(A)

Category	REF	WES	FFPE*		Input DNA amount			Purity & Coverage
Sample	Fresh	Fresh	FFPE	FFPE	Fresh	Fresh	Fresh	Fresh
Input DNA amount	1000ng	1000ng	200ng	200ng	100ng	10ng	1ng	1000ng
Tumor purity	100%	100%	100%	100%	100%	100%	100%	100%, 75%, 50%, 20%, 10%, 5%
Capture	WGS	WES	WES	WGS	WGS	WGS	WGS	WGS
Coverage	100x	100x	100x	100x	100x	100x	100x	300x, 200x, 100x, 80x, 50x, 30x, 10x
Replicates	21	12	3	4	3	3	3	42

Total: 91

Fixed Varied

*Formalin Fixed Paraffin Embedded

(B)

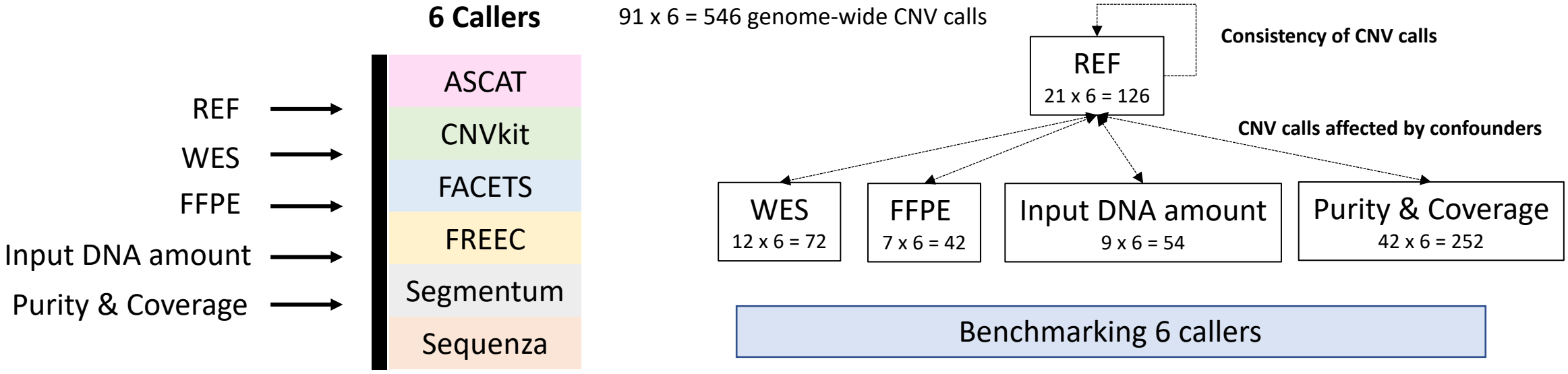


Figure 2

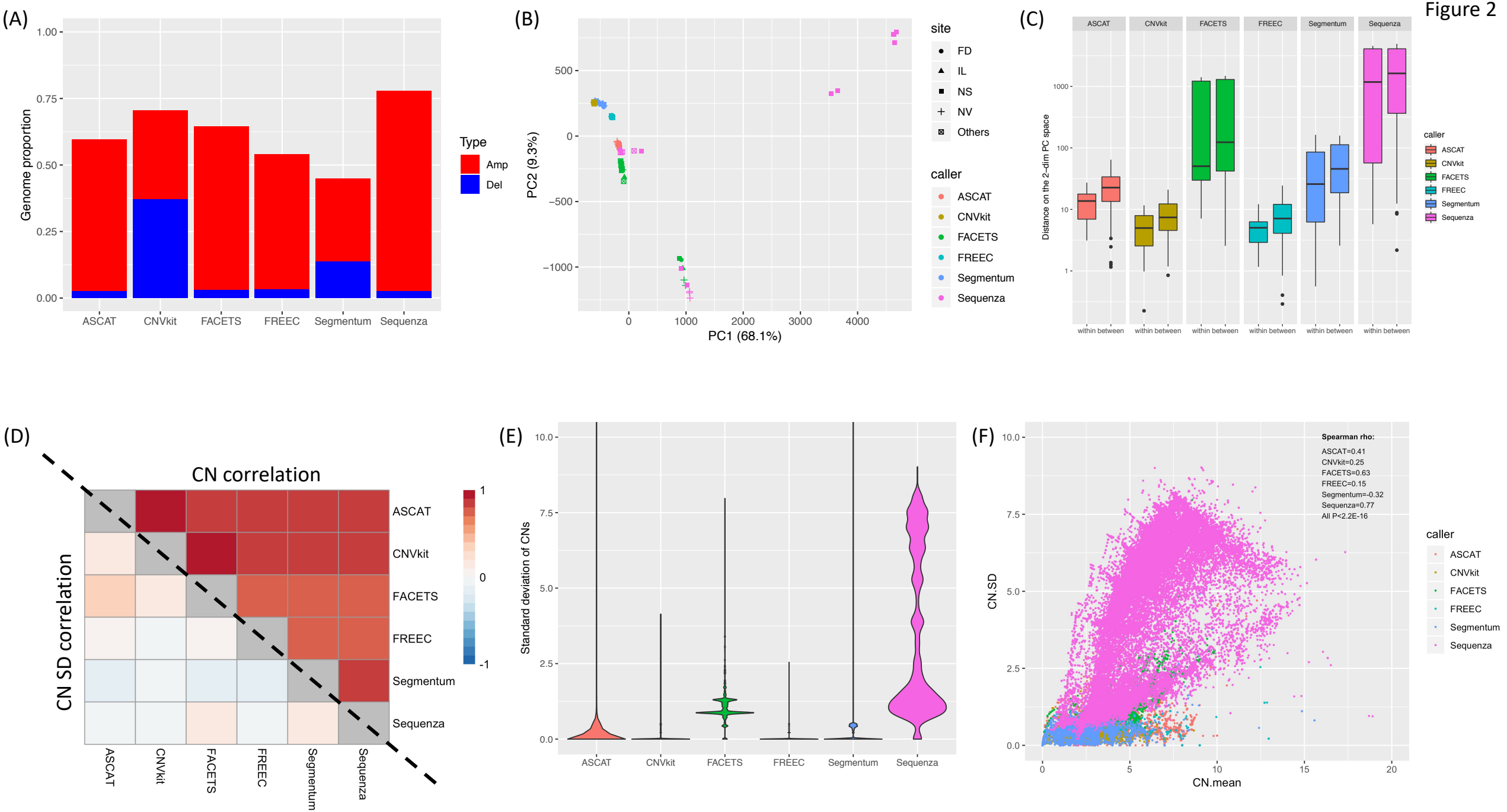
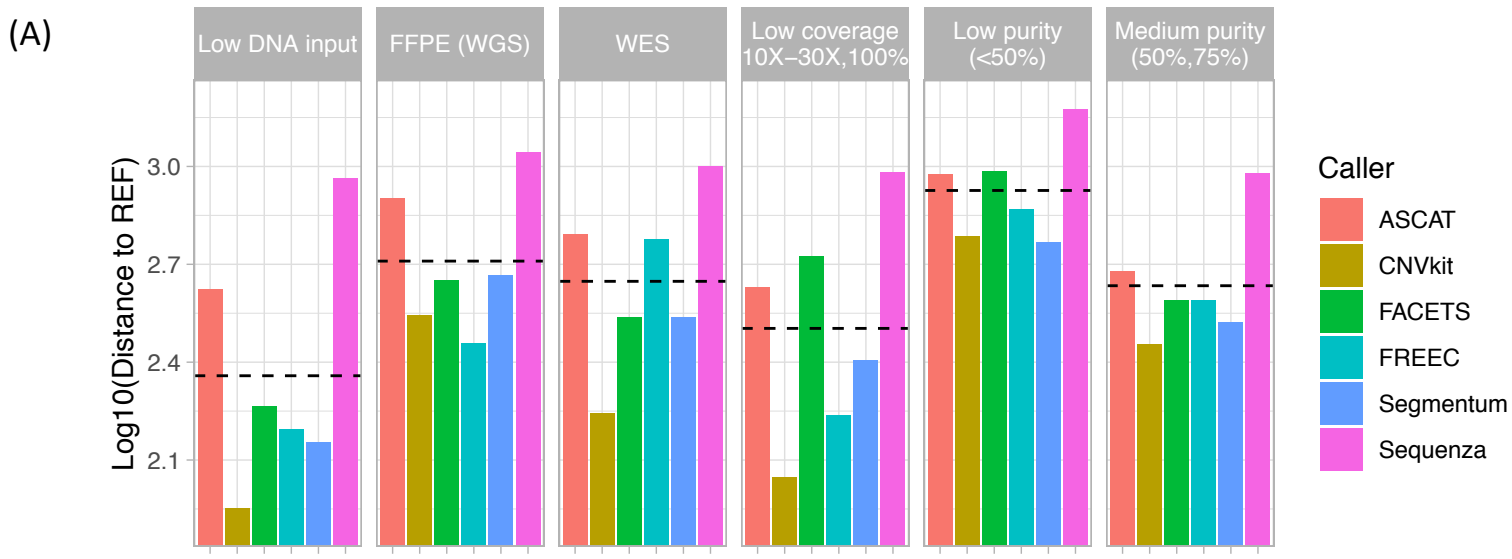
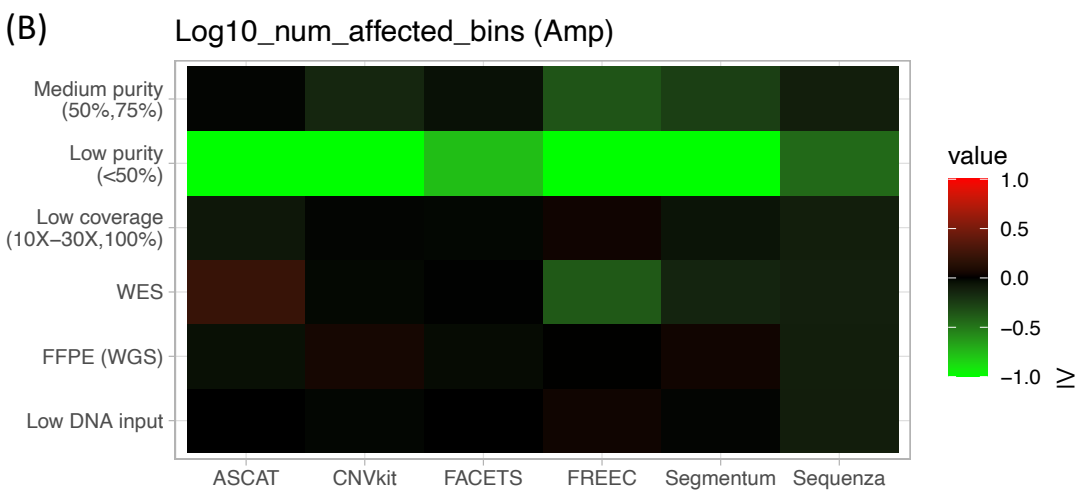
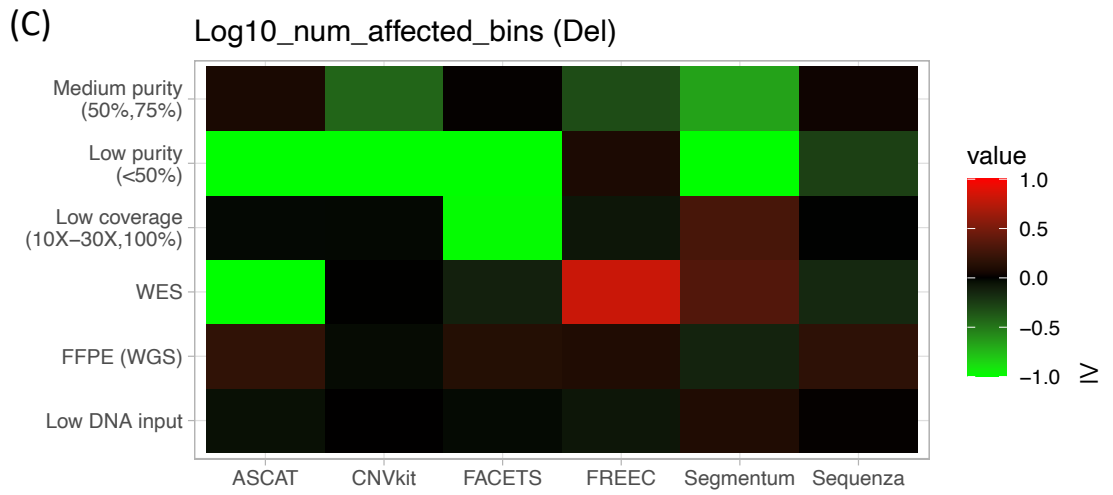
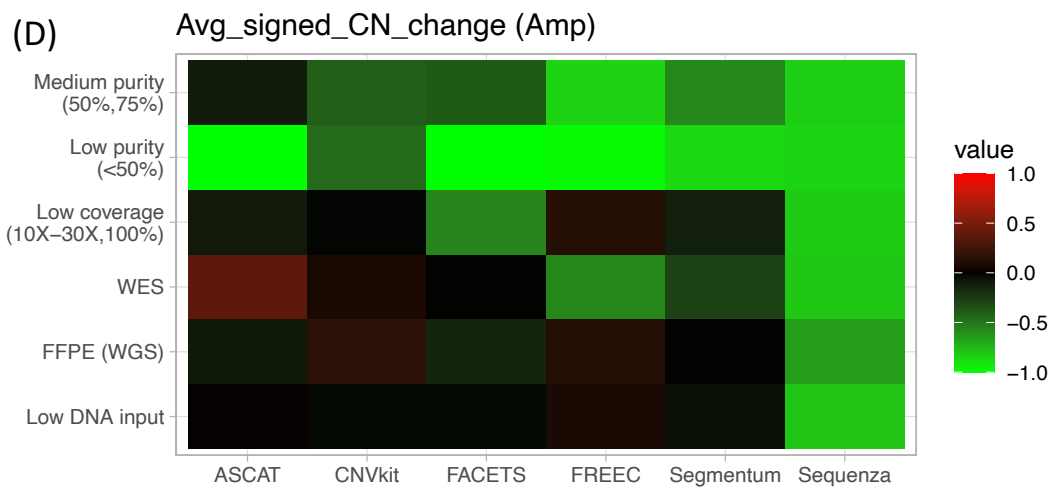

