167
5	20%	26	40	49	66	85	138	163	181	209	227
10	10%	30	47	55	76	98	162	192	215	247	268
20	5%	34	53	62	85	110	185	220	247	284	308
50	2%	38	61	70	97	126	214	256	289	332	359
75	1.3%	41	64	74	102	133	227	272	307	352	381
100	1%	42	67	76	106	138	236	283	319	367	396
Highest (1.9C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	22	33	41	55	70	109	125	137	159	173
5	20%	28	43	52	71	91	147	172	191	220	238
10	10%	32	50	60	81	105	173	204	228	263	284
20	5%	36	57	67	91	118	199	236	265	305	329
50	2%	42	66	76	105	136	231	277	312	358	388
75	1.3%	44	69	80	110	143	245	294	331	380	411
100	1%	45	72	83	114	149	255	306	345	396	428

Table 8.3: Depth – duration – frequency tables for three temperature projections for 2050s for Banaba.

Lowest (0.6C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	20	31	38	62	77	101	123	136	160	182
5	20%	23	37	47	81	110	148	181	196	222	252
10	10%	25	41	52	93	133	179	220	236	264	299
20	5%	28	45	58	105	154	210	257	275	305	345
50	2%	30	50	65	120	182	249	306	325	358	404
75	1.3%	32	52	68	127	194	266	327	347	380	429
100	1%	32	53	71	132	203	278	342	362	396	447
Mid-Range (1.5C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	21	33	40	65	80	105	128	141	164	187
5	20%	25	39	49	85	116	155	189	204	231	261
10	10%	27	43	55	98	140	189	231	248	277	313
20	5%	29	48	61	111	163	222	272	290	322	363
50	2%	32	53	69	128	193	264	324	345	379	428
75	1.3%	33	55	72	135	206	282	347	368	403	455
100	1%	34	56	75	140	215	295	362	384	420	474
Highest (3.1C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	23	37	44	71	87	112	136	149	173	196
5	20%	27	43	54	93	126	167	203	219	246	278
10	10%	30	48	61	108	153	205	250	268	298	337
20	5%	32	52	67	122	179	243	297	317	351	396
50	2%	35	58	76	140	213	291	357	380	418	472
75	1.3%	37	60	80	148	227	311	382	405	444	501
100	1%	38	62	83	154	237	325	399	423	463	522

Table 8.4: Depth – duration – frequency tables for three temperature projections for 2050s for Tarawa.

Lowest (0.6C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	20	30	38	51	66	103	119	131	153	166
5	20%	26	40	48	66	85	138	162	180	208	226
10	10%	30	46	55	75	97	161	191	213	246	267
20	5%	33	53	61	84	109	184	219	245	283	306
50	2%	38	60	70	96	125	213	255	287	330	357
75	1.3%	40	64	73	101	132	225	270	305	350	378
100	1%	42	66	76	105	137	234	281	317	364	393
Mid-Range (1.5C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	21	32	40	54	69	107	123	136	157	171
5	20%	27	42	51	69	89	144	169	188	216	235
10	10%	31	49	58	79	103	169	200	224	258	279
20	5%	35	56	65	89	116	194	231	259	298	322
50	2%	41	64	74	102	133	226	270	304	350	378
75	1.3%	43	68	78	108	140	239	287	323	371	401
100	1%	44	70	81	111	145	249	298	336	386	417
Highest (3.1C)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	23	35	44	59	74	114	131	143	165	179
5	20%	30	47	56	75	97	156	182	201	231	249
10	10%	35	54	64	87	112	184	217	242	278	300
20	5%	39	61	71	98	127	212	252	283	325	351
50	2%	45	71	82	112	146	249	297	335	385	416
75	1.3%	47	75	86	118	154	263	316	356	409	442
100	1%	49	77	89	123	160	274	328	370	425	459

Table 8.5: Depth-Duration-Frequency for 2090s for Banaba for three climate warming scenarios.

