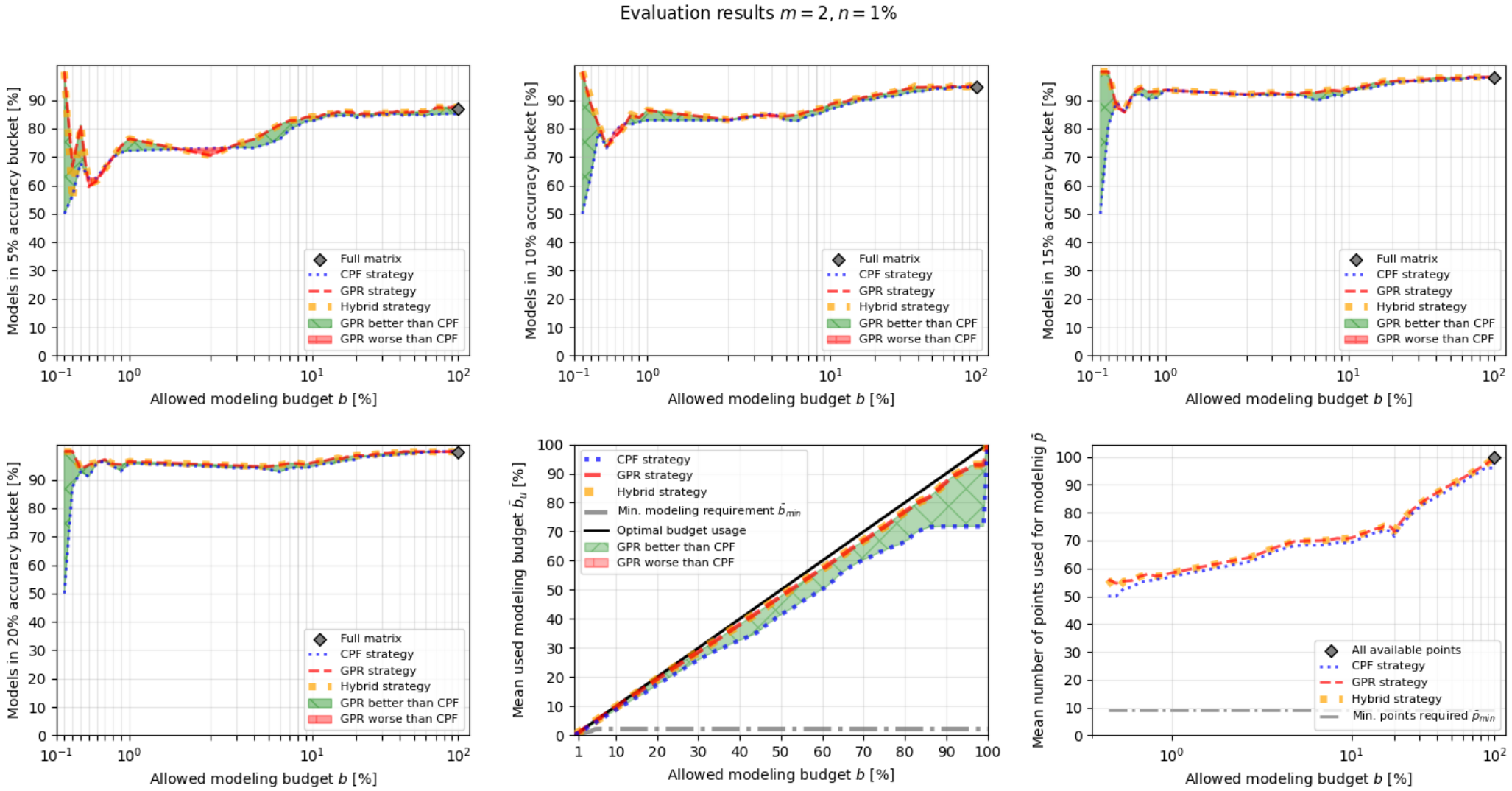
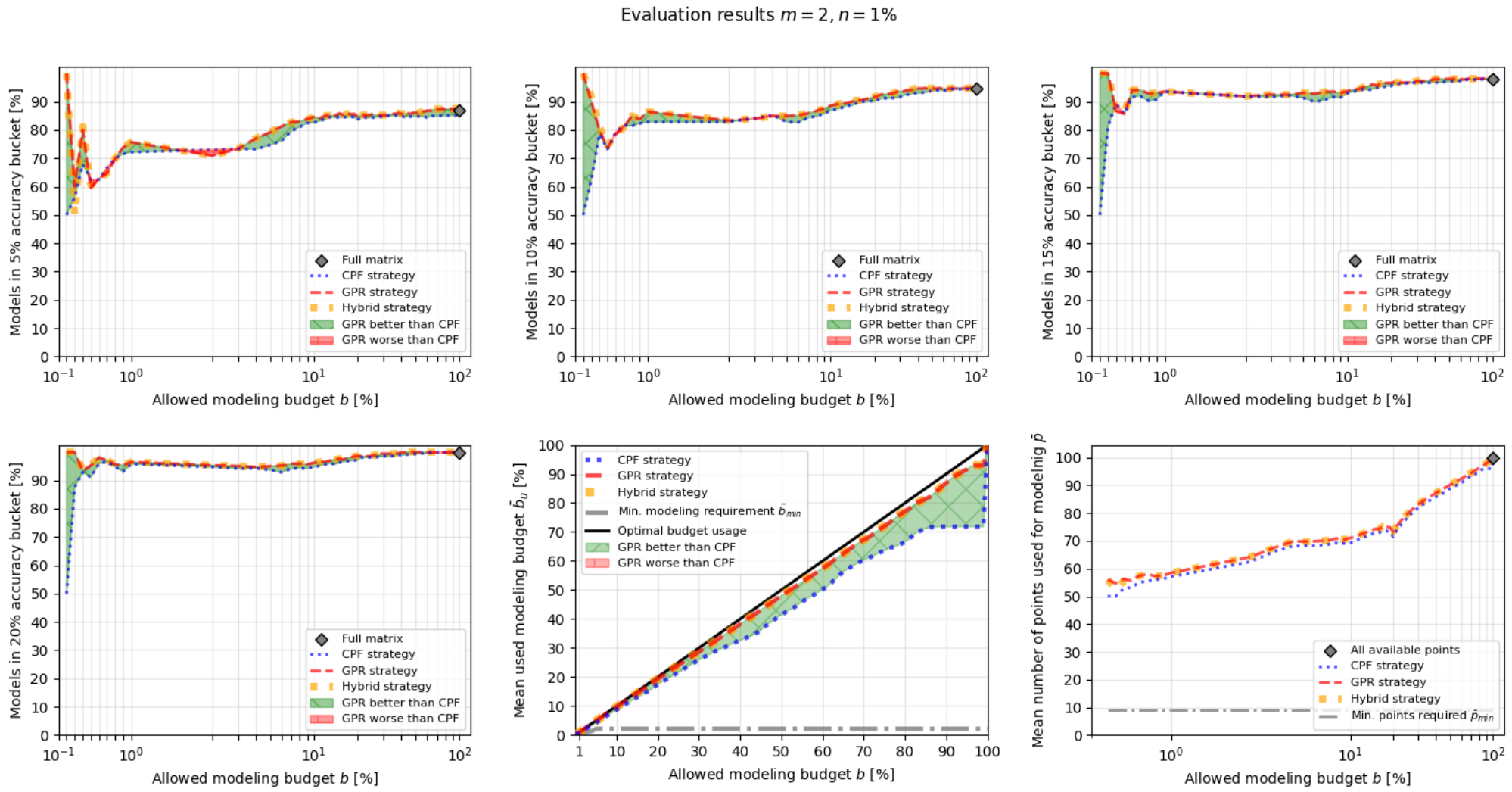
Grid Search for best configuration