Electro Facies Analysis
GPD 509

Presented By:

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Presentation outline

❑ Pair plots for the well 'SHRIMPLIN'

❑ Log response of different tools.

❑ well prediction using KNN, Random Forest and MLP.

❑ Prediction of blind well

❑ Lithofacies and wells

❑ Cross plots.

Data description

|	Facies	Depth	GR	ILD_log 10	DeltaPHI	PHIND	PE	NM_M	RELPOS
count	4149.000000	4149.000000	4149.000000	4149.000000	4149.000000	4149.000000	3232.000000	4149.000000	4149.000000
mean	4.503254	2906.867438	64.933985	0.659566	4.402484	13.201066	3.725014	1.518438	0.521852
std	2.474324	133.300164	30.302530	0.252703	5.274947	7.132846	0.896152	0.499720	0.286644
min	1.000000	2573.500000	10.149000	-0.025949	-21.832000	0.550000	0.200000	1.000000	0.000000
25%	2.000000	2821.500000	44.730000	0.498000	1.600000	8.500000	3.100000	1.000000	0.277000
50%	4.000000	2932.500000	64.990000	0.639000	4.300000	12.020000	3.551500	2.000000	0.528000
75%	6.000000	3007.000000	79.438000	0.822000	7.500000	16.050000	4.300000	2.000000	0.769000
max	9.000000	3138.000000	361.150000	1.800000	19.312000	84.400000	8.094000	2.000000	1.000000
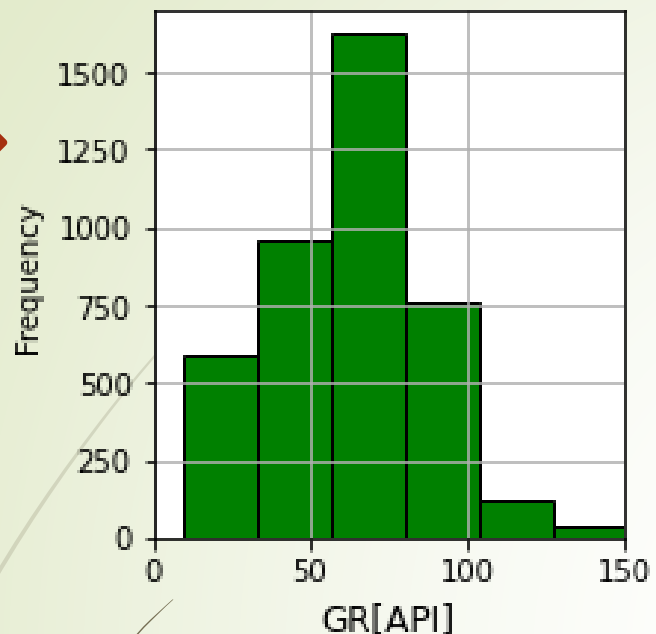
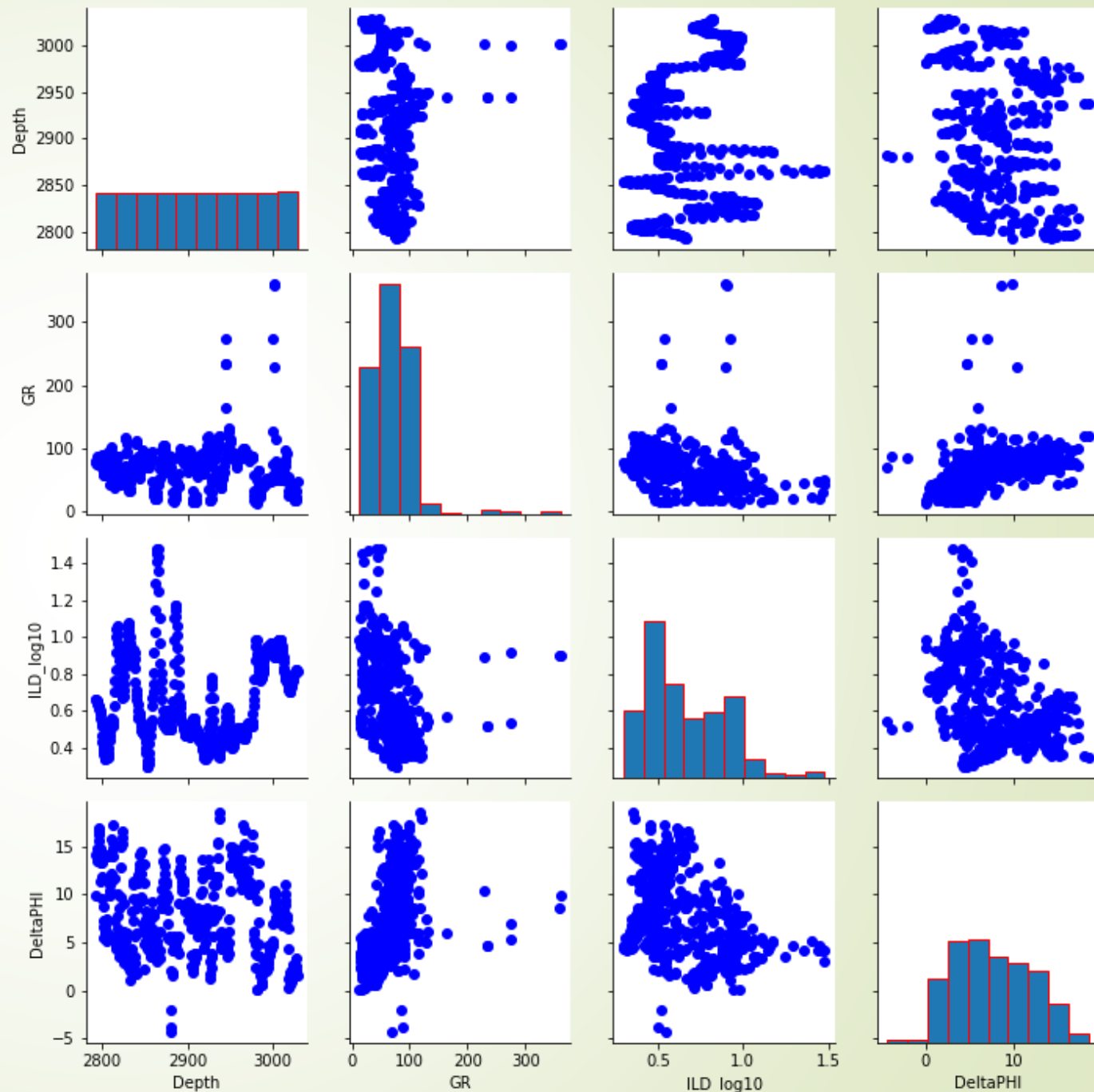Fig 1: Frequency vs GR plot after removing outlier.

