
Appendix E

Meteorological Data Processing

JULY 31, 2016

1. RAINFALL DATA QUALITY CONTROL

Rainfall data from two primary data sources ([1] the National Climatic Data Center (NCDC) Global Historic Climatology Network daily gage network—30 gages, and [2] the NCDC Quality Controlled Local Climatological Data hourly gage network—5 gages) were processed and quality controlled (using the Normal Ratio Method) to derive the forcing time series used to drive the watershed model. Figure 1 summarizes patching results over 35 years for all stations. The top 10 highest quality stations are labeled in Figure 1 for reference. Rainfall was also plotted against gage elevation for reference. Table 1 summarizes the final set of 30 rainfall gages from among the three islands used for modeling. The stations are sorted from highest quality to lowest quality. Attribute information includes elevation, rainfall evaluation period, percent missing (reported and adjusted), and average annual rainfall (reported and adjusted). Figure 2 through Figure 31 shows annual quantity and quality of rainfall for 35 water years (10/1/1980 – 9/30/2015), also ordered by highest to lowest quality.

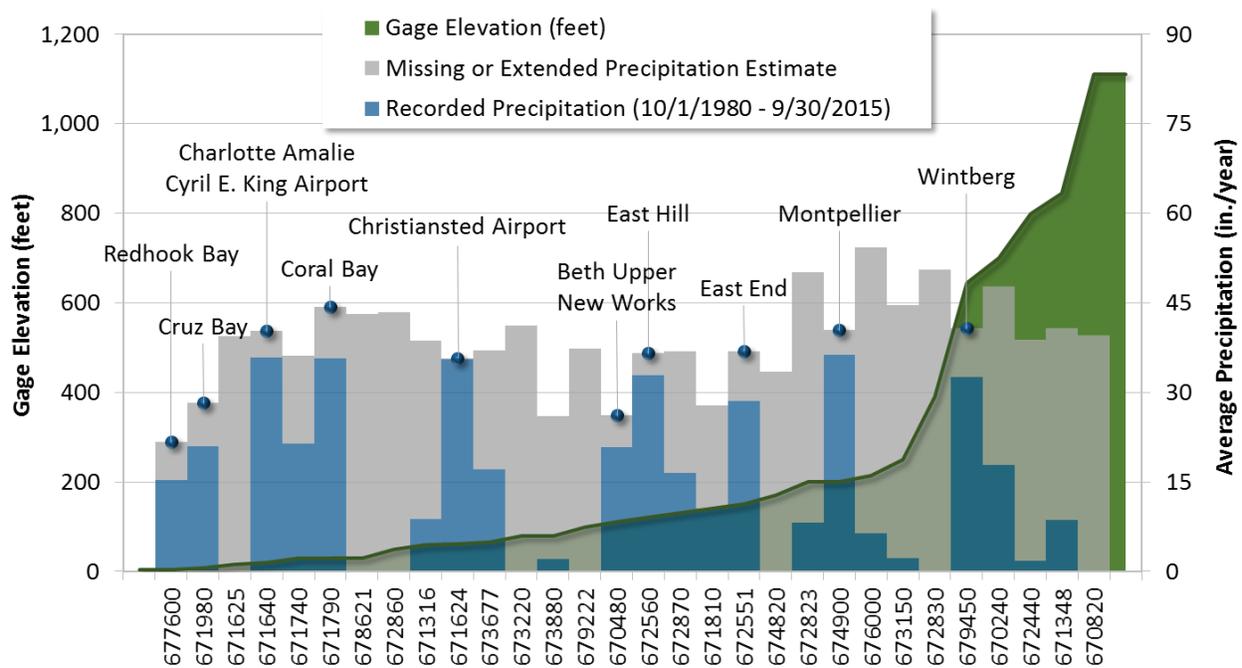


Figure 1. Regional NCDC rainfall totals vs. gage elevation

Table 1. Summary of Virgin Islands NCDC rainfall data compiled and processed for modeling

Quality Rank	Station Name	Station ID	Elevation (ft)	Evaluation Period ¹		Percent Missing ²		Rainfall (inches/year)	
				First	Last	Reported	Adjusted	Reported	Adjusted
1	CHRISTIANSTED AP	671624	61	1/2/1980	12/30/2015	0%	3%	35.52	35.74
2	EAST HILL	672560	120	1/5/1980	12/30/2015	0%	8%	32.83	36.55
3	MONTPELLIER	674900	200	2/2/1980	12/27/2015	0%	8%	36.28	40.45
4	CHARLOTTE AMALIE CYRIL	671640	20	3/24/1980	12/31/2015	0%	11%	35.77	40.30
5	BETH UPPER NEW WORKS	670480	110	1/2/1980	10/31/2014	3%	16%	20.87	26.11
6	WINTBERG	679450	645	9/3/1980	12/16/2010	14%	17%	32.62	40.72
7	EAST END	672551	150	1/6/1980	11/29/2015	0%	18%	28.52	36.92
8	CORAL BAY	671790	30	3/4/1981	9/30/2011	13%	19%	35.68	44.26
9	CRUZ BAY	671980	8	1/5/1980	11/1/2015	0%	19%	20.97	28.24
10	REDHOOK BAY ST THOMAS	677600	4	3/3/1980	12/31/2015	0%	26%	15.38	21.71
11	CHRISTIANSTED FORT	671740	30	1/3/1980	11/24/2015	0%	30%	21.40	36.09
12	ESTATE THE SIGHT	672870	130	2/3/1980	6/28/2002	38%	39%	16.48	36.95
13	GRANARD	673677	65	1/5/1980	6/19/2003	35%	39%	17.16	37.02
14	COTTON VALLEY 2	671810	140	2/2/1982	7/31/2001	44%	47%	10.54	27.85
15	ANNALY	670240	700	1/2/1980	2/21/2003	36%	47%	17.80	47.71
16	CANEEL BAY PLANTATION	671316	60	2/3/1980	2/19/1998	50%	53%	8.71	38.67
17	CATHERINEBURG	671348	845	1/5/1980	10/27/1996	54%	57%	8.56	40.75
18	ESTATE FORT MYLNER	672823	200	1/3/1980	8/30/1995	57%	61%	8.22	50.14
19	FOUNTAIN	673150	250	1/2/1980	4/29/1992	67%	67%	2.29	44.69
20	HAM BLUFF LIGHTHOUSE	673880	80	1/23/1980	10/29/1992	65%	68%	2.06	26.03
21	DOROTHEA AES	672440	800	1/4/1980	5/14/1993	64%	68%	1.75	38.84
22	LAMESHUR BAY	674820	170	1/10/1980	3/29/1989	76%	78%	0.00	33.47
23	WATER ISLE	679222	100	1/9/1980	7/25/1990	72%	79%	0.00	37.36
24	FREDERIKSTED 1 SE	673220	80	1/2/1980	8/30/1989	75%	87%	0.00	41.22
25	ESTATE HOPE	672830	390	5/7/1984	8/30/1989	85%	87%	0.00	50.54
26	PROSPECT HILL	676000	214	9/11/2012	12/31/2015	91%	92%	6.39	54.31
27	ESTATE RUST-OP-TWIST	672860	50	3/22/1980	7/29/1984	91%	92%	0.00	43.46
28	BORDEAUX MOUNTAIN	670820	1,110	1/6/1980	7/30/1984	89%	93%	0.00	39.59
29	CHARLOTTE AMALIE 2	671625	15	1/9/1980	11/21/1981	97%	97%	0.00	39.47
30	TAGUE BAY	678621	30	1/7/1980	5/28/1981	98%	99%	0.00	43.17

1. Evaluation period (for data processing): 1/1/1980 – 12/31/2015. Actual start and end date ranges of the gages may extend outside this window.
2. Percent missing: “Reported” are flagged missing intervals in the dataset over the evaluation period. “Adjusted” includes un-flagged dry intervals longer than 30 days.

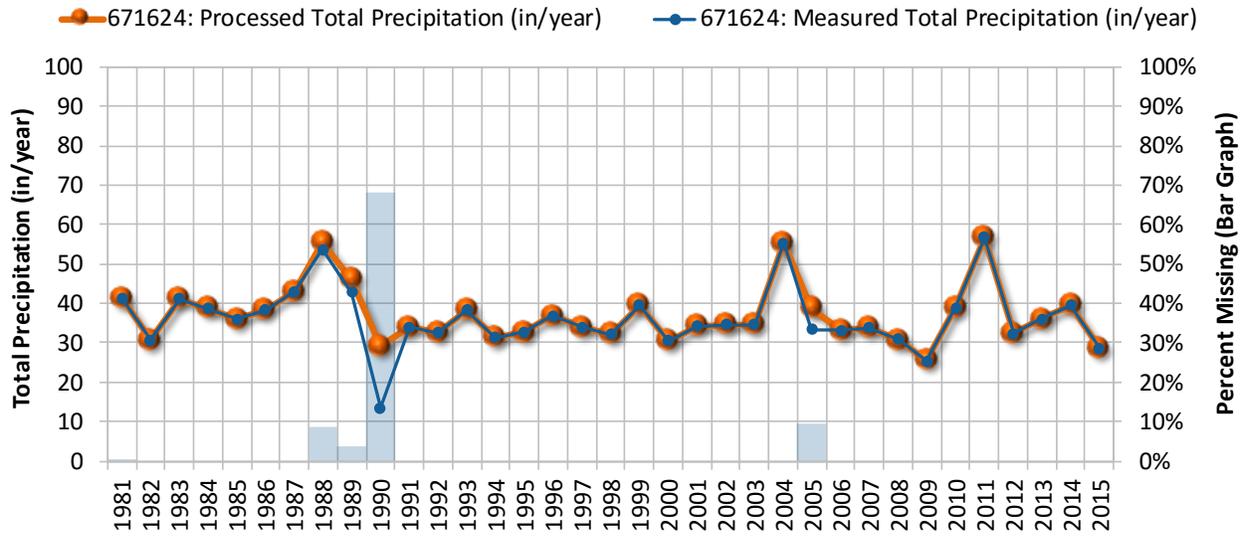


Figure 2. Total Precipitation at CHRISTIANSTED AP (671624), 1981-2015.

