1 Carbonates - Report Three models for all logs combinations (Linear Regression — Polynomiyal Regression — XGBoost Regression)

Table 1: Models - Carbonates

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
RHOB	SHC	0.9510	115.3794	0.9536	113.4171	0.9559	109.1164
	TC	0.8267	0.2330	0.8520	0.2012	0.8519	0.2006
	TD	0.8360	0.1212	0.8800	0.0892	0.8804	0.0887
PHIN	SHC	0.9709	90.2407	0.9721	89.0495	0.9738	84.9992
	TC	0.8341	0.2327	0.8666	0.1996	0.8703	0.1962
	TD	0.8697	0.1114	0.9358	0.0691	0.9386	0.0656
VSH	SHC	4.4896×10^{-05}	590.6090	4.5447×10^{-05}	590.6075	-1.1578×10^{-05}	590.6266
	TC	0.1031	0.6187	0.1033	0.6186	0.0971	0.6125
	TD	0.0492	0.3315	0.0492	0.3315	0.0234	0.3215
U	SHC	0.7226	286.8822	0.7596	266.1204	0.7643	261.2606
	TC	0.5428	0.3877	0.5560	0.3883	0.5563	0.3727
	TD	0.5652	0.1933	0.5702	0.1956	0.5809	0.1875
DT	SHC	0.9910	50.0589	0.9911	49.8693	0.9924	41.4024
	TC	0.8181	0.2433	0.8511	0.2097	0.8583	0.2002
	TD	0.8539	0.1165	0.9209	0.0752	0.9253	0.0697
AI	SHC	0.8961	178.8051	0.9809	75.1938	0.9858	61.0116
	TC	0.8596	0.2060	0.8627	0.2000	0.8650	0.1978
	TD	0.9222	0.0714	0.9223	0.0716	0.9223	0.0710
RHOB, PHIN	SHC	0.9753	83.3372	0.9792	76.6479	0.9822	67.4413
	TC	0.8415	0.2271	0.8872	0.1825	0.8954	0.1738

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.8703	0.1110	0.9402	0.0665	0.9455	0.0610
RHOB, VSH	SHC	0.9668	94.6405	0.9690	92.2189	0.9713	86.0435
	TC	0.8664	0.2131	0.9082	0.1668	0.9156	0.1584
	TD	0.8457	0.1202	0.8953	0.0877	0.9077	0.0815
RHOB, U	SHC	0.9576	106.1117	0.9609	103.1456	0.9674	88.2918
	TC	0.8703	0.2079	0.9181	0.1558	0.9255	0.1442
	TD	0.8700	0.1120	0.9386	0.0654	0.9436	0.0601
RHOB, DT	SHC	0.9920	46.7204	0.9927	44.6904	0.9941	35.1259
	TC	0.8293	0.2335	0.8719	0.1918	0.8819	0.1809
	TD	0.8544	0.1162	0.9249	0.0731	0.9314	0.0671
RHOB, AI	SHC	0.9530	113.1003	0.9879	59.6110	0.9940	35.3887
	TC	0.8652	0.1965	0.8656	0.1966	0.8815	0.1815
	TD	0.9225	0.0714	0.9260	0.0706	0.9308	0.0674
PHIN, VSH	SHC	0.9910	49.5778	0.9929	42.3156	0.9938	36.1107
	TC	0.8687	0.2134	0.9115	0.1627	0.9184	0.1534
	TD	0.8765	0.1099	0.9423	0.0652	0.9468	0.0608
PHIN, U	SHC	0.9709	90.2167	0.9722	88.8336	0.9740	84.4853
	TC	0.8440	0.2235	0.8826	0.1851	0.8879	0.1803
	TD	0.8802	0.1075	0.9500	0.0608	0.9538	0.0563
PHIN, DT	SHC	0.9910	49.8839	0.9913	49.4488	0.9929	35.7525
	TC	0.8341	0.2327	0.8712	0.1951	0.8789	0.1858
	TD	0.8697	0.1114	0.9421	0.0652	0.9475	0.0592
PHIN, AI	SHC	0.9720	88.6876	0.9864	62.7281	0.9891	50.6336
	TC	0.8703	0.1946	0.8746	0.1929	0.8788	0.1868