(A)
Genome proportion
1.00
0.75
0.50
0.25
0.00
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Type
Amp
Del
(B)
PC2 (9.3%)
PC1 (68.1%)
site
FD
IL
NS
NV
Others
caller
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
(C)
Distance on the 2−dim PC space
within between
caller
(D)
CN correlation
CN SD correlation
(E)
Standard deviation of CNs
(F)
CN.SD
CN.mean
Spearman rho:
ASCAT=0.41
CNVkit=0.25
FACETS=0.63
FREEC=0.15
Segmentum=-0.32
Sequenza=0.77
All P<2.2E-16

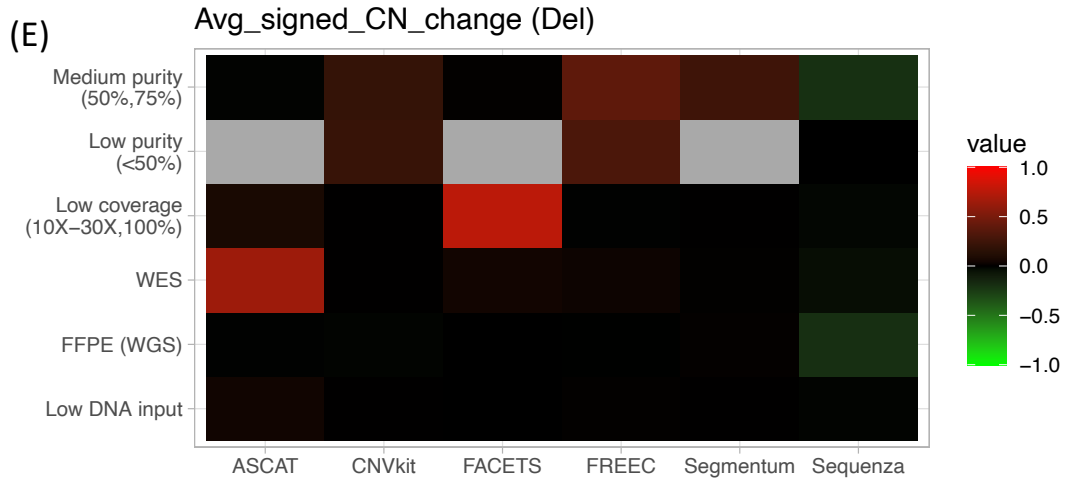
Figure 3

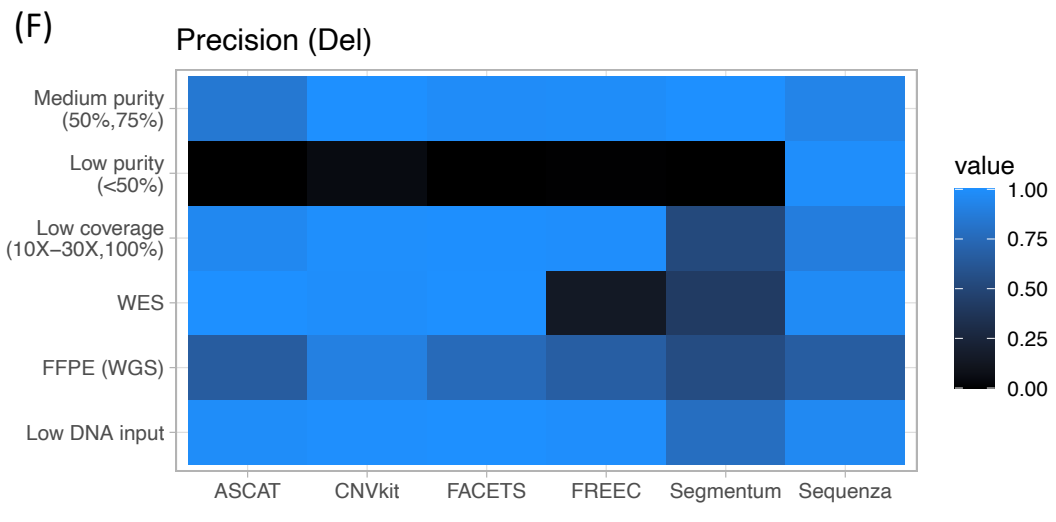

(A)
Low DNA input
FFPE (WGS)
WES
Low coverage 10X–30X,100%
Low purity (<50%)
Medium purity (50%,75%)
Log10(Distance to REF)
3.0
2.7
2.4
2.1
Caller
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza

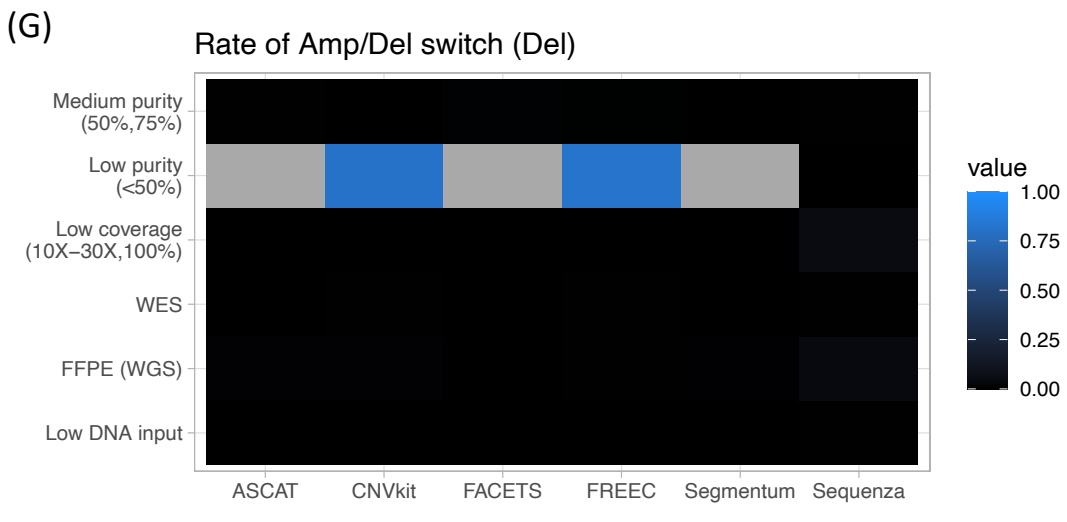

(B)
Log10_num_affected_bins (Amp)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.0
0.5
0.0
−0.5
−1.0
NA
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza


