
OSIRIS

Optical, Spectroscopic, and Infrared Remote Imaging System

OSIRIS camera bias levels

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1 General aspects

1.1 Scope

Previous studies of BIAS images during the earlier mission phases indicated that the bias level is constant for all software windowing and binning modes. The value changes by hardware window size, binning and amplifier channel. The bias level also indicated a strong correlation with the ADC temperature. This document describes the methods and results of the OSIRIS camera post hibernation BIAS analysis. The examination was carried out on the OSIRIS FM Narrow Angle and Wide Angle Cameras to provide the following data for the calibration pipeline:

- BIAS levels at various hardware configurations
- BIAS level dependency on the ADC temperature
- Bias stability and repeatability

The analysis is based on the May 2014 delta calibration campaign, and the regular inflight BIAS and dark tests.

1.2 Applicable Documents

no.	document name	document number, Issue./Rev.
AD2	OSIRIS calibration pipeline OsiCalliope	RO-RIS-MPAE-MA-007, 1/-

1.3 Reference Documents

no.	document name	document number, Issue./Rev.
RD1	OSIRIS user manual	RO-RIS-MPAE-UM-004, D/s
RD3	OSIRIS Calibration Report	RO-RIS-MPAE-RP-147, 1/b



2 BIAS analysis

2.1 Evaluation method

The BIAS images were processed by the following method:

- The images were selected and ordered by hardware configuration and temperature values: software or hardware windowing (HwWin), binning (Bin), CRB sync position (Sync), CCD and ADC temperatures (TCCD, TADC1, TADC2).
- The image statistics were calculated for the full window area of each image: average (AVG), standard deviation (SDV), median (MED), sigma clipped average with 1 sigma (AVG1S).
- In case of dual amplifier readout, the left and right image half was handled separately.
- The BIAS value is estimated by the sigma clip average of the full image (or half image in case of dual readout) to avoid cosmics and other transient effects.
- Least squares linear fit parameters were calculated wrt. the average of the two ADC temperatures.
- The “base” BIAS values were reduced to 285K.



2.2 NAC Image data

FILE_NAME	Hw win	Bin	Sy nc	Am pli	TCCD	TADC1	TADC2	AVG	SDV	MED	AVG1S
NAC_2014-05-14T23.09.19.763Z_ID10_1397549000_F82	1	1	17	2	149.20	280.40	279.50	233.22	10.71	233	232.83
NAC_2014-05-16T16.29.45.466Z_ID10_1397549000_F54	1	1	17	1	149.20	281.60	282.20	235.98	9.72	236	235.75
NAC_2014-05-16T16.29.56.457Z_ID10_1397549000_F54	1	1	17	1	149.20	281.50	282.00	235.92	8.96	236	235.50
NAC_2014-05-16T16.30.05.477Z_ID10_1397549000_F54	1	1	17	1	149.20	281.50	281.80	236.00	15.01	236	235.76
NAC_2014-05-16T16.30.37.492Z_ID10_1397549000_F54	1	2	15	1	149.20	281.20	281.20	243.95	13.42	244	243.98
NAC_2014-05-16T16.30.46.455Z_ID10_1397549000_F54	1	2	15	1	149.20	281.10	281.00	244.00	20.64	244	243.81
NAC_2014-05-16T16.30.57.495Z_ID10_1397549000_F54	1	2	15	1	149.20	281.10	280.80	244.05	41.18	244	243.77
NAC_2014-05-16T16.31.28.517Z_ID10_1397549000_F54	1	4	15	1	149.20	281.00	280.50	244.41	35.71	243	242.92
NAC_2014-05-16T16.31.37.456Z_ID10_1397549000_F54	1	4	15	1	149.20	280.90	280.40	244.41	130.3	243	243.12
NAC_2014-05-16T16.31.48.561Z_ID10_1397549000_F54	1	4	15	1	149.20	280.90	280.30	244.02	22.26	243	242.98
NAC_2014-05-16T16.32.18.437Z_ID10_1397549000_F54	1	8	0	1	149.20	280.80	280.10	248.13	95.60	243	243.57
NAC_2014-05-16T16.32.29.440Z_ID10_1397549000_F54	1	8	0	1	149.20	280.80	280.10	247.16	56.23	243	243.29
NAC_2014-05-16T16.32.38.436Z_ID10_1397549000_F54	1	8	0	1	149.20	280.80	280.10	246.80	51.57	243	243.27
NAC_2014-05-16T16.33.09.481Z_ID10_1397549000_F54	1	1	17	1	149.20	280.70	279.90	236.41	9.88	236	236.29
NAC_2014-05-16T16.33.20.430Z_ID10_1397549000_F54	1	1	17	1	149.20	280.70	279.90	236.42	17.47	236	236.21
NAC_2014-05-16T16.33.29.482Z_ID10_1397549000_F54	1	1	17	1	149.20	280.70	279.90	236.42	7.94	236	236.37
NAC_2014-05-16T16.34.01.587Z_ID10_1397549000_F54	1	2	15	1	149.20	280.70	279.80	244.36	9.26	244	244.48
NAC_2014-05-16T16.34.10.465Z_ID10_1397549000_F54	1	2	15	1	149.20	280.70	279.80	244.39	11.01	244	244.52
NAC_2014-05-16T16.34.20.513Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.80	244.39	12.46	244	244.21
NAC_2014-05-16T16.34.52.452Z_ID10_1397549000_F54	1	1	17	1	149.20	280.70	279.70	236.75	7.31	236	236.74
NAC_2014-05-16T16.35.01.486Z_ID10_1397549000_F54	1	1	17	1	149.20	280.60	279.70	236.75	7.23	236	236.25
NAC_2014-05-16T16.35.12.463Z_ID10_1397549000_F54	1	1	17	1	149.20	280.60	279.70	236.74	7.24	236	236.25
NAC_2014-05-16T16.35.42.462Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.70	244.71	9.16	245	244.56
NAC_2014-05-16T16.35.53.463Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.70	244.62	9.37	244	244.53
NAC_2014-05-16T16.36.02.527Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.70	244.65	9.07	245	244.55
NAC_2014-05-16T16.36.33.486Z_ID10_1397549000_F54	1	1	17	1	149.20	280.60	279.70	237.08	7.23	237	236.80
NAC_2014-05-16T16.36.44.430Z_ID10_1397549000_F54	1	1	17	1	149.20	280.60	279.60	237.07	7.29	237	236.82
NAC_2014-05-16T16.36.53.446Z_ID10_1397549000_F54	1	1	17	1	149.20	280.60	279.60	237.05	7.18	237	236.80
NAC_2014-05-16T16.37.25.499Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.60	244.96	9.53	245	245.04
NAC_2014-05-16T16.37.34.471Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.60	244.96	9.44	245	245.10
NAC_2014-05-16T16.37.45.471Z_ID10_1397549000_F54	1	2	15	1	149.20	280.60	279.60	244.93	9.54	245	245.03
NAC_2014-05-16T16.38.36.423Z_ID10_1397549000_F54	1	1	17	2	149.20	280.60	279.60	232.56	10.34	232	232.32
NAC_2014-05-16T16.38.45.442Z_ID10_1397549000_F54	1	1	17	2	149.20	280.60	279.70	232.48	11.47	232	231.97
NAC_2014-05-16T16.38.56.463Z_ID10_1397549000_F54	1	1	17	2	149.20	280.70	280.00	232.45	10.30	232	232.31
NAC_2014-05-16T16.39.26.470Z_ID10_1397549000_F54	1	2	15	2	149.20	281.00	280.60	239.57	13.10	240	239.80
NAC_2014-05-16T16.39.37.443Z_ID10_1397549000_F54	1	2	15	2	149.20	281.10	280.80	239.67	19.77	240	239.53
NAC_2014-05-16T16.39.46.452Z_ID10_1397549000_F54	1	2	15	2	149.20	281.10	281.00	239.70	58.21	240	239.54
NAC_2014-05-16T16.40.17.479Z_ID10_1397549000_F54	1	4	15	2	149.20	281.20	281.30	238.78	21.70	238	238.32
NAC_2014-05-16T16.40.28.448Z_ID10_1397549000_F54	1	4	15	2	149.20	281.30	281.40	238.78	20.91	238	238.26



NAC_2014-05-16T16.40.37.488Z_ID10_1397549000_F54	1	4	15	2	149.20	281.30	281.50	238.83	27.10	238	238.14
NAC_2014-05-16T16.41.10.465Z_ID10_1397549000_F54	1	8	0	2	149.20	281.40	281.60	241.27	51.39	238	238.55
NAC_2014-05-16T16.41.18.447Z_ID10_1397549000_F54	1	8	0	2	149.20	281.40	281.70	241.01	39.40	238	238.52
NAC_2014-05-16T16.41.29.449Z_ID10_1397549000_F54	1	8	0	2	149.20	281.40	281.80	243.79	397.4	238	238.67
NAC_2014-05-16T16.42.00.455Z_ID10_1397549000_F54	1	1	17	2	149.20	281.50	281.90	232.69	8.90	232	232.27
NAC_2014-05-16T16.42.09.469Z_ID10_1397549000_F54	1	1	17	2	149.20	281.50	281.90	232.71	8.54	232	232.61
NAC_2014-05-16T16.42.20.437Z_ID10_1397549000_F54	1	1	17	2	149.20	281.50	281.90	232.73	8.96	232	232.28
NAC_2014-05-16T16.42.50.458Z_ID10_1397549000_F54	1	2	15	2	149.20	281.60	282.00	240.08	11.13	240	240.17
NAC_2014-05-16T16.43.01.477Z_ID10_1397549000_F54	1	2	15	2	149.20	281.40	282.00	240.09	10.32	240	240.21
NAC_2014-05-16T16.43.10.472Z_ID10_1397549000_F54	1	2	15	2	149.20	281.60	282.00	240.11	10.97	240	240.38
NAC_2014-05-16T16.43.41.454Z_ID10_1397549000_F54	1	1	17	2	149.20	281.60	282.00	232.97	8.32	232	232.70
NAC_2014-05-16T16.43.52.478Z_ID10_1397549000_F54	1	1	17	2	149.20	281.60	282.10	232.98	8.34	232	232.71
NAC_2014-05-16T16.44.01.451Z_ID10_1397549000_F54	1	1	17	2	149.20	281.60	282.00	232.99	8.27	232	232.69
NAC_2014-05-16T16.44.33.451Z_ID10_1397549000_F54	1	2	15	2	149.20	281.60	282.10	240.51	11.28	240	240.48
NAC_2014-05-16T16.44.42.458Z_ID10_1397549000_F54	1	2	15	2	149.20	281.60	282.10	240.41	10.55	240	240.30
NAC_2014-05-16T16.44.53.464Z_ID10_1397549000_F54	1	2	15	2	149.20	281.60	282.10	240.41	10.61	240	240.47
NAC_2014-05-16T16.45.24.440Z_ID10_1397549000_F54	1	1	17	2	149.20	281.70	282.20	233.30	8.24	233	232.98
NAC_2014-05-16T16.45.33.447Z_ID10_1397549000_F54	1	1	17	2	149.20	281.60	282.20	233.30	8.59	233	232.72
NAC_2014-05-16T16.45.44.476Z_ID10_1397549000_F54	1	1	17	2	149.20	281.70	282.20	233.38	8.68	233	233.24
NAC_2014-05-16T16.46.14.434Z_ID10_1397549000_F54	1	2	15	2	149.20	281.70	282.20	240.67	10.90	241	240.57
NAC_2014-05-16T16.46.25.487Z_ID10_1397549000_F54	1	2	15	2	149.20	281.70	282.20	240.48	11.00	240	240.46
NAC_2014-05-16T16.46.35.430Z_ID10_1397549000_F54	1	2	15	2	149.10	281.70	282.20	240.61	10.88	241	240.54
NAC_2014-05-16T16.47.25.466Z_ID10_1397549000_F54	1	1	17	3	149.20	281.70	282.20	219.79	14.37	221	220.85
NAC_2014-05-16T16.47.36.461Z_ID10_1397549000_F54	1	1	17	3	149.20	281.70	282.20	219.77	16.04	221	219.84
NAC_2014-05-16T16.47.45.478Z_ID10_1397549000_F54	1	1	17	3	149.20	281.70	282.20	219.80	14.67	221	220.81
NAC_2014-05-16T16.48.17.489Z_ID10_1397549000_F54	1	2	15	3	149.20	281.90	282.30	227.45	19.13	228	228.44
NAC_2014-05-16T16.48.26.471Z_ID10_1397549000_F54	1	2	15	3	149.20	282.00	282.30	227.45	16.41	228	227.70
NAC_2014-05-16T16.48.37.463Z_ID10_1397549000_F54	1	2	15	3	149.20	282.00	282.30	227.51	16.12	228	227.71
NAC_2014-05-16T16.49.08.535Z_ID10_1397549000_F54	1	4	15	3	149.20	282.20	282.40	226.36	19.01	227	227.05
NAC_2014-05-16T16.49.17.481Z_ID10_1397549000_F54	1	4	15	3	149.20	282.20	282.40	226.45	23.33	227	226.76
NAC_2014-05-16T16.49.28.545Z_ID10_1397549000_F54	1	4	15	3	149.20	282.30	282.40	226.46	22.64	227	226.80
NAC_2014-05-16T16.49.58.513Z_ID10_1397549000_F54	1	8	0	3	149.20	282.40	282.50	228.21	37.36	227	225.87
NAC_2014-05-16T16.50.09.453Z_ID10_1397549000_F54	1	8	0	3	149.20	282.40	282.50	228.31	39.12	228	225.98
NAC_2014-05-16T16.50.18.439Z_ID10_1397549000_F54	1	8	0	3	149.20	282.40	282.50	228.28	35.99	228	226.09
NAC_2014-05-16T16.50.49.478Z_ID10_1397549000_F54	1	1	17	3	149.20	282.60	282.60	220.84	13.86	222	221.54
NAC_2014-05-16T16.51.00.433Z_ID10_1397549000_F54	1	1	17	3	149.20	282.60	282.60	220.87	13.94	222	221.56
NAC_2014-05-16T16.51.09.446Z_ID10_1397549000_F54	1	1	17	3	149.20	282.60	282.70	220.93	14.06	222	221.57
NAC_2014-05-16T16.51.41.591Z_ID10_1397549000_F54	1	2	15	3	149.20	282.70	282.70	228.29	15.97	229	229.25
NAC_2014-05-16T16.51.50.484Z_ID10_1397549000_F54	1	2	15	3	149.20	282.70	282.70	228.19	15.89	229	229.24
NAC_2014-05-16T16.52.01.571Z_ID10_1397549000_F54	1	2	15	3	149.20	282.70	282.80	228.26	16.39	229	228.47
NAC_2014-05-16T16.52.32.427Z_ID10_1397549000_F54	1	1	17	3	149.20	282.80	282.80	221.53	13.77	222	221.88



NAC_2014-05-16T16.52.41.465Z_ID10_1397549000_F54	1	1	17	3	149.20	282.80	282.80	221.57	13.77	222	221.87
NAC_2014-05-16T16.52.52.427Z_ID10_1397549000_F54	1	1	17	3	149.20	282.90	282.80	221.57	14.00	222	221.89
NAC_2014-05-16T16.53.22.484Z_ID10_1397549000_F54	1	2	15	3	149.20	282.90	282.90	228.71	16.13	229	229.27
NAC_2014-05-16T16.53.34.467Z_ID10_1397549000_F54	1	2	15	3	149.20	282.90	282.90	228.78	16.22	230	229.25
NAC_2014-05-16T16.53.42.455Z_ID10_1397549000_F54	1	2	15	3	149.20	282.90	282.90	228.59	16.08	229	229.21
NAC_2014-05-16T16.54.13.560Z_ID10_1397549000_F54	1	1	17	3	149.20	283.00	283.00	221.73	13.73	223	222.81
NAC_2014-05-16T16.54.24.442Z_ID10_1397549000_F54	1	1	17	3	149.20	283.00	283.00	221.72	13.86	223	221.95
NAC_2014-05-16T16.54.33.578Z_ID10_1397549000_F54	1	1	17	3	149.20	283.00	283.00	221.80	13.79	223	222.79
NAC_2014-05-16T16.55.05.506Z_ID10_1397549000_F54	1	2	15	3	149.20	283.10	283.10	228.47	16.40	229	229.22
NAC_2014-05-16T16.55.14.464Z_ID10_1397549000_F54	1	2	15	3	149.20	283.10	283.10	228.41	16.38	229	229.27
NAC_2014-05-16T16.55.25.523Z_ID10_1397549000_F54	1	2	15	3	149.20	283.10	283.00	228.71	16.45	229	229.49
NAC_2014-05-16T21.19.45.484Z_ID10_1397549000_F54	1	1	17	2	149.50	284.50	284.60	233.74	12.05	233	233.18
NAC_2014-05-16T21.19.55.544Z_ID10_1397549000_F54	1	1	17	2	149.30	284.40	284.50	233.85	59.40	234	233.75
NAC_2014-05-16T21.20.05.457Z_ID10_1397549000_F54	1	1	17	2	149.50	284.40	284.60	233.85	13.19	234	233.55
NAC_2014-05-16T21.20.37.453Z_ID10_1397549000_F54	1	2	15	2	149.50	284.30	284.50	241.07	12.14	241	241.16
NAC_2014-05-16T21.20.46.473Z_ID10_1397549000_F54	1	2	15	2	149.50	284.20	284.50	241.08	12.53	241	241.16
NAC_2014-05-16T21.20.57.461Z_ID10_1397549000_F54	1	2	15	2	149.50	284.20	284.50	241.07	12.46	241	241.17
NAC_2014-05-16T21.21.28.423Z_ID10_1397549000_F54	1	4	15	2	149.50	284.00	284.50	240.98	71.59	240	239.45
NAC_2014-05-16T21.21.37.483Z_ID10_1397549000_F54	1	4	15	2	149.50	284.00	284.50	240.62	29.42	240	239.45
NAC_2014-05-16T21.21.48.543Z_ID10_1397549000_F54	1	4	15	2	149.50	283.90	284.30	240.54	29.07	240	239.45
NAC_2014-05-16T21.22.18.471Z_ID10_1397549000_F54	1	8	0	2	149.50	283.80	284.30	243.59	60.69	240	239.79
NAC_2014-05-16T21.22.28.539Z_ID10_1397549000_F54	1	8	0	2	149.50	283.80	284.30	243.24	55.64	240	239.76
NAC_2014-05-16T21.22.38.483Z_ID10_1397549000_F54	1	8	0	2	149.60	283.80	284.30	243.21	58.02	240	239.76
NAC_2014-05-16T22.39.45.472Z_ID10_1397549000_F54	1	1	17	2	151.10	282.40	283.10	232.77	22.61	232	232.68
NAC_2014-05-16T22.39.56.434Z_ID10_1397549000_F54	1	1	17	2	151.10	282.30	283.00	232.79	8.78	232	232.63
NAC_2014-05-16T22.40.05.441Z_ID10_1397549000_F54	1	1	17	2	150.90	282.40	283.20	232.86	14.62	232	232.51
NAC_2014-05-16T22.40.37.479Z_ID10_1397549000_F54	1	2	15	2	151.10	282.50	283.10	240.12	13.80	240	240.15
NAC_2014-05-16T22.40.47.420Z_ID10_1397549000_F54	1	2	15	2	151.20	282.40	283.10	240.12	12.51	240	240.10
NAC_2014-05-16T22.40.56.510Z_ID10_1397549000_F54	1	2	15	2	151.10	282.50	283.20	240.21	16.61	240	240.15
NAC_2014-05-16T22.41.28.460Z_ID10_1397549000_F54	1	4	15	2	150.90	282.50	283.20	239.92	29.79	239	238.66
NAC_2014-05-16T22.41.37.445Z_ID10_1397549000_F54	1	4	15	2	151.00	282.40	283.20	239.86	32.14	239	238.65
NAC_2014-05-16T22.41.48.441Z_ID10_1397549000_F54	1	4	15	2	150.90	282.40	283.20	239.90	77.95	239	238.69
NAC_2014-05-16T22.42.18.474Z_ID10_1397549000_F54	1	8	0	2	151.10	282.50	283.10	242.98	62.73	238	239.07
NAC_2014-05-16T22.42.29.490Z_ID10_1397549000_F54	1	8	0	2	151.20	282.40	283.00	242.78	61.16	239	239.09
NAC_2014-05-16T22.42.38.431Z_ID10_1397549000_F54	1	8	0	2	151.10	282.30	283.00	242.56	57.06	239	239.11
NAC_2014-07-05T23.59.18.483Z_ID10_1397549000_F54	1	1	17	2	149.30	286.30	285.50	236.54	8.47	236	236.64
NAC_2014-07-05T23.59.29.443Z_ID10_1397549000_F54	1	1	17	2	149.30	286.30	285.50	236.44	8.46	236	235.71
NAC_2014-07-05T23.59.39.433Z_ID10_1397549000_F54	1	1	17	2	149.30	286.40	285.70	236.04	8.45	236	235.67
NAC_2014-07-28T03.11.53.447Z_ID10_1397549700_F54	1	1	17	2	149.40	289.50	290.10	252.52	301.1	238	242.01
NAC_2014-07-28T03.33.04.439Z_ID10_1397549900_F54	1	1	17	2	149.40	289.40	290.00	252.33	286.3	238	241.91
NAC_2014-07-28T03.54.13.468Z_ID10_1397549100_F54	1	1	17	2	149.40	289.40	290.00	253.22	339.7	238	242.34



