



UNITAU

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Precipitation Regime for the Southeast Brazil: a case study analyses for future actions at Paraíba's Valley region

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Sistema Cantareira



Paraíba do Sul

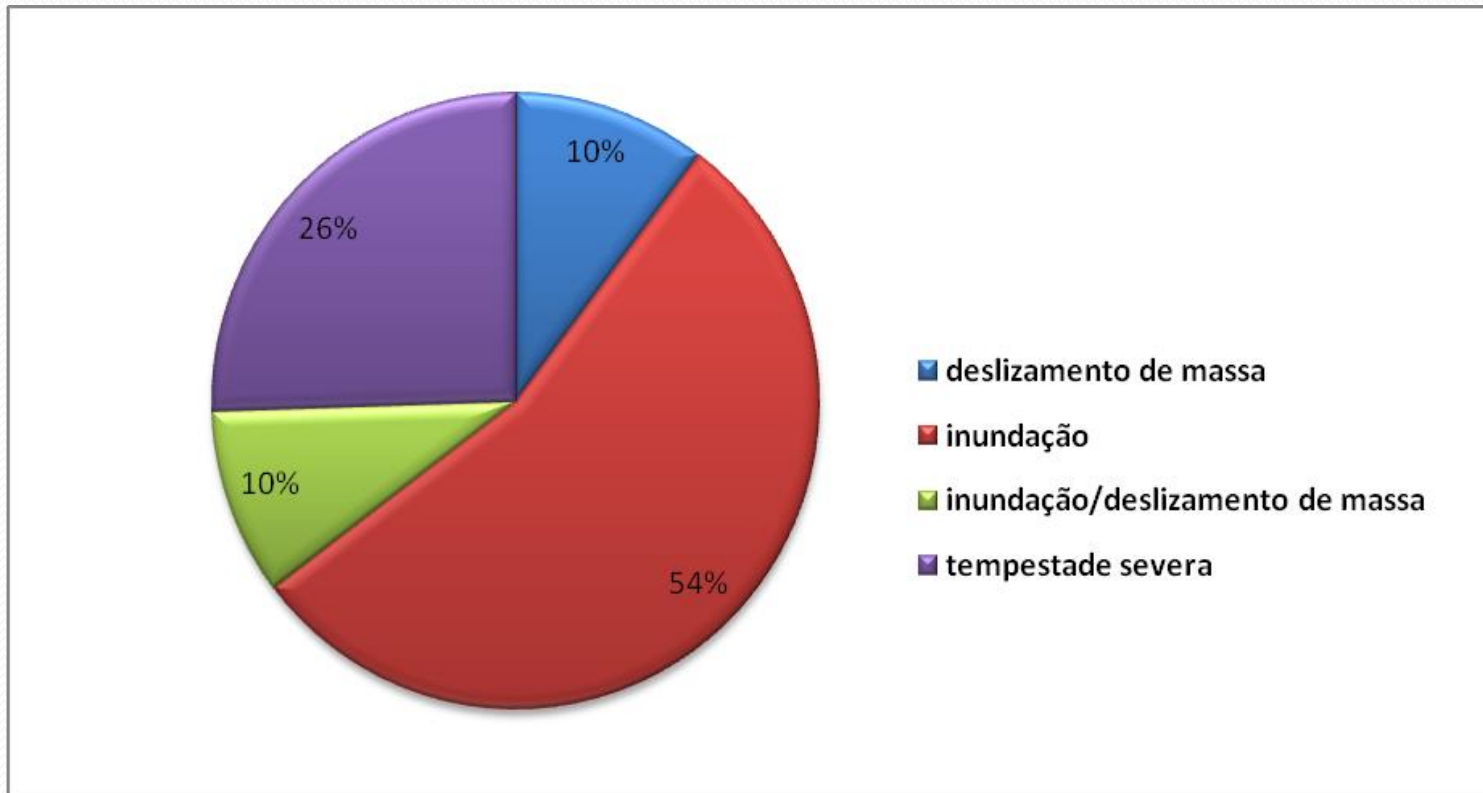


11 de junho de 2005



10 de fevereiro de 2014

- **VULNERABILITY OF THE REGION**

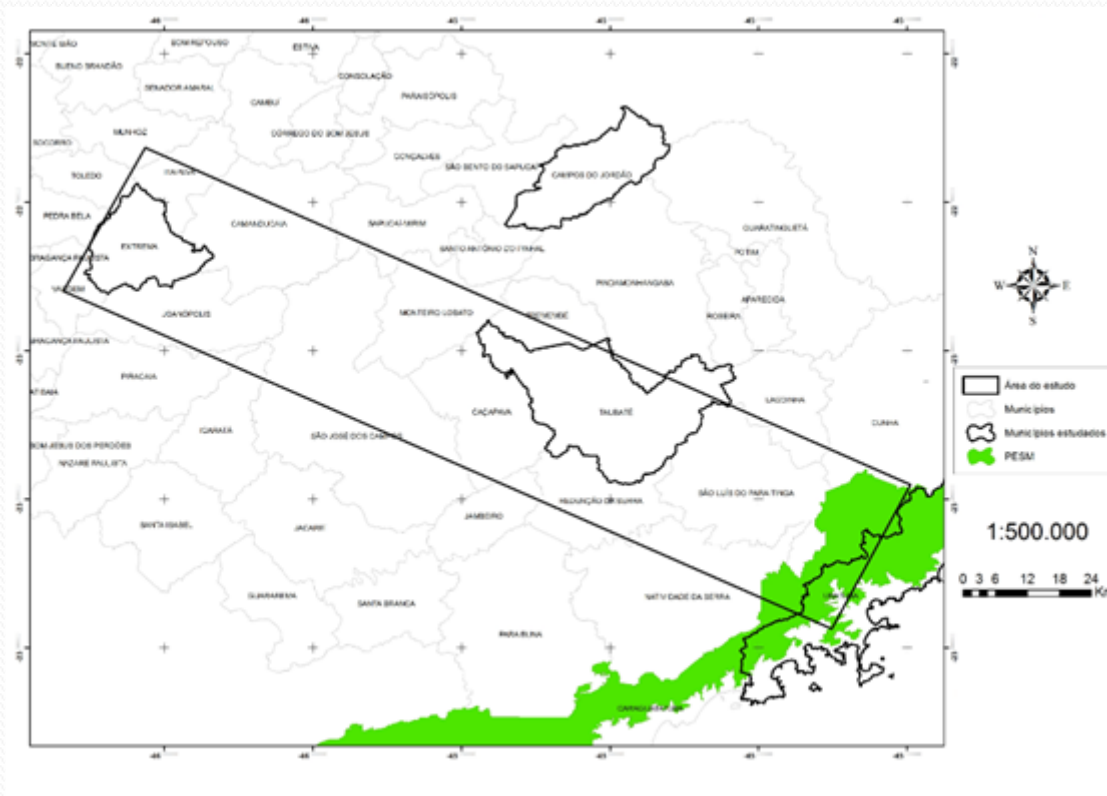


Paraíba's Valley is a region between São Paulo and Rio de Janeiro and it has more than 2.000.000 inhabitants

2. Objectives

- a) The region is very vulnerable to the weather
- b) Using the climatic simulations (downscaling of a global model) to analyse/forecast the water budget components at the Paraíba's Valley for past and future scenarios.