Banaba (Lowest)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	21	33	39	64	79	104	126	139	163	185
5	20%	24	39	48	84	114	152	187	201	228	258
10	10%	26	43	54	97	137	186	227	244	273	308
20	5%	29	47	60	109	160	218	267	285	316	357
50	2%	32	52	68	125	189	259	318	338	372	420
75	1.3%	33	54	71	132	202	277	340	361	396	446
100	1%	34	55	73	137	211	290	355	377	412	465
Banaba (Mid-Range)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	22	35	42	69	85	110	133	146	170	193
5	20%	26	42	52	90	123	163	199	214	241	273
10	10%	29	46	59	105	149	200	244	261	292	329
20	5%	31	51	66	118	174	236	289	308	342	386
50	2%	34	56	74	136	207	283	347	369	406	458
75	1.3%	36	59	78	144	220	302	371	393	431	487
100	1%	37	60	80	149	230	316	387	411	449	507
Banaba (Highest)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	26	42	49	80	97	124	149	161	186	209
5	20%	31	49	61	105	141	186	226	241	270	303
10	10%	34	54	69	122	173	231	280	299	334	374
20	5%	37	60	77	139	204	275	337	358	398	447
50	2%	41	66	87	161	243	333	409	435	480	540
75	1.3%	42	69	91	170	260	356	437	463	510	573
100	1%	43	71	94	176	271	372	456	484	529	597

Table 8.6: Depth-Duration-Frequency for 2090s for Tarawa for three climate warming scenarios.

Tarawa (Lowest)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	21	32	40	53	68	106	122	134	156	169
5	20%	27	42	50	68	87	142	167	185	214	232
10	10%	31	48	57	78	101	167	197	220	254	275
20	5%	35	55	64	88	113	191	227	254	293	317
50	2%	40	63	73	100	130	221	265	298	343	371
75	1.3%	42	66	76	105	137	234	281	317	364	393
100	1%	43	69	79	109	142	244	292	330	379	409
Tarawa (Mid-Range)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	23	34	43	57	73	112	129	141	163	176
5	20%	29	45	54	74	94	152	178	197	226	245
10	10%	34	53	62	85	109	180	212	236	272	293
20	5%	38	60	69	95	123	207	246	275	317	342
50	2%	43	69	79	109	142	241	289	325	374	404
75	1.3%	46	72	83	115	150	256	306	345	397	429
100	1%	47	75	86	119	155	266	319	360	413	446
Tarawa (Highest)											
ARI (y)	AEP	10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
2	50%	27	40	50	66	83	126	143	155	177	191
5	20%	35	53	63	85	109	173	202	222	253	273
10	10%	40	62	73	99	127	207	243	270	310	33
20	5%	45	70	82	112	144	241	286	320	367	396
50	2%	51	81	93	129	167	284	340	383	440	476
75	1.3%	54	85	98	135	176	301	361	407	467	505
100	1%	56	89	101	140	182	313	376	424	486	525

14.2 High Intensity Rainfall Tables for Banaba and Tarawa derived from annual maximum rainfalls for 1 – 3 day durations and for average recurrence intervals from 2 – 100 years

Table 8.7: Depth (mm) – Duration (days) – Frequency (years) for sites in Kiribati for three temperature projections for 2025s.

Fanning Is		Lowest			Mid-Range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	110	187	210	113	144	164	118	150	170
5	20%	216	265	300	152	190	217	160	199	228
10	10%	266	325	373	179	220	254	190	234	269
20	5%	319	388	447	204	250	289	219	268	310
50	2%	385	468	543	237	289	335	257	312	362
75	1.3%	408	494	575	252	305	355	272	329	383
100	1%	424	513	597	262	317	368	283	342	398
Christmas Is										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	77	95	108	79	97	110	83	100	114
5	20%	131	159	185	135	163	190	142	171	199
10	10%	167	201	236	172	208	243	183	220	258
20	5%	201	242	285	209	251	296	224	269	316
50	2%	245	295	349	256	307	363	276	332	392
75	1.3%	265	318	376	276	332	392	298	358	423
100	1%	278	335	396	290	349	412	313	377	445
Banaba										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	114	145	163	117	148	166	122	154	172
5	20%	159	196	223	164	202	229	172	212	240
10	10%	189	231	263	195	238	271	207	253	287
20	5%	217	263	301	225	273	312	242	293	334
50	2%	254	306	350	265	318	365	286	344	394
75	1.3%	270	324	372	281	338	387	304	365	418
100	1%	281	337	387	293	351	403	317	380	435
Butaritari										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	133	164	187	136	167	190	142	173	197
5	20%	185	229	260	190	235	266	200	247	279
10	10%	219	272	308	226	281	318	240	298	337
20	5%	251	314	355	261	325	368	280	348	394
50	2%	294	367	416	306	383	433	330	413	468
75	1.3%	312	391	442	325	407	460	351	440	497
100	1%	325	407	461	339	424	480	366	458	518

