JASPER EQUIVALENT AQUIFER SUMMARY, 2021
AQUIFER SAMPLING AND ASSESSMENT PROGRAM

APPENDIX 14 TO THE 2021 TRIENNIAL SUMMARY REPORT
PARTIAL FUNDING PROVIDED BY THE CWA

Contents

BACKGROUND

The Louisiana Department of Environmental Quality's (LDEQ) Aquifer Sampling and Assessment (ASSET) Program is an ambient monitoring program established to determine and monitor the quality of groundwater produced from Louisiana's major freshwater aquifers. The ASSET Program samples approximately 200 water wells located in 14 aquifers across the state. The sampling process is designed so that all 14 aquifers and associated wells are monitored every three years.

In order to better assess the water quality of a particular aquifer, an attempt is made to sample all ASSET Program wells producing from it in a narrow time frame. To more conveniently and economically promulgate those data collected, a summary report on each aquifer is prepared separately. Collectively, these aquifer summaries will make up, in part, the ASSET Program's Triennial Summary Report.

Analytical and field data contained in this summary were collected from wells producing from the Jasper Equivalent aquifer during the 2021 state fiscal year (July 1, 2020 - June 30, 2021). This summary will become Appendix 14 of the ASSET Program Triennial Summary Report for 2021.

These data show that in FY 2021, 14 wells were sampled which produce from the Jasper Equivalent aquifer. Of these 14 wells, 11 are classified as public supply, and one each of irrigation, industrial and domestic classification. The wells are located in nine parishes in southeast Louisiana.

Figure 14-1 shows the geographic locations of the Jasper Equivalent aquifer and the associated wells, whereas Table 14-1 lists the wells monitored along with their total depths, use made of produced waters and date sampled.

Well data, including well location and aquifer assignment, for registered water wells were obtained from the Louisiana Department of Natural Resources' water well registration data file.

GEOLOGY

The Jasper Equivalent aquifer is composed of the Miocene aged aquifers of the Florida Parishes and Pointe Coupee Parish. These Miocene sediments outcrop in southwestern Mississippi. The sedimentary sequences that make up the aquifer are subdivided into several aquifer units separated by confining beds. Northward within southeast Louisiana, fewer units are recognized because some younger units pinch out updip and some clay layers present to the south disappear. Where clay layers are discontinuous or disappear, aquifer units coalesce. The aquifers consist of fine to coarse sand and gravel, with grain size increasing and sorting decreasing with depth.

HYDROGEOLOGY

The deposits that constitute the individual aquifers are not readily differentiated at the surface and act as one hydraulic that can be subdivided into several hydrologic zones in the subsurface. A zone or ridge of saline water occurs within the Miocene sediments beneath the Mississippi River alluvial valley. Recharge occurs primarily by the direct infiltration of rainfall in interstream, upland outcrop areas, and by the movement of water between aquifers. The hydraulic conductivity varies between 10-200 feet/day.

The maximum depths of occurrence of freshwater in the Jasper Equivalent aquifer range from 500 to 3,200 feet below sea level. The range of thickness of the fresh water interval in the Jasper Equivalent aquifer is 1,600 to 2,350 feet. The depths of the wells that were monitored in conjunction with the ASSET Program range from 960 to 2,700 feet below ground surface.

PROGRAM PARAMETERS

The field parameters checked at each ASSET well and the list of conventional parameters analyzed in the laboratory are shown in Table 14-2. The inorganic (total metals) parameters analyzed in the laboratory are listed in Table 14-3. These tables also show the field and analytical results determined for each analyte. For quality control, duplicate samples were taken for each parameter at EB-854, ST-1135, SH-104, ST-FOLSOM and WA-248.

In addition to the field, conventional and inorganic analytical parameters, the target analyte list includes three other categories of compounds: volatiles, semi-volatiles, and pesticides/PCBs. Due to the large number of analytes in these categories, tables were not prepared showing the analytical results for these compounds. A discussion of any detections from any of these three categories, if necessary can be found in their respective sections. Tables 14-8, 14-9 and 14-10 list the target analytes for volatiles, semi-volatiles and pesticides/PCBs, respectively.

Tables 14-4 and 14-5 provide a statistical overview of field and conventional data and inorganic data for the Jasper Equivalent aquifer, listing the minimum, maximum, and average results for these parameters collected in the FY 2021 sampling. Tables 14-6 and 14-7 compare these same parameter averages to historical ASSET-derived data for the Jasper Equivalent aquifer, from previous fiscal years.

The average values listed in the above referenced tables are determined using all valid, reported results, including those reported as non-detect, or less than the detection limit (< DL). The average values listed in the above referenced tables are determined using all valid, reported results, including those reported as non-detect, or less than the detection limit (< DL). The method used to generate the descriptive statistics varies, depending on the dataset and the proportion of values that are <DL. When estimating a dataset with more than 50 observations, the Maximum Likelihood Estimation (MLE) method is used. This is used to describe Upper and Lower confidence intervals or historical descriptive statistics. For datasets of less than 50 observations, the Kapan-Meier method is used. This is used to calculate descriptive statistics of a single sampling round. If all values for a particular analyte are reported as < DL, then the minimum, maximum, and average values are all reported as < DL.

Charts 14-1 through 14-17 represent the trend of the graphed parameter, based on the averaged value of that parameter for each three-year reporting period. Discussion of historical data and related trends is found in the **Water Quality Trends and Comparison to Historical ASSET Data** section.

INTERPRETATION OF DATA

Under the Federal Safe Drinking Water Act, EPA has established maximum contaminant levels (MCLs) for pollutants that may pose a health risk in public drinking water. An MCL is the highest level of a contaminant that EPA allows in public drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. While not all wells sampled were public supply wells, the ASSET Program uses the MCLs as a benchmark for further evaluation.

EPA has set secondary standards, which are defined as non-enforceable taste, odor, or appearance guidelines. Field and laboratory data contained in Tables 14-2 and 14-3 show that 10 secondary MCLs (SMCLs) were exceeded in 10 of the 14 wells sampled in the Jasper Equivalent aquifer.

Field and Conventional Parameters

Table 14-2 shows the field and conventional parameters for which samples are collected at each well and the analytical results for those parameters. Table 14-6 provides an overview of field and conventional parameter data averages for the Jasper Equivalent aquifer, including the previous sampling event averages.

<u>Federal Primary Drinking Water Standards:</u> A review of the analysis listed in Table 14-2 shows that no MCL was exceeded for field or conventional parameters for this reporting period.

<u>Federal Secondary Drinking Water Standards:</u> A review of the analysis listed in Table 14-2 shows that 10 wells exceeded the SMCL for pH. Following is a list of SMCL exceedances with well number and results:

<u>pH (SMCL = 6.5 – 8.5 Standard Units):</u>

EB-854	8.72 SU (Original and Duplicate)
EF-272	8.80 SU
LI-185	8.62 SU
LI-229	8.93 SU
PC-275	9.30 SU
SH-104	9.25 SU
ST-1135	8.86 SU (Duplicate: 8.88 SU)
ST-FOLSOM	9.11 SU (Duplicate: 9.10 SU)
TA-286	9.05 SU
WA-248	8.83 SU

Inorganic Parameters

Table 14-3 shows the inorganic parameters for which samples are collected at each well and the analytical results for those parameters. Table 14-7 provides an overview of inorganic parameter data averages for the Jasper Equivalent aquifer, including the previous sampling event averages.

Federal Primary Drinking Water Standards: A review of the analyses listed on Table 14-3 shows that no MCL was exceeded for total metals.

Federal Secondary Drinking Water Standards: Laboratory data contained in Table 14-3 shows that no SMCL was exceeded for total metals.

Volatile Organic Compounds

Table 14-6 shows the volatile organic compound (VOC) parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however, any detection of a VOC would be discussed in this section.

Three VOCs were detected at low levels in two of the wells that were sampled. Toluene was detected in well PC-275 at 4.30 µg/L. Xylenes and o-xylene (1, 2-dimethlbenzene) were detected in well LI-229 at 1.0 µg/L and 0.60, respectively. Neither of these compounds have MCLs established for them. There were no other confirmed VOC detections at or above its detection limit during the FY 2021 sampling of the Jasper Equivalent aquifer.

Semi-Volatile Organic Compounds

Table 14-7 shows the semi-volatile organic compound (SVOC) parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however any detection of a SVOC would be discussed in this section.

The semi-volatile organic compound, bis(2-ethylhexyl)phthalate (no MCL established) was detected in the field duplicate sample at well WF-264 at 9.60 µg/L. The analyte was not present in the normal sample. There were no other confirmed SVOC detections at or above its detection limit during the FY 2021 sampling of the Jasper Equivalent aquifer.

Pesticides and PCBs

Table 14-8 shows the pesticide and PCB parameters for which samples are collected at each well. Due to the number of analytes in this category, analytical results are not tabulated; however any detection of a pesticide or PCB would be discussed in this section.

There were no confirmed Pesticide or PCB at or above its detection limit during the FY 2021 sampling of the Jasper Equivalent aquifer.

WATER QUALITY TRENDS AND COMPARISON TO HISTORICAL ASSET DATA

Analytical and field data show that the quality and characteristics of groundwater produced from the Jasper Equivalent aquifer show some change when comparing current data to that of the six previous sampling rotations. These comparisons can be found in Tables 14-6 and 14-7, and in Charts 14-1 to 14-17 of this summary. Increasing or decreasing trend statements made here are based on an R-square value of 0.03 or greater and a p-value of 0.05.

Over the 24-year period, only total kjedahl nitrogen has shown a general increase in average concentration. For this same period, two analytes have shown a general decrease. These analytes are zinc and specific conductance. All other analyte averages have remained consistent or have been non-detect for this period. The number of wells and secondary exceedances in the Jasper Equivalent aquifer has decreased from the previous sampling. There were eight wells with one or more SMCL exceedances in FY 2018 for a total of 12 SMCL exceedances. In the FY 2021 sampling, there were 10 wells with a total of 10 SMCL exceedances.

SUMMARY AND RECOMMENDATIONS

In summary, the data show that the groundwater produced from this aquifer is soft[1] and is of good quality when considering short-term or long-term health risk guidelines. Laboratory data show that no ASSET well that was sampled during the Fiscal Year 2021 monitoring of the Jasper Equivalent aquifer exceeded a primary MCL. The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines, with 10 SMCLs exceeded in 10 wells.

Comparison to historical ASSET-derived data shows some change in the quality or characteristics of the Jasper Equivalent aquifer, with total kjedahl nitrogen showing and increase in average concentration. Both specific conductance and zinc showed decreasing average concentrations with the remainder of the analyte averages staying consistent over the 24 year period.

It is recommended that the wells assigned to the Jasper Equivalent aquifer be re-sampled as planned, in approximately three years. In addition, several wells should be added to the 14 currently in place to increase the well density for this aquifer.

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[1] Classification based on hardness scale from: Peavy, H. S. et al. *Environmental Engineering*. New York: McGraw-Hill, 1985.