NAC_2014-08-13T09.59.17.479Z_ID10_1397549700_F54	1	1	17	2	149.30	286.20	285.30	236.29	8.03	236	236.31
NAC_2014-08-13T09.59.28.447Z_ID10_1397549800_F54	1	1	17	2	149.40	286.20	285.40	236.22	8.18	236	236.36
NAC_2014-08-13T09.59.37.466Z_ID10_1397549900_F54	1	1	17	2	149.40	286.30	285.60	236.17	8.14	236	236.38
NAC_2014-09-09T22.29.17.454Z_ID10_1397549600_F54	1	1	17	2	149.40	287.70	286.80	237.41	8.21	237	237.06
NAC_2014-09-09T22.29.26.440Z_ID10_1397549700_F54	1	1	17	2	149.40	287.70	286.80	236.92	8.11	236	236.79
NAC_2014-09-09T22.29.37.436Z_ID10_1397549800_F54	1	1	17	2	149.40	287.80	287.00	237.10	8.12	236	236.74
NAC_2014-09-24T07.11.17.480Z_ID10_1397549900_F54	1	1	17	2	149.40	288.70	287.80	238.23	8.24	238	237.74
NAC_2014-09-24T07.11.26.435Z_ID10_1397549000_F54	1	1	17	2	149.40	288.70	287.80	237.90	8.41	237	237.58
NAC_2014-09-24T07.11.37.441Z_ID10_1397549100_F54	1	1	17	2	149.40	288.80	288.00	237.82	8.51	237	237.65
NAC_2014-09-30T23.59.17.481Z_ID10_1397549600_F54	1	1	17	2	149.40	288.10	287.20	237.64	8.44	238	237.69
NAC_2014-09-30T23.59.26.455Z_ID10_1397549700_F54	1	1	17	2	149.40	288.10	287.20	237.51	8.46	237	237.20
NAC_2014-09-30T23.59.37.436Z_ID10_1397549800_F54	1	1	17	2	149.40	288.20	287.40	237.39	8.71	237	237.36
NAC_2014-10-07T23.59.16.447Z_ID10_1397549000_F54	1	1	17	2	149.50	289.40	288.50	238.53	8.53	238	237.93
NAC_2014-10-07T23.59.25.454Z_ID10_1397549100_F54	1	1	17	2	149.50	289.40	288.60	238.17	8.67	238	237.78
NAC_2014-10-07T23.59.36.449Z_ID10_1397549200_F54	1	1	17	2	149.50	289.50	288.70	238.17	8.74	238	237.79
NAC_2014-10-14T23.59.16.435Z_ID10_1397549300_F54	1	1	17	2	149.40	288.60	287.70	237.77	8.29	237	237.71
NAC_2014-10-14T23.59.25.441Z_ID10_1397549400_F54	1	1	17	2	149.40	288.60	287.70	237.48	8.12	237	237.15
NAC_2014-10-14T23.59.36.437Z_ID10_1397549500_F54	1	1	17	2	149.40	288.70	288.00	237.80	8.11	237	237.18
NAC_2014-10-22T23.59.15.440Z_ID10_1397549300_F54	1	1	17	2	149.60	289.50	288.60	238.52	8.13	238	238.41
NAC_2014-10-22T23.59.25.459Z_ID10_1397549400_F54	1	1	17	2	149.60	289.50	288.60	238.18	8.51	238	237.80
NAC_2014-10-22T23.59.36.429Z_ID10_1397549500_F54	1	1	17	2	149.60	289.60	288.90	238.29	8.44	238	237.86
NAC_2014-12-20T21.06.52.460Z_ID00_1397549700_F54	1	1	17	2	149.13	288.18	287.29	237.52	8.17	237	237.05
NAC_2014-12-20T21.07.01.473Z_ID00_1397549800_F54	1	1	17	2	149.10	288.20	287.29	237.87	8.22	238	237.63
NAC_2014-12-20T21.07.12.477Z_ID00_1397549900_F54	1	1	17	2	149.11	288.27	287.49	237.43	8.38	237	237.16
NAC_2014-12-26T21.04.49.477Z_ID10_1397549700_F54	1	1	17	2	149.10	287.70	286.80	237.52	8.46	237	237.21
NAC_2014-12-26T21.04.58.581Z_ID10_1397549800_F54	1	1	17	2	149.10	287.70	286.80	237.41	8.48	237	236.90
NAC_2014-12-26T21.05.09.506Z_ID10_1397549900_F54	1	1	17	2	149.10	287.80	287.00	237.17	8.40	236	236.77
NAC_2015-01-07T07.19.13.463Z_ID00_1397549500_F54	1	1	17	2	149.13	287.56	286.63	237.14	8.26	236	236.85
NAC_2015-01-07T07.19.24.460Z_ID00_1397549600_F54	1	1	17	2	149.10	287.56	286.68	237.12	8.33	236	236.79
NAC_2015-01-07T07.19.33.464Z_ID00_1397549700_F54	1	1	17	2	149.10	287.64	286.88	235.82	8.44	236	235.59
NAC_2015-01-20T15.27.42.568Z_ID10_1397549400_F54	1	1	17	2	149.10	287.70	286.80	237.49	8.35	237	237.04
NAC_2015-01-20T15.27.53.479Z_ID10_1397549500_F54	1	1	17	2	149.10	287.70	286.80	237.24	8.37	237	236.84
NAC_2015-01-20T15.28.02.435Z_ID10_1397549600_F54	1	1	17	2	149.10	287.80	287.00	237.24	8.40	236	236.85
NAC_2015-01-27T14.33.12.568Z_ID10_1397549400_F54	1	1	17	2	149.10	287.00	286.10	237.28	8.32	237	236.90
NAC_2015-01-27T14.33.22.476Z_ID10_1397549500_F54	1	1	17	2	149.00	287.10	286.20	237.62	8.21	237	237.21
NAC_2015-01-27T14.33.32.535Z_ID10_1397549600_F54	1	1	17	2	149.10	287.20	286.40	236.74	8.20	236	236.43
NAC_2015-01-30T02.18.21.486Z_ID10_1397549600_F54	1	1	17	2	149.10	288.30	287.30	237.72	8.43	237	237.59
NAC_2015-01-30T02.18.32.448Z_ID10_1397549700_F54	1	1	17	2	149.10	288.30	287.40	237.18	8.65	236	236.82
NAC_2015-01-30T02.18.41.485Z_ID10_1397549800_F54	1	1	17	2	149.10	288.30	287.60	237.39	8.48	237	236.92
NAC_2015-02-09T10.19.52.434Z_ID10_1397549100_F54	1	1	17	2	149.10	287.30	286.40	237.00	8.16	236	236.65
NAC_2015-02-09T10.20.01.444Z_ID10_1397549200_F54	1	1	17	2	149.10	287.30	286.40	237.22	8.32	237	237.02



NAC_2015-02-09T10.20.12.455Z_ID10_1397549300_F54	1	1	17	2	149.10	287.40	286.60	236.75	8.30	236	236.56
NAC_2015-02-11T18.29.56.444Z_ID10_1397549900_F54	1	1	17	2	149.10	287.90	287.00	237.74	8.54	238	237.70
NAC_2015-02-11T18.30.05.480Z_ID10_1397549000_F54	1	1	17	2	149.10	287.90	287.00	237.15	8.58	237	236.80
NAC_2015-02-11T18.30.16.430Z_ID10_1397549100_F54	1	1	17	2	149.10	288.00	287.20	237.23	8.14	236	237.03
NAC_2015-02-18T13.14.13.583Z_ID10_1397549600_F54	1	1	17	2	149.10	288.60	287.70	238.02	8.61	238	237.65
NAC_2015-02-18T13.14.22.474Z_ID10_1397549700_F54	1	1	17	2	149.10	288.60	287.70	237.48	8.39	237	237.04
NAC_2015-02-18T13.14.33.475Z_ID10_1397549800_F54	1	1	17	2	149.10	288.70	287.90	237.34	8.42	236	236.89
NAC_2015-02-28T05.14.12.444Z_ID10_1397549800_F54	1	1	17	2	149.10	288.30	287.40	237.71	8.44	237	237.57
NAC_2015-02-28T05.14.21.464Z_ID10_1397549900_F54	1	1	17	2	149.10	288.30	287.40	236.92	8.47	236	236.78
NAC_2015-02-28T05.14.32.426Z_ID10_1397549000_F54	1	1	17	2	149.10	288.40	287.60	237.45	8.04	237	237.16
NAC_2015-03-04T06.57.29.452Z_ID10_1397549700_F54	0	1	1	1	149.10	288.40	287.50	240.43	7.39	240	240.12
NAC_2015-03-04T06.57.42.454Z_ID10_1397549900_F54	0	1	1	2	149.10	288.40	287.50	237.26	8.48	237	236.82
NAC_2015-03-04T06.57.53.460Z_ID10_1397549100_F54	0	1	1	3	149.10	288.40	287.60	224.98	13.36	226	225.60
NAC_2015-03-04T06.58.00.453Z_ID10_1397549300_F54	1	1	17	1	149.10	288.40	287.70	241.16	7.23	241	240.77
NAC_2015-03-04T06.58.01.486Z_ID10_1397549500_F54	1	1	17	2	149.10	288.50	287.70	237.83	8.30	238	237.69
NAC_2015-03-04T06.58.04.433Z_ID10_1397549700_F54	1	1	17	3	149.10	288.50	287.70	226.07	13.34	228	226.71
NAC_2015-03-04T06.58.05.481Z_ID10_1397549900_F54	1	2	15	1	149.10	288.50	287.80	248.09	8.63	248	248.05
NAC_2015-03-04T06.58.08.455Z_ID10_1397549100_F54	1	2	15	2	149.10	288.50	287.80	244.85	10.08	245	245.01
NAC_2015-03-04T06.58.09.472Z_ID10_1397549300_F54	1	2	15	3	149.10	288.60	287.90	233.10	16.53	233	233.63
NAC_2015-03-04T06.58.12.433Z_ID10_1397549500_F54	1	4	15	1	149.10	288.60	287.90	246.71	8.21	247	247.04
NAC_2015-03-04T06.58.13.499Z_ID10_1397549700_F54	1	4	15	2	149.10	288.60	288.00	242.68	9.77	243	242.83
NAC_2015-03-04T06.58.16.439Z_ID10_1397549900_F54	1	4	15	3	149.10	288.60	288.00	237.79	33.09	232	232.54
NAC_2015-03-04T06.58.17.484Z_ID10_1397549100_F54	1	8	0	1	149.10	288.60	288.00	247.91	8.28	248	247.30
NAC_2015-03-04T06.58.20.442Z_ID10_1397549300_F54	1	8	0	2	149.10	288.70	288.10	243.45	9.81	243	243.17
NAC_2015-03-04T06.58.21.479Z_ID10_1397549500_F54	1	8	0	3	149.10	288.70	288.10	257.28	93.84	232	233.95
NAC_2015-03-04T08.57.33.468Z_ID10_1397549800_F54	1	1	17	2	149.00	291.70	291.70	238.56	54.62	238	238.45
NAC_2015-03-04T08.57.42.472Z_ID10_1397549900_F54	1	1	17	2	149.10	291.70	291.70	238.55	21.97	238	238.43
NAC_2015-03-04T08.57.50.478Z_ID10_1397549000_F54	1	1	17	2	149.10	291.60	291.70	238.54	9.51	238	238.53
NAC_2015-03-08T01.39.59.440Z_ID10_1397549600_F54	1	1	17	2	149.10	290.30	289.40	238.63	8.19	238	238.57
NAC_2015-03-08T01.40.09.485Z_ID10_1397549700_F54	1	1	17	2	149.10	290.30	289.40	238.48	8.25	238	238.52
NAC_2015-03-08T01.40.18.546Z_ID10_1397549800_F54	1	1	17	2	149.10	290.40	289.50	238.50	8.17	238	238.43
NAC_2015-03-17T01.24.12.422Z_ID10_1397549900_F54	1	1	17	2	149.20	290.50	289.60	238.99	8.08	238	238.87
NAC_2015-03-17T01.24.21.458Z_ID10_1397549000_F54	1	1	17	2	149.20	290.50	289.70	238.61	8.05	238	238.57
NAC_2015-03-17T01.24.32.552Z_ID10_1397549100_F54	1	1	17	2	149.20	290.60	289.80	238.62	8.22	238	238.55
NAC_2015-03-23T07.45.12.537Z_ID10_1397549700_F54	1	1	17	2	149.10	288.90	288.00	237.97	8.81	238	237.72
NAC_2015-03-23T07.45.21.490Z_ID10_1397549800_F54	1	1	17	2	149.10	288.90	288.00	237.70	8.94	237	237.49
NAC_2015-03-23T07.45.32.544Z_ID10_1397549900_F54	1	1	17	2	149.10	289.00	288.20	237.64	8.86	237	237.57
NAC_2015-04-21T09.37.10.470Z_ID10_1397549900_F54	1	1	17	2	149.20	292.00	291.10	239.75	8.30	240	239.55
NAC_2015-04-21T09.37.21.480Z_ID10_1397549000_F54	1	1	17	2	149.20	292.00	291.20	239.18	8.77	238	238.76
NAC_2015-04-21T09.37.30.468Z_ID10_1397549100_F54	1	1	17	2	149.20	292.10	291.30	239.30	8.40	239	238.62
NAC_2015-04-27T23.03.10.479Z_ID10_1397549100_F54	1	1	17	2	149.10	291.00	290.20	239.36	8.59	238	238.68



NAC_2015-04-27T23.03.21.483Z_ID10_1397549200_F54	1	1	17	2	149.10	291.10	290.20	239.10	8.41	238	238.68
NAC_2015-04-27T23.03.30.476Z_ID10_1397549300_F54	1	1	17	2	149.10	291.10	290.40	239.13	8.45	239	238.79
NAC_2015-05-01T14.16.21.557Z_ID10_1397549500_F54	1	1	17	2	149.00	289.60	288.80	238.58	10.56	238	238.30
NAC_2015-05-01T14.16.32.452Z_ID10_1397549600_F54	1	1	17	2	149.00	289.60	288.80	238.30	10.56	238	237.61
NAC_2015-05-01T14.16.41.453Z_ID10_1397549700_F54	1	1	17	2	149.00	289.70	288.90	238.07	10.63	238	237.45
NAC_2015-05-11T13.28.07.423Z_ID10_1397549400_F54	1	1	17	2	149.20	291.10	290.20	239.23	8.47	238	238.75
NAC_2015-05-11T13.28.17.446Z_ID10_1397549500_F54	1	1	17	2	149.20	291.10	290.20	238.94	8.53	238	238.60
NAC_2015-05-11T13.28.26.430Z_ID10_1397549600_F54	1	1	17	2	149.10	291.20	290.40	238.98	8.60	238	238.77
NAC_2015-05-16T06.49.09.440Z_ID10_1397549400_F54	1	1	17	2	149.20	290.10	289.20	238.89	8.52	238	238.76
NAC_2015-05-16T06.49.29.453Z_ID10_1397549600_F54	1	1	17	2	149.20	290.10	289.40	238.11	8.16	238	237.60
NAC_2015-05-23T06.44.09.490Z_ID10_1397549500_F54	1	1	17	2	149.30	290.80	289.90	239.27	8.46	238	238.76
NAC_2015-05-23T06.44.20.447Z_ID10_1397549600_F54	1	1	17	2	149.30	290.80	290.00	239.01	8.13	238	238.60
NAC_2015-05-23T06.44.29.518Z_ID10_1397549700_F54	1	1	17	2	149.30	290.90	290.10	238.78	8.59	238	238.54
NAC_2015-06-07T20.02.12.629Z_ID10_1397549500_F54	1	1	17	2	149.20	293.60	294.30	240.35	8.52	240	239.79
NAC_2015-06-07T20.02.13.061Z_ID10_1397549600_F54	1	1	17	2	149.10	293.60	294.30	240.30	8.28	240	240.47
NAC_2015-06-07T20.02.13.468Z_ID10_1397549700_F54	1	1	17	2	149.20	293.70	294.30	240.19	8.27	240	239.69
NAC_2015-06-16T03.52.49.456Z_ID10_1397549900_F54	1	1	17	2	149.20	292.20	291.30	239.80	8.17	240	239.10
NAC_2015-06-16T03.53.00.441Z_ID10_1397549000_F54	1	1	17	2	149.20	292.20	291.30	239.48	8.17	240	238.85
NAC_2015-06-16T03.53.09.489Z_ID10_1397549100_F54	1	1	17	2	149.20	292.30	291.50	239.19	7.86	239	238.73
NAC_2015-06-23T06.39.08.516Z_ID10_1397549300_F54	1	1	17	2	149.20	292.10	291.10	239.37	8.51	239	238.79
NAC_2015-06-23T06.39.18.462Z_ID10_1397549400_F54	1	1	17	2	149.20	292.10	291.20	239.43	8.27	240	238.89
NAC_2015-06-23T06.39.29.530Z_ID10_1397549500_F54	1	1	17	2	149.20	292.10	291.40	239.28	8.42	240	238.80
NAC_2015-04-22T02.40.52.445Z_ID10_1397549700_F54	0	1	1	1	149.1	291.4	290.7	241.72	7.58	242	241.73
NAC_2015-04-22T02.41.05.461Z_ID10_1397549900_F54	0	1	1	2	149.1	291.4	290.7	238.99	8.76	238	238.66
NAC_2015-04-22T02.41.16.430Z_ID10_1397549100_F54	0	1	1	3	149.1	291.5	290.7	237.35	7.47	237	236.96
NAC_2015-04-22T02.41.16.430Z_ID10_1397549100_F54	0	1	1	3	149.1	291.5	290.7	216.37	8.68	216	215.70
NAC_2015-04-22T02.41.23.443Z_ID10_1397549300_F54	0	2	15	1	149.1	291.5	290.9	248.77	8.44	249	249.09
NAC_2015-04-22T02.41.36.469Z_ID10_1397549500_F54	0	2	15	2	149.2	291.6	291.1	245.76	10.15	246	245.59
NAC_2015-04-22T02.41.46.433Z_ID10_1397549700_F54	0	2	15	3	149.2	291.7	291.1	248.65	14.50	247	247.23
NAC_2015-04-22T02.41.46.433Z_ID10_1397549700_F54	0	2	15	3	149.2	291.7	291.1	222.31	10.33	222	222.17
NAC_2015-04-22T02.41.53.469Z_ID10_1397549900_F54	1	1	17	1	149.1	291.7	291.2	242.67	7.66	242	242.59
NAC_2015-04-22T02.41.55.452Z_ID10_1397549100_F54	1	1	17	2	149.2	291.7	291.2	239.37	8.55	240	238.85
NAC_2015-04-22T02.41.57.492Z_ID10_1397549300_F54	1	1	17	3	149.2	291.7	291.3	238.26	7.58	238	237.79
NAC_2015-04-22T02.41.57.492Z_ID10_1397549300_F54	1	1	17	3	149.2	291.7	291.3	217.16	8.82	216	216.71
NAC_2015-04-22T02.41.58.458Z_ID10_1397549500_F54	1	2	15	1	149.2	291.7	291.3	249.47	8.74	250	249.72
NAC_2015-04-22T02.42.00.475Z_ID10_1397549700_F54	1	2	15	2	149.1	291.7	291.3	246.05	9.81	246	246.40
NAC_2015-04-22T02.42.02.558Z_ID10_1397549900_F54	1	2	15	3	149.1	291.8	291.3	246.75	10.73	246	246.38
NAC_2015-04-22T02.42.02.558Z_ID10_1397549900_F54	1	2	15	3	149.1	291.8	291.3	221.98	10.53	222	222.03
NAC_2015-04-22T02.42.05.469Z_ID10_1397549100_F54	1	4	15	1	149.1	291.8	291.4	247.81	8.16	248	247.37
NAC_2015-04-22T02.42.07.447Z_ID10_1397549300_F54	1	4	15	2	149.2	291.8	291.4	244.10	9.66	244	243.62
NAC_2015-04-22T02.42.08.560Z_ID10_1397549500_F54	1	4	15	3	149.1	291.8	291.4	256.82	37.10	246	245.34
NAC_2015-04-22T02.42.08.560Z_ID10_1397549500_F54	1	4	15	3	149.1	291.8	291.4	221.54	9.93	221	220.70
NAC_2015-04-22T02.42.10.449Z_ID10_1397549700_F54	1	8	0	1	149.2	291.8	291.4	248.97	8.03	248	248.19