Location of the Paraíba's Valley



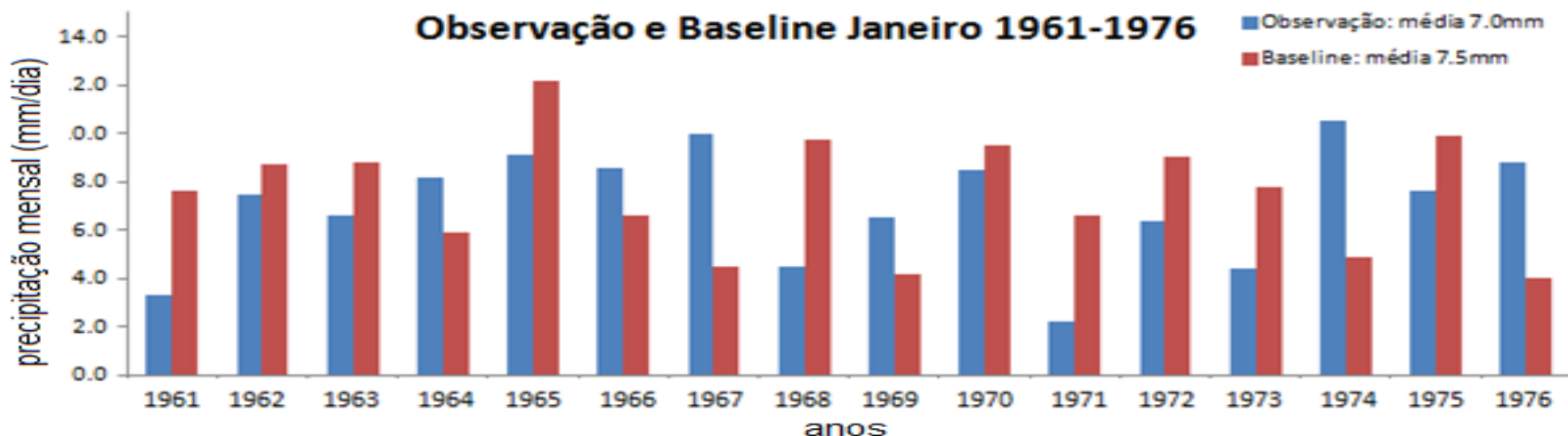
4. Validation



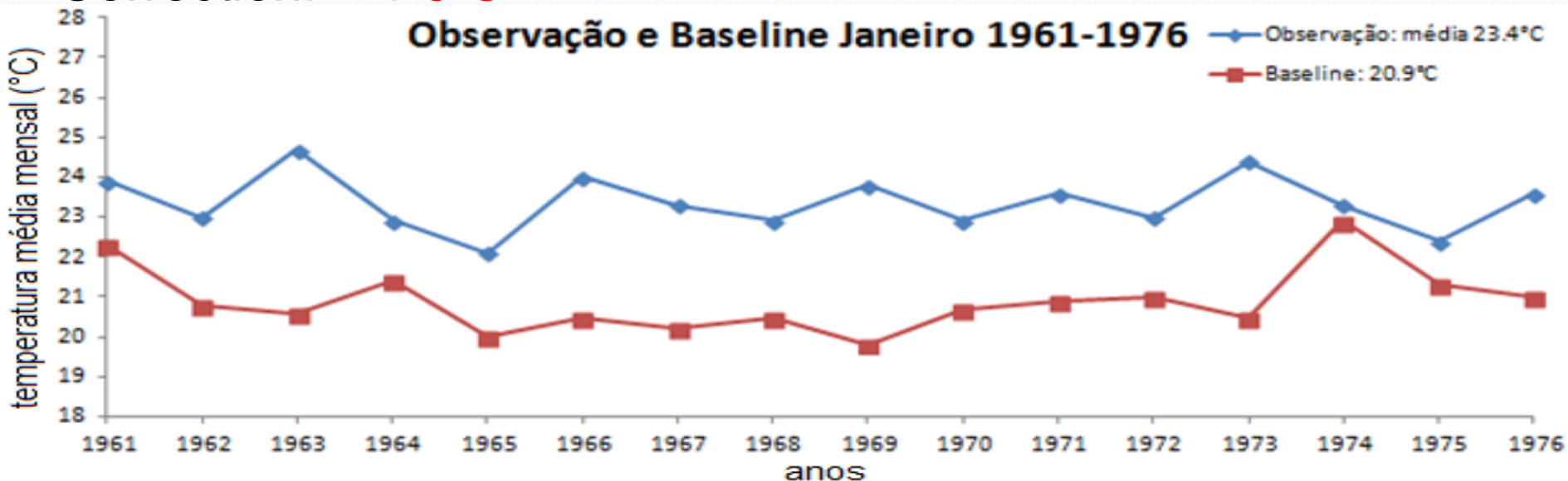
5 Resultados

5.1 Dados Climatológicos

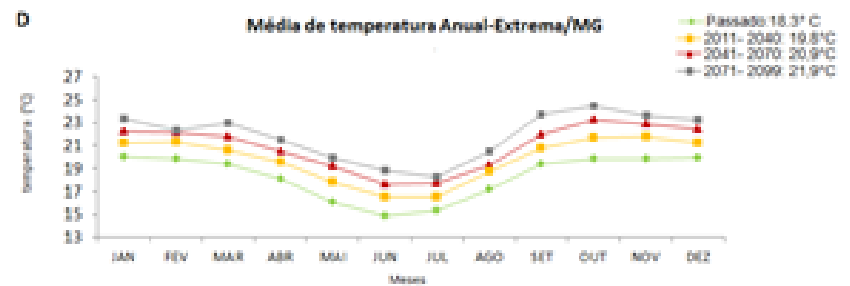
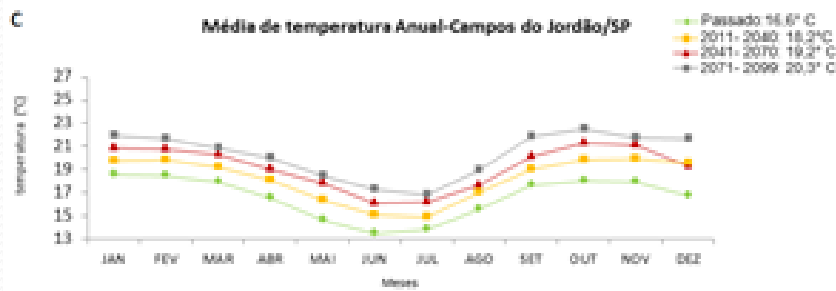
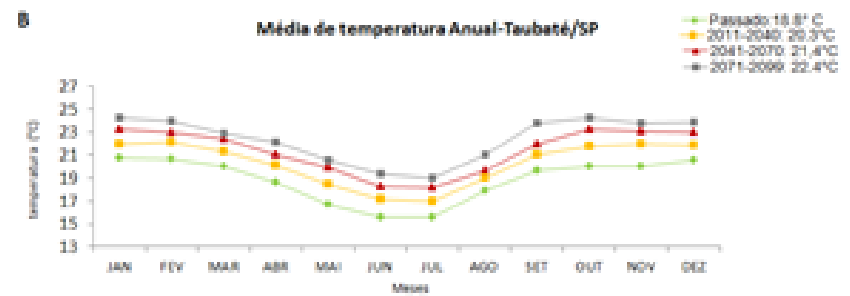
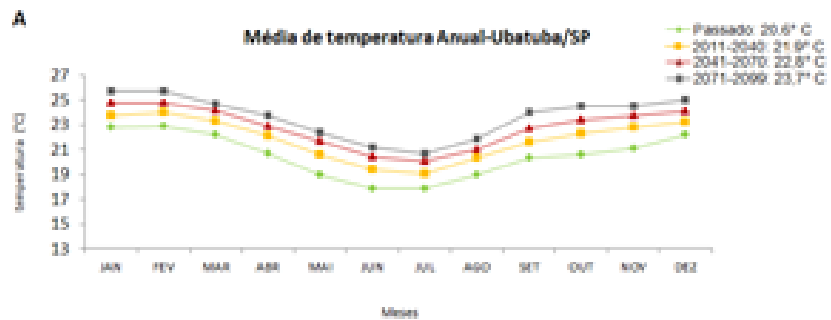
Correction: **-1,5 mm**