Table 14-1: List of Wells Sampled, Jasper Equivalent Aquifer – FY 2021

Well ID	Parish	Date	Owner	Depth (Feet)	Well Use
EB-854	East Baton Rouge	09/10/2020	City of Zachary	2,090	Public Supply
EF-272	East Feliciana	09/09/2020	Louisiana. War Vets Home	1,325	Public Supply
LI-185	Livingston	11/18/2020	City of Denham Springs	2,610	Public Supply
LI-229	Livingston	09/10/2020	Ward 2 Water District	1,826	Public Supply
LI-257	Livingston	11/18/2020	Village of Albany	1,842	Public Supply
PC-275	Point Coupee	08/19/2020	Private Owner	1,912	Domestic
SH-104	St. Helena	10/21/2020	Cal Maine Foods	1,652	Industrial
ST-995	St. Tammany	03/10/2021	Insta-Gator	2,290	Irrigation
ST-1135	St. Tammany	03/30/2021	Lakeshore Estates	2,605	Public Supply
ST-FOLSOM	St. Tammany	03/08/2021	Village of Folsom	2,265	Public Supply
TA-560	Tangipahoa	10/21/2020	Town of Roseland	2,032	Public Supply
TA-826	Tangipahoa	11/18/2020	City of Ponchatoula	2,015	Public Supply
WA-248	Washington	03/08/2021	Town of Franklinton	2,700	Public Supply
WF-264	West Feliciana	08/19/2020	West Feliciana Parish Utilities	960	Public Supply

Table 14-2: Summary of Field and Conventional Data, Jasper Equivalent Aquifer – FY 2021

Well ID	pH SU	Sal. ppt	Sp. Cond. mmhos/cm	Temp Deg. C	TDS g/L	Alk mg/L	Cl mg/L	Color PCU	Hard. mg/L	Nitrite-Nitrate (as N) mg/L	NH3 mg/L	Tot. P mg/L	Sp. Cond. µmhos/cm	SO4 mg/L	TDS mg/L	TKN mg/L	TSS mg/L	Turb. mg/L
	LABORATORY REPORTING LIMITS →					2	1	5	5	0.05	0.1	0.05	1	1	10	0.1	4	0.1
	FIELD PARAMETERS					LABORATORY PARAMETERS												
EB-854	8.72	0.14	292.57	30.77	190.17	129	2.50	< DL	< DL	< DL	0.24	0.17	378	9.60	185	0.48	< DL	0.27
EB-854*	8.72	0.14	292.69	30.82	190.25	136	2.50	< DL	6	< DL	0.24	0.17	377	9.50	155	0.28	5.00	0.34
EF-272	8.80	0.16	335.45	25.68	218.04	155	4.20	< DL	< DL	< DL	0.26	0.36	440	7.70	155	0.47	< DL	0.72
LI-185	8.62	0.13	274.18	27.74	178.22	122	3.40	10	28	< DL	0.49	0.24	326	7.80	215	0.55	< DL	0.46
LI-229	8.93	0.14	303.71	27.65	197.41	136	3.10	< DL	< DL	< DL	0.15	0.19	400	8.10	200	0.25	< DL	0.32
LI-257	8.39	0.12	250.30	26.67	162.70	114	2.80	10	68	< DL	0.36	0.32	312	8.60	195	0.86	< DL	0.29
LI-257*	8.35	0.12	250.02	27.14	162.51	110	2.90	10	22	< DL	0.29	0.28	303	8.60	175	0.44	< DL	0.10
PC-275	9.30	0.32	666.42	27.91	433.17	277	27	< DL	< DL	< DL	0.57	0.42	773	6.60	330	0.83	< DL	0.53
SH-104	9.25	0.19	399.29	26.07	259.54	180	3.10	< DL	< DL	< DL	0.28	0.55	474	6.90	250	0.66	< DL	0.48
ST-1135	8.86	0.22	474.59	35.29	308.49	227	13.50	< DL	12	< DL	0.55	0.31	643	10.70	250	0.95	< DL	0.59
ST-1135*	8.88	0.22	473.65	32.82	307.87	236	13.60	10	12	< DL	0.52	0.30	640	10.70	305	0.82	< DL	0.34
ST-995	7.93	0.09	194.82	26.66	126.63	80.50	2.70	10	12	< DL	0.21	0.53	213	8.50	115	0.48	< DL	0.50
ST-FOLSOM	9.11	0.13	272.19	27.49	176.92	117	3.50	< DL	10	< DL	0.36	0.22	257	8.80	205	0.38	< DL	0.30
ST-FOLSOM*	9.10	0.13	272.58	27.35	177.18	111	3.30	10	6	< DL	0.27	0.22	257	8.80	195	0.36	< DL	0.69
TA-560	8.33	0.10	220.37	29.36	143.24	91.90	2.80	< DL	10	< DL	0.12	0.59	258	7.20	120	0.73	< DL	0.42
TA-826	9.05	0.16	ND	ND	216.31	150	2.80	10	102	< DL	0.27	0.32	368	10.00	220	0.61	< DL	0.57
WA-248	8.83	0.17	ND	ND	236.48	159	9.30	10	8	< DL	0.64	0.59	378	7.60	260	0.98	< DL	0.33
WA-264	8.10	0.14	287.31	24.50	186.75	129	2.80	< DL	8	< DL	0.30	0.12	329	8.30	205	0.58	< DL	0.41
WF-264*	8.10	0.14	287.56	24.52	186.91	126	2.70	< DL	10	< DL	0.31	0.17	342	8.00	225	0.60	< DL	0.68

* Duplicate Sample   Exceeds EPA secondary standards (SMCL)

Table 14-3: Summary of Inorganic Data, Jasper Equivalent Aquifer – FY 2021

Well Number	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Cadmium µg/L	Chromium µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Mercury µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Thallium µg/L	Zinc µg/L
Laboratory Detection Limits	**1**	**1**	**1**	**0.5**	**1**	**1**	**3**	**50**	**1**	**0.2**	**1**	**1**	**0.5**	**0.5**	**5**
EB-854	< DL	< DL	6.00	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
EB-854*	< DL	< DL	6.10	< DL	< DL	< DL	< DL	24.70	< DL	< DL	< DL	< DL	< DL	< DL	< DL
EF-272	< DL	< DL	6.40	< DL	< DL	0.57	< DL	55.60	1.10	< DL	< DL	< DL	< DL	< DL	< DL
LI-185	< DL	< DL	18.00	< DL	< DL	< DL	< DL	27.30	< DL	< DL	1.2	< DL	< DL	< DL	< DL
LI-229	< DL	< DL	11.50	< DL	< DL	< DL	< DL	29.80	< DL	< DL	< DL	< DL	< DL	< DL	< DL
LI-257	< DL	< DL	6.80	< DL	< DL	< DL	< DL	61.40	< DL	< DL	< DL	< DL	< DL	< DL	< DL
LI-257*	< DL	< DL	6.90	< DL	< DL	< DL	< DL	56.90	< DL	< DL	< DL	< DL	< DL	< DL	< DL
PC-275	< DL	< DL	8.10	< DL	< DL	< DL	< DL	20.70	< DL	< DL	< DL	< DL	< DL	< DL	12.00
SH-104	< DL	< DL	3.00	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	3.40
ST-1135	1.2	< DL	16.10	0.94	< DL	< DL	< DL	< DL	1.20	< DL	< DL	< DL	< DL	< DL	< DL
ST-1135*	< DL	< DL	16.30	1.40	< DL	< DL	< DL	< DL	1.30	< DL	< DL	< DL	< DL	< DL	< DL
ST-995	< DL	< DL	8.60	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
ST-FOLSOM	< DL	< DL	3.20	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
ST-FOLSOM*	< DL	< DL	3.10	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
TA-560	< DL	< DL	0.81	< DL	< DL	< DL	< DL	34.40	< DL	< DL	< DL	< DL	< DL	< DL	< DL
TA-826	< DL	< DL	24.50	< DL	< DL	< DL	< DL	< DL	0.52	< DL	< DL	< DL	< DL	< DL	< DL
WA-248	< DL	< DL	4.40	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
WA-264	< DL	< DL	43.30	< DL	< DL	< DL	< DL	44.80	< DL	< DL	< DL	< DL	< DL	< DL	< DL
WF-264*	< DL	< DL	43.00	< DL	< DL	< DL	< DL	41.20	< DL	< DL	< DL	< DL	< DL	< DL	< DL

* Duplicate Sample Exceeds EPA secondary standards (SMCL)

Table 14-4: FY 2021 Field and Conventional Statistics, ASSET Wells

	PARAMETER	MINIMUM	MAXIMUM	AVERAGE
FIELD	pH (SU)	7.93	9.29	8.70
	Salinity (ppt)	0.09	0.32	0.16
	Specific Conductance (µmhos/cm)	220.37	666.42	326.34
	Temperature (^{O}C)	24.50	35.29	28.14
	Total Dissolved Solids (g/L)	143.24	433.17	213.62
LABORATORY	Alkalinity (mg/L)	80.50	277	146.65
	Chloride (mg/L)	2.50	13.60	5.71
	Color (PCU)	< DL	10	< DL
	Hardness (mg/L)	< DL	102	17.84
	Nitrite - Nitrate, as N (mg/L)	< DL	< DL	< DL
	Ammonia, as N (mg/L)	0.12	0.64	0.34
	Total Phosphorus (mg/L)	0.12	0.59	0.32
	Specific Conductance (µmhos/cm)	213	643	393.05
	Sulfate (mg/L)	6.60	10.70	8.53
	Total Dissolved Solids (mg/L)	115	330	208.42
	Total Kjeldahl Nitrogen (mg/L)	0.25	0.98	0.60
	Total Suspended Solids (mg/L)	< DL	5.00	< DL
	Turbidity (NTU)	< DL	0.72	0.44

Table 14-5: FY 2021 Inorganic Statistics, ASSET Wells

PARAMETER	MINIMUM	MAXIMUM	AVERAGE
Antimony (µg/L)	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL
Barium (µg/L)	3.00	43.30	12.43
Beryllium (µg/L)	< DL	0.94	< DL
Cadmium (µg/L)	< DL	< DL	< DL
Chromium (µg/L)	< DL	0.57	< DL
Copper (µg/L)	< DL	< DL	< DL
Iron (µg/L)	< DL	61.40	35.97
Lead (µg/L)	< DL	1.30	0.63
Mercury (µg/L)	< DL	< DL	< DL
Nickel (µg/L)	< DL	< DL	< DL
Selenium (µg/L)	< DL	< DL	< DL
Silver (µg/L)	< DL	< DL	< DL
Thallium (µg/L)	< DL	< DL	< DL
Zinc (µg/L)	< DL	12	< DL

Table 14-6: Triennial Field and Conventional Statistics, ASSET Wells

	PARAMETER	AVERAGE VALUES BY FISCAL YEAR								
		FY 1997	FY 2000	FY 2003	FY 2006	FY 2009	FY 2012	FY 2015	FY 2018	FY 2021
FIELD	pH (SU)	7.64	Invalid	8.67	8.67	8.12	8.76	8.49	8.20	8.70
FIELD	Salinity (ppt)	0.17	0.18	0.17	0.18	0.16	0.17	0.19	0.20	0.16
FIELD	Specific Conductance (mmhos/cm)	0.350	0.380	0.370	0.368	0.330	0.366	0.393	0.416	326.34
FIELD	Temperature (OC)	29.00	28.84	28.13	29.16	27.62	27.00	28.54	25.22	28.14
FIELD	Total Dissolved Solids (g/L)	-	-	-	0.180	0.170	0.238	0.255	0.270	213.62
LABORATORY	Alkalinity (mg/L)	137	167	163	165	164	156	201	159	146.65
LABORATORY	Chloride (mg/L)	12.1	17.9	14.4	24.5	6.4	14.0	20.4	33.7	5.71
LABORATORY	Color (PCU)	8	6	10	9	2	6	8	9	< DL
LABORATORY	Hardness (mg/L)	7	6	11	6	5	8	10	< DL	17.84
LABORATORY	Nitrite - Nitrate, as N (mg/L)	< DL	< DL	0.06	< DL	< DL	< DL	< DL	< DL	< DL
LABORATORY	Ammonia, as N (mg/L)	0.31	0.27	0.24	0.29	0.89	0.22	0.46	0.21	0.34
LABORATORY	Total Phosphorus (mg/L)	0.20	0.28	0.32	0.26	0.41	0.51	0.33	0.36	0.32
LABORATORY	Specific Conductance (µmhos/cm)	335	394	343	397	309	327	377	419	393.05
LABORATORY	Sulfate (mg/L)	8.8	7.3	8.1	8.3	9.4	8.0	9.4	8.1	8.53
LABORATORY	Total Dissolved Solids (mg/L)	258	251	221	250	279	220	215	263	208.42
LABORATORY	Total Kjeldahl Nitrogen (mg/L)	0.19	0.47	0.33	0.43	1.55	< DL	0.63	0.66	0.60
LABORATORY	Total Suspended Solids (mg/L)	4.1	8.6	< DL	< DL	< DL	< DL	< DL	< DL	< DL
LABORATORY	Turbidity (NTU)	< DL	1.1	1.1	< DL	< DL	0.2	0.5	1.02	0.44

Table 14-7: Triennial Inorganic Statistics, ASSET Wells

PARAMETER	AVERAGE VALUES BY FISCAL YEAR								
	FY 1997	FY 2000	FY 2003	FY 2006	FY 2009	FY 2012	FY 2015	FY 2018	FY 2021
Antimony (µg/L)	7.78	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Arsenic (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Barium (µg/L)	24	12	22	14	14	12	17	15.8	12.43
Beryllium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Cadmium (µg/L)	1.13	1.02	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Chromium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Copper (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	13.5	< DL
Iron (µg/L)	28	28	86	31	< DL	< DL	63	107	35.97
Lead (µg/L)	< DL	< DL	< DL	< DL	< DL	0.64	< DL	1.8	0.63
Mercury (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Nickel (µg/L)	< DL	< DL	< DL	< DL	7.79	< DL	< DL	< DL	< DL
Selenium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Silver (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Thallium (µg/L)	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL	< DL
Zinc (µg/L)	< DL	22.9	56.8	< DL	10.3	3.0	< DL	< DL	< DL