Tarawa		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	110	138	153	112	141	156	117	146	162
5	20%	153	191	211	157	196	217	166	206	227
10	10%	181	227	250	187	234	258	199	248	273
20	5%	209	261	287	217	270	298	232	290	319
50	2%	244	305	335	254	317	349	275	343	377
75	1.3%	260	324	356	271	338	371	292	365	401
100	1%	271	338	371	282	352	387	305	380	418

Beru		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	92	112	129	94	114	131	98	119	136
5	20%	136	162	189	139	166	194	147	175	204
10	10%	164	195	230	170	201	237	181	213	251
20	5%	192	227	269	200	235	279	214	252	298
50	2%	228	268	319	238	279	332	257	301	359
75	1.3%	244	286	341	254	298	355	274	321	384
100	1%	255	298	356	266	311	371	287	336	401

Arorae		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	109	135	153	112	137	156	117	143	162
5	20%	145	179	207	149	184	212	157	194	222
10	10%	168	209	242	174	216	249	185	229	264
20	5%	191	238	276	198	247	286	212	264	306
50	2%	220	275	320	229	286	333	247	309	360
75	1.3%	232	291	339	242	303	353	261	327	381
100	1%	241	302	353	251	315	367	272	340	397

Kanton Is		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	82	102	116	84	104	118	88	108	123
5	20%	127	157	182	131	162	187	138	170	196
10	10%	158	195	226	163	201	233	173	213	247
20	5%	186	230	268	193	239	278	207	256	298
50	2%	224	276	323	233	288	336	252	311	363
75	1.3%	240	297	347	250	309	361	270	334	390
100	1%	252	311	364	262	324	379	283	350	409

Table 8.8: Depth (mm) – Duration (days) – Frequency (years) for sites in Kiribati for three temperature projections for 2050s.

Fanning Is		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	112	144	163	116	148	168	121	153	173
5	20%	151	189	217	157	196	225	165	205	234
10	10%	178	219	253	186	229	264	196	242	278
20	5%	203	249	288	214	262	303	228	278	322
50	2%	236	287	333	250	304	353	268	325	378
75	1.3%	250	303	352	265	321	373	284	344	400
100	1%	260	314	366	276	333	388	295	357	415
Christmas Is										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	79	96	110	81	99	113	85	102	117
5	20%	134	162	189	140	169	196	146	176	205
10	10%	171	207	242	179	216	253	190	228	267
20	5%	207	250	294	219	263	309	232	280	328
50	2%	254	305	361	269	324	382	288	346	409
75	1.3%	274	329	389	291	349	413	311	374	442
100	1%	288	346	410	306	367	434	327	393	465
Banaba										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	117	148	166	120	152	170	125	157	176
5	20%	163	201	228	169	209	236	178	218	246
10	10%	194	237	269	203	248	282	215	261	297
20	5%	224	271	310	236	286	326	251	304	346
50	2%	263	316	362	279	335	384	298	359	411
75	1.3%	279	336	385	296	356	408	317	381	436
100	1%	291	349	400	309	370	425	330	396	454
Butaritari										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	136	166	190	140	171	195	146	177	201
5	20%	189	234	265	197	243	275	206	254	287
10	10%	225	279	316	235	292	331	249	308	348
20	5%	259	323	366	273	341	385	291	362	409
50	2%	304	380	430	322	403	456	345	431	488
75	1.3%	323	404	457	343	429	485	366	459	519
100	1%	337	421	477	357	447	505	382	478	541
Tarawa										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	112	140	156	116	144	160	120	149	165
5	20%	156	195	216	163	203	224	171	212	234
10	10%	186	233	257	195	243	268	206	256	282
20	5%	215	269	296	227	283	312	241	301	331
50	2%	253	315	347	268	334	368	287	358	393
75	1.3%	269	335	369	285	356	391	305	380	418
100	1%	280	349	384	297	371	407	318	396	436