(C)
Log10_num_affected_bins (Del)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.0
0.5
0.0
−0.5
−1.0
NA
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza

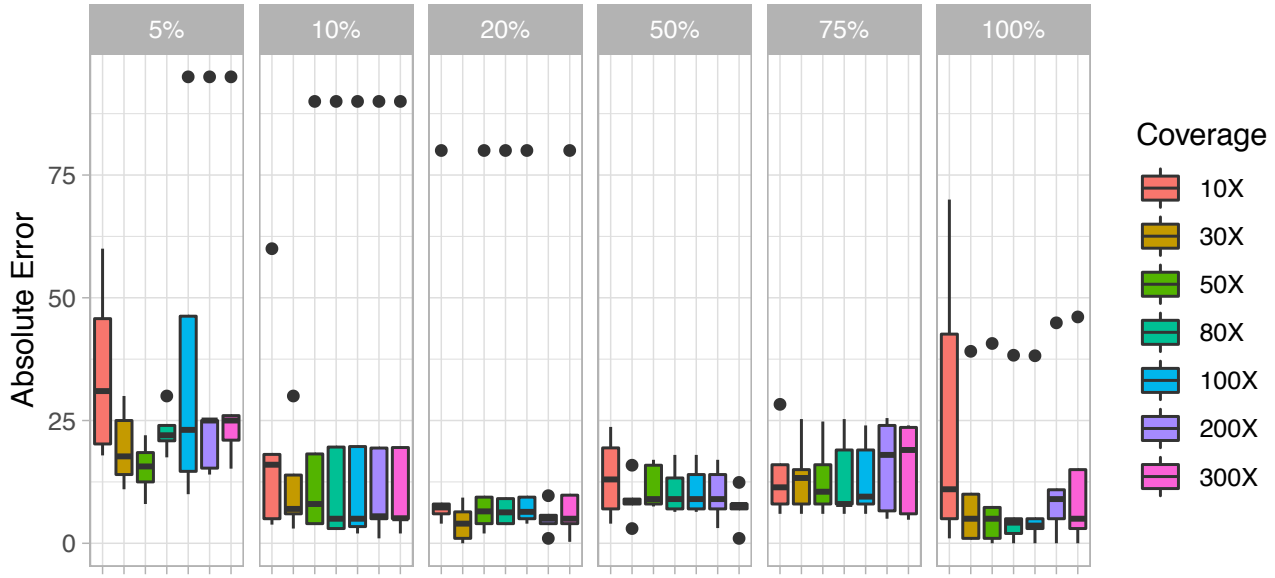

(D)
Avg_signed_CN_change (Amp)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.0
0.5
0.0
−0.5
−1.0
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza


(E)
Avg_signed_CN_change (Del)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.0
0.5
0.0
−0.5
−1.0
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza


(F)
Precision (Del)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.00
0.75
0.50
0.25
0.00
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza


(G)
Rate of Amp/Del switch (Del)
Medium purity (50%,75%)
Low purity (<50%)
Low coverage (10X–30X,100%)
WES
FFPE (WGS)
Low DNA input
value
1.00
0.75
0.50
0.25
0.00
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza

(A)


5%
10%
20%
50%
75%
100%
Absolute Error
0
25
50
75
Coverage
10X
30X
50X
80X
100X
200X
300X

(B)