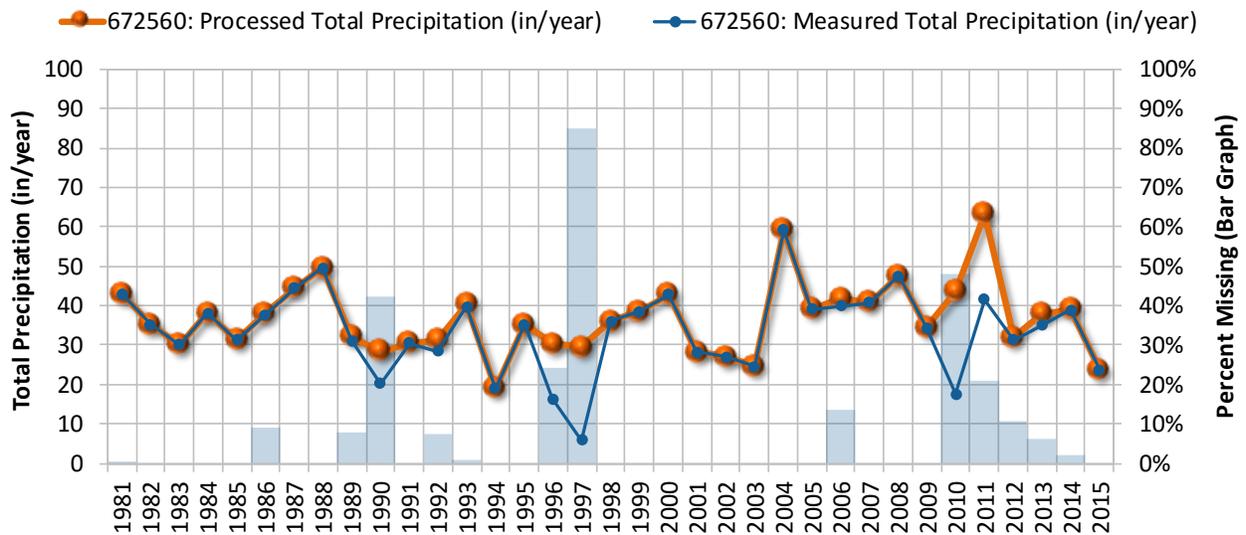


Figure 3. Total Precipitation at EAST HILL (672560), 1981-2015.

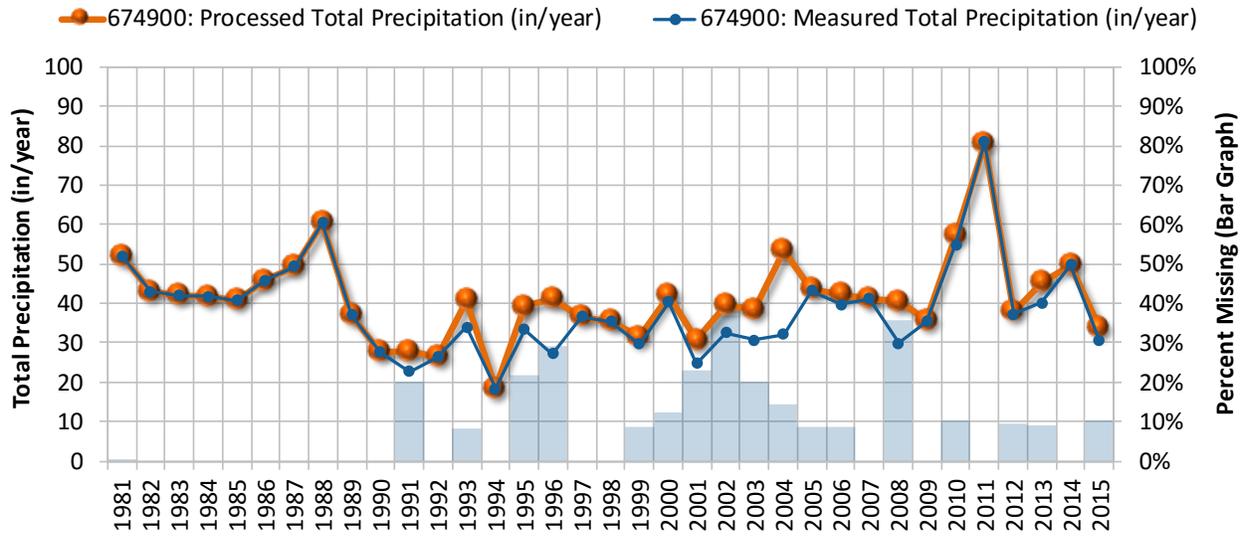


Figure 4. Total Precipitation at MONTPELLIER (674900), 1981-2015.

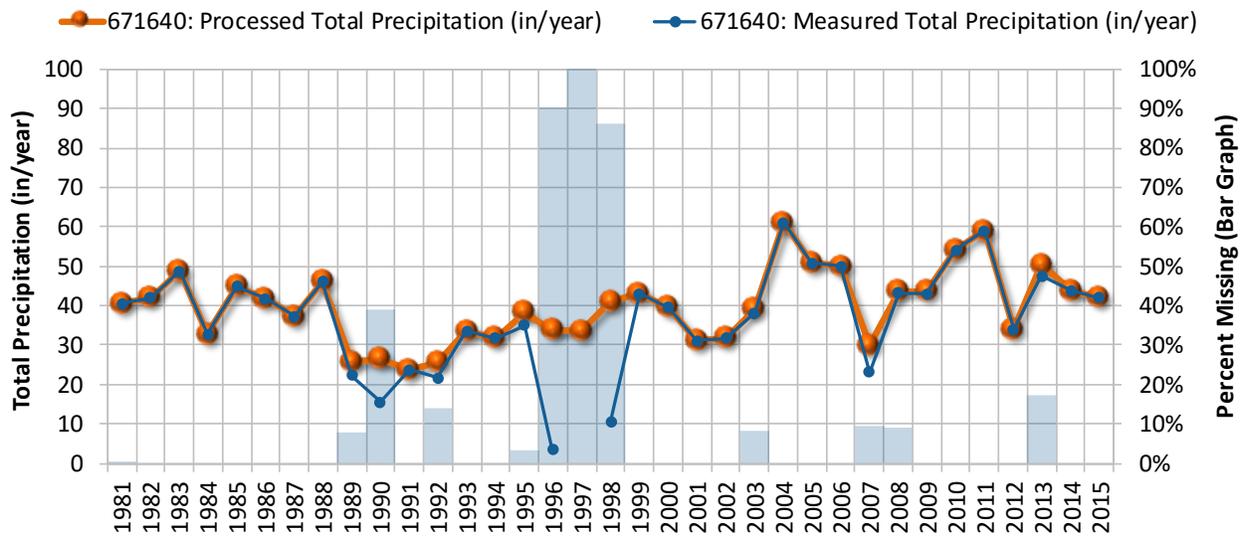


Figure 5. Total Precipitation at CHARLOTTE AMALIE CYRIL (671640), 1981-2015.

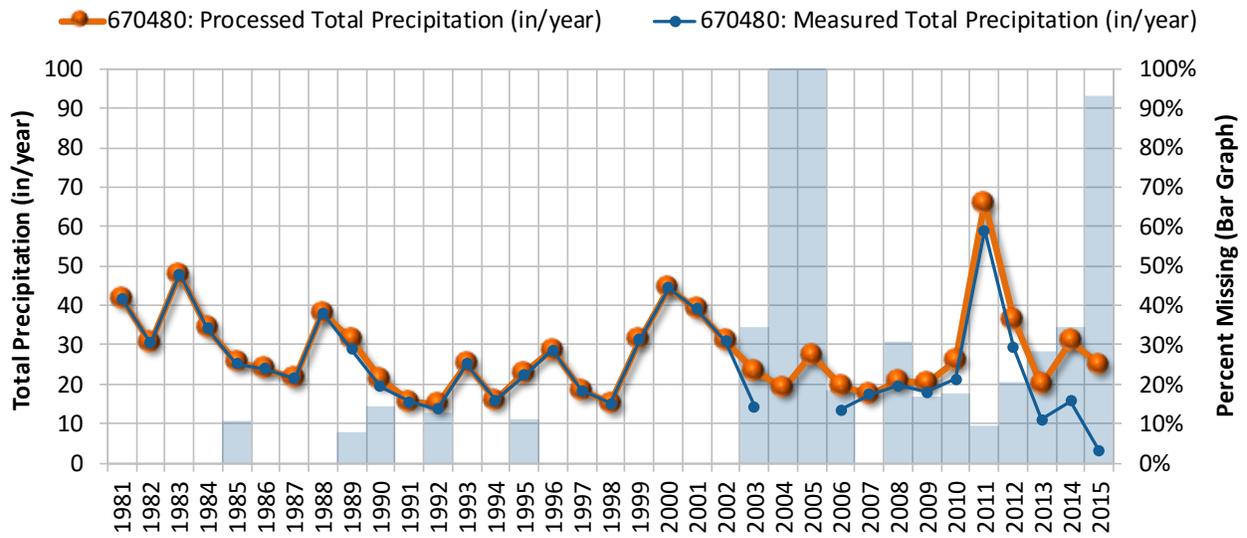


Figure 6. Total Precipitation at BETH UPPER NEW WORKS (670480), 1981-2015.