Table 14-8: Volatile Organic Compound List

VOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
1,1,1-TRICHLOROETHANE	624	0.50
1,1,2,2-TETRACHLOROETHANE	624	0.50
1,1,2-TRICHLOROETHANE	624	0.50
1,1-DICHLOROETHANE	624	0.50
1,1-DICHLOROETHENE	624	0.50
1,2-DICHLOROBENZENE	624	0.50
1,2-DICHLOROETHANE	624	0.50
1,2-DICHLOROPROPANE	624	0.50
1,3-DICHLOROBENZENE	624	0.50
1,4-DICHLOROBENZENE	624	0.50
BENZENE	624	0.50
BROMODICHLOROMETHANE	624	0.50
BROMOFORM	624	0.50
BROMOMETHANE	624	1.0
CARBON TETRACHLORIDE	624	0.50
CHLOROBENZENE	624	0.50
CHLOROETHANE	624	0.50
CHLOROFORM	624	0.50
CHLOROMETHANE	624	1.0
CIS-1,3-DICHLOROPROPENE	624	1.0
DIBROMOCHLOROMETHANE	624	0.50
ETHYL BENZENE	624	0.50
METHYLENE CHLORIDE	624	1.0
O-XYLENE (1,2-DIMETHYLBENZENE)	624	0.50
STYRENE	624	0.50
TERT-BUTYL METHYL ETHER	624	0.50
TETRACHLOROETHYLENE (PCE)	624	0.50
TOLUENE	624	0.50
TRANS-1,2-DICHLOROETHENE	624	0.50
TRANS-1,3-DICHLOROPROPENE	624	0.50
TRICHLOROETHYLENE (TCE)	624	0.50
TRICHLOROFLUOROMETHANE (FREON-11)	624	0.50
VINYL CHLORIDE	624	0.50
XYLENES, M & P	624	1.0

Table 14-9: Semi-Volatile Organic Compound List

SVOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
1,2,4-TRICHLOROBENZENE	625	5.0
2,4,6-TRICHLOROPHENOL	625	5.0
2,4-DICHLOROPHENOL	625	5.0
2,4-DIMETHYLPHENOL	625	5.0
2,4-DINITROPHENOL	625	20.0
2,4-DINITROTOLUENE	625	5.0
2,6-DINITROTOLUENE	625	5.0
2-CHLORONAPHTHALENE	625	5.0
2-CHLOROPHENOL	625	5.0
2-NITROPHENOL	625	5.0
3,3'-DICHLOROBENZIDINE	625	5.0
4,6-DINITRO-2-METHYLPHENOL	625	10.0
4-BROMOPHENYL PHENYL ETHER	625	5.0
4-CHLORO-3-METHYLPHENOL	625	5.0
4-CHLOROPHENYL PHENYL ETHER	625	5.0
4-NITROPHENOL	625	20.0
ACENAPHTHENE	625	0.20
ACENAPHTHYLENE	625	0.20
ANTHRACENE	625	0.20
BENZIDINE	625	20.0
BENZO(A)ANTHRACENE	625	0.20
BENZO(A)PYRENE	625	0.20
BENZO(B)FLUORANTHENE	625	0.20
BENZO(G,H,I)PERYLENE	625	0.20
BENZO(K)FLUORANTHENE	625	0.20
BENZYL BUTYL PHTHALATE	625	5.0
BIS(2-CHLOROETHOXY) METHANE	625	5.0
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	625	5.0
BIS(2-ETHYLHEXYL) PHTHALATE	625	5.0
CHRYSENE	625	0.20
DIBENZ(A,H)ANTHRACENE	625	0.20
DIETHYL PHTHALATE	625	5.0
DIMETHYL PHTHALATE	625	5.0
DI-N-BUTYL PHTHALATE	625	5.0
DI-N-OCTYLPHTHALATE	625	5.0
FLUORANTHENE	625	0.20
FLUORENE	625	0.20

SVOC ANAYTICAL PARAMETERS	METHOD	REPORTING LIMIT (µg/L)
HEXACHLOROBENZENE	625	5.0
HEXACHLOROBUTADIENE	625	5.0
HEXACHLOROCYCLOPENTADIENE	625	10.0
HEXACHLOROETHANE	625	5.0
INDENO(1,2,3-C,D)PYRENE	625	0.20
ISOPHORONE	625	5.0
NAPHTHALENE	625	0.20
NITROBENZENE	625	5.0
N-NITROSODIMETHYLAMINE	625	5.0
N-NITROSODI-N-PROPYLAMINE	625	5.0
N-NITROSODIPHENYLAMINE	625	5.0
PENTACHLOROPHENOL	625	5.00
PHENANTHRENE	625	0.20
PHENOL	625	5.0
PYRENE	625	0.20

Table 14-10: Pesticide and PCB List

Pest/PCB Analytical Parameters	METHOD	REPORTING LIMIT (µg/L)
ALDRIN	608	0.025
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	608	0.025
ALPHA ENDOSULFAN	608	0.025
ALPHA-CHLORDANE	608	0.025
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	608	0.025
BETA ENDOSULFAN	608	0.025
CHLORDANE	608	0.20
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	608	0.025
DIELDRIN	608	0.025
ENDOSULFAN SULFATE	608	0.025
ENDRIN	608	0.025
ENDRIN ALDEHYDE	608	0.025
ENDRIN KETONE	608	0.025
GAMMA-CHLORDANE	608	0.025
HEPTACHLOR	608	0.025
HEPTACHLOR EPOXIDE	608	0.025
METHOXYCHLOR	608	0.25
P,P'-DDD	608	0.025
P,P'-DDE	608	0.025
P,P'-DDT	608	0.025
PCB-1016 (AROCHLOR 1016)	608	0.80
PCB-1221 (AROCHLOR 1221)	608	0.80
PCB-1232 (AROCHLOR 1232)	608	0.80
PCB-1242 (AROCHLOR 1242)	608	0.80
PCB-1248 (AROCHLOR 1248)	608	0.80
PCB-1254 (AROCHLOR 1254)	608	0.80
PCB-1260 (AROCHLOR 1260)	608	0.80
TOXAPHENE	608	1.0

Figure 14-1: Location Plat, Jasper Equivalent Aquifer

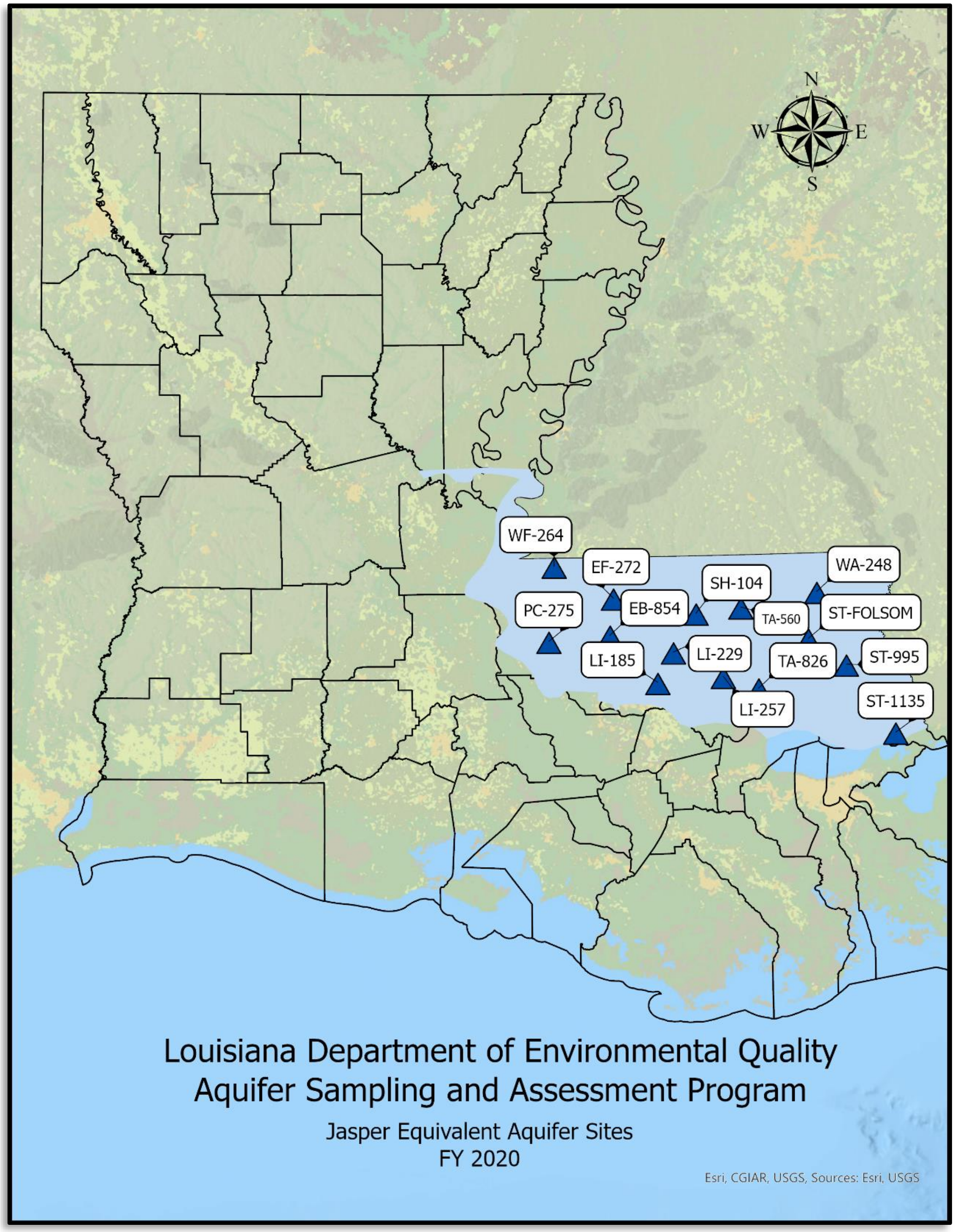
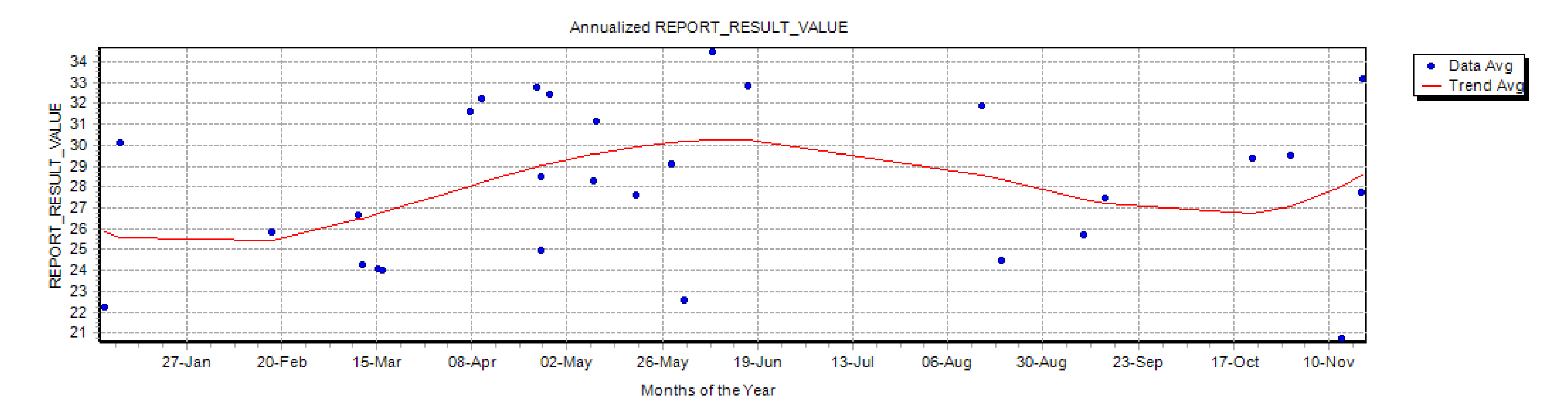