Fig 2: cross plot for well name 'SHRIMPLIN' between Depth, GR, ILD_log10, DeltaPHI. Diagonal will show the histogram.
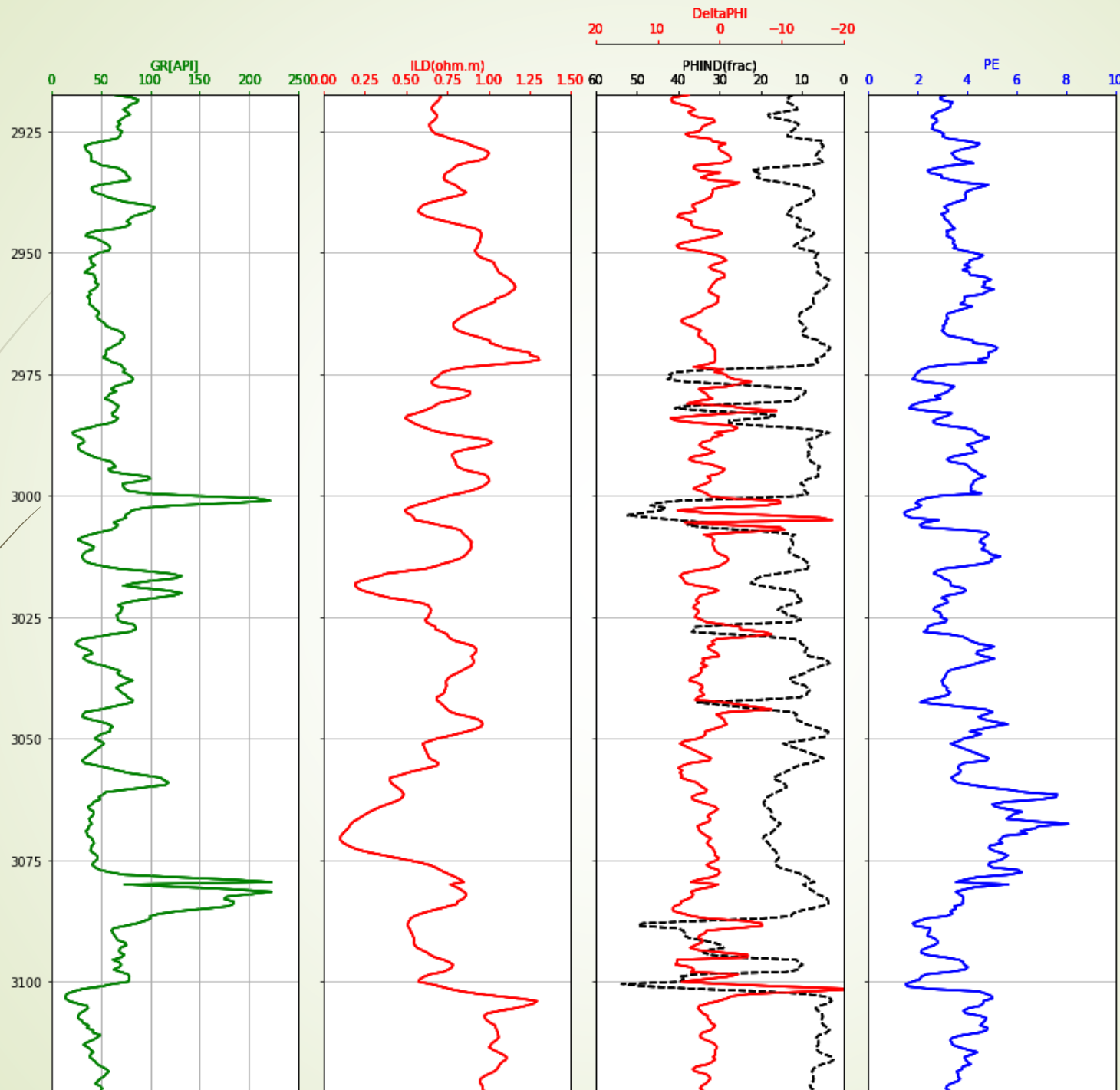