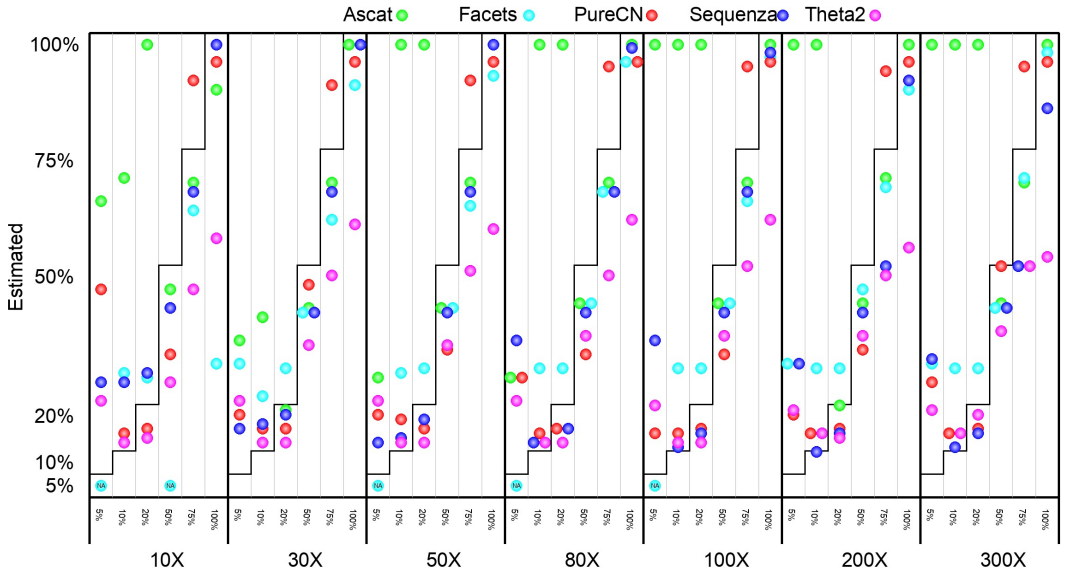
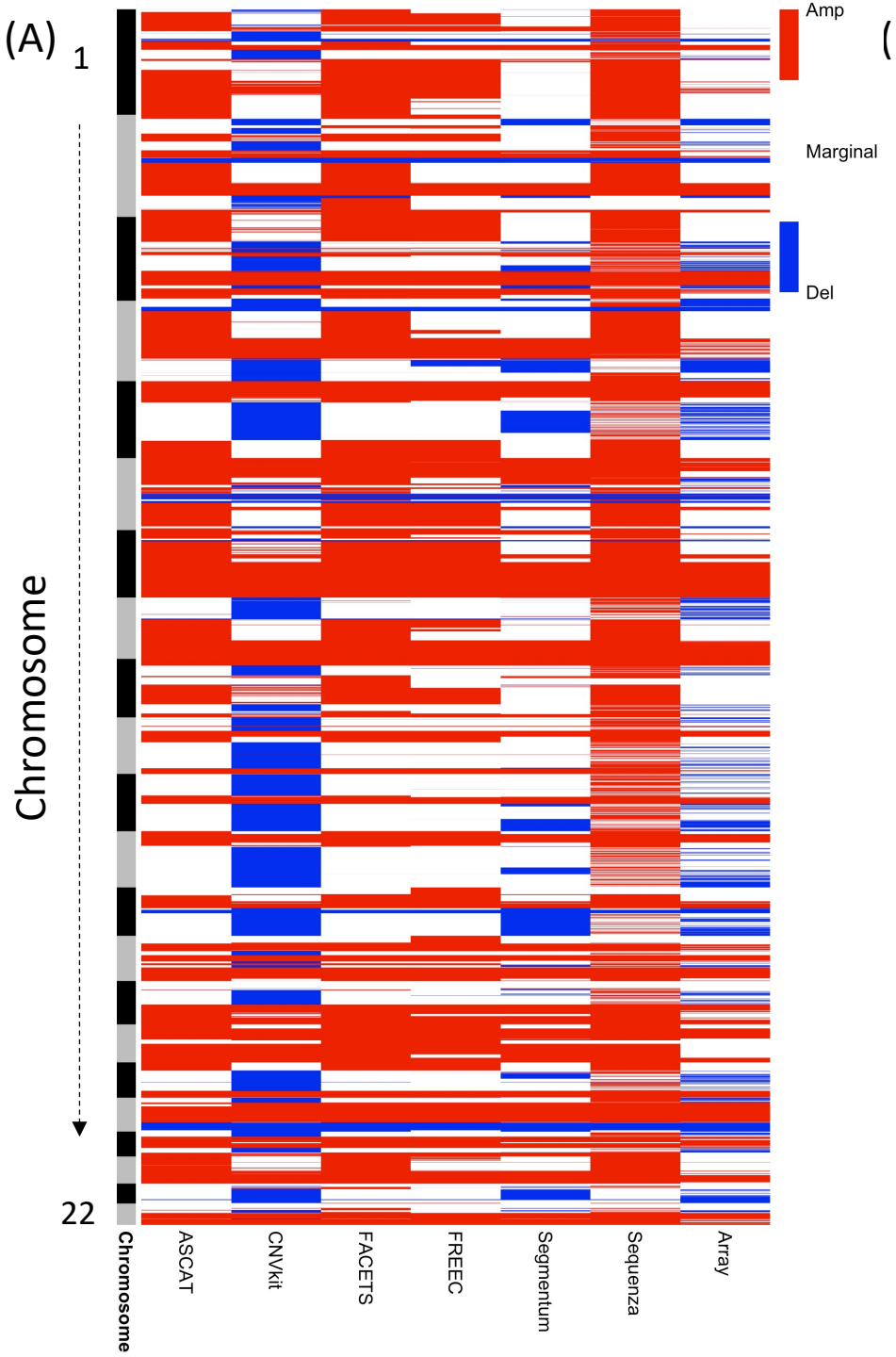