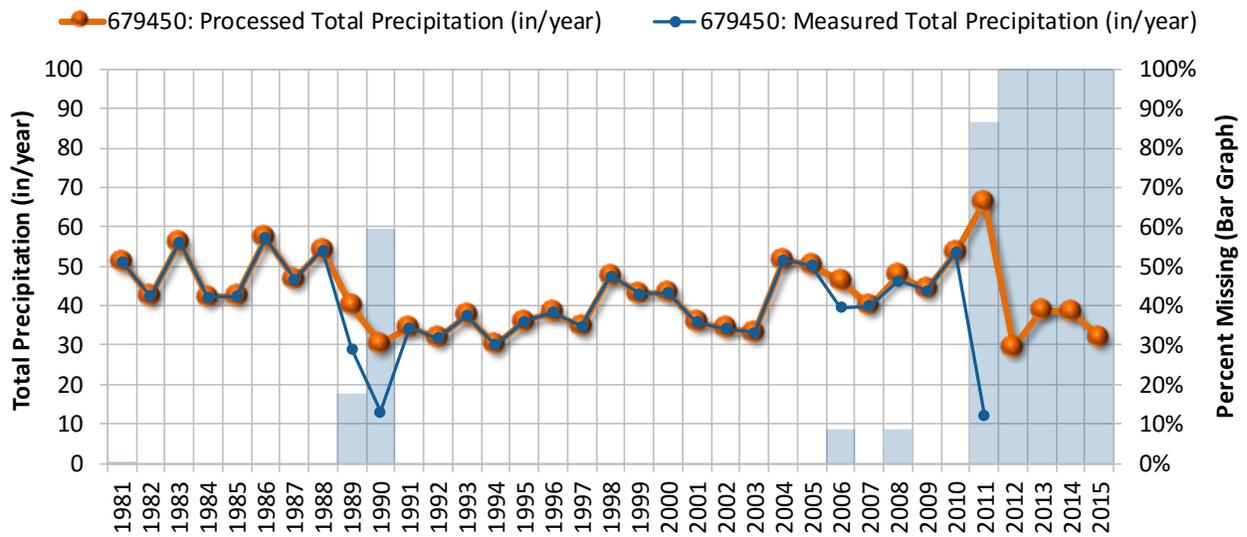


Figure 7. Total Precipitation at WINTBERG (679450), 1981-2015.

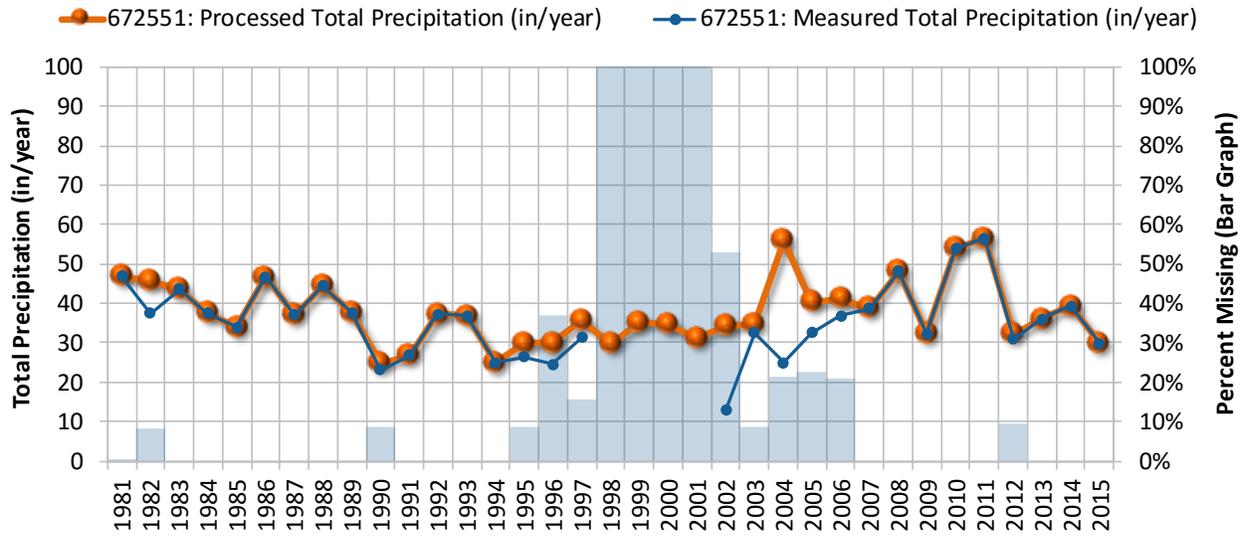


Figure 8. Total Precipitation at EAST END (672551), 1981-2015.

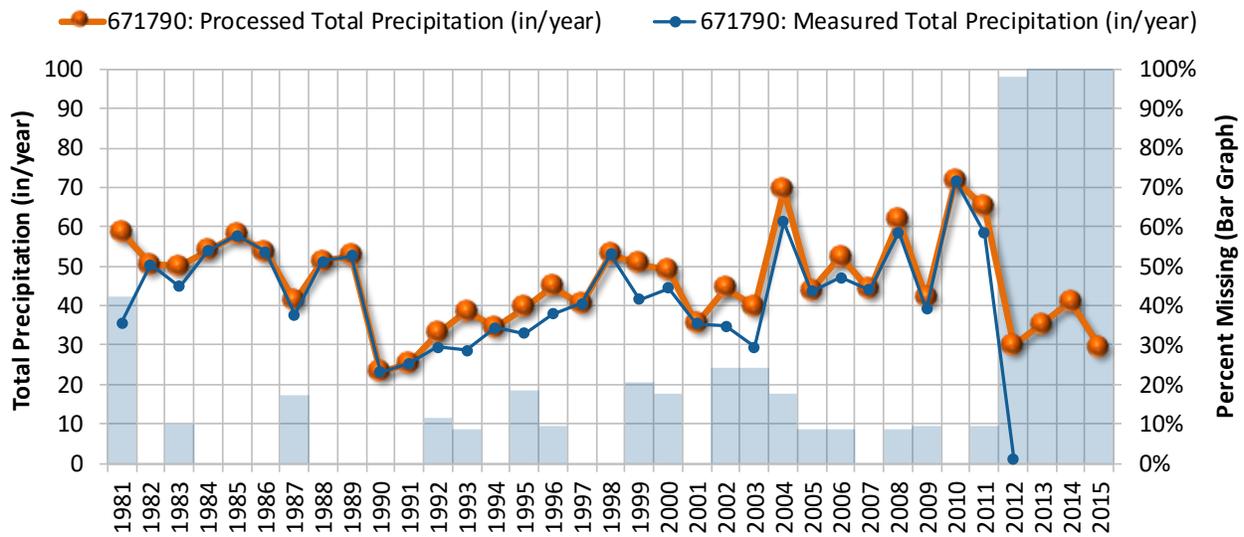


Figure 9. Total Precipitation at CORAL BAY (671790), 1981-2015.

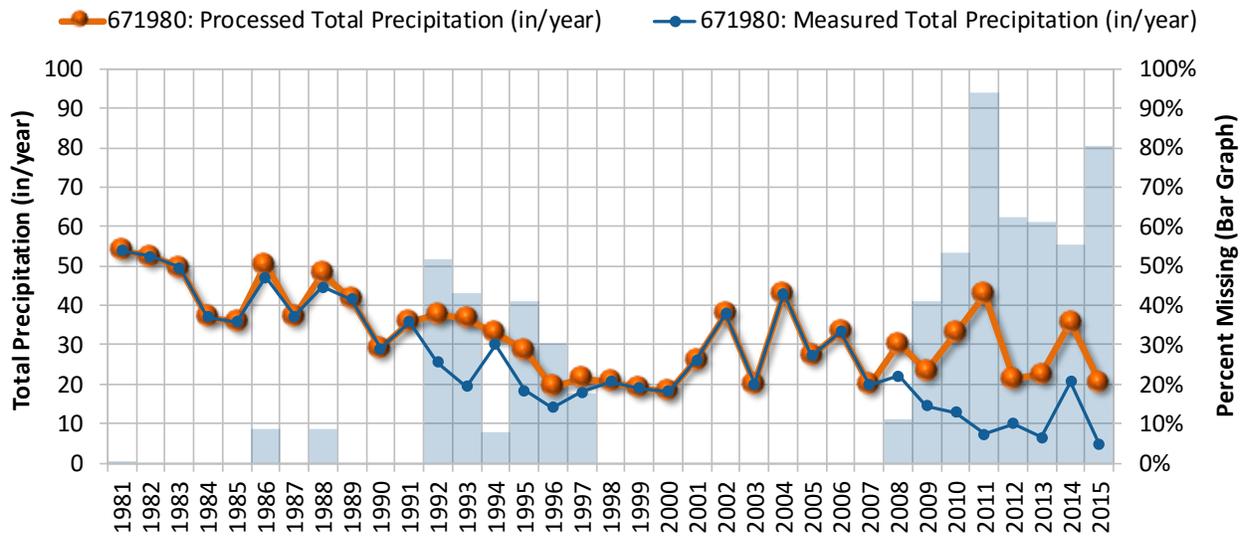


Figure 10. Total Precipitation at CRUZ BAY (671980), 1981-2015.