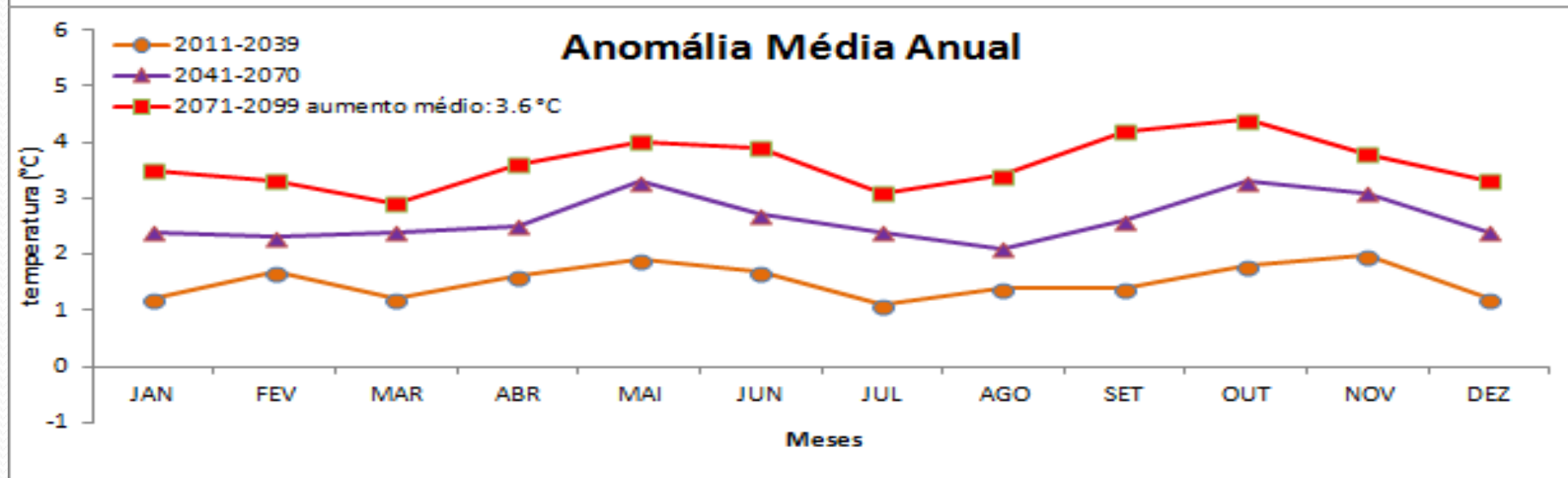
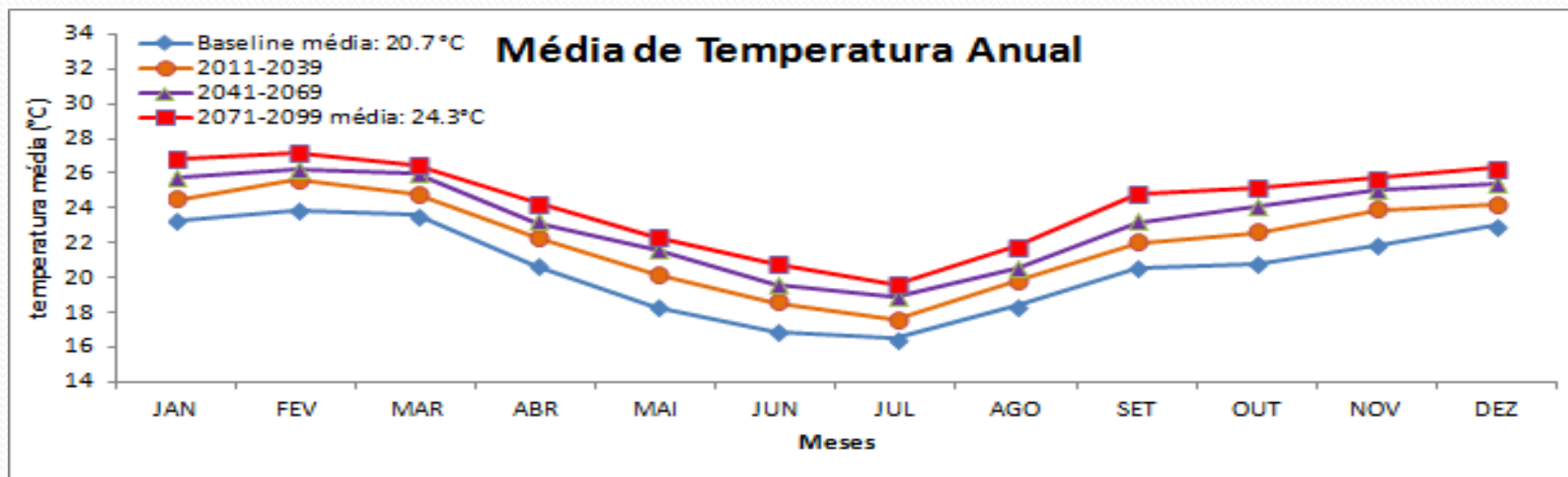


