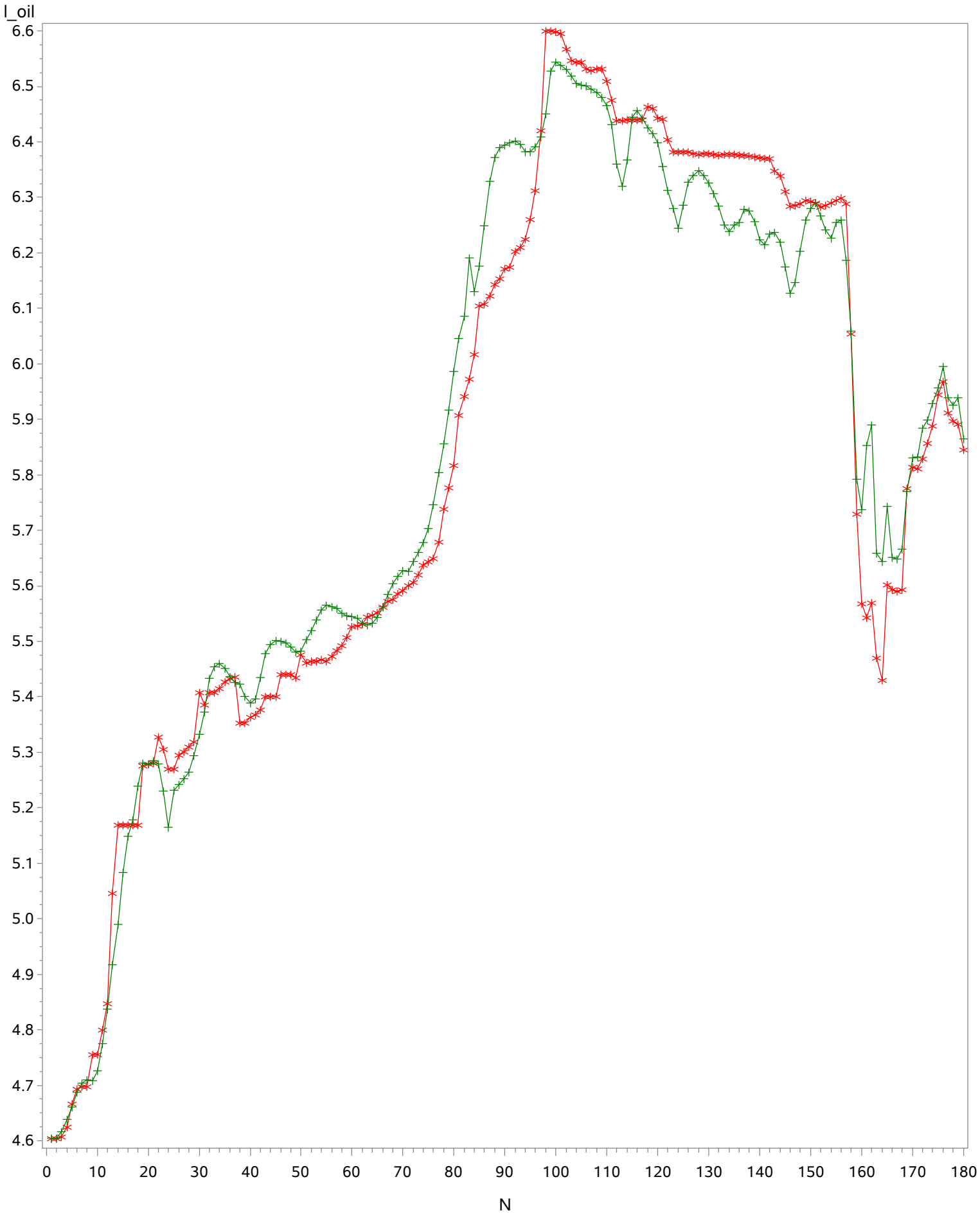
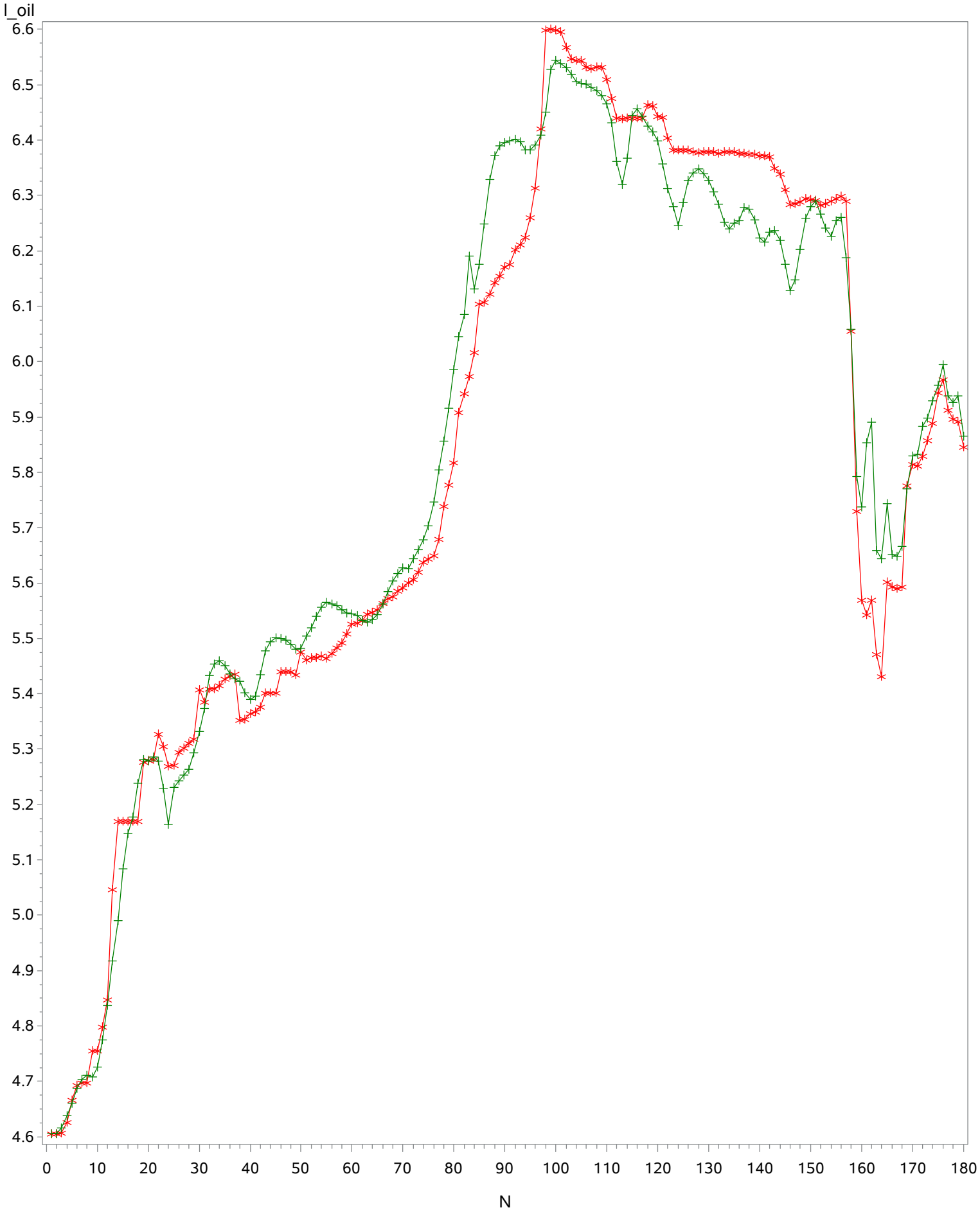
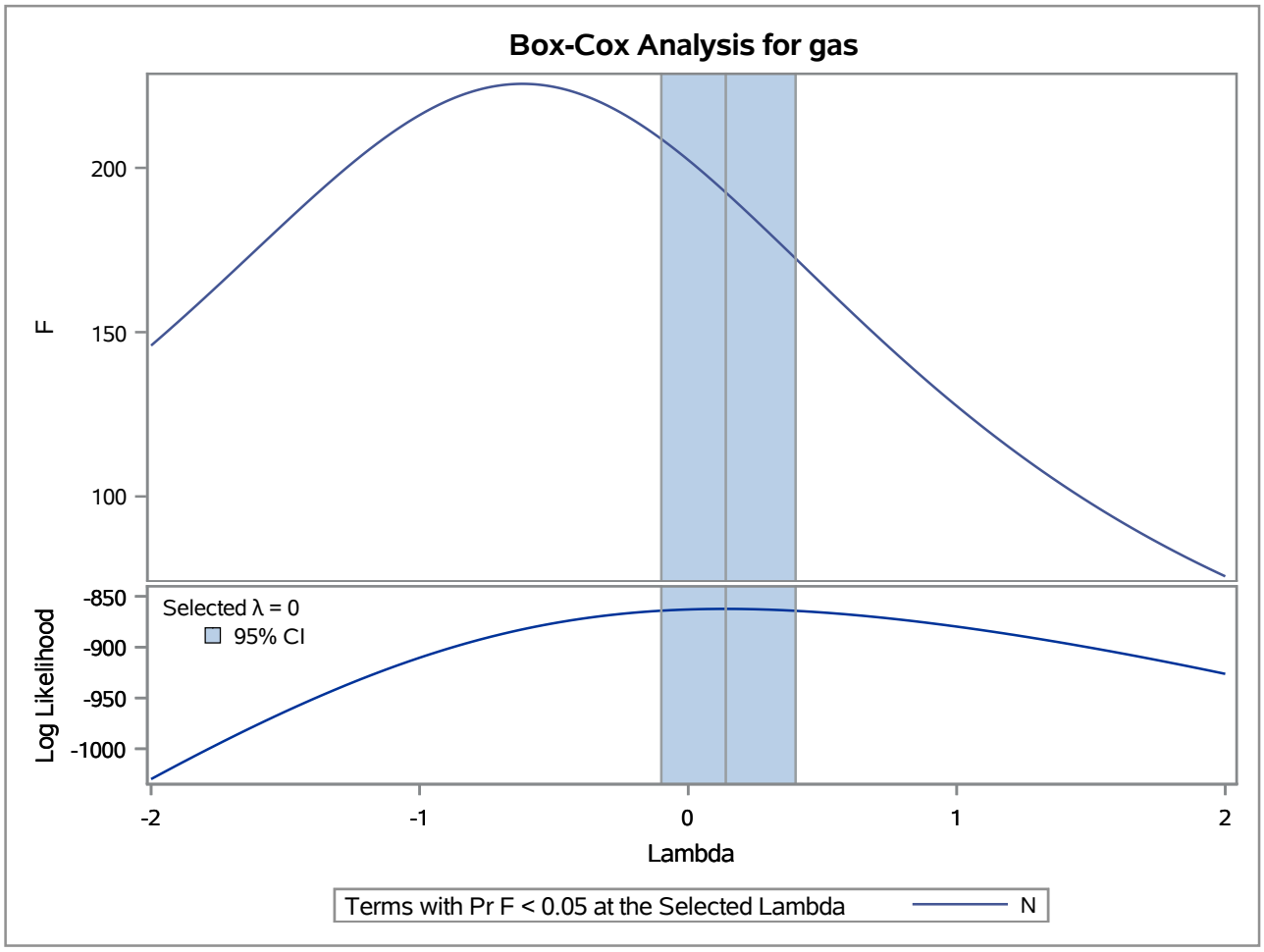
Shumway Oil and Gas Price Data