Chart 14-1: Temperature Trend



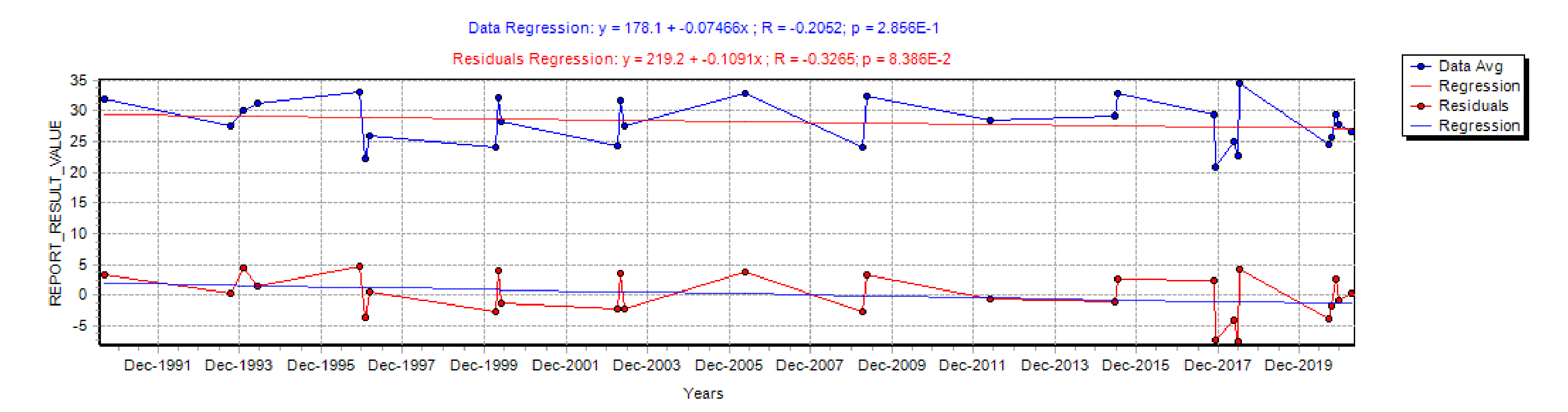
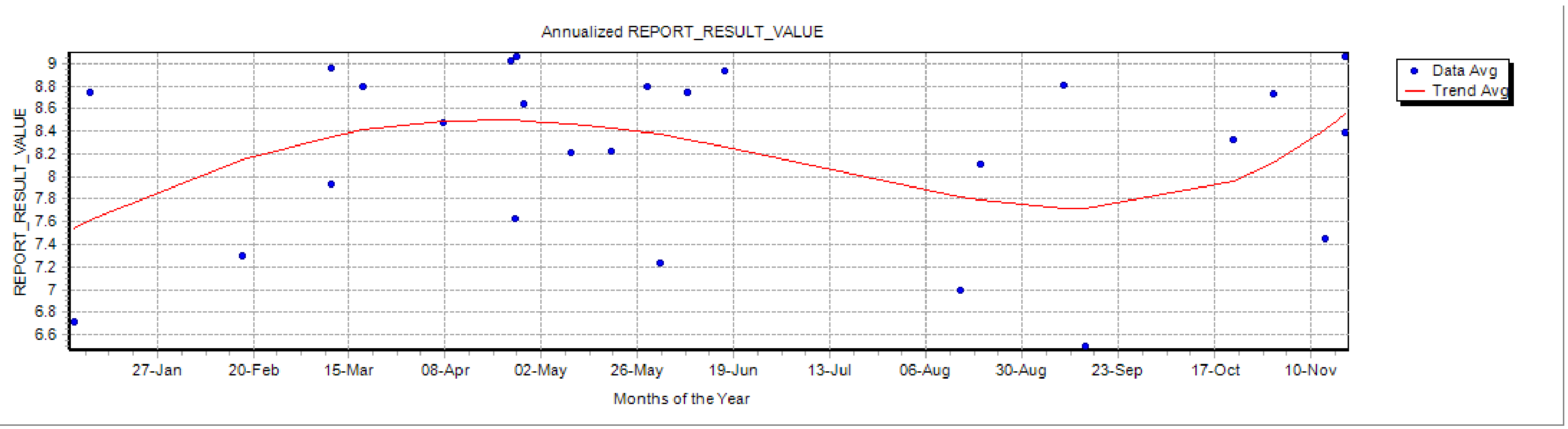


Chart 14-2: pH Trend



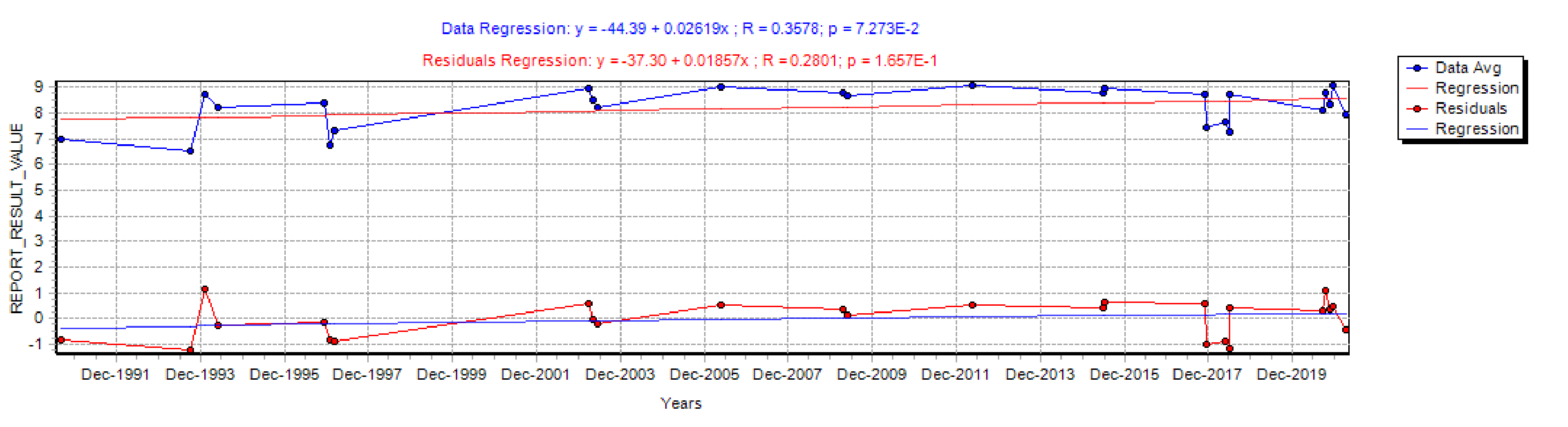
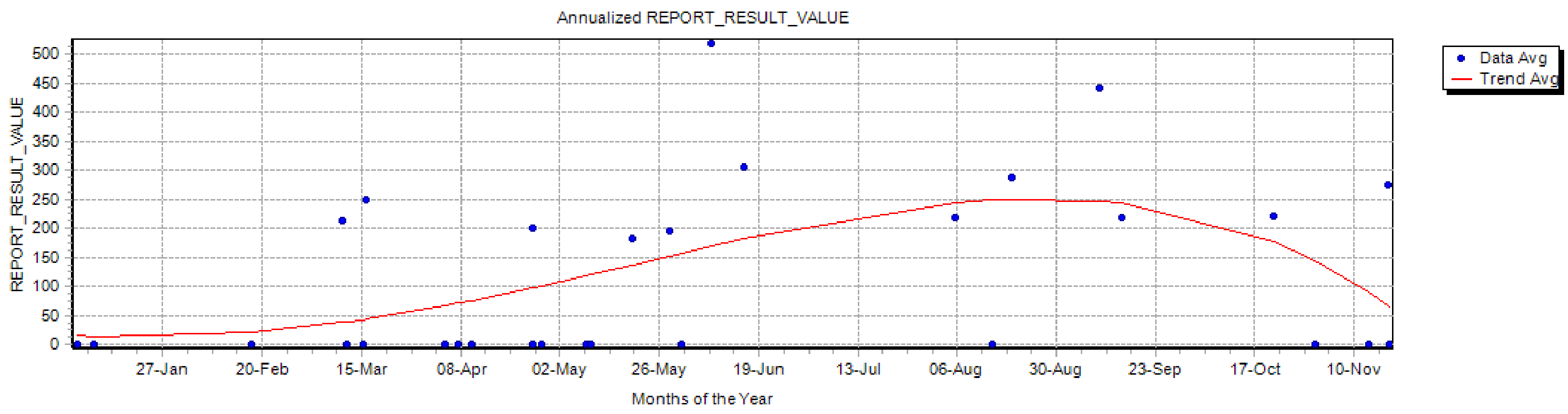


Chart 14-3: Specific Conductance Trend



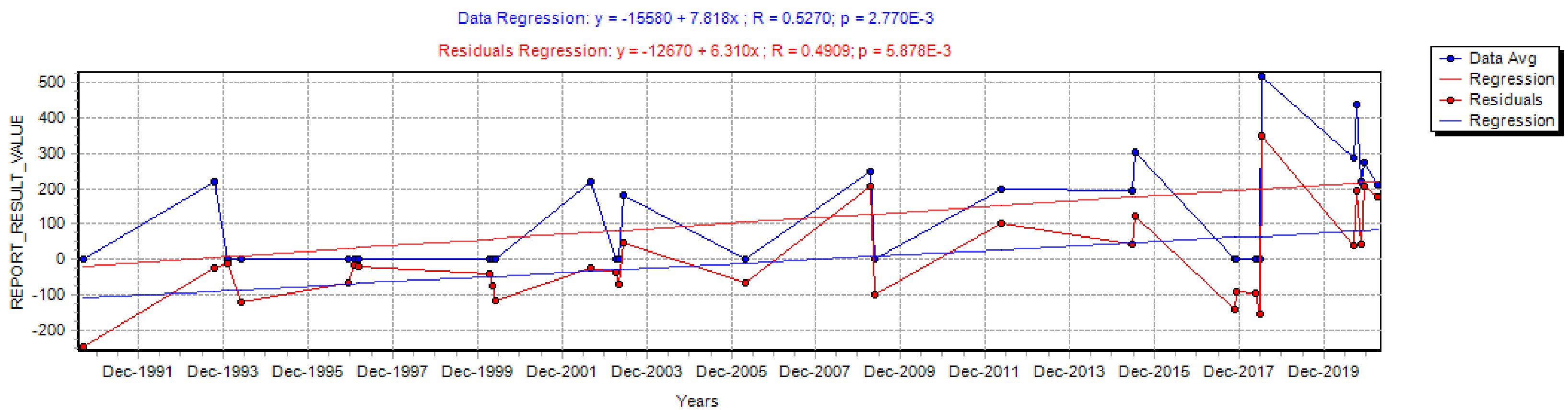
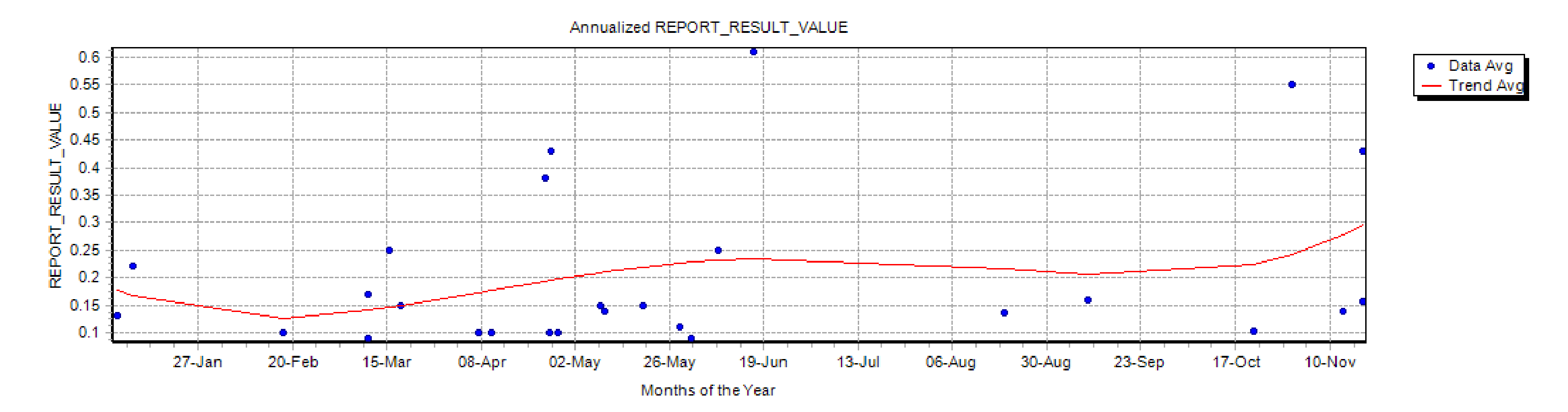