Correction: **+1.9 C**

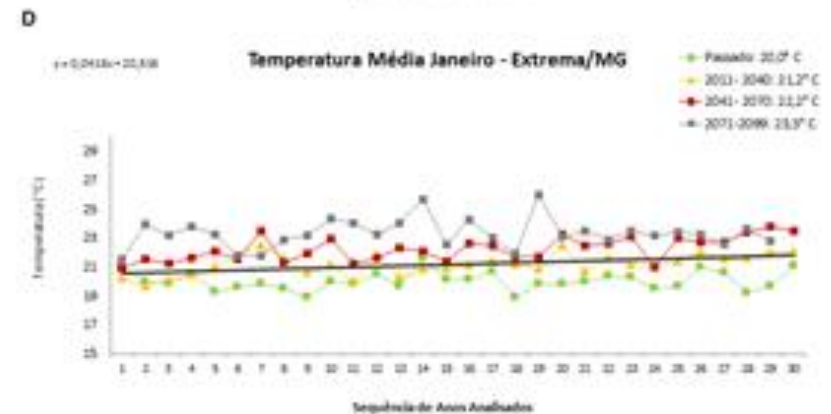
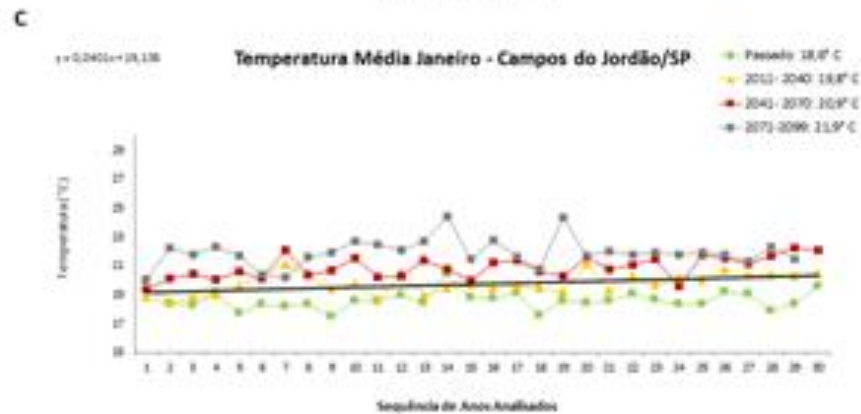
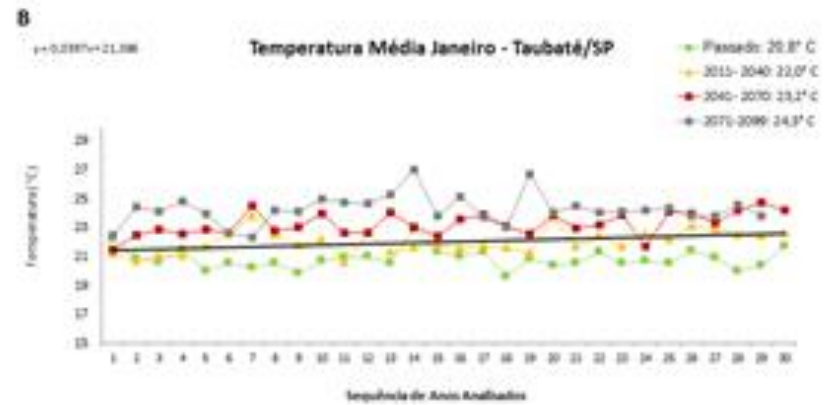
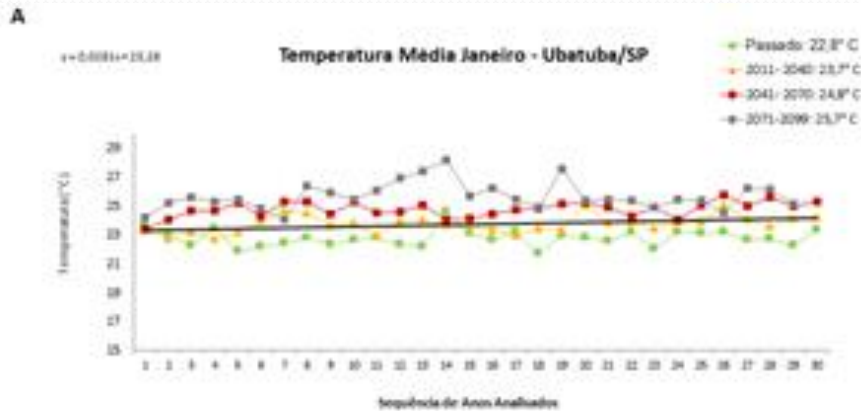


Seasonal temperature cycle

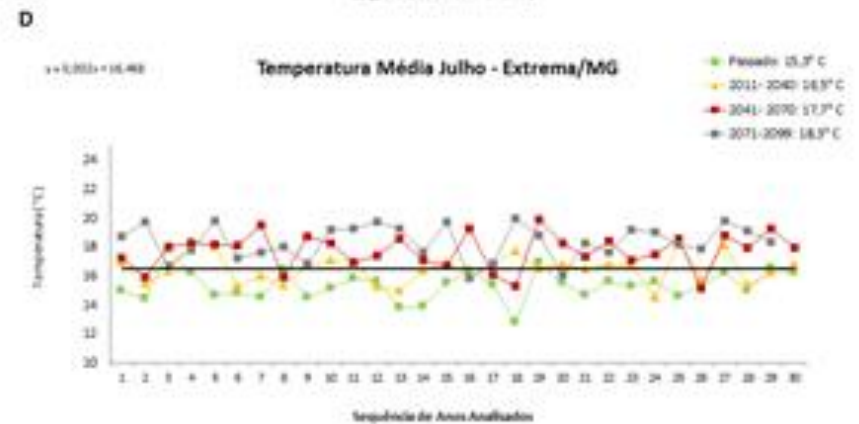
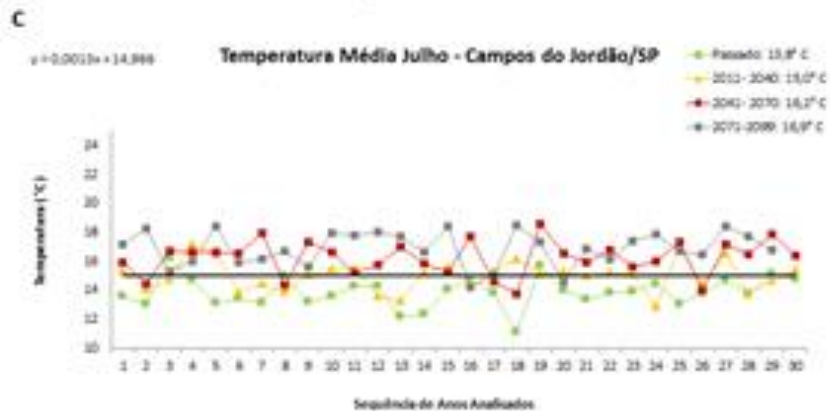
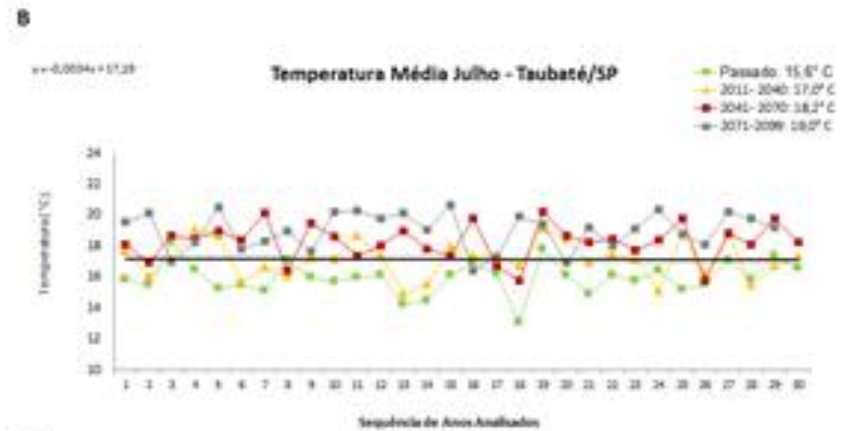
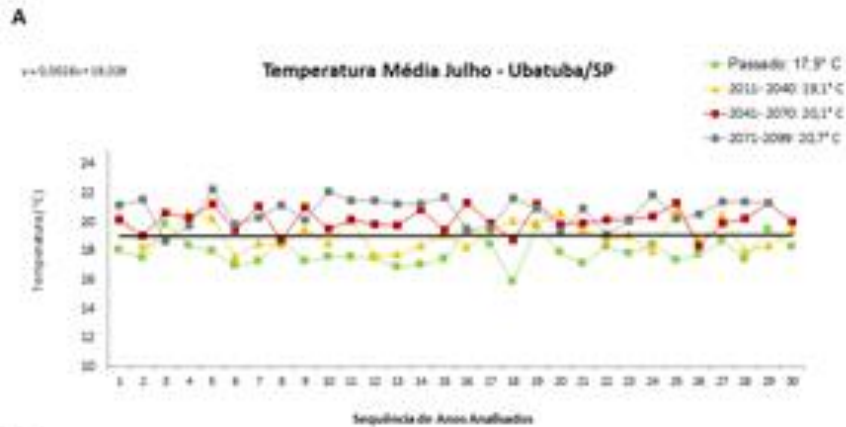