of GPR strategy

2 parameter, 1% noise

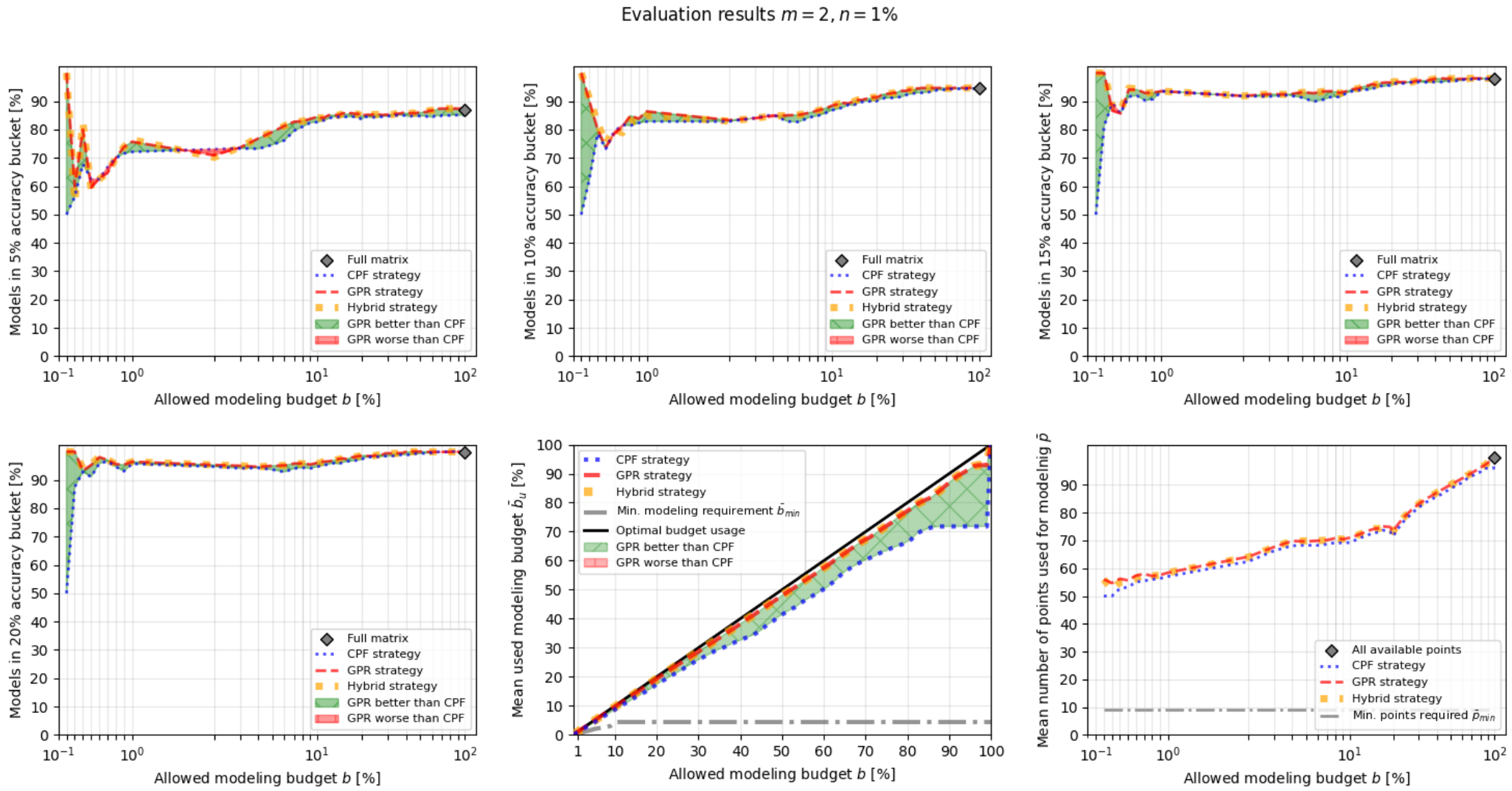
Config 1: rep. selection for ad. points