Chart 14-4: Field Salinity Trend



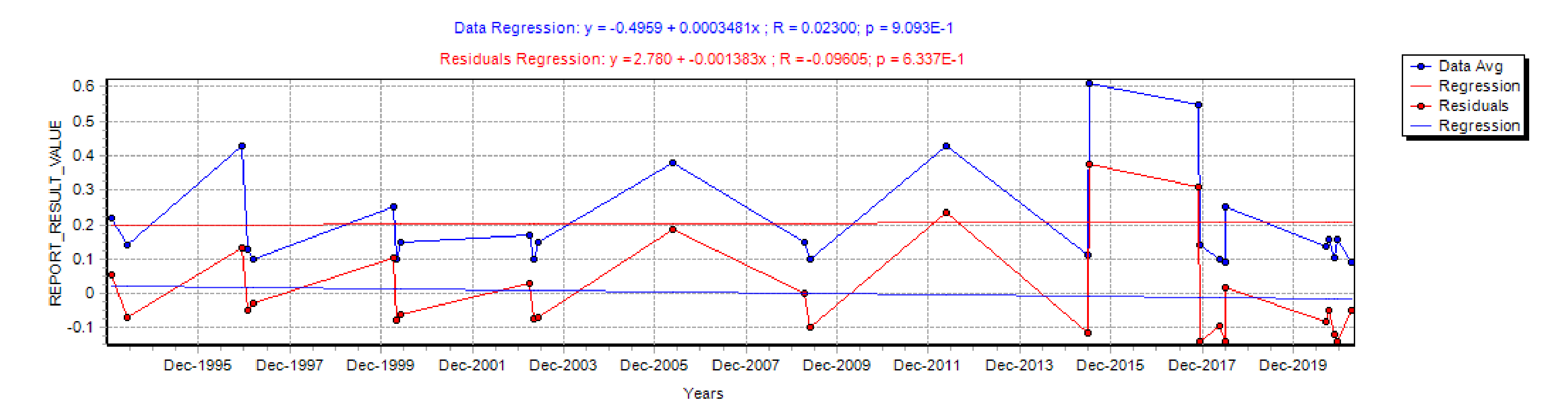
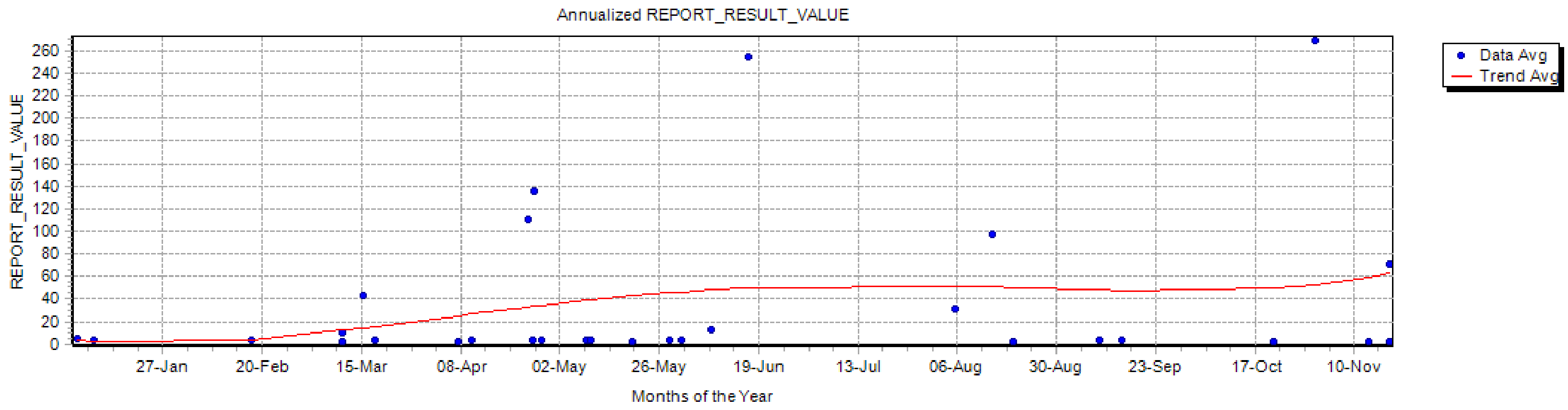


Chart 14-5: Chloride Trend



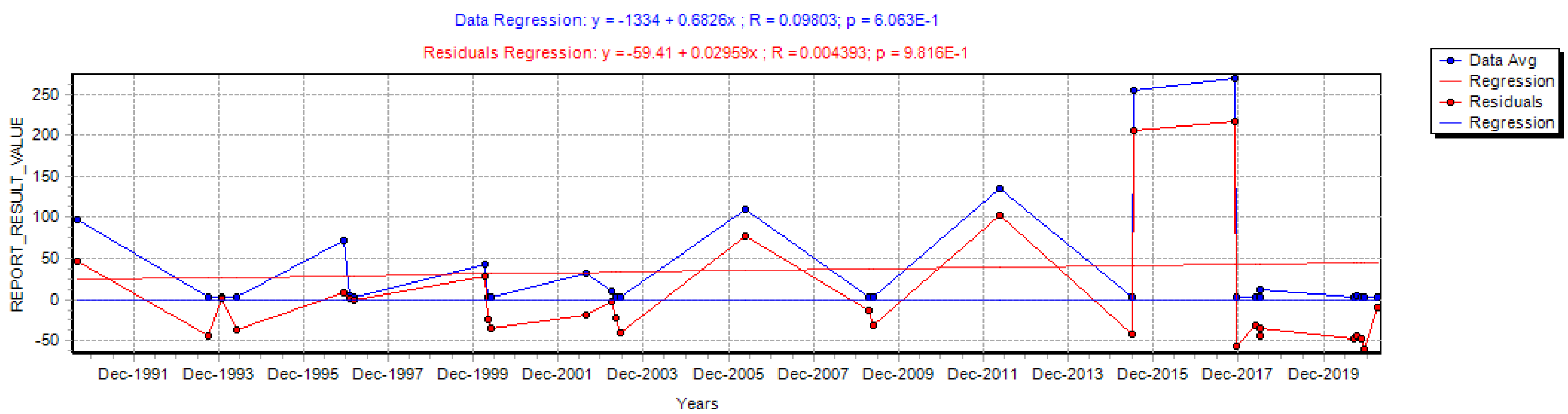
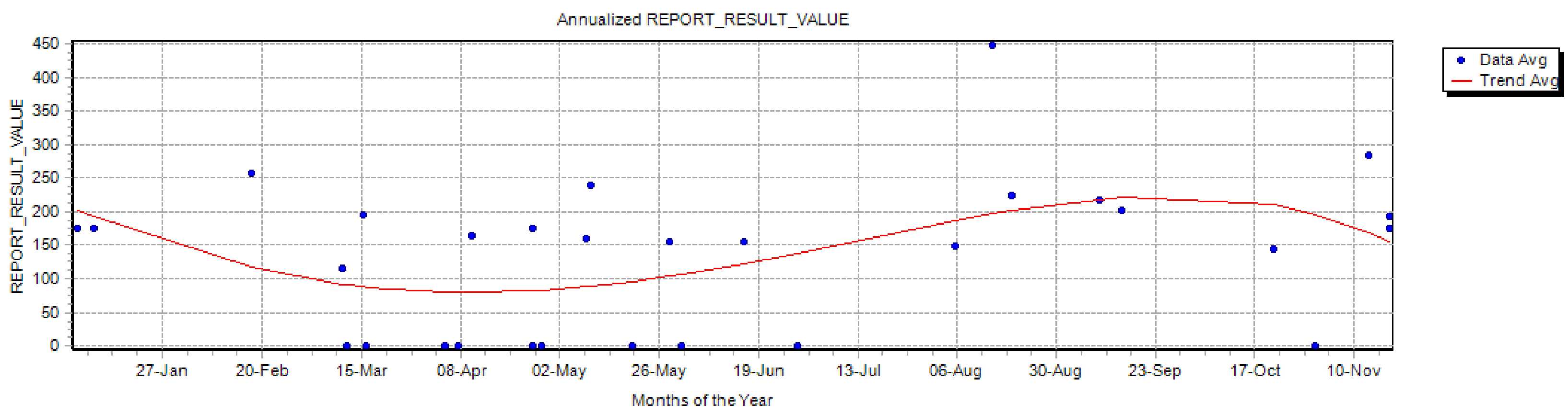


Chart 14-6: Total Dissolved Solids Trend



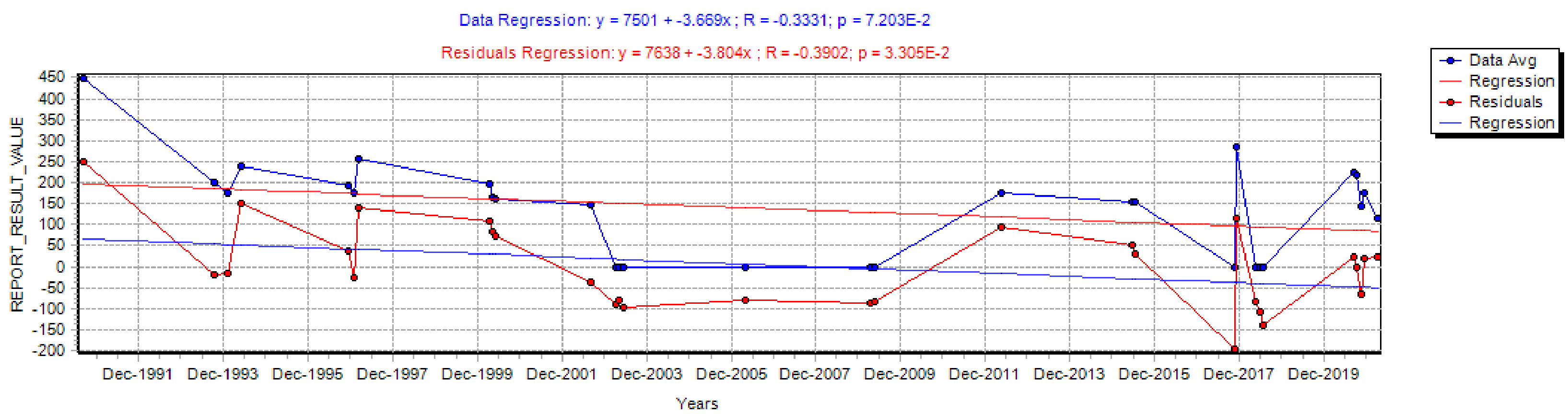
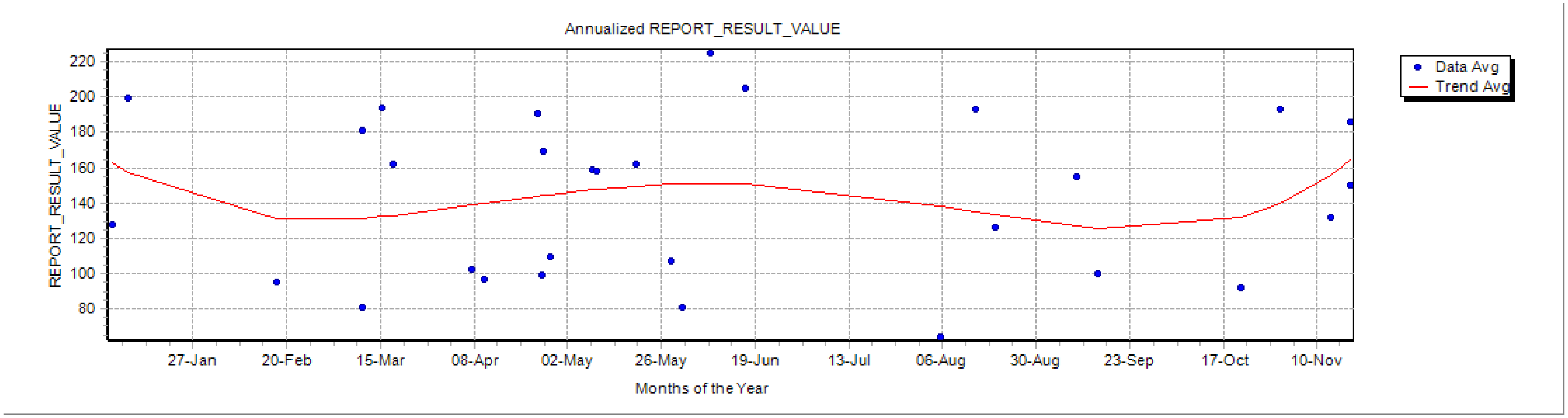


