

1. Climate historical and future data in PNA

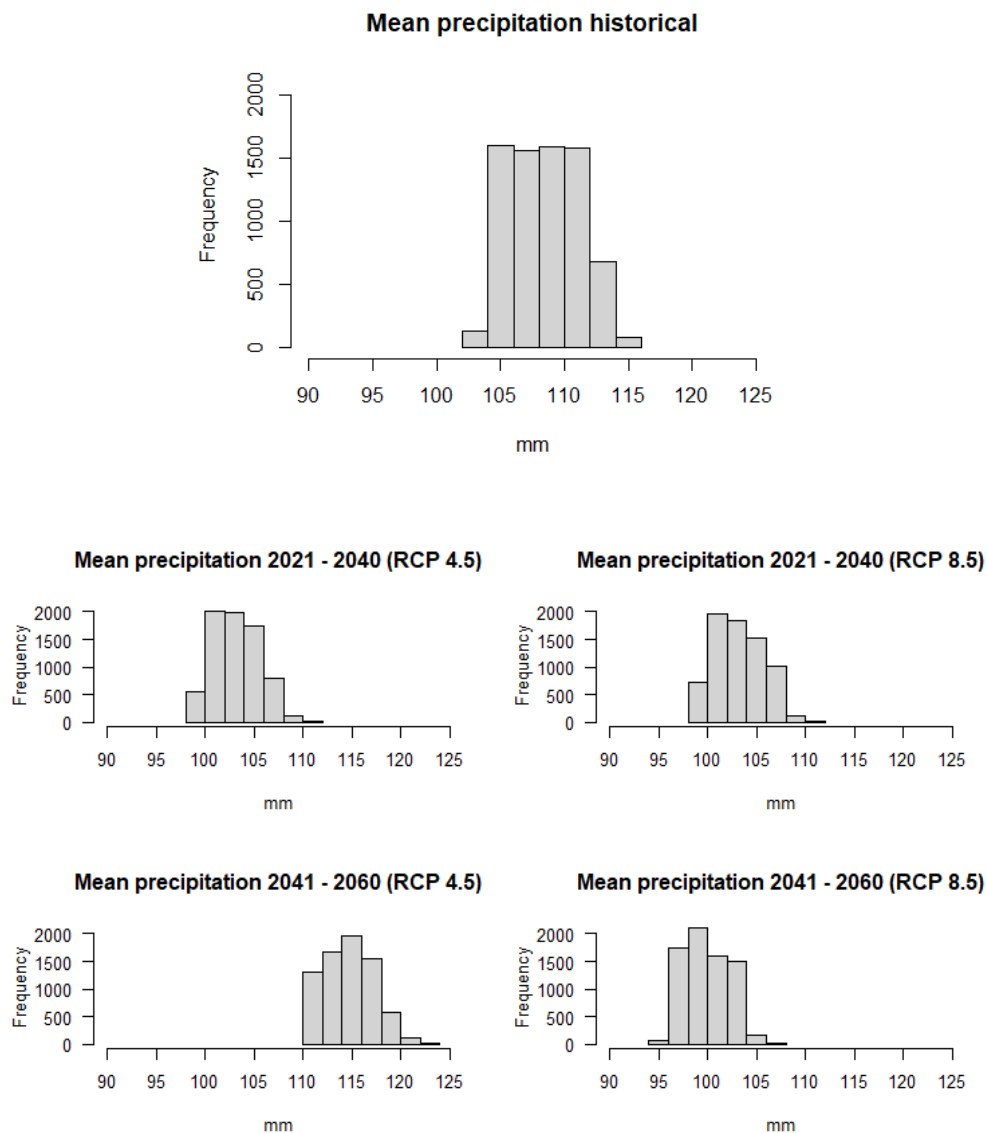


Figure S1. Histogram precipitation data.

Table S1. Precipitation data statistic.

