

The Role of Genomic Data in Stratifying Patients within Predictive Models for Breast Cancer Survival Outcome - Supplementary Information

A Thesis submitted by
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1 Copy Number Alterations as a Measure of Genomic Instability

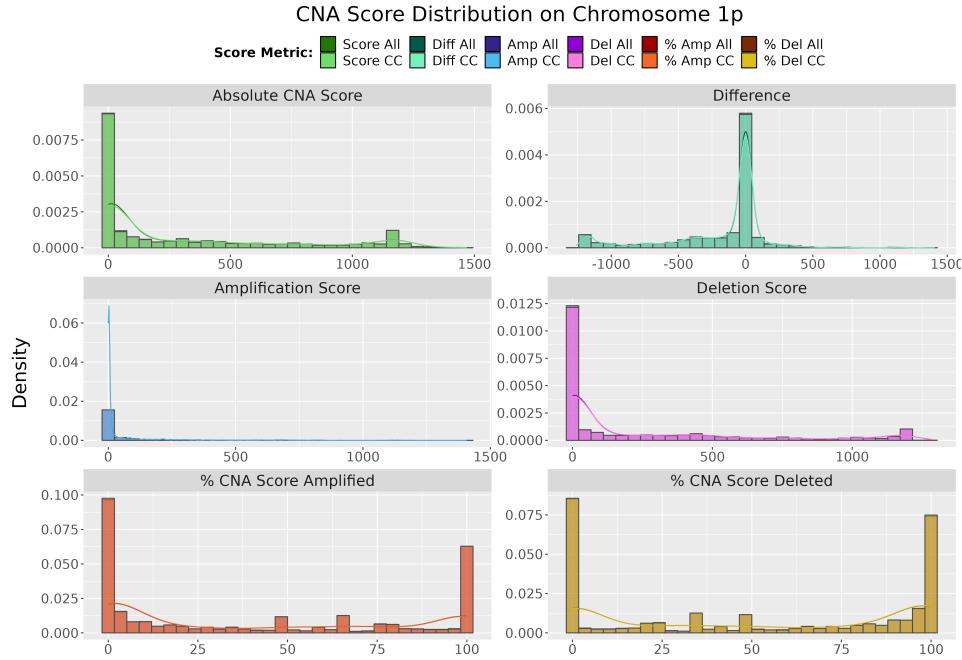


Figure 1.1: Density plots for each CNA Score metric on chromosome 1p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

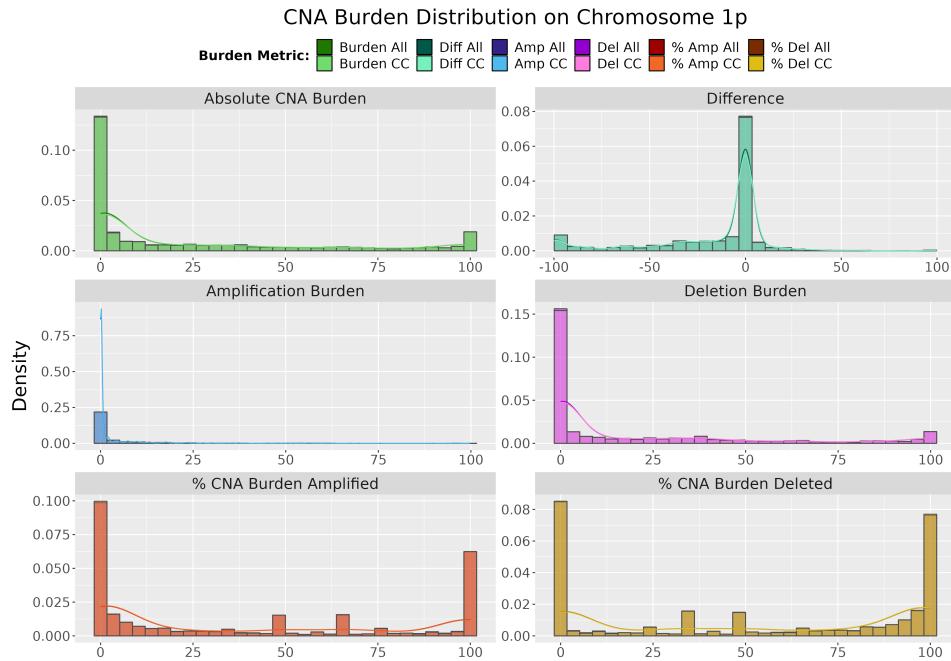


Figure 1.2: Density plots for each CNA Burden metric on chromosome 1p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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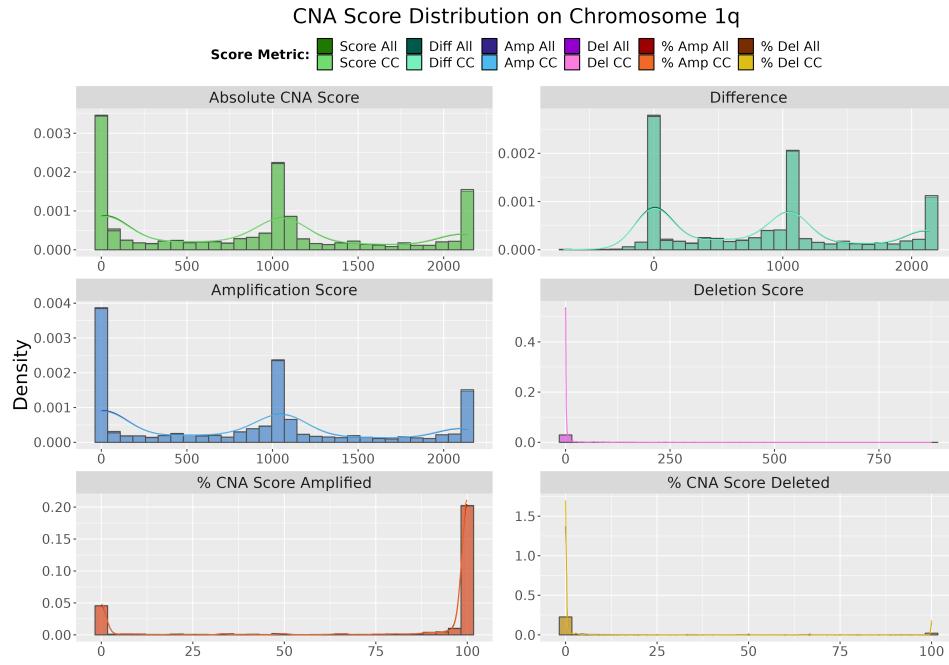


Figure 1.3: Density plots for each CNA Score metric on chromosome 1q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

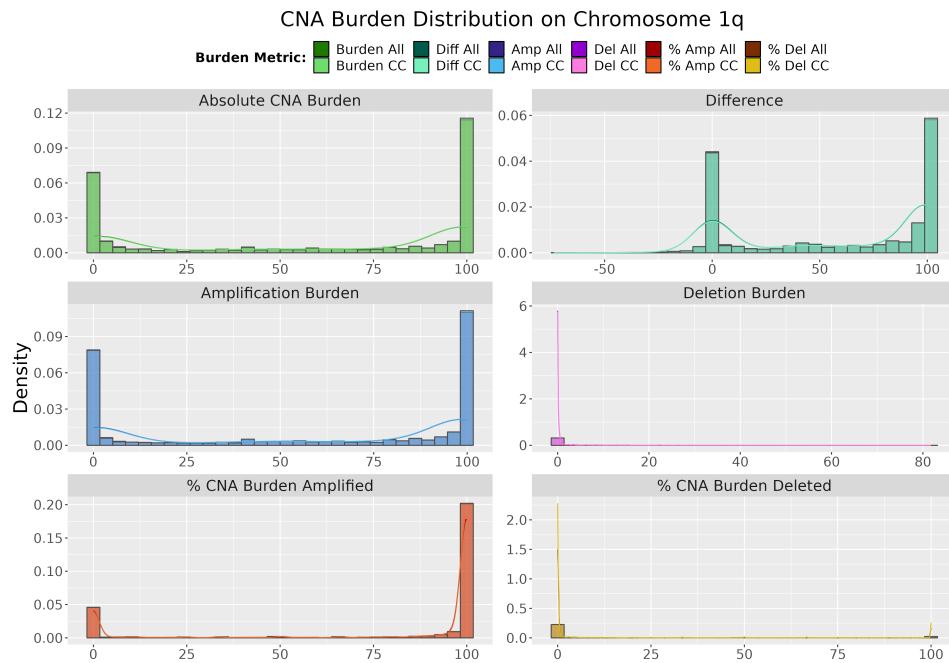


Figure 1.4: Density plots for each CNA Burden metric on chromosome 1q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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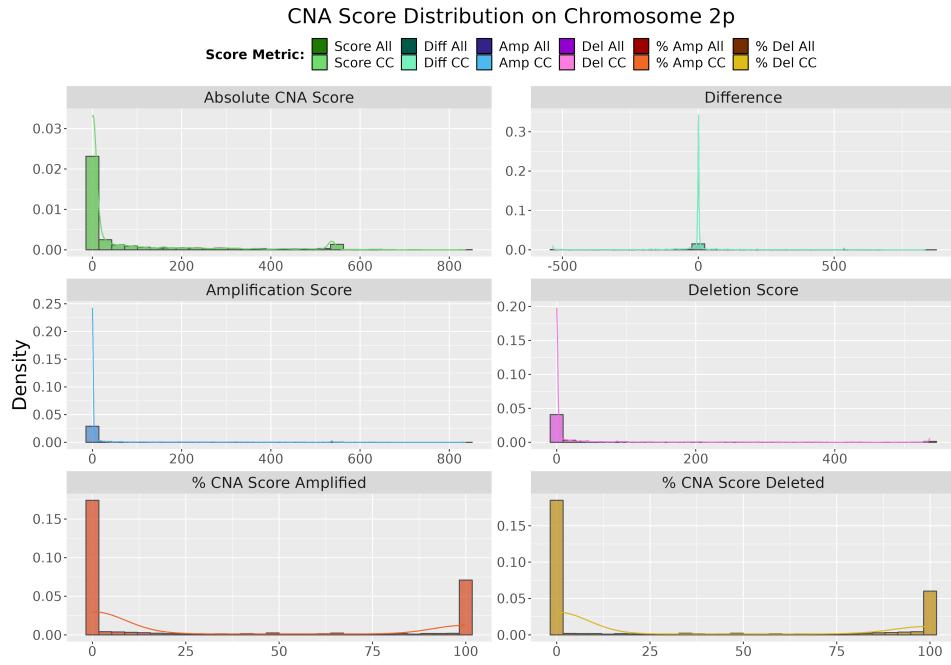


Figure 1.5: Density plots for each CNA Score metric on chromosome 2p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

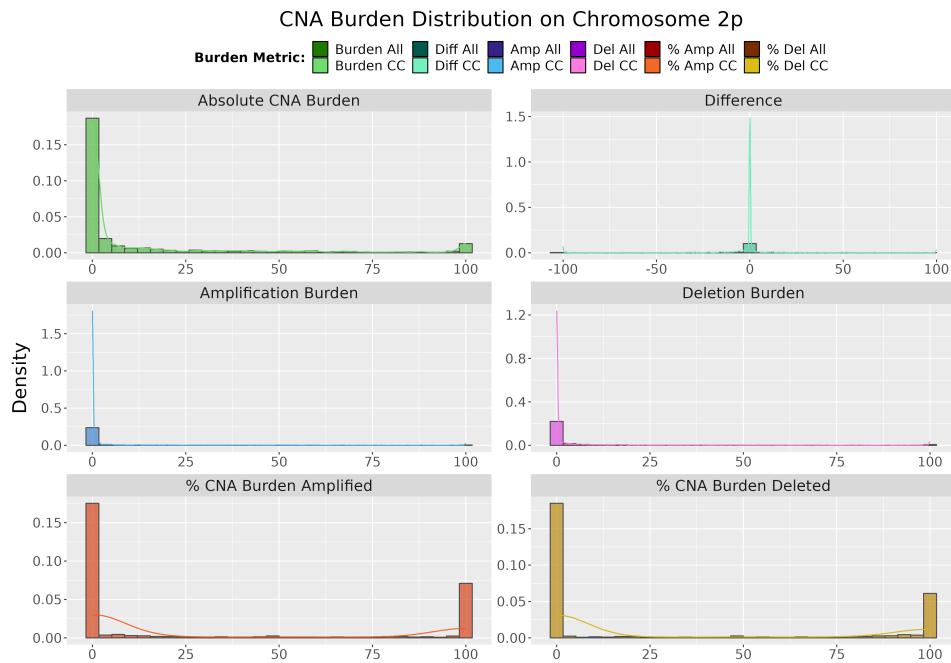


Figure 1.6: Density plots for each CNA Burden metric on chromosome 2p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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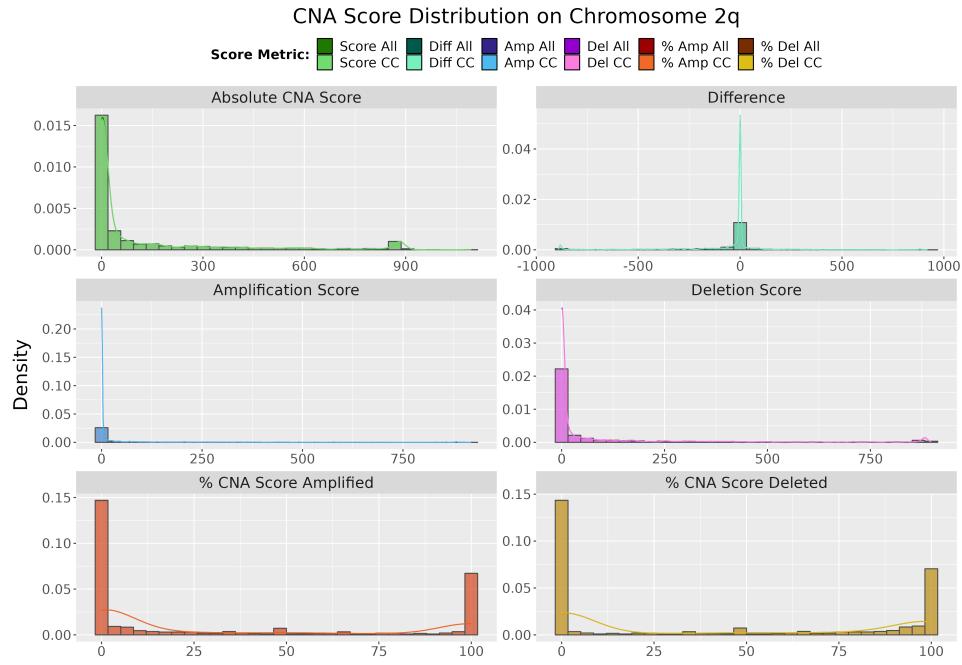


Figure 1.7: Density plots for each CNA Score metric on chromosome 2q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

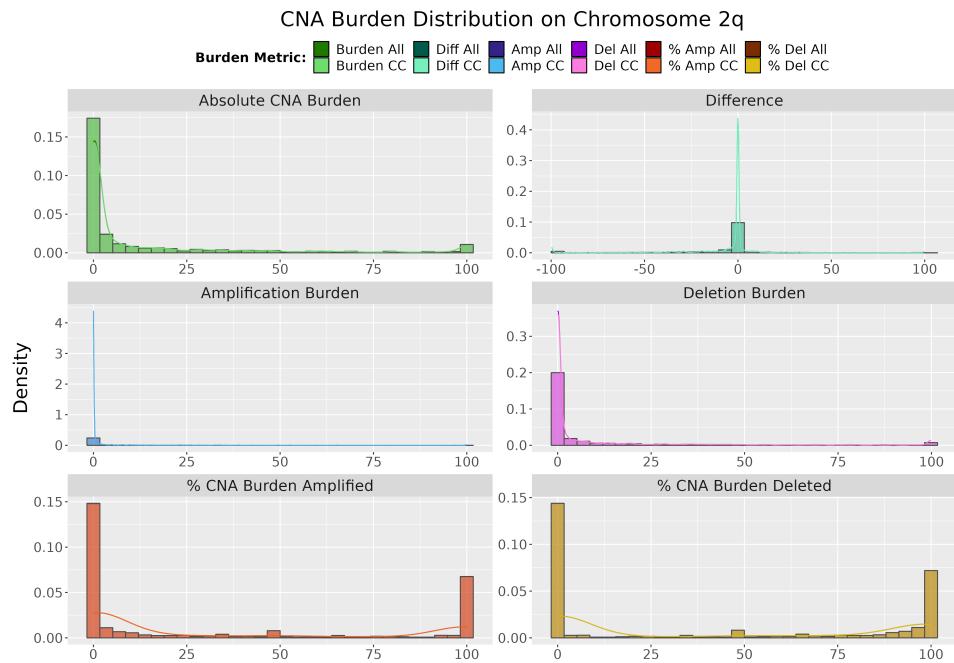


Figure 1.8: Density plots for each CNA Burden metric on chromosome 2q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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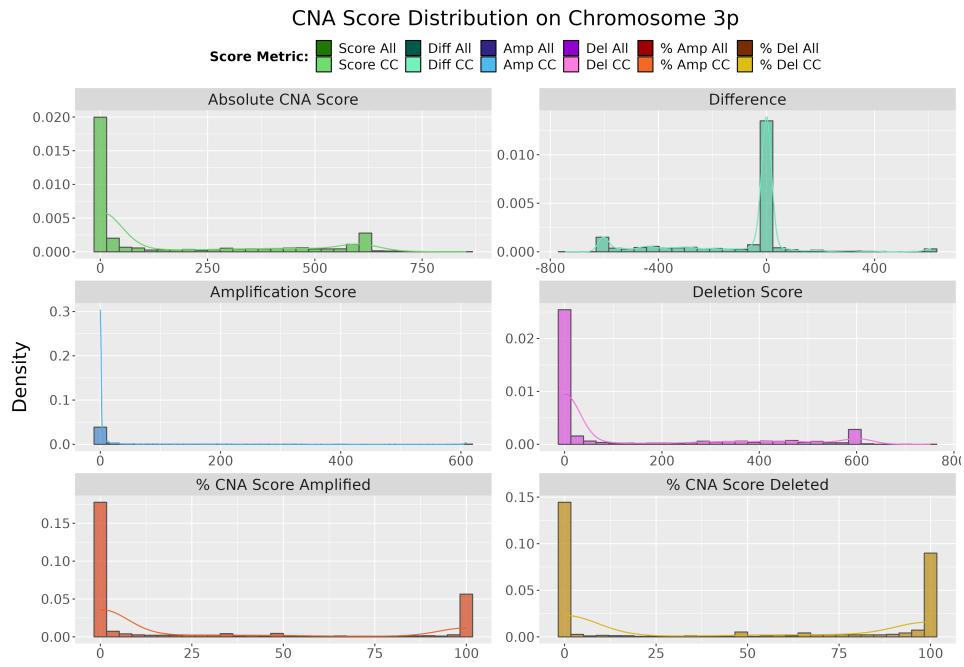


Figure 1.9: Density plots for each CNA Score metric on chromosome 3p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

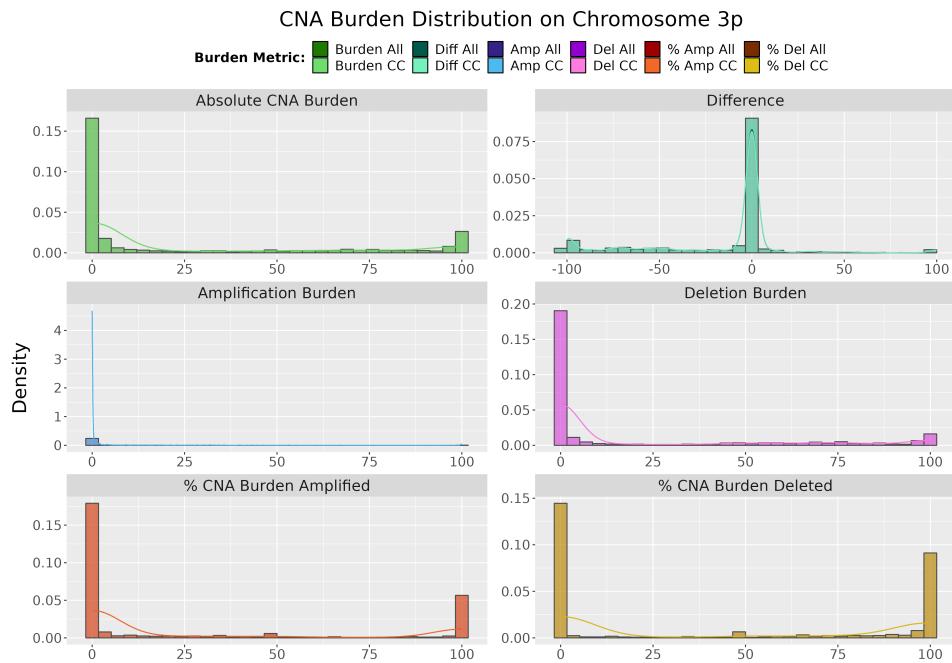


Figure 1.10: Density plots for each CNA Burden metric on chromosome 3p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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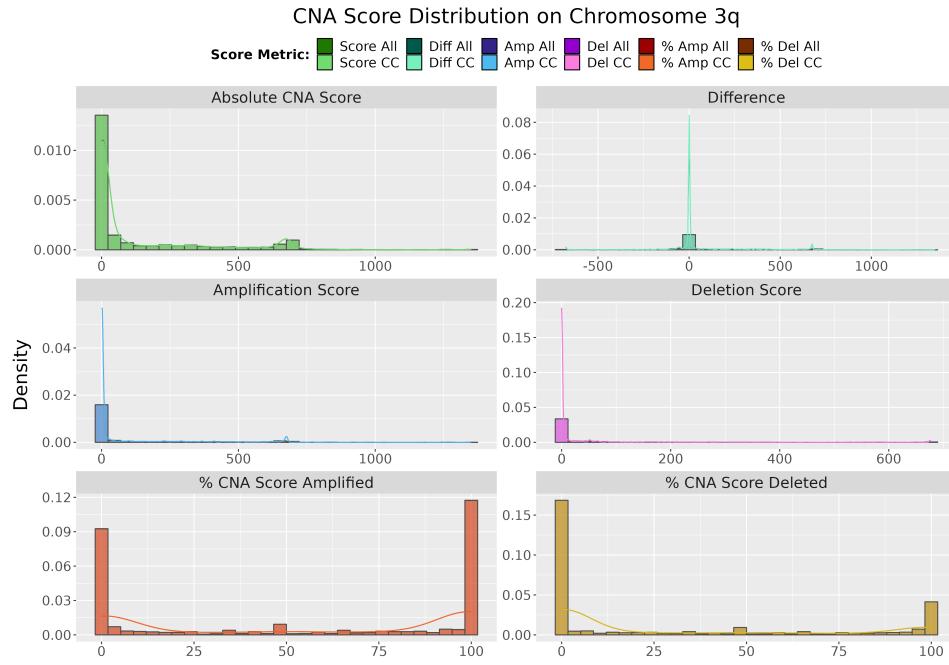