Chart 14-7: Alkalinity Trend



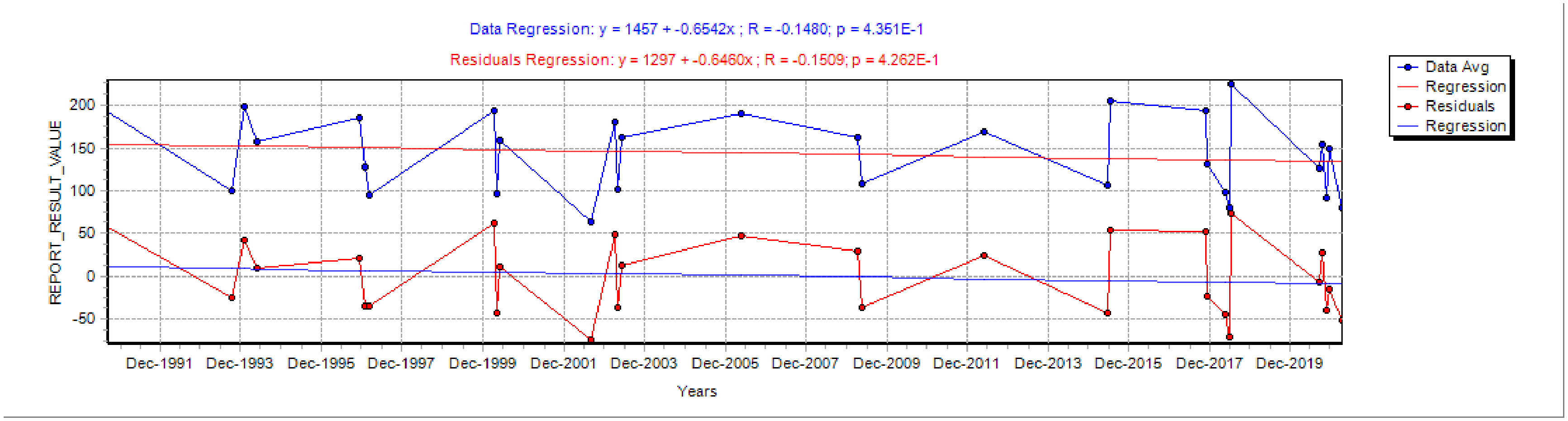
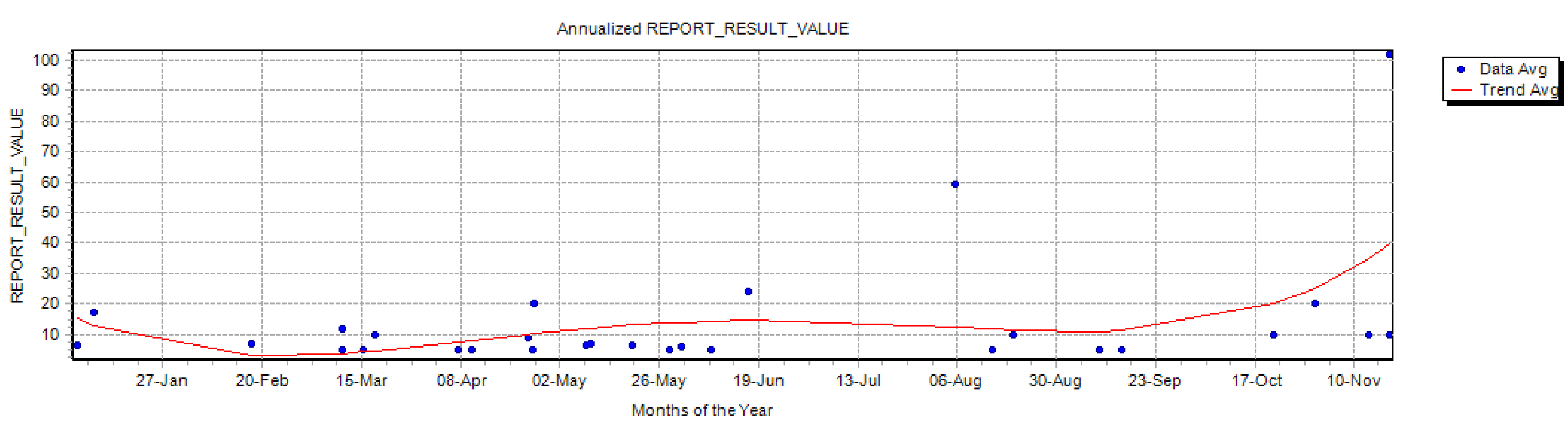


Chart 14-8: Hardness Trend



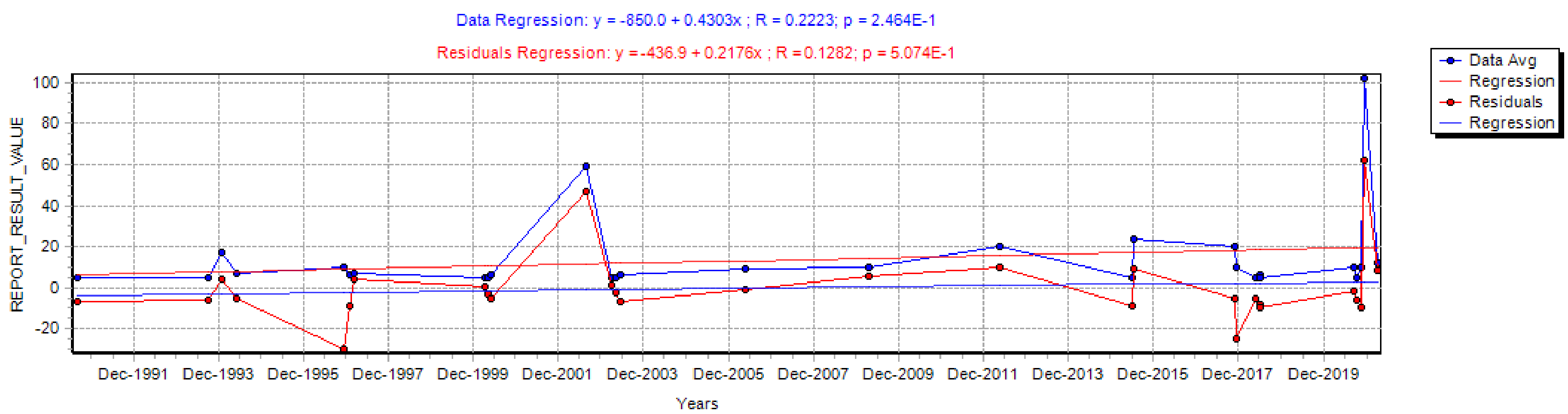
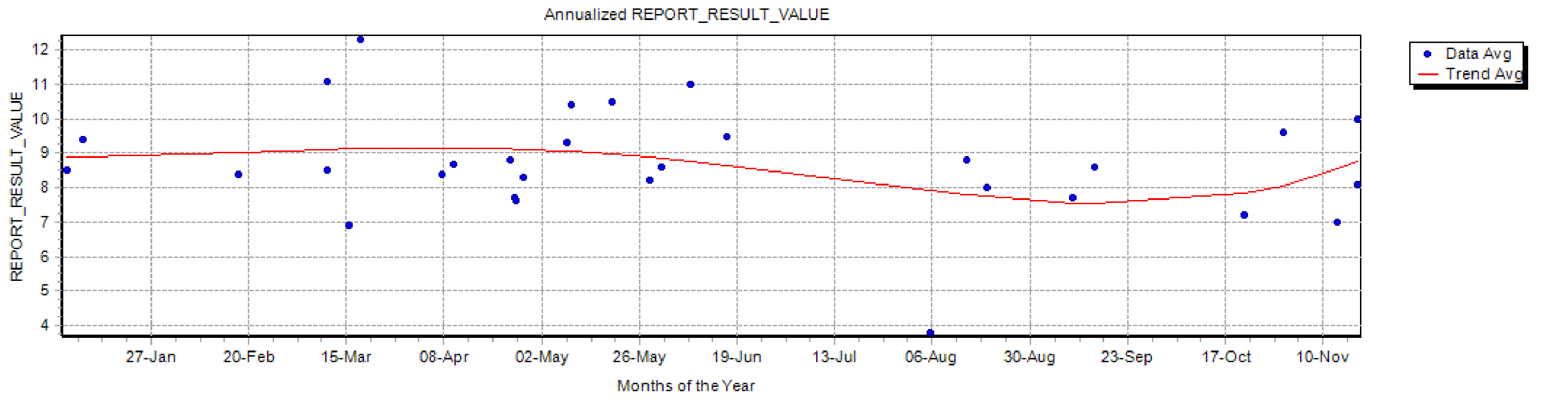


Chart 14-9: Sulfate Trend



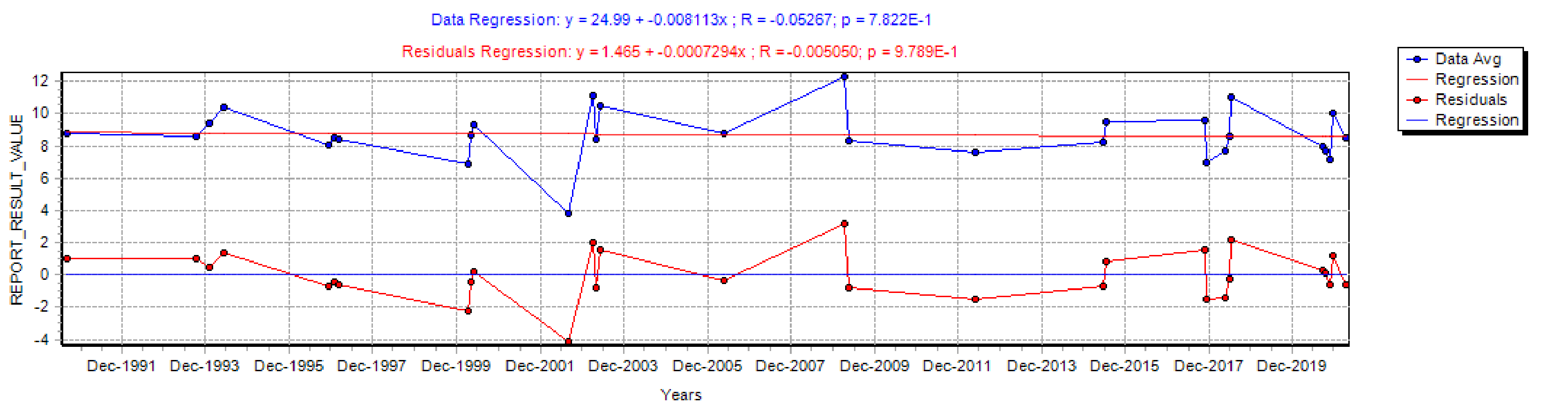
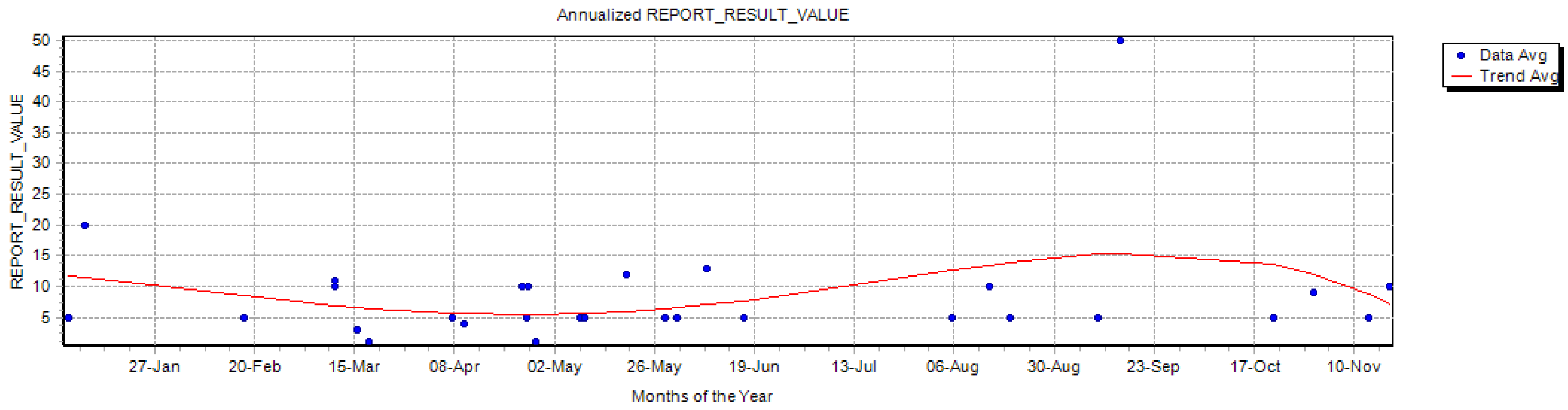