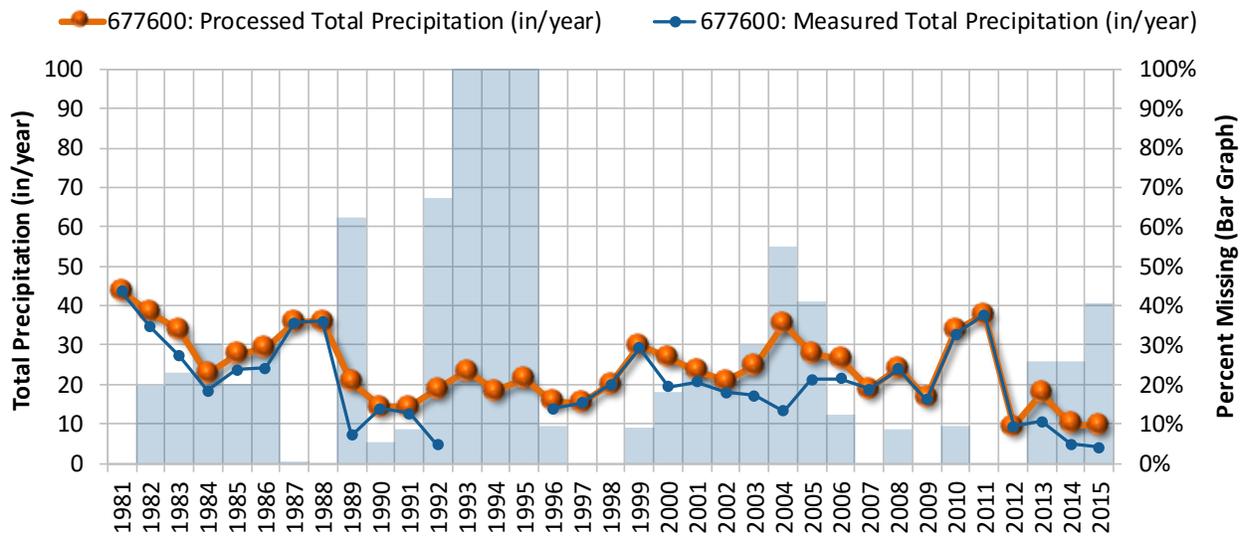


Figure 11. Total Precipitation at REDHOOK BAY ST THOMAS (677600), 1981-2015.

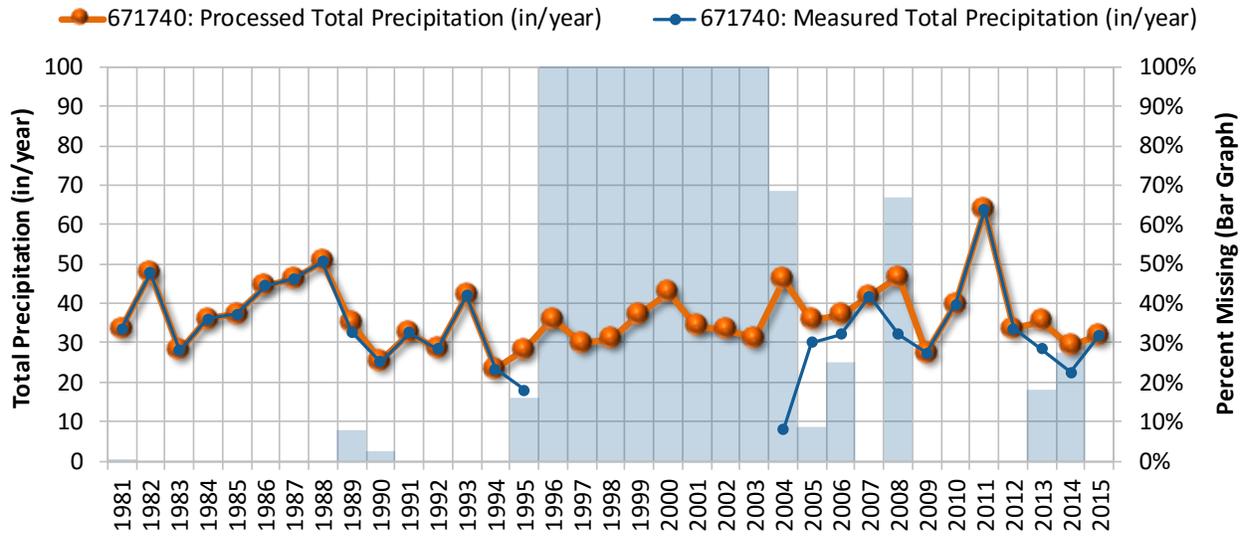


Figure 12. Total Precipitation at CHRISTIANSTED FORT (671740), 1981-2015.

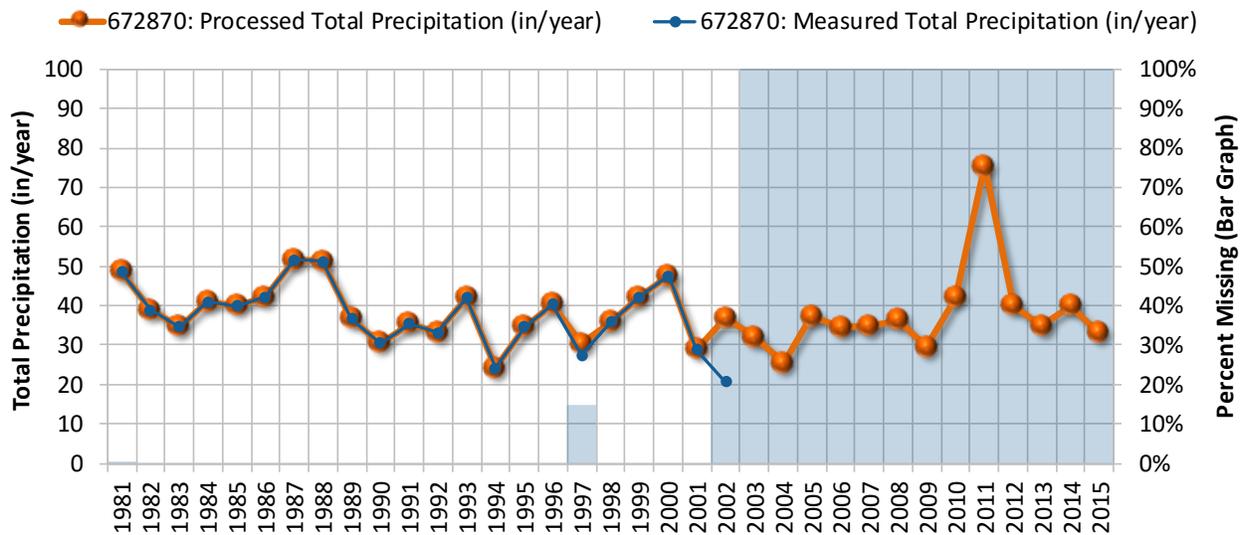


Figure 13. Total Precipitation at ESTATE THE SIGHT (672870), 1981-2015.

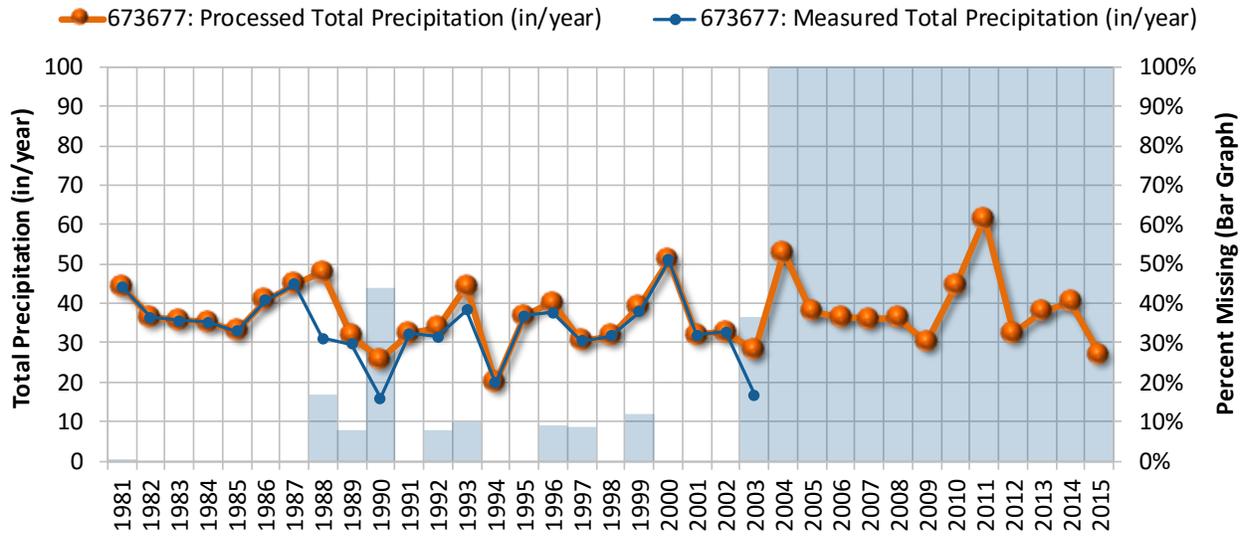


Figure 14. Total Precipitation at GRANARD (673677), 1981-2015.