	RCP 4.5		RCP 8.5	
	2021-2040	2041-2060	2021-2040	2041-2060
Minimum	98.67	110.1	98.5	95.5
Mean	103.2	114.6	103.2	100.1
Maximum	110.17	122.2	110.3	106.92
Variance	5.49	6.27	6.03	5.37
Standard deviation	2.34	2.5	2.45	2.31

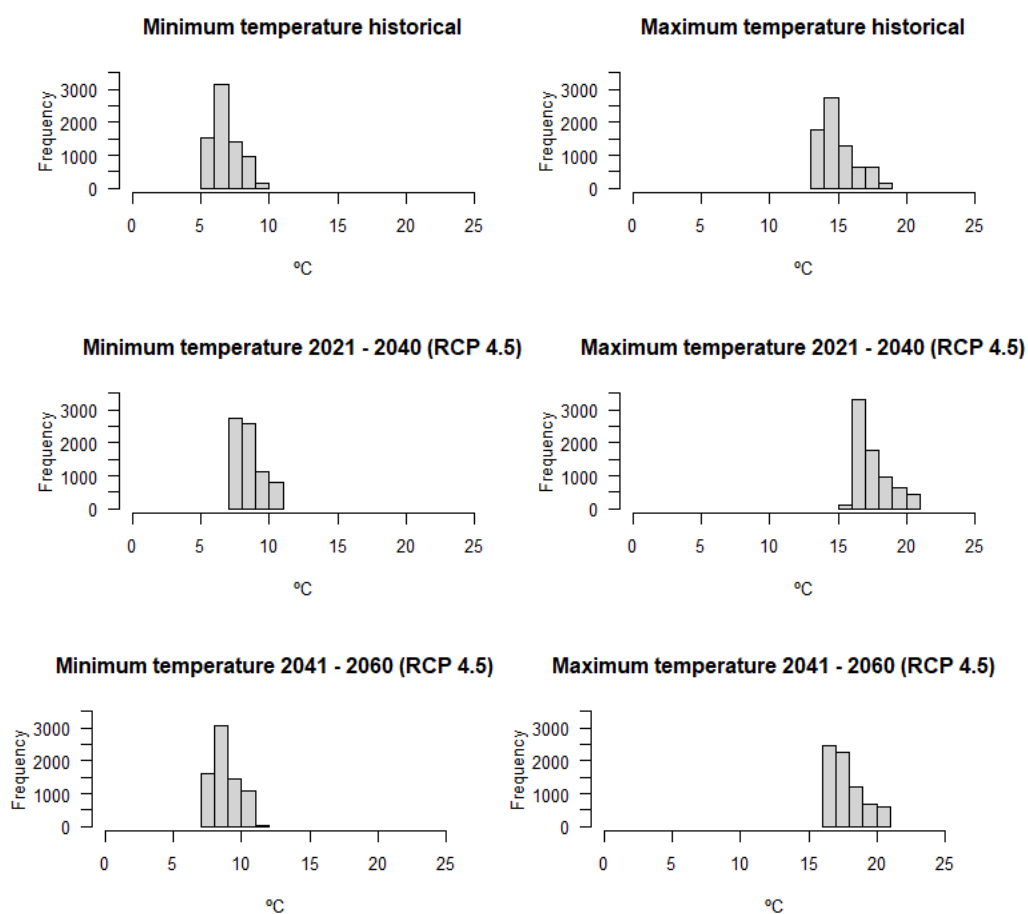


Figure S2. Histogram temperature data (RCP 4.5).

Table S2. Temperature data statistic (RCP 4.5).

Minimum temperature			
	Historical	2021-2040	2041-2060
Minimum	5.58	7.29	7.56
Mean	6.81	8.51	8.78
Maximum	9.2	10.89	11.15
Variance	0.9	0.89	0.89
Standard deviation	0.94	0.94	0.94
Maximum temperature			
	Historical	2021-2040	2041-2060
Minimum	13.31	15.82	16.07
Mean	14.96	17.48	17.75
Maximum	18.24	20.74	20.99
Variance	1.58	1.56	1.54
Standard deviation	1.25	1.25	1.24