Beru		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	94	114	131	97	117	134	101	122	139
5	20%	139	165	193	145	172	201	151	180	209
10	10%	169	200	236	177	209	247	187	221	260
20	5%	198	234	277	209	246	292	222	262	309
50	2%	236	277	330	250	294	350	268	314	374
75	1.3%	252	296	353	268	313	374	286	335	400
100	1%	264	309	369	280	327	391	299	350	418
Arorae										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	111	137	156	115	141	160	120	146	165
5	20%	148	183	211	154	190	219	162	199	228
10	10%	173	215	248	181	225	259	191	237	273
20	5%	197	245	284	207	258	299	220	274	318
50	2%	227	284	331	241	301	351	258	322	375
75	1.3%	240	301	351	255	319	372	273	341	398
100	1%	250	313	365	265	332	387	283	355	414
Kanton Is										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	84	103	118	86	106	121	90	110	125
5	20%	130	161	186	136	167	193	142	175	201
10	10%	162	200	232	170	209	243	179	220	255
20	5%	192	237	276	203	250	291	216	266	309
50	2%	232	286	334	246	303	354	263	324	379
75	1.3%	249	307	359	264	326	380	282	348	407
100	1%	261	322	376	276	341	399	296	365	427

Table 8.8: Depth (mm) – Duration (days) – Frequency (years) for sites in Kiribati for three temperature projections for 2090s.

Fanning Is		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	115	146	166	121	153	173	133	167	188
5	20%	155	194	222	165	205	234	186	229	261
10	10%	183	226	260	196	242	278	225	275	316
20	5%	210	258	298	228	278	322	265	323	372
50	2%	245	298	346	268	325	378	315	383	445
75	1.3%	260	315	366	284	344	400	334	405	470
100	1%	270	327	380	295	357	415	347	420	489
Christmas Is										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	81	98	112	85	102	117	94	112	127
5	20%	138	166	194	146	176	205	165	197	228
10	10%	177	213	250	190	228	267	217	260	303
20	5%	215	259	304	232	280	328	270	324	380
50	2%	264	318	375	288	346	409	339	408	482
75	1.3%	285	343	405	311	374	442	366	440	520
100	1%	300	360	426	327	393	465	385	463	547
Banaba										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	119	150	169	125	157	176	138	171	191
5	20%	178	218	246	178	218	246	200	244	274
10	10%	246	297	337	215	261	297	246	297	337
20	5%	216	262	299	251	304	346	292	353	401
50	2%	252	304	348	298	359	411	351	423	484
75	1.3%	268	322	369	317	381	436	373	448	514
100	1%	280	335	384	330	396	454	389	466	535
Butaritari										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	139	170	193	146	177	201	161	193	219
5	20%	194	240	272	206	254	287	232	284	320
10	10%	232	288	326	249	308	348	284	351	396
20	5%	269	335	379	291	362	409	338	420	474
50	2%	316	395	447	345	431	488	406	508	574
75	1.3%	336	421	476	366	459	519	432	540	611
100	1%	350	438	496	382	478	541	450	563	637
Tarawa										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	114	143	159	120	149	165	133	163	180
5	20%	161	200	221	171	212	234	192	237	260
10	10%	192	240	264	206	256	282	236	292	321
20	5%	223	278	306	241	301	331	281	349	383
50	2%	263	328	361	287	358	393	338	421	463
75	1.3%	280	349	383	305	380	418	359	448	492
100	1%	291	363	399	318	396	436	374	467	513