Figure 1.11: Density plots for each CNA Score metric on chromosome 3q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

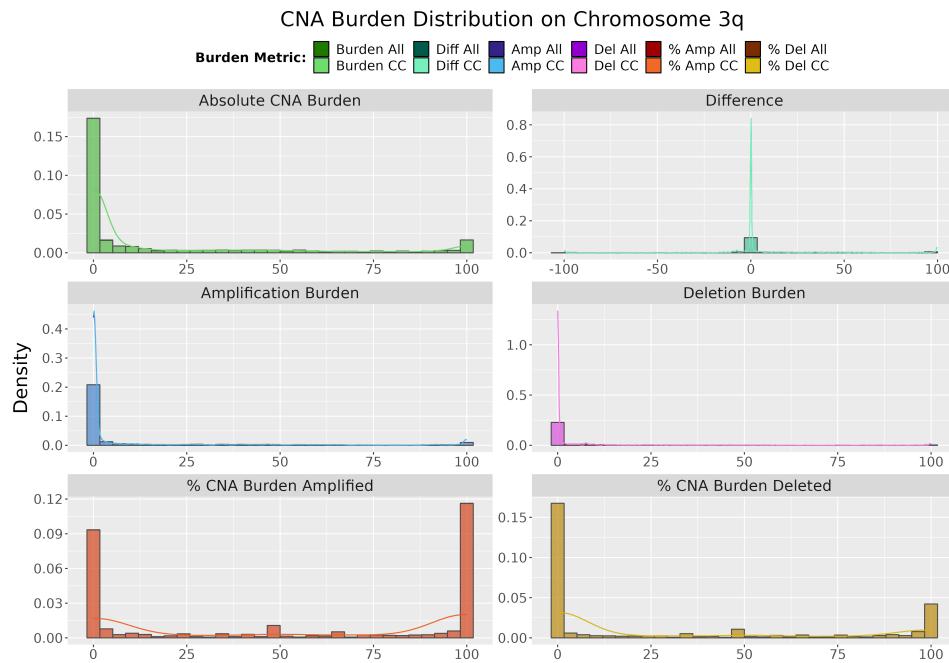


Figure 1.12: Density plots for each CNA Burden metric on chromosome 3q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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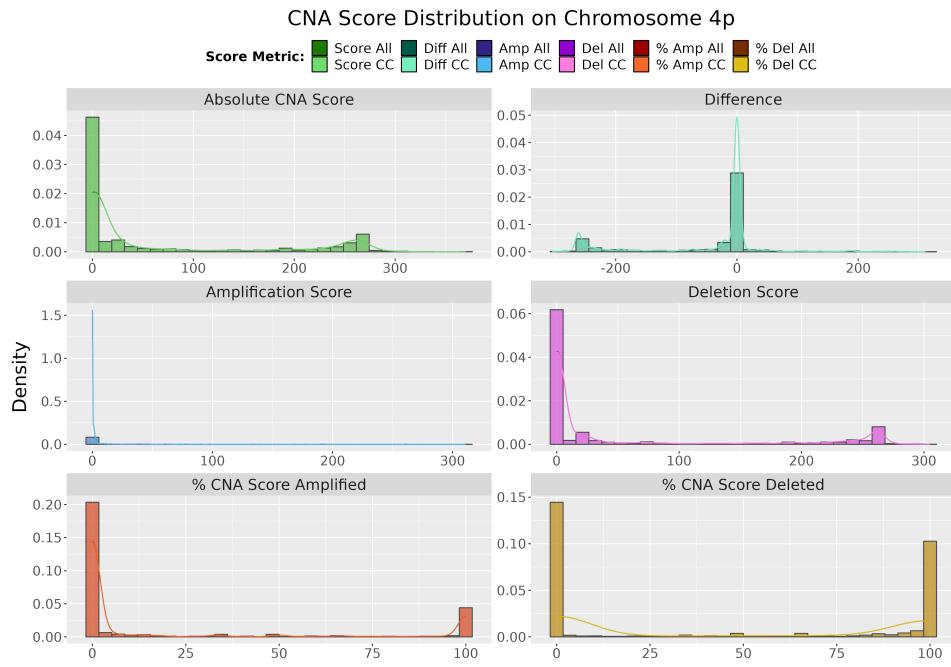


Figure 1.13: Density plots for each CNA Score metric on chromosome 4p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

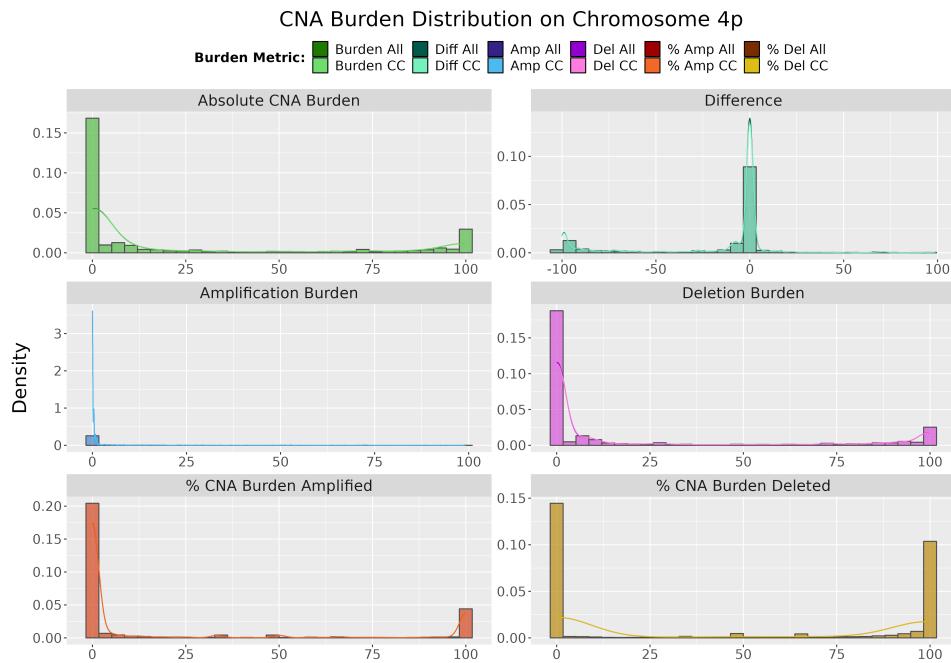


Figure 1.14: Density plots for each CNA Burden metric on chromosome 4p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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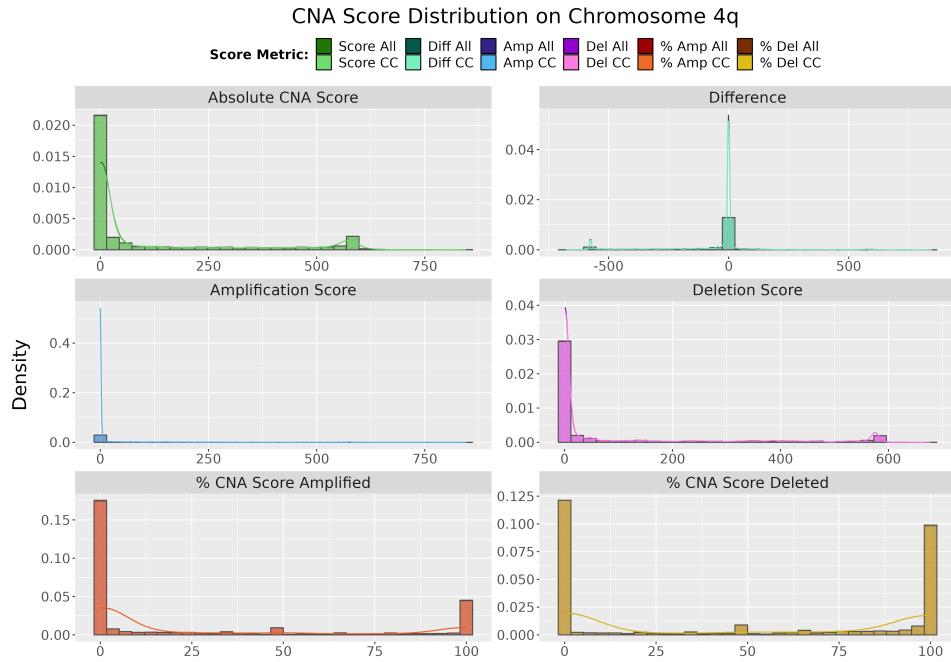


Figure 1.15: Density plots for each CNA Score metric on chromosome 4q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

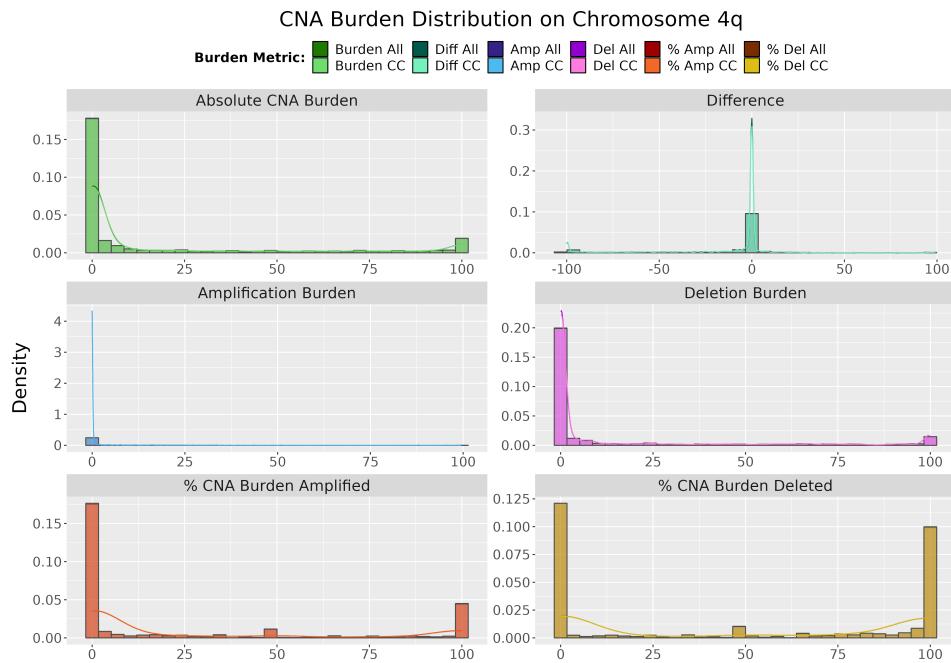


Figure 1.16: Density plots for each CNA Burden metric on chromosome 4q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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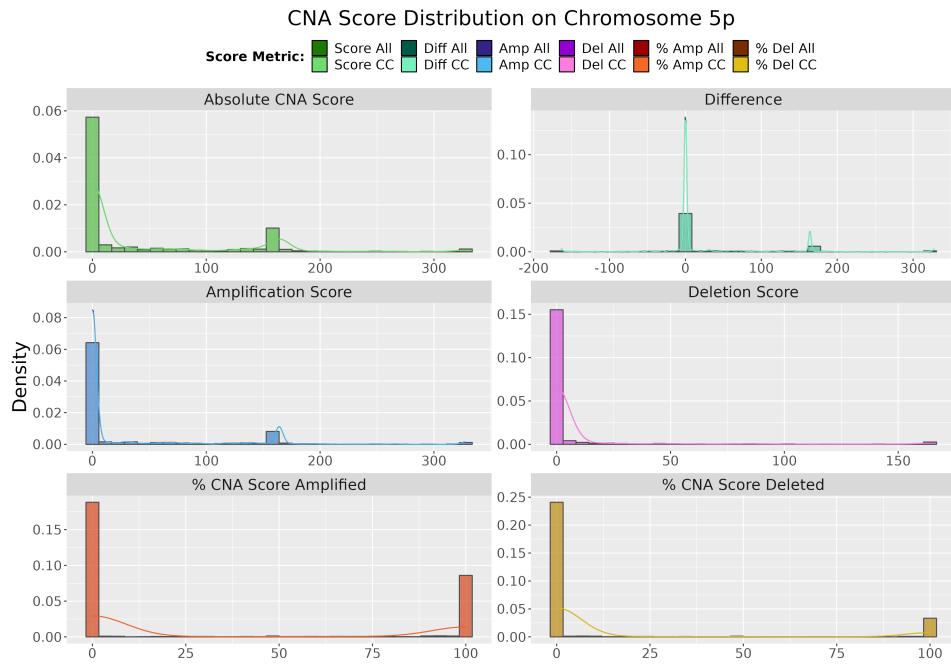


Figure 1.17: Density plots for each CNA Score metric on chromosome 5p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

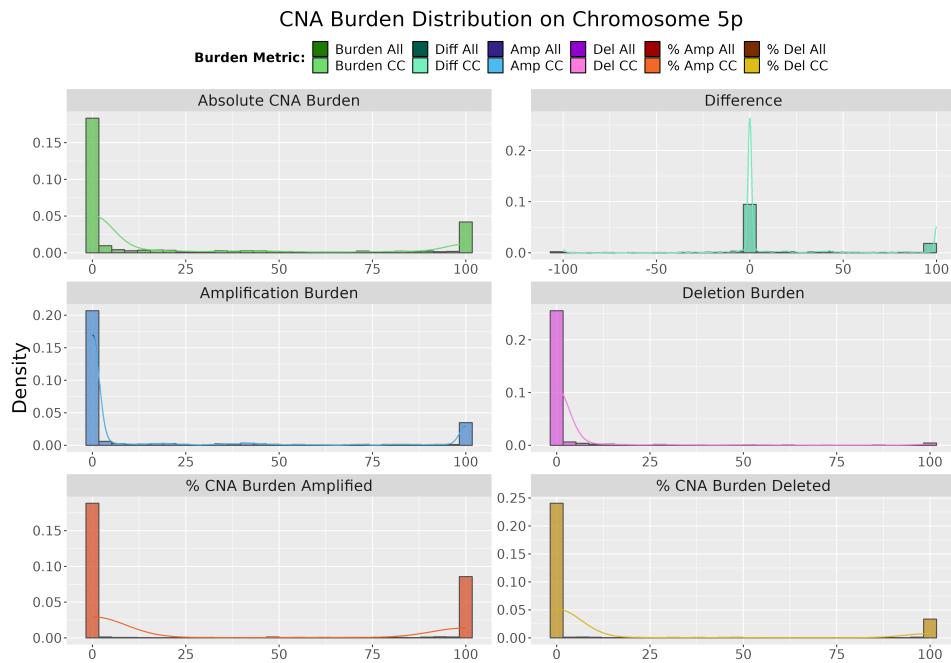


Figure 1.18: Density plots for each CNA Burden metric on chromosome 5p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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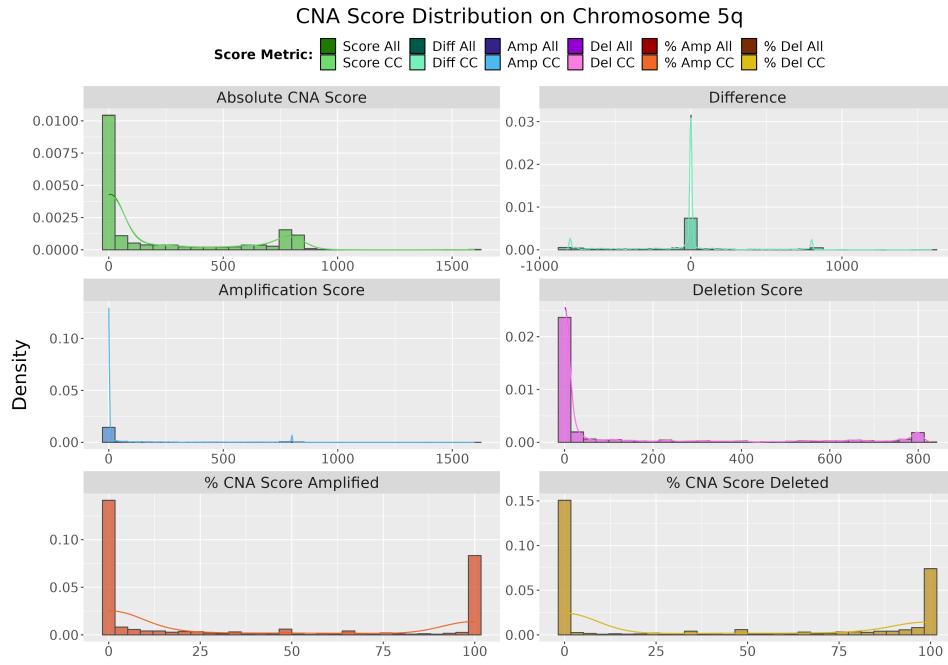


Figure 1.19: Density plots for each CNA Score metric on chromosome 5q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

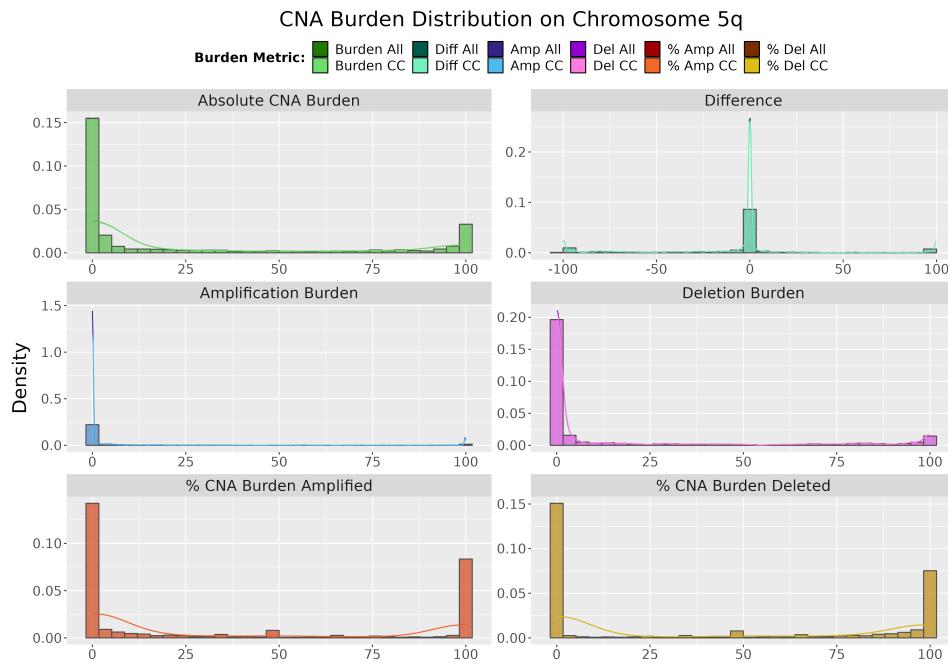


Figure 1.20: Density plots for each CNA Burden metric on chromosome 5q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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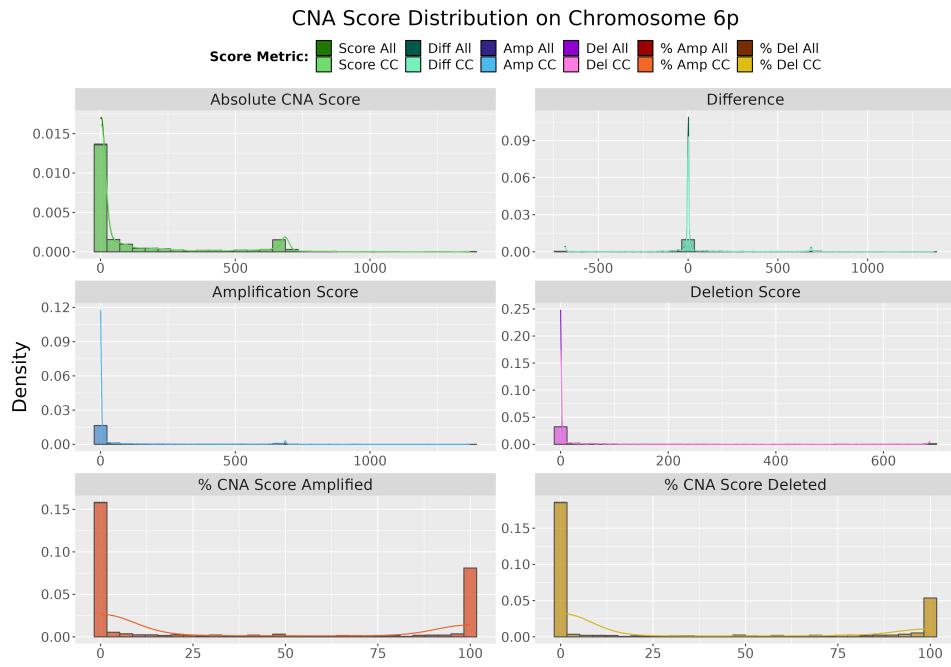


Figure 1.21: Density plots for each CNA Score metric on chromosome 6p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