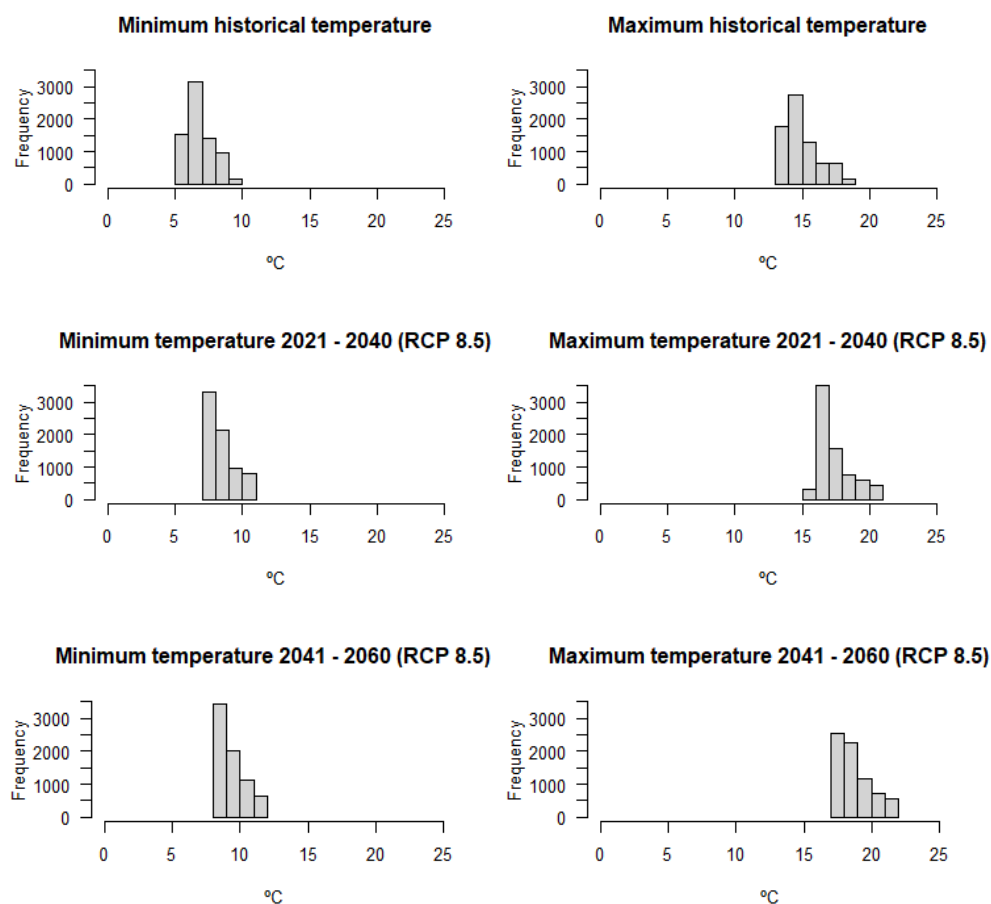


Figure S3. Histogram temperature data (RCP 8.5).

Table S3. Temperature data statistic (RCP 8.5).

	Minimum temperature		Maximum temperature	
	2021-2040	2041-2060	2021-2040	2041-2060
Minimum	15.82	16.07	15.72	17.06
Mean	17.48	17.75	17.38	18.73
Maximum	20.74	20.99	20.62	21.96
Variance	1.56	1.54	1.56	1.53
Standard deviation	1.25	1.24	1.24	1.23

Table S4. Mean month precipitation in PNA (HadGEM3-GC31-LL, RCP 4.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	dez
Historical	178.8	167.6	120	120.13	95.982	61.03	19.25	20.12	61.71	128.04	159.4	170.1
2021-2040	219.3	175.3	95.82	93.97	80.29	62.9	18.19	20.13	47.71	92.1	186.6	145.7
2041-2060	258.8	263.5	136.5	87.15	87.68	57.18	18.52	17.72	42.74	106.6	162.4	136.3
2061-2080	226.9	216.4	100.5	90.9	83.61	56.83	15.63	17.82	41.46	83.15	201.8	204.4