NAC_2015-04-22T02.42.13.483Z_ID10_1397549900_F54	1	8	0	2	149.1	291.8	291.5	245.36	10.76	244	244.92
NAC_2015-04-22T02.42.14.470Z_ID10_1397549100_F54	1	8	0	3	149.2	291.8	291.5	298.55	113.74	254	256.5893
NAC_2015-04-22T02.42.14.470Z_ID10_1397549100_F54	1	8	0	3	149.2	291.8	291.5	225.34	10.63	226	224.8974



2.3 WAC Image data

FILE_NAME	Hw win	Bin	Sy nc	Am pli	TCCD	TADC1	TADC2	AVG	SDV	MED	AVG1S
WAC_2014-05-14T23.12.17.404Z_ID10_1397549000_F12	1	1	17	2	166.30	286.10	287.30	233.92	8.05	234	233.46
WAC_2014-05-16T16.29.46.471Z_ID10_1397549000_F87	1	1	17	1	166.20	286.40	287.70	234.74	8.27	234	234.79
WAC_2014-05-16T16.29.57.453Z_ID10_1397549000_F87	1	1	17	1	166.20	286.40	287.50	234.64	18.3	234	234.62
WAC_2014-05-16T16.30.06.460Z_ID10_1397549000_F87	1	1	17	1	166.30	286.30	287.20	234.64	8.53	234	234.74
WAC_2014-05-16T16.30.37.487Z_ID10_1397549000_F87	1	2	16	1	166.30	286.10	286.60	240.40	12.1	240	240.41
WAC_2014-05-16T16.30.48.517Z_ID10_1397549000_F87	1	2	16	1	166.30	286.00	286.30	240.38	11.5	240	240.13
WAC_2014-05-16T16.30.57.496Z_ID10_1397549000_F87	1	2	16	1	166.20	285.90	286.20	240.41	12.5	240	240.19
WAC_2014-05-16T16.31.28.577Z_ID10_1397549000_F87	1	4	15	1	166.20	285.80	285.80	241.22	9.46	241	241.13
WAC_2014-05-16T16.31.39.427Z_ID10_1397549000_F87	1	4	15	1	166.20	285.80	285.70	241.31	17.4	242	241.21
WAC_2014-05-16T16.31.48.561Z_ID10_1397549000_F87	1	4	15	1	166.30	285.70	285.70	241.23	10.6	241	241.23
WAC_2014-05-16T16.32.20.459Z_ID10_1397549000_F87	1	8	15	1	166.20	285.70	285.50	242.11	21.4	242	241.94
WAC_2014-05-16T16.32.29.488Z_ID10_1397549000_F87	1	8	15	1	166.20	285.60	285.40	241.85	11.0	242	241.76
WAC_2014-05-16T16.32.40.453Z_ID10_1397549000_F87	1	8	15	1	166.30	285.60	285.40	241.98	21.5	242	241.84
WAC_2014-05-16T16.33.10.437Z_ID10_1397549000_F87	1	1	17	1	166.20	285.50	285.20	235.36	12.8	236	235.40
WAC_2014-05-16T16.33.21.537Z_ID10_1397549000_F87	1	1	17	1	166.20	285.50	285.20	235.36	7.04	236	235.50
WAC_2014-05-16T16.33.30.488Z_ID10_1397549000_F87	1	1	17	1	166.30	285.50	285.20	235.38	7.95	236	235.24
WAC_2014-05-16T16.34.01.586Z_ID10_1397549000_F87	1	2	16	1	166.20	285.50	285.10	240.77	7.69	241	240.85
WAC_2014-05-16T16.34.12.437Z_ID10_1397549000_F87	1	2	16	1	166.30	285.50	285.10	240.75	7.64	240	240.83
WAC_2014-05-16T16.34.21.473Z_ID10_1397549000_F87	1	2	16	1	166.30	285.50	285.00	240.79	11.7	240	240.79
WAC_2014-05-16T16.34.53.458Z_ID10_1397549000_F87	1	1	17	1	166.30	285.40	285.00	235.72	6.95	236	235.63
WAC_2014-05-16T16.35.02.460Z_ID10_1397549000_F87	1	1	17	1	166.30	285.40	285.00	235.70	6.92	236	235.61
WAC_2014-05-16T16.35.13.474Z_ID10_1397549000_F87	1	1	17	1	166.30	285.40	285.00	235.71	6.87	236	235.62
WAC_2014-05-16T16.35.44.466Z_ID10_1397549000_F87	1	2	16	1	166.30	285.40	284.90	240.94	7.68	241	240.90
WAC_2014-05-16T16.35.53.469Z_ID10_1397549000_F87	1	2	16	1	166.20	285.40	284.90	240.96	8.00	241	240.65
WAC_2014-05-16T16.36.04.455Z_ID10_1397549000_F87	1	2	16	1	166.30	285.40	284.90	240.93	7.70	241	240.92
WAC_2014-05-16T16.36.34.433Z_ID10_1397549000_F87	1	1	17	1	166.20	285.40	284.90	235.86	6.90	236	235.65
WAC_2014-05-16T16.36.45.483Z_ID10_1397549000_F87	1	1	17	1	166.30	285.40	284.80	235.89	6.90	236	235.65
WAC_2014-05-16T16.36.54.443Z_ID10_1397549000_F87	1	1	17	1	166.30	285.40	284.90	235.90	6.85	236	235.93
WAC_2014-05-16T16.37.25.498Z_ID10_1397549000_F87	1	2	16	1	166.20	285.30	284.80	241.01	7.70	241	241.01
WAC_2014-05-16T16.37.36.432Z_ID10_1397549000_F87	1	2	16	1	166.30	285.30	284.80	240.97	7.64	241	240.88
WAC_2014-05-16T16.37.45.472Z_ID10_1397549000_F87	1	2	16	1	166.30	285.30	284.80	240.93	7.97	241	240.60
WAC_2014-05-16T16.38.17.471Z_ID10_1397549000_F87	1	1	17	1	166.20	285.30	284.80	235.86	6.84	236	235.88
WAC_2014-05-16T16.38.26.474Z_ID10_1397549000_F87	1	1	17	1	166.30	285.30	284.80	235.82	6.82	236	235.64
WAC_2014-05-16T16.38.37.486Z_ID10_1397549000_F87	1	1	17	1	166.20	285.30	284.80	235.93	7.32	236	235.90
WAC_2014-05-16T16.39.07.534Z_ID10_1397549000_F87	1	2	16	1	166.30	285.30	284.80	240.87	7.71	241	240.99
WAC_2014-05-16T16.39.17.478Z_ID10_1397549000_F87	1	2	16	1	166.30	285.30	284.80	240.89	7.75	241	241.06
WAC_2014-05-16T16.39.27.533Z_ID10_1397549000_F87	1	2	16	1	166.30	285.30	284.80	241.00	7.85	241	240.92
WAC_2014-05-16T16.40.19.441Z_ID10_1397549000_F87	1	1	17	2	166.30	285.30	284.80	233.76	33.9	234	233.70
WAC_2014-05-16T16.40.29.458Z_ID10_1397549000_F87	1	1	17	2	166.20	285.40	285.00	233.65	8.54	234	233.69
WAC_2014-05-16T16.40.38.477Z_ID10_1397549000_F87	1	1	17	2	166.30	285.50	285.20	233.64	10.8	234	233.55
WAC_2014-05-16T16.41.10.512Z_ID10_1397549000_F87	1	2	16	2	166.30	285.70	285.90	240.32	11.6	240	240.08
WAC_2014-05-16T16.41.20.468Z_ID10_1397549000_F87	1	2	16	2	166.20	285.80	286.10	240.27	9.41	240	240.04



WAC_2014-05-16T16.41.29.498Z_ID10_1397549000_F87	1	2	16	2	166.30	285.90	286.30	240.30	10.1	240	240.38
WAC_2014-05-16T16.42.00.456Z_ID10_1397549000_F87	1	4	15	2	166.30	286.00	286.60	240.39	15.7	240	240.34
WAC_2014-05-16T16.42.11.458Z_ID10_1397549000_F87	1	4	15	2	166.30	286.00	286.70	240.43	17.7	240	240.38
WAC_2014-05-16T16.42.21.486Z_ID10_1397549000_F87	1	4	15	2	166.20	286.10	286.80	240.37	9.95	240	240.49
WAC_2014-05-16T16.42.52.433Z_ID10_1397549000_F87	1	8	15	2	166.30	286.20	287.00	241.08	16.5	241	240.92
WAC_2014-05-16T16.43.01.476Z_ID10_1397549000_F87	1	8	15	2	166.30	286.20	287.10	241.10	11.3	241	240.92
WAC_2014-05-16T16.43.12.447Z_ID10_1397549000_F87	1	8	15	2	166.30	286.20	287.10	241.04	8.96	241	241.34
WAC_2014-05-16T16.43.42.455Z_ID10_1397549000_F87	1	1	17	2	166.30	286.30	287.30	233.94	7.21	234	233.89
WAC_2014-05-16T16.43.52.479Z_ID10_1397549000_F87	1	1	17	2	166.30	286.30	287.30	233.99	20.2	234	233.95
WAC_2014-05-16T16.44.02.467Z_ID10_1397549000_F87	1	1	17	2	166.30	286.30	287.30	233.99	7.07	234	233.90
WAC_2014-05-16T16.44.33.502Z_ID10_1397549000_F87	1	2	16	2	166.30	286.30	287.40	240.59	10.5	240	240.67
WAC_2014-05-16T16.44.44.458Z_ID10_1397549000_F87	1	2	16	2	166.30	286.40	287.40	240.60	7.44	240	240.72
WAC_2014-05-16T16.44.53.499Z_ID10_1397549000_F87	1	2	16	2	166.30	286.40	287.40	240.60	7.00	240	240.31
WAC_2014-05-16T16.45.25.463Z_ID10_1397549000_F87	1	1	17	2	166.30	286.40	287.50	234.24	6.65	234	233.96
WAC_2014-05-16T16.45.34.453Z_ID10_1397549000_F87	1	1	17	2	166.30	286.40	287.50	234.21	6.37	234	233.95
WAC_2014-05-16T16.45.44.475Z_ID10_1397549000_F87	1	1	17	2	166.30	286.40	287.50	234.26	9.42	234	234.02
WAC_2014-05-16T16.46.16.564Z_ID10_1397549000_F87	1	2	16	2	166.30	286.40	287.60	240.82	7.06	241	240.38
WAC_2014-05-16T16.46.25.485Z_ID10_1397549000_F87	1	2	16	2	166.30	286.40	287.50	240.87	7.05	241	240.37
WAC_2014-05-16T16.46.36.537Z_ID10_1397549000_F87	1	2	16	2	166.20	286.50	287.60	240.80	6.98	241	240.35
WAC_2014-05-16T16.47.06.438Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.50	234.41	6.23	234	234.50
WAC_2014-05-16T16.47.17.471Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.60	234.43	6.18	234	234.52
WAC_2014-05-16T16.47.27.456Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.60	234.40	6.38	234	234.50
WAC_2014-05-16T16.47.57.475Z_ID10_1397549000_F87	1	2	16	2	166.20	286.50	287.60	240.83	7.00	241	240.31
WAC_2014-05-16T16.48.08.442Z_ID10_1397549000_F87	1	2	16	2	166.30	286.50	287.60	240.91	7.02	241	240.34
WAC_2014-05-16T16.48.17.489Z_ID10_1397549000_F87	1	2	16	2	166.30	286.50	287.60	240.94	7.16	241	240.86
WAC_2014-05-16T16.48.48.518Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.70	234.31	6.24	234	234.46
WAC_2014-05-16T16.48.58.473Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.60	234.39	6.25	234	234.53
WAC_2014-05-16T16.49.08.541Z_ID10_1397549000_F87	1	1	17	2	166.30	286.50	287.70	234.37	6.33	234	234.52
WAC_2014-05-16T16.49.40.429Z_ID10_1397549000_F87	1	2	16	2	166.30	286.60	287.70	240.91	6.96	241	240.46
WAC_2014-05-16T16.49.49.473Z_ID10_1397549000_F87	1	2	16	2	166.30	286.50	287.70	240.71	6.98	240	240.39
WAC_2014-05-16T16.50.00.453Z_ID10_1397549000_F87	1	2	16	2	166.30	286.50	287.70	240.78	6.97	241	240.43
WAC_2014-05-16T16.50.51.445Z_ID10_1397549000_F87	1	1	17	3	166.30	286.60	287.70	219.63	12.3	219	219.25
WAC_2014-05-16T16.51.01.447Z_ID10_1397549000_F87	1	1	17	3	166.30	286.60	287.70	219.56	12.7	219	220.06
WAC_2014-05-16T16.51.10.472Z_ID10_1397549000_F87	1	1	17	3	166.30	286.60	287.70	219.54	13.0	219	219.50
WAC_2014-05-16T16.51.41.592Z_ID10_1397549000_F87	1	2	16	3	166.30	286.70	287.80	226.71	11.9	226	226.49
WAC_2014-05-16T16.51.52.445Z_ID10_1397549000_F87	1	2	16	3	166.30	286.80	287.70	226.76	14.1	226	226.37
WAC_2014-05-16T16.52.01.570Z_ID10_1397549000_F87	1	2	16	3	166.20	286.90	287.80	226.81	16.8	226	226.13
WAC_2014-05-16T16.52.33.488Z_ID10_1397549000_F87	1	4	15	3	166.30	287.00	287.80	226.26	14.6	226	225.54
WAC_2014-05-16T16.52.42.446Z_ID10_1397549000_F87	1	4	15	3	166.30	287.10	287.80	226.26	16.2	226	226.13
WAC_2014-05-16T16.52.53.487Z_ID10_1397549000_F87	1	4	15	3	166.30	287.10	287.90	226.32	15.5	226	225.65
WAC_2014-05-16T16.53.24.419Z_ID10_1397549000_F87	1	8	15	3	166.30	287.20	287.90	226.67	12.5	226	226.49
WAC_2014-05-16T16.53.34.514Z_ID10_1397549000_F87	1	8	15	3	166.30	287.30	288.00	226.66	14.4	226	226.51
WAC_2014-05-16T16.53.44.460Z_ID10_1397549000_F87	1	8	15	3	166.30	287.30	288.00	226.71	16.7	226	225.93
WAC_2014-05-16T16.54.14.480Z_ID10_1397549000_F87	1	1	17	3	166.30	287.40	288.10	220.57	13.1	220	220.35



