

Minerva vs Metis: Average ballots drawn

	Minerva	Metis	% improvement
.6 win, 10% alpha.	159.13	157.71	0.892352164896625
.55 win, 10% alpha	655.02	633.62	3.26707581447895
.525win, 10%alpha	2580.39	2534.08	1.7946899499688
.6 win, 5% alpha	205.71	195.92	4.75912692625541
.55 win, 5% alpha	787.63	782.45	0.657669210162132
.525 win, 5% alpha	3159.81	3122.65	1.17602007715654
.6 win, 1% alpha	296.32	295.08	0.418466522678186
.55 win, 1% alpha	1202.82	1179.20	1.96371859463594
.525 win, 1% alpha	4743.64	4722.47	0.446281758312182

These results seem to defy a simple takeaway. N
it's usually lowering an early-round kmin by 1.

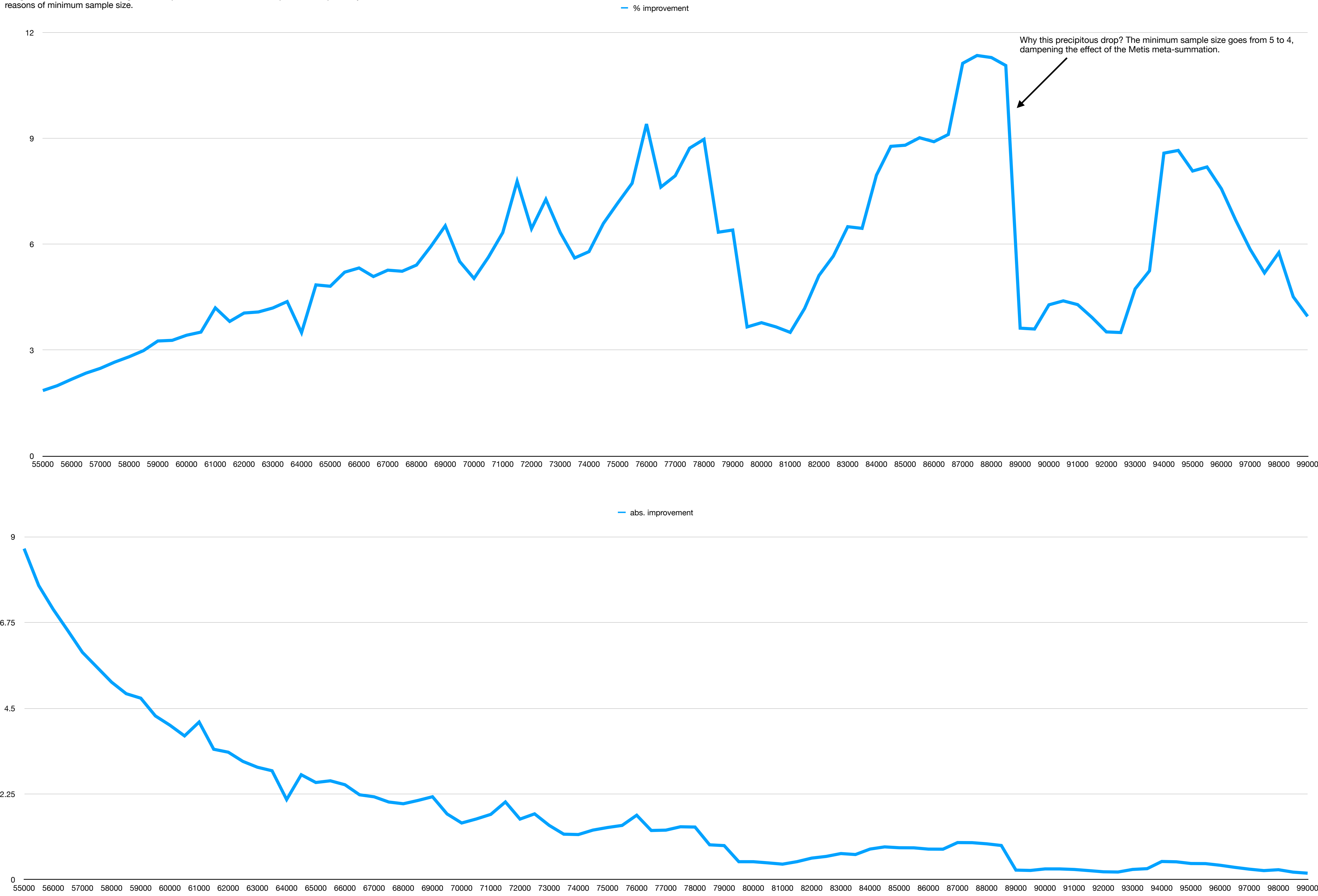
Round schedules for .6 winner tally: 100, 200, 400, 800, 1600.
Round schedules for .55 winner tally: 400, 800, 1600, 3200, 6400.
Round schedules for .525 winner tally: 1600, 3200, 6400, 12800, 25600.