Table S5. Mean month precipitation in PNA (HadGEM3-GC31-LL, RCP 8.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	dez
Historical	178.8	167.6	120	120.13	95.982	61.03	19.25	20.12	61.71	128.04	159.4	170.1
2021-2040	192.1	173.1	119.2	96.35	86.2	56.31	16.9	18.17	49.04	110.6	163.7	156.3
2041-2060	186.3	182.8	114.9	94.5	75.55	53.53	16.51	17.35	47.04	107.3	143.3	160.5
2061-2080	208.1	192.7	124.8	80.21	69.04	47.31	16.08	16.72	39.52	97.38	132.3	176.2

Table S6. Mean month minimum temperature in PNA (HadGEM3-GC31-LL, RCP 4.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	dez
Historical	1.65	2.00	3.59	4.69	7.23	10.81	12.80	13.13	11.35	8.07	4.39	2.48
2021-2040	3.81	3.67	4.64	6.24	8.88	12.31	14.64	15.18	13.79	9.61	6.24	4.13
2041-2060	4.11	4.26	4.74	5.84	8.98	12.96	14.84	15.66	13.61	10.71	6.64	4.03
2061-2080	4.71	4.57	5.24	6.24	9.44	13.92	15.82	17.24	15.08	11.39	7.64	5.23

Table S7. Mean month minimum temperature in PNA (HadGEM3-GC31-LL, RCP 8.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	dez
Historical	1.65	2.00	3.59	4.69	7.23	10.81	12.80	13.13	11.35	8.07	4.39	2.48
2021-2040	3.21	3.37	4.64	5.84	8.78	12.49	14.32	15.24	13.58	10.41	6.44	4.03
2041-2060	4.41	4.27	5.62	6.44	9.28	13.25	15.29	16.32	14.54	11.55	7.34	5.23
2061-2080	5.31	5.37	6.64	7.64	10.68	14.09	16.72	18.13	16.10	12.82	8.84	6.23

Table S8. Mean month maximum temperature in PNA (HadGEM3-GC31-LL, RCP 4.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	Dez
Historical	7.85	8.97	11.09	12.78	15.75	20.81	23.59	23.87	20.69	15.55	10.79	8.36
2021-2040	10.02	10.75	12.88	15.44	18.54	23.46	26.44	26.51	24.45	19.02	13.27	10.39
2041-2060	10.32	11.15	12.28	14.74	18.67	24.39	26.76	27.34	25.01	19.55	13.66	10.49
2061-2080	10.98	11.62	13.56	16.12	19.77	25.67	29.21	29.70	26.51	21.15	14.27	11.23

Table S9. Mean month maximum temperature in PNA (HadGEM3-GC31-LL, RCP 8.5)

	jan	feb	mar	apr	may	jun	jul	aug	sep	ouc	nov	dez
Historical	7.85	8.97	11.09	12.78	15.75	20.81	23.59	23.87	20.69	15.55	10.79	8.36
2021-2040	9.62	10.65	12.66	14.74	18.32	23.55	26.44	26.91	24.41	19.08	13.26	10.32
2041-2060	10.92	11.64	13.76	15.83	19.76	25.42	27.93	28.40	25.81	20.65	14.46	11.49
2061-2080	11.92	12.78	14.96	17.82	22.09	26.82	30.00	30.47	27.91	22.85	16.20	12.63

2. Climate historical and future data by land use classes in 1995, 2018 and 2041

Table S10. Precipitation by land use classes (RCP 4.5)