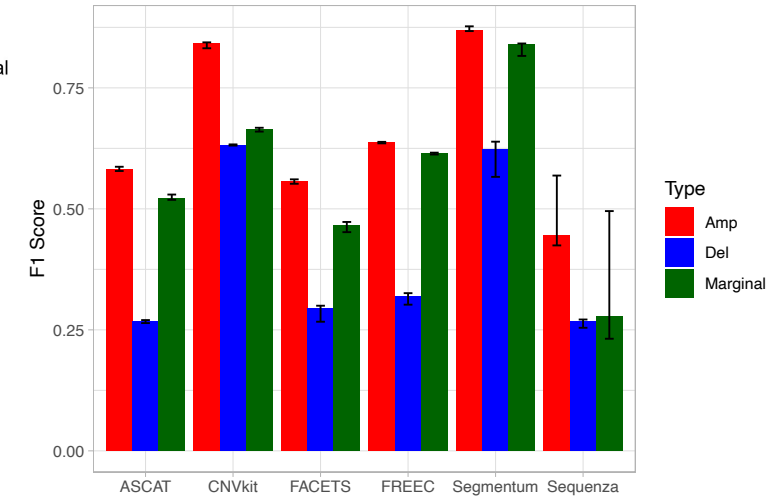
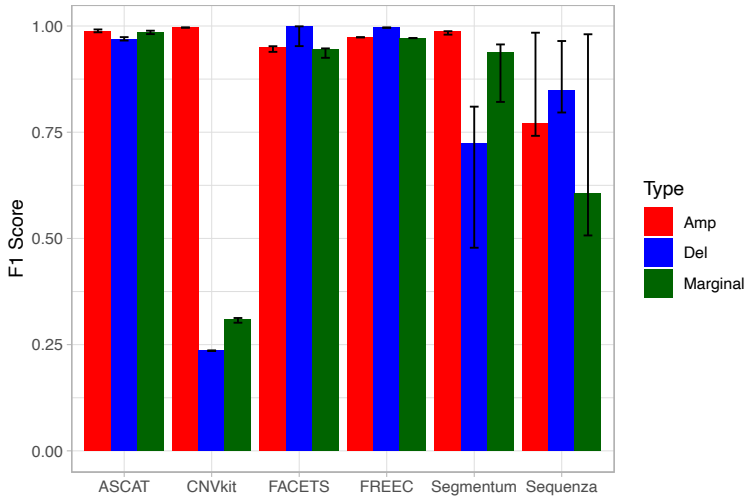