Beru		Lowest			Mid-range			Highest		
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	96	116	133	101	122	139	111	133	150
5	20%	143	170	198	151	180	209	171	201	233
10	10%	174	206	243	187	221	260	214	251	295
20	5%	206	242	287	222	262	309	259	304	358
50	2%	246	288	343	268	314	374	315	370	441
75	1.3%	262	308	367	286	335	400	337	395	471
100	1%	274	321	384	299	350	418	352	412	493
Arorae										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	114	139	159	120	146	165	132	159	180
5	20%	152	188	216	162	199	228	182	223	254
10	10%	178	221	256	191	237	273	219	270	311
20	5%	204	254	294	220	274	318	256	318	368
50	2%	237	296	344	258	322	375	304	380	442
75	1.3%	250	313	365	273	341	398	321	402	469
100	1%	260	325	380	283	355	414	334	418	487
Kanton Is										
ARI (y)	AEP	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
2	50%	85.5	105.3	120.2	90	110	125	99	120	136
5	20%	134.1	165.1	190.8	142	175	201	160	195	224
10	10%	167.0	205.9	239.0	179	220	255	205	251	291
20	5%	199.3	245.9	286.2	216	266	309	251	308	358
50	2%	241.1	297.6	347.6	263	324	379	310	382	446
75	1.3%	258.8	319.3	373.2	282	348	407	332	410	479
100	1%	271.2	334.7	391.4	296	365	427	348	430	503

15. Appendix 9: Additional I-Kiribati temperature change scenarios

Following this report being finalised a further three future climate change scenarios and three particular timeframes were selected by the I-Kiribati participants in the training workshops to be used for routine climate change assessments that were appropriate for Kiribati.

The temperature changes in Figures 9.1 and 9.2 shown below are interpolated from global climate model projections prepared for the IPCC 4th Assessment Report. The starting data were monthly-average temperatures as simulated by 12 climate models for the 20th century (ending 1999 or 2000), and for the 21st century under three different emission scenarios known as SRES B1, A1B and A2. Monthly temperatures were bilinearly interpolated to the gridpoint (180°E, 0°S), chosen as a representative location for Kiribati, and annual-average changes relative to 1980-1999 calculated.

Temperature changes were calculated for three future periods, representing the generational time-frames of: Te tibu or Grand Children (specified as the period 2012-2036), Tibu-toru or Great Grand Children (2036-2060), and Tibu-mwamwanu or Great Great Grand Children (2060-2084). Model output data were not available for the *ukmo_hadgem1* model for the B1 scenario, or for the *miroc32_hires* model for the A2 scenario. No data from any model were available for the B2 or A1FI emission scenarios. In all these cases, the Kiribati temperature change was estimated by scaling the A1B changes (for the appropriate future time-frame) by the following factors: 0.65 (B1), 0.85 (B2), 1.21 (A2), and 1.44 (A1FI). These factors are chosen to rescale the range across the 12 models used here to match the IPCC 4th Assessment global warming range for the various emission scenarios.