Shumway Oil and Gas Price Data

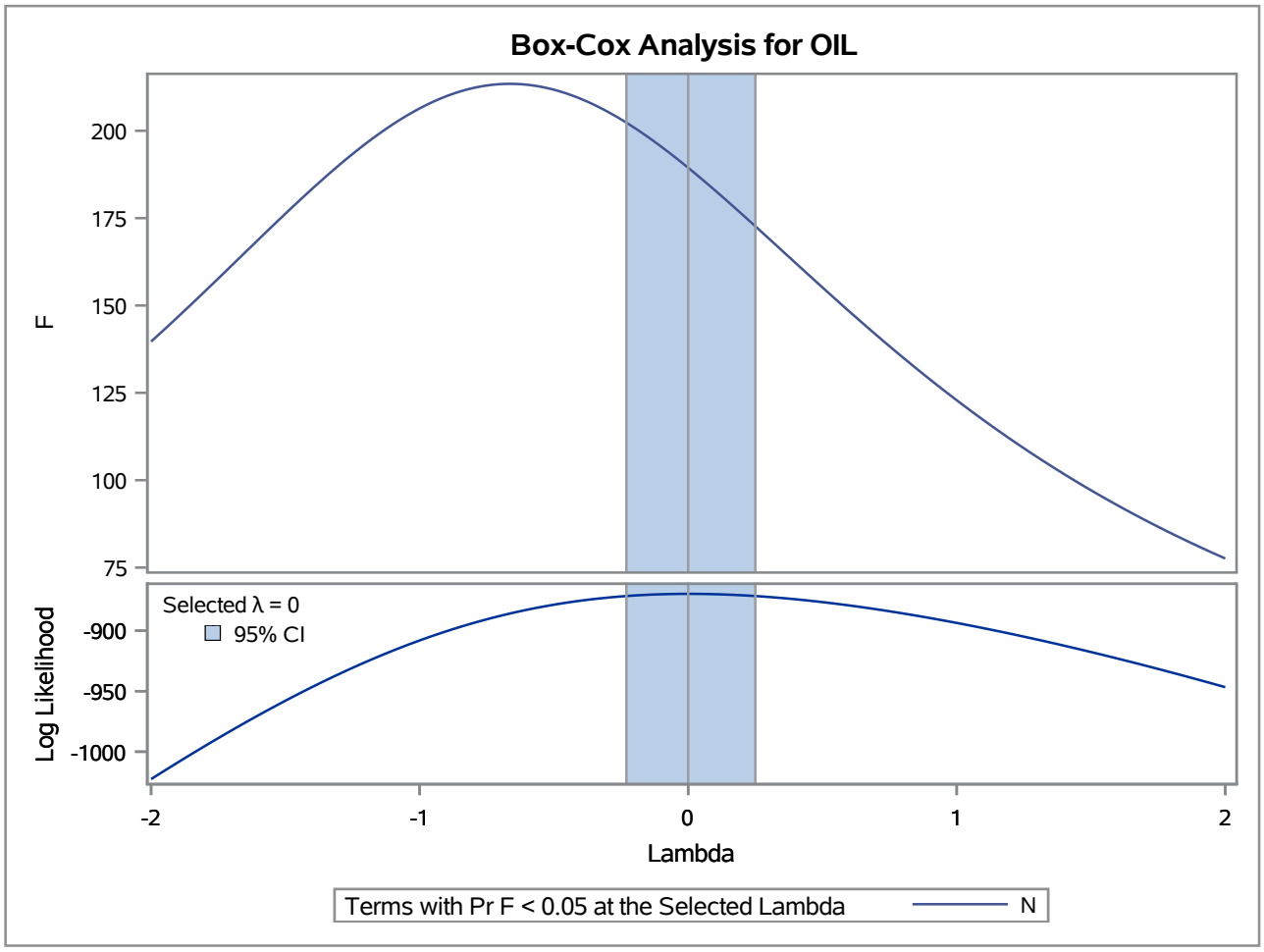


The TRANSREG Procedure



Model Statement Specification Details				
Type	**DF**	**Variable**	**Description**	**Value**
Dep	1	BoxCox(gas)	Lambda Used	0
			Lambda	0.14
			Log Likelihood	-862.3
			Conv. Lambda	0
			Conv. Lambda LL	-862.9
			CI Limit	-864.2
			Alpha	0.05
			Options	Convenient Lambda Used
			Label	gas
Ind	1	Identity(N)	DF	1

The TRANSREG Procedure

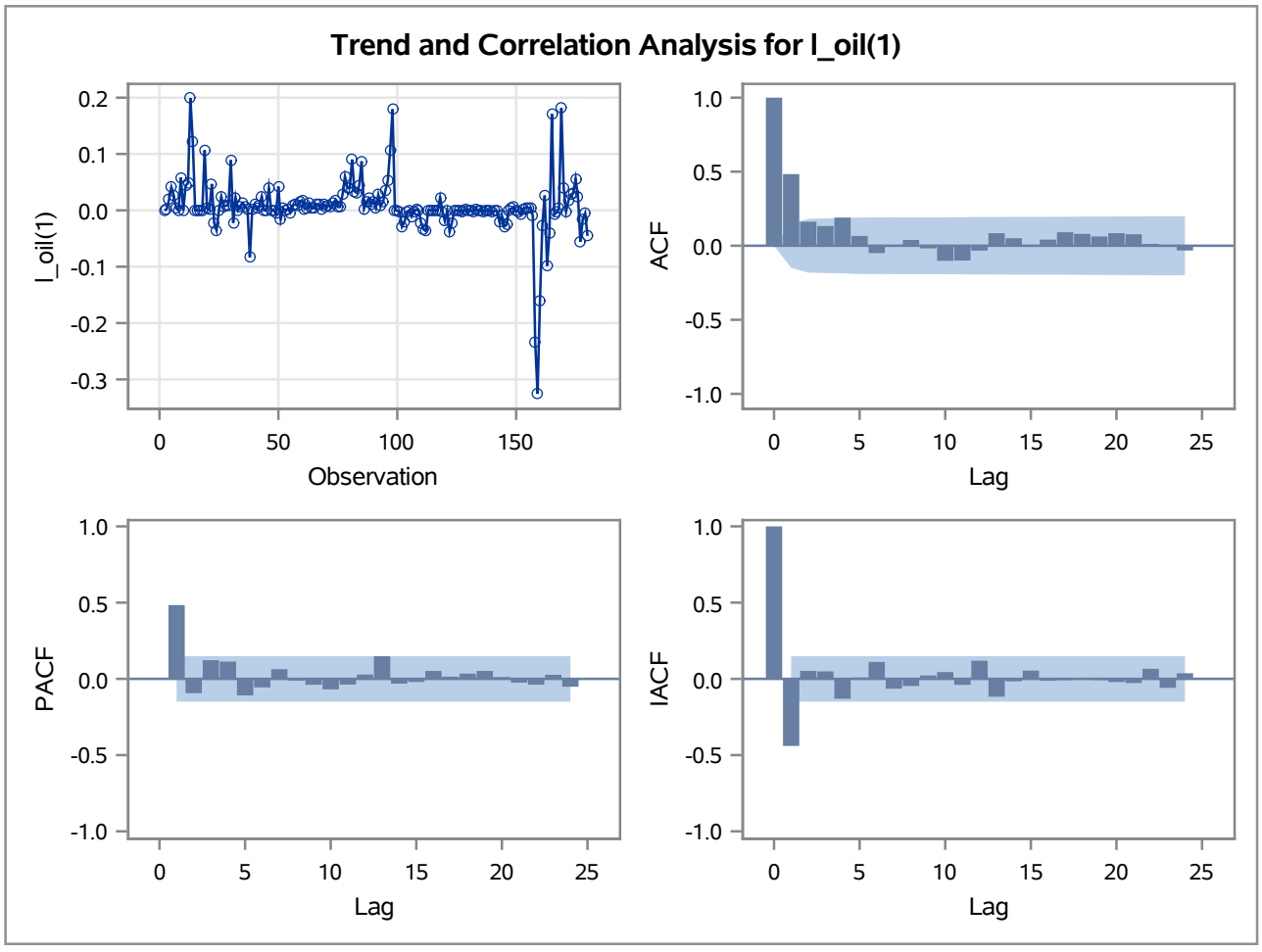


Model Statement Specification Details				
Type	**DF**	**Variable**	**Description**	**Value**
Dep	1	BoxCox(OIL)	Lambda Used	0
			Lambda	0
			Log Likelihood	-869.6
			Conv. Lambda	0
			Conv. Lambda LL	-869.6
			CI Limit	-871.5
			Alpha	0.05
			Options	Convenient Lambda Used
			Label	OIL
Ind	1	Identity(N)	DF	1

The ARIMA Procedure

Name of Variable = l_oil	
Period(s) of Differencing	1
Mean of Working Series	0.006932
Standard Deviation	0.050467
Number of Observations	179
Observation(s) eliminated by differencing	1

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	58.66	6	<.0001	0.484	0.162	0.133	0.190	0.066	-0.050
12	63.11	12	<.0001	0.003	0.039	-0.018	-0.102	-0.100	-0.033
18	68.31	18	<.0001	0.085	0.051	-0.004	0.041	0.091	0.080
24	72.05	24	<.0001	0.062	0.085	0.077	0.012	-0.004	-0.032



The ARIMA Procedure

Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MA1,1	0.16239	0.07739	2.10	0.0373	6
AR1,1	0.49553	0.06479	7.65	<.0001	1
AR1,2	0.14523	0.06561	2.21	0.0281	4