Fig 3: Log response of GR, ILD, PHILD and PE log for the well name 'CHURCHMAN BIBLE'.
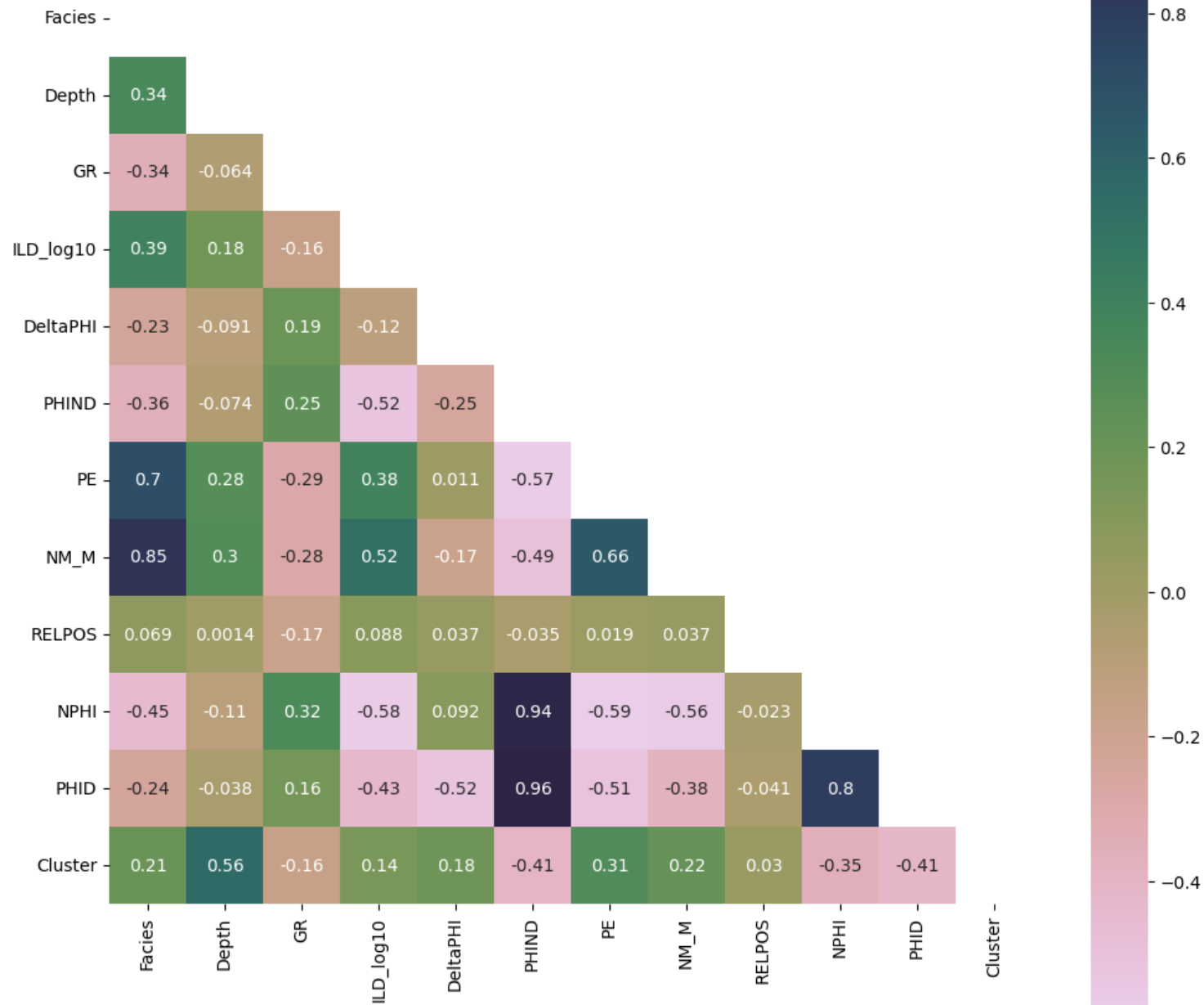
Fig 4: Cross corelation between the features of the data.