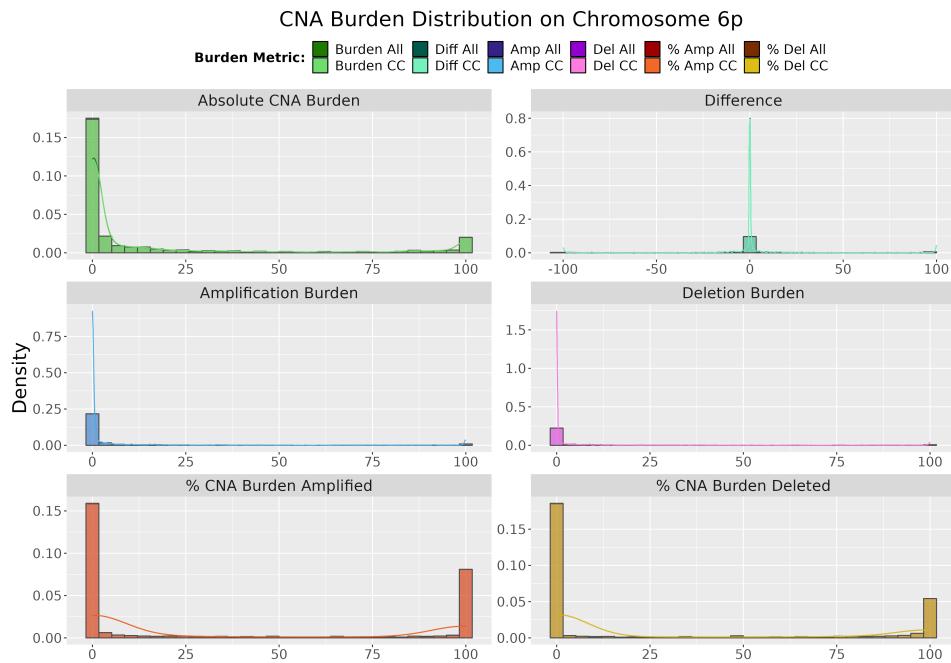


Figure 1.22: Density plots for each CNA Burden metric on chromosome 6p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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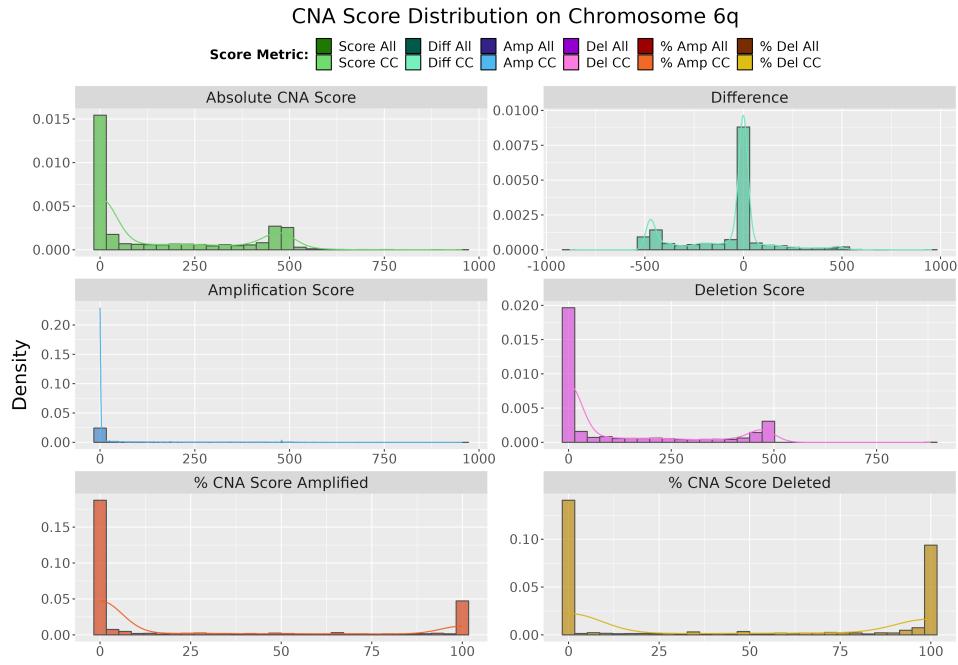


Figure 1.23: Density plots for each CNA Score metric on chromosome 6q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

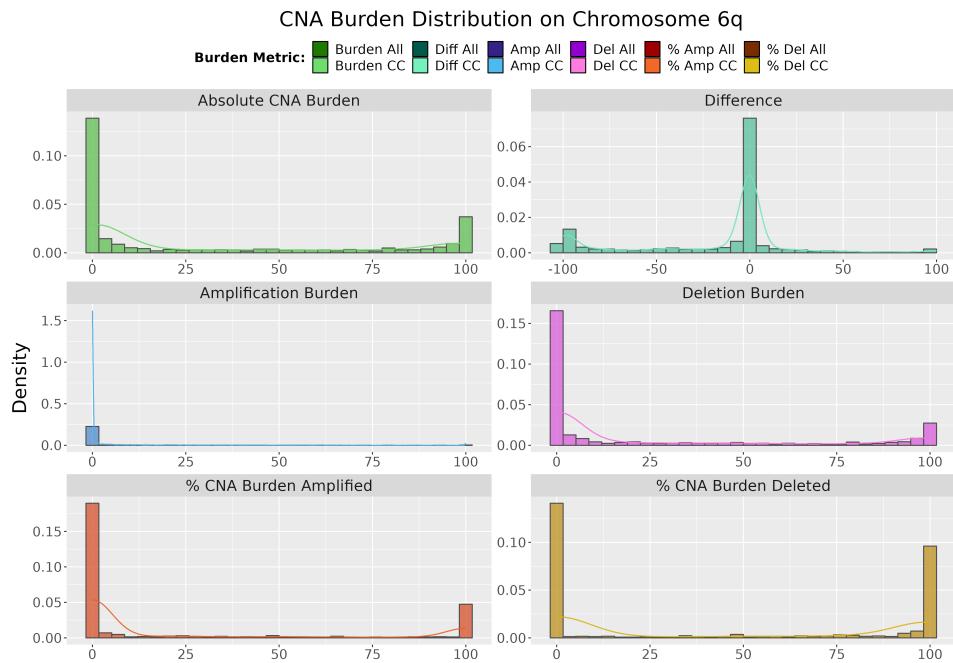


Figure 1.24: Density plots for each CNA Burden metric on chromosome 6q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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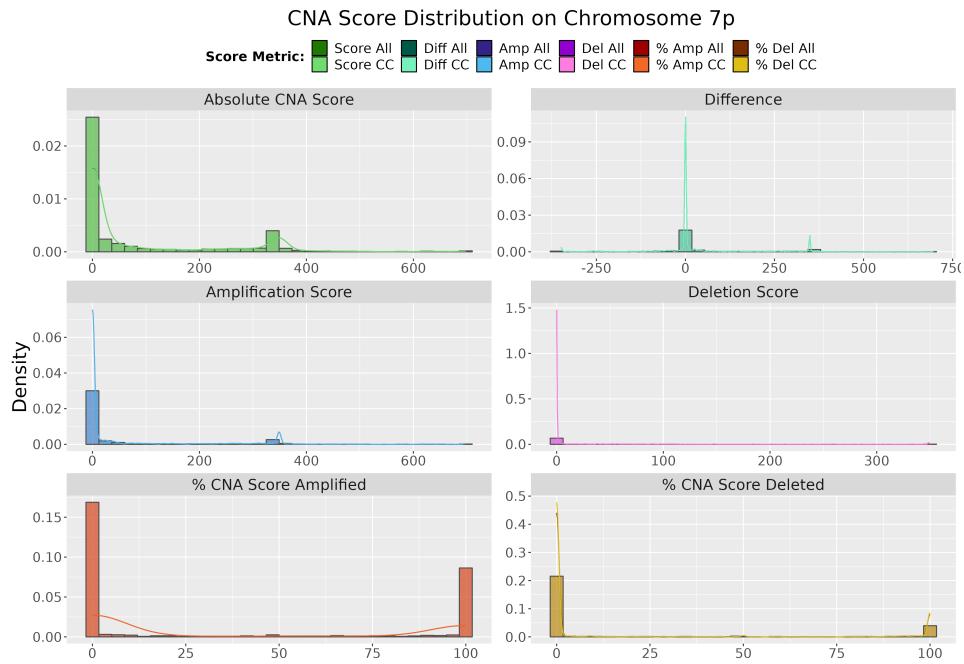


Figure 1.25: Density plots for each CNA Score metric on chromosome 7p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

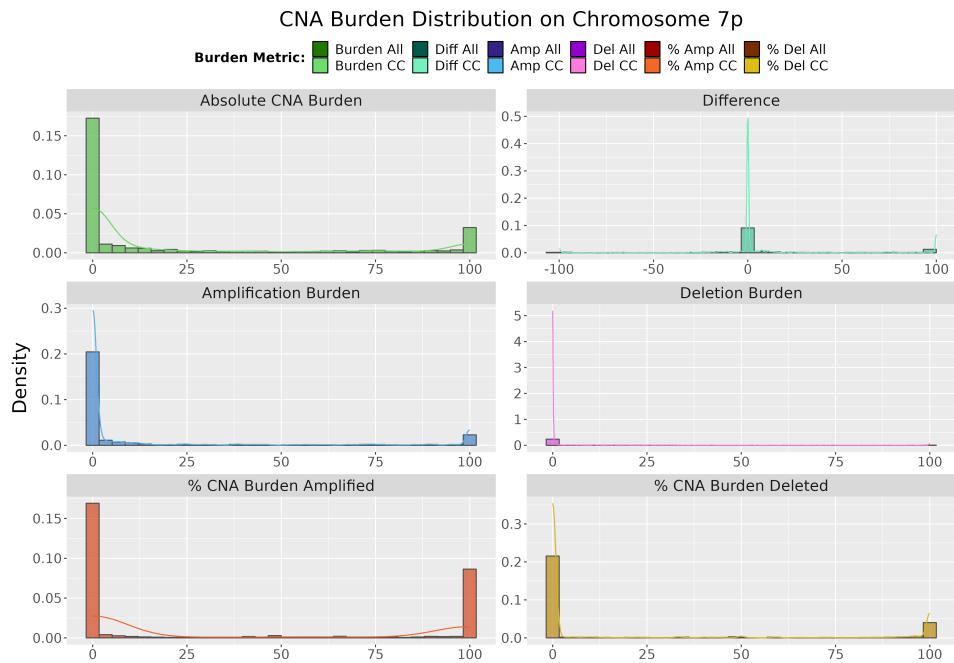


Figure 1.26: Density plots for each CNA Burden metric on chromosome 7p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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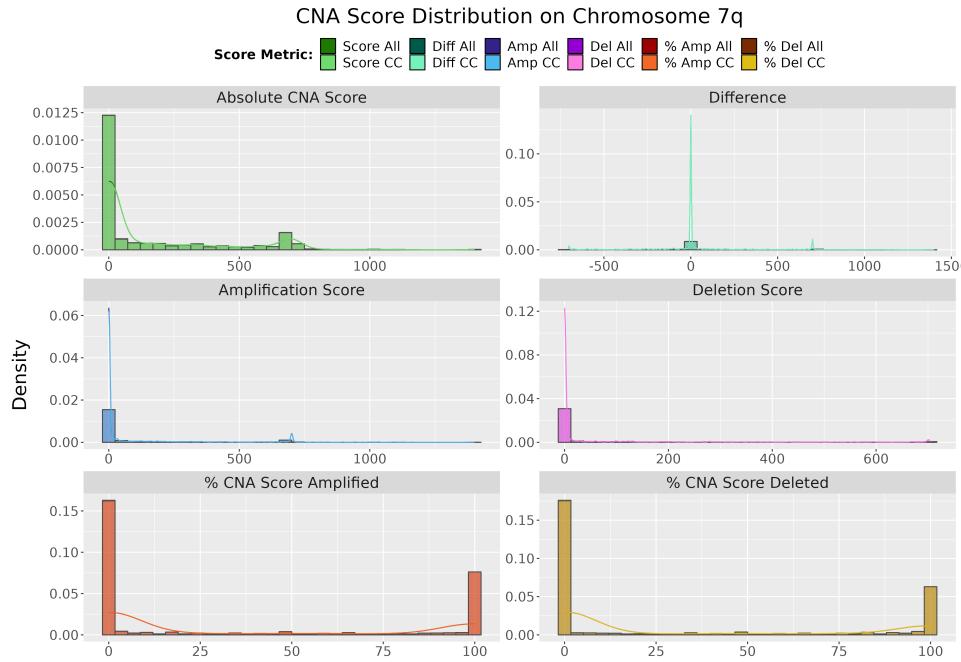


Figure 1.27: Density plots for each CNA Score metric on chromosome 7q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

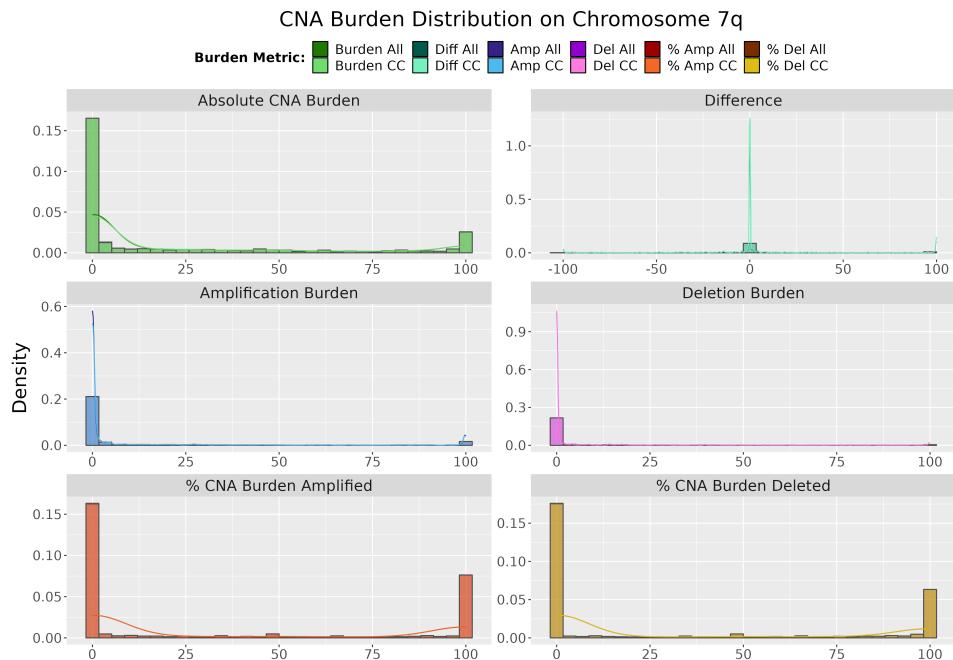


Figure 1.28: Density plots for each CNA Burden metric on chromosome 7q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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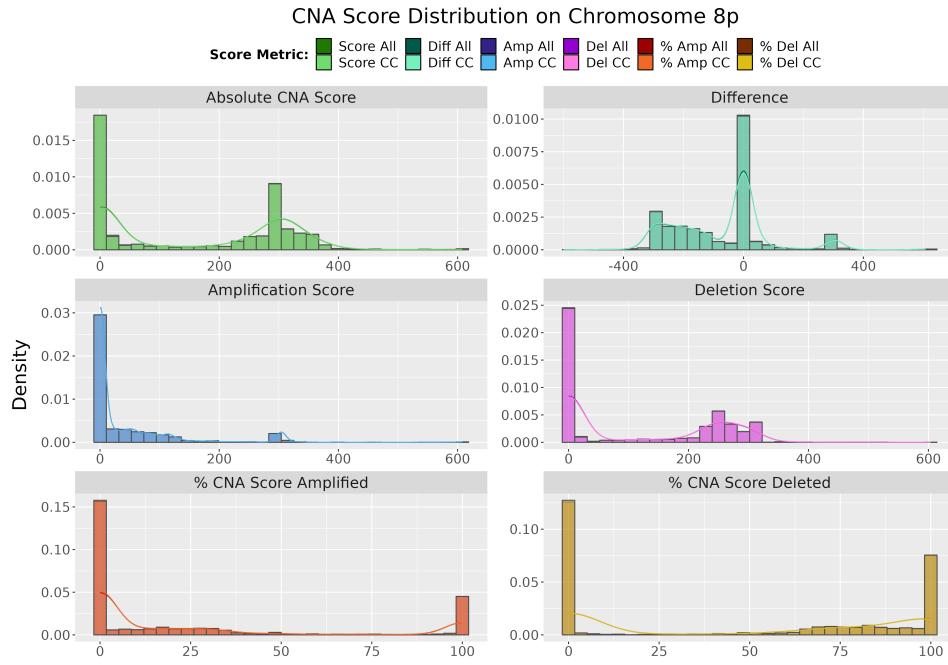


Figure 1.29: Density plots for each CNA Score metric on chromosome 8p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

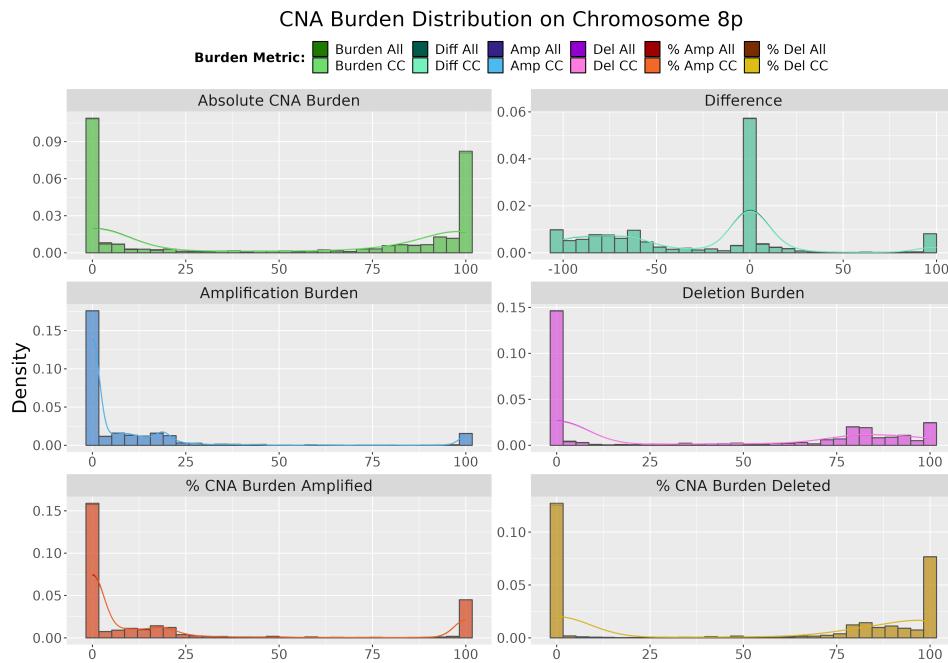


Figure 1.30: Density plots for each CNA Burden metric on chromosome 8p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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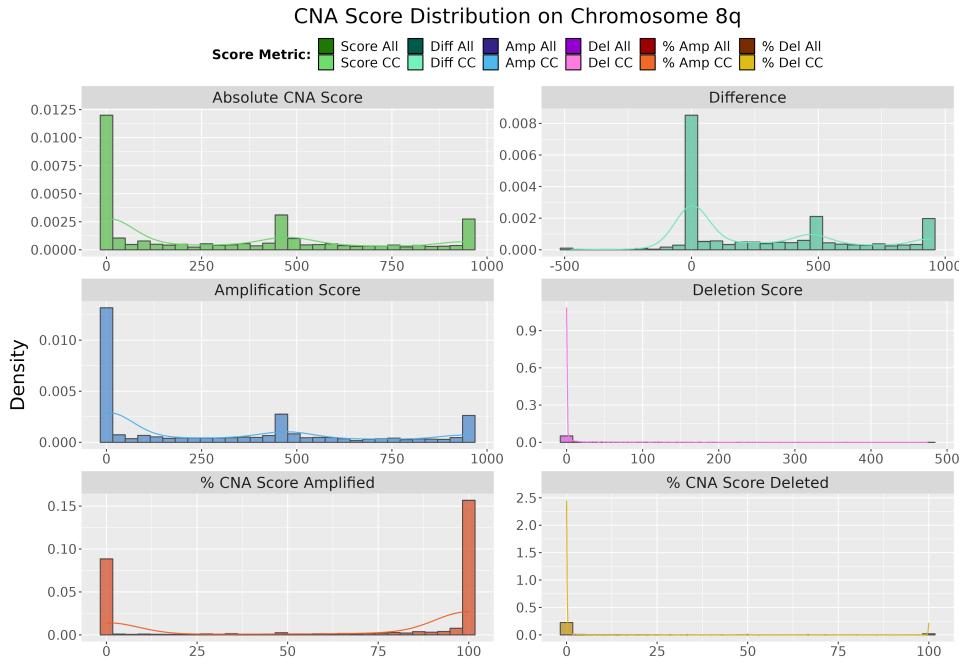


Figure 1.31: Density plots for each CNA Score metric on chromosome 8q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