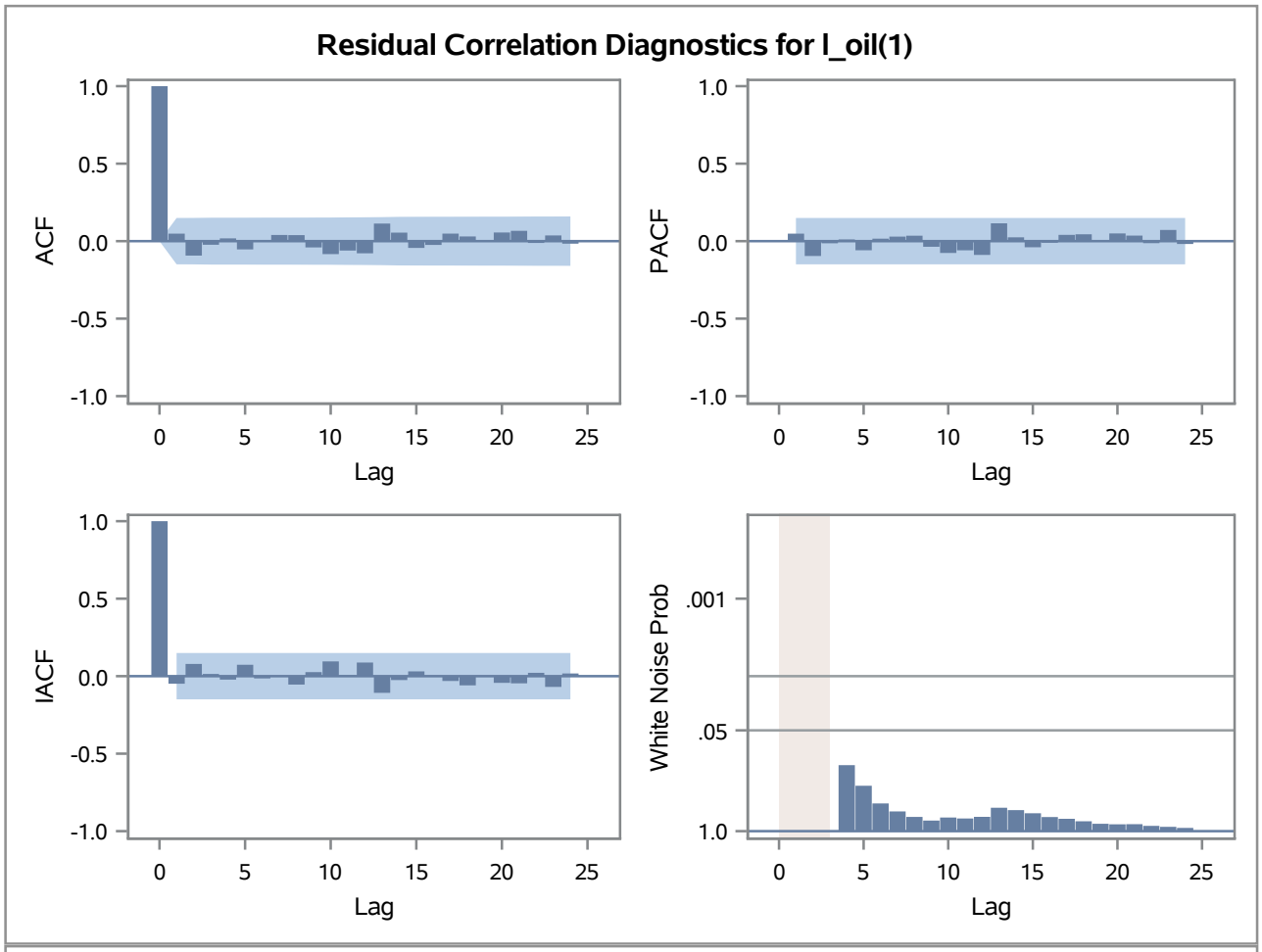
Variance Estimate	0.001902
Std Error Estimate	0.043616
AIC	-610.418
SBC	-600.856
Number of Residuals	179

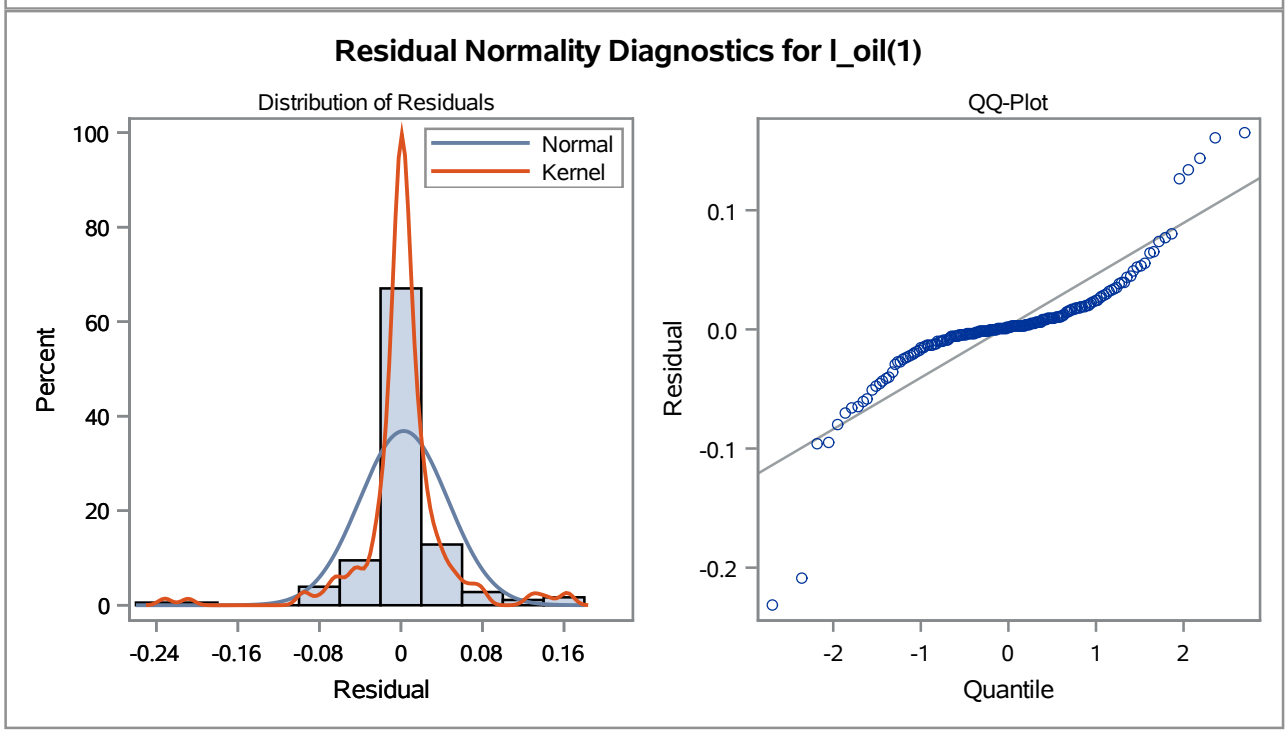
*** AIC and SBC do not include log determinant.**

Correlations of Parameter Estimates			
Parameter	MA1,1	AR1,1	AR1,2
MA1,1	1.000	0.079	0.157
AR1,1	0.079	1.000	-0.158
AR1,2	0.157	-0.158	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	2.54	3	0.4674	0.053	-0.088	-0.019	0.022	-0.048	0.012
12	6.46	9	0.6927	0.044	0.042	-0.036	-0.079	-0.056	-0.077
18	10.74	15	0.7705	0.114	0.056	-0.041	-0.023	0.050	0.031
24	12.67	21	0.9196	-0.004	0.056	0.066	-0.009	0.041	-0.012
30	13.73	27	0.9837	-0.069	0.006	0.003	0.012	-0.006	-0.002

The ARIMA Procedure





Model for variable l_oil	
Period(s) of Differencing	1

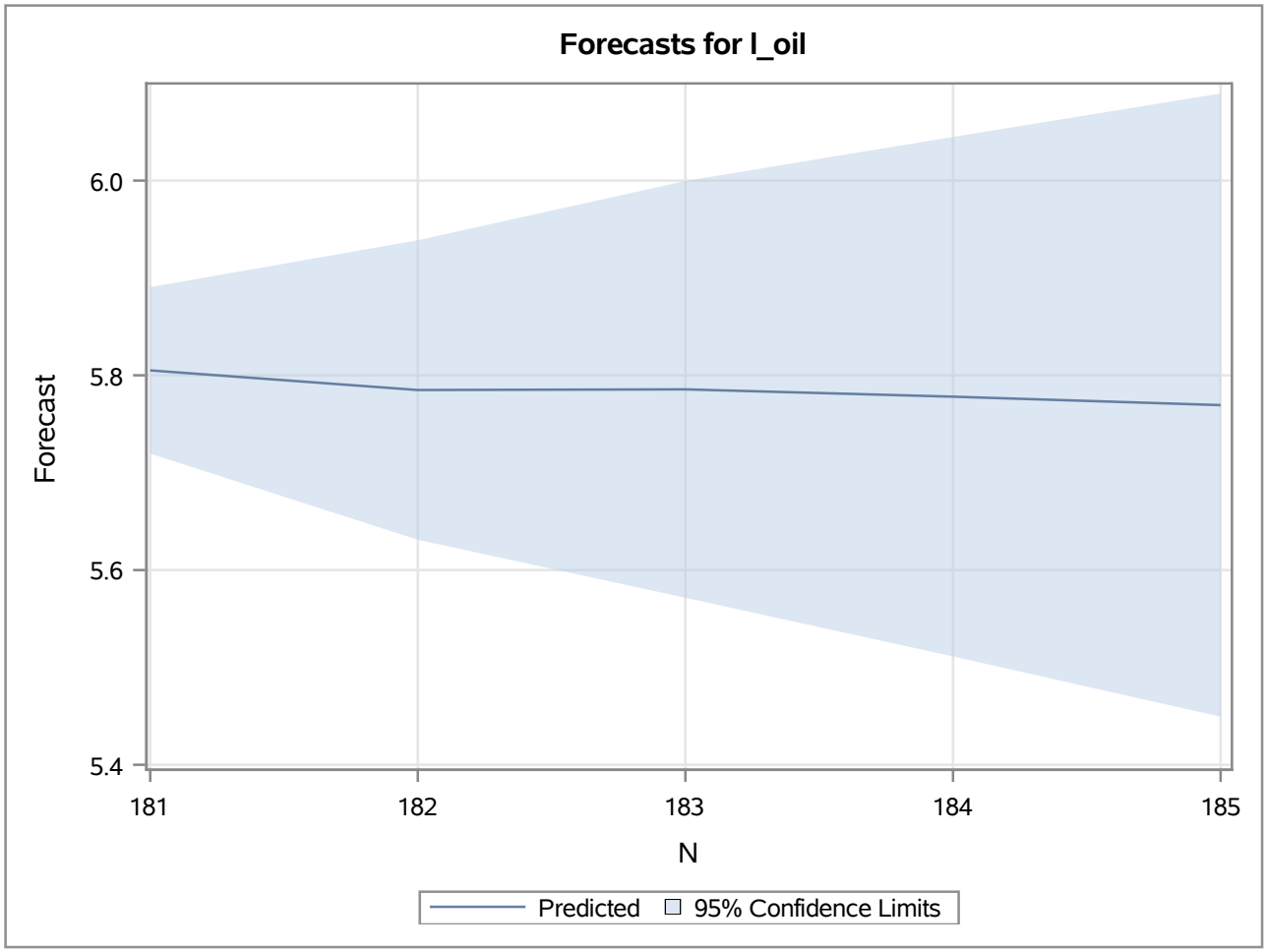
The ARIMA Procedure

No mean term in this model.