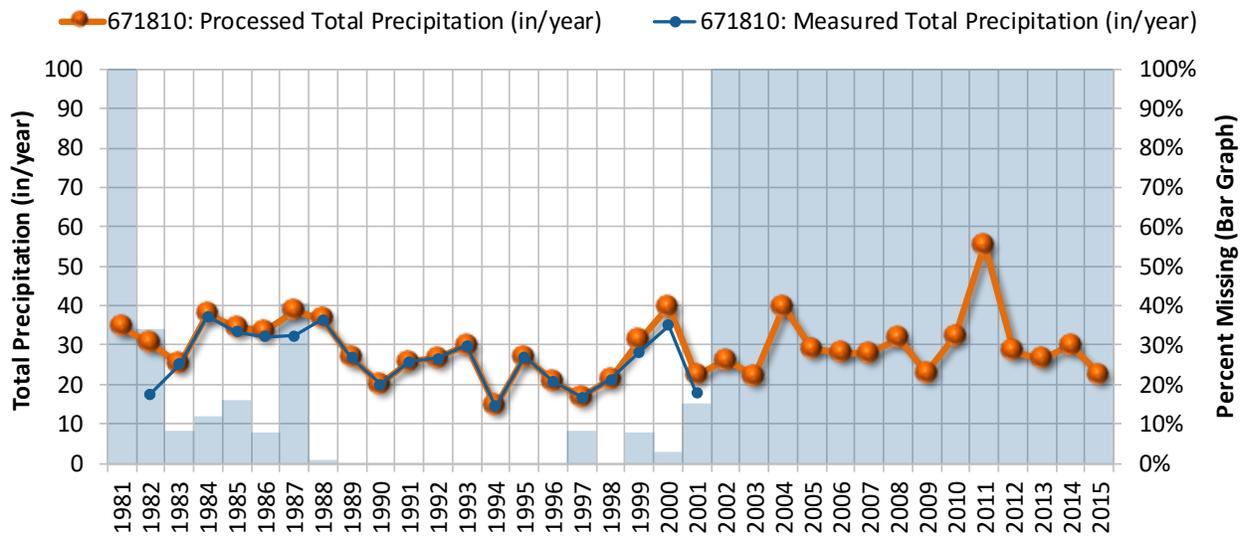


Figure 15. Total Precipitation at COTTON VALLEY 2 (671810), 1981-2015.

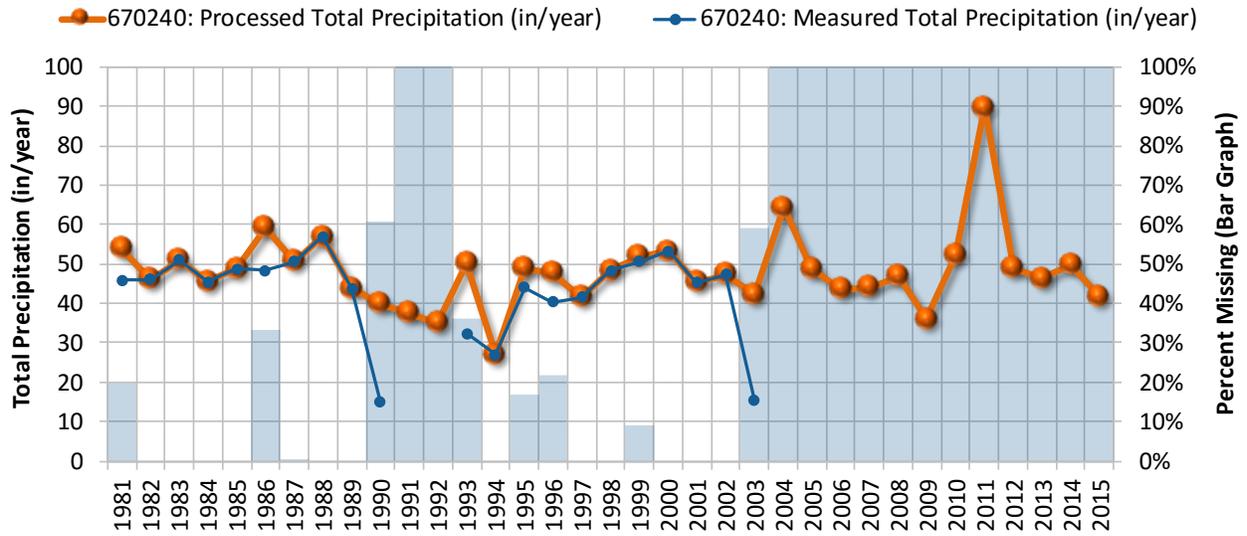


Figure 16. Total Precipitation at ANNALY (670240), 1981-2015.

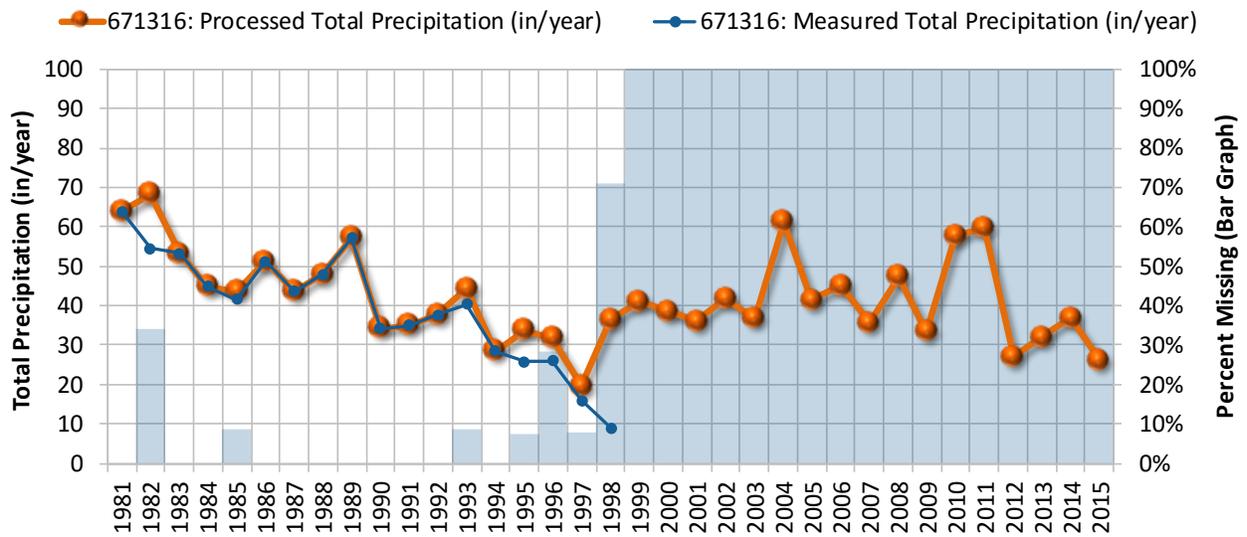


Figure 17. Total Precipitation at CANEEL BAY PLANTATION (671316), 1981-2015.

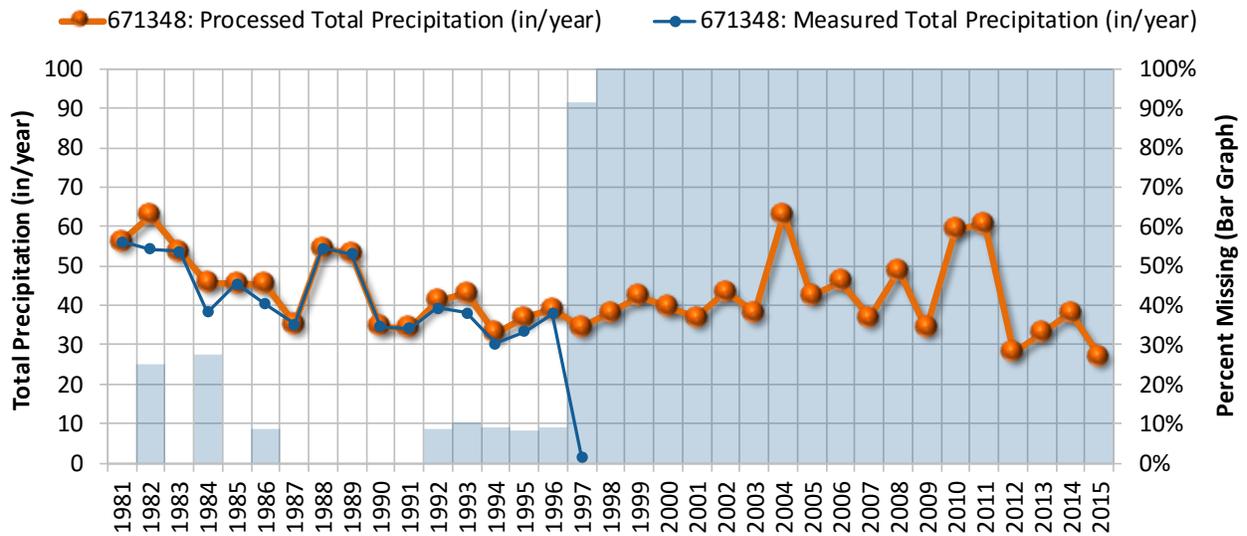


Figure 18. Total Precipitation at CATHERINEBURG (671348), 1981-2015.