The cross co relation value greater then 0.5 is chosen.
1) NPHI
2) Facies
3) NM_M
4) PHID
5) PHIND

	Random Forest		MLP		KNN	
	R2 Score	RMSE	R2 Score	RMSE	R2 Score	RMSE
Training	0.95	0.18	0.69	0.47	0.79	0.39
Validation	0.69	0.50	0.66	0.52	0.68	0.50

Table 2: RMS error and R2 score for the Random Forest MLP and KNN models for the well name 'Recruit F9'.

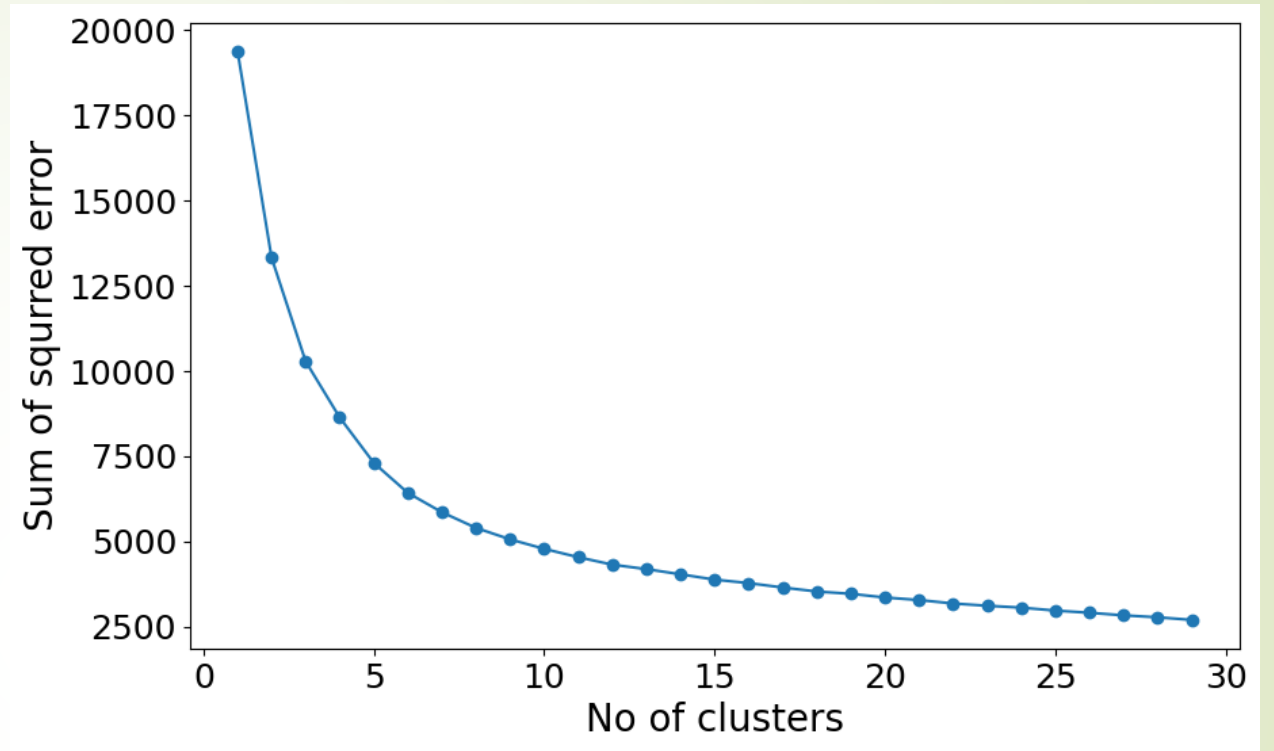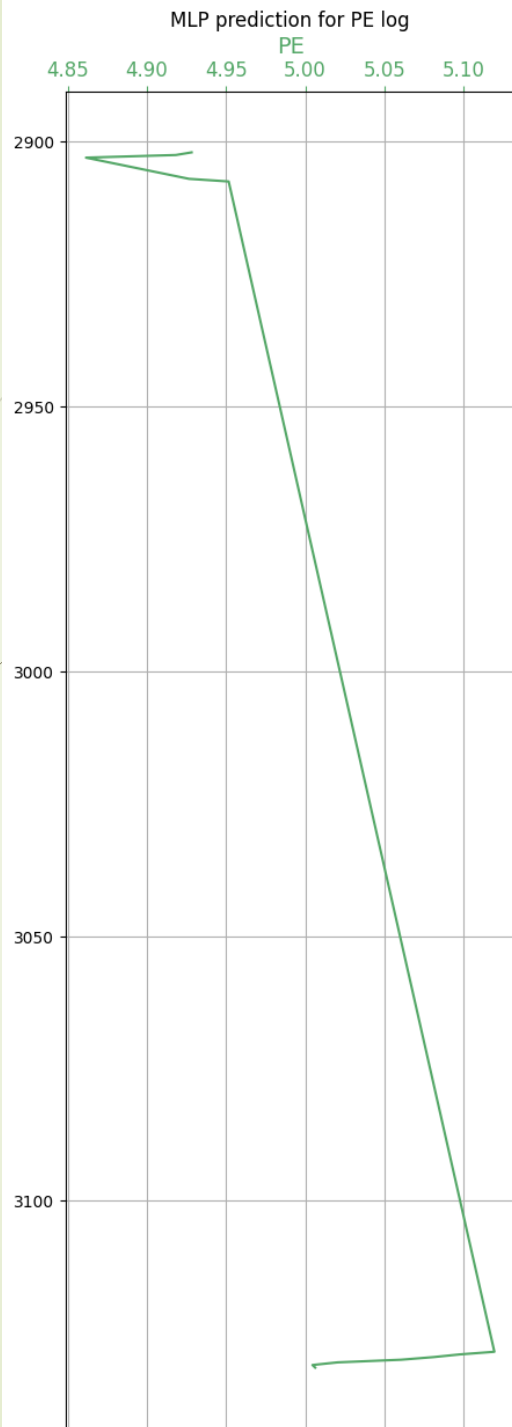MLP gives the best result among Random forest and KNN. So, we use MLP for blind log generation.