Autoregressive Factors	
Factor 1:	1 - 0.49553 B**(1) - 0.14523 B**(4)

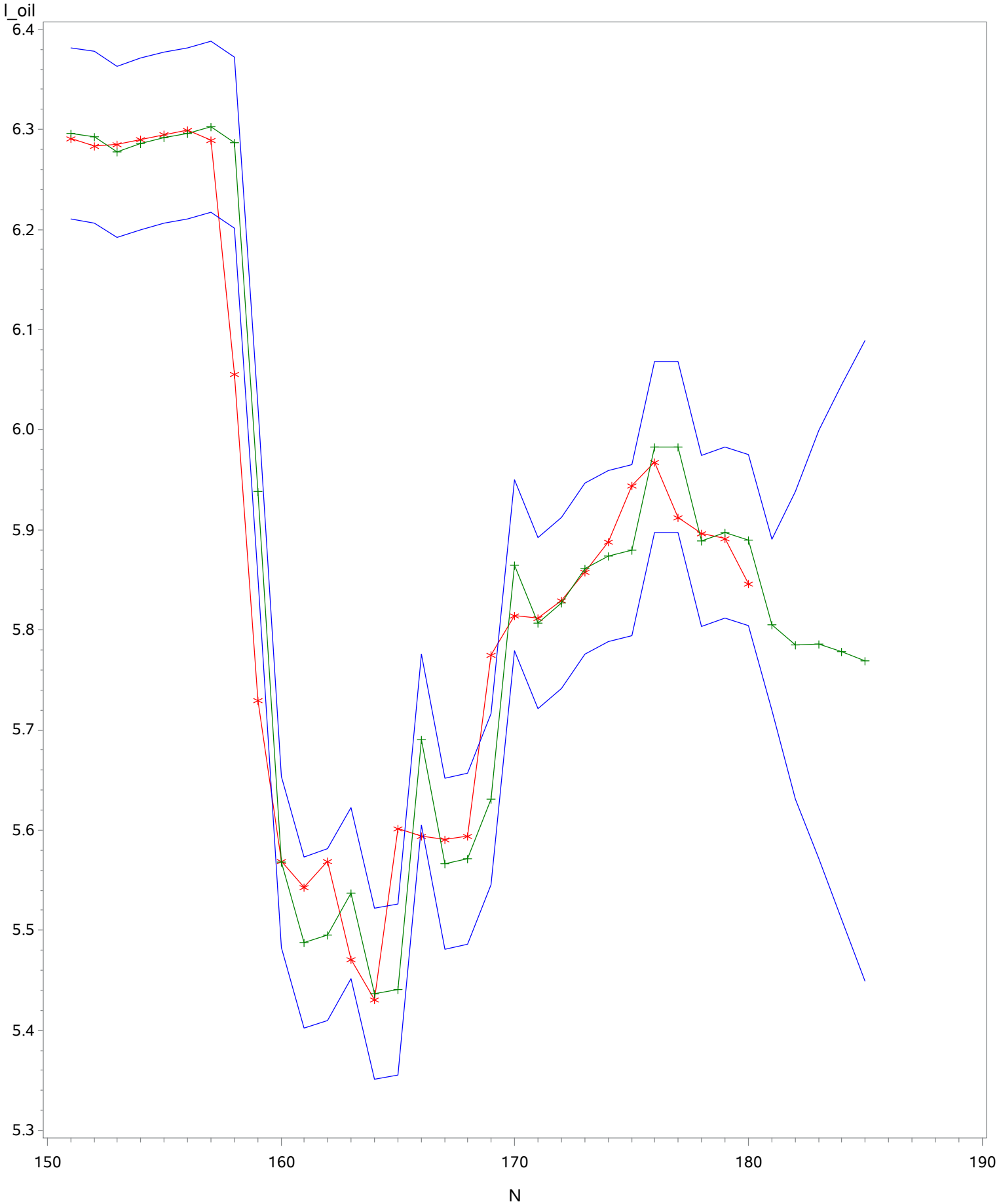
Moving Average Factors	
Factor 1:	1 - 0.16239 B**(6)

Forecasts for variable l_oil				
Obs	**Forecast**	**Std Error**	**95% Confidence Limits**	
181	5.8050	0.0436	5.7196	5.8905
182	5.7849	0.0785	5.6311	5.9387
183	5.7856	0.1092	5.5716	5.9996
184	5.7781	0.1361	5.5113	6.0448
185	5.7694	0.1633	5.4493	6.0894



Shumway Oil and Gas Price Data

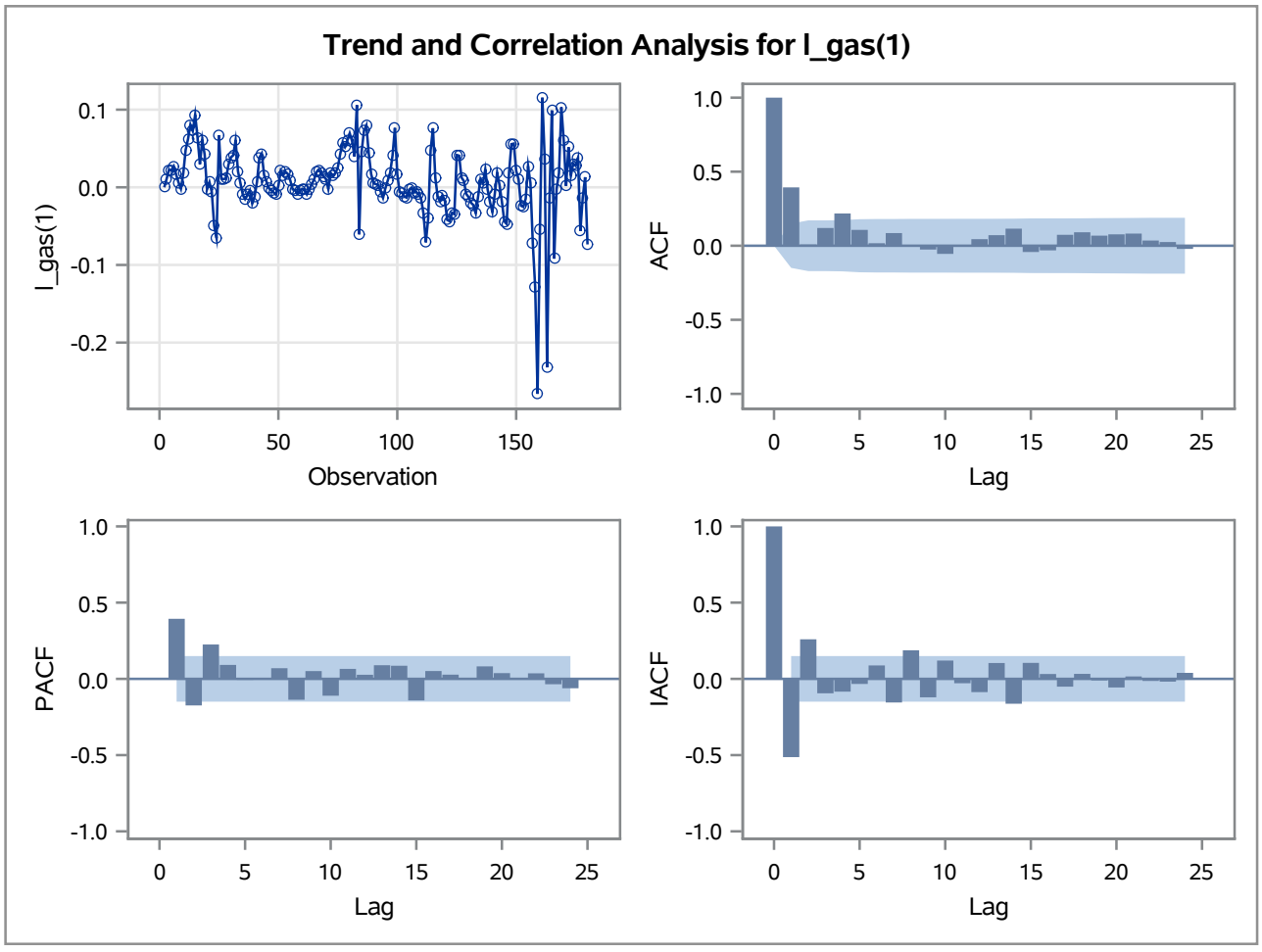
Modeling oil



The ARIMA Procedure

Name of Variable = l_gas	
Period(s) of Differencing	1
Mean of Working Series	0.007037
Standard Deviation	0.046025
Number of Observations	179
Observation(s) eliminated by differencing	1

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	41.88	6	<.0001	0.394	0.008	0.120	0.218	0.107	0.017
12	44.34	12	<.0001	0.085	-0.003	-0.026	-0.055	-0.001	0.044
18	51.23	18	<.0001	0.071	0.115	-0.042	-0.031	0.074	0.091
24	55.24	24	0.0003	0.068	0.077	0.082	0.035	0.025	-0.021



The ARIMA Procedure

Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MA1,1	0.04753	0.07786	0.61	0.5423	6
AR1,1	0.39921	0.06872	5.81	<.0001	1
AR1,2	0.18668	0.06841	2.73	0.0070	4