WAC_2014-05-16T16.54.25.507Z_ID10_1397549000_F87	1	1	17	3	166.30	287.40	288.10	220.58	12.1	220	220.54
WAC_2014-05-16T16.54.34.481Z_ID10_1397549000_F87	1	1	17	3	166.20	287.40	288.10	220.61	12.3	220	220.53
WAC_2014-05-16T16.55.05.501Z_ID10_1397549000_F87	1	2	16	3	166.30	287.50	288.10	227.68	11.8	228	226.99
WAC_2014-05-16T16.55.16.435Z_ID10_1397549000_F87	1	2	16	3	166.30	287.50	288.20	227.71	11.8	228	227.00
WAC_2014-05-16T16.55.25.521Z_ID10_1397549000_F87	1	2	16	3	166.30	287.60	288.20	227.73	11.8	228	226.97
WAC_2014-05-16T16.55.57.494Z_ID10_1397549000_F87	1	1	17	3	166.30	287.60	288.30	221.23	12.1	221	221.18
WAC_2014-05-16T16.56.06.448Z_ID10_1397549000_F87	1	1	17	3	166.30	287.60	288.30	221.29	12.9	221	221.50
WAC_2014-05-16T16.56.17.456Z_ID10_1397549000_F87	1	1	17	3	166.30	287.70	288.30	221.27	12.1	221	221.19
WAC_2014-05-16T16.56.48.455Z_ID10_1397549000_F87	1	2	16	3	166.30	287.70	288.30	228.01	12.7	228	227.72
WAC_2014-05-16T16.56.57.463Z_ID10_1397549000_F87	1	2	16	3	166.30	287.70	288.40	228.00	11.7	228	227.68
WAC_2014-05-16T16.57.08.469Z_ID10_1397549000_F87	1	2	16	3	166.30	287.80	288.40	228.13	11.7	228	227.64
WAC_2014-05-16T16.57.38.443Z_ID10_1397549000_F87	1	1	17	3	166.30	287.80	288.40	221.36	12.1	221	221.20
WAC_2014-05-16T16.57.49.464Z_ID10_1397549000_F87	1	1	17	3	166.30	287.80	288.40	221.32	12.1	221	221.19
WAC_2014-05-16T16.57.58.446Z_ID10_1397549000_F87	1	1	17	3	166.30	287.80	288.40	221.34	12.1	221	221.22
WAC_2014-05-16T16.58.29.459Z_ID10_1397549000_F87	1	2	16	3	166.30	287.90	288.50	228.27	11.8	228	228.36
WAC_2014-05-16T16.58.40.425Z_ID10_1397549000_F87	1	2	16	3	166.30	287.90	288.50	228.27	11.8	228	228.30
WAC_2014-05-16T16.58.49.469Z_ID10_1397549000_F87	1	2	16	3	166.30	287.90	288.50	228.25	11.8	228	228.29
WAC_2014-05-16T16.59.21.548Z_ID10_1397549000_F87	1	1	17	3	166.30	287.90	288.60	221.39	12.1	221	221.12
WAC_2014-05-16T16.59.30.460Z_ID10_1397549000_F87	1	1	17	3	166.30	288.00	288.60	221.25	12.0	221	221.13
WAC_2014-05-16T16.59.41.456Z_ID10_1397549000_F87	1	1	17	3	166.30	288.00	288.60	221.22	12.0	221	221.13
WAC_2014-05-16T17.00.12.426Z_ID10_1397549000_F87	1	2	16	3	166.30	288.00	288.60	228.08	11.5	228	227.79
WAC_2014-05-16T17.00.21.463Z_ID10_1397549000_F87	1	2	16	3	166.30	288.00	288.60	228.00	11.7	228	227.60
WAC_2014-05-16T17.00.32.440Z_ID10_1397549000_F87	1	2	16	3	166.30	288.00	288.60	228.05	11.8	228	227.47
WAC_2014-05-16T21.19.46.445Z_ID10_1397549000_F87	1	1	17	2	166.50	289.30	290.00	235.05	14.6	235	234.98
WAC_2014-05-16T21.19.57.467Z_ID10_1397549000_F87	1	1	17	2	166.50	289.30	290.00	235.12	27.2	235	235.02
WAC_2014-05-16T21.20.06.470Z_ID10_1397549000_F87	1	1	17	2	166.40	289.20	290.00	235.07	8.09	235	234.91
WAC_2014-05-16T21.20.37.467Z_ID10_1397549000_F87	1	2	16	2	166.50	289.10	290.00	241.88	11.5	242	241.86
WAC_2014-05-16T21.20.48.421Z_ID10_1397549000_F87	1	2	16	2	166.50	289.00	290.00	241.87	9.53	242	241.83
WAC_2014-05-16T21.20.57.508Z_ID10_1397549000_F87	1	2	16	2	166.50	289.00	290.00	241.89	9.35	242	241.83
WAC_2014-05-16T21.21.28.483Z_ID10_1397549000_F87	1	4	15	2	166.70	288.80	289.90	241.86	26.9	242	241.59
WAC_2014-05-16T21.21.38.482Z_ID10_1397549000_F87	1	4	15	2	166.60	288.80	289.90	241.70	22.0	242	241.58
WAC_2014-05-16T21.21.48.544Z_ID10_1397549000_F87	1	4	15	2	166.60	288.90	289.80	241.77	25.7	242	241.58
WAC_2014-05-16T21.22.20.456Z_ID10_1397549000_F87	1	8	15	2	166.50	288.60	289.80	242.30	20.	242	242.17
WAC_2014-05-16T21.22.29.456Z_ID10_1397549000_F87	1	8	15	2	166.60	288.70	289.90	242.18	8.87	242	242.16
WAC_2014-05-16T21.22.40.467Z_ID10_1397549000_F87	1	8	15	2	166.50	288.60	289.80	242.26	17.1	242	242.12
WAC_2014-05-16T22.39.46.431Z_ID10_1397549000_F87	1	1	17	2	168.10	287.10	288.40	234.20	25.0	234	234.16
WAC_2014-05-16T22.39.57.444Z_ID10_1397549000_F87	1	1	17	2	168.10	287.20	288.50	234.24	11.5	234	234.10
WAC_2014-05-16T22.40.06.452Z_ID10_1397549000_F87	1	1	17	2	168.10	287.00	288.40	234.22	7.49	234	234.00
WAC_2014-05-16T22.40.37.468Z_ID10_1397549000_F87	1	2	16	2	168.00	287.00	288.40	241.08	10.8	241	240.95
WAC_2014-05-16T22.40.48.423Z_ID10_1397549000_F87	1	2	16	2	168.10	287.20	288.60	241.06	8.54	241	240.92
WAC_2014-05-16T22.40.57.443Z_ID10_1397549000_F87	1	2	16	2	168.00	287.00	288.40	241.11	13.2	241	240.99
WAC_2014-05-16T22.41.28.465Z_ID10_1397549000_F87	1	4	15	2	168.00	287.20	288.50	241.07	14.7	241	241.04
WAC_2014-05-16T22.41.38.456Z_ID10_1397549000_F87	1	4	15	2	168.10	287.20	288.40	241.06	16.1	241	240.92
WAC_2014-05-16T22.41.49.452Z_ID10_1397549000_F87	1	4	15	2	167.90	287.20	288.50	240.99	9.63	241	240.88



WAC_2014-05-16T22.42.20.453Z_ID10_1397549000_F87	1	8	15	2	168.00	287.20	288.60	241.79	21.8	242	241.60
WAC_2014-05-16T22.42.29.492Z_ID10_1397549000_F87	1	8	15	2	167.90	287.20	288.50	242.38	51.9	242	241.62
WAC_2014-05-16T22.42.40.449Z_ID10_1397549000_F87	1	8	15	2	168.10	287.30	288.50	242.15	95.8	242	241.57
WAC_2014-07-06T00.00.09.474Z_ID10_1397549000_F87	1	1	17	2	166.70	294.00	295.30	237.52	6.37	238	237.21
WAC_2014-07-06T00.00.20.419Z_ID10_1397549000_F87	1	1	17	2	166.70	294.00	295.30	237.82	6.38	238	237.79
WAC_2014-07-06T00.00.29.459Z_ID10_1397549000_F87	1	1	17	2	166.70	294.00	295.20	236.97	6.21	237	236.85
WAC_2014-07-28T03.12.04.452Z_ID10_1397549800_F87	1	1	17	2	169.80	294.90	296.20	1861.55	542	1858	1865.34
WAC_2014-07-28T03.33.13.484Z_ID10_1397549000_F87	1	1	17	2	169.80	294.80	296.10	1861.17	510	1858	1863.95
WAC_2014-07-28T03.54.23.517Z_ID10_1397549200_F87	1	1	17	2	169.70	294.80	296.10	1862.47	537	1859	1866.47
WAC_2014-08-13T10.00.09.480Z_ID10_1397549200_F87	1	1	17	2	166.70	292.90	294.10	237.28	6.41	237	236.98
WAC_2014-08-13T10.00.18.428Z_ID10_1397549300_F87	1	1	17	2	166.70	292.90	294.10	237.07	6.44	237	236.88
WAC_2014-08-13T10.00.29.473Z_ID10_1397549400_F87	1	1	17	2	166.70	292.90	294.10	237.19	6.40	237	236.92
WAC_2014-09-09T22.30.08.442Z_ID10_1397549100_F87	1	1	17	2	166.90	295.40	296.70	238.37	6.50	238	237.98
WAC_2014-09-09T22.30.17.439Z_ID10_1397549200_F87	1	1	17	2	166.90	295.50	296.70	238.46	6.45	238	238.60
WAC_2014-09-09T22.30.28.440Z_ID10_1397549300_F87	1	1	17	2	166.90	295.50	296.70	238.30	6.47	238	237.88
WAC_2014-09-24T07.12.07.457Z_ID10_1397549400_F87	1	1	17	2	166.80	296.10	297.30	238.31	6.47	238	237.99
WAC_2014-09-24T07.12.17.448Z_ID10_1397549500_F87	1	1	17	2	166.80	296.10	297.30	238.47	6.37	238	238.52
WAC_2014-09-24T07.12.27.550Z_ID10_1397549600_F87	1	1	17	2	166.80	296.00	297.30	237.98	6.40	238	237.73
WAC_2014-10-01T00.00.08.419Z_ID10_1397549100_F87	1	1	17	2	166.80	295.80	297.00	238.87	6.48	238	238.90
WAC_2014-10-01T00.00.17.456Z_ID10_1397549200_F87	1	1	17	2	166.80	295.80	297.00	238.23	6.57	238	237.86
WAC_2014-10-01T00.00.28.456Z_ID10_1397549300_F87	1	1	17	2	166.80	295.80	297.00	238.47	6.66	238	238.23
WAC_2014-10-08T00.00.06.465Z_ID10_1397549500_F87	1	1	17	2	167.00	296.70	297.90	238.90	6.47	239	239.00
WAC_2014-10-08T00.00.17.471Z_ID10_1397549600_F87	1	1	17	2	167.00	296.70	298.00	238.79	6.44	238	238.86
WAC_2014-10-08T00.00.26.465Z_ID10_1397549700_F87	1	1	17	2	167.00	296.70	298.00	239.05	6.46	239	239.02
WAC_2014-10-15T00.00.06.524Z_ID10_1397549800_F87	1	1	17	2	166.90	296.00	297.20	238.72	6.48	238	238.92
WAC_2014-10-15T00.00.17.440Z_ID10_1397549900_F87	1	1	17	2	166.90	296.00	297.20	238.67	6.46	238	238.87
WAC_2014-10-15T00.00.26.472Z_ID10_1397549000_F87	1	1	17	2	166.90	295.90	297.20	238.58	6.48	238	238.82
WAC_2014-10-23T00.00.06.443Z_ID10_1397549800_F87	1	1	17	2	167.00	296.20	297.50	238.54	6.45	238	238.66
WAC_2014-10-23T00.00.17.458Z_ID10_1397549900_F87	1	1	17	2	167.00	296.20	297.50	238.47	6.36	238	238.58
WAC_2014-10-23T00.00.26.442Z_ID10_1397549000_F87	1	1	17	2	167.00	296.20	297.50	238.66	6.48	238	238.78
WAC_2014-12-20T21.07.42.462Z_ID00_1397549200_F87	1	1	17	2	166.06	295.60	296.89	238.44	6.40	238	238.60
WAC_2014-12-20T21.07.53.486Z_ID00_1397549300_F87	1	1	17	2	166.04	295.60	296.87	238.27	6.24	238	238.45
WAC_2014-12-20T21.08.02.482Z_ID00_1397549400_F87	1	1	17	2	166.03	295.62	296.85	237.86	6.34	238	237.79
WAC_2014-12-26T21.05.40.468Z_ID10_1397549200_F87	1	1	17	2	166.10	295.20	296.50	238.05	6.46	238	237.91
WAC_2014-12-26T21.05.49.475Z_ID10_1397549300_F87	1	1	17	2	166.00	295.20	296.50	238.12	6.42	238	237.89
WAC_2014-12-26T21.06.00.458Z_ID10_1397549400_F87	1	1	17	2	166.00	295.20	296.50	238.22	6.16	238	238.53
WAC_2015-01-07T07.20.05.474Z_ID00_1397549000_F87	1	1	17	2	166.04	293.72	293.35	238.16	6.42	238	237.93
WAC_2015-01-07T07.20.14.472Z_ID00_1397549100_F87	1	1	17	2	166.03	293.68	293.37	237.81	6.42	238	237.79
WAC_2015-01-07T07.20.25.470Z_ID00_1397549200_F87	1	1	17	2	166.01	293.80	293.59	238.79	6.38	238	238.88
WAC_2015-01-20T15.28.33.481Z_ID10_1397549900_F87	1	1	17	2	166.10	295.40	296.60	238.21	6.36	238	237.99
WAC_2015-01-20T15.28.44.431Z_ID10_1397549000_F87	1	1	17	2	166.10	295.40	296.60	238.47	6.29	238	238.52
WAC_2015-01-20T15.28.53.469Z_ID10_1397549100_F87	1	1	17	2	166.10	295.40	296.60	238.33	6.30	238	238.47
WAC_2015-01-27T14.34.04.473Z_ID10_1397549900_F87	1	1	17	2	166.00	294.70	296.00	238.02	6.31	238	237.87
WAC_2015-01-27T14.34.13.450Z_ID10_1397549000_F87	1	1	17	2	166.00	294.70	295.90	237.77	6.24	238	237.58



WAC_2015-01-27T14.34.24.455Z_ID10_1397549100_F87	1	1	17	2	166.00	294.70	295.90	238.24	6.23	238	238.49
WAC_2015-01-30T02.19.13.482Z_ID10_1397549100_F87	1	1	17	2	166.10	295.50	296.70	238.24	6.28	238	237.91
WAC_2015-01-30T02.19.22.584Z_ID10_1397549200_F87	1	1	17	2	166.10	295.40	296.70	238.31	6.27	238	238.50
WAC_2015-01-30T02.19.33.473Z_ID10_1397549300_F87	1	1	17	2	166.10	295.40	296.70	237.81	6.33	238	237.72
WAC_2015-02-09T10.20.42.455Z_ID10_1397549600_F87	1	1	17	2	166.00	294.80	296.10	237.94	6.35	238	237.81
WAC_2015-02-09T10.20.53.446Z_ID10_1397549700_F87	1	1	17	2	166.10	294.80	296.00	238.01	6.37	238	237.83
WAC_2015-02-09T10.21.02.446Z_ID10_1397549800_F87	1	1	17	2	166.10	294.80	296.00	238.52	6.33	238	238.57
WAC_2015-02-11T18.30.46.469Z_ID10_1397549400_F87	1	1	17	2	166.10	295.60	296.80	238.39	6.44	238	237.99
WAC_2015-02-11T18.30.56.533Z_ID10_1397549500_F87	1	1	17	2	166.10	295.50	296.80	238.37	6.35	238	238.51
WAC_2015-02-11T18.31.06.472Z_ID10_1397549600_F87	1	1	17	2	166.10	295.50	296.80	238.47	6.39	238	238.50
WAC_2015-02-18T13.15.04.437Z_ID10_1397549100_F87	1	1	17	2	166.10	295.90	297.20	238.86	6.33	238	238.93
WAC_2015-02-18T13.15.13.474Z_ID10_1397549200_F87	1	1	17	2	166.10	295.90	297.20	238.69	6.28	238	238.64
WAC_2015-02-18T13.15.24.461Z_ID10_1397549300_F87	1	1	17	2	166.10	296.00	297.20	238.44	6.48	238	237.94
WAC_2015-02-28T05.15.02.470Z_ID10_1397549300_F87	1	1	17	2	166.20	295.80	297.00	239.41	6.38	240	239.32
WAC_2015-02-28T05.15.12.558Z_ID10_1397549400_F87	1	1	17	2	166.20	295.80	297.00	238.04	6.40	238	237.82
WAC_2015-02-28T05.15.22.482Z_ID10_1397549500_F87	1	1	17	2	166.20	295.80	297.00	238.50	6.34	238	238.51
WAC_2015-03-04T06.58.29.450Z_ID10_1397549800_F87	0	1	1	1	166.20	295.70	297.00	241.04	7.15	241	240.90
WAC_2015-03-04T06.58.41.483Z_ID10_1397549000_F87	0	1	1	2	166.20	295.70	296.80	238.11	6.3	238	237.83
WAC_2015-03-04T06.58.52.462Z_ID10_1397549200_F87	0	1	1	3	166.20	295.70	296.70	225.75	12.1	226	225.15
WAC_2015-03-04T06.59.00.429Z_ID10_1397549400_F87	0	2	16	1	166.20	295.70	296.70	247.85	99.1	245	245.61
WAC_2015-03-04T06.59.05.463Z_ID10_1397549600_F87	0	2	16	2	166.20	295.70	296.70	245.17	7.12	245	245.64
WAC_2015-03-04T06.59.12.447Z_ID10_1397549800_F87	0	2	16	3	166.20	295.70	296.70	232.11	11.9	232	232.49
WAC_2015-03-04T06.59.16.453Z_ID10_1397549000_F87	1	1	17	1	166.20	295.70	296.70	241.75	7.06	242	241.65
WAC_2015-03-04T06.59.17.468Z_ID10_1397549200_F87	1	1	17	2	166.20	295.70	296.70	238.77	6.31	238	238.85
WAC_2015-03-04T06.59.19.454Z_ID10_1397549400_F87	1	1	17	3	166.20	295.70	296.70	226.25	12.1	226	226.53
WAC_2015-03-04T06.59.21.475Z_ID10_1397549600_F87	1	2	16	1	166.20	295.70	296.60	245.68	8.01	246	245.46
WAC_2015-03-04T06.59.24.447Z_ID10_1397549800_F87	1	2	16	2	166.20	295.60	296.60	245.55	7.22	246	245.63
WAC_2015-03-04T06.59.25.508Z_ID10_1397549000_F87	1	2	16	3	166.20	295.70	296.70	232.40	12.2	232	232.38
WAC_2015-03-04T06.59.28.484Z_ID10_1397549200_F87	1	4	15	1	166.10	295.70	296.60	246.78	8.44	248	247.27
WAC_2015-03-04T06.59.29.502Z_ID10_1397549400_F87	1	4	15	2	166.20	295.70	296.70	244.93	7.33	245	245.26
WAC_2015-03-04T06.59.32.429Z_ID10_1397549600_F87	1	4	15	3	166.20	295.70	296.60	232.21	12.1	232	232.38
WAC_2015-03-04T06.59.33.467Z_ID10_1397549800_F87	1	8	15	1	166.20	295.70	296.60	247.63	8.59	248	247.57
WAC_2015-03-04T06.59.36.524Z_ID10_1397549000_F87	1	8	15	2	166.20	295.70	296.60	245.73	8.43	246	245.73
WAC_2015-03-04T06.59.37.463Z_ID10_1397549200_F87	1	8	15	3	166.20	295.70	296.60	231.76	12.6	231	231.08
WAC_2015-03-04T07.57.58.531Z_ID10_1397549100_F87	1	1	17	2	166.10	297.80	298.40	238.85	9.56	238	238.82
WAC_2015-03-04T07.58.08.458Z_ID10_1397549200_F87	1	1	17	2	166.20	297.80	298.50	238.90	9.20	238	238.84
WAC_2015-03-04T07.58.16.462Z_ID10_1397549300_F87	1	1	17	2	166.20	297.80	298.50	238.89	9.76	238	238.83
WAC_2015-03-08T01.40.49.483Z_ID10_1397549100_F87	1	1	17	2	166.30	296.60	297.90	238.78	6.34	238	238.87
WAC_2015-03-08T01.41.00.452Z_ID10_1397549200_F87	1	1	17	2	166.30	296.60	297.90	238.79	6.34	238	238.92
WAC_2015-03-08T01.41.09.443Z_ID10_1397549300_F87	1	1	17	2	166.30	296.60	297.90	239.14	6.34	239	238.88
WAC_2015-03-17T01.25.02.491Z_ID10_1397549400_F87	1	1	17	2	166.30	297.70	299.00	239.16	6.59	239	239.07
WAC_2015-03-17T01.25.12.524Z_ID10_1397549500_F87	1	1	17	2	166.30	297.70	299.00	239.35	6.42	239	239.02
WAC_2015-03-17T01.25.22.472Z_ID10_1397549600_F87	1	1	17	2	166.30	297.70	299.00	239.03	6.55	239	238.93
WAC_2015-03-23T07.46.02.454Z_ID10_1397549200_F87	1	1	17	2	166.30	295.60	296.90	238.27	6.38	238	237.87