MLP prediction for PE log

Fig 5: Predicted PE log using MLP.

Fig 6: Sum of squared errors vs no of clusters.
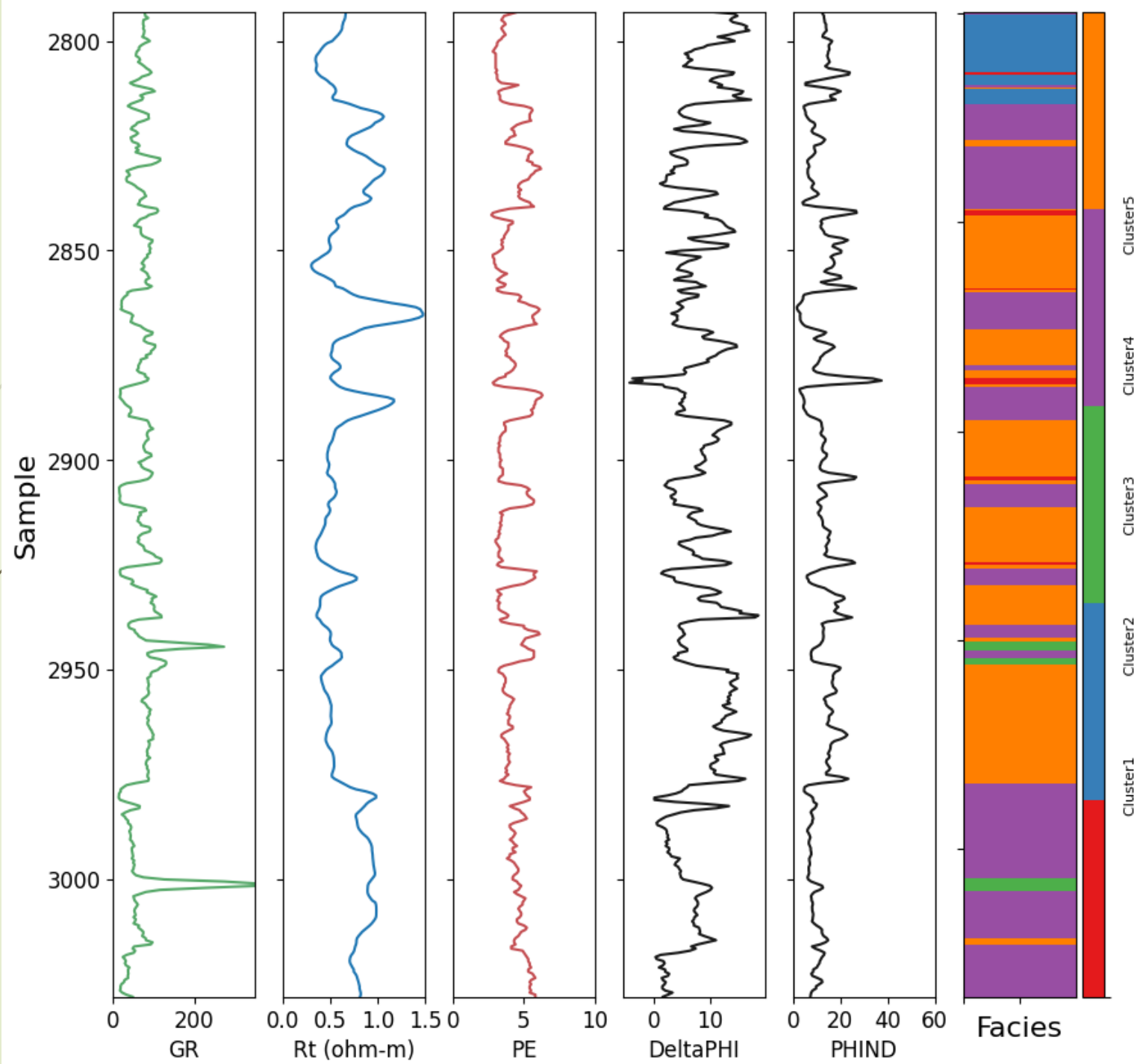We choose no of clusters 5.