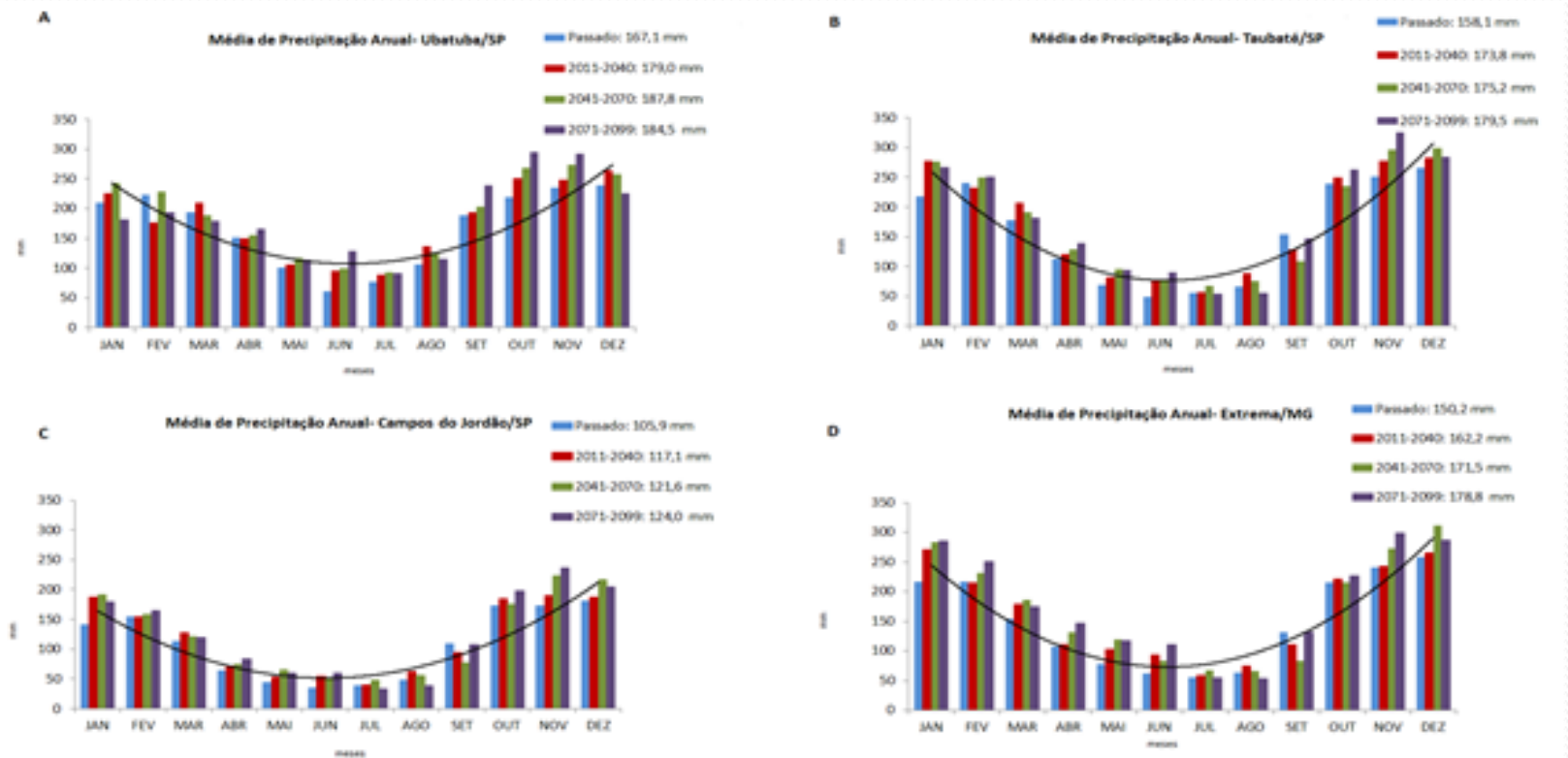
Summer month

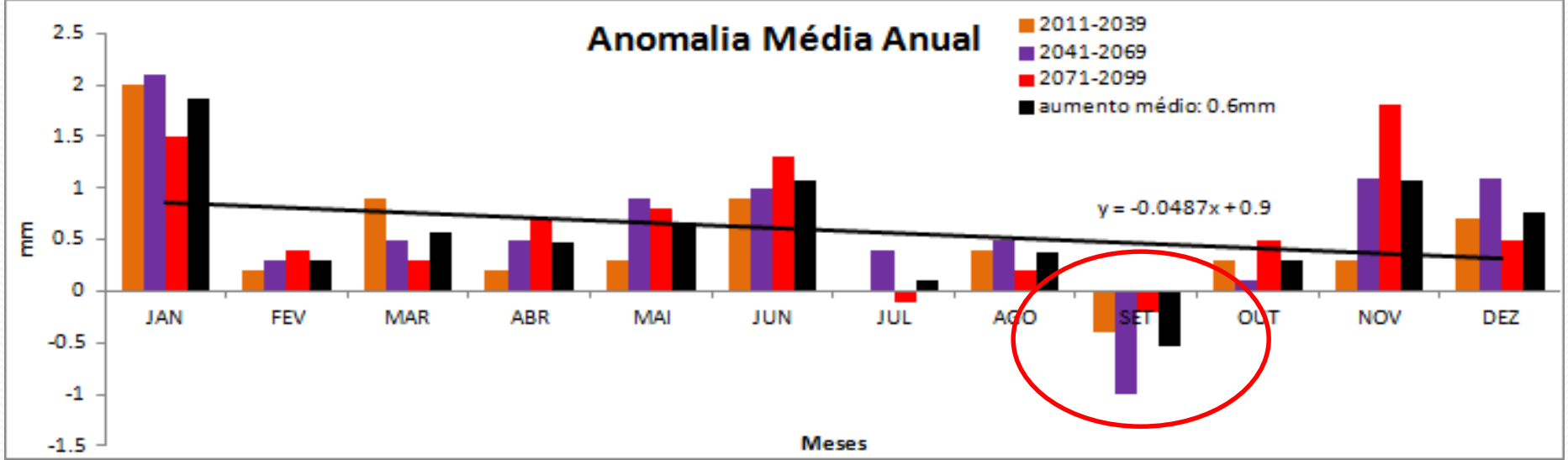
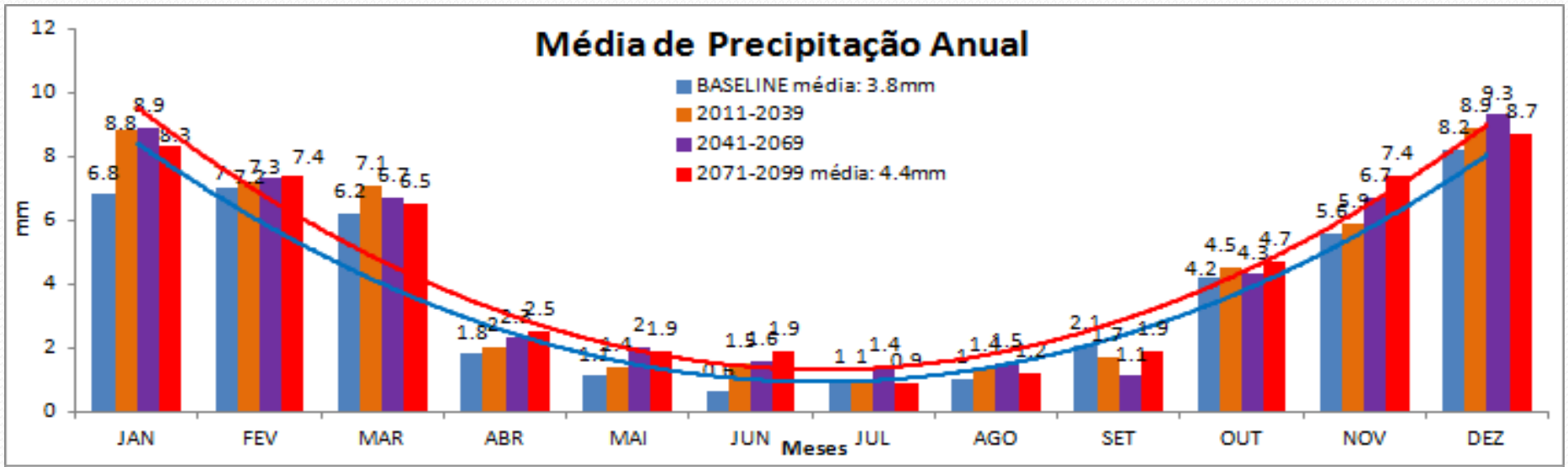