	1995							2018							2041						
	Artifi	Agricul	Past	For	Bus	Op	Wat	Artifi	Agricul	Past	For	Bus	Op	Wat	Artifi	Agricul	Past	Fore	Bus	e or	Wat
	cial	ture	ure	est	hes	en	er	cial	ture	ure	est	hes	en	er	cial	ture	ure	st	hes	non-	er
	surfa	ce				spa		surfa	ce				spa		surfa	ce				vege	
						ce							ce							tatio	
						veg							veg							n	
						etat							etat								
						ion							ion								
Minim	104.3	103.8	105	103	103.	104	107	104.3	103.8	105.	103	103.	104	107	110.6	110.4	112.	110.	110.	110.	114.
um				.2	2	.3	.8			9	.2	2	.3	.8			2	1	1	9	1
1st qu	105.9	106.1	108.	105	107.	108	109	106	105.4	107.	105	107.	107	109	112.5	111.8	113.	111.	114.	113.	115.
			2		1	.1				1	.4	8	.2				6	8	2	4	3
Mean	106.9	106.8	109.	106	109.	109	108	106.8	106.5	107.	106	109.	108	108	113.1	112.7	114	113	115.	114.	115.
			5	.8	2	.4	.9			7	.7	4	.7	.9					7	6	2
3rd qu	108	107.8	111.	108	111.	111	109	107.8	107.1	108.	107	111.	110	109	114.1	112.8	114.	113.	117.	115.	115.
			2	.2	4	.1				1	.8	8	.7				3	5	7	9	3
Maxim	109.2	110.1	112.	114	115.	113	109	109.2	110.1	110.	114	115.	113	109	115.2	115.9	115.	120.	122.	118.	115.
um			5	.6	9	.2				5	.6	9	.2				6	7	2	4	3

Table S11. Precipitation by land use classes (RCP 8.5)

	1995							2018							2041						
	Artifi	Agricul	Past	For	Bus	Op	Wat	Artifi	Agricul	Past	For	Bus	Op	Wat	Artifi	Agricul	Past	Fore	Bus	e or	Wat
	cial	ture	ure	est	hes	en	er	cial	ture	ure	est	hes	en	er	cial	ture	ure	st	hes	non-	er
	surfa	ce				spa		surfa	ce				spa		surfa	ce				vege	
						ce							ce							tatio	
						veg							veg							n	
						etat							etat								
						ion							ion								
Minim	104.3	103.8	105	103	103.	104	107	104.3	103.8	105.	103	103.	104	107	96.42	96.08	97.7	95.5	95.5	96.4	99.4
um				.2	2	.3	.8			9	.2	2	.3	.8			5			2	2
1st qu	105.9	106.1	108.	105	107.	108	109	106	105.4	107.	105	107.	107	109	97.83	97.42	99	97.3	99.5	98.5	100.
			2		1	.1				1	.4	8	.2					3	8		5
Mean	106.9	106.8	109.	106	109.	109	108	106.8	106.5	107.	106	109.	108	108	98.65	98.19	99.3	98.5	101	99.8	100.
			5	.8	2	.4	.9			7	.7	4	.7	.9			3	1		1	41

3rd qu	108	107.8	111.2	108.2	111.4	111.1	109	107.8	107.1	108.1	107.8	111.8	110.7	109	99.42	98.83	99.67	99	102.75	101	100.5
Maximum	109.2	110.1	112.5	114.6	115.9	113.2	109	109.2	110.1	110.5	114.6	115.9	113.2	109	100.58	101.33	100.92	105.67	106.92	103.58	100.5

Table S12. Minimum temperature by land use classes (RCP 4.5)

	1995							2018							2041						
	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water
Minimum	6.3	6.05	5.66	5.94	5.58	5.58	6.2	6.3	6.05	5.92	5.94	5.59	5.58	6.26	8.26	8.01	8.08	7.9	7.56	7.56	8.23
1st qu	6.64	6.51	5.81	6.44	5.91	5.92	6.6	6.64	6.82	6.4	6.68	5.9	6.26	6.26	8.6	9.01	8.33	8.75	7.82	8.31	8.23
Mean	7.63	7.29	6.45	7.36	6.58	6.41	6.28	7.55	7.44	6.49	7.6	6.41	6.53	6.28	9.54	9.49	8.45	9.61	8.32	8.63	8.24
3rd qu	8.79	7.78	6.67	8.07	7.05	6.71	6.2	8.79	7.78	6.61	8.52	6.66	6.79	6.26	10.75	9.75	8.58	10.49	8.56	8.79	8.23
Maximum	9.02	9.02	8.45	9.18	9.2	8.86	6.45	9.02	9.02	7.36	9.2	8.95	8.45	6.45	10.99	10.99	9.33	11.15	10.91	10.41	8.42

Table S13. Minimum temperature by land use classes (RCP 8.5)

	1995							2018							2041						
	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open non-ter	Water