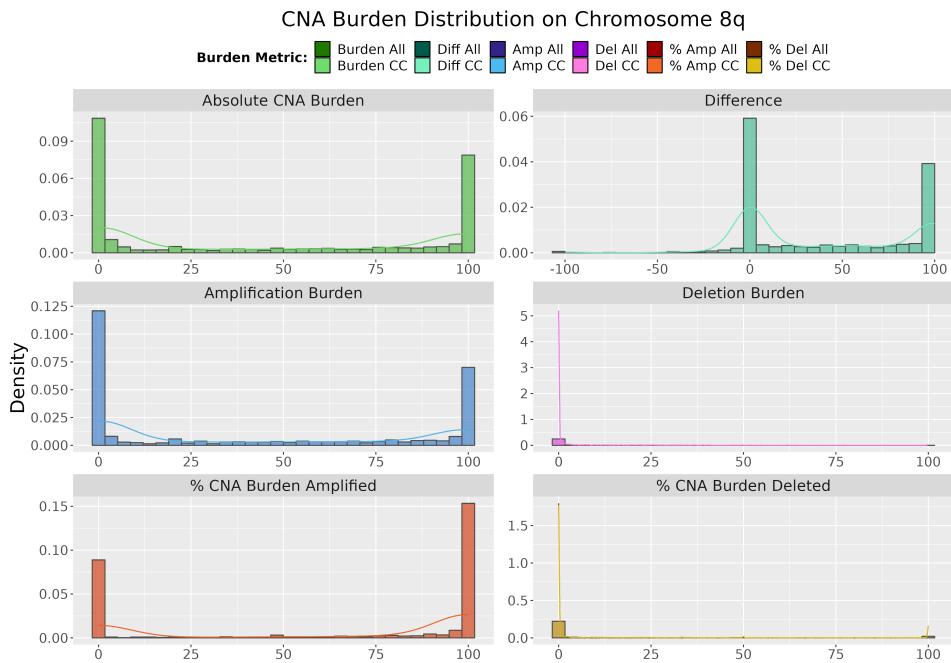


Figure 1.32: Density plots for each CNA Burden metric on chromosome 8q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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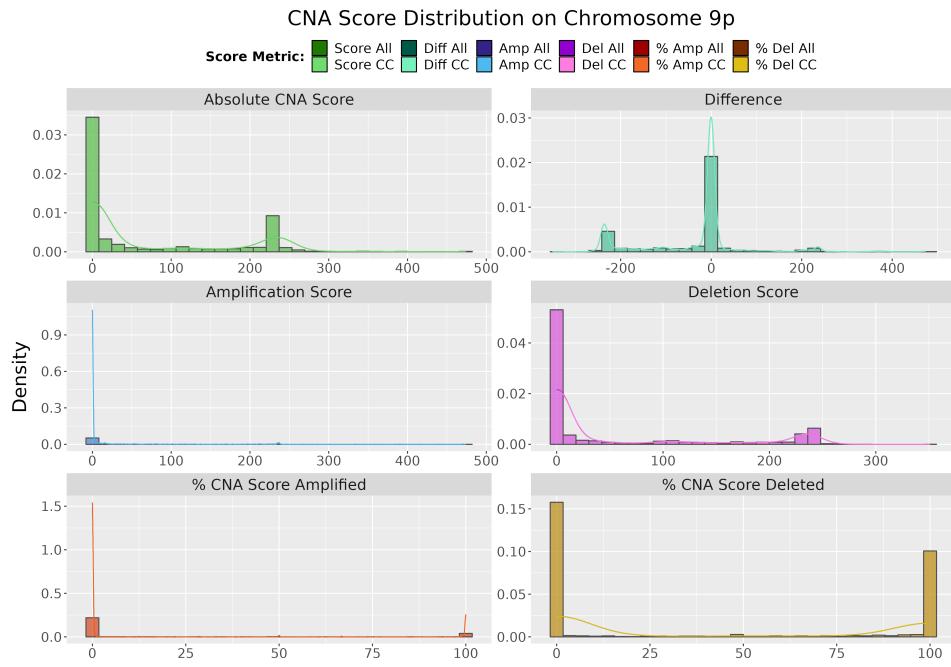


Figure 1.33: Density plots for each CNA Score metric on chromosome 9p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

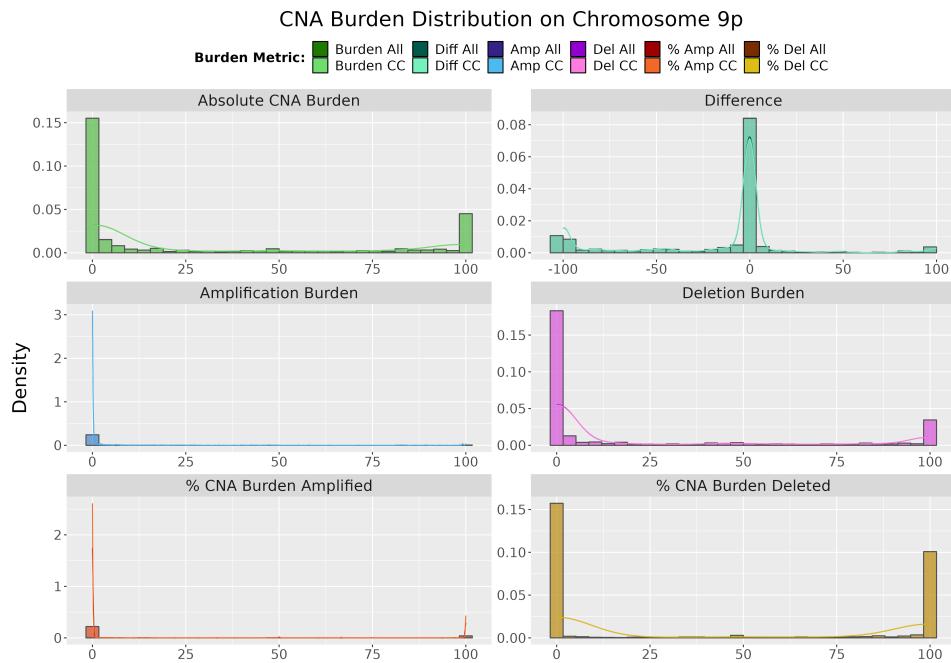


Figure 1.34: Density plots for each CNA Burden metric on chromosome 9p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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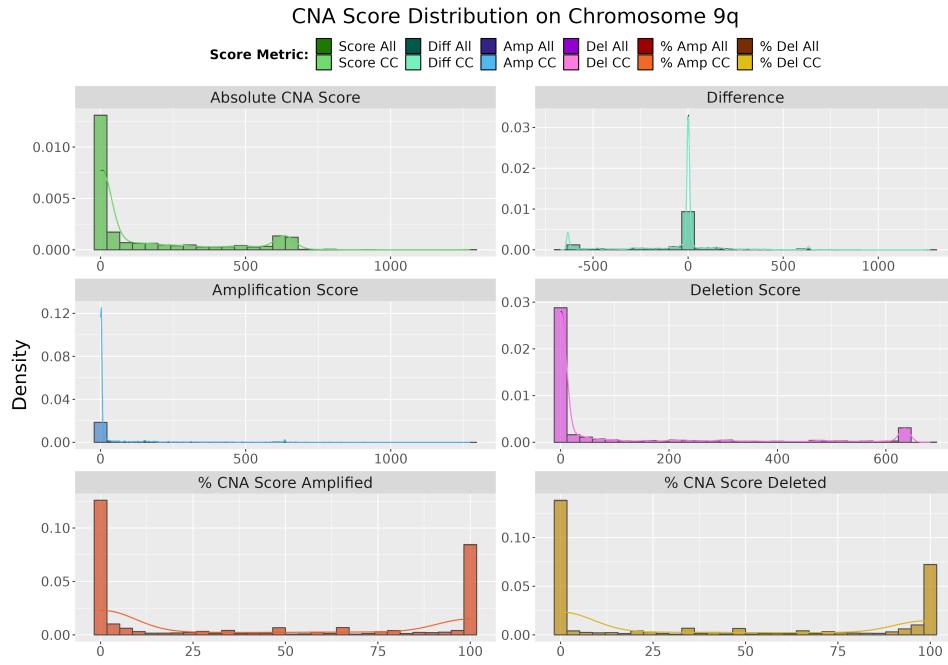


Figure 1.35: Density plots for each CNA Score metric on chromosome 9q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

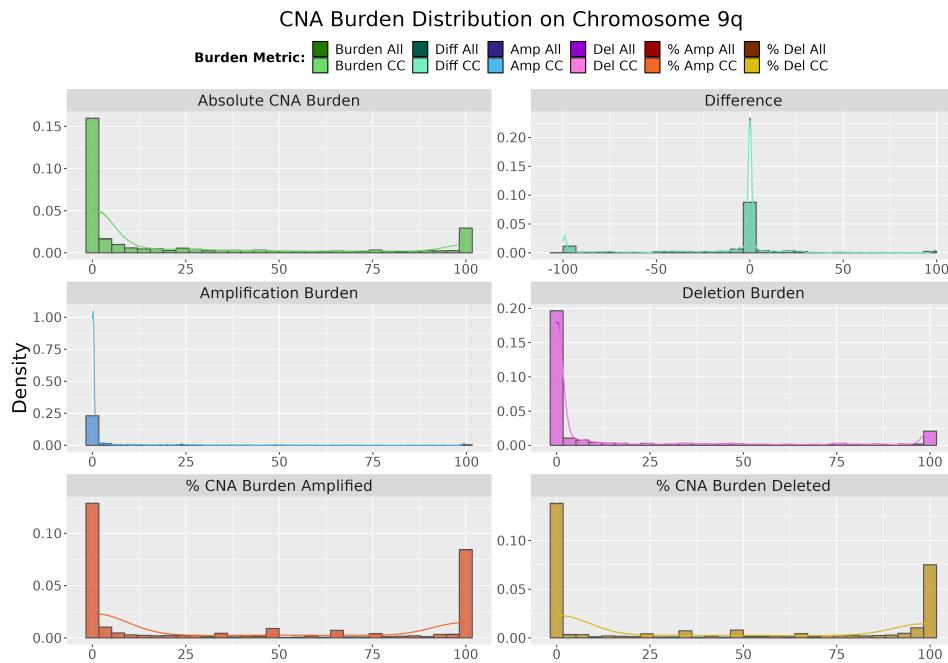


Figure 1.36: Density plots for each CNA Burden metric on chromosome 9q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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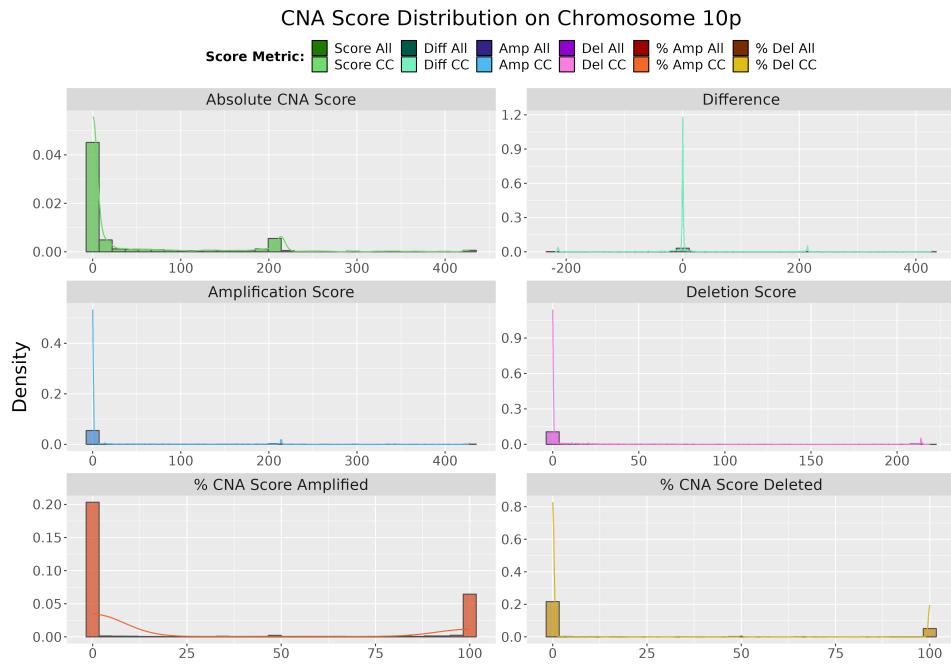


Figure 1.37: Density plots for each CNA Score metric on chromosome 10p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

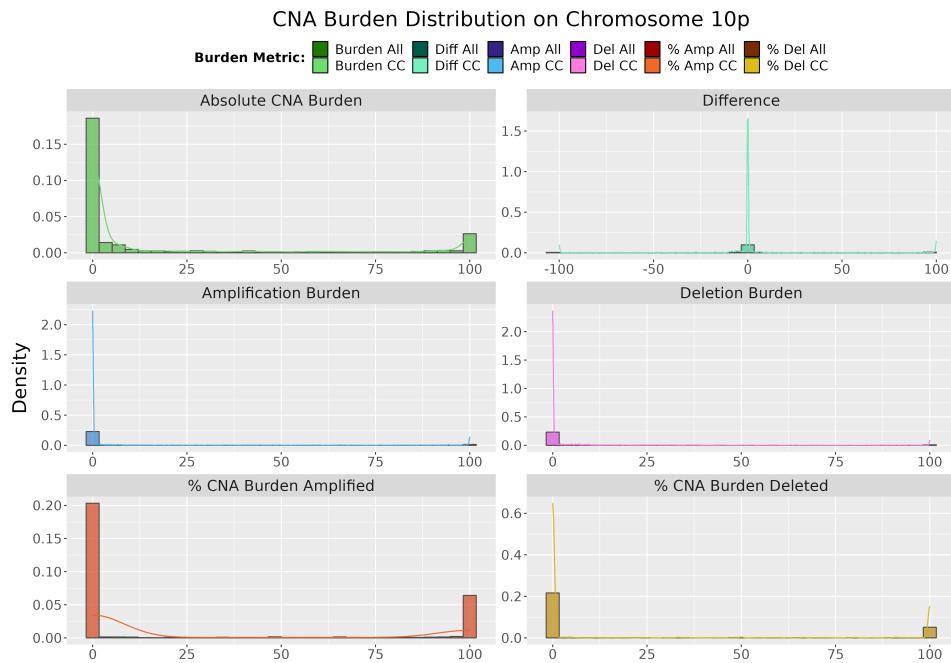


Figure 1.38: Density plots for each CNA Burden metric on chromosome 10p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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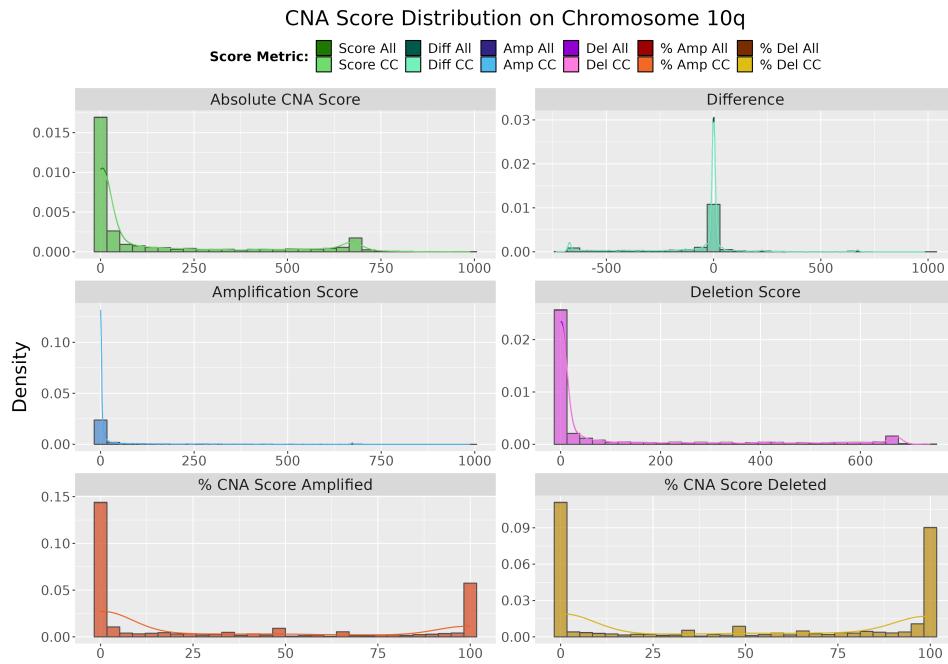


Figure 1.39: Density plots for each CNA Score metric on chromosome 10q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

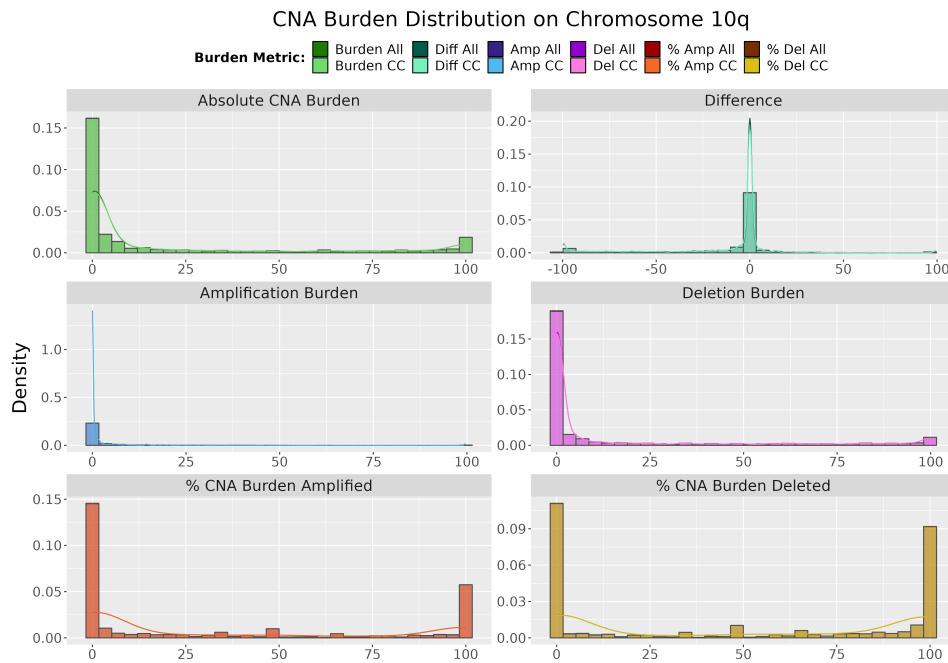


Figure 1.40: Density plots for each CNA Burden metric on chromosome 10q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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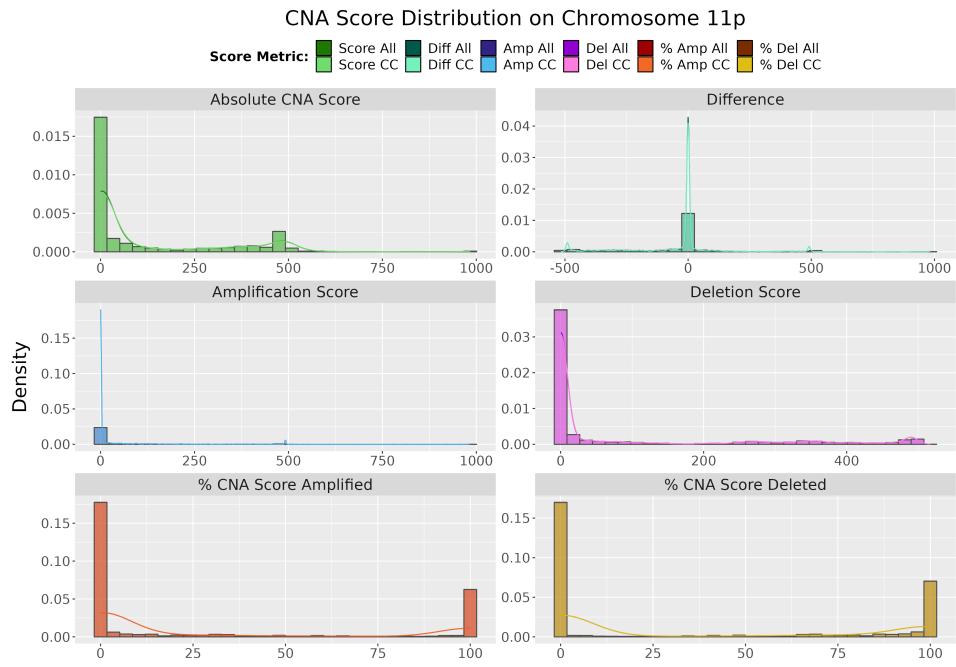


Figure 1.41: Density plots for each CNA Score metric on chromosome 11p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

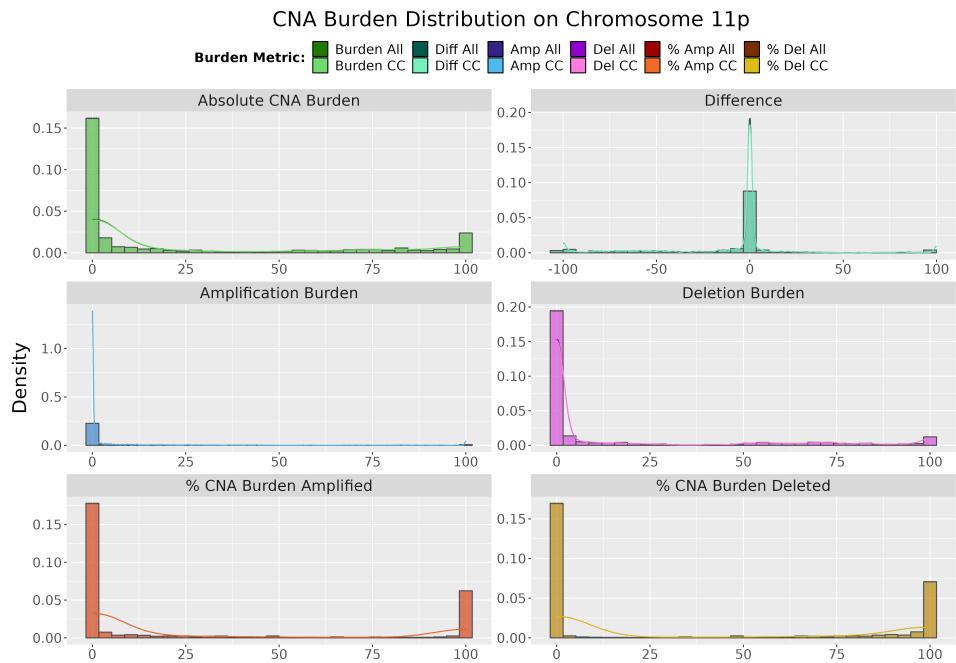


Figure 1.42: Density plots for each CNA Burden metric on chromosome 11p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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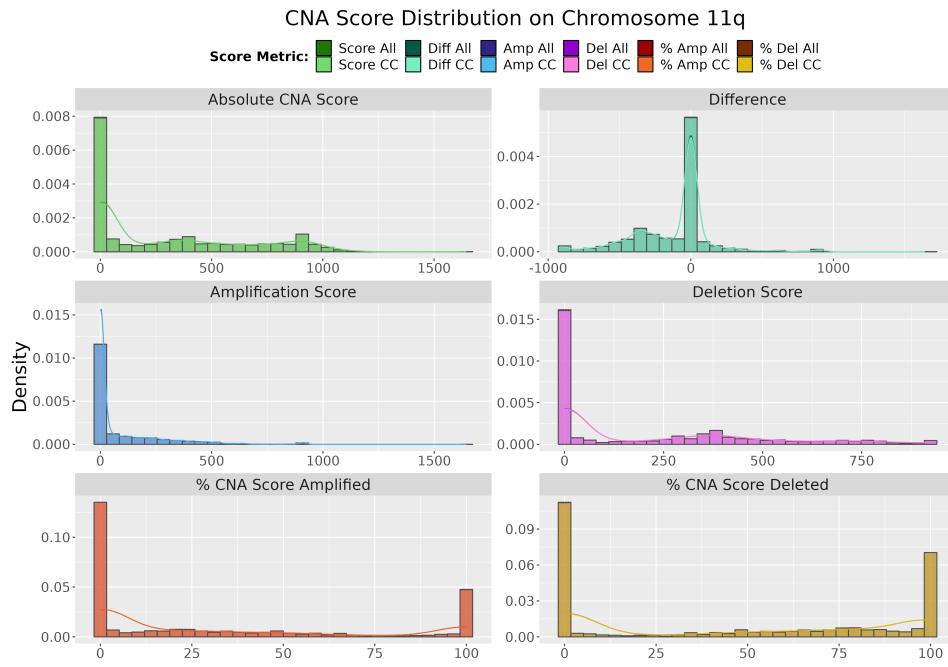