Winter month

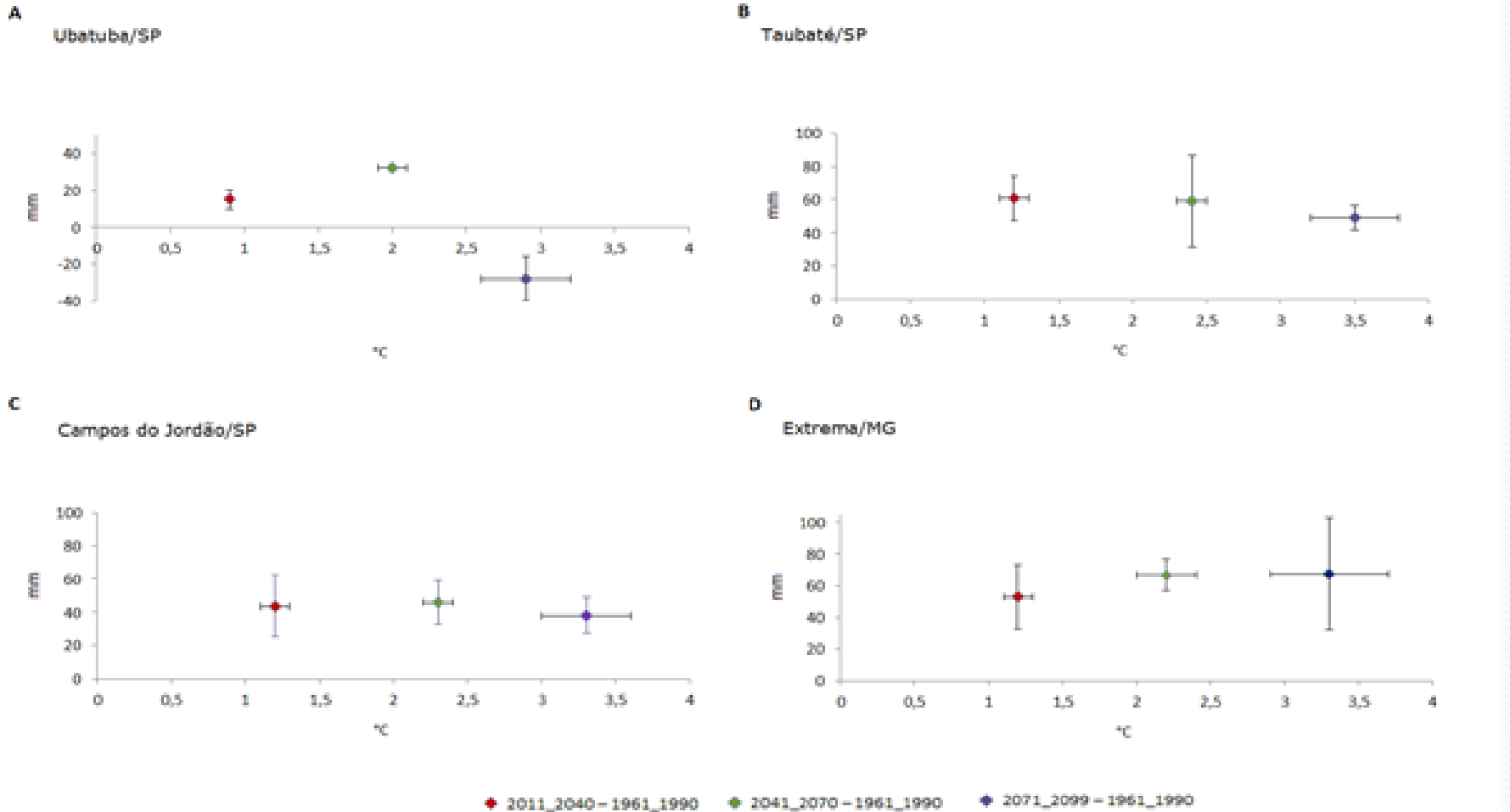


Seasonal rainfall regime





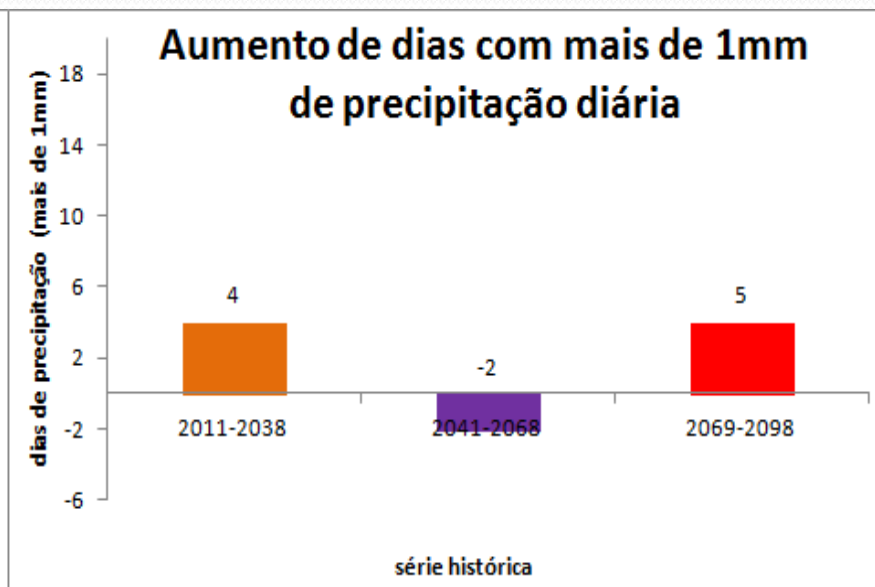
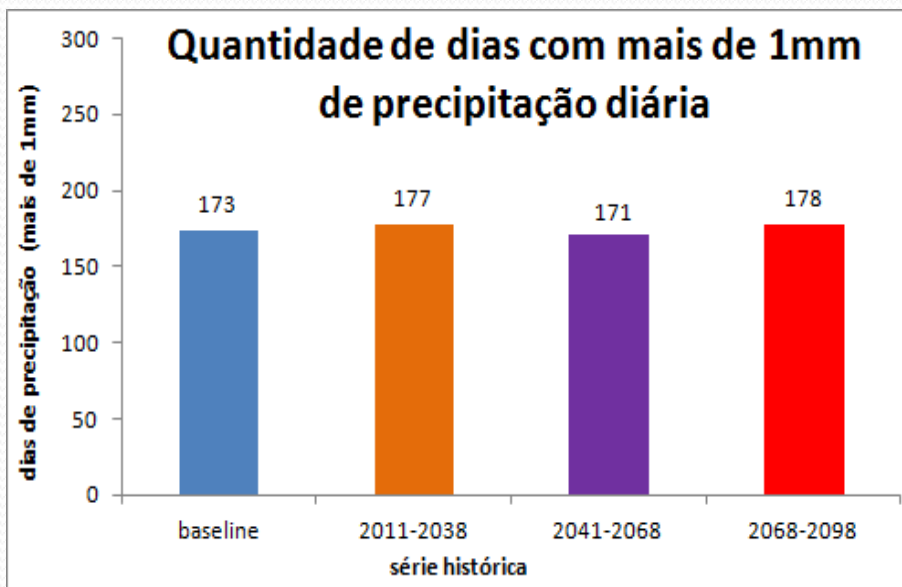
Variability of temperature and precipitation



- Rainfall higher than 1 mm day

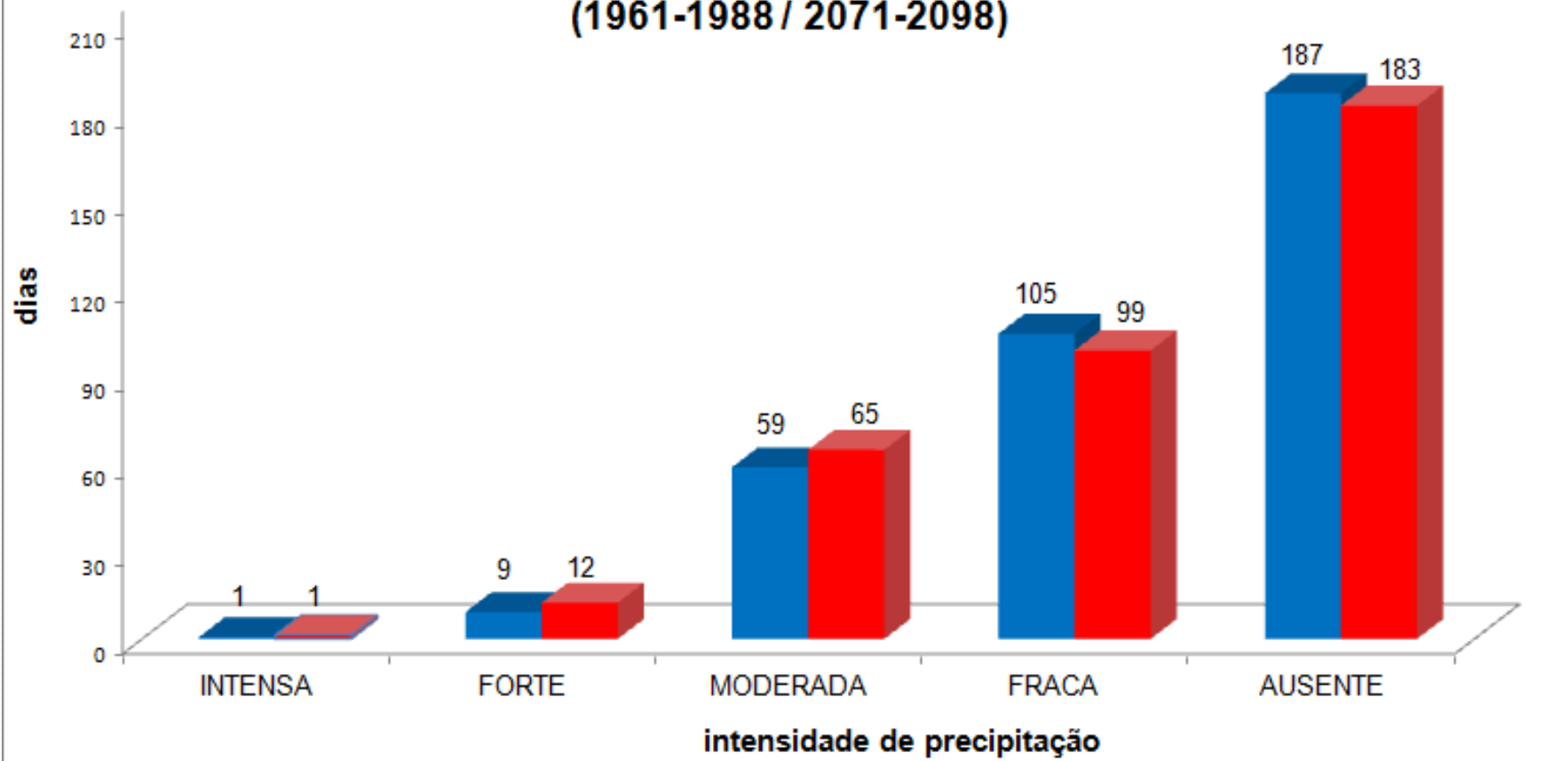
(increase of 5 days / year)

ano	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085
dias	182	203	198	166	178	158	186	175	152	171	210	185	193	165	168
ano	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	
dias	176	170	214	164	159	149	183	161	173	174	175	165	212	-----	