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.9263	0.0730	0.9411	0.0640	0.9442	0.0612
VSH, U	SHC	0.7475	274.0529	0.7824	253.7197	0.7879	248.2670
	TC	0.5765	0.3794	0.6138	0.3670	0.6265	0.3506
	TD	0.5715	0.1936	0.5900	0.1932	0.6055	0.1832
VSH, DT	SHC	0.9964	32.2245	0.9970	28.6318	0.9993	13.0305
	TC	0.8798	0.2013	0.9302	0.1405	0.9588	0.1067
	TD	0.8755	0.1086	0.9475	0.0605	0.9817	0.0338
VSH, AI	SHC	0.9083	170.4096	0.9874	60.8105	0.9954	28.4514
	TC	0.9028	0.1760	0.9307	0.1399	0.9375	0.1328
	TD	0.9329	0.0700	0.9408	0.0645	0.9537	0.0532
U, DT	SHC	0.9921	45.8230	0.9923	45.3529	0.9933	37.3580
	TC	0.8286	0.2354	0.8661	0.1997	0.8832	0.1789
	TD	0.8651	0.1127	0.9380	0.0681	0.9485	0.0582
U, AI	SHC	0.9007	171.9898	0.9829	70.5127	0.9897	50.2719
	TC	0.8747	0.2039	0.8947	0.1778	0.9003	0.1700
	TD	0.9445	0.0658	0.9566	0.0553	0.9573	0.0539
DT, AI	SHC	0.9915	49.0098	0.9924	45.6932	0.9941	35.2105
	TC	0.8630	0.1998	0.8659	0.1961	0.8809	0.1817
	TD	0.9224	0.0719	0.9254	0.0708	0.9309	0.0673
RHOB, PHIN, VSH	SHC	0.9946	38.6202	0.9967	29.1274	0.9982	15.9404
	TC	0.8776	0.2047	0.9224	0.1514	0.9507	0.1127
	TD	0.8774	0.1093	0.9448	0.0637	0.9659	0.0461
RHOB, PHIN, U	SHC	0.9775	79.2406	0.9810	72.8958	0.9841	63.1960
	TC	0.8759	0.2038	0.9414	0.1335	0.9520	0.1183

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.8914	0.1043	0.9755	0.0443	0.9816	0.0356
RHOB, PHIN, DT	SHC	0.9920	46.5429	0.9928	44.0511	0.9959	18.2667
	TC	0.8470	0.2235	0.9016	0.1689	0.9143	0.1536
	TD	0.8707	0.1112	0.9492	0.0607	0.9573	0.0524
RHOB, PHIN, AI	SHC	0.9753	83.3148	0.9912	50.8852	0.9964	19.9177
	TC	0.8703	0.1946	0.8913	0.1798	0.9140	0.1547
	TD	0.9347	0.0683	0.9443	0.0626	0.9570	0.0529
RHOB, VSH, U	SHC	0.9707	90.4326	0.9775	79.2977	0.9799	71.8643
	TC	0.9262	0.1622	0.9812	0.0760	0.9843	0.0669
	TD	0.8869	0.1063	0.9569	0.0561	0.9671	0.0465
RHOB, VSH, DT	SHC	0.9964	31.9729	0.9972	27.8754	0.9995	11.4688
	TC	0.8805	0.2009	0.9332	0.1375	0.9659	0.0970
	TD	0.8762	0.1083	0.9501	0.0588	0.9852	0.0299
RHOB, VSH, AI	SHC	0.9686	92.6804	0.9940	42.1454	0.9993	12.3897
	TC	0.9067	0.1726	0.9328	0.1370	0.9632	0.1020
	TD	0.9335	0.0691	0.9527	0.0548	0.9833	0.0319
RHOB, U, DT	SHC	0.9923	45.1381	0.9932	42.1926	0.9946	32.3698
	TC	0.8706	0.2074	0.9332	0.1393	0.9469	0.1152
	TD	0.8765	0.1097	0.9611	0.0537	0.9703	0.0421
RHOB, U, AI	SHC	0.9593	104.3489	0.9893	55.8283	0.9946	33.1915
	TC	0.9046	0.1707	0.9255	0.1509	0.9460	0.1173
	TD	0.9509	0.0613	0.9625	0.0514	0.9705	0.0424
RHOB, DT, AI	SHC	0.9922	46.3731	0.9931	43.5494	0.9941	35.0667
	TC	0.8652	0.1962	0.8763	0.1883	0.8819	0.1811