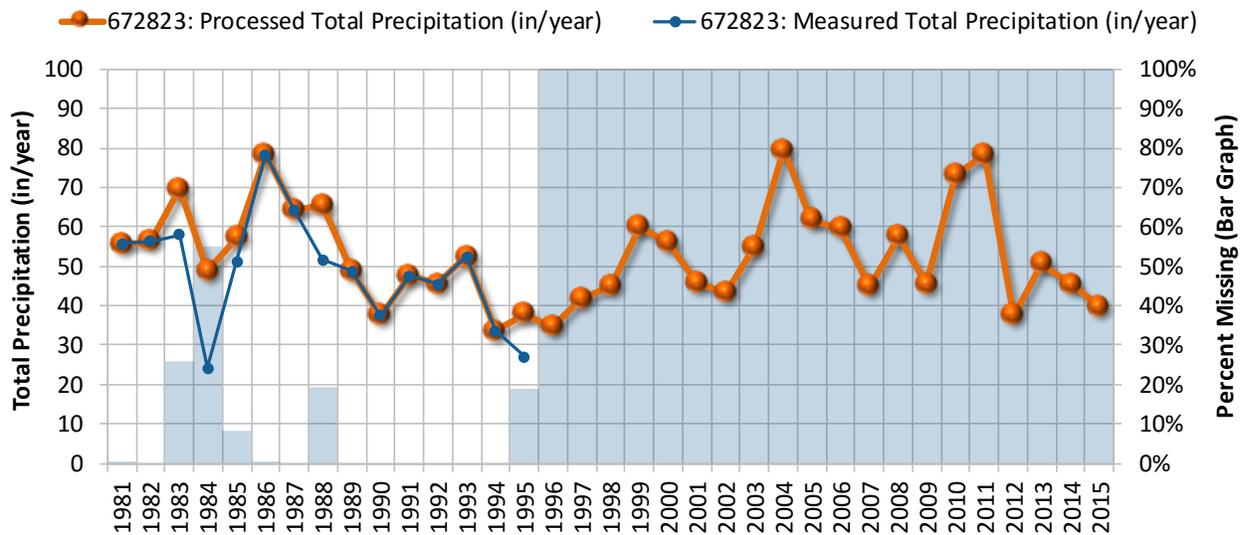


Figure 19. Total Precipitation at ESTATE FORT MYLNER (672823), 1981-2015.

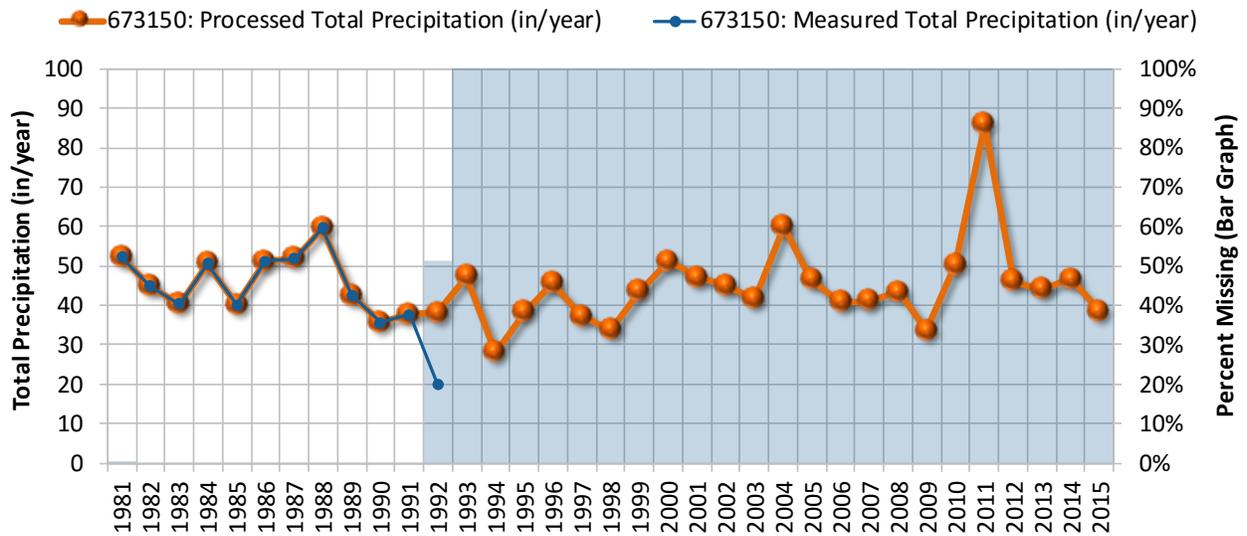


Figure 20. Total Precipitation at FOUNTAIN (673150), 1981-2015.

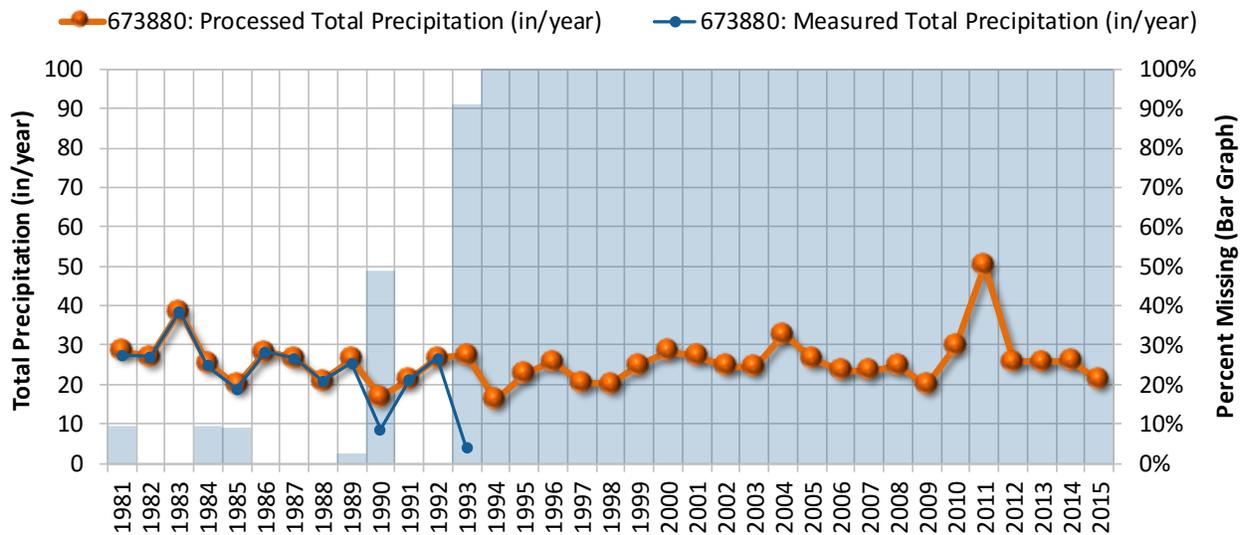


Figure 21. Total Precipitation at HAM BLUFF LIGHTHOUSE (673880), 1981-2015.

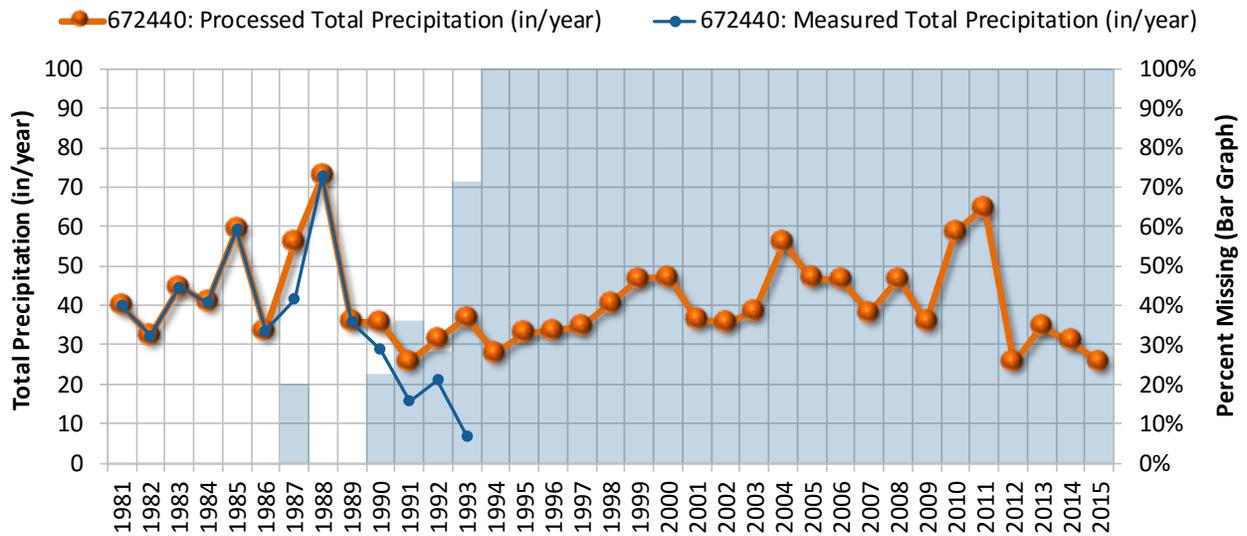


Figure 22. Total Precipitation at DOROTHEA AES (672440), 1981-2015.

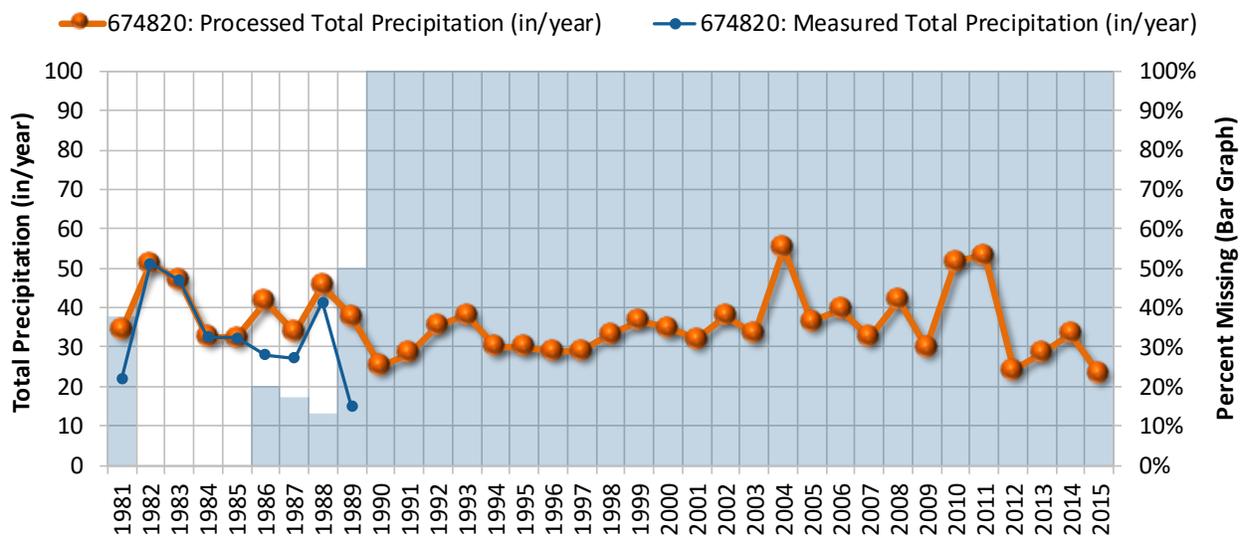


Figure 23. Total Precipitation at LAMESHUR BAY (674820), 1981-2015.