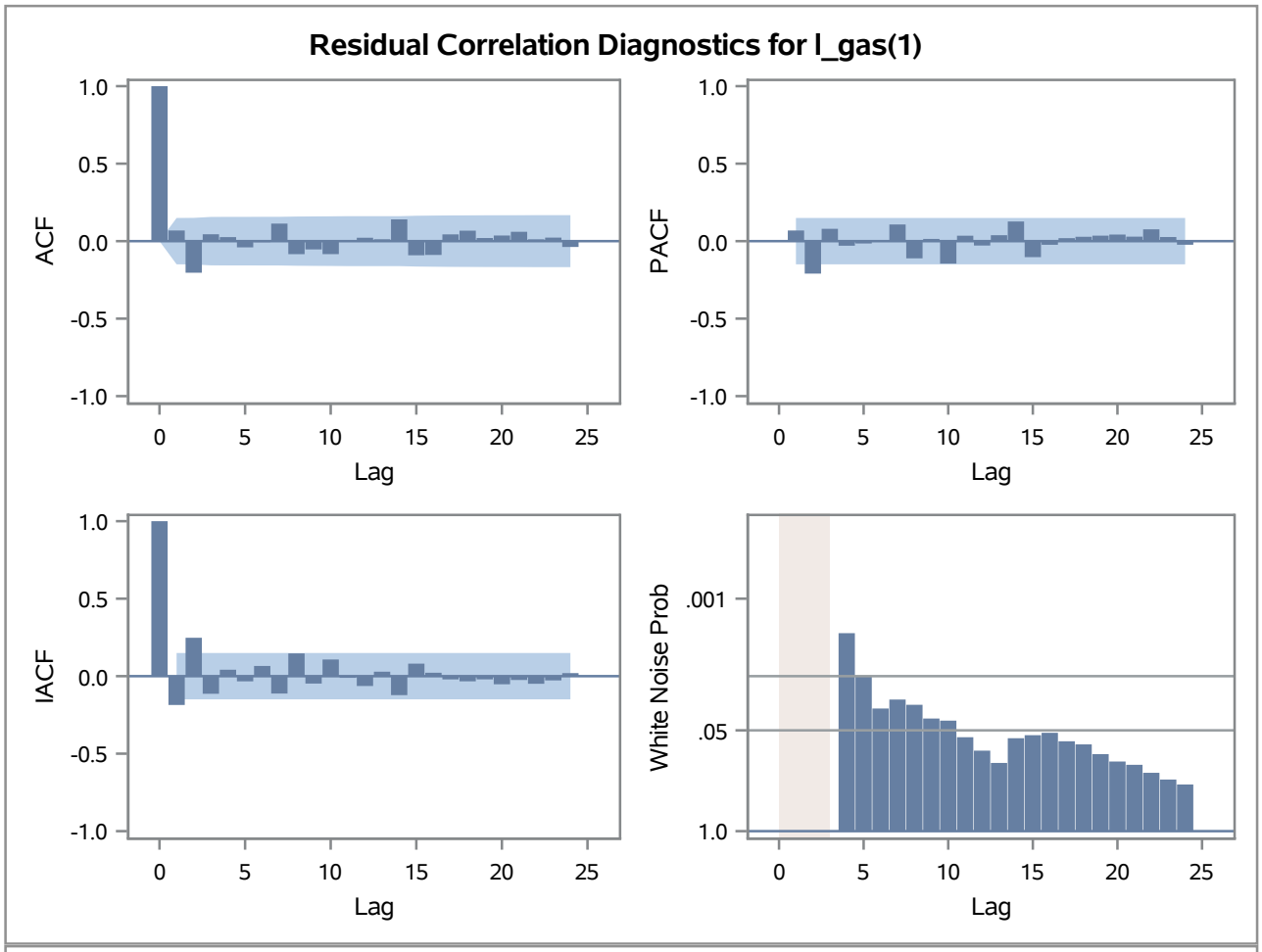
Variance Estimate	0.001749
Std Error Estimate	0.041823
AIC	-625.45
SBC	-615.888
Number of Residuals	179

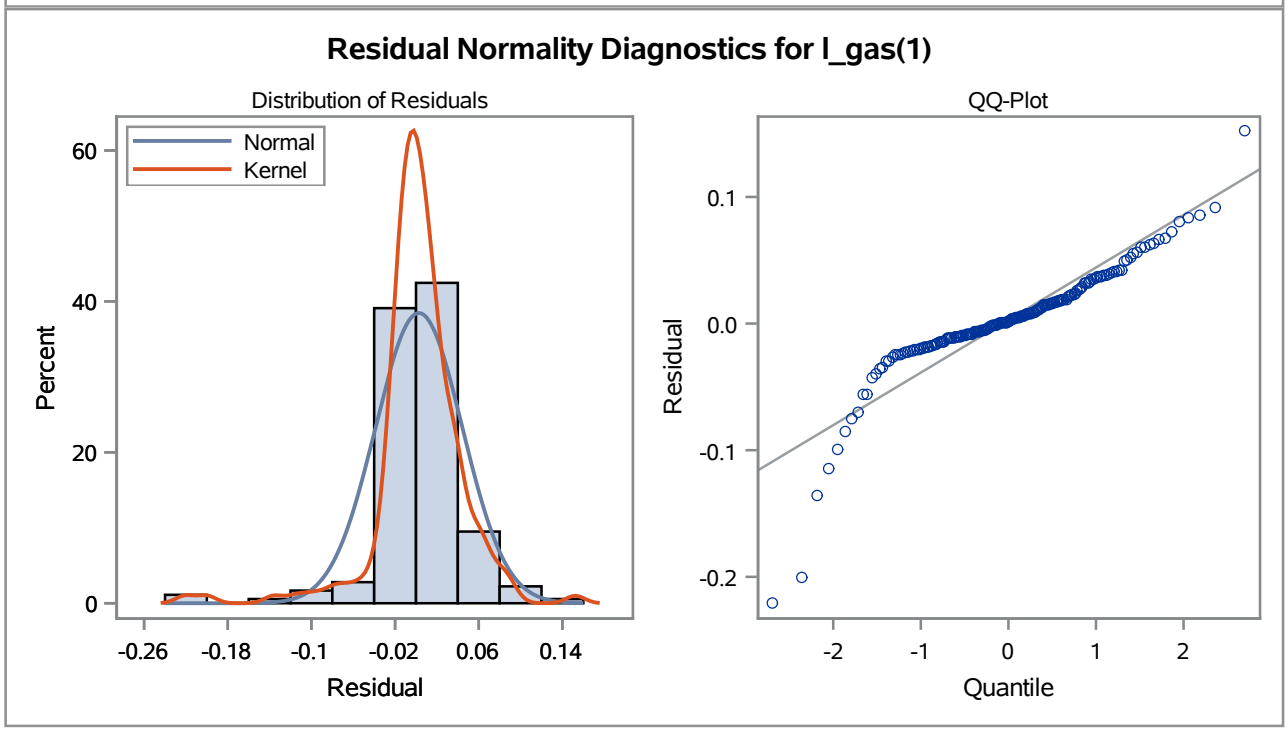
*** AIC and SBC do not include log determinant.**

Correlations of Parameter Estimates			
Parameter	MA1,1	AR1,1	AR1,2
MA1,1	1.000	0.141	-0.045
AR1,1	0.141	1.000	-0.143
AR1,2	-0.045	-0.143	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	8.99	3	0.0294	0.074	-0.198	0.049	0.031	-0.035	-0.001
12	14.53	9	0.1048	0.118	-0.078	-0.048	-0.079	0.007	0.025
18	22.88	15	0.0867	0.014	0.141	-0.089	-0.087	0.044	0.070
24	24.46	21	0.2714	0.022	0.037	0.061	0.015	0.027	-0.033
30	26.27	27	0.5037	-0.029	0.018	0.061	0.057	0.001	-0.021

The ARIMA Procedure





Model for variable l_gas	
Period(s) of Differencing	1

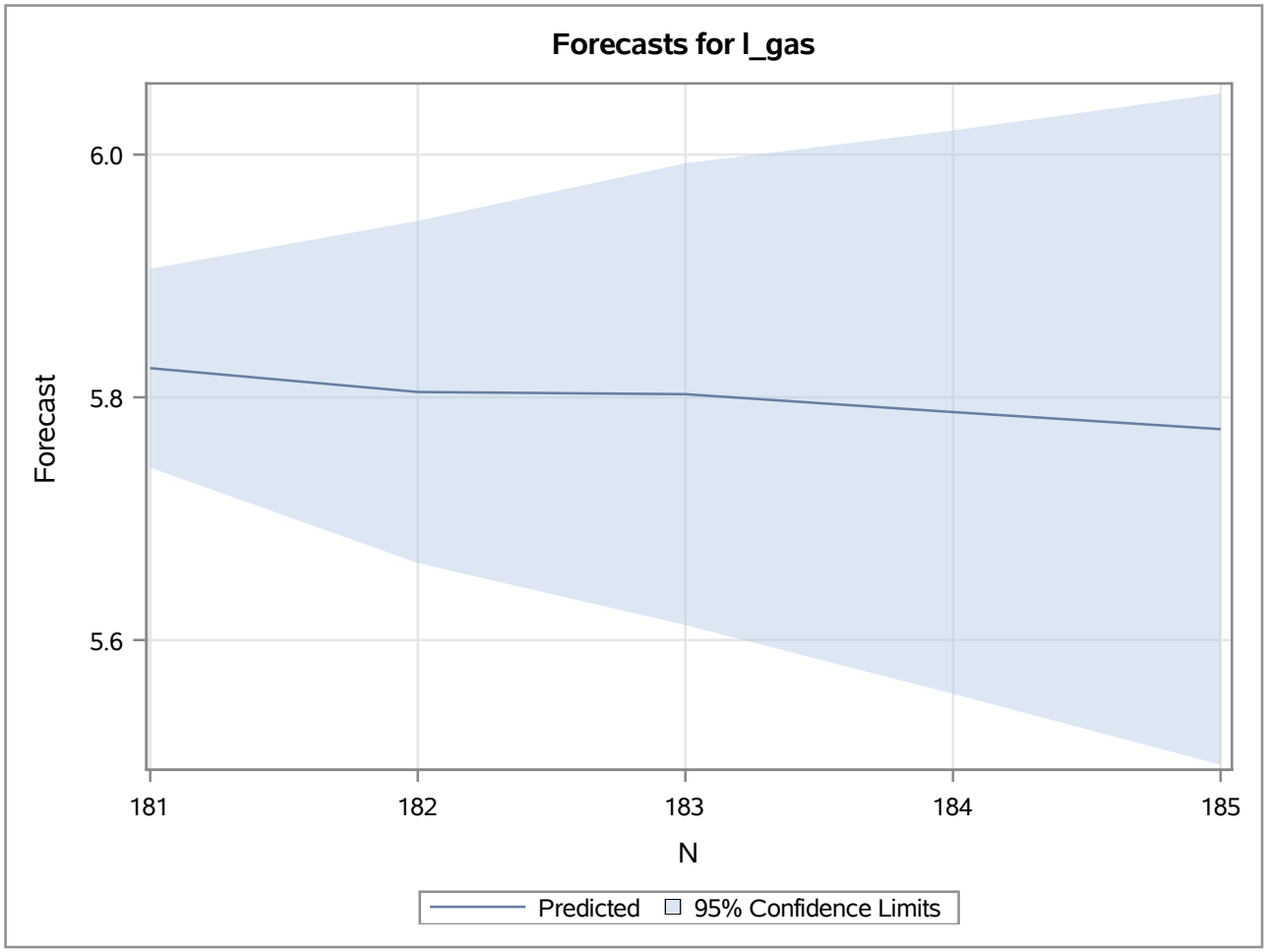
The ARIMA Procedure

No mean term in this model.