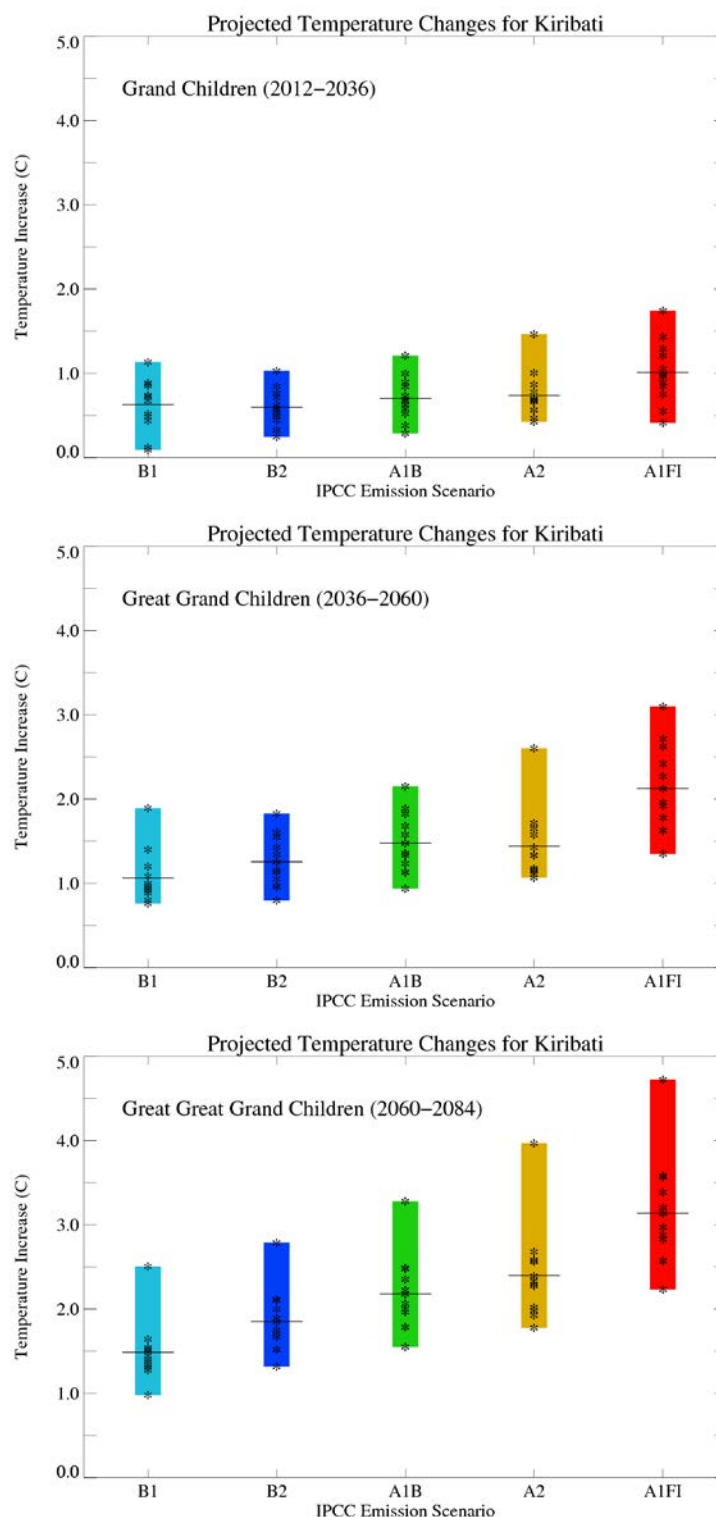


Figure 9.1: IPCC projections of temperature change for Kiribati (180°E, 0°S) for 3 generational time-frames. Within each plot, vertical coloured bars show the range across 12 climate models for 5 IPCC SRES emission scenarios known as B1, B2, A1B, A2 and A1FI. Stars mark the individual model values, and short horizontal lines denote the 12-model average. All temperature changes are relative to the 1980-1999 average.