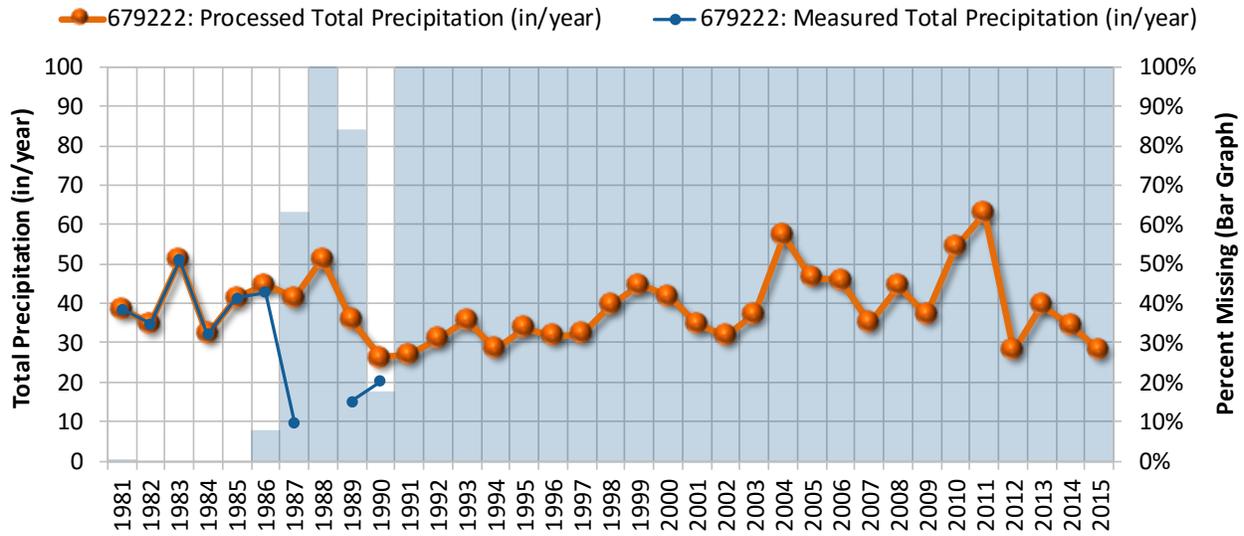


Figure 24. Total Precipitation at WATER ISLE (679222), 1981-2015.

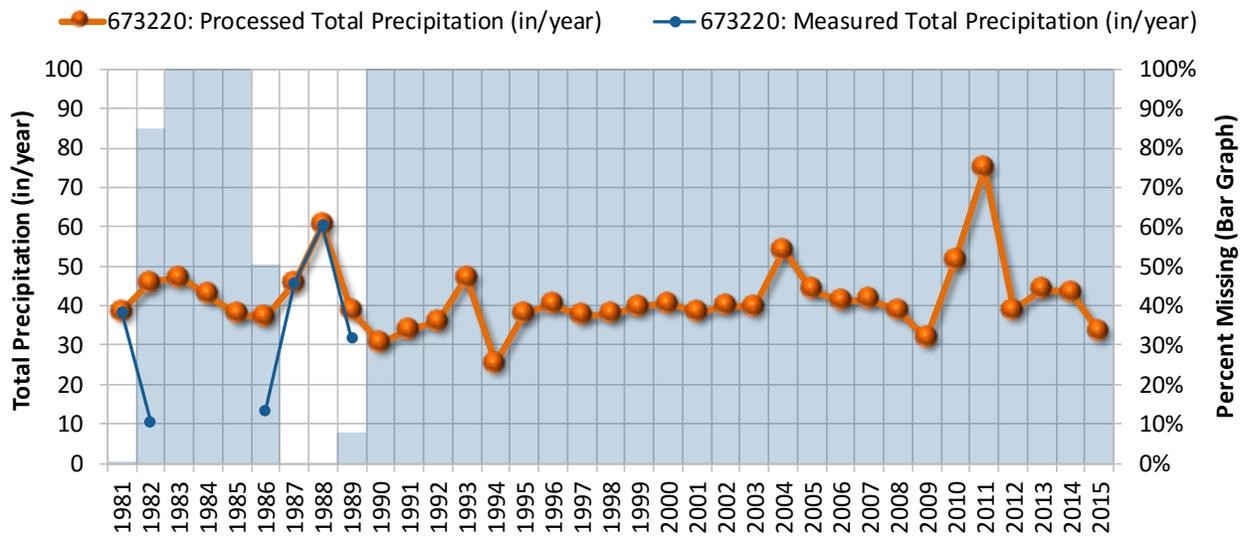


Figure 25. Total Precipitation at FREDERIKSTED 1 SE (673220), 1981-2015.

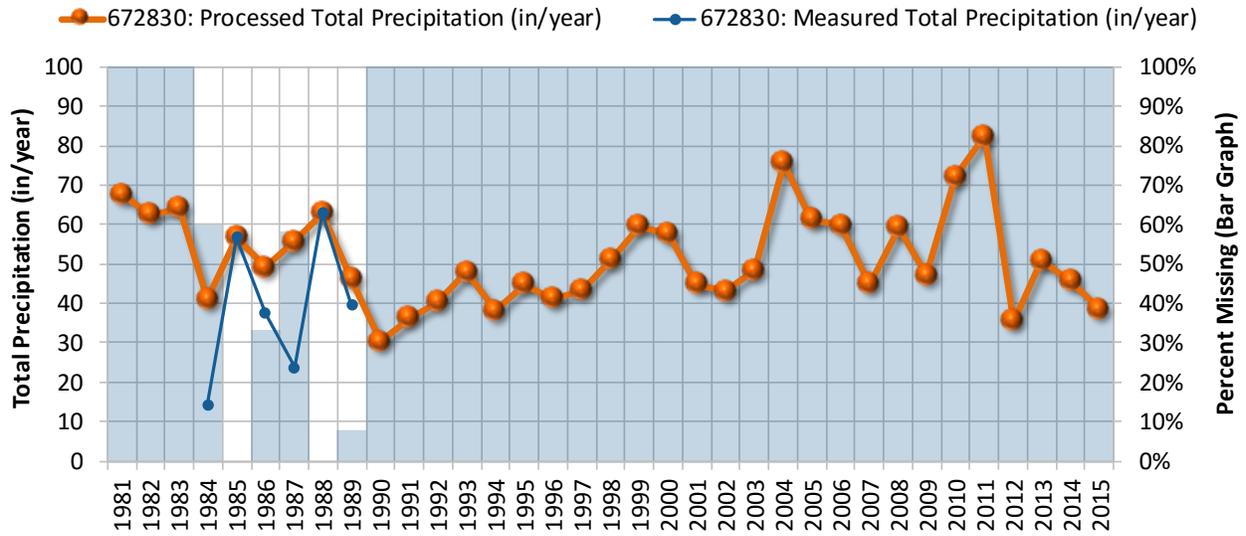


Figure 26. Total Precipitation at ESTATE HOPE (672830), 1981-2015.

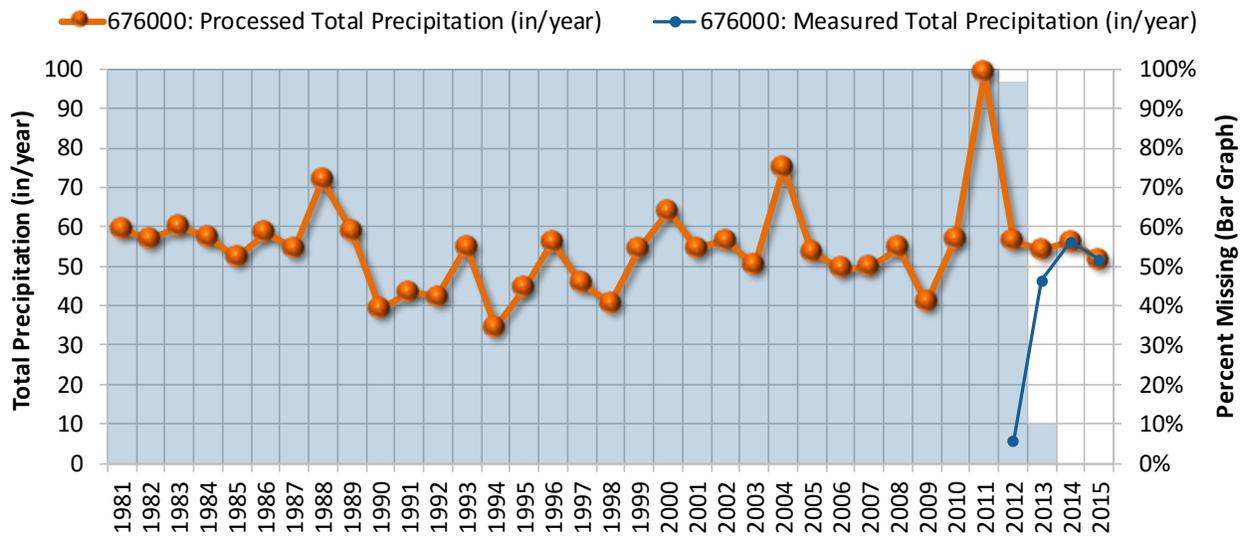


Figure 27. Total Precipitation at PROSPECT HILL (676000), 1981-2015.