Figure 1.43: Density plots for each CNA Score metric on chromosome 11q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

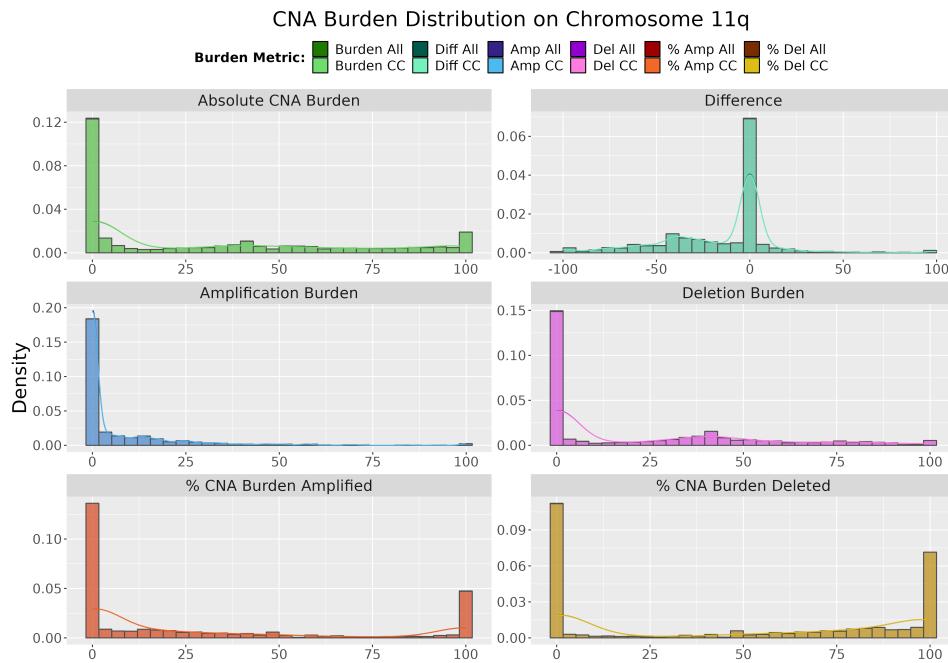


Figure 1.44: Density plots for each CNA Burden metric on chromosome 11q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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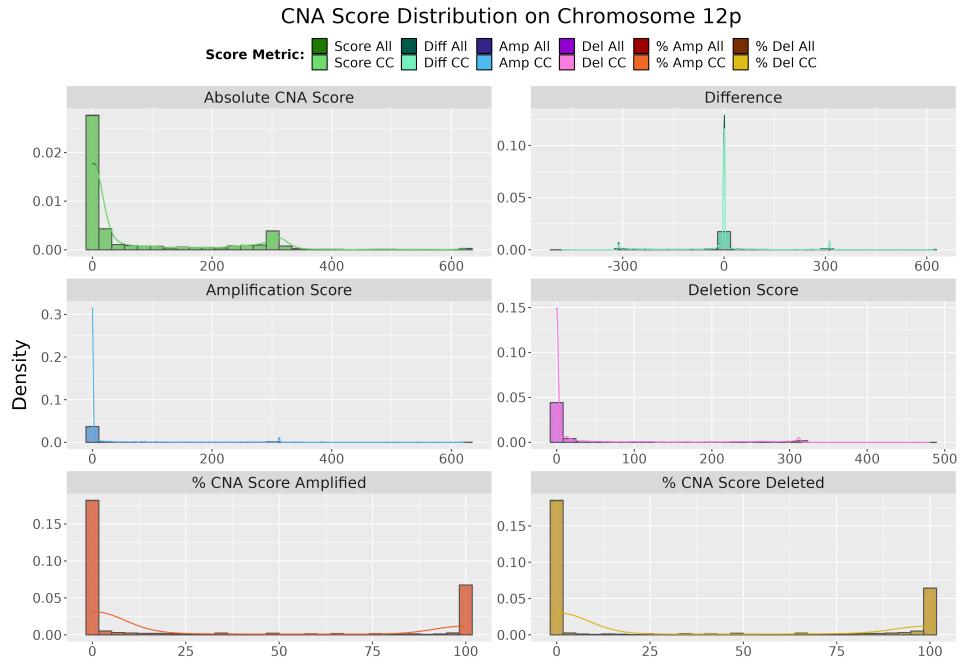


Figure 1.45: Density plots for each CNA Score metric on chromosome 12p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

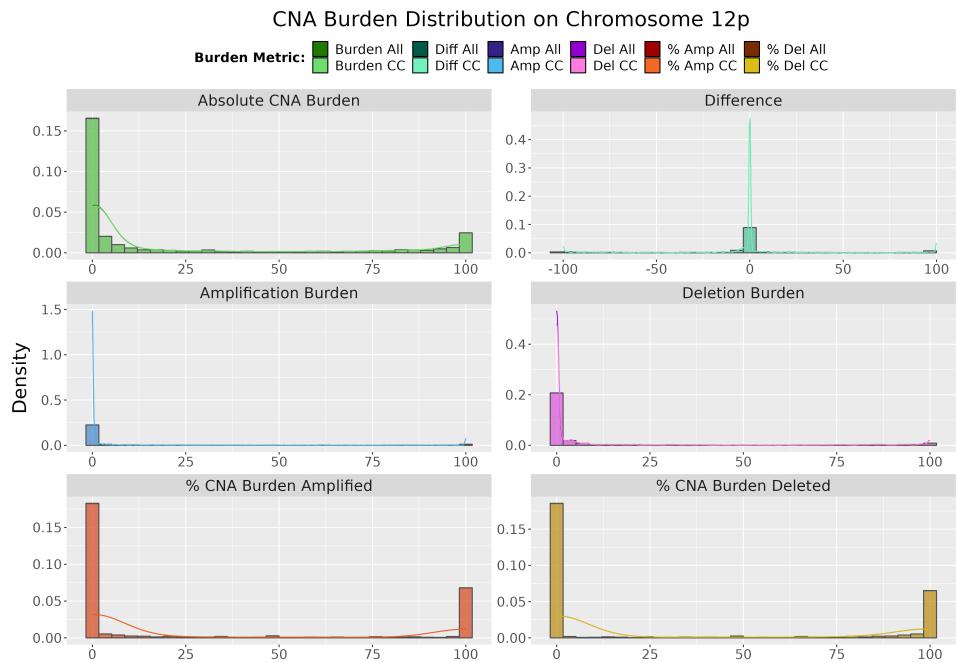


Figure 1.46: Density plots for each CNA Burden metric on chromosome 12p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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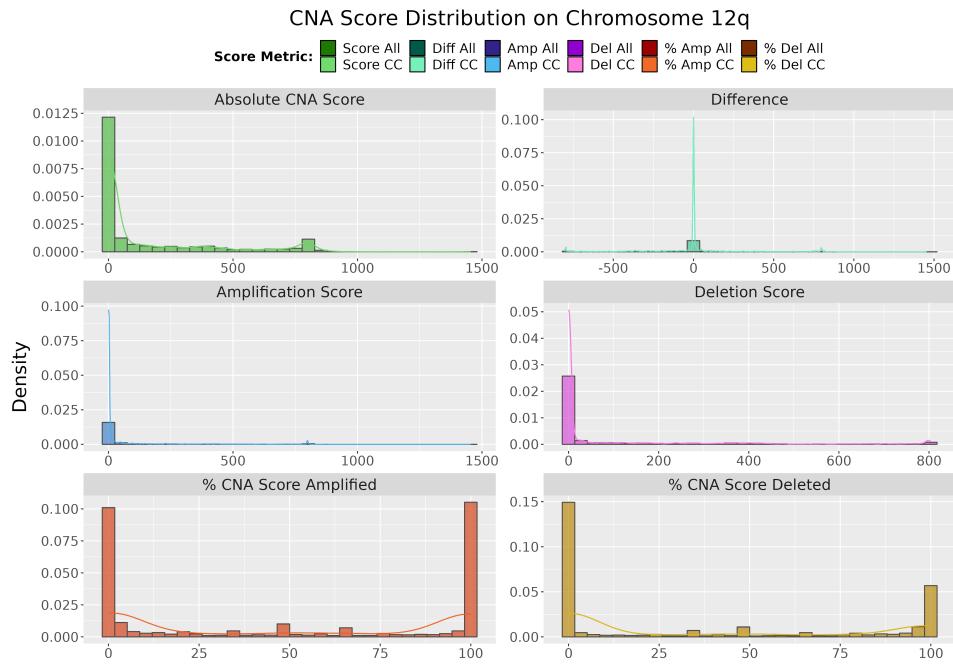


Figure 1.47: Density plots for each CNA Score metric on chromosome 12q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

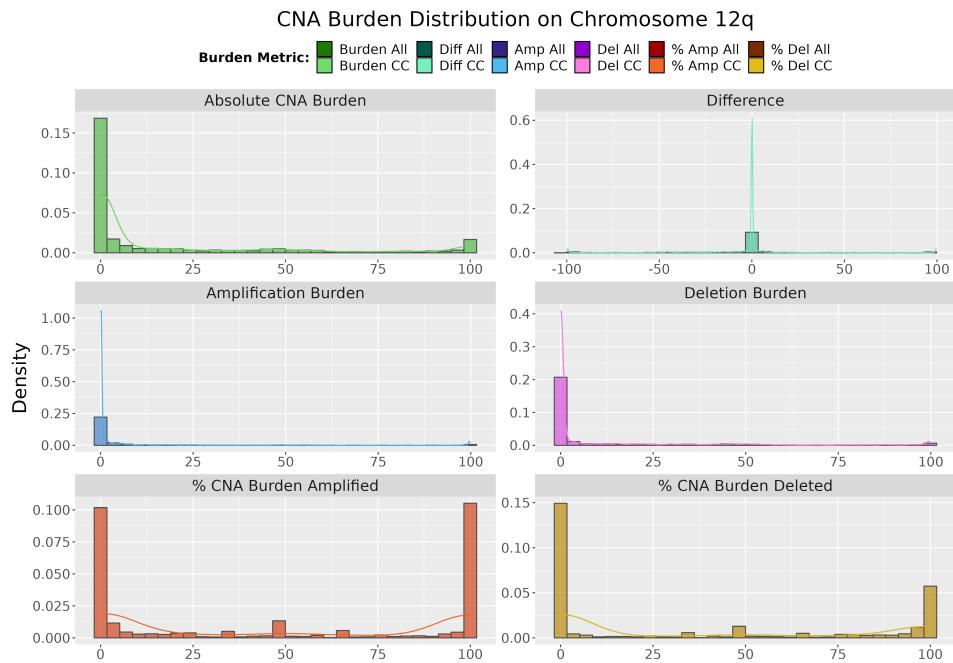


Figure 1.48: Density plots for each CNA Burden metric on chromosome 12q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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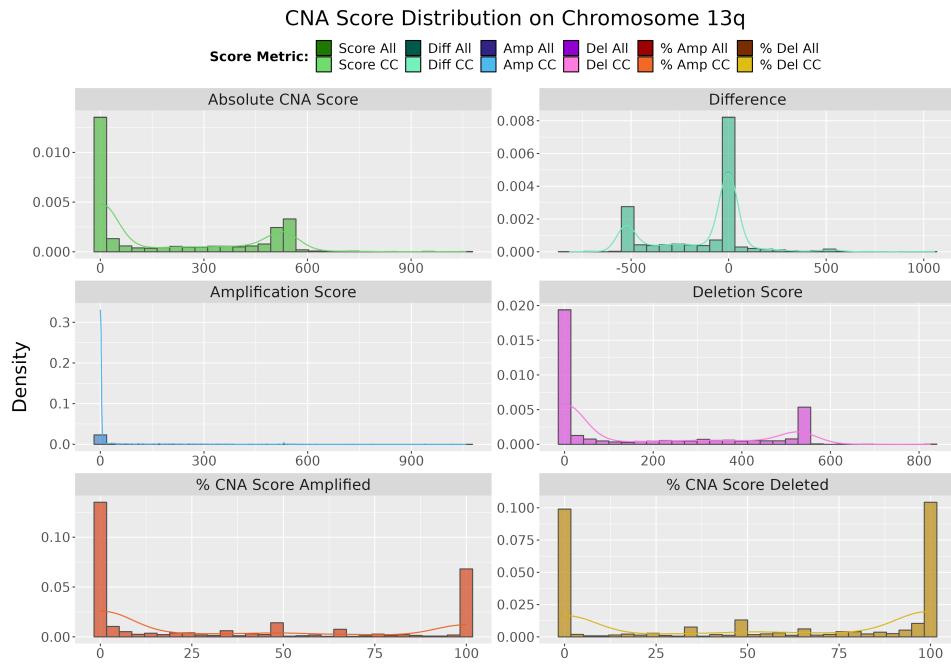


Figure 1.49: Density plots for each CNA Score metric on chromosome 13q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

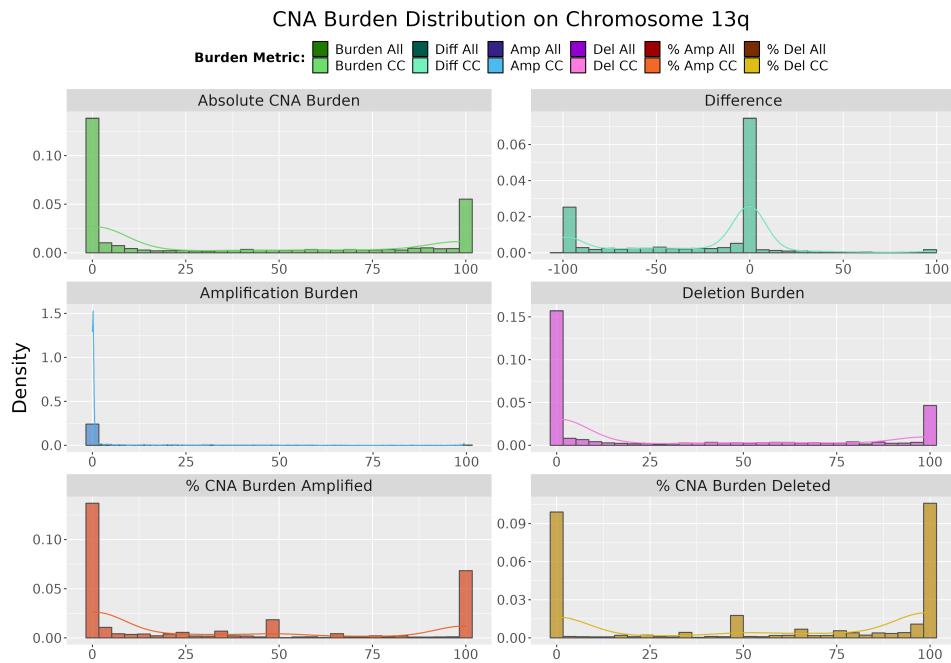


Figure 1.50: Density plots for each CNA Burden metric on chromosome 13q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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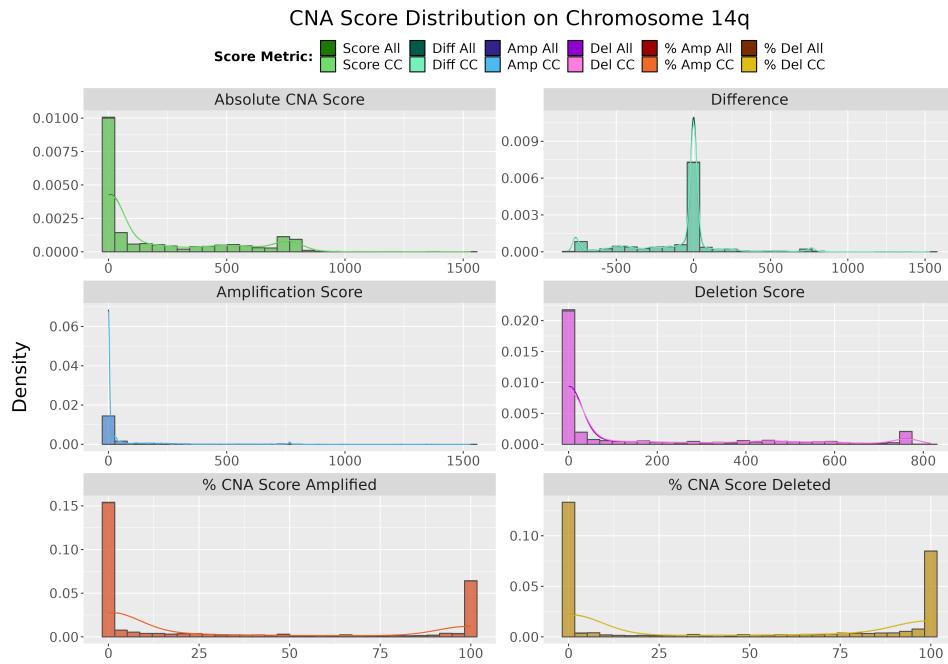


Figure 1.51: Density plots for each CNA Score metric on chromosome 14q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

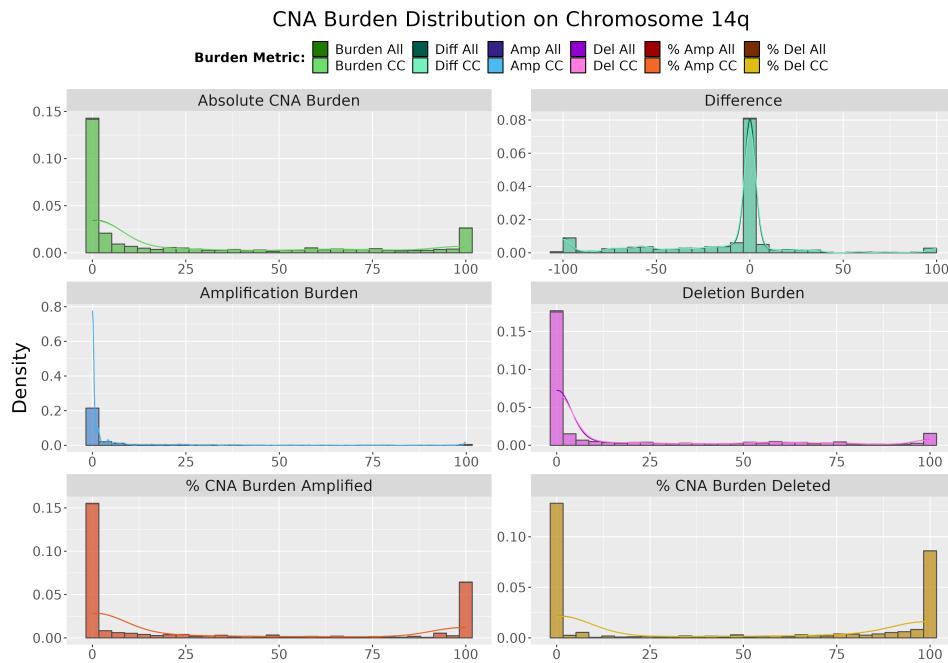


Figure 1.52: Density plots for each CNA Burden metric on chromosome 14q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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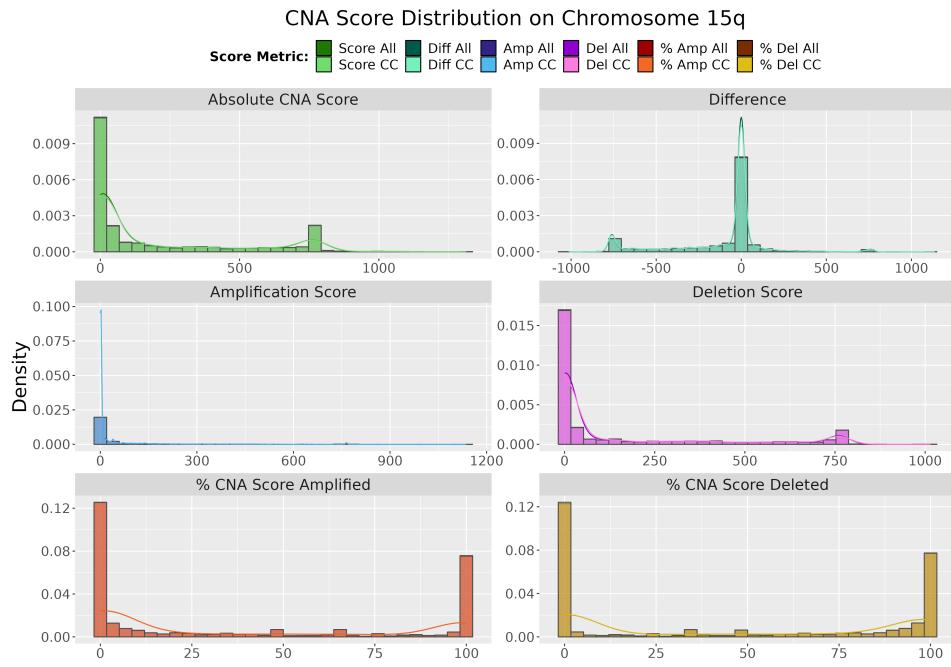


Figure 1.53: Density plots for each CNA Score metric on chromosome 15q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