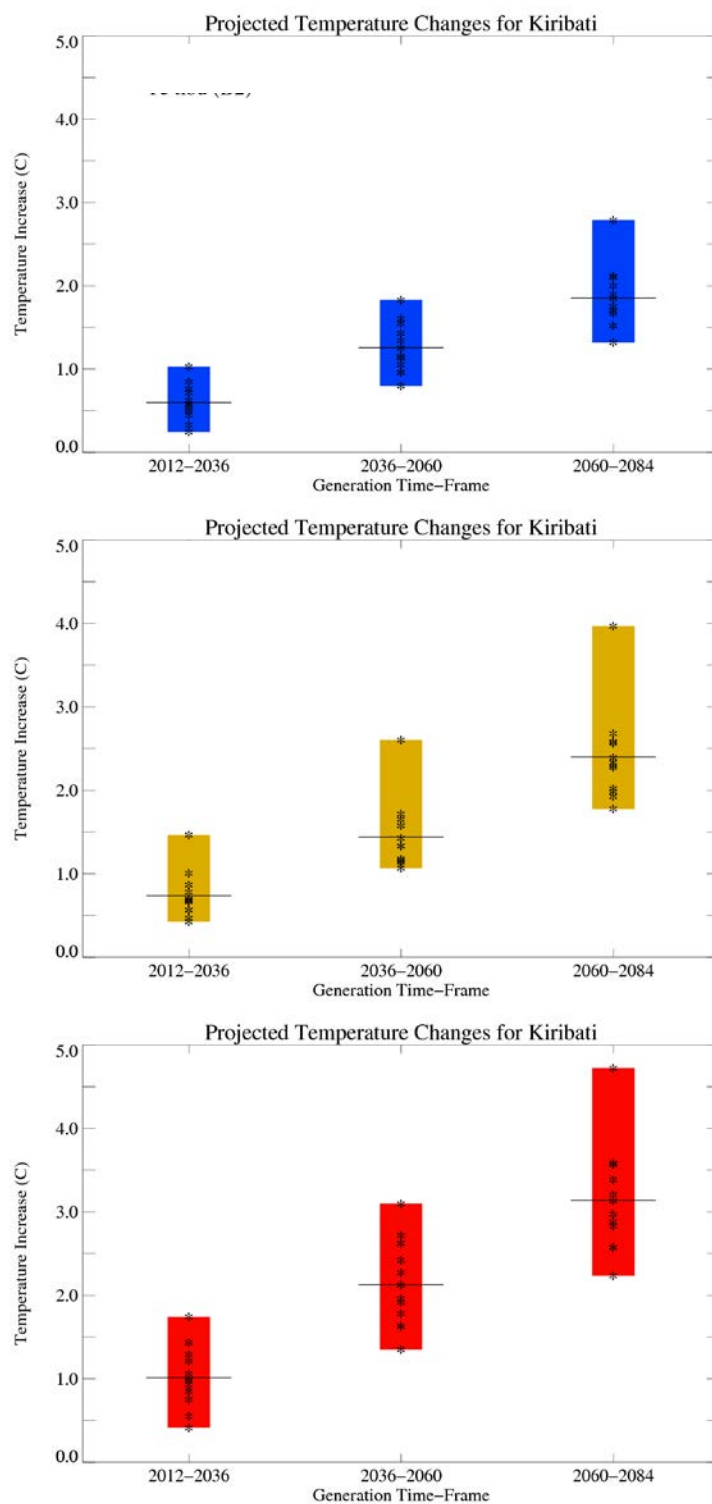


Figure 9.2: IPCC projections of temperature change for Kiribati (180°E, 0°S) for 3 SRES emission scenarios: B2 (top panel), A2 (middle panel) and A1FI (bottom panel). Within each plot, vertical coloured bars show the range across 12 climate models for 3 generational time-frames. Stars mark the individual model values, and short horizontal lines denote the 12-model average. All temperature changes are relative to the 1980-1999 average.

Table 9.1 provides the numerical values for the temperature scenarios for the three future I-Kiribati timeframes. The “low” scenario corresponds to B2 emission scenario. The “high” scenario corresponds to the model with greatest warming by the scenario period for the highest emissions scenario (A1FI). The “middle” scenario corresponds to a mid-range emissions scenario known as A2.

Table 9.1: I-Kiribati temperature change scenarios used to calculate changes in extreme rainfall. Changes are relative to 1980-1999, and are shown for three future periods of Grand children / Te tibu (2012 – 2036 average), Great-grand children / Tibu-toru (2036-2060 average) and Great-great grand children / Tibu-mwamwanu (2060-2084 average).

Scenario Period	Low (B2)	Mid-range (A2)	High (A1FI)
Grand children / Te tibu (2012 – 2036)	0.243	0.738	1.742
Great-grand children / Tibu-toru (2036-2060)	0.796	1.44	3.099
Great-great grand children / Tibu-mwamwanu (2060-2084)	1.318	2.4	4.723

These temperature change scenarios have been incorporated in to the Rainfall Calculator (Version 4.3) which enables climate change related changes to high intensity rainfall depth-duration values to be calculated for various islands in Kiribati.