

Table S6: Comparison of the breakpoints on simulated SVs: indels, inversions, deletion-inversion-deletions, inverted-duplications. The breakpoints accuracy analysis was conducted by comparing the boundaries of true positive SVs to the boundaries of ground truth SV for each aligner/caller combination. Breakpoints accuracy is measured by the percentage of SVs with perfect breakpoint boundaries and the average shifting distance between the left-most coordinate of SV boundaries.

INDEL									
	HiFi			CLR			ONT		
aligner	lra	minimap2	ngmlr	lra	minimap2	ngmlr	lra	minimap2	ngmlr
total TP	171	188	185	154	179	181	140	143	155
SV% of zero shifting distance of breakpoint	84.2	81.9	51.9	72.1	72.1	42.0	75.0	74.8	48.4
average shifting distance of breakpoint	0.25	0.25	0.78	0.37	0.37	1.10	1.72	0.90	0.93

INV									
	HiFi			CLR			ONT		
aligner	lra	minimap2	ngmlr	lra	minimap2	ngmlr	lra	minimap2	ngmlr
total TP	97	95	96	95	97	94	95	93	95
SV% of zero shifting distance of breakpoint	5.2	6.3	6.3	8.4	33.0	26.6	27.4	20.4	27.4
average shifting distance of breakpoint	4.40	1.19	1.15	7.97	0.80	0.84	3.02	0.97	0.92

INVDEL									
	HiFi			CLR			ONT		
aligner	lra	minimap2	ngmlr	lra	minimap2	ngmlr	lra	minimap2	ngmlr
total TP	298	287	289	161	294	264	235	197	200
SV% of zero shifting distance of breakpoint	7.8	15.4	19.9	1.1	20.3	19.4	11.3	15.8	9.1
average shifting distance of breakpoint	279.11	261.16	284.40	302.18	278.75	238.12	272.72	238.48	285.09

INVDUP									
	HiFi			CLR			ONT		
aligner	lra	minimap2	ngmlr	lra	minimap2	ngmlr	lra	minimap2	ngmlr
total TP	189	100	198	176	100	195	200	155	198
SV% of zero shifting distance of breakpoint	12.7	78.0	27.8	33.5	79.0	30.3	19.0	57.4	26.3
average shifting distance of breakpoint	4.38	0.27	1.37	3.04	0.32	0.82	1.61	0.48	0.90