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.9252	0.0711	0.9292	0.0688	0.9310	0.0669
PHIN, VSH, U	SHC	0.9914	48.7759	0.9938	40.2593	0.9948	32.6096
	TC	0.8838	0.2030	0.9399	0.1357	0.9525	0.1105
	TD	0.8894	0.1059	0.9614	0.0546	0.9697	0.0437
PHIN, VSH, DT	SHC	0.9977	25.6224	0.9990	16.3409	0.9999	4.1752
	TC	0.8798	0.2013	0.9366	0.1315	0.9707	0.0852
	TD	0.8790	0.1080	0.9557	0.0559	0.9847	0.0310
PHIN, VSH, AI	SHC	0.9916	47.9753	0.9982	22.5757	0.9997	6.0212
	TC	0.9095	0.1700	0.9312	0.1397	0.9544	0.1084
	TD	0.9358	0.0698	0.9500	0.0587	0.9744	0.0389
PHIN, U, DT	SHC	0.9921	45.7165	0.9925	44.6341	0.9942	29.2439
	TC	0.8445	0.2227	0.8866	0.1820	0.9041	0.1597
	TD	0.8809	0.1069	0.9567	0.0571	0.9659	0.0471
PHIN, U, AI	SHC	0.9720	88.6767	0.9893	55.3782	0.9911	45.2137
	TC	0.8949	0.1778	0.9047	0.1696	0.9119	0.1560
	TD	0.9564	0.0583	0.9684	0.0477	0.9710	0.0442
PHIN, DT, AI	SHC	0.9915	48.8896	0.9925	45.5315	0.9959	20.1290
	TC	0.8768	0.1923	0.8900	0.1794	0.9118	0.1556
	TD	0.9355	0.0682	0.9472	0.0598	0.9563	0.0530
VSH, U, DT	SHC	0.9966	31.0981	0.9974	26.4733	0.9994	12.2245
	TC	0.9081	0.1772	0.9746	0.0889	0.9840	0.0679
	TD	0.8971	0.1015	0.9814	0.0379	0.9970	0.0129
VSH, U, AI	SHC	0.9159	158.7839	0.9886	56.6445	0.9984	16.7570
	TC	0.9283	0.1582	0.9838	0.0685	0.9874	0.0575

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.9615	0.0553	0.9852	0.0316	0.9929	0.0183
VSH, DT, AI	SHC	0.9965	31.7891	0.9971	28.4395	0.9994	11.5645
	TC	0.9102	0.1693	0.9323	0.1367	0.9647	0.0979
	TD	0.9338	0.0702	0.9522	0.0559	0.9848	0.0300
U, DT, AI	SHC	0.9923	45.3717	0.9928	43.7706	0.9947	32.5275
	TC	0.8848	0.1877	0.9168	0.1603	0.9446	0.1173
	TD	0.9487	0.0623	0.9579	0.0549	0.9695	0.0426
RHOB, PHIN, VSH, U	SHC	0.9951	37.0021	0.9977	24.4722	0.9989	13.5789
	TC	0.9283	0.1609	0.9858	0.0665	0.9928	0.0422
	TD	0.9041	0.0996	0.9834	0.0369	0.9930	0.0198
RHOB, PHIN, VSH, DT	SHC	0.9977	25.5776	0.9991	15.1946	0.9999	1.5978
	TC	0.8805	0.2010	0.9399	0.1288	0.9776	0.0751
	TD	0.8791	0.1079	0.9579	0.0545	0.9886	0.0259
RHOB, PHIN, VSH, AI	SHC	0.9946	38.6216	0.9987	19.4522	0.9999	2.6683
	TC	0.8903	0.1937	0.9342	0.1341	0.9766	0.0786
	TD	0.9436	0.0652	0.9551	0.0543	0.9873	0.0281
RHOB, PHIN, U, DT	SHC	0.9923	45.0162	0.9934	41.7597	0.9963	20.6718
	TC	0.8903	0.1937	0.9524	0.1192	0.9673	0.0896
	TD	0.8942	0.1037	0.9788	0.0416	0.9867	0.0289
RHOB, PHIN, U, AI	SHC	0.9776	79.0415	0.9920	47.9124	0.9964	21.8487
	TC	0.9054	0.1701	0.9507	0.1218	0.9666	0.0931
	TD	0.9564	0.0583	0.9793	0.0385	0.9863	0.0297
RHOB, PHIN, DT, AI	SHC	0.9922	46.2200	0.9932	42.9764	0.9962	219.8621
	TC	0.8799	0.1890	0.9042	0.1662	0.9143	0.1537