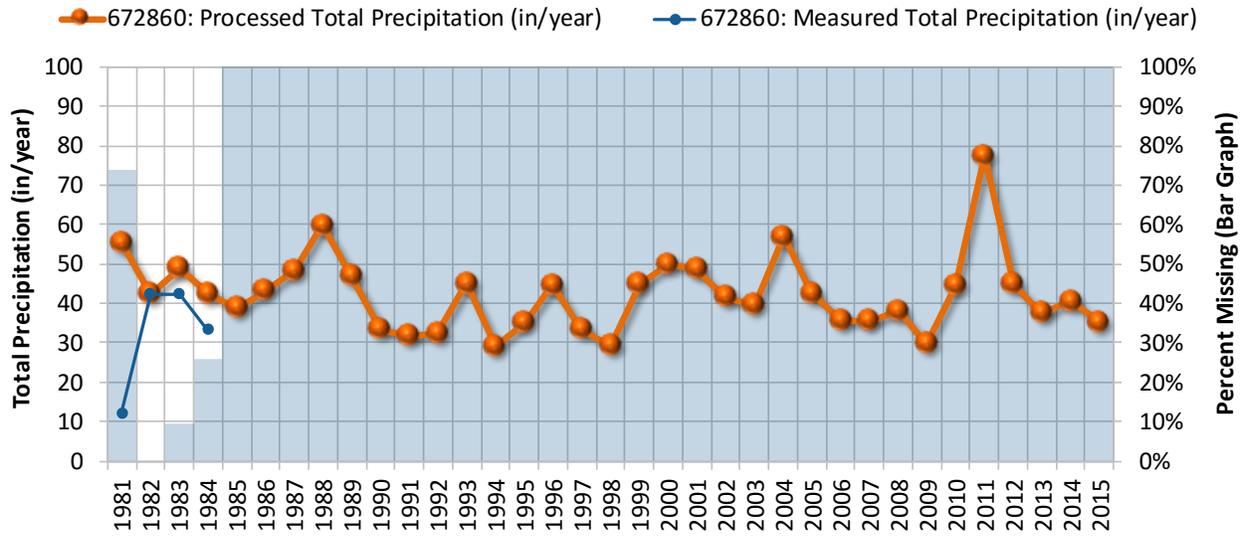


Figure 28. Total Precipitation at ESTATE RUST-OP-TWIST (672860), 1981-2015.

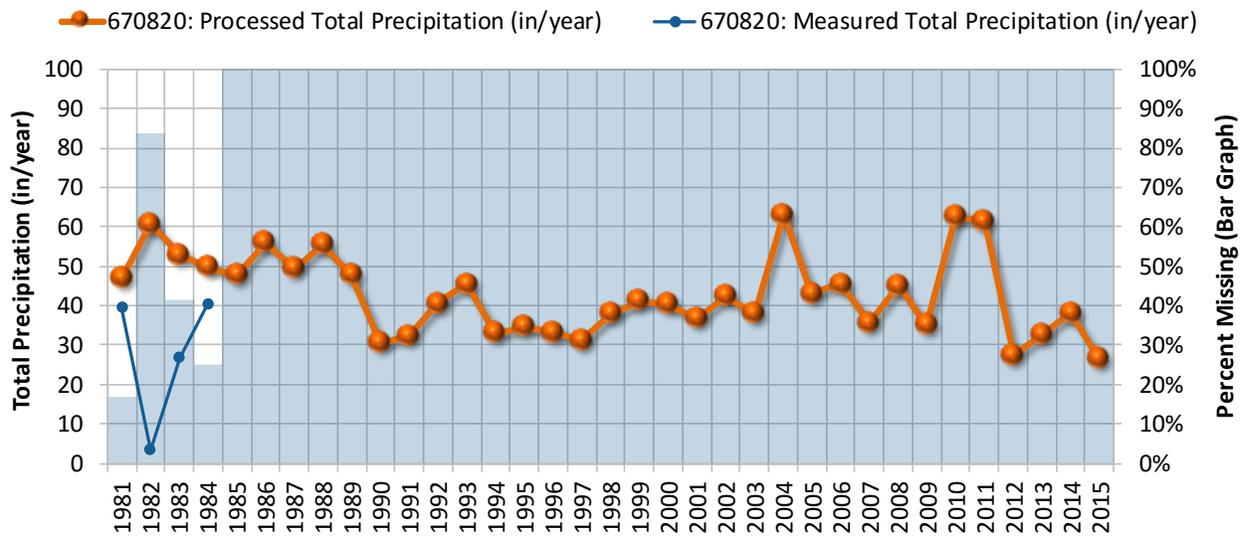


Figure 29. Total Precipitation at BORDEAUX MOUNTAIN (670820), 1981-2015.

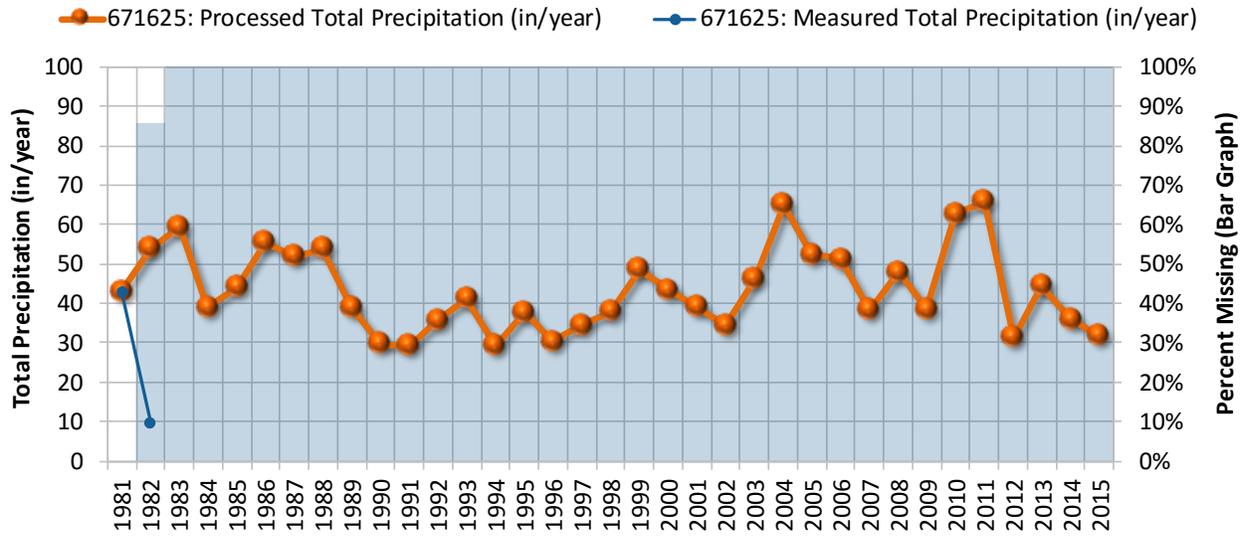


Figure 30. Total Precipitation at CHARLOTTE AMALIE 2 (671625), 1981-2015.

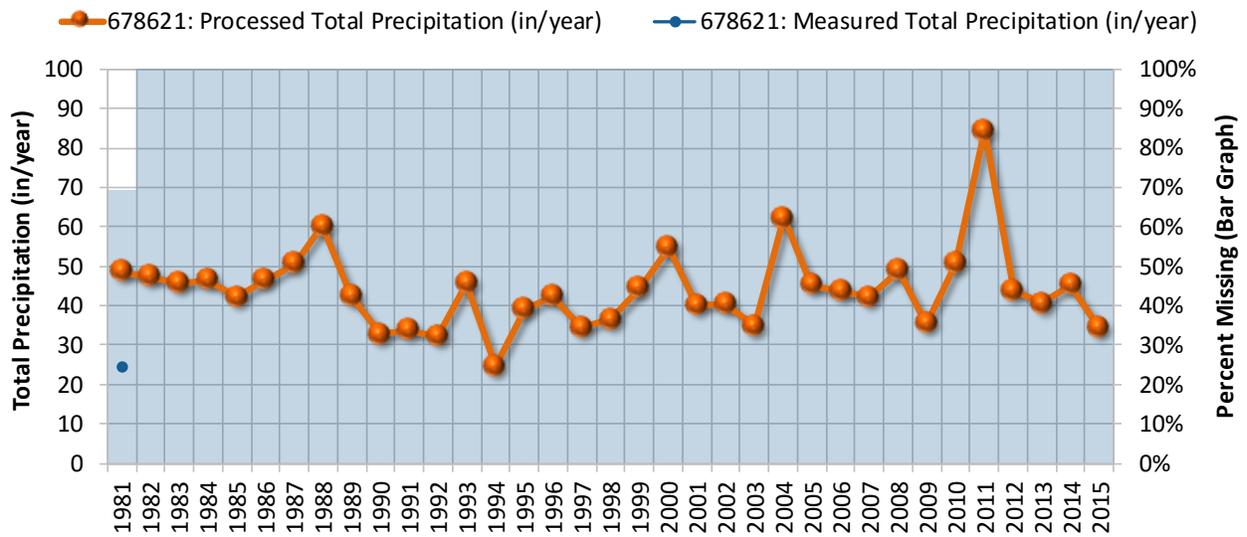


Figure 31. Total Precipitation at TAGUE BAY (678621), 1981-2015.