Ascat
Facets
PureCN
Sequenza
Theta2
Estimated
100%
75%
50%
20%
10%
5%
10X
30X
50X
80X
100X
200X
300X

Figure 5


(A)
1
22
Chromosome
Amp
Marginal
Del
Chromosome
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Array


(B)
Performance based on array calls
F1 Score
0.00
0.25
0.50
0.75
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Type
Amp
Del
Marginal


(D)
Performance based on high confidence calls
F1 Score
0.00
0.25
0.50
0.75
1.00
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Type
Amp
Del
Marginal

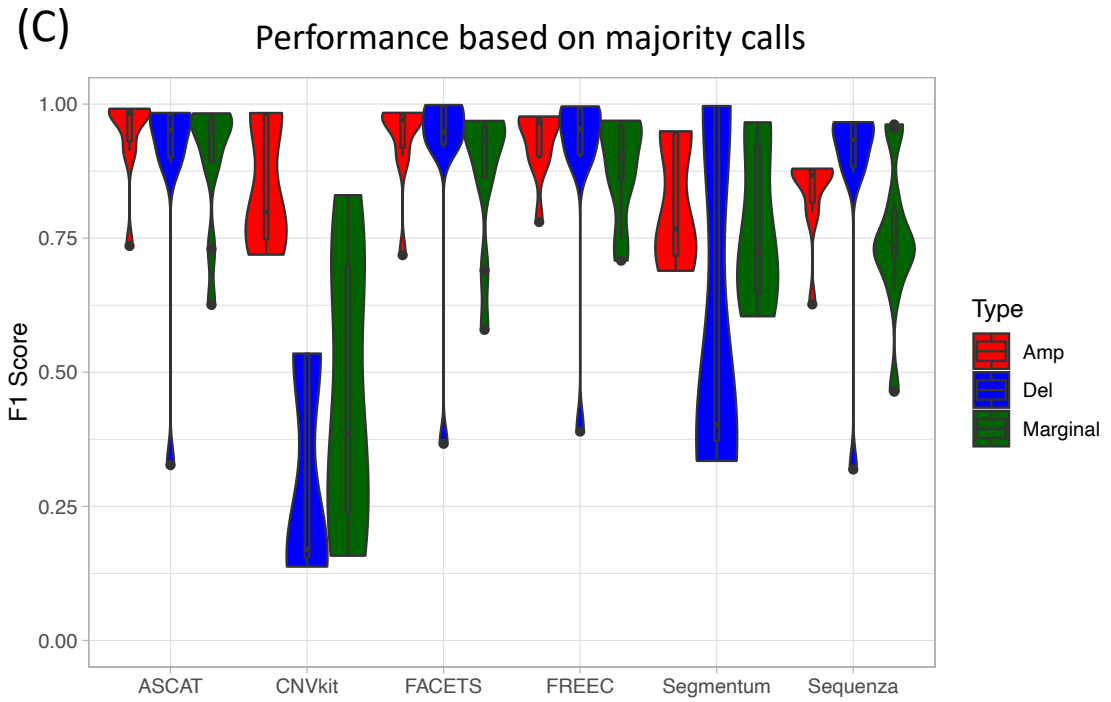
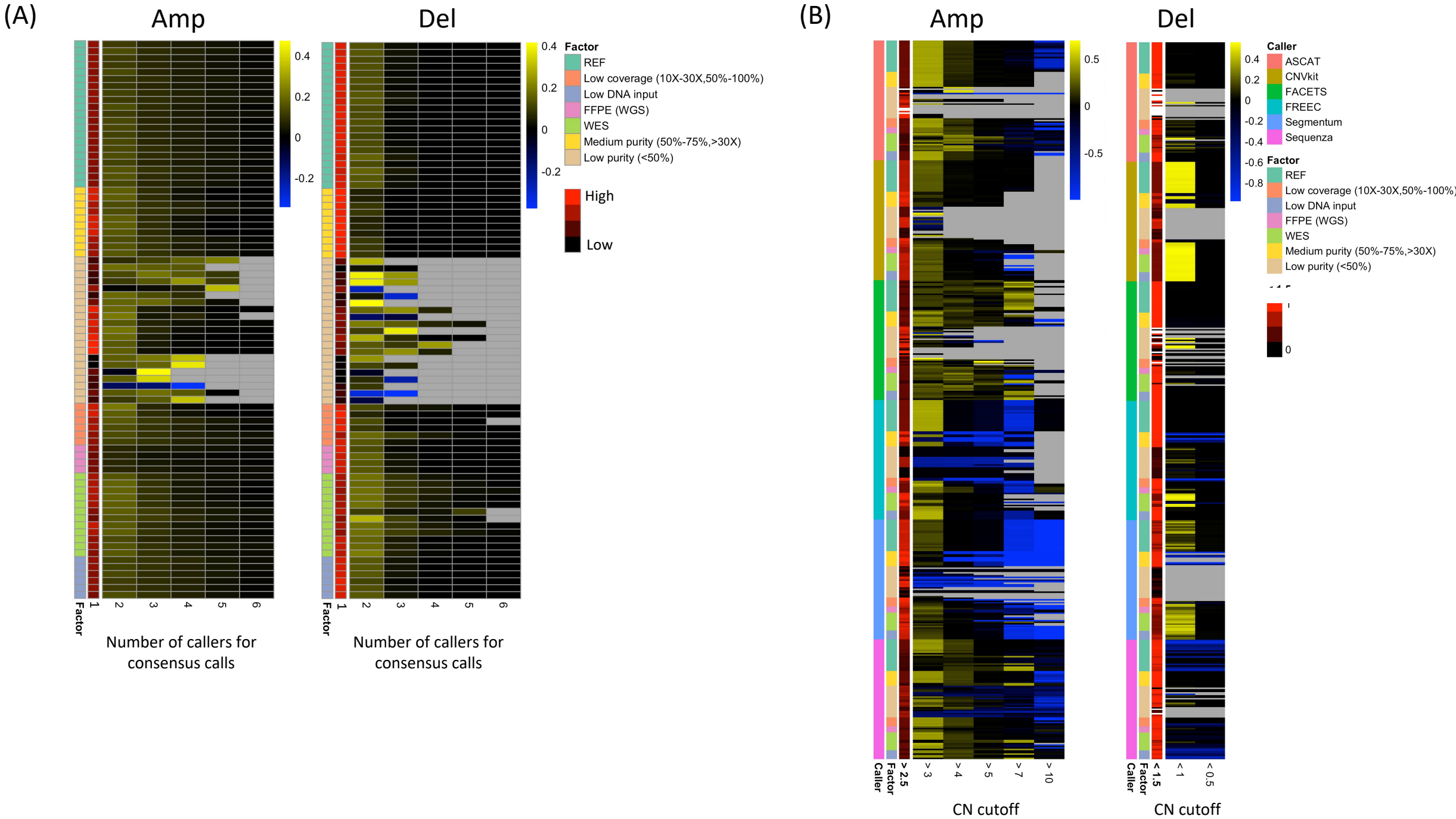

(C)
Performance based on majority calls
F1 Score
0.00
0.25
0.50
0.75
1.00
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Type
Amp
Del
Marginal

Figure 6


(A)
Amp
Del
0.4
0.2
0
-0.2
Factor
REF
Low coverage (10X-30X,50%-100%)
Low DNA input
FFPE (WGS)
WES
Medium purity (50%-75%,>30X)
Low purity (<50%)
High
Low
Factor
1
2
3
4
5
6
Number of callers for consensus calls
Number of callers for consensus calls
(B)
Amp
Del
0.5
0
-0.5
Caller
ASCAT
CNVkit
FACETS
FREEC
Segmentum
Sequenza
Factor
REF
Low coverage (10X-30X,50%-100%)
Low DNA input
FFPE (WGS)
WES
Medium purity (50%-75%,>30X)
Low purity (<50%)
Caller
Factor
> 2.5
> 3
> 4
> 5
> 7
> 10
CN cutoff
< 1.5
< 1
< 0.5
CN cutoff