WAC_2015-03-23T07.46.12.524Z_ID10_1397549300_F87	1	1	17	2	166.30	295.60	296.90	238.44	6.39	238	238.60
WAC_2015-03-23T07.46.22.444Z_ID10_1397549400_F87	1	1	17	2	166.20	295.60	296.90	238.34	6.30	238	238.51
WAC_2015-04-21T09.38.01.472Z_ID10_1397549400_F87	1	1	17	2	166.30	298.50	299.80	239.95	6.55	240	240.03
WAC_2015-04-21T09.38.12.437Z_ID10_1397549500_F87	1	1	17	2	166.30	298.50	299.80	240.01	6.46	240	239.83
WAC_2015-04-21T09.38.21.478Z_ID10_1397549600_F87	1	1	17	2	166.30	298.50	299.80	239.89	6.43	240	239.79
WAC_2015-04-27T23.04.01.467Z_ID10_1397549600_F87	1	1	17	2	166.30	297.60	298.90	239.19	6.45	238	238.97
WAC_2015-04-27T23.04.12.433Z_ID10_1397549700_F87	1	1	17	2	166.30	297.60	298.90	239.49	6.40	240	239.33
WAC_2015-04-27T23.04.21.486Z_ID10_1397549800_F87	1	1	17	2	166.30	297.60	299.00	239.40	6.40	240	239.30
WAC_2015-05-01T14.17.13.496Z_ID10_1397549000_F87	1	1	17	2	166.30	297.10	298.40	239.16	7.49	239	238.92
WAC_2015-05-01T14.17.22.474Z_ID10_1397549100_F87	1	1	17	2	166.30	297.10	298.40	238.65	7.73	238	238.57
WAC_2015-05-01T14.17.33.455Z_ID10_1397549200_F87	1	1	17	2	166.30	297.10	298.30	239.52	7.60	240	238.99
WAC_2015-05-11T13.28.57.483Z_ID10_1397549900_F87	1	1	17	2	167.40	298.40	298.00	239.85	6.47	240	239.94
WAC_2015-05-11T13.29.08.448Z_ID10_1397549000_F87	1	1	17	2	167.40	298.40	298.00	239.54	6.23	240	239.28
WAC_2015-05-11T13.29.17.580Z_ID10_1397549100_F87	1	1	17	2	167.40	298.40	298.30	239.56	6.38	240	239.24
WAC_2015-05-16T06.50.01.438Z_ID10_1397549900_F87	1	1	17	2	167.10	298.20	299.50	239.10	6.44	239	239.08
WAC_2015-05-16T06.50.11.453Z_ID10_1397549000_F87	1	1	17	2	167.10	298.20	299.50	239.20	6.47	239	239.05
WAC_2015-05-16T06.50.21.453Z_ID10_1397549100_F87	1	1	17	2	167.10	298.20	299.50	238.90	6.34	238	238.96
WAC_2015-05-23T06.45.01.491Z_ID10_1397549000_F87	1	1	17	2	167.40	298.70	299.90	239.00	6.36	239	238.96
WAC_2015-05-23T06.45.10.589Z_ID10_1397549100_F87	1	1	17	2	167.40	298.70	299.90	239.31	6.44	239	238.99
WAC_2015-05-23T06.45.21.493Z_ID10_1397549200_F87	1	1	17	2	167.40	298.70	299.90	239.31	6.37	239	239.06
WAC_2015-06-07T20.02.21.468Z_ID10_1397549000_F87	1	1	17	2	167.40	300.60	301.90	240.59	6.45	240	240.79
WAC_2015-06-07T20.02.21.881Z_ID10_1397549100_F87	1	1	17	2	167.40	300.60	301.90	239.90	6.43	240	239.90
WAC_2015-06-07T20.02.22.256Z_ID10_1397549200_F87	1	1	17	2	167.40	300.60	301.90	240.17	6.48	240	240.02
WAC_2015-06-16T03.53.41.478Z_ID10_1397549400_F87	1	1	17	2	167.50	300.30	301.60	240.21	6.52	240	240.01
WAC_2015-06-16T03.53.50.575Z_ID10_1397549500_F87	1	1	17	2	167.50	300.30	301.60	240.16	6.47	240	239.89
WAC_2015-06-16T03.54.01.475Z_ID10_1397549600_F87	1	1	17	2	167.50	300.30	301.60	240.06	6.46	240	240.04
WAC_2015-06-23T06.40.00.421Z_ID10_1397549800_F87	1	1	17	2	167.50	300.30	301.60	239.13	6.55	239	238.98
WAC_2015-06-23T06.40.09.440Z_ID10_1397549900_F87	1	1	17	2	167.50	300.30	301.60	239.83	6.64	240	239.86
WAC_2015-06-23T06.40.20.431Z_ID10_1397549000_F87	1	1	17	2	167.50	300.30	301.60	240.44	6.61	240	240.19
WAC_2015-04-22T02.42.21.466Z_ID10_1397549400_F87	0	1	1	1	167.3	299.2	300.5	242.55	7.24	242	242.36
WAC_2015-04-22T02.42.33.459Z_ID10_1397549600_F87	0	1	1	2	167.3	299.2	300.3	239.27	6.54	239	239.01
WAC_2015-04-22T02.42.45.453Z_ID10_1397549800_F87	0	1	1	3	167.3	299.1	300.2	237.01	7.10	237	236.92
WAC_2015-04-22T02.42.45.453Z_ID10_1397549800_F87	0	1	1	3	167.3	299.1	300.2	217.07	6.49	217	217.10
WAC_2015-04-22T02.42.53.473Z_ID10_1397549000_F87	0	2	16	1	167.3	299.1	300.3	246.77	7.87	247	246.57
WAC_2015-04-22T02.42.59.427Z_ID10_1397549200_F87	0	2	16	2	167.3	299.1	300.1	246.34	7.19	246	246.24
WAC_2015-04-22T02.43.05.580Z_ID10_1397549400_F87	0	2	16	3	167.3	299.1	300.2	241.94	8.74	242	242.06
WAC_2015-04-22T02.43.05.580Z_ID10_1397549400_F87	0	2	16	3	167.3	299.1	300.2	224.61	7.93	225	224.60
WAC_2015-04-22T02.43.08.572Z_ID10_1397549600_F87	1	1	17	1	167.3	299.1	300.2	243.26	7.26	243	242.92
WAC_2015-04-22T02.43.10.458Z_ID10_1397549800_F87	1	1	17	2	167.3	299.1	300.2	239.74	6.38	240	239.77
WAC_2015-04-22T02.43.13.504Z_ID10_1397549000_F87	1	1	17	3	167.3	299.1	300.2	238.15	7.16	238	238.02
WAC_2015-04-22T02.43.13.504Z_ID10_1397549000_F87	1	1	17	3	167.3	299.1	300.2	217.85	6.39	218	217.80
WAC_2015-04-22T02.43.15.099Z_ID10_1397549200_F87	1	2	16	1	167.3	299.1	300.1	247.36	8.05	248	247.09
WAC_2015-04-22T02.43.17.455Z_ID10_1397549400_F87	1	2	16	2	167.3	299.1	300.1	247.20	7.66	247	247.01



WAC_2015-04-22T02.43.18.475Z_ID10_1397549600_F87	1	2	16	3	167.3	299.1	300.1	243.27	8.83	244	243.84
WAC_2015-04-22T02.43.18.475Z_ID10_1397549600_F87	1	2	16	3	167.3	299.1	300.1	226.02	7.85	226	226.23
WAC_2015-04-22T02.43.20.437Z_ID10_1397549800_F87	1	4	15	1	167.3	299.1	300.1	247.59	8.15	248	247.39
WAC_2015-04-22T02.43.22.467Z_ID10_1397549000_F87	1	4	15	2	167.3	299.2	300.1	245.81	7.34	246	245.94
WAC_2015-04-22T02.43.25.492Z_ID10_1397549200_F87	1	4	15	3	167.3	299.2	300.1	242.92	8.19	243	243.05
WAC_2015-04-22T02.43.25.492Z_ID10_1397549200_F87	1	4	15	3	167.3	299.2	300.1	224.29	7.23	224	224.12
WAC_2015-04-22T02.43.27.456Z_ID10_1397549400_F87	1	8	15	1	167.3	299.1	300.1	249.13	8.25	249	248.72
WAC_2015-04-22T02.43.29.498Z_ID10_1397549600_F87	1	8	15	2	167.3	299.1	300.1	246.30	7.41	246	246.36
WAC_2015-04-22T02.43.31.436Z_ID10_1397549800_F87	1	8	15	3	167.3	299.1	300.1	243.31	8.12	244	243.65
WAC_2015-04-22T02.43.31.436Z_ID10_1397549800_F87	1	8	15	3	167.3	299.1	300.1	225.07	7.55	226	225.26