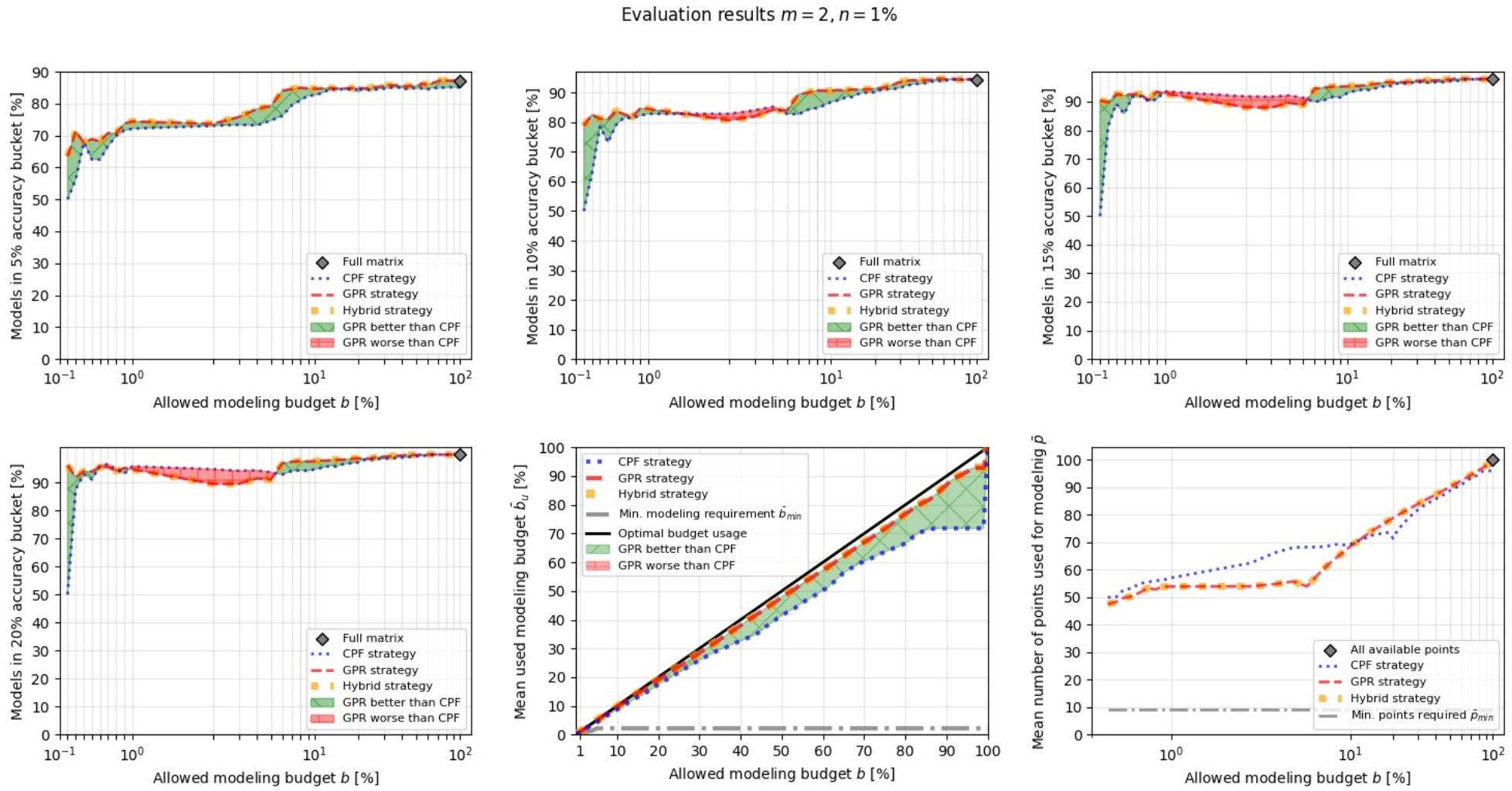
Config 4: rep. selection ad. Points + weighted point cost function