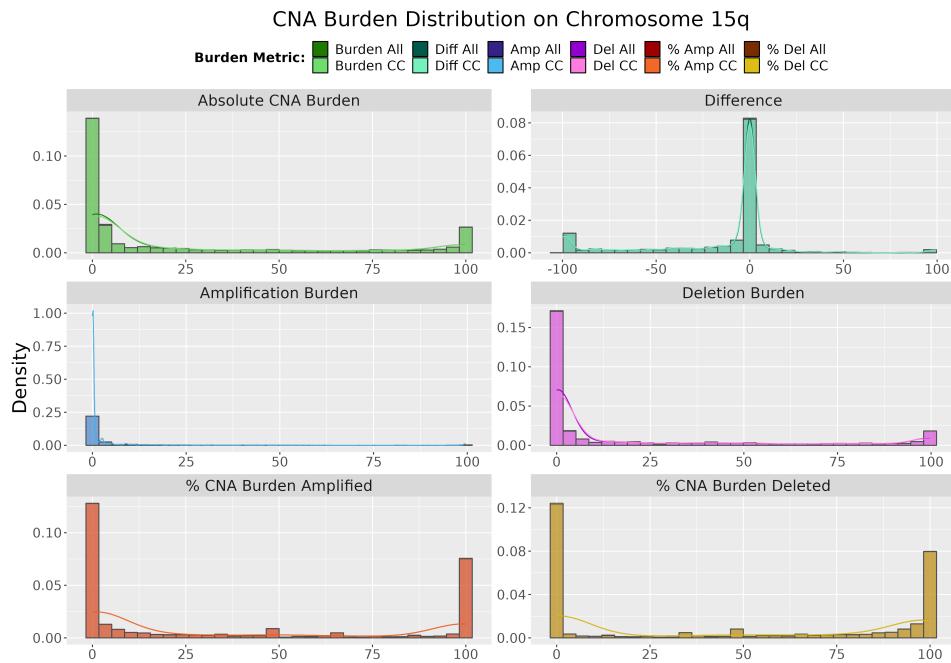


Figure 1.54: Density plots for each CNA Burden metric on chromosome 15q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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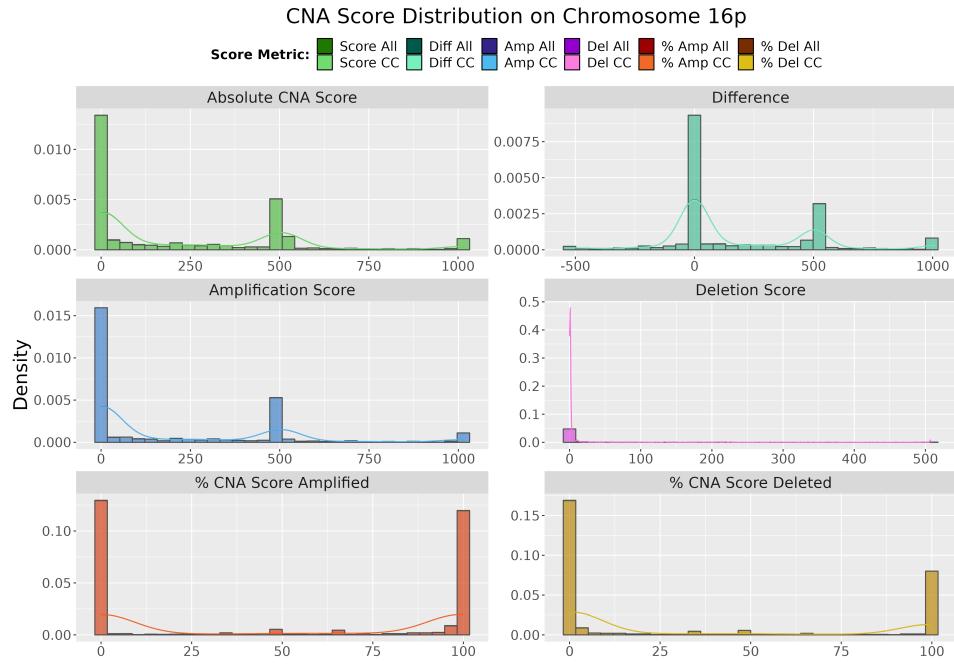


Figure 1.55: Density plots for each CNA Score metric on chromosome 16p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

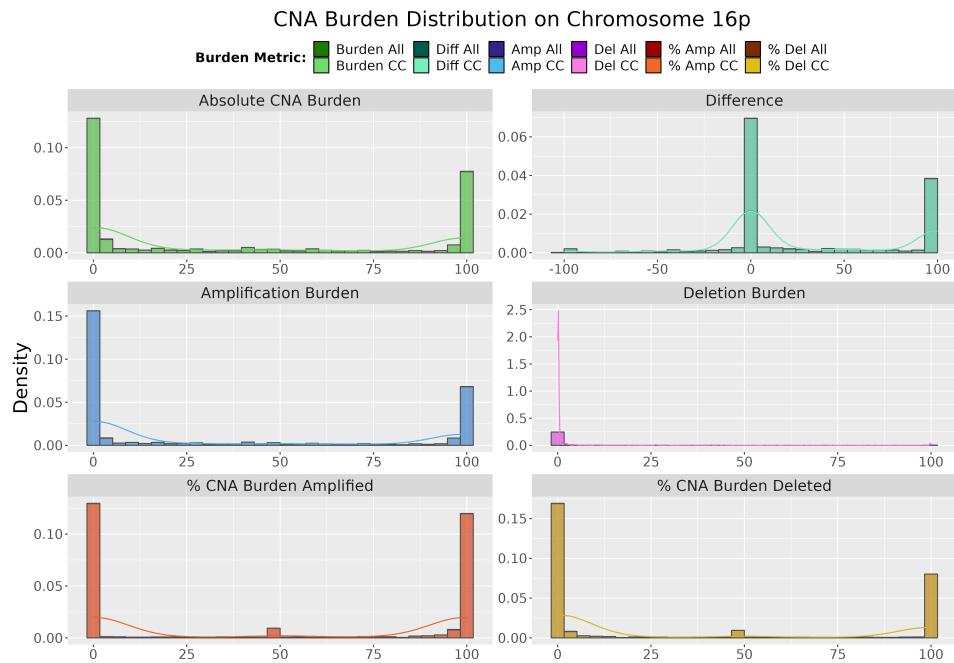


Figure 1.56: Density plots for each CNA Burden metric on chromosome 16p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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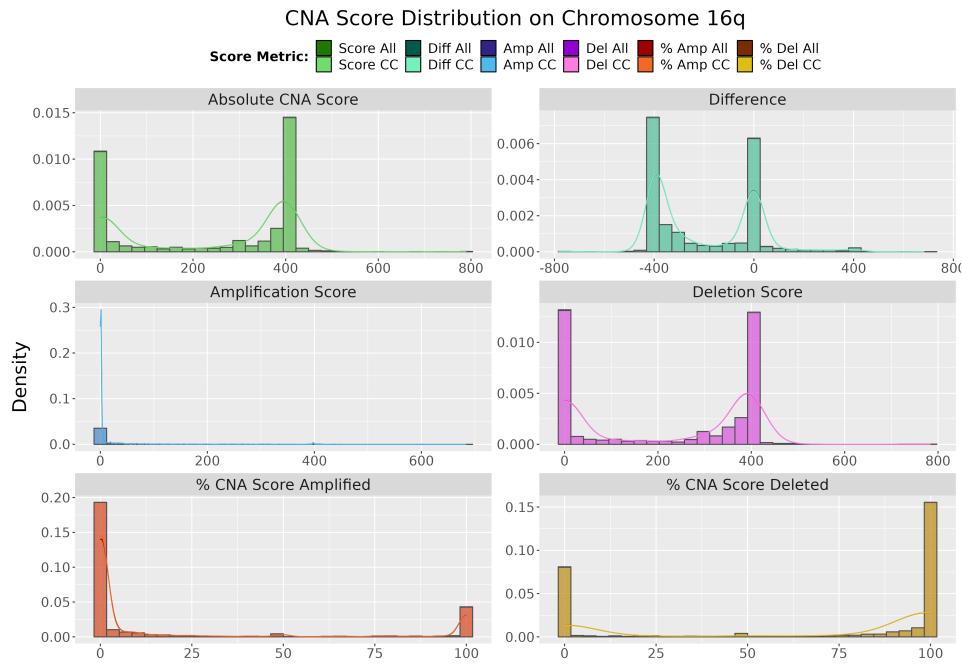


Figure 1.57: Density plots for each CNA Score metric on chromosome 16q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

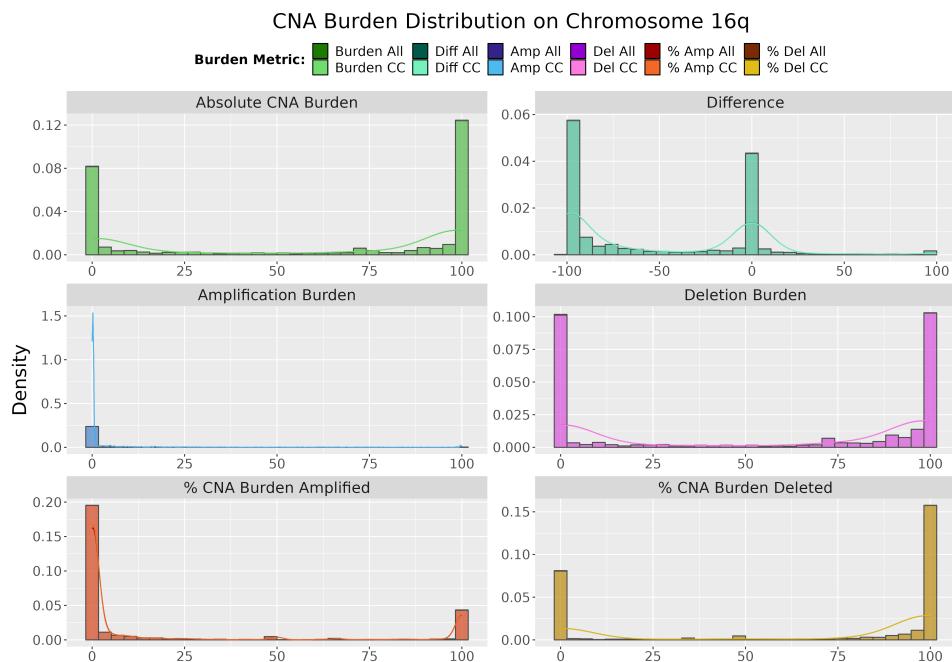


Figure 1.58: Density plots for each CNA Burden metric on chromosome 16q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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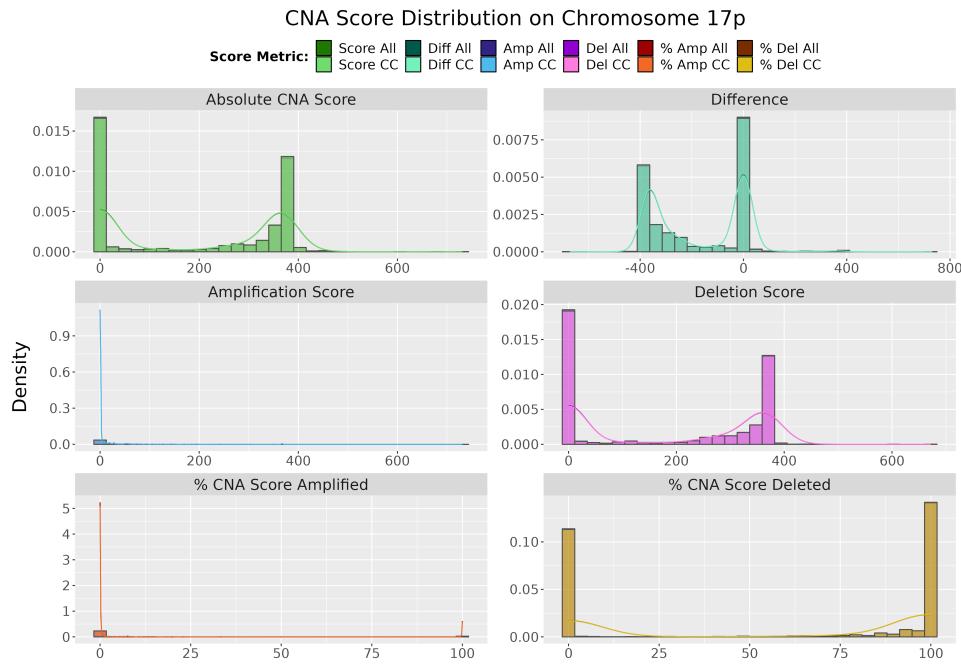


Figure 1.59: Density plots for each CNA Score metric on chromosome 17p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

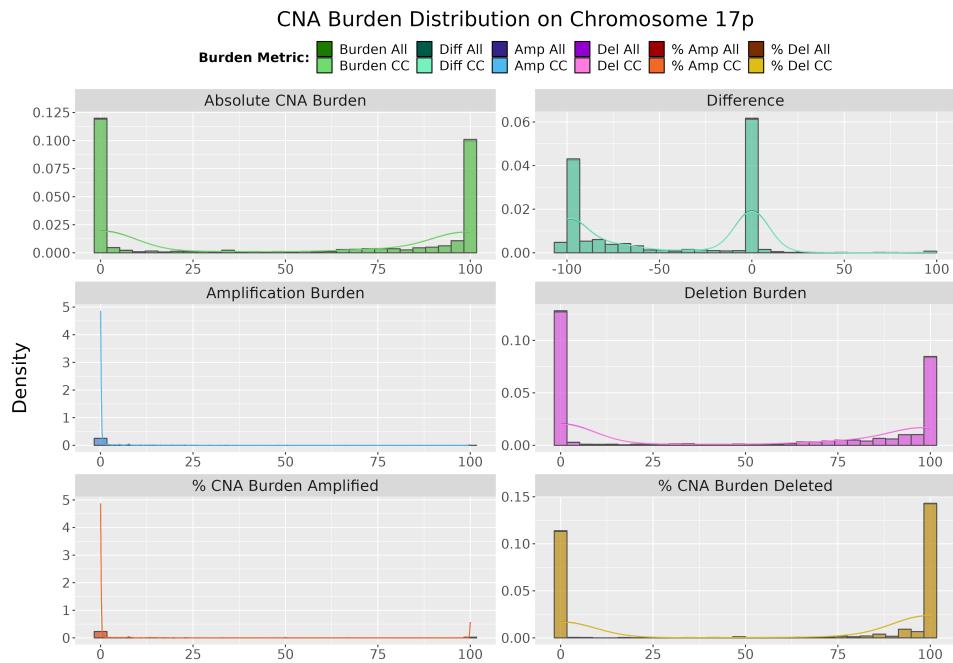


Figure 1.60: Density plots for each CNA Burden metric on chromosome 17p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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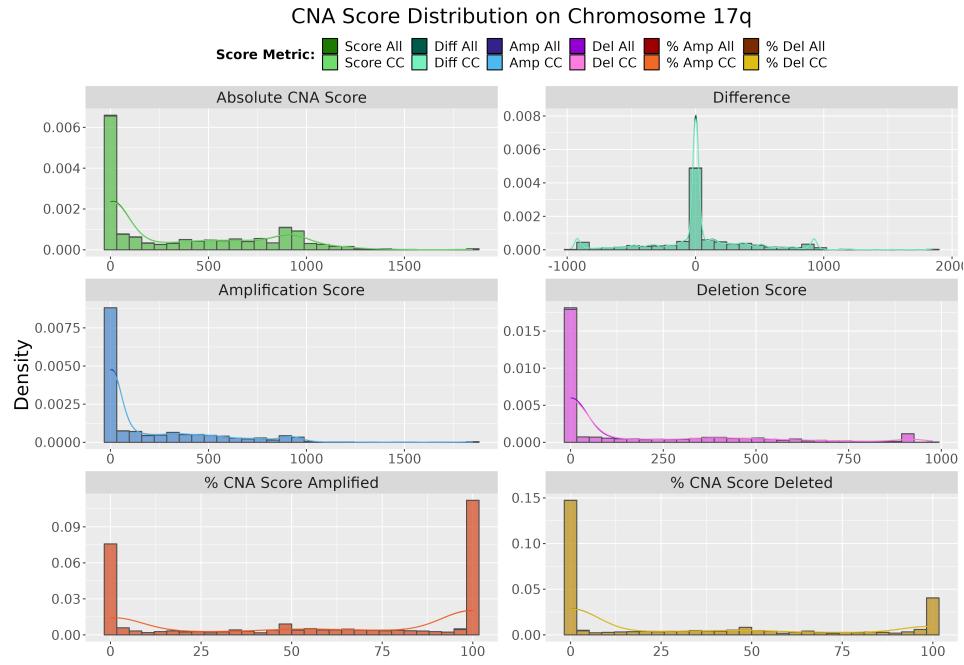


Figure 1.61: Density plots for each CNA Score metric on chromosome 17q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

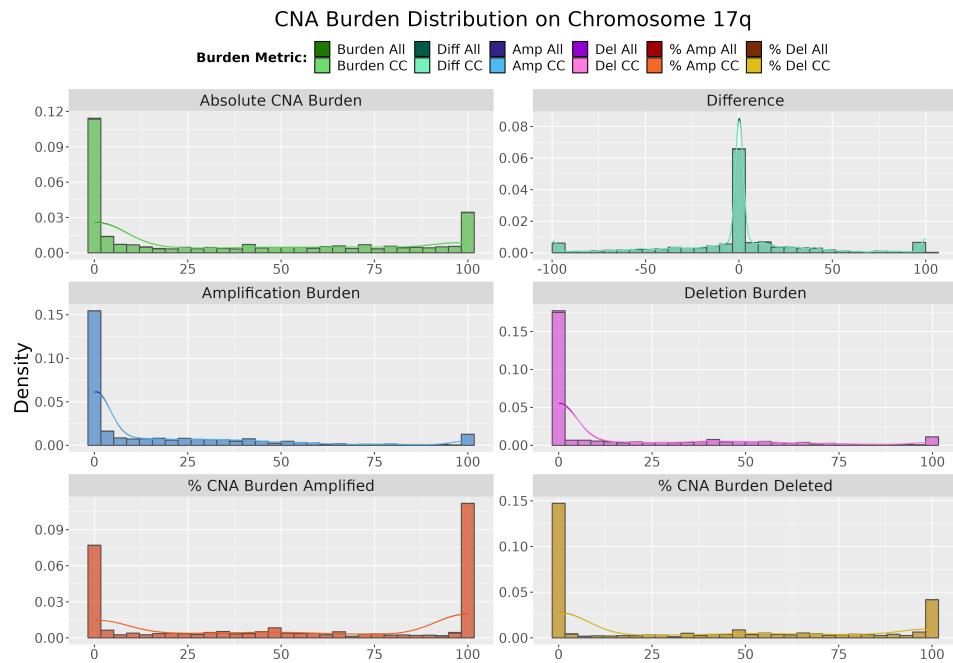


Figure 1.62: Density plots for each CNA Burden metric on chromosome 17q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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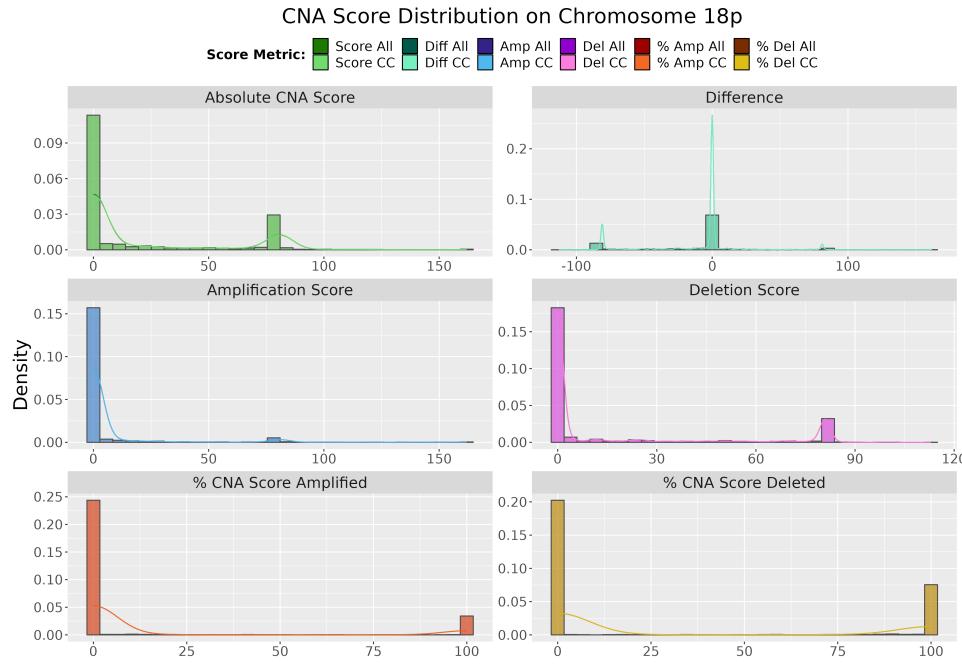


Figure 1.63: Density plots for each CNA Score metric on chromosome 18p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