Autoregressive Factors	
Factor 1:	1 - 0.39921 B**(1) - 0.18668 B**(4)

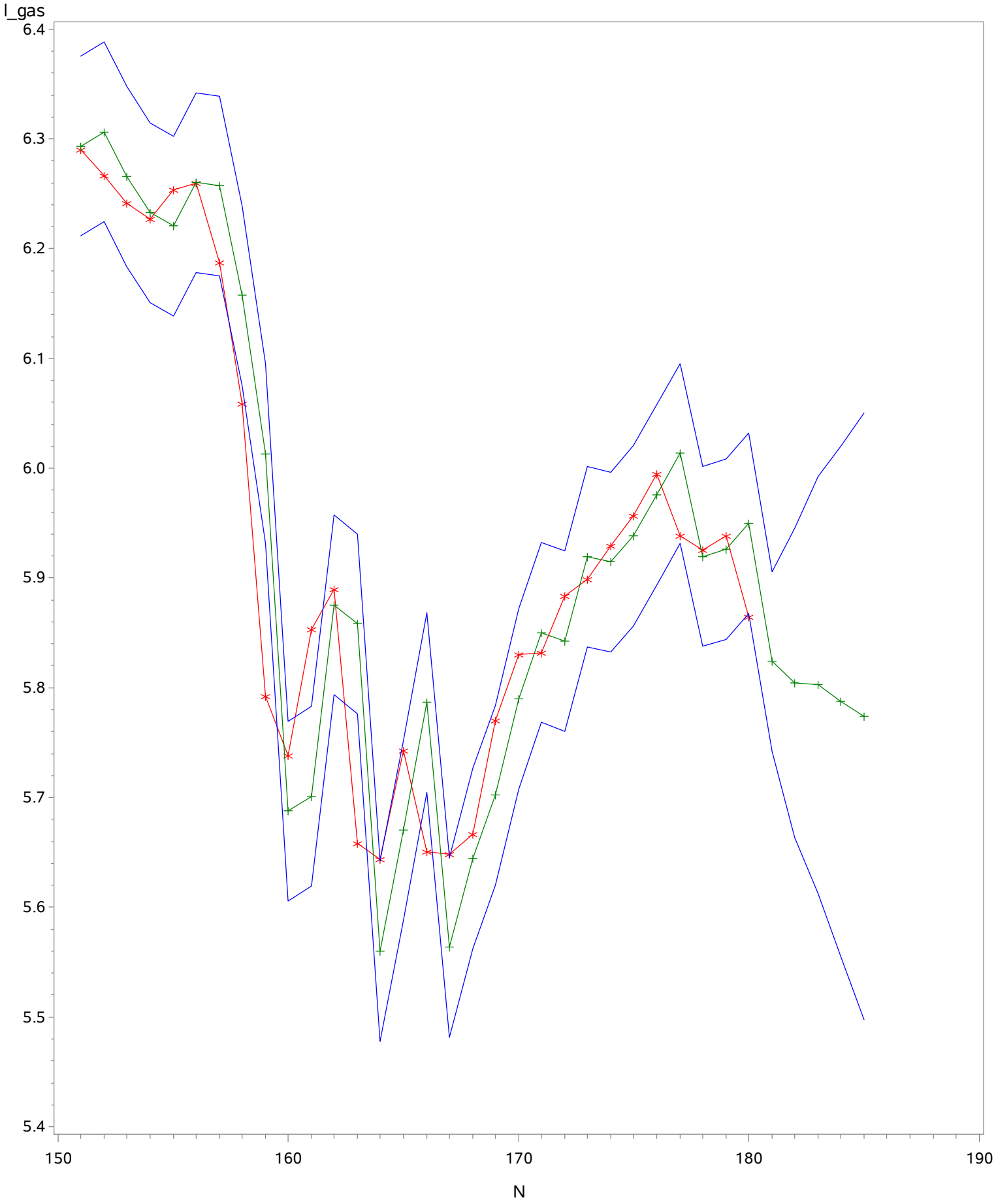
Moving Average Factors	
Factor 1:	1 - 0.04753 B**(6)

Forecasts for variable l_gas				
Obs	**Forecast**	**Std Error**	**95% Confidence Limits**	
181	5.8240	0.0418	5.7420	5.9060
182	5.8044	0.0719	5.6634	5.9454
183	5.8026	0.0971	5.6123	5.9928
184	5.7878	0.1184	5.5557	6.0199
185	5.7738	0.1411	5.4972	6.0503



Shumway Oil and Gas Price Data

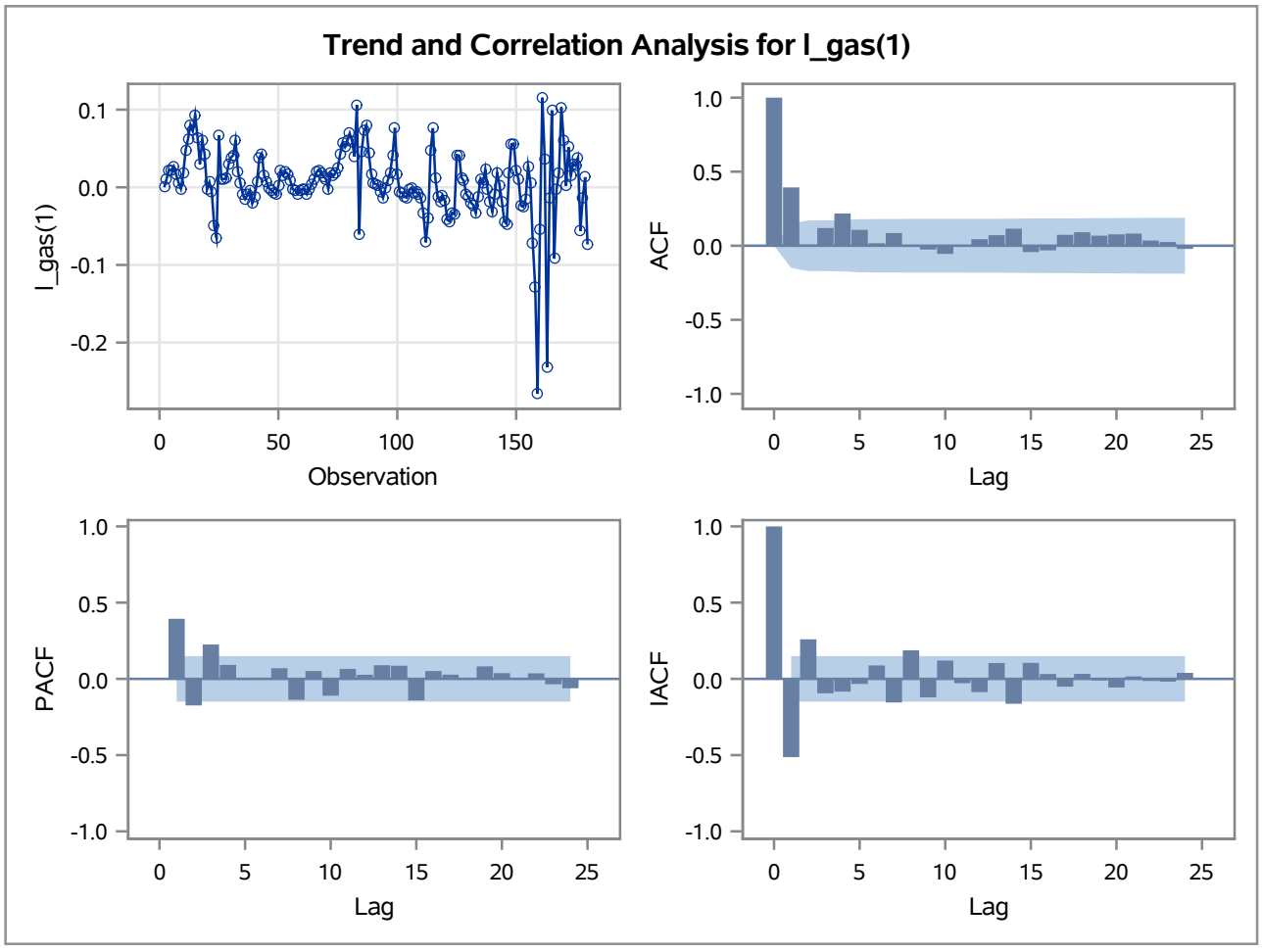
Modeling gas without oil



The ARIMA Procedure

Name of Variable = l_gas	
Period(s) of Differencing	1
Mean of Working Series	0.007037
Standard Deviation	0.046025
Number of Observations	179
Observation(s) eliminated by differencing	1

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	41.88	6	<.0001	0.394	0.008	0.120	0.218	0.107	0.017
12	44.34	12	<.0001	0.085	-0.003	-0.026	-0.055	-0.001	0.044
18	51.23	18	<.0001	0.071	0.115	-0.042	-0.031	0.074	0.091
24	55.24	24	0.0003	0.068	0.077	0.082	0.035	0.025	-0.021



The ARIMA Procedure

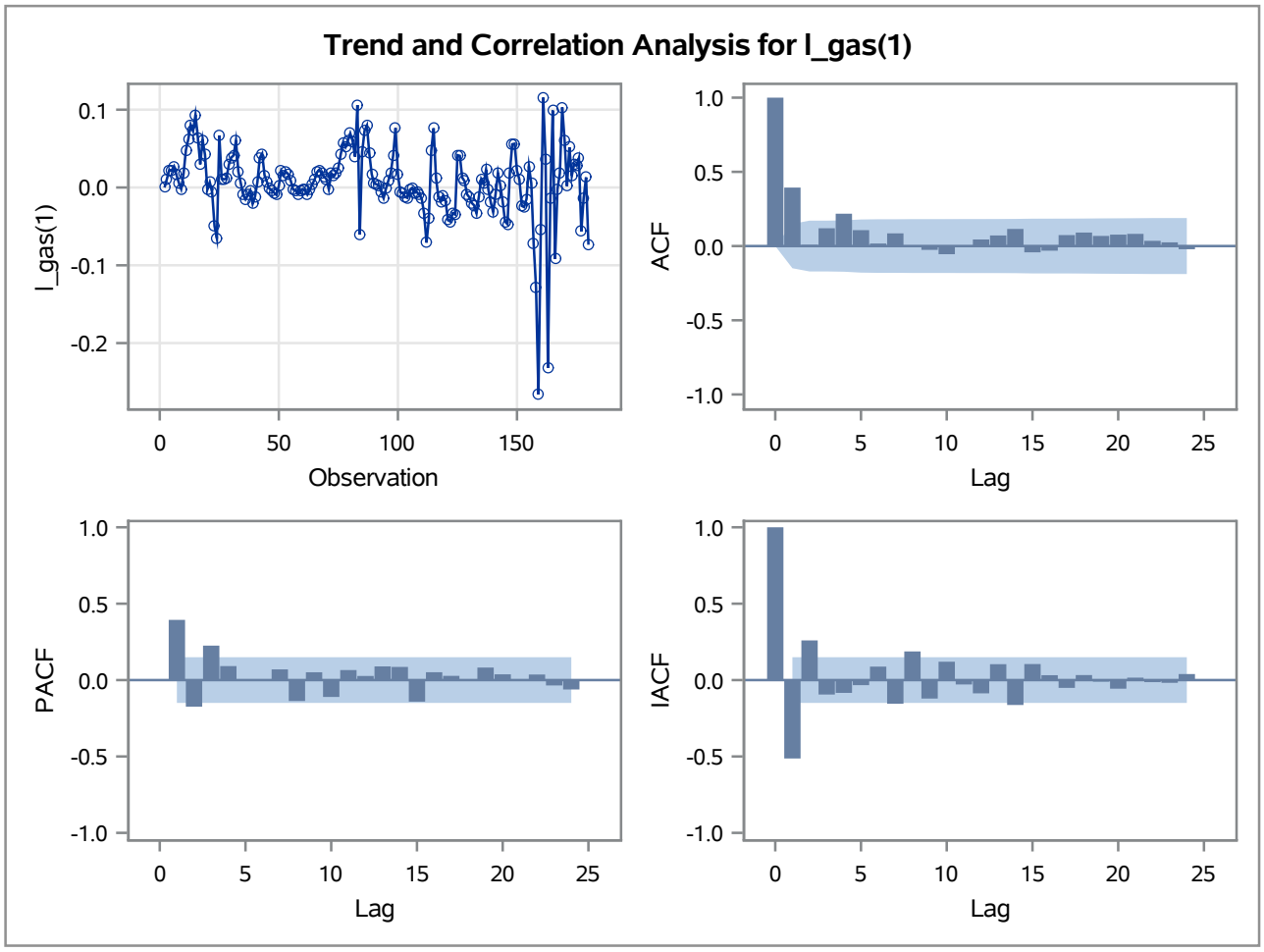
Name of Variable = l_gas	
Period(s) of Differencing	1
Mean of Working Series	0.007037
Standard Deviation	0.046025
Number of Observations	179
Observation(s) eliminated by differencing	1