2.4 NAC BIAS temperature dependency

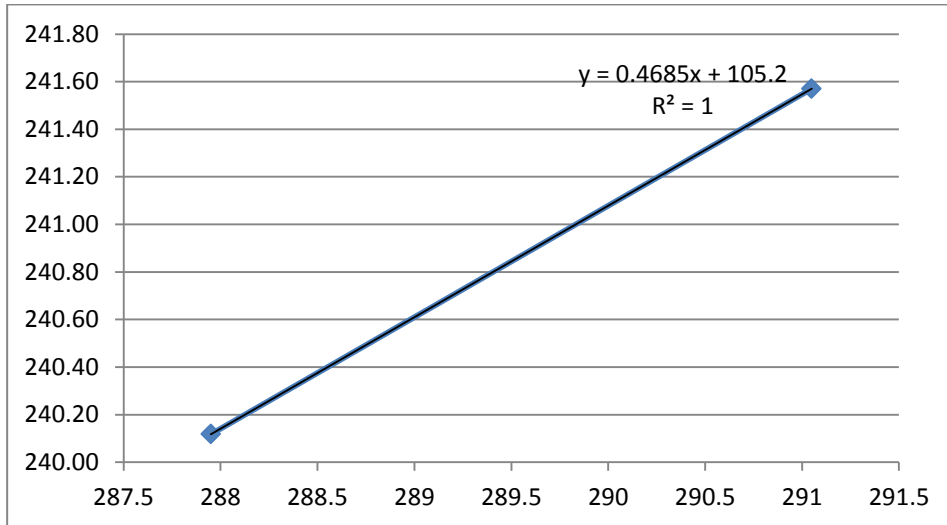


Figure 1 NAC SwW, B1, Ampli A BIAS vs. temperature

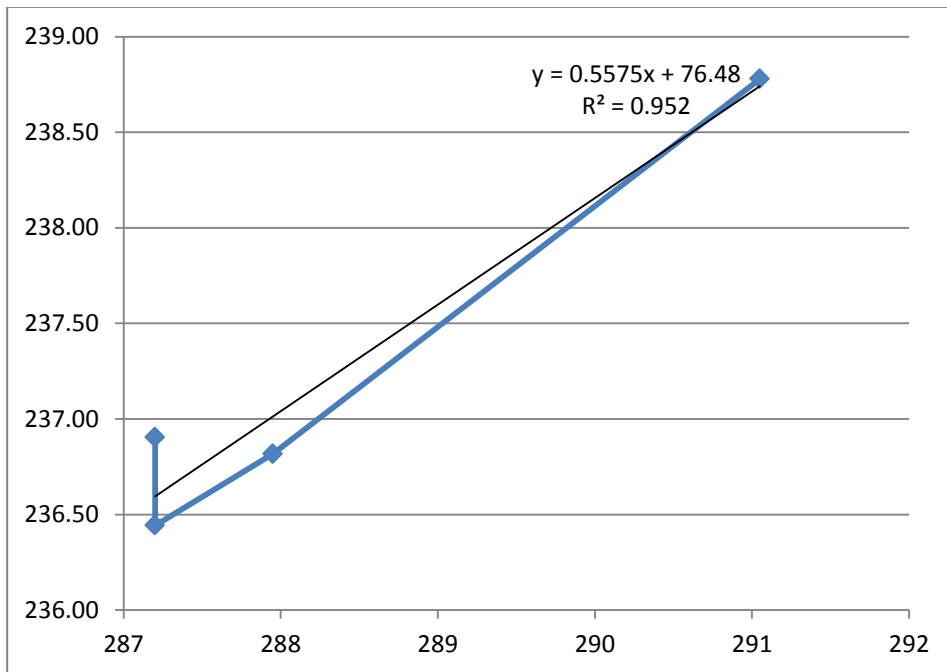


Figure 2 NAC SwW, B1, Ampli B BIAS vs. temperature

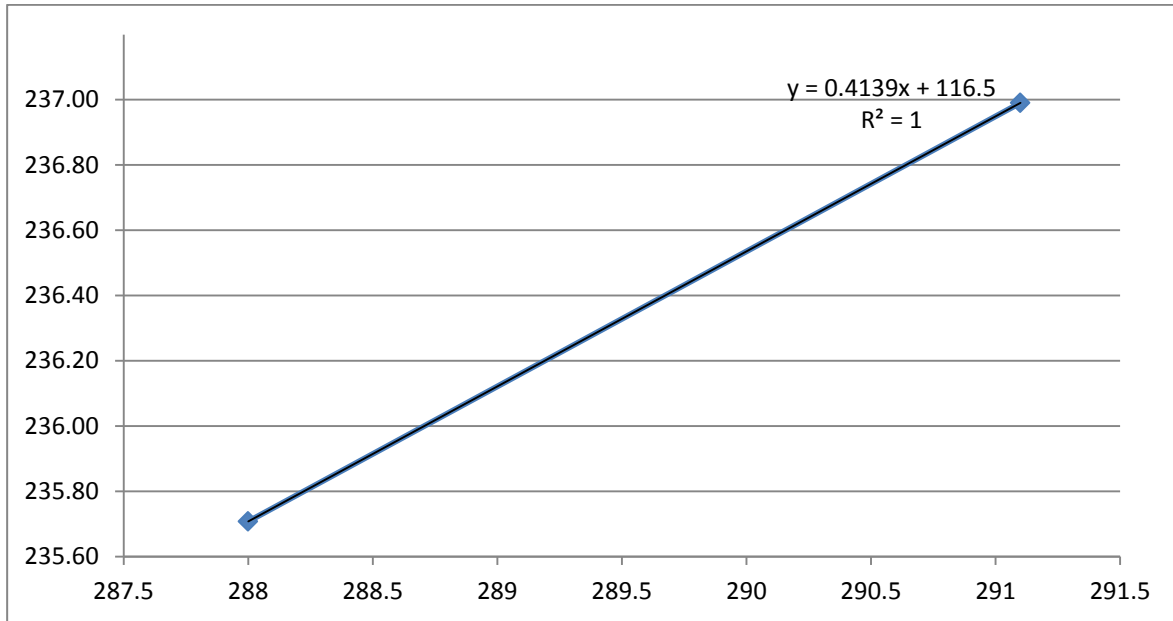


Figure 3 NAC SwW, B1, Ampli DA BIAS vs. temperature

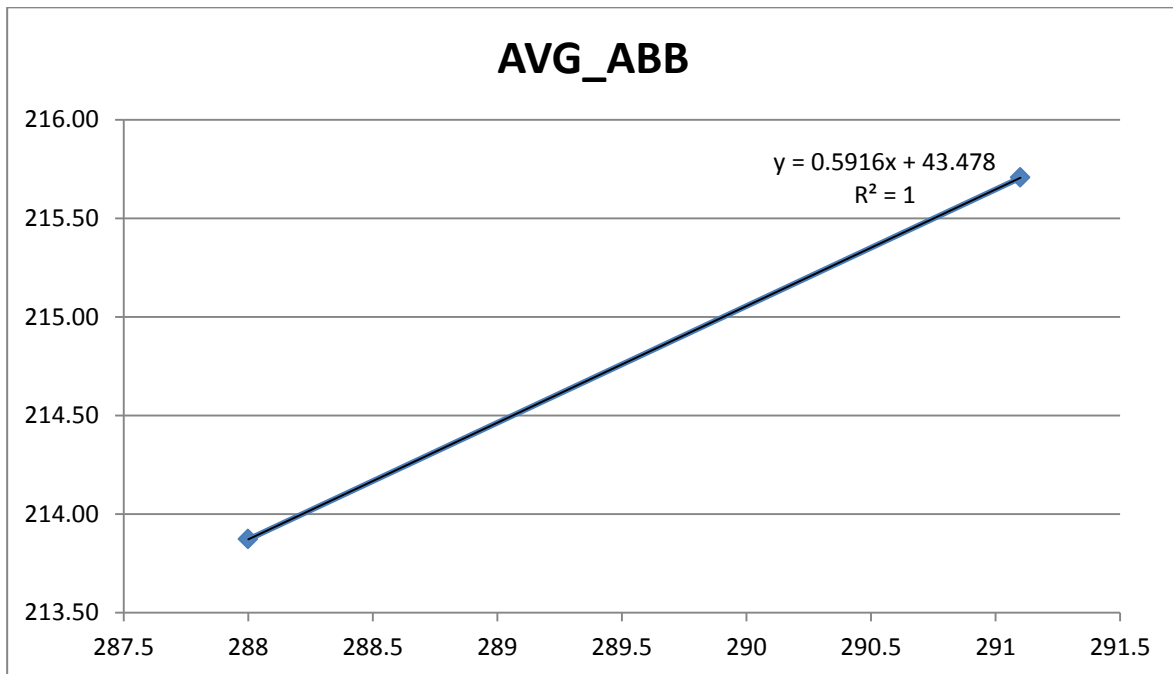


Figure 4 NAC SwW, B1, Ampli DB BIAS vs. temperature

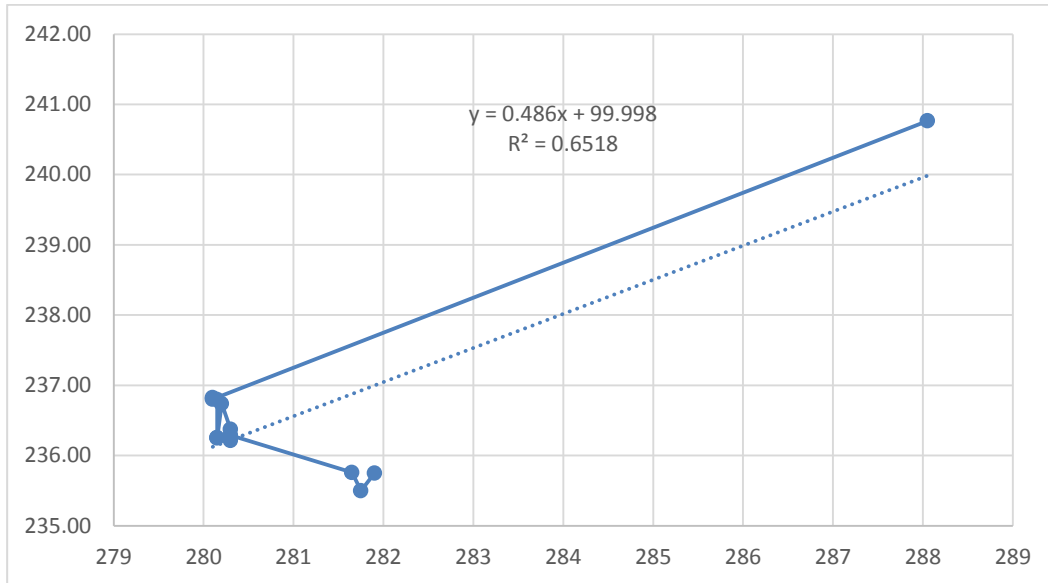


Figure 5 NAC HwW, B1, Ampli A BIAS vs. temperature

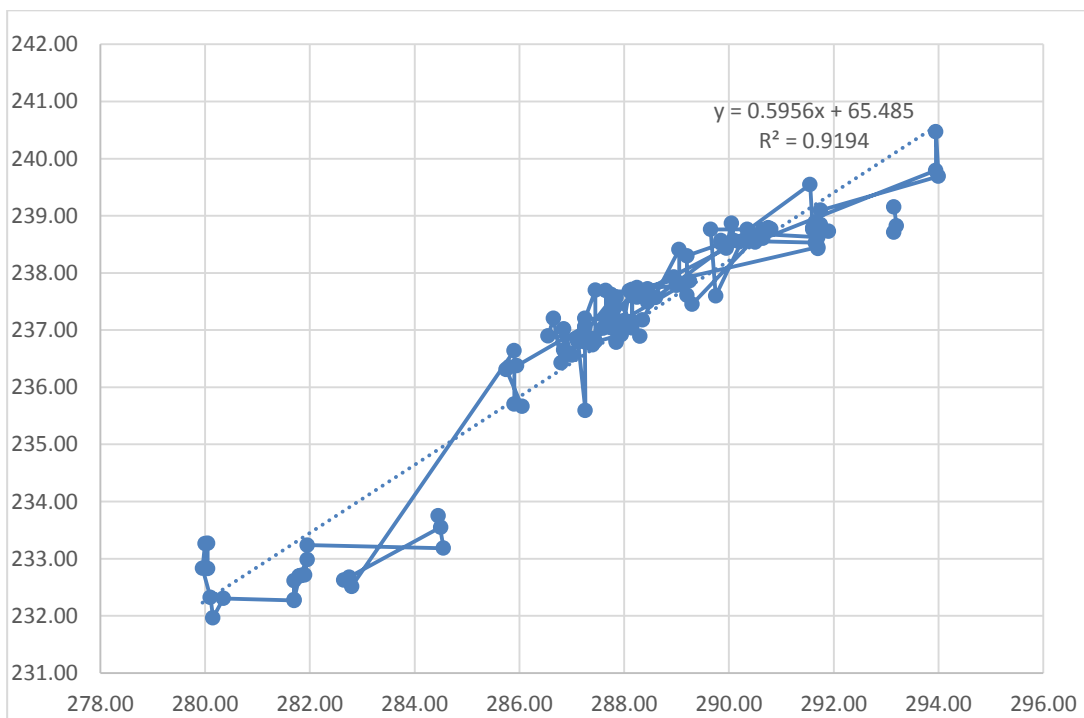


Figure 6 NAC HwW, B1, Ampli B BIAS vs. temperature

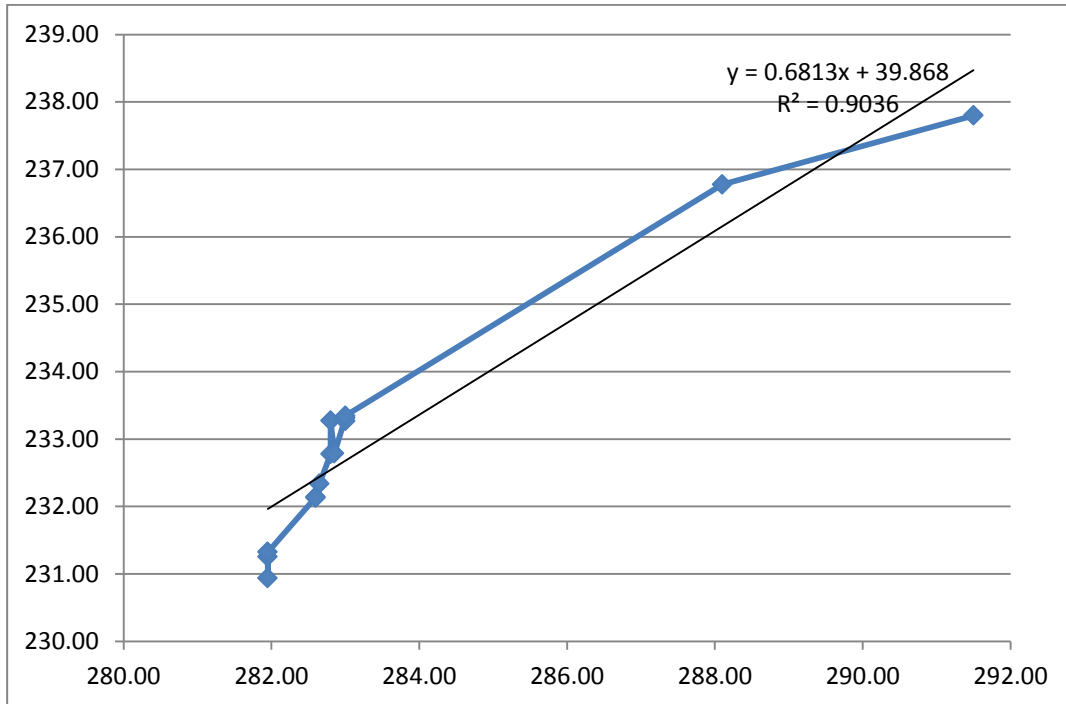


Figure 7 NAC HwW, B1, Ampli DA BIAS vs. temperature

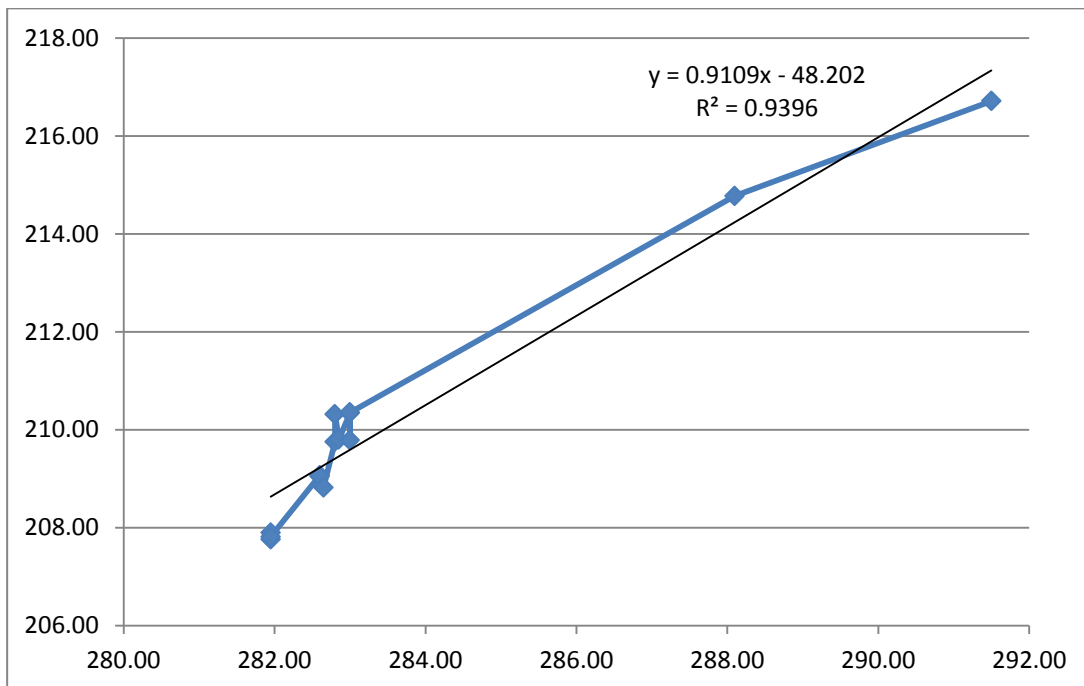


Figure 8 NAC HwW, B1, Ampli DB BIAS vs. temperature

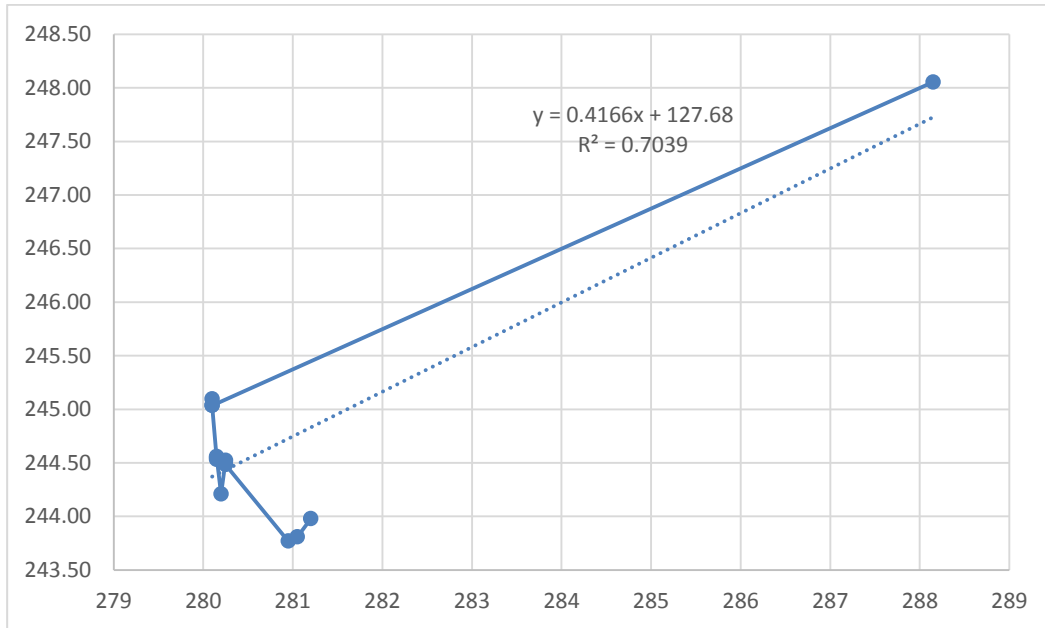


Figure 9 NAC HwW, B2, Ampli A BIAS vs. temperature

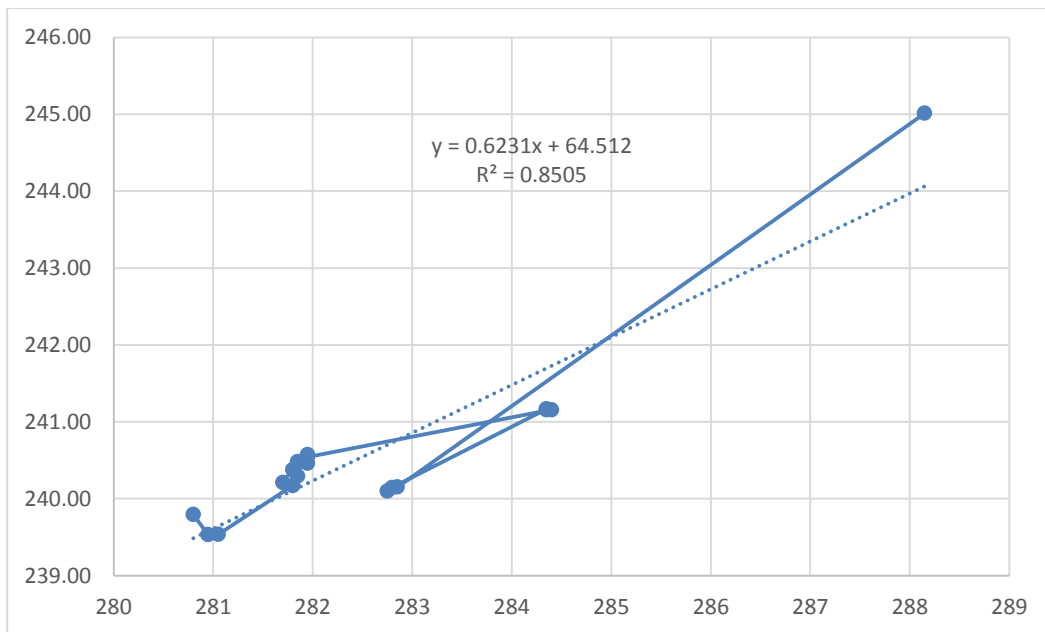


Figure 10 NAC HwW, B2, Ampli B BIAS vs. temperature

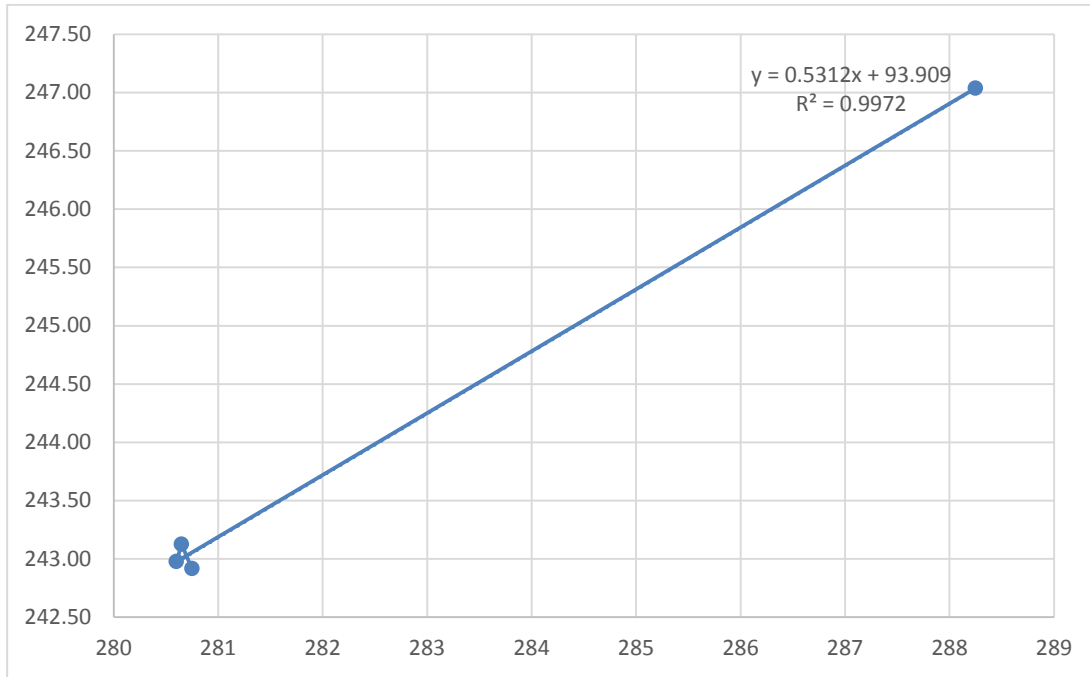


Figure 11 NAC HwW, B4, Ampli A BIAS vs. temperature

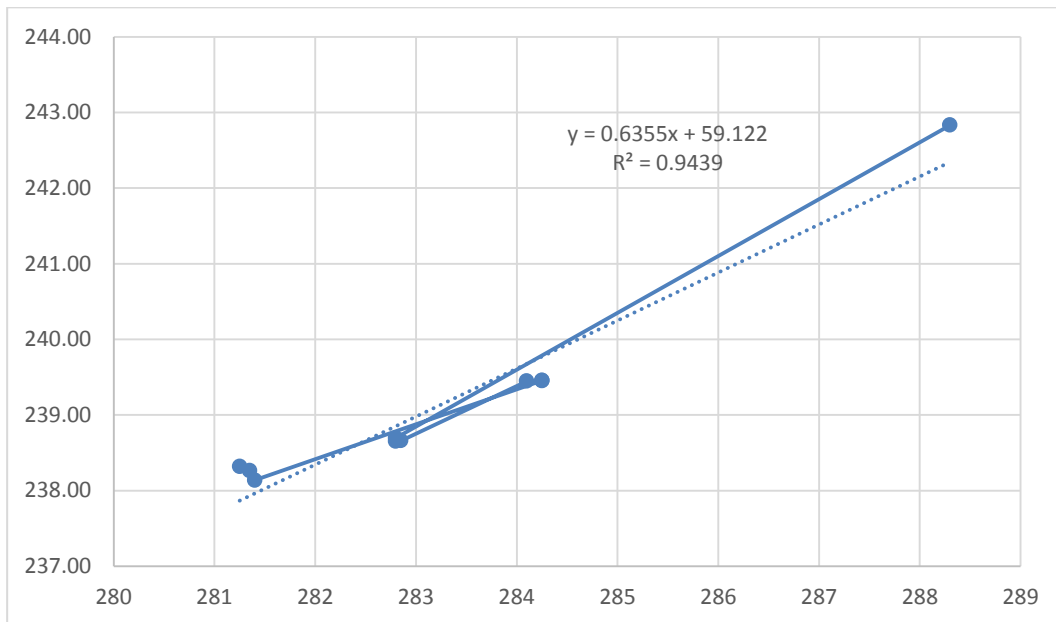


Figure 12 NAC HwW, B4, Ampli B BIAS vs. temperature

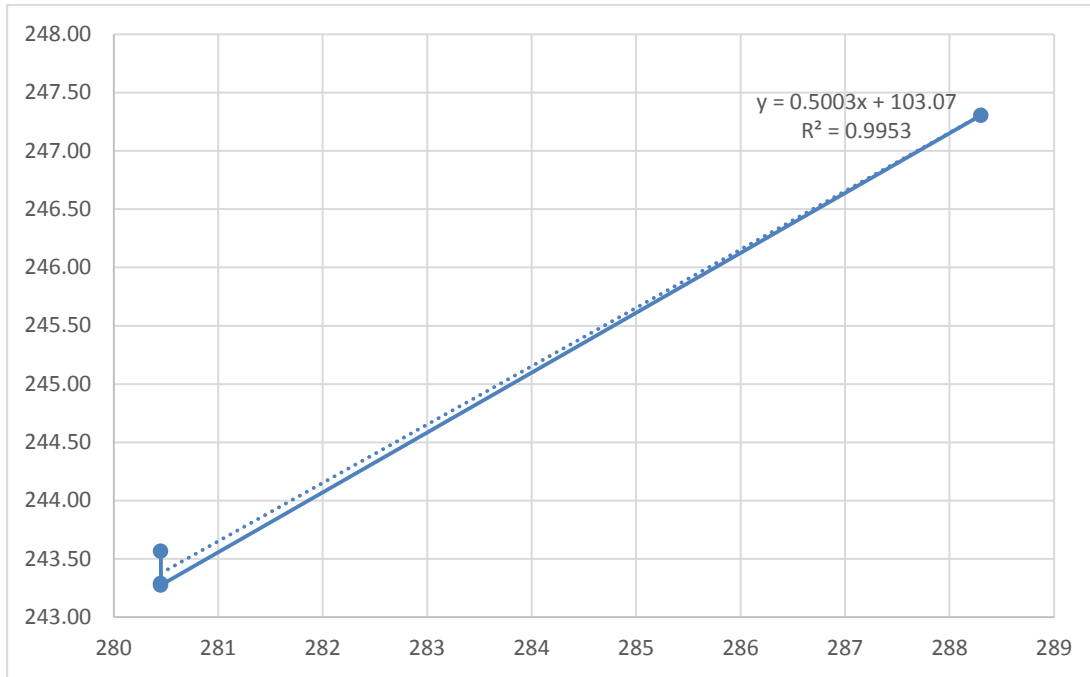


Figure 13 NAC HwW, B8, Ampli A BIAS vs. temperature

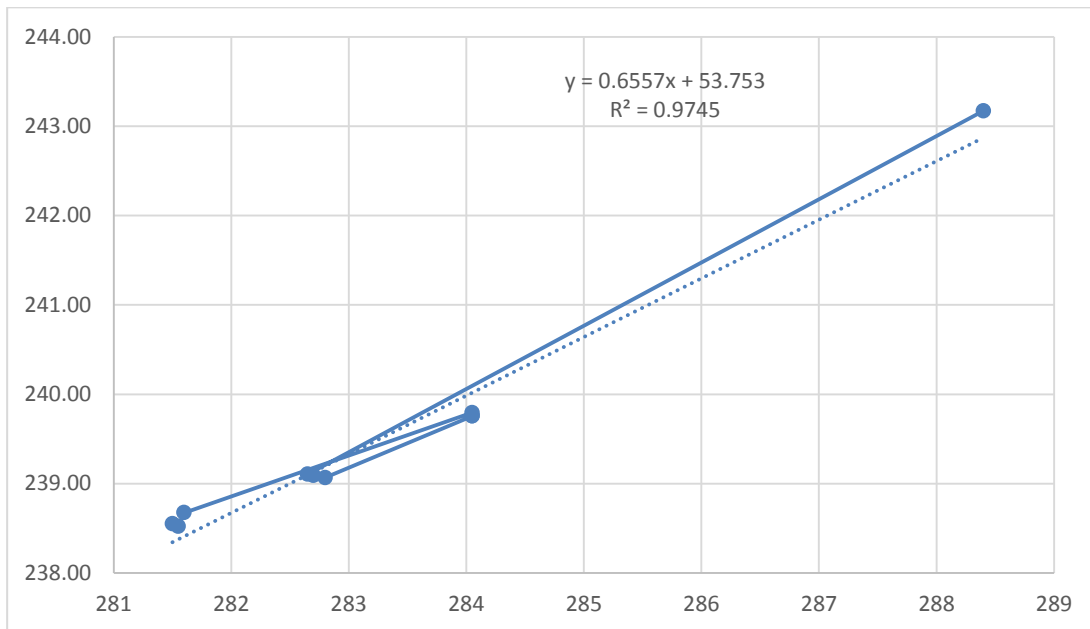


Figure 14 NAC HwW, B8, Ampli B BIAS vs. temperature



2.5 WAC temperature dependency

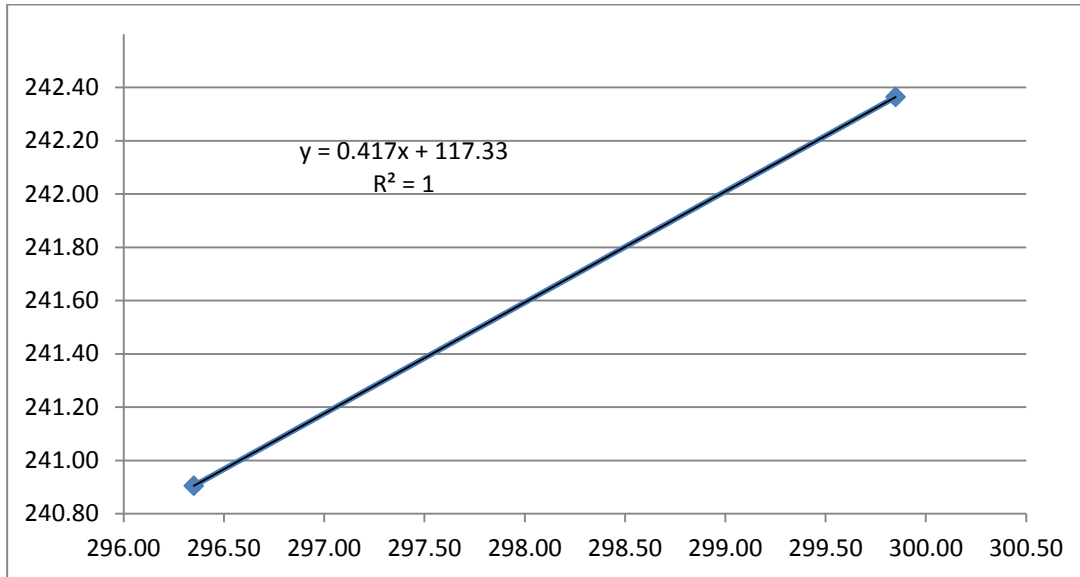


Figure 15 WAC SwW, B1, Ampli A BIAS vs. temperature

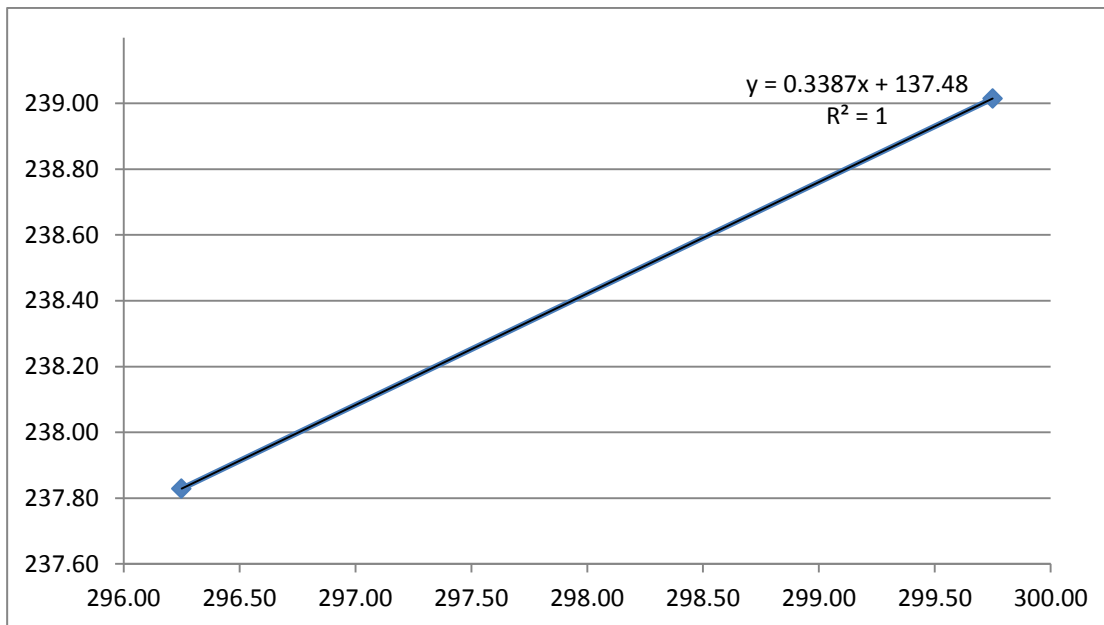