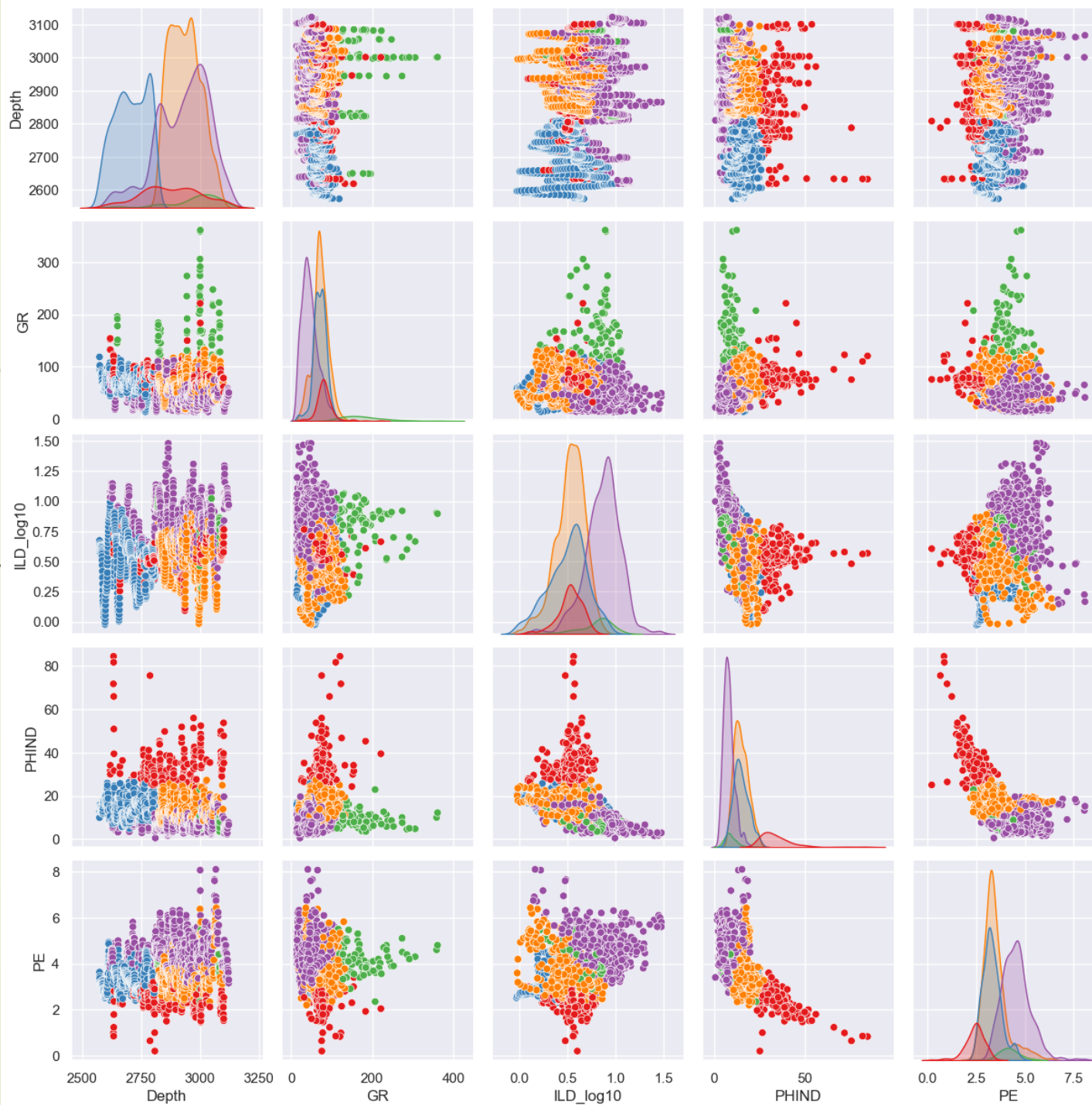Fig 6: Facies variation in depth section for the well name 'SHRIMPLIN'.

Fig 7: Cross plots for the data value ILD_log10, GR, Depth, PHIND and PE log.

Thank You