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	41.88	6	<.0001	0.394	0.008	0.120	0.218	0.107	0.017
12	44.34	12	<.0001	0.085	-0.003	-0.026	-0.055	-0.001	0.044
18	51.23	18	<.0001	0.071	0.115	-0.042	-0.031	0.074	0.091
24	55.24	24	0.0003	0.068	0.077	0.082	0.035	0.025	-0.021

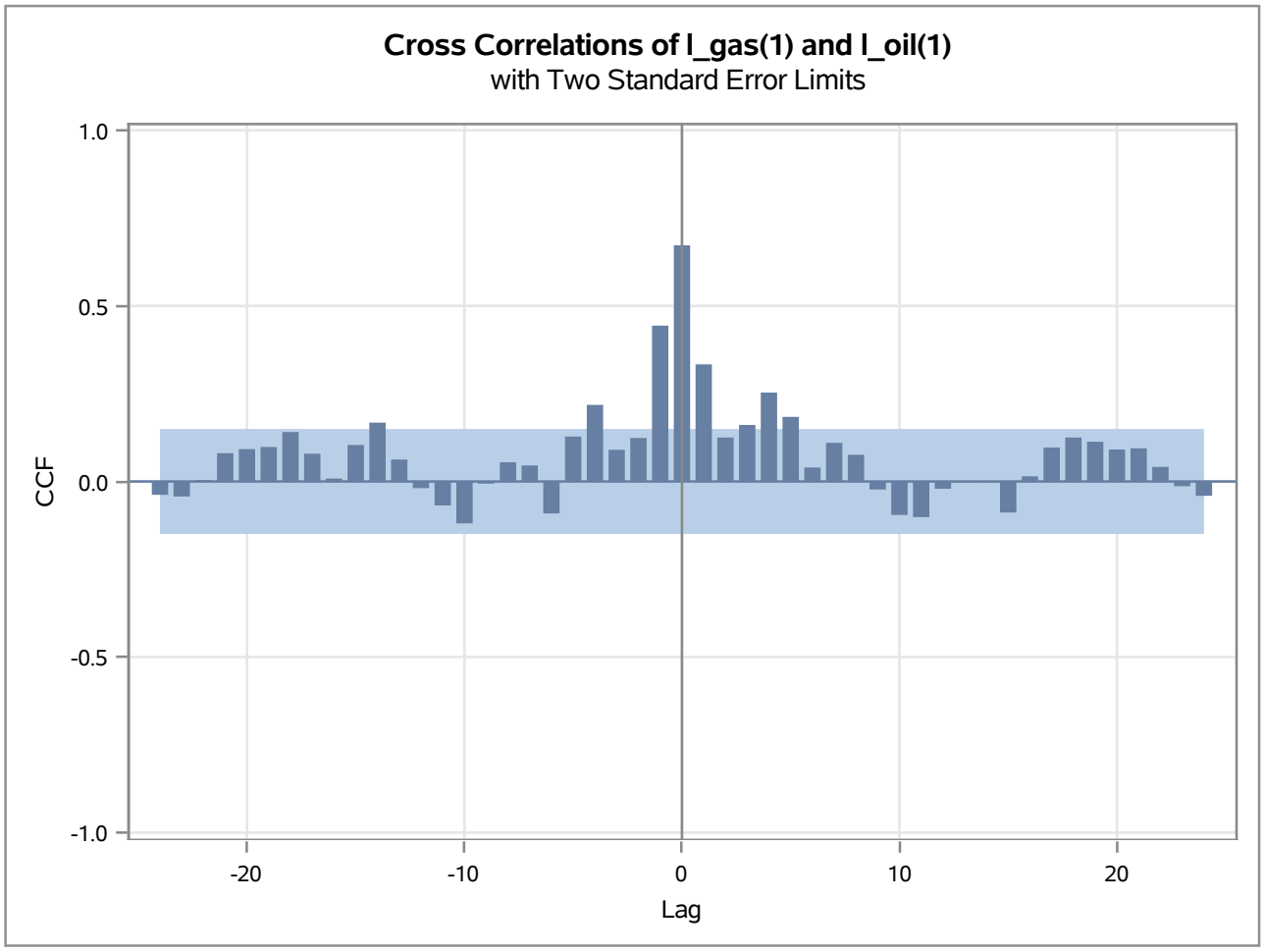
Variable l_oil has been differenced.

Correlation of l_gas and l_oil	
Period(s) of Differencing	1
Variance of input =	0.002547
Number of Observations	179
Observation(s) eliminated by differencing	1

The ARIMA Procedure



The ARIMA Procedure



Conditional Least Squares Estimation							
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag	Variable	Shift
MA1,1	-0.31241	0.07166	-4.36	<.0001	1	l_gas	0
MA1,2	0.18636	0.07212	2.58	0.0106	5	l_gas	0
NUM1	0.61787	0.05411	11.42	<.0001	0	l_oil	0

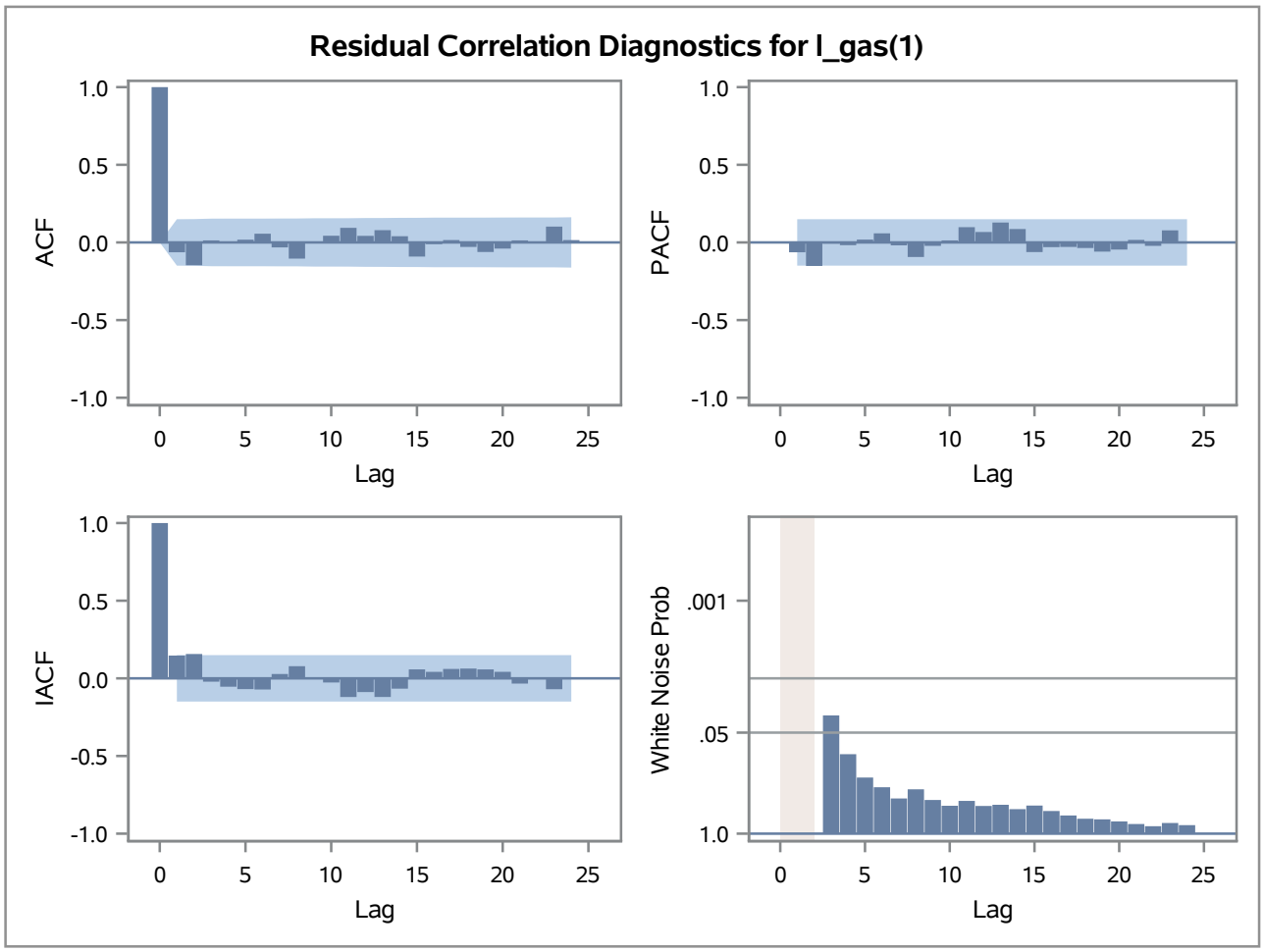
Variance Estimate	0.001095
Std Error Estimate	0.033094
AIC	-709.25
SBC	-699.688
Number of Residuals	179

* AIC and SBC do not include log determinant.