Chart 14-10: Color Trend



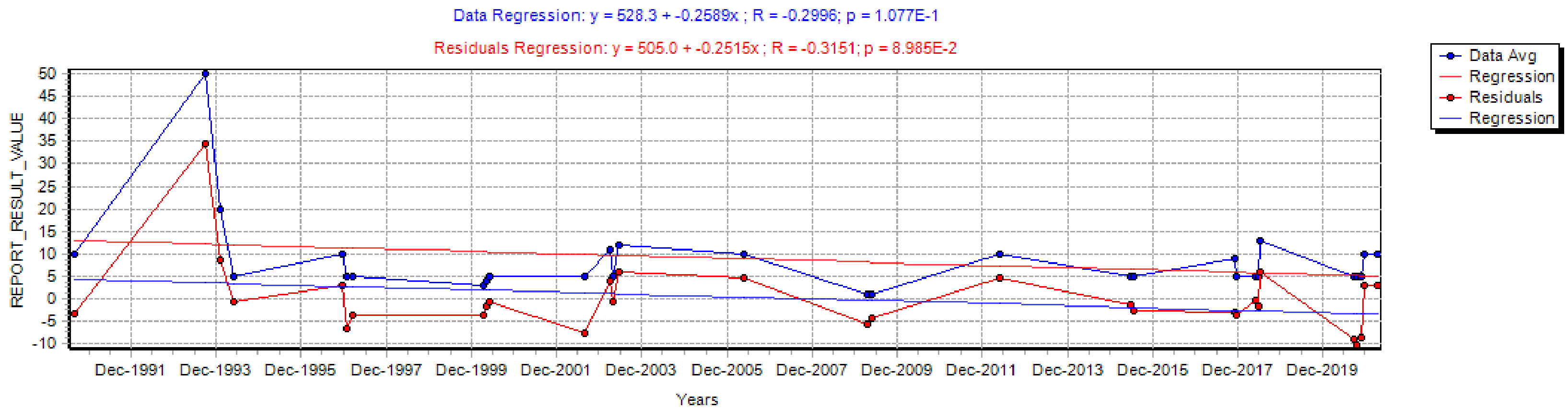
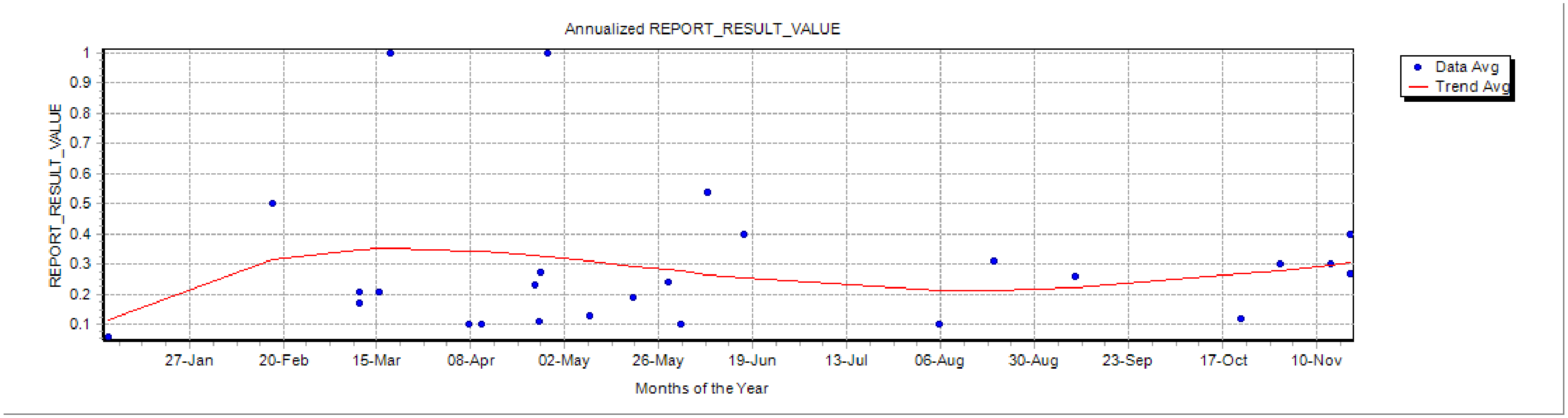


Chart 14-11: Ammonia Trend



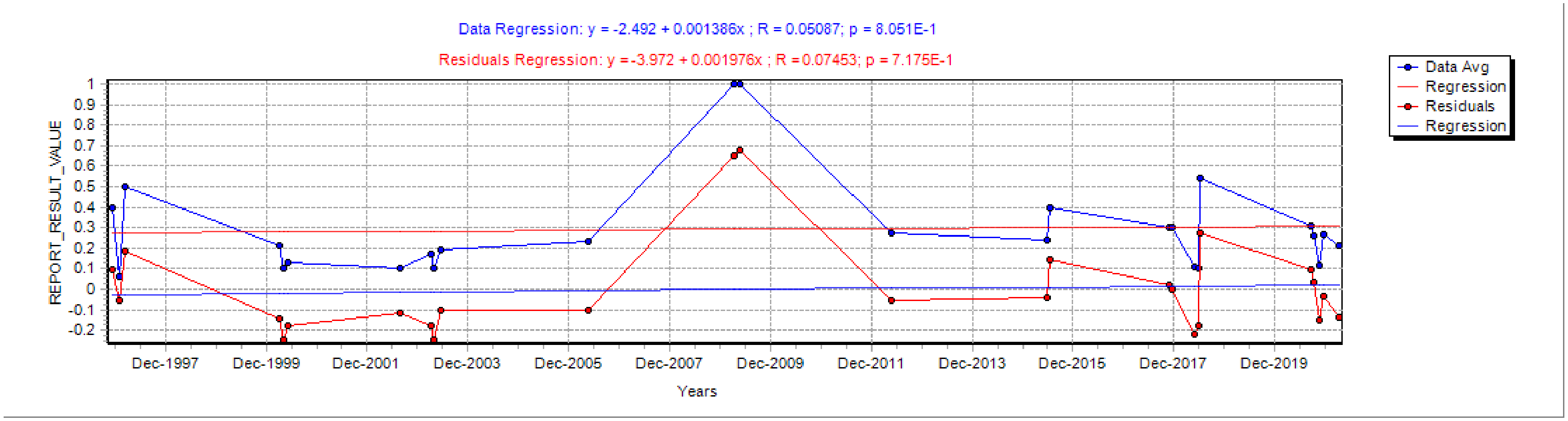
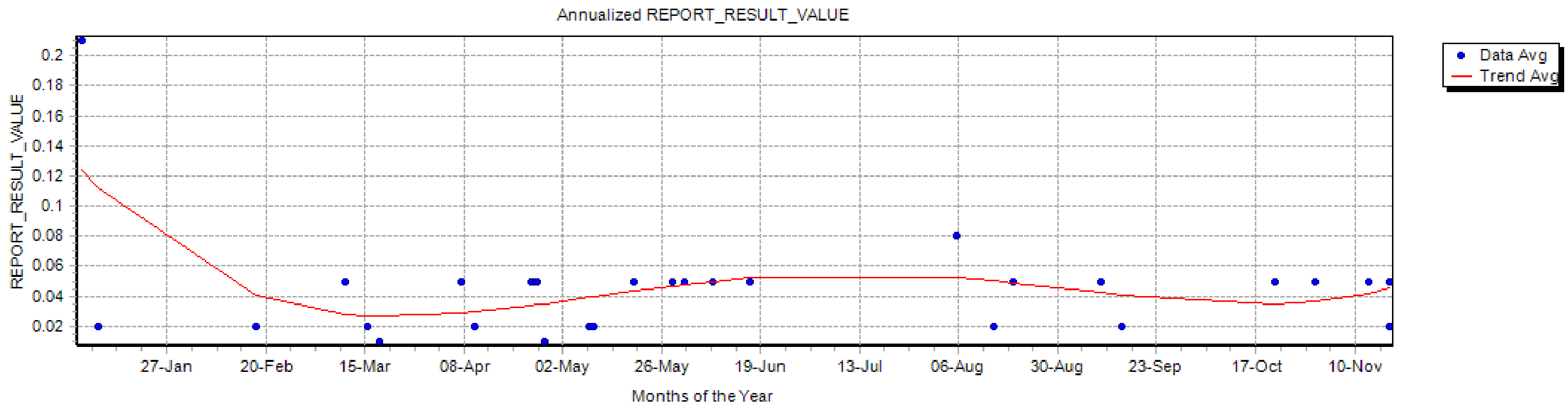


Chart 14-12: Nitrite - Nitrate Trend



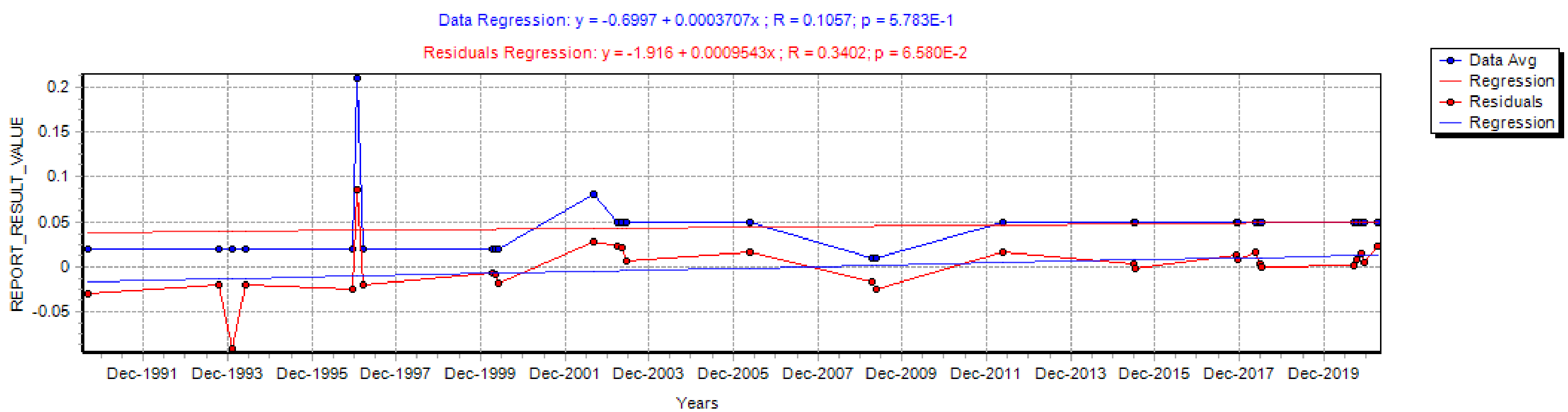
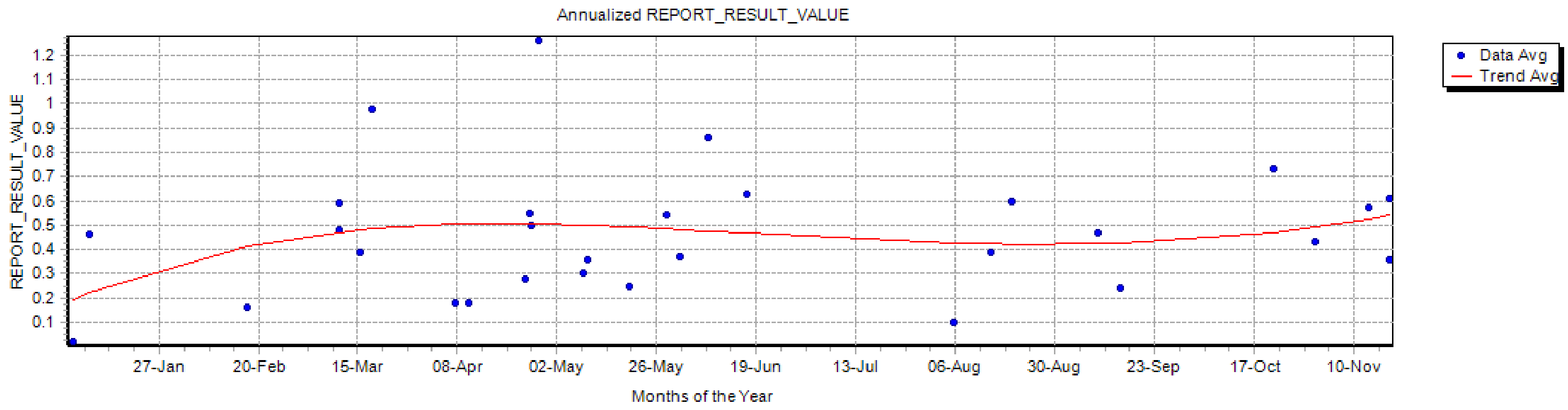