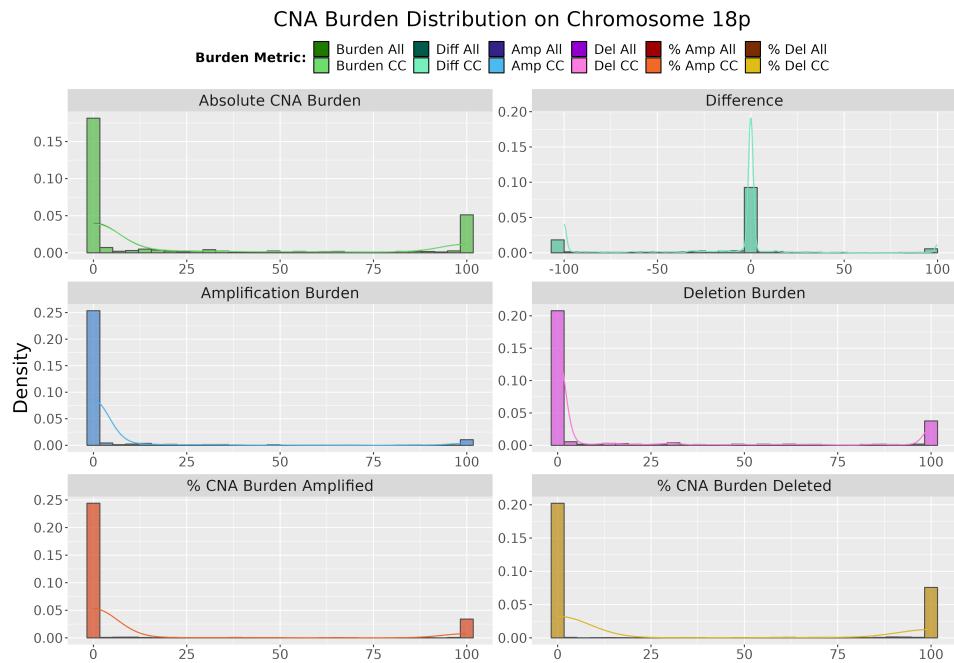


Figure 1.64: Density plots for each CNA Burden metric on chromosome 18p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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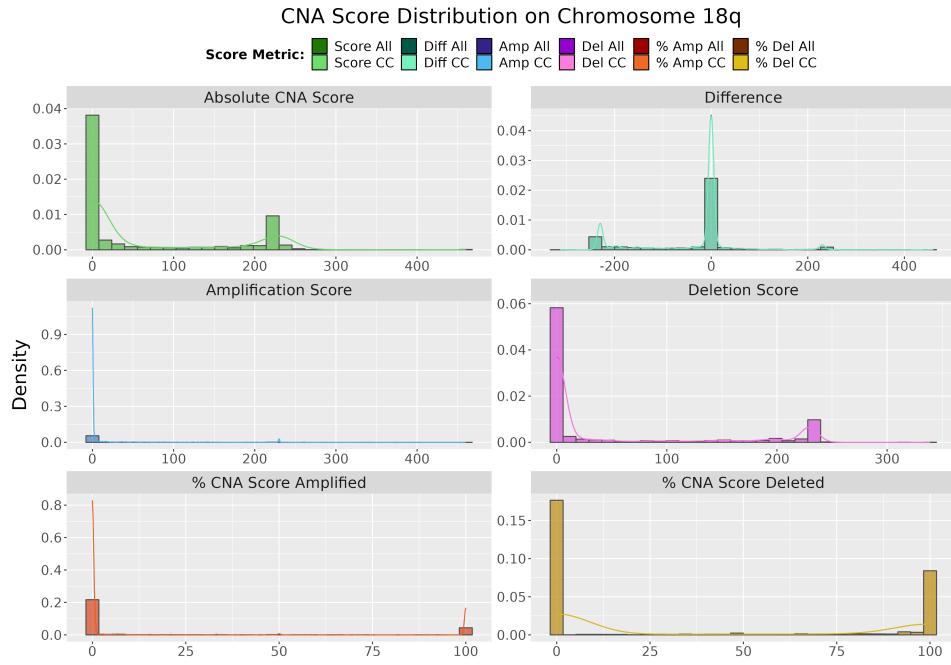


Figure 1.65: Density plots for each CNA Score metric on chromosome 18q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

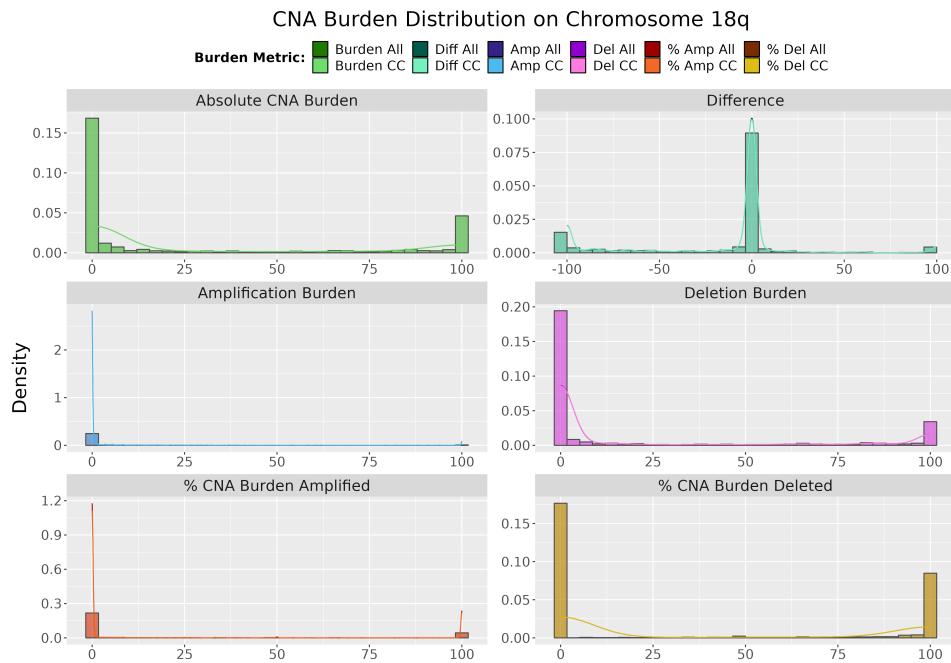


Figure 1.66: Density plots for each CNA Burden metric on chromosome 18q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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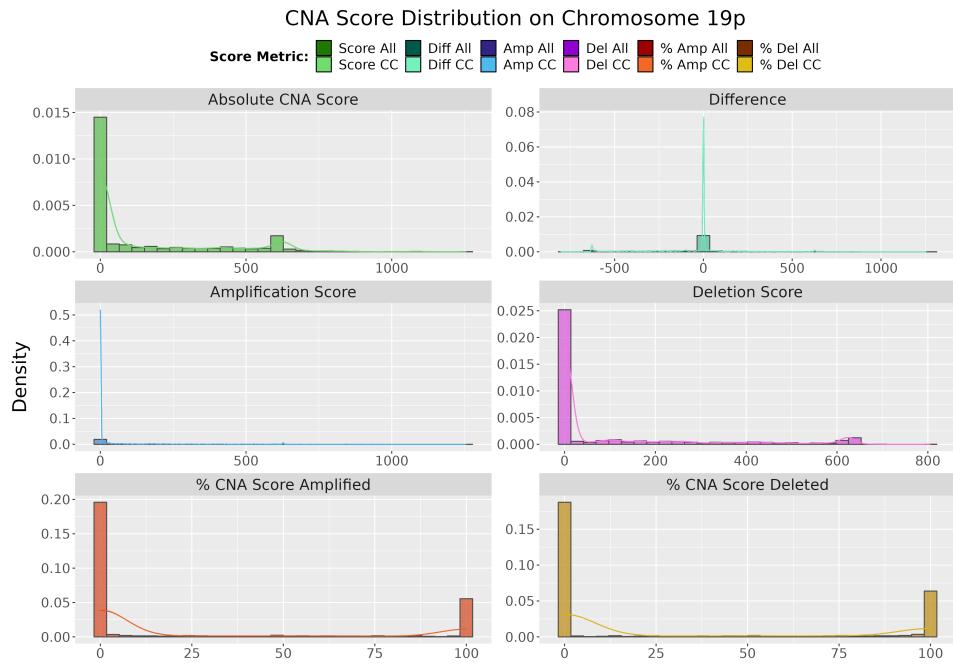


Figure 1.67: Density plots for each CNA Score metric on chromosome 19p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

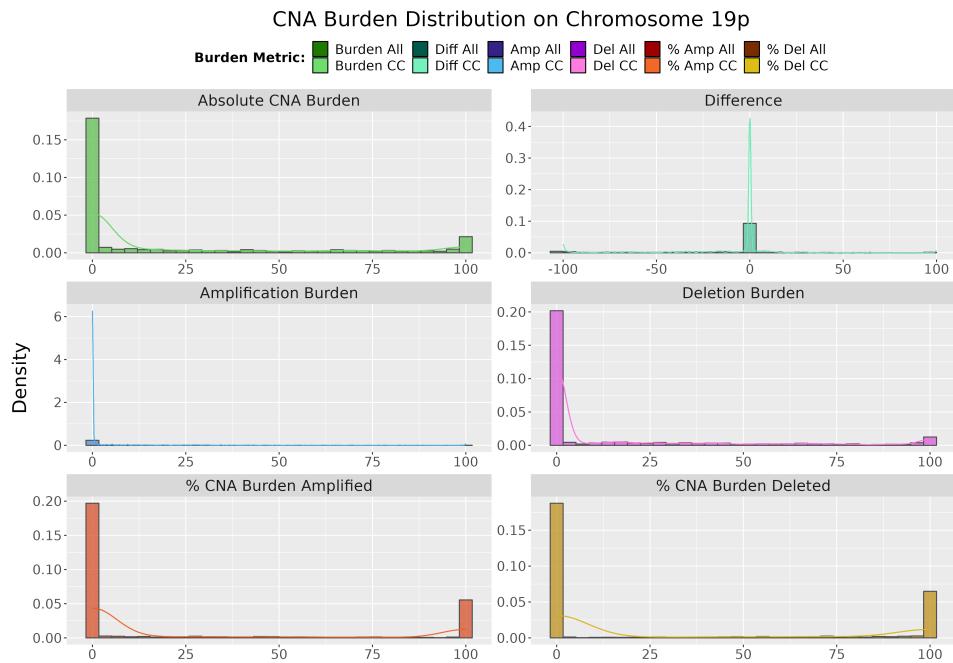


Figure 1.68: Density plots for each CNA Burden metric on chromosome 19p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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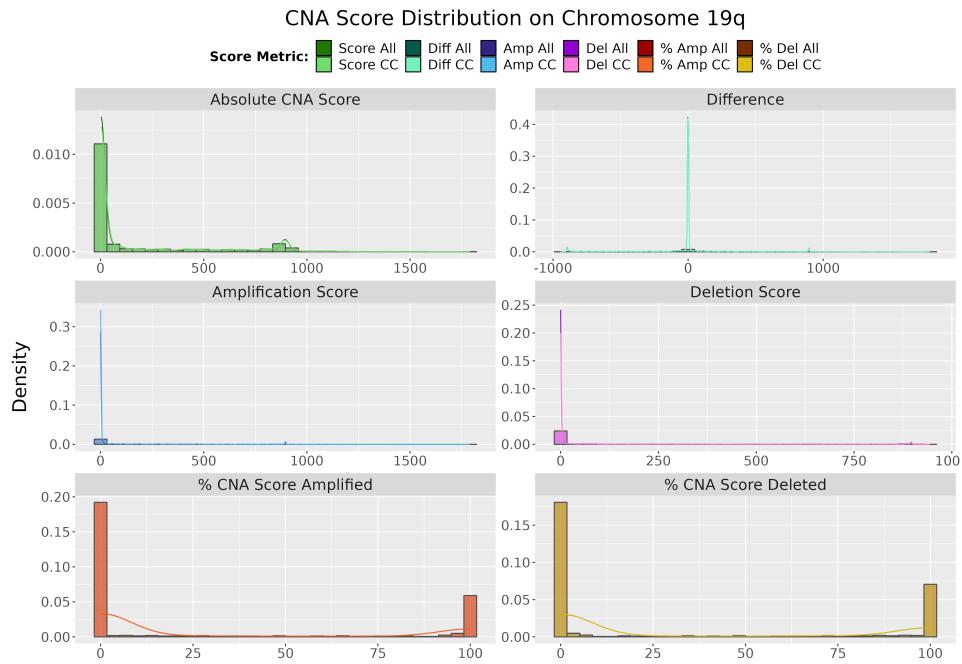


Figure 1.69: Density plots for each CNA Score metric on chromosome 19q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

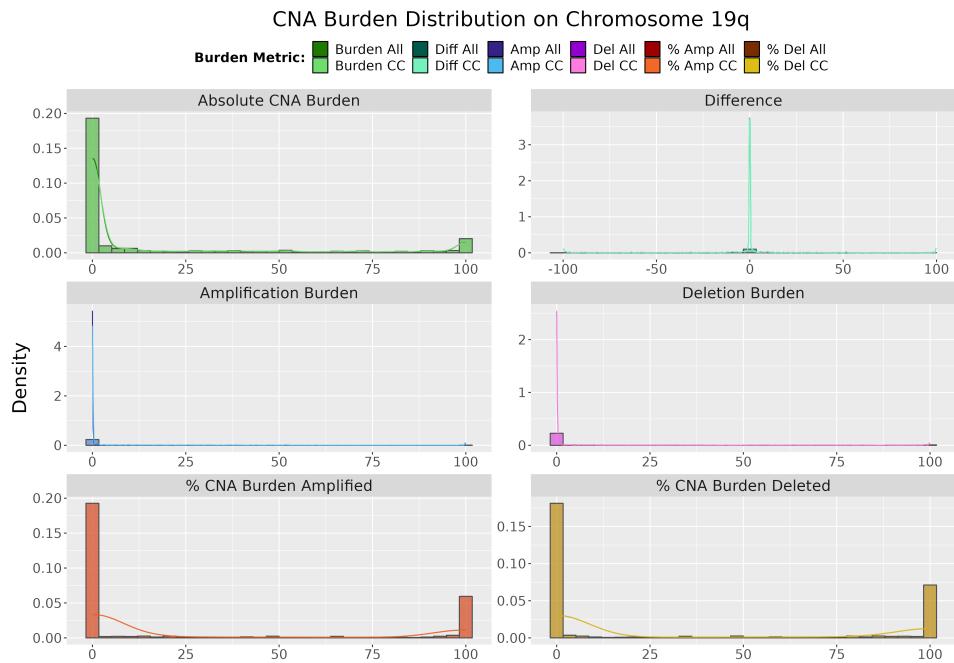


Figure 1.70: Density plots for each CNA Burden metric on chromosome 19q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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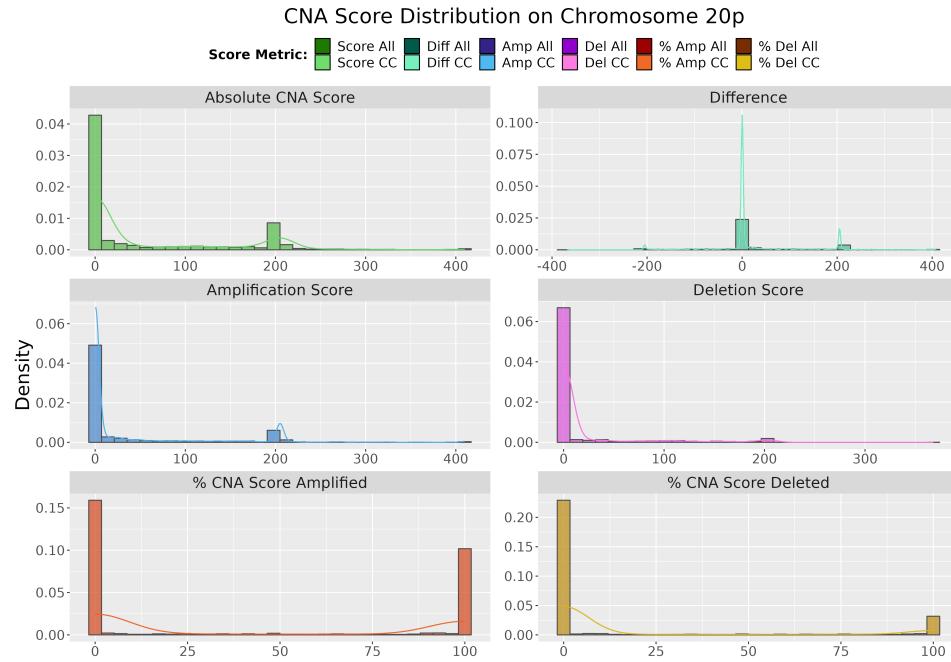


Figure 1.71: Density plots for each CNA Score metric on chromosome 20p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

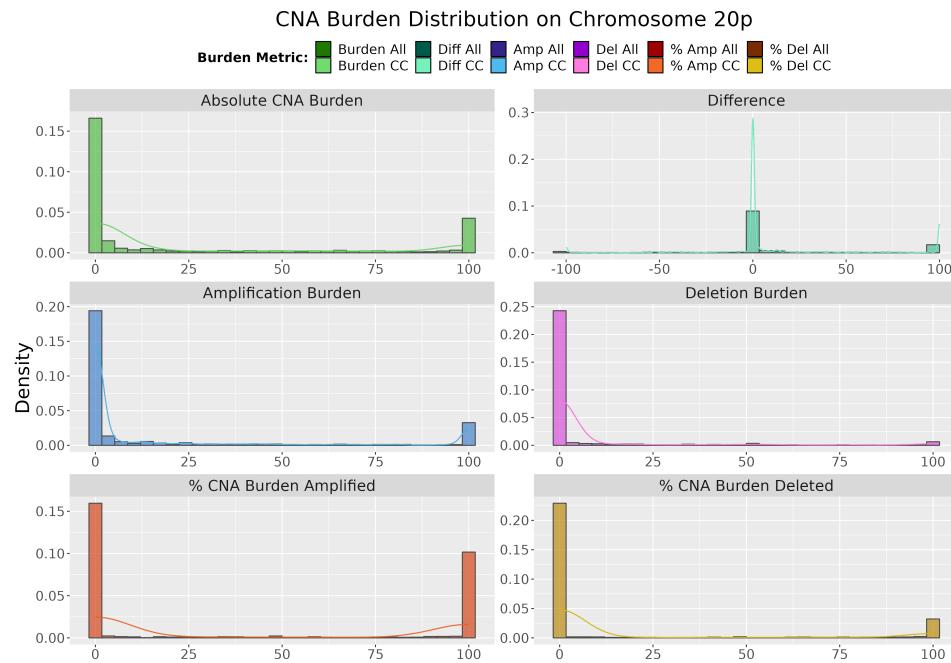


Figure 1.72: Density plots for each CNA Burden metric on chromosome 20p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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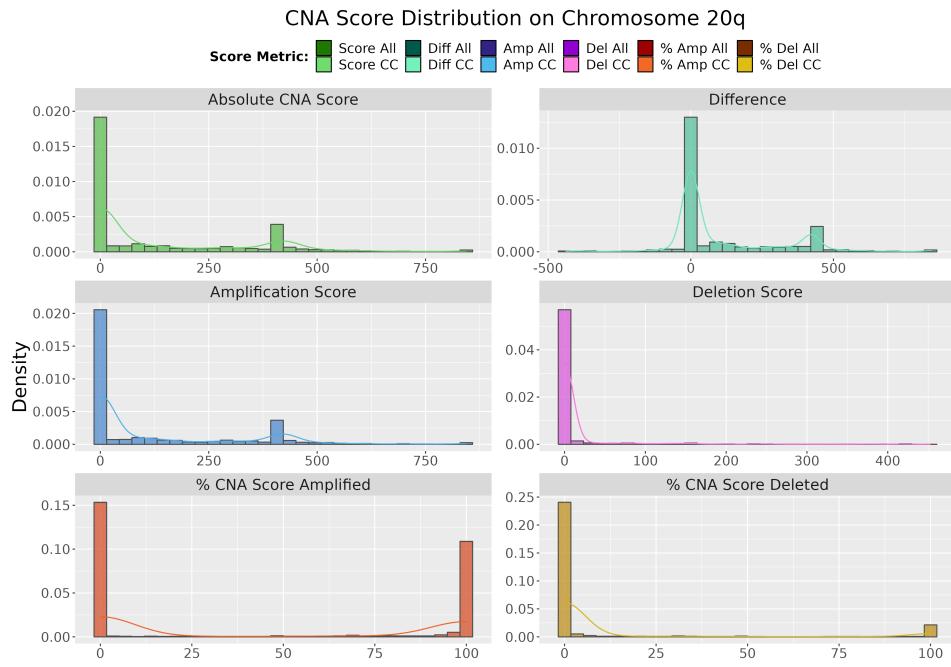


Figure 1.73: Density plots for each CNA Score metric on chromosome 20q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

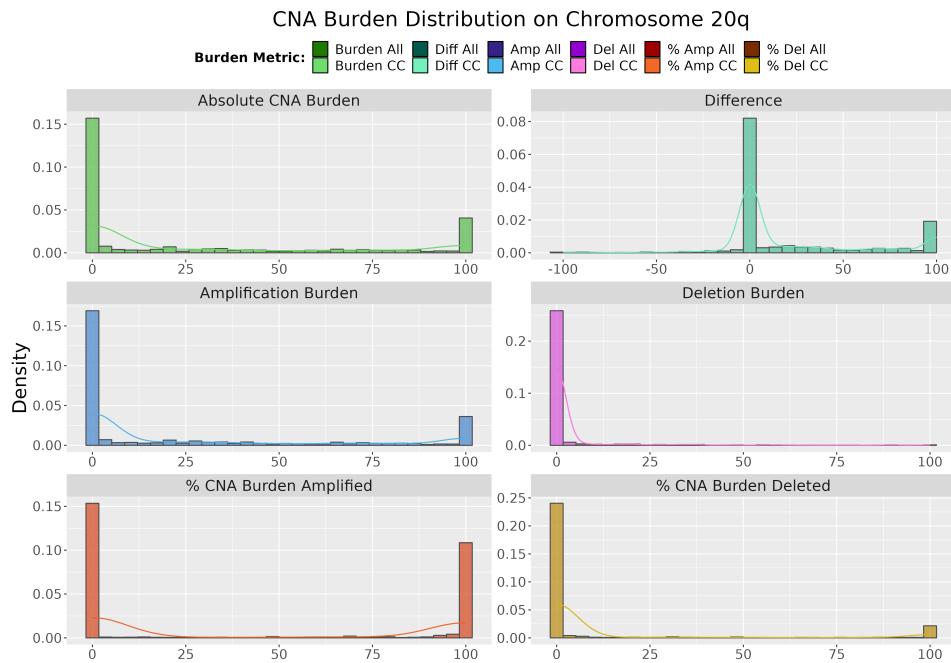


Figure 1.74: Density plots for each CNA Burden metric on chromosome 20q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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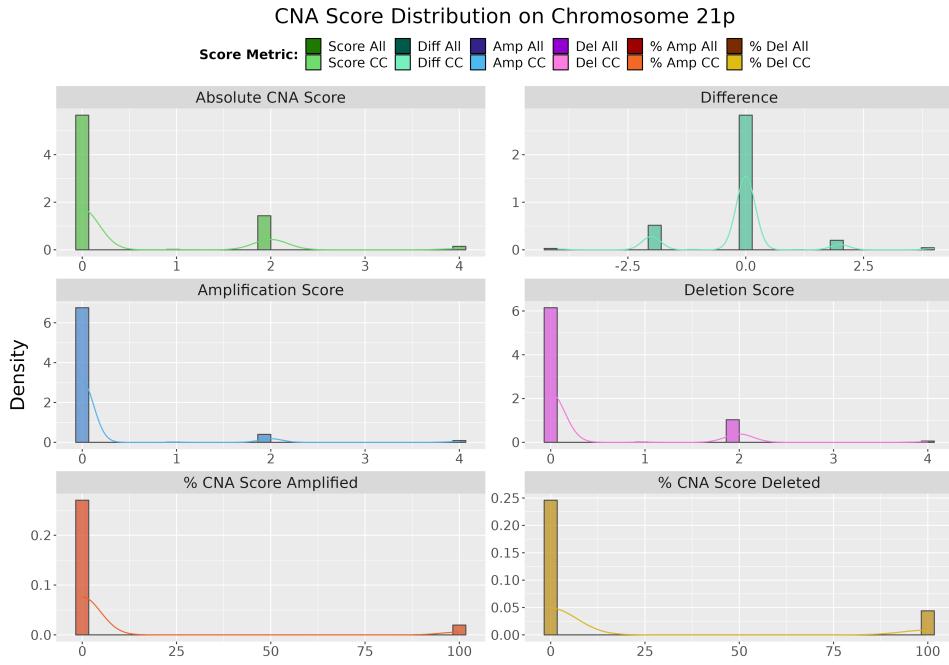