In all cases these schedules are sufficiently powerful so that the cumulative
stopping probabilities are in excess of .9999 (for all 18 audits).

lote that, if Metis gives a substantive improvement,

Expectations for various margins, N = 100,000, alpha = .1																			
Reported winner	55000	55500	56000	56500	57000	57500	58000	58500	59000	59500	60000	60500	61000	61500	62000	62500	63000	63500	
Metis	459.7468029	379.9081258	319.1051877	271.8022433	234.2633545	203.9768286	179.1926531	158.6518120	141.4355674	126.8681957	114.4172397	103.7147443	94.44411400	86.36331599	79.25665261	72.97262192	67.41856259	62.47558125	
Minerva B2 (i.e., BRAVO)	468.43593047	387.62966354	326.19858050	278.33797004	240.23019088	209.55235499	184.37656387	163.53386279	146.19966699	131.16662927	118.47098104	107.48827447	98.581850564	89.786481369	82.602853869	76.077452134	70.369636133	65.334645603	
% improvement	1.85482336787171	1.99198834936683	2.17456272938875	2.34812618226897	2.48379950162278	2.68068416934782	2.81158875548894	2.98534546814958	3.25862541192731	3.27707860480833	3.42171664888481	3.51064352322366	4.19725997404583	3.81256211241228	4.05095114095554	4.08114378221145	4.19367456941985	4.37803100103855	
abs. improvement	8.689127537854	7.72153773657	7.09339275536	6.53572674994	5.96683628394	5.57552633589	5.183910737734	4.88205076176	4.764099500848	4.298433544756	4.053741282457	3.773530145988	4.1377365554259	3.4231653707796	3.3462012513014	3.1048302074557	2.9510735351312	2.8590643460384	

Takeaway: Improvement generally seems to improve as the margin widens, at least until about margins of 40%. After 40% margins, the improvement is much more unpredictable, probably for reasons of minimum sample size.



Reported winner	64000	64500	65000	65500	66000	66500	67000	67500	68000	68500	69000	69500	70000	70500	71000	71500	72000	72500
Metis	58.05869839	54.06132328	50.48084986	47.22916094	44.27722480	41.59308051	39.13060349	36.90488748	34.83736265	32.91983116	31.19887572	29.56415590	28.08313839	26.68399930	25.37105271	24.17468967	23.09965497	22.02732936
Minerva B2 (i.e., BRAVO)	60.161659479	56.815989809	53.031538585	49.824425340	46.768774405	43.821125907	41.305538798	38.943447817	36.830146735	34.998876892	33.375985959	31.288881452	29.570753020	28.276581455	27.085640009	26.215213617	24.689587884	23.755030380
% improvement	3.49551708475031	4.84840013456558	4.80975809969338	5.2088195206704	5.32737843143592	5.08440927684185	5.26548102409724	5.23466833120376	5.4107416312344	5.94032125972814	6.52298403873841	5.51226335321853	5.03069577573952	5.63215942920938	6.33024472083754	7.78373952118487	6.43988996909126	7.27299012950837
abs. improvement	2.1029610855598	2.7546665263655	2.5506887225181	2.5952643931989	2.4915496003315	2.2280453908448	2.1749353073433	2.0385603299673	1.9927840822365	2.079045724697	2.1771102369296	1.7247255459575	1.4876146230597	1.5925821487112	1.7145872967766	2.040523942922	1.5899329144041	1.7277010148602