Rainfall intensity

**Classificação quanto a intensidade de precipitação
(1961-1988 / 2071-2098)**

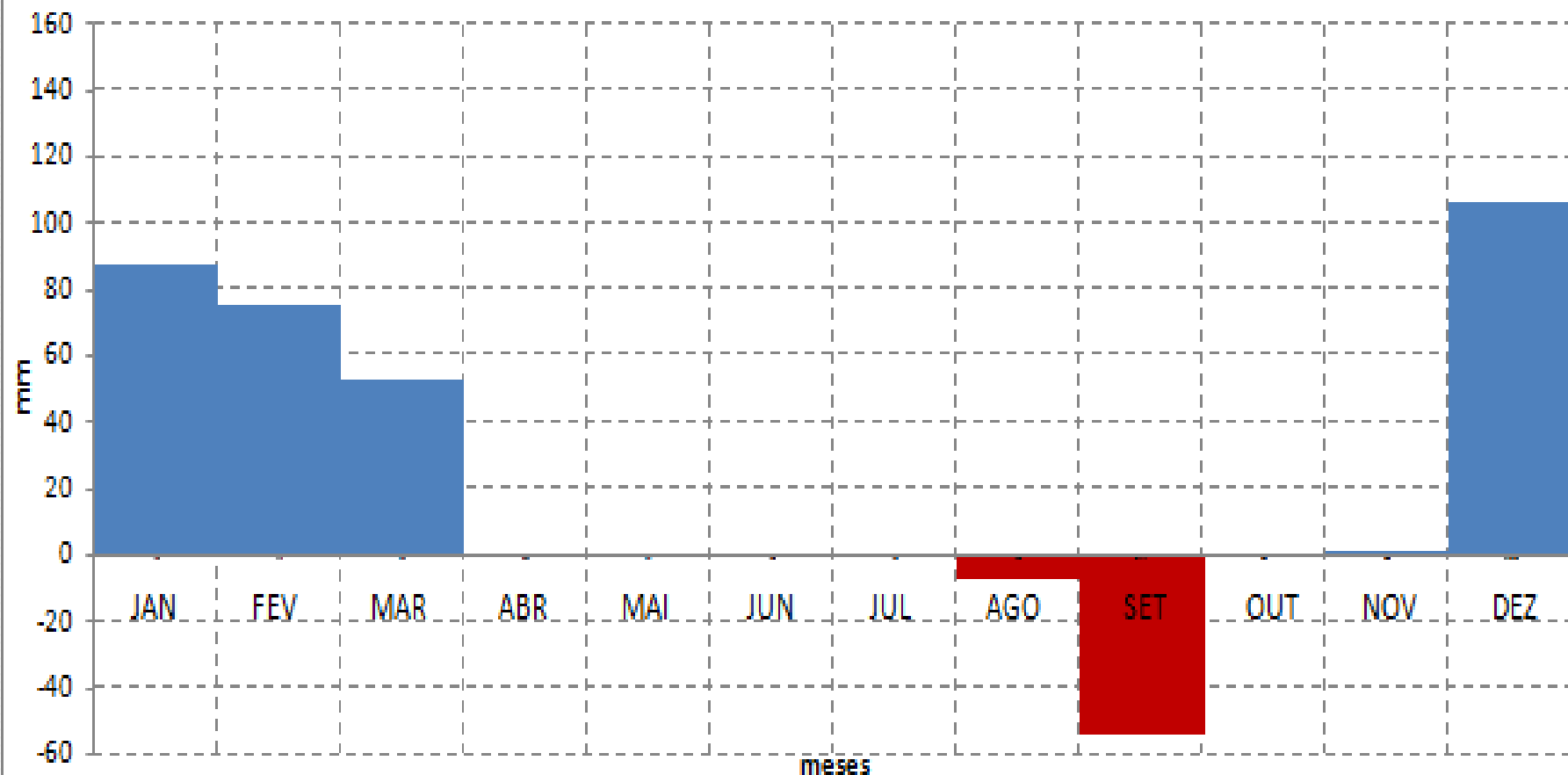


Water Budget (Thornthwaith-Mather)

Balanzo Hídrico: 2071-2099												
meses	T (°C)	P (mm)	Etp (mm)	Cor	ETP (mm)	P- ETP (mm)	VAL (mm)	ALT (mm)	ETR (mm)	DEF (mm)	EXC (mm)	ESC (mm)
JAN	26,8	249	140	1,15	161	88	100	0	161	0	88	72
FEV	27,2	222	146	1,00	146	76	100	0	146	0	76	74
MAR	26,5	195	135	1,05	142	53	100	0	142	0	53	64
ABR	24,3	75	104	0,97	101	-26	74	-26	101	0	0	0
MAI	22,3	57	80	0,95	76	-19	55	-19	76	0	0	0
JUN	20,8	57	65	0,89	57	0	55	0	57	0	0	0
JUL	19,6	27	54	0,94	51	-24	31	-24	51	0	0	0
AGO	21,8	36	74	0,98	73	-37	0	-31	67	6	0	0
SET	24,8	57	110	1,00	110	-53	0	0	57	53	0	0
OUT	25,2	141	116	1,09	126	15	15	15	126	0	0	0
NOV	25,7	222	123	1,10	135	87	100	85	135	0	2	1
DEZ	26,3	261	132	1,17	155	106	100	0	155	0	106	54
Total	24,3	1599			1333	266		0	1274	59	325	265

Water Budget (Thornthwaith-Mather)

BALANÇO HÍDRICO CLIMATOLÓGICO (2071-2099) ■ DÉFICIT ■ EXCEDENTE



- Synthesis of the Water budget

Série temporal	Temperatura (°C)	Precipitação (mm)	Evapotranspiração (mm)	Déficit hídrico (mm)	Excedente (mm)
1960-1989	20,7	1368	977	22	413
2010-2039	22,2	1542	1096	19	466
2040-2069	23,3	1593	1210	24	407
2070-2099	24,3	1599	1333	59	325

Conclusions

- The temperature will be higher (around 3° C) and also the **precipitação (216 mm year)**.
- The rainfall will be **more intense** and with a **higher number of events**
- Although **the temperature and rainfall will be higher**, the evapotranspiration will increase and, as a result, the **water deficit** during the end of the dry period (Sept) will increase.
- Ongoing work is studying the role of the atmospheric circulation (sea breeze) and the decadal variability.