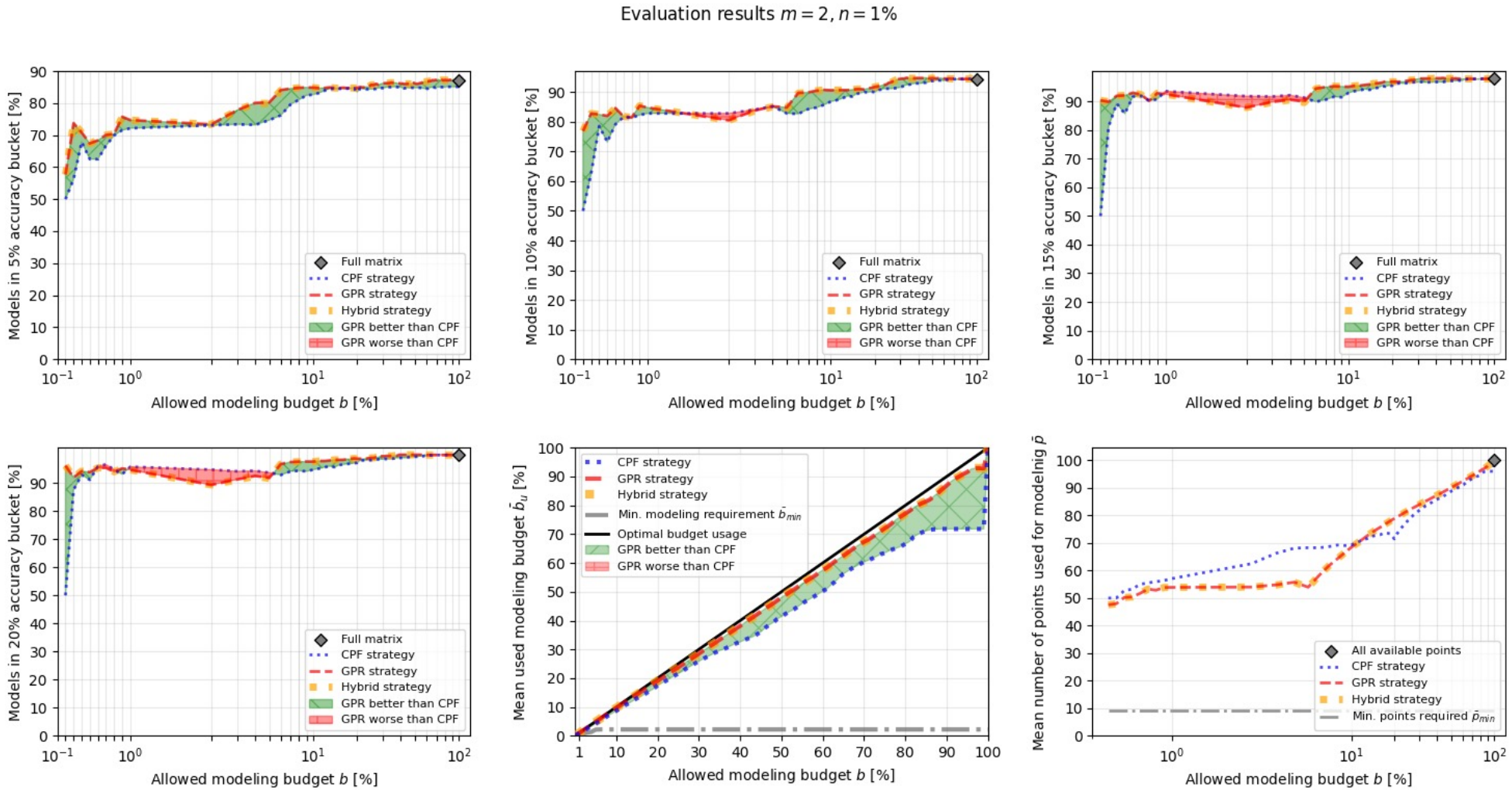
Config 8: rep. selection for ad. + weighted point cost function + cor. cost calc + 2 base points + 4 reps total + fixed points calc. + fixed hybrid strat. selection switch 20