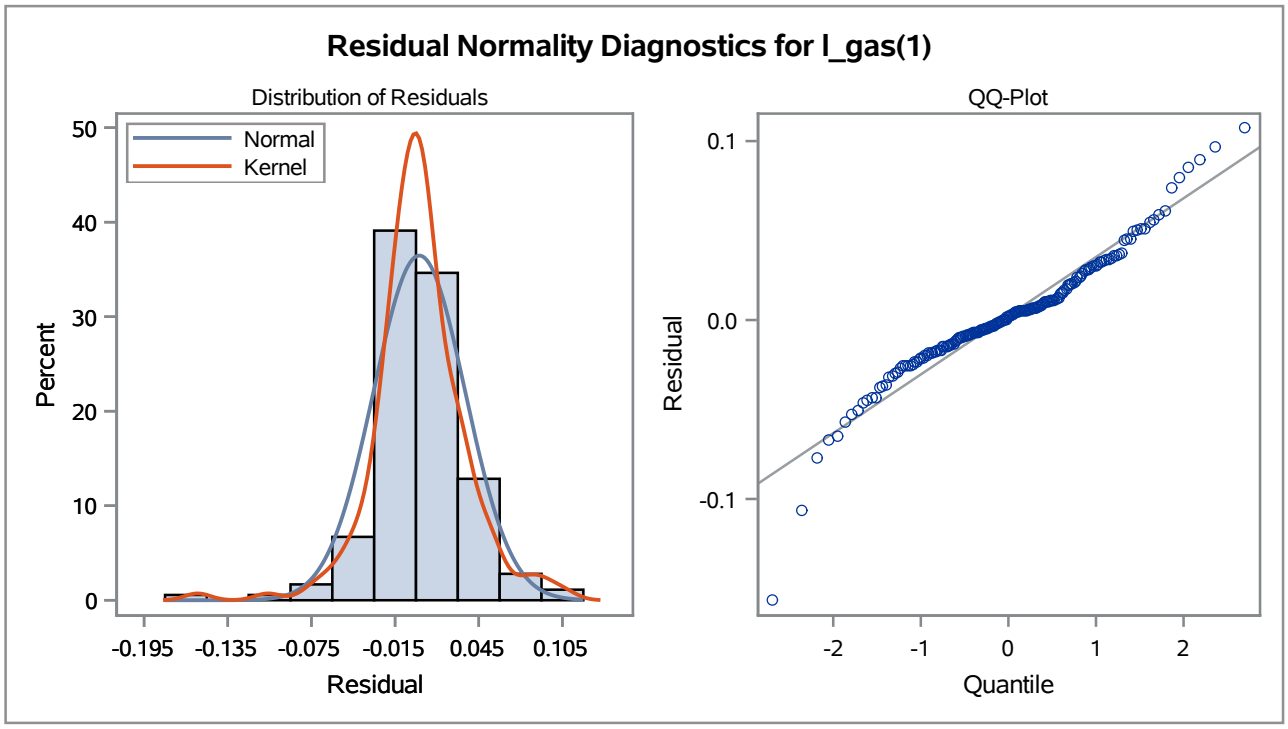
The ARIMA Procedure

Correlations of Parameter Estimates				
Variable	Parameter	l_gas MA1,1	l_gas MA1,2	l_oil NUM1
l_gas	MA1,1	1.000	0.062	0.144
l_gas	MA1,2	0.062	1.000	0.166
l_oil	NUM1	0.144	0.166	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	5.09	4	0.2786	-0.057	-0.140	0.019	0.011	0.023	0.061
12	9.75	10	0.4629	-0.027	-0.097	0.007	0.048	0.098	0.047
18	13.14	16	0.6623	0.084	0.044	-0.086	-0.007	0.018	-0.023
24	16.52	22	0.7894	-0.056	-0.035	0.017	-0.002	0.106	0.020
30	20.14	28	0.8593	-0.061	0.038	0.046	0.049	-0.039	-0.075



The ARIMA Procedure



Model for variable l_gas	
Period(s) of Differencing	1

No mean term in this model.

Moving Average Factors	
Factor 1:	1 + 0.31241 B**(1) - 0.18636 B**(5)

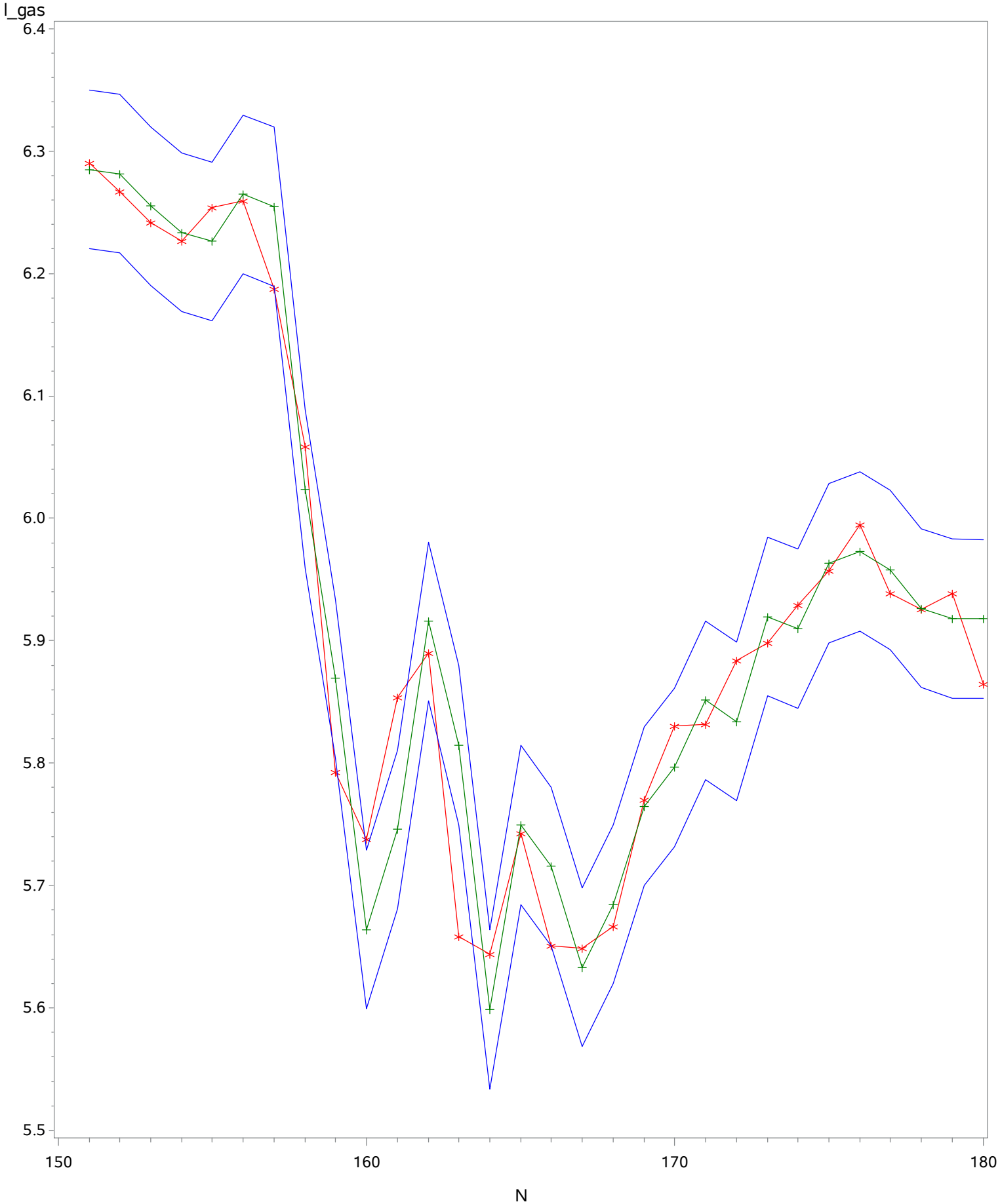
Input Number 1	
Input Variable	l_oil
Period(s) of Differencing	1
Overall Regression Factor	0.617866

Warning: More values of input variable l_oil are needed.

The value for option LEAD= has been reduced to 0.

Shumway Oil and Gas Price Data

Modeling gas with oil intervention



The STATESPACE Procedure

Number of Observations	179

Variable	Mean	Standard Error	
l_oil	0.006932	0.050609	Has been differenced. With period(s) = 1.
l_gas	0.007037	0.046154	Has been differenced. With period(s) = 1.

The STATESPACE Procedure

Information Criterion for Autoregressive Models										
Lag=0	Lag=1	Lag=2	Lag=3	Lag=4	Lag=5	Lag=6	Lag=7	Lag=8	Lag=9	Lag=10
-2277.1	-2328.1	-2331.22	-2331.47	-2331.07	-2331.55	-2327.48	-2331.82	-2331.66	-2325.53	-2320.25

Schematic Representation of Correlations											
Name/Lag	0	1	2	3	4	5	6	7	8	9	10
l_oil	++	++	+.	..	++	..	..	..	..	..	..
l_gas	++	++	..	+.	++	+.	..	..	..	..	..
+ is > 2*std error, - is < -2*std error, . is between											

Schematic Representation of Partial Autocorrelations										
Name/Lag	1	2	3	4	5	6	7	8	9	10
l_oil	++	..	..	..	..	..	.+	..	..	..
l_gas	.+	.-	..	..	..	..	..	.-	..	..
+ is > 2*std error, - is < -2*std error, . is between										

Yule-Walker Estimates for Minimum AIC												
	Lag=1		Lag=2		Lag=3		Lag=4		Lag=5		Lag=6	
	l_oil	l_gas	l_oil	l_gas	l_oil	l_gas	l_oil	l_gas	l_oil	l_gas	l_oil	l_gas
l_oil	0.420728	0.25485	-0.06376	-0.10894	-0.03645	0.087555	0.082013	0.082032	-0.10012	0.110198	-0.04245	-0.20048
l_gas	0.179814	0.351201	0.066912	-0.33286	-0.01384	0.113249	0.148001	-0.00979	0.100301	-0.09519	-0.0856	-0.0307

Yule-Walker Estimates for Minimum AIC		
	Lag=7	
	l_oil	l_gas
l_oil	-0.05871	0.235472
l_gas	0.131395	0.032796

The STATESPACE Procedure
Selected Statespace Form and Preliminary Estimates

State Vector		
l_oil(T;T)	l_gas(T;T)	l_gas(T+1;T)

Estimate of Transition Matrix		
0.338502	0.236873	0
0	0	1
0.197177	-0.1458	0.021248

Input Matrix for Innovation	
1	0
0	1
0.179814	0.351201

Variance Matrix for Innovation	
0.001657	0.000956
0.000956	0.001523

WARNING: Convergence failed using covariance matrix.