Minimum	6.3	6.0	5.6	5.9	5.58	5.5	6.2	6.3	6.05	5.92	5.94	5.59	5.5	8	6.26	8.85	8.63	8.69	8.49	8.16	8.16	8.84
1st qu	6.6	6.5	5.8	6.4	5.91	5.9	6.6	6.64	6.82	6.4	6.68	5.9	6.2	6	6.26	9.21	9.6	8.94	9.34	8.43	8.92	8.84
Mean	7.6	7.2	6.4	7.3	6.58	6.4	6.2	7.55	7.44	6.49	7.6	6.41	6.5	3	6.28	10.13	10.07	9.05	10.2	8.92	9.23	8.85
3rd qu	8.7	7.7	6.6	8.0	7.05	6.7	6.2	8.79	7.78	6.61	8.52	6.66	6.7	9	6.26	11.33	10.33	9.19	11.0	9.15	9.4	8.84
Maximum	9.0	9.0	8.4	9.1	9.2	8.8	6.4	9.02	9.02	7.36	9.2	8.95	8.4	5	6.45	11.56	11.56	9.91	11.7	11.4	11	9.03
	2	2	5	8		6	5												3	9		

Table S14. Maximum temperature by land use classes (RCP 4.5)

	1995							2018							2041						
	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water
Minimum	14.29	14.05	13.72	13.48	13.31	13.43	14.28	14.29	14.05	14.01	13.48	13.31	13.43	14.28	17.08	16.88	16.99	16.25	16.07	16.33	17.07
1st qu	16.61	14.61	13.88	14.47	13.79	13.88	14.28	14.61	15.07	15.52	14.72	13.77	14.09	14.28	17.41	17.91	17.29	17.64	16.56	17.02	17.07
Mean	15.65	15.61	14.66	15.66	14.66	14.45	14.33	15.96	15.77	14.61	15.98	14.45	14.55	14.33	18.76	18.65	17.39	18.82	17.17	17.49	17.09
3rd qu	17.72	16.23	14.48	16.62	15.15	14.66	14.28	17.72	16.23	14.78	17.27	14.68	14.85	14.28	20.48	19	17.51	20.04	17.42	17.86	17.07
Maximum	18.04	18.04	17.21	18.22	18.24	17.77	15.57	18.04	18.04	15.58	18.24	17.89	17.21	14.57	20.81	20.81	18.35	20.99	20.66	19.98	17.36

Table S15. Maximum temperature by land use classes (RCP 8.5)

	1995							2018							2041						
	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water	Artificial surface	Agriculture	Pasture	Forest	Bushes	Open space	Water

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Minim	14.	14.	13.	13.	13.3	13.	14.	14.2		14.0	13.4	13.3	13.	14.2	18.07	17.84	17.9	17.2	17.0	17.	18.0							
um	29	05	72	48	1	43	28	9	14.05	1	8	1	43	8			6	3	6	32	6							
	16.	14.	13.	14.	13.7	13.	14.	14.6		14.7	13.7	14.	14.2				18.2	18.6	17.6	18.	18.0							
1st qu	61	61	88	47	9	88	28	1	15.07	15.5	2	7	09	8	18.39	18.89	7	2	2	02	6							
	15.	15.	14.	15.	14.6	14.	14.	15.9		14.6	15.9	14.4	14.	14.3			18.3	19.7	18.1	18.	18.0							
Mean	65	61	66	66	6	45	3	6	15.77	1	8	5	55		19.74	19.63	8	9	5	48	8							
	17.	16.	14.	16.	15.1	14.	14.	17.7		14.7	17.2	14.6	14.	14.2			18.4		18.3	18.	18.0							
3rd qu	72	23	48	62	5	66	28	2	16.23	8	7	8	85	8	21.44	19.98	9	21	8	85	6							
Maxim	18.	18.	17.	18.	18.2	17.	15.	18.0		15.5	18.2	17.8	17.	14.5			19.3	21.9	21.6	20.	18.3							
um	04	04	21	2	4	77	57	4	18.04	8	4	9	21	7	21.77	21.77	3	6	2	96	5							