Reported winner	73000	73500	74000	74500	75000	75500	76000	76500	77000	77500	78000	78500	79000	79500	80000	80500	81000	81500
Metis	21.09118226	20.09147978	19.26858041	18.45019559	17.73038367	17.00499991	16.29271135	15.65148772	15.07490584	14.53044370	14.01379762	13.50952439	13.07471579	12.43453081	12.00767290	11.60699687	11.22068214	10.85347438
Minerva B2 (i.e., BRAVO)	22.516595513	21.285749461	20.452960467	19.751463331	19.099552067	18.429094169	17.984469022	16.942254039	16.375158906	15.919021515	15.395139113	14.424196267	13.969084476	12.906428404	12.479042007	12.047874812	11.627986038	11.326745617
% improvement	6.33050074209435	5.61065363660333	5.79075120877321	6.58820924030453	7.168589020137	7.72742403158196	9.40677019884664	7.61862211024829	7.94039966247852	8.72275852441503	8.97258201690326	6.34123284500648	6.40248600496739	3.65629882101439	3.77728598334723	3.65938348647071	3.50278964744821	4.17835138566496
abs. improvement	1.425413246078	1.1942696762347	1.1843800554997	1.3012677322819	1.3691683924027	1.4240942516473	1.6917576724578	1.2907663122251	1.3002530625388	1.3885778062649	1.3813414835665	0.9146718713393	0.8943686786272	0.4718975895899	0.4713691045869	0.4408779412452	0.4073038911537	0.473271232447

Reported winner	82000	82500	83000	83500	84000	84500	85000	85500	86000	86500	87000	87500	88000	88500	89000	89500	90000	90500
Metis	10.50408901	10.17484641	9.867667289	9.572906414	9.292138544	8.948696863	8.679882975	8.432726173	8.205541224	7.985385063	7.779368004	7.586076348	7.395018115	7.214055991	6.683182685	6.490124201	6.310049949	6.138236852
Minerva B2 (i.e., BRAVO)	11.070198353	10.785771379	10.553324246	10.232919285	10.095518068	9.8093910895	9.5179710665	9.2684998093	9.0076805263	8.7857570005	8.7532966305	8.5571542285	8.3361644968	8.1115132496	6.9343622291	6.7323532689	6.5924186917	6.4204600265
% improvement	5.11381388845709	5.66417500884178	6.49707088550075	6.44989814070884	7.9577840211249	8.77418606348623	8.80532295372973	9.01735613612014	8.9050594080148	9.10988019691564	11.1264209038531	11.3481404520644	11.2899209451892	11.0639929958727	3.62224434793729	3.59798509926681	4.28323435595541	4.39568461431442
abs. improvement	0.5661093409023	0.6109249669946	0.68565695706187	0.66001287072095	0.80337952367253	0.86069422589375	0.83808809105152	0.83577363628865	0.80213930215156	0.80037193714641	0.97392862607869	0.9710778805932	0.94114638155443	0.89745725780261	0.25117954391051	0.24222906744717	0.28236874229298	0.28222317355386

Reported winner	91000	91500	92000	92500	93000	93500	94000	94500	95000	95500	96000	96500	97000	97500	98000	98500	99000
Metis	5.975445924	5.822549218	5.675539749	5.536277847	5.403750779	5.218454600	5.087416792	4.946722592	4.830779246	4.722145252	4.620290529	4.524738445	4.435056682	4.350850315	4.271754597	4.197430383	4.127560094
Minerva B2 (i.e., BRAVO)	6.2432464367	6.0603842487	5.8823529411	5.7370028722	5.6723405335	5.5074327530	5.5649631732	5.4156050432	5.2551028036	5.1433846813	4.9988192356	4.8484850460	4.711111021052	4.5889152514	4.5330285237	4.3957387023	4.2976029646
% improvement	4.2894432413384	3.92442162450146	3.51582426157105	3.49877853302616	4.73507809280319	5.24705731045458	8.58130352844259	8.65798830049578	8.07450534599024	8.18992658015011	7.57236235463568	6.67727335373232	5.85982788411906	5.1878259525162	5.76378297916115	4.51137641468616	3.95669101061304
abs. improvement	0.2678005123221	0.23783502998679	0.20681319185723	0.20072502493262	0.26858975395164	0.28897815288961	0.47754638113932	0.46888245104913	0.42432355682138	0.42123942914025	0.37852870597765	0.3237466000381	0.27605352754768	0.23806493635251	0.26127392649202	0.19830831907115	0.17004287017465