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.9376	0.0672	0.9521	0.0566	0.9573	0.0525
RHOB, VSH, U, DT	SHC	0.9966	31.0970	0.9932	42.9764	0.9996	10.2318
	TC	0.9287	0.1595	0.9889	0.0586	0.9954	0.0358
	TD	0.9016	0.1000	0.9846	0.0339	0.9988	0.0074
RHOB, VSH, U, AI	SHC	0.9722	88.2230	0.9932	42.9764	0.9994	11.8550
	TC	0.9617	0.1145	0.9897	0.0552	0.9946	0.0387
	TD	0.9688	0.0508	0.9875	0.0272	0.9980	0.0091
RHOB, VSH, DT, AI	SHC	0.9965	31.6641	0.9973	27.7411	0.9994	11.4979
	TC	0.9105	0.1689	0.9349	0.1343	0.9657	0.0974
	TD	0.9416	0.0658	0.9530	0.0546	0.9852	0.0301
RHOB, U, DT, AI	SHC	0.9925	44.8501	0.9935	41.2634	0.9947	32.2527
	TC	0.9099	0.1660	0.9387	0.1332	0.9468	0.1153
	TD	0.9509	0.0613	0.9667	0.0470	0.9702	0.0421
PHIN, VSH, U, DT	SHC	0.9978	24.9527	0.9991	15.8154	0.9999	2.4001
	TC	0.9089	0.1766	0.9807	0.0769	0.9962	0.0318
	TD	0.8984	0.1011	0.9838	0.0361	0.9993	0.0067
PHIN, VSH, U, AI	SHC	0.9918	47.5078	0.9985	20.4059	0.9998	6.1231
	TC	0.9447	0.1385	0.9893	0.0543	0.9954	0.0340
	TD	0.9717	0.0492	0.9885	0.0277	0.9974	0.0126
PHIN, VSH, DT, AI	SHC	0.9978	25.3379	0.9991	15.5572	0.9999	1.5968
	TC	0.9102	0.1693	0.9388	0.1274	0.9747	0.0783
	TD	0.9387	0.0679	0.9589	0.0517	0.9875	0.0268
PHIN, U, DT, AI	SHC	0.9924	45.2858	0.9931	42.9947	0.9955	24.3269
	TC	0.8982	0.1770	0.9391	0.1389	0.9631	0.0948

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TD	0.9614	0.0560	0.9765	0.0422	0.9859	0.0295
VSH, U, DT, AI	SHC	0.9967	30.7844	0.9975	26.3835	0.9996	10.2997
	TC	0.9504	0.1294	0.9880	0.0612	0.9946	0.0382
	TD	0.9700	0.0499	0.9872	0.0282	0.9985	0.0079
RHOB, PHIN, VSH, U, DT	SHC	0.9979	24.3895	0.9993	13.5027	0.9999	1.6856
	TC	0.9288	0.1597	0.9911	0.0522	0.9995	0.0100
	TD	0.9044	0.09931	0.9878	0.0315	0.9997	0.0040
RHOB, PHIN, VSH, U, AI	SHC	0.9951	37.0145	0.9990	16.8661	0.9999	3.1515
	TC	0.9617	0.1144	0.9922	0.0461	0.9992	0.0137
	TD	0.9721	0.0489	0.9904	0.0250	0.9993	0.0063
RHOB, PHIN, VSH, DT, AI	SHC	0.9978	25.2125	0.9991	15.1493	0.9999	1.5541
	TC	0.9105	0.1689	0.9405	0.1265	0.9773	0.0757
	TD	0.9439	0.0650	0.9603	0.0507	0.9886	0.0259
RHOB, PHIN, U, DT, AI	SHC	0.9925	44.7453	0.9937	40.8229	0.9958	20.9633
	TC	0.9265	0.1536	0.9561	0.1140	0.9664	0.0910
	TD	0.9645	0.0546	0.9829	0.0347	0.9866	0.0290
RHOB, VSH, U, DT, AI	SHC	0.9967	30.7572	0.9976	25.9137	0.9996	10.2325
	TC	0.9617	0.1146	0.9909	0.0511	0.9952	0.0366
	TD	0.9703	0.0498	0.9883	0.0264	0.9988	0.0076
PHIN, VSH, U, DT, AI	SHC	0.9979	24.7212	0.9992	14.4111	0.9999	1.6001
	TC	0.9510	0.1278	0.9909	0.0526	0.9992	0.0133
	TD	0.9717	0.0493	0.9900	0.0262	0.9996	0.0044
RHOB, PHIN, VSH, U, DT, AI	SHC	0.9980	23.8965	0.9993	13.4732	0.9999	1.4636

Table 1: Models - Carbonates (Continued)

logs	Predict	Linear R2	Linear MAE	Polynomial R2	Polynomial MAE	XGBoost R2	XGBoost MAE
	TC	0.9617	0.1146	0.9929	0.0433	0.9995	0.0102
	TD	0.9724	0.0490	0.9912	0.0236	0.9996	0.0042