Figure 1.75: Density plots for each CNA Score metric on chromosome 21p. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

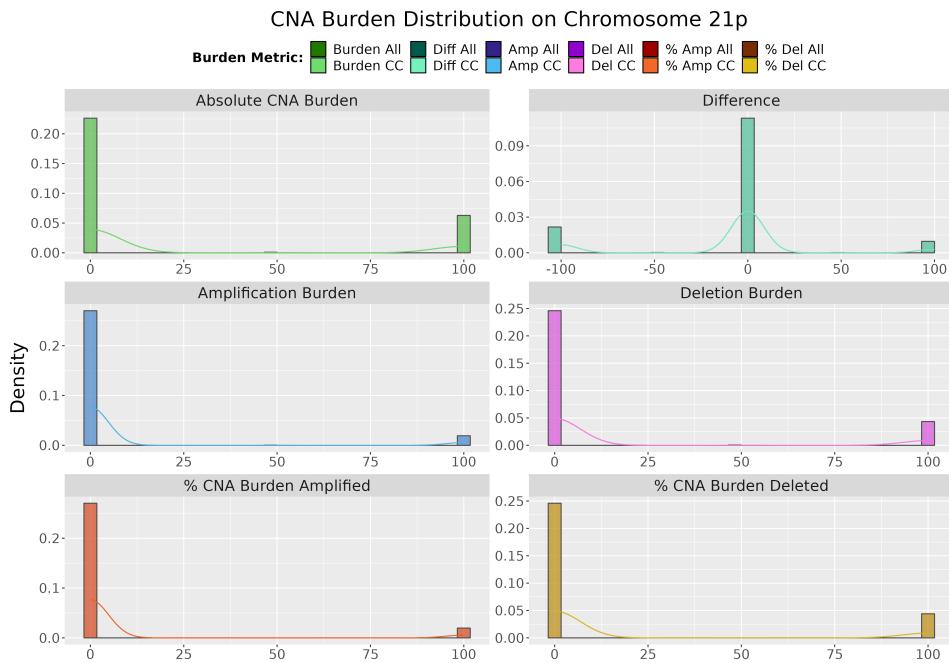


Figure 1.76: Density plots for each CNA Burden metric on chromosome 21p. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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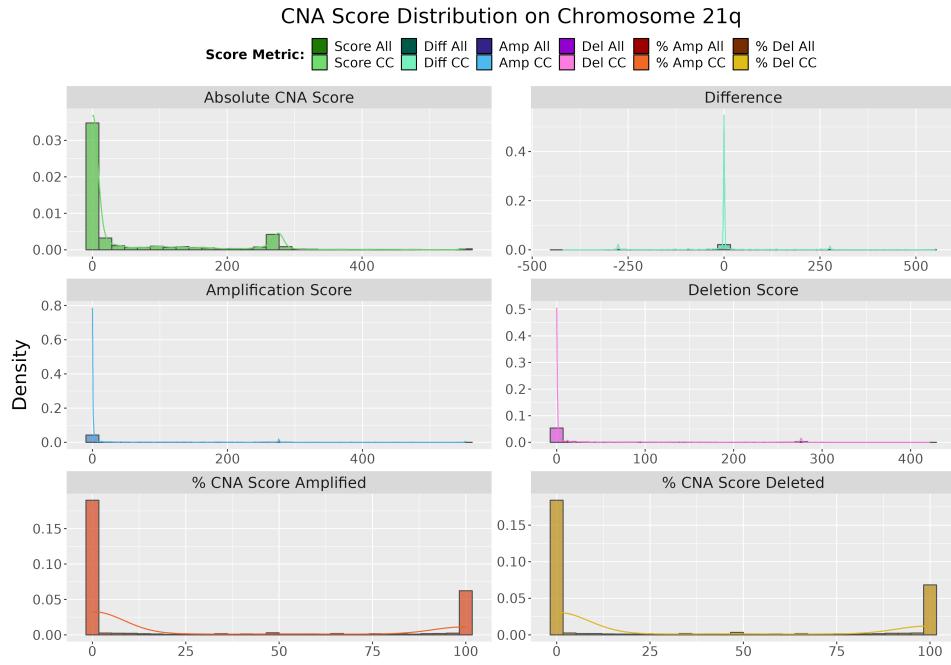


Figure 1.77: Density plots for each CNA Score metric on chromosome 21q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

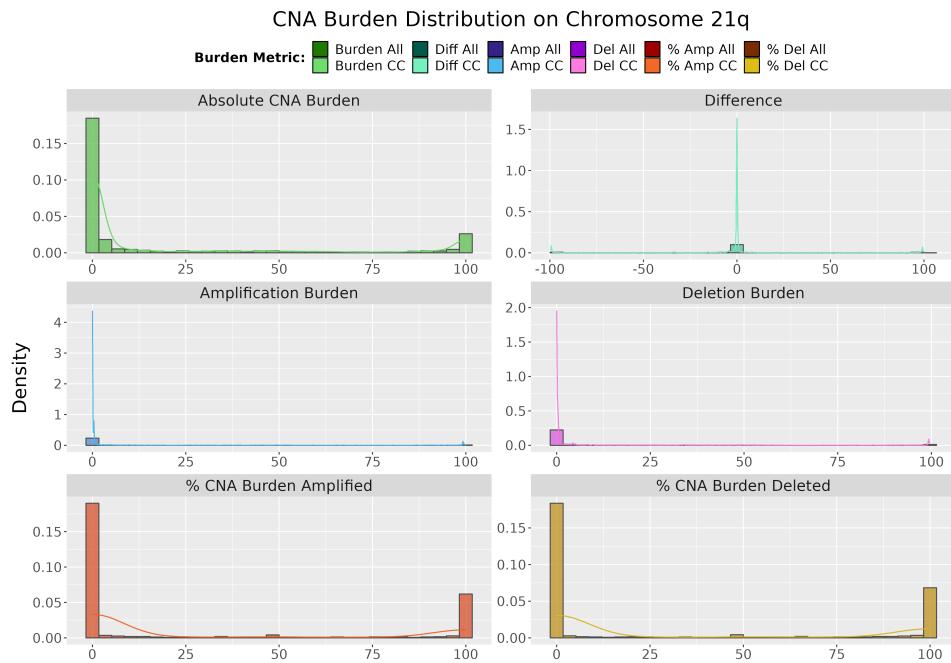


Figure 1.78: Density plots for each CNA Burden metric on chromosome 21q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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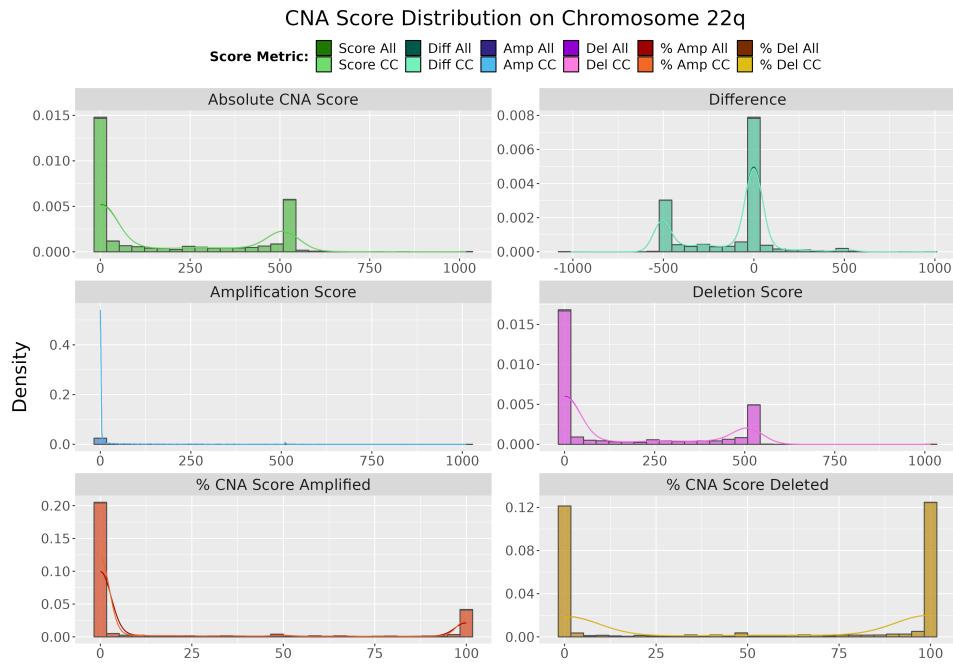


Figure 1.79: Density plots for each CNA Score metric on chromosome 22q. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

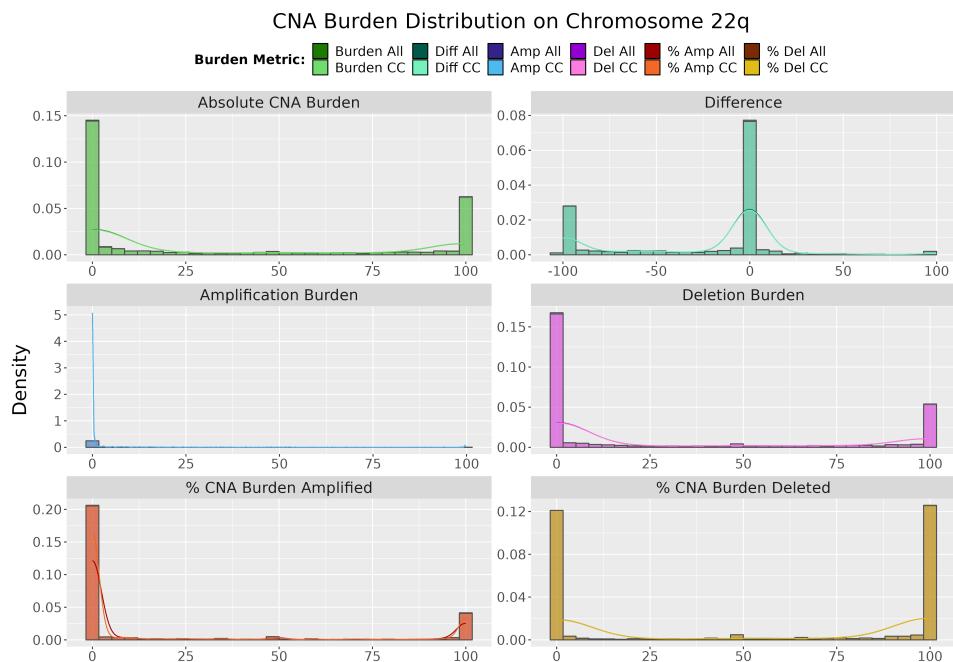


Figure 1.80: Density plots for each CNA Burden metric on chromosome 22q. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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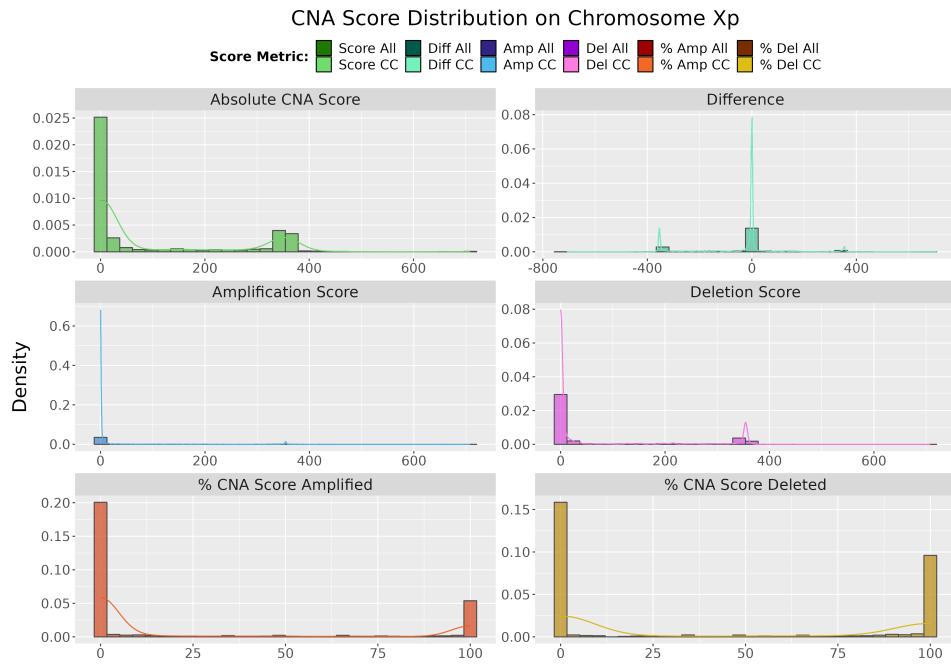


Figure 1.81: Density plots for each CNA Score metric on chromosome Xp. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

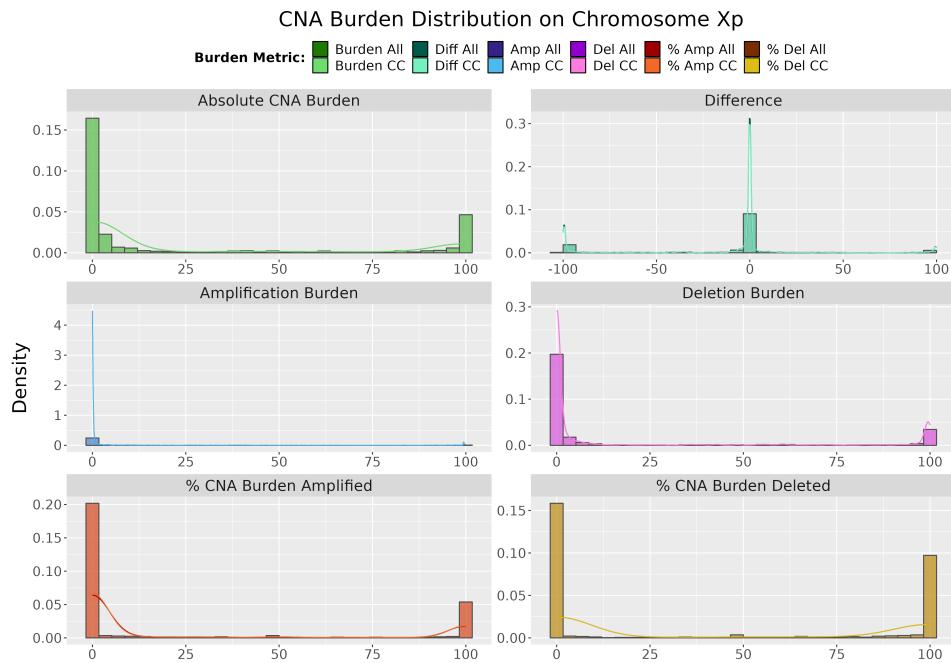


Figure 1.82: Density plots for each CNA Burden metric on chromosome Xp. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

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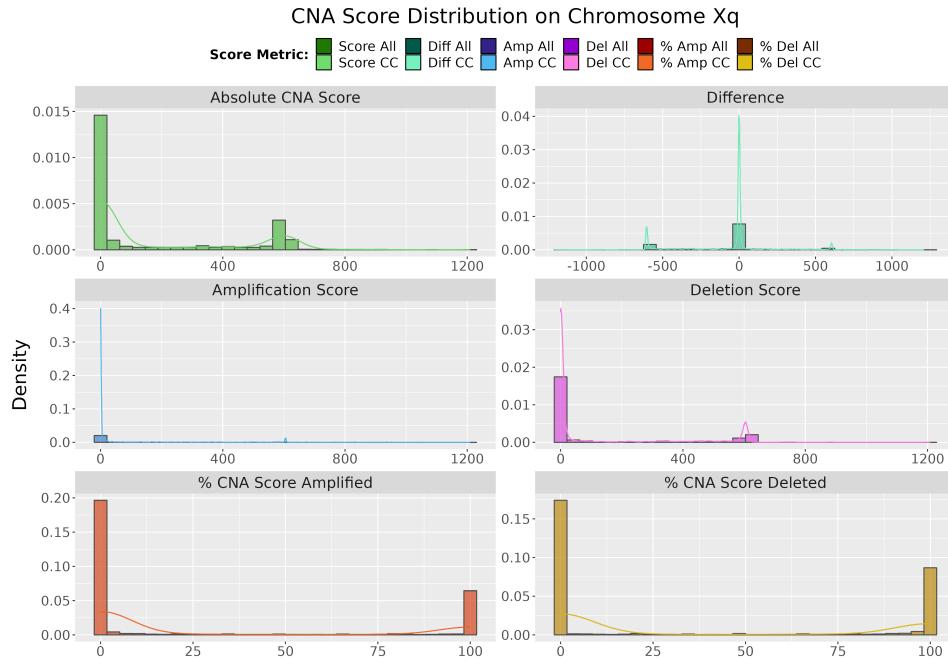


Figure 1.83: Density plots for each CNA Score metric on chromosome Xq. Each facet contains density plots for both the complete case CNA Score metric and the CNA Score metric calculated using all available data.

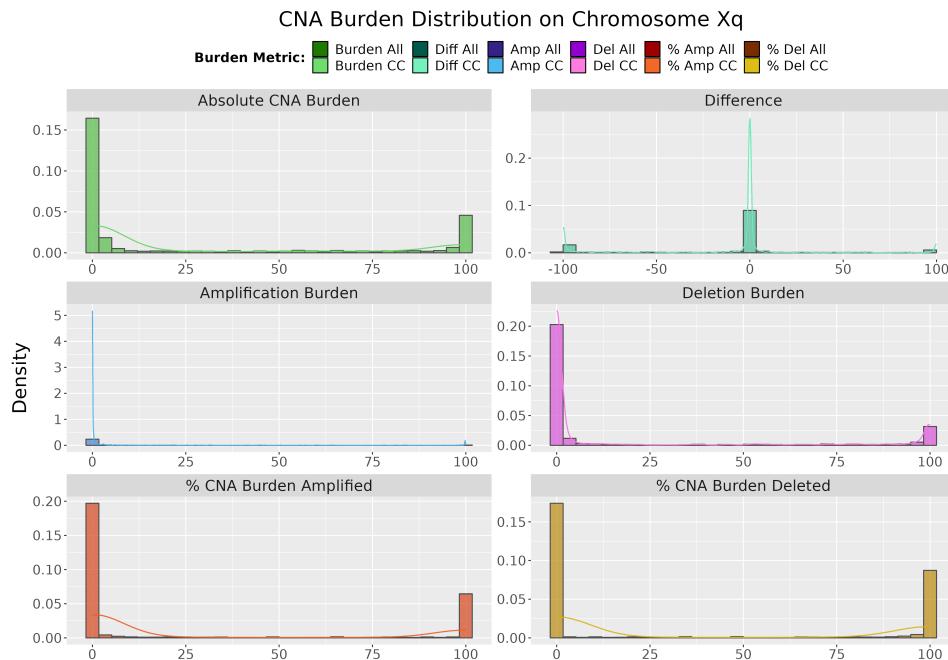


Figure 1.84: Density plots for each CNA Burden metric on chromosome Xq. Each facet contains density plots for both the complete case CNA Burden metric and the CNA Burden metric calculated using all available data.

2 Association of Copy Number Alteration Signatures and Survival Outcomes

Table 1: Assessing the proportional hazards assumption of the final multivariable Cox model including selected clinical variables and Absolute CNA Score, allowing for interactions.

Clinical Variable	Chisq	DF	P-value
PAM50 Subtype	3.50	1	0.06
Histological Grade	2.13	2	0.35
Tumour Size	0.58	1	0.45
Positive Lymph Nodes	0.24	1	0.63
Age at Diagnosis	1.99	1	0.16
HER2 Status	2.43	1	0.12
CNA Score	3.50	1	0.06
CNA Score:PAM50	1.033	1	0.31
Global	14.24	9	0.11

Chisq: Chi-squared test; DF: Degrees of freedom.

Table 2: Assessing the proportional hazards assumption of the final multivariable Cox model including selected clinical variables and Absolute CNA Score Quartiles, allowing for interactions.

Clinical Variable	Chisq	DF	P-value
PAM50 Subtype	3.61	1	0.06
Histological Grade	1.90	2	0.39
Tumour Size	0.38	1	0.54
Positive Lymph Nodes	0.23	1	0.64
Age at Diagnosis	2.26	1	0.13
HER2 Status	2.41	1	0.12
CNA Quartile	12.86	3	< 0.01
CNA Quartile:PAM50	16.39	3	< 0.001
Global	28.22	13	< 0.01

Chisq: Chi-squared test; DF: Degrees of freedom.

3 Effect of Copy Number Alterations on Gene Expression

Results (p-values, log-fold change etc.) corresponding to the ModLim3 and Modlim5 differential gene expression analysis are provided as .txt files in the DE_Genes folder.