Figure 16 WAC SwW, B1, Ampli B BIAS vs. temperature

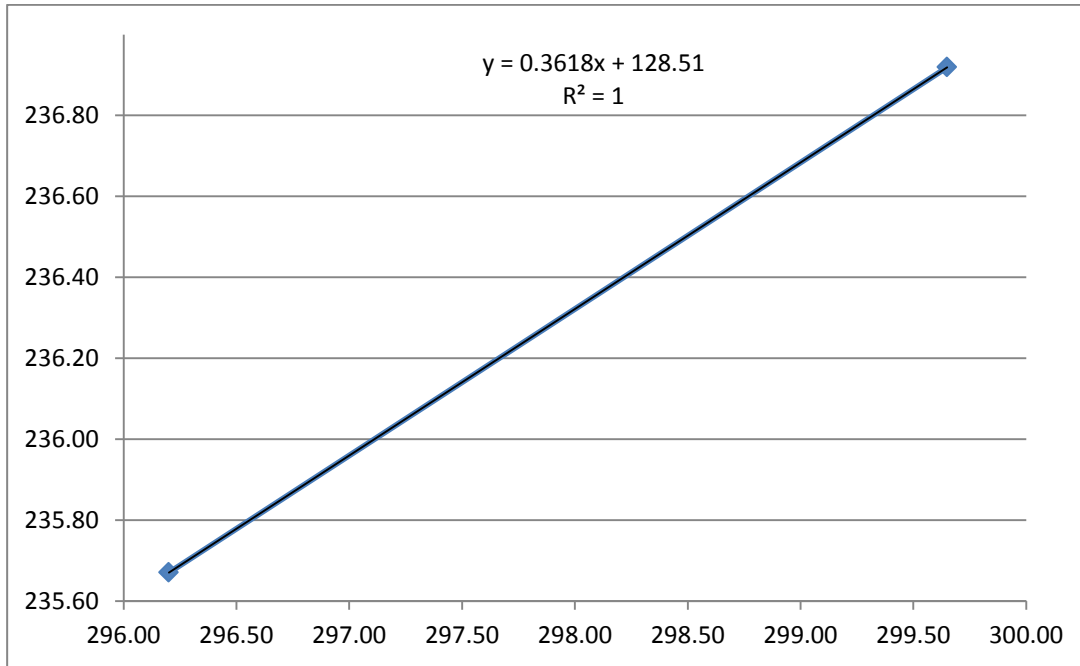


Figure 17 WAC SwW, B1, Ampli DA BIAS vs. temperature

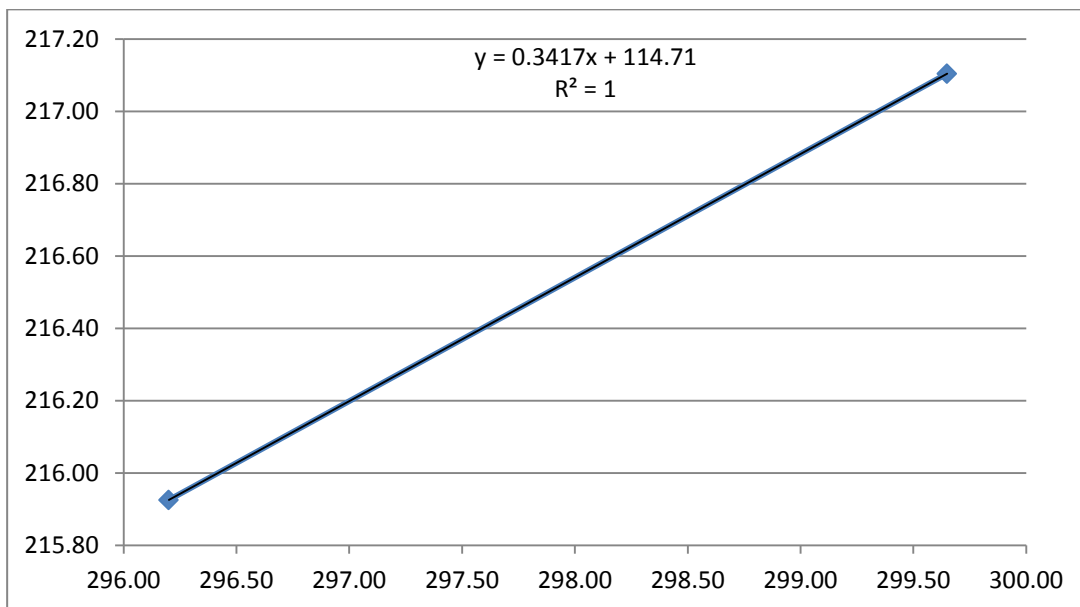


Figure 18 SwW, B1, Ampli DB BIAS vs. temperature

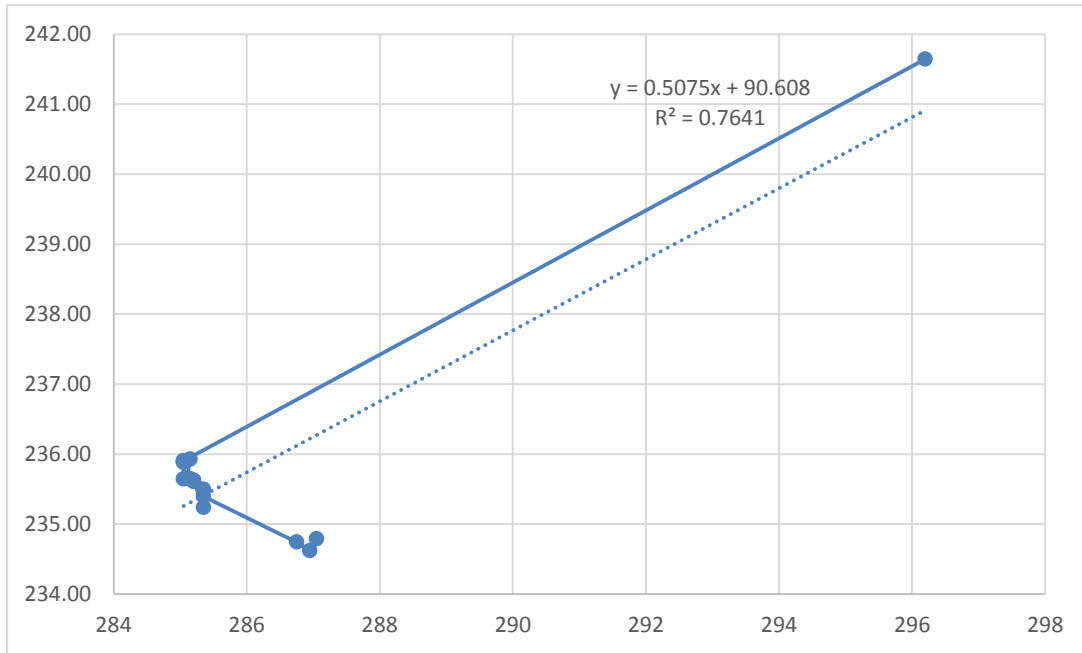


Figure 19 WAC HwW, B1, Ampli A BIAS vs. temperature

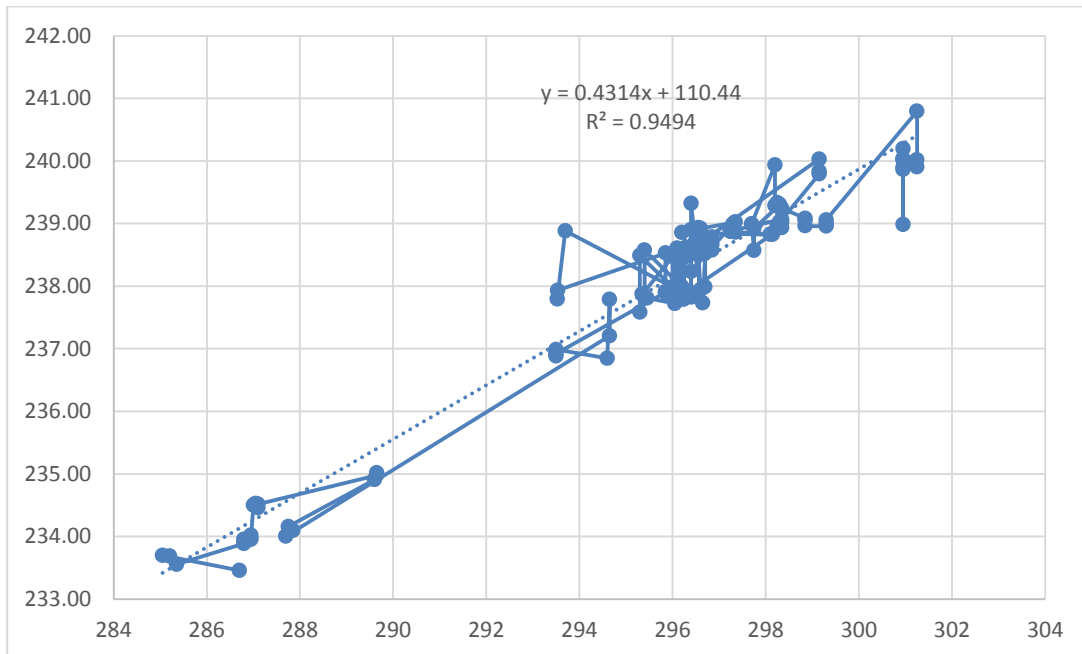


Figure 20 WAC HwW, B1, Ampli B BIAS vs. temperature

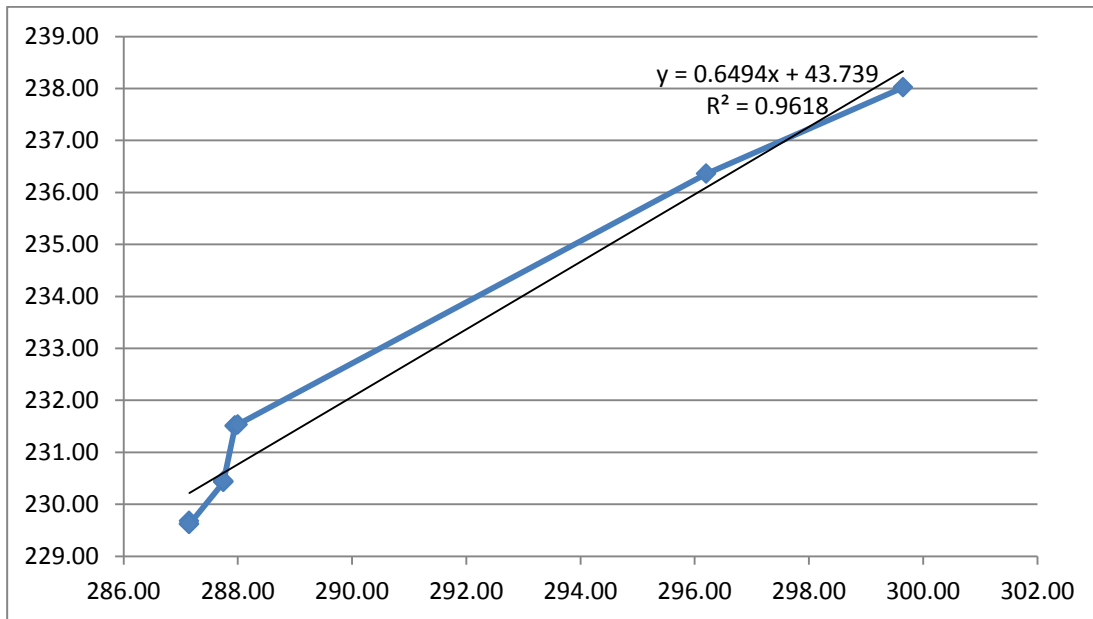


Figure 21 WAC HwW, B1, Ampli DA BIAS vs. temperature

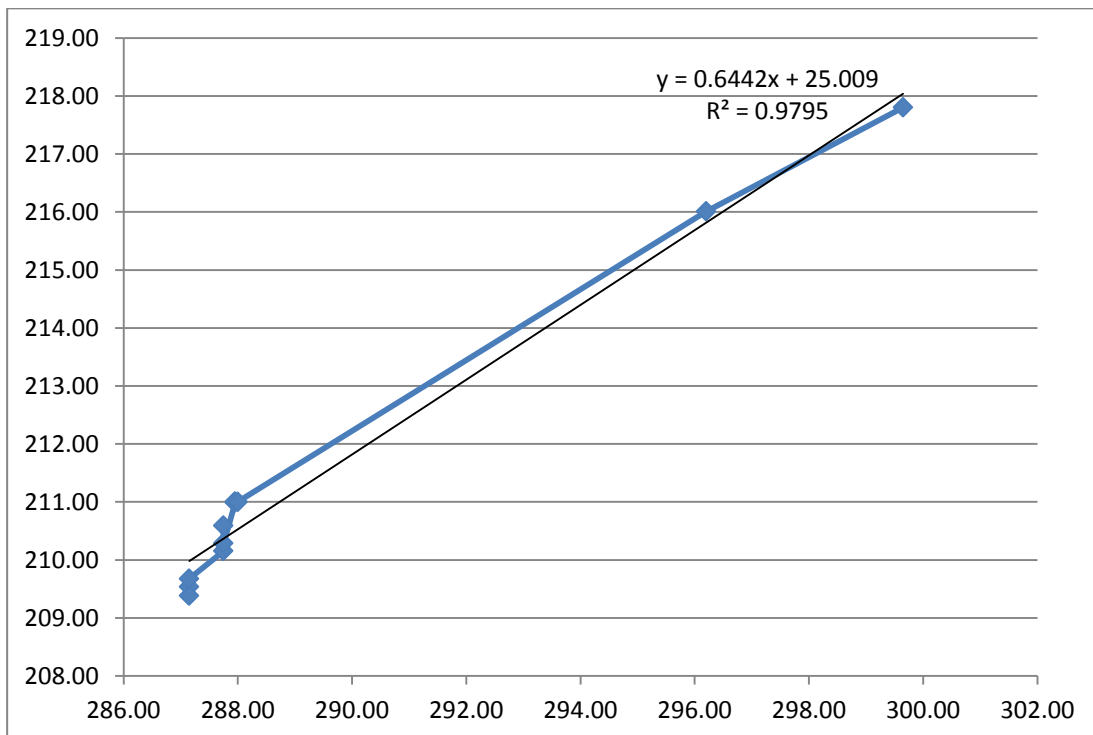


Figure 22 WAC HwW, B1, Ampli DB BIAS vs. temperature

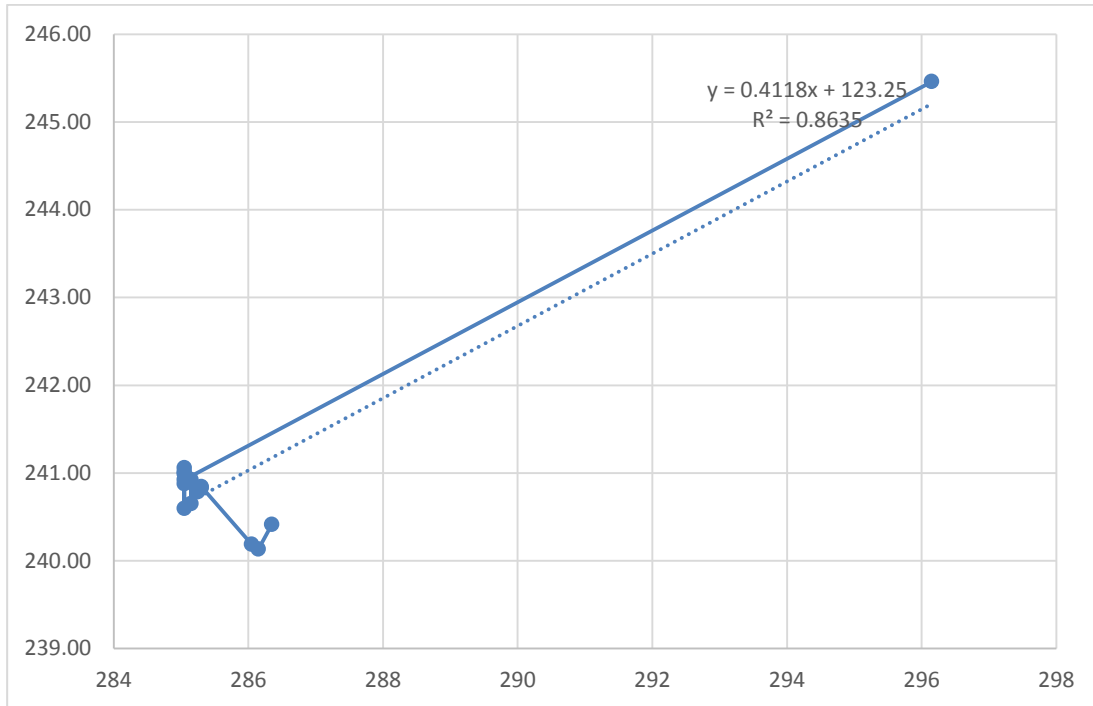


Figure 23 WAC HwW, B2, Ampli A BIAS vs. temperature

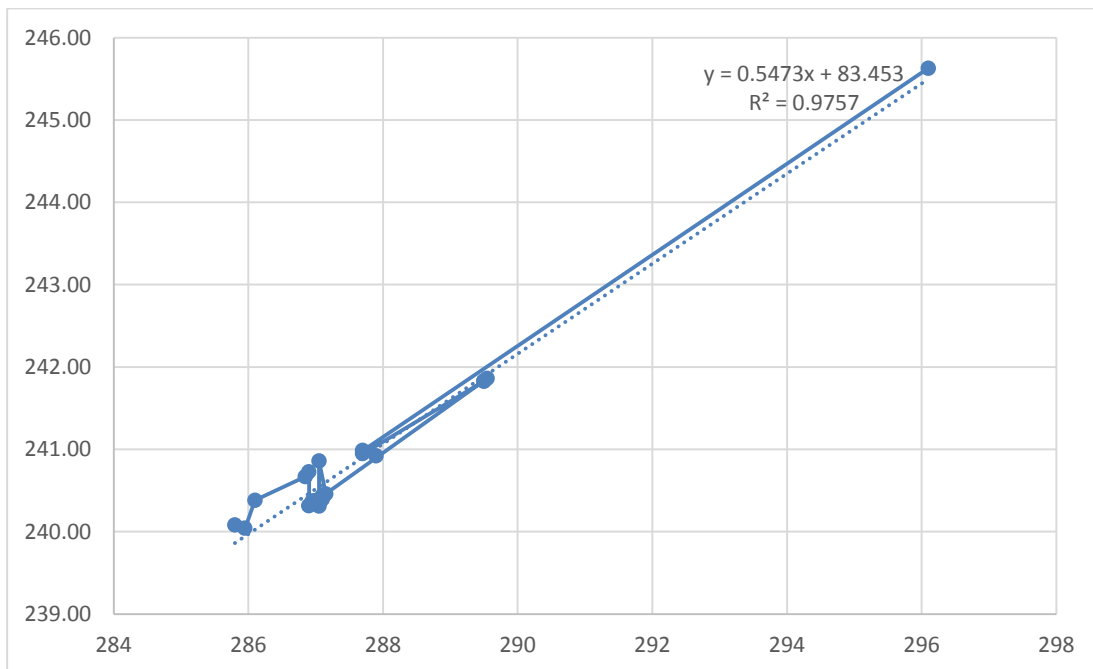


Figure 24 WAC HwW, B2, Ampli B BIAS vs. temperature

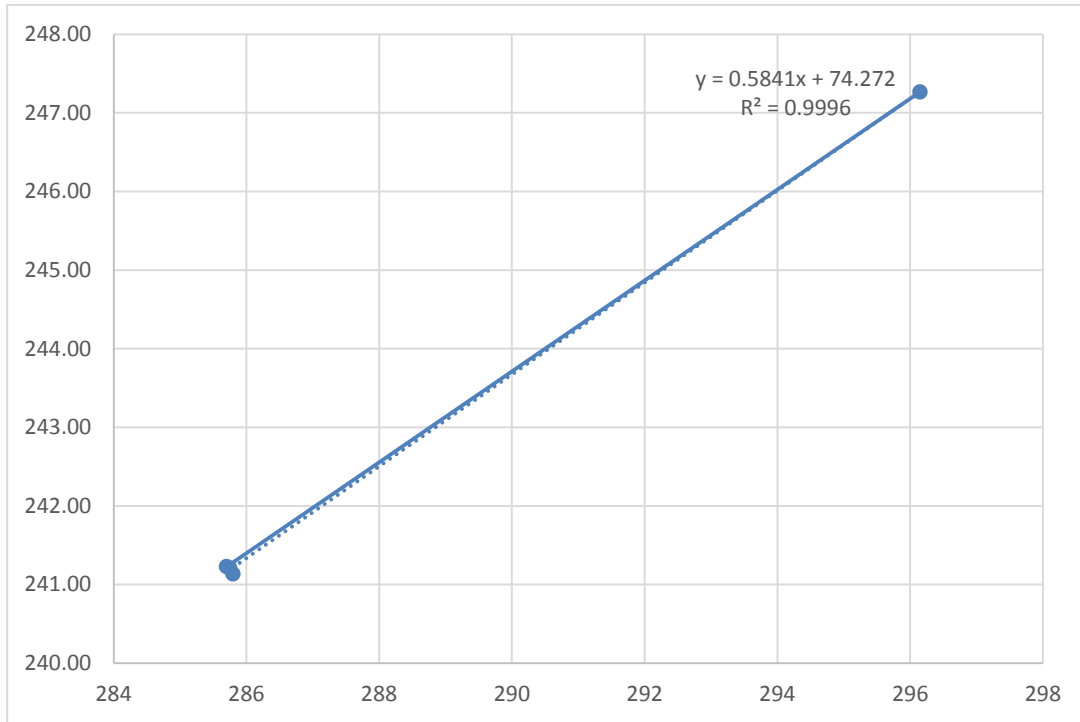


Figure 25 WAC HwW, B4, Ampli A BIAS vs. temperature

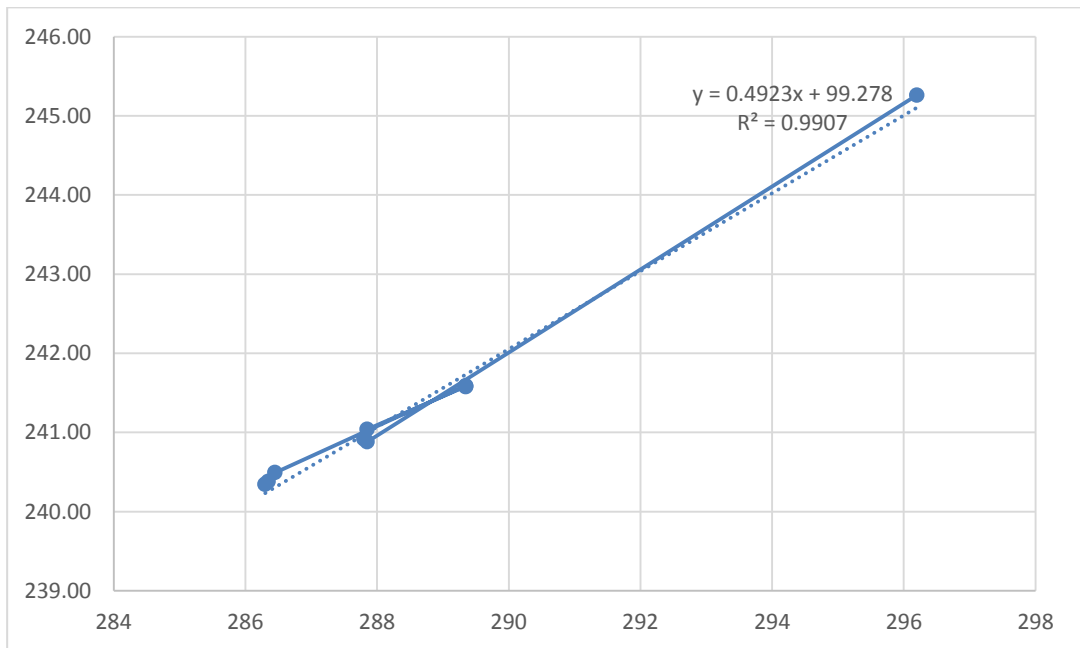


Figure 26 WAC HwW, B4, Ampli B BIAS vs. temperature

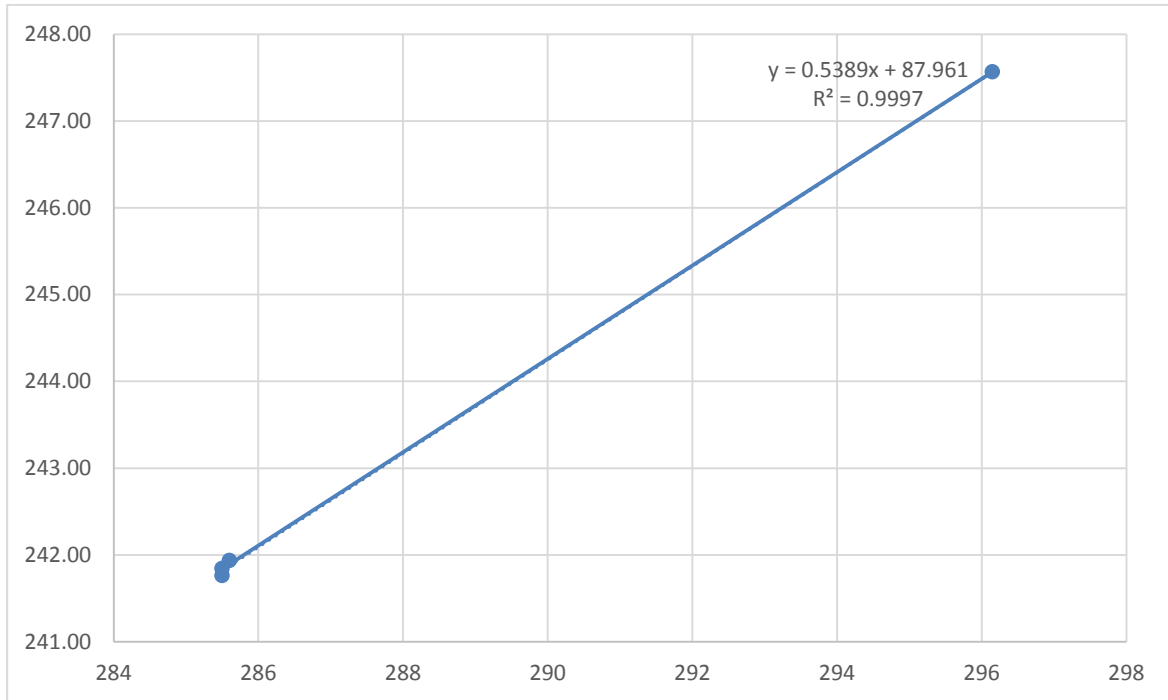


Figure 27 WAC HwW, B8, Ampli A BIAS vs. temperature

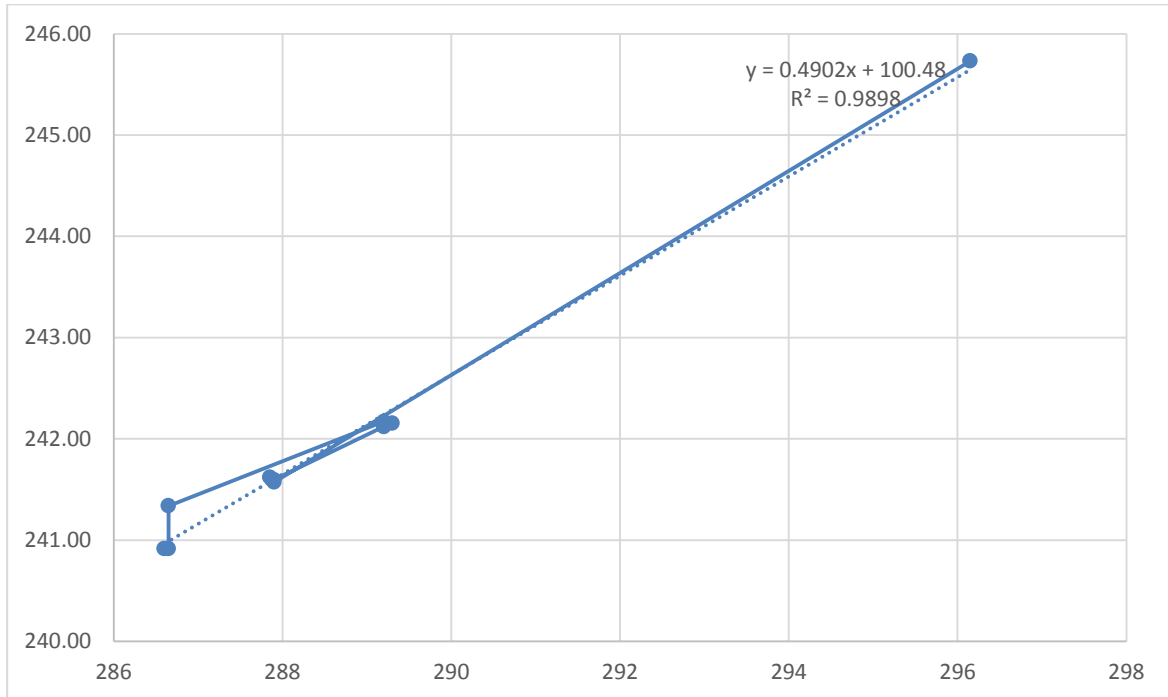


Figure 28 WAC HwW, B8, Ampli A BIAS vs. temperature



2.6 Results

For the different operational modes, we performed a linear fit of the measured bias versus ADC temperature (T_{ADC}) datasets and determined the two fit parameters slope (C_T) and intercept (b):

$$BIAS = C_T * T_{ADC} + b$$

Using the just determined fit parameters we calculated the bias value ($BIAS_{OM_T0}$) at the reference temperature $T_0 = 285$ K:

$$BIAS_{OM_T0} = C_T * T_0 + b$$

The bias value to be subtracted from each image depends on the ADC temperature at the time when the image was acquired and it is calculated as follows:

$$BIAS_{OM_TADC} = BIAS_{OM_T0} - (T_{ADC} - T_0) C_T$$

Table 1 NAC BIAS values

Window	Binning	Amplifier	C_T [DN/K]	b [DN]	$BIAS_{OM_T0}$
SW	1	A	0.4685	105.2	238.72
SW	1	B	0.6328	54.61	234.96
SW	1	AB_A	0.4139	116.50	234.46
SW	1	AB_B	0.5916	43.48	212.08
HW	1	A	0.486	99.998	238.51
HW	1	B	0.5956	65.485	235.23
HW	1	AB_A	0.6813	39.868	234.04
HW	1	AB_B	0.9109	-48.202	211.40
HW	2	A	0.4166	127.68	246.41
HW	2	B	0.6231	64.51	242.10
HW	4	A	0.5312	93.91	245.30
HW	4	B	0.6355	59.12	240.24
HW	8	A	0.5003	103.07	245.66
HW	8	B	0.6557	53.75	240.63

**Table 2 WAC BIAS values**

Window	Binning	Amplifier	m	b	BIAS_285
SW	1	A	0.417	117.33	236.18
SW	1	B	0.3387	137.48	234.01
SW	1	AB_A	0.3618	128.51	231.62
SW	1	AB_B	0.3417	114.71	212.09
HW	1	A	0.5075	90.608	235.25
HW	1	B	0.4314	110.44	233.39
HW	1	AB_A	0.6494	43.739	228.82
HW	1	AB_B	0.6442	25.009	208.61
HW	2	A	0.4118	123.25	240.61
HW	2	B	0.5473	83.453	239.43
HW	4	A	0.5841	74.272	240.74
HW	4	B	0.4923	99.278	239.58
HW	8	A	0.5389	87.961	241.55
HW	8	B	0.4902	100.48	240.19

3 Calibration files used by OsiCalliope

The calibration files used by OsiCalliope to calibrate OSIRIS images are:

- NAC_FM_BIAS_V01.TXT
- WAC_FM_BIAS_V01.TXT

Previous versions:

- NAC_FM_BIAS.LBL (obsolete, same values as NAC_FM_BIAS_V01.TXT)
- WAC_FM_BIAS.LBL (obsolete, same values as WAC_FM_BIAS_V01.TXT)