Chart 14-13: Total Kjeldahl Nitrogen Trend



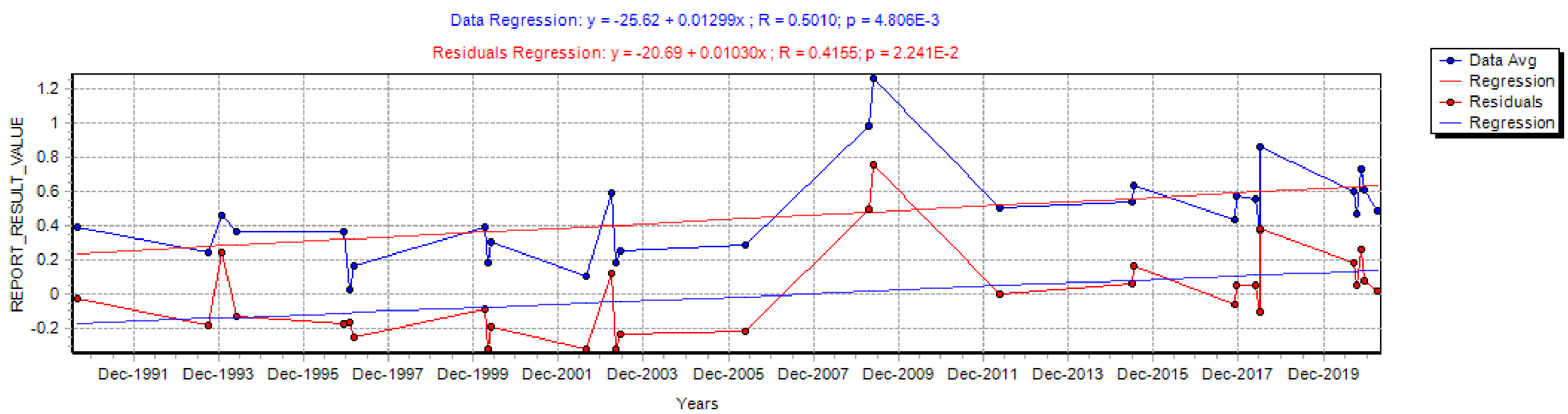
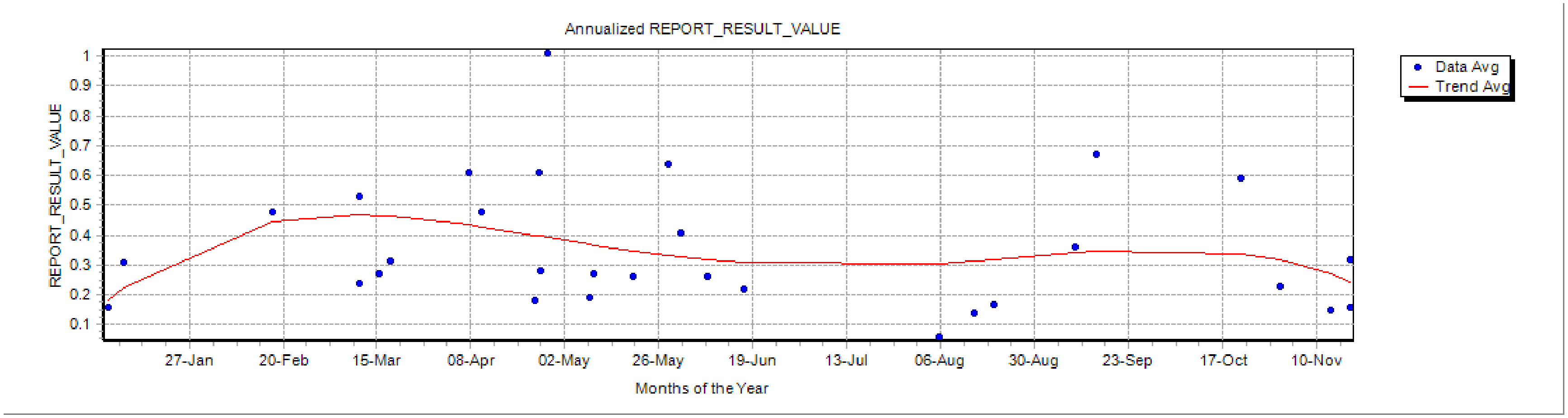


Chart 14-14: Total Phosphorus Trend



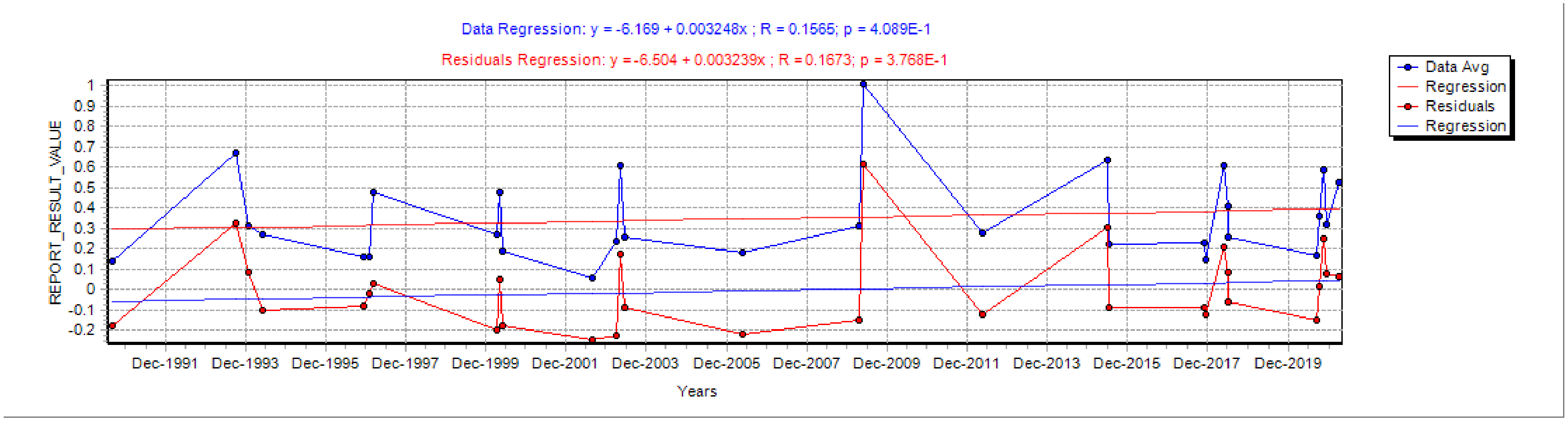
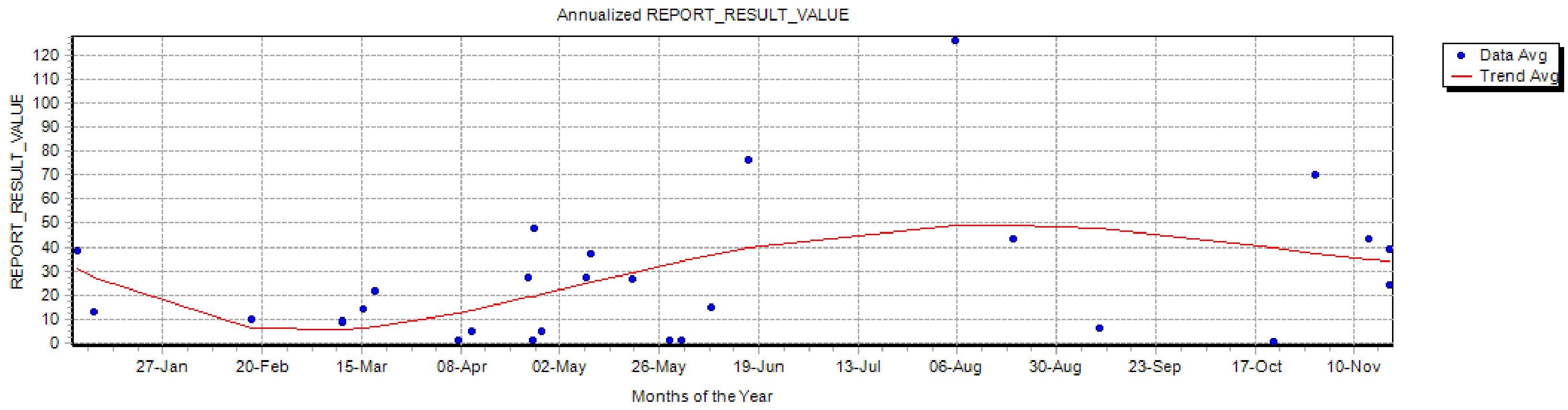


Chart 14-15: Barium Trend



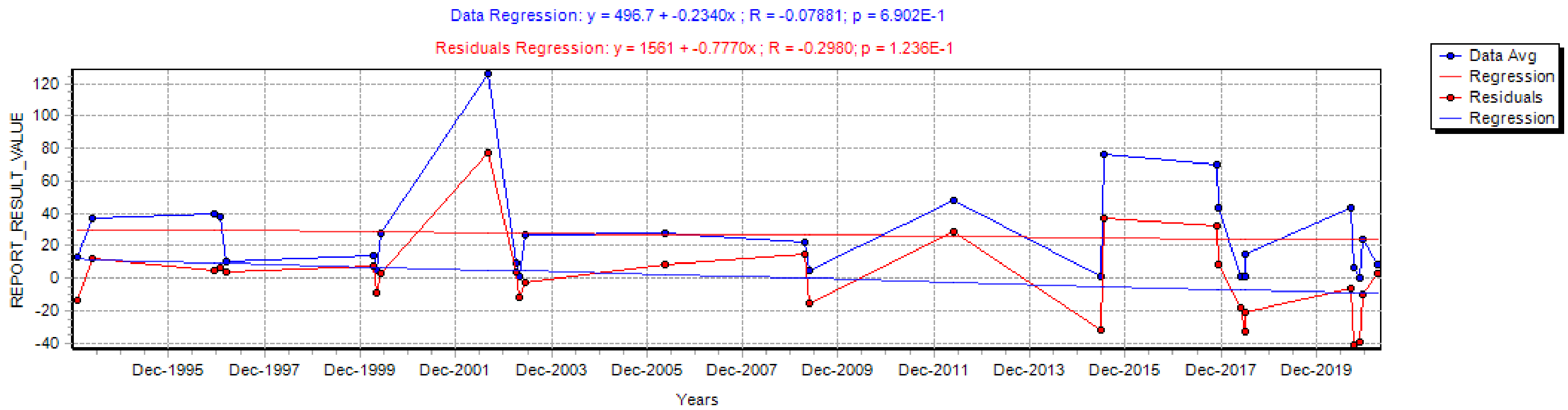
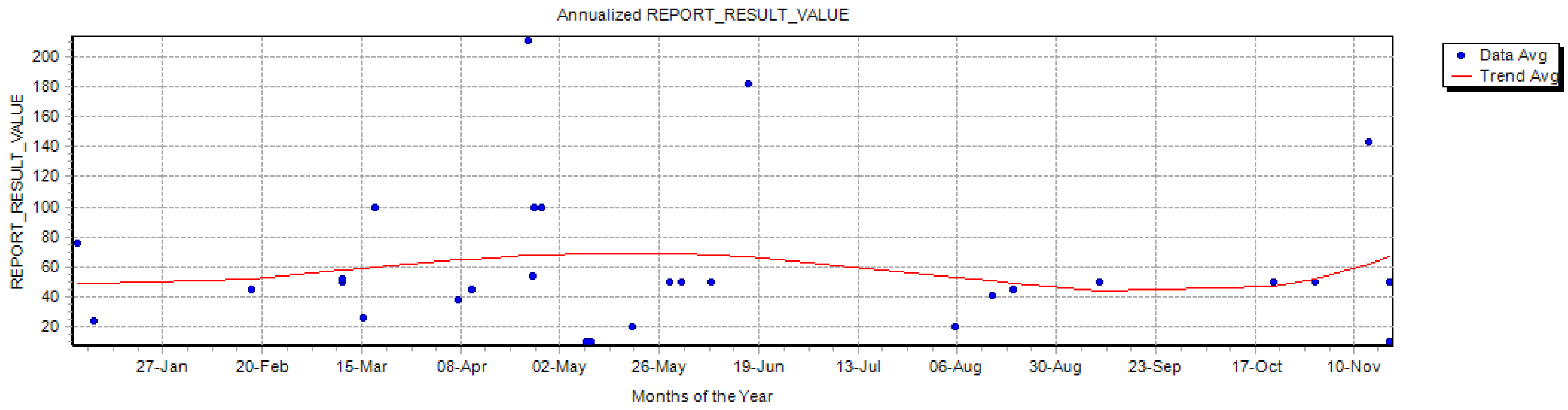


Chart 14-16: Iron Trend



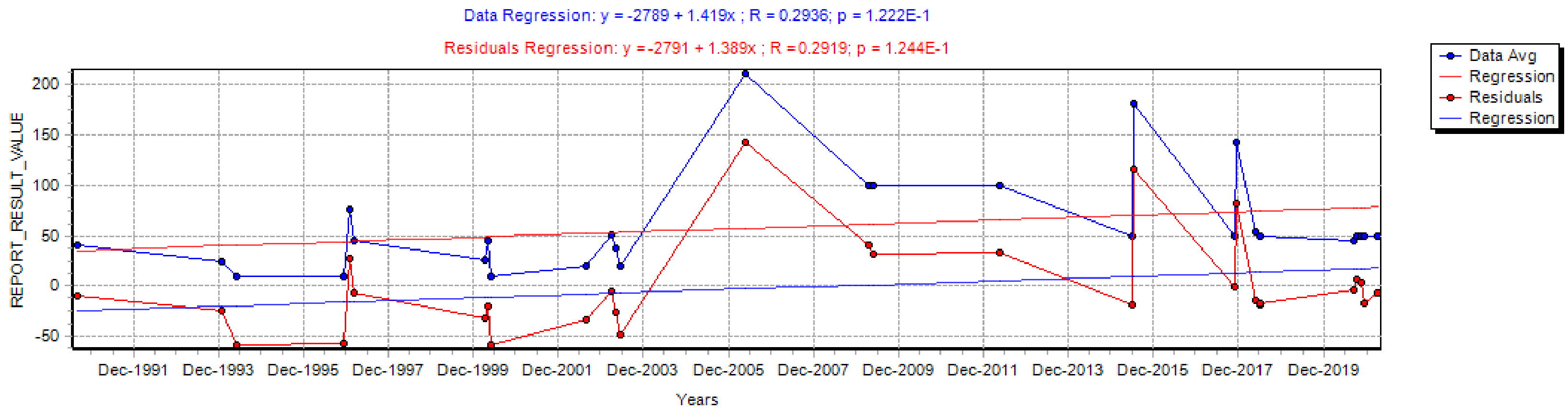


Chart 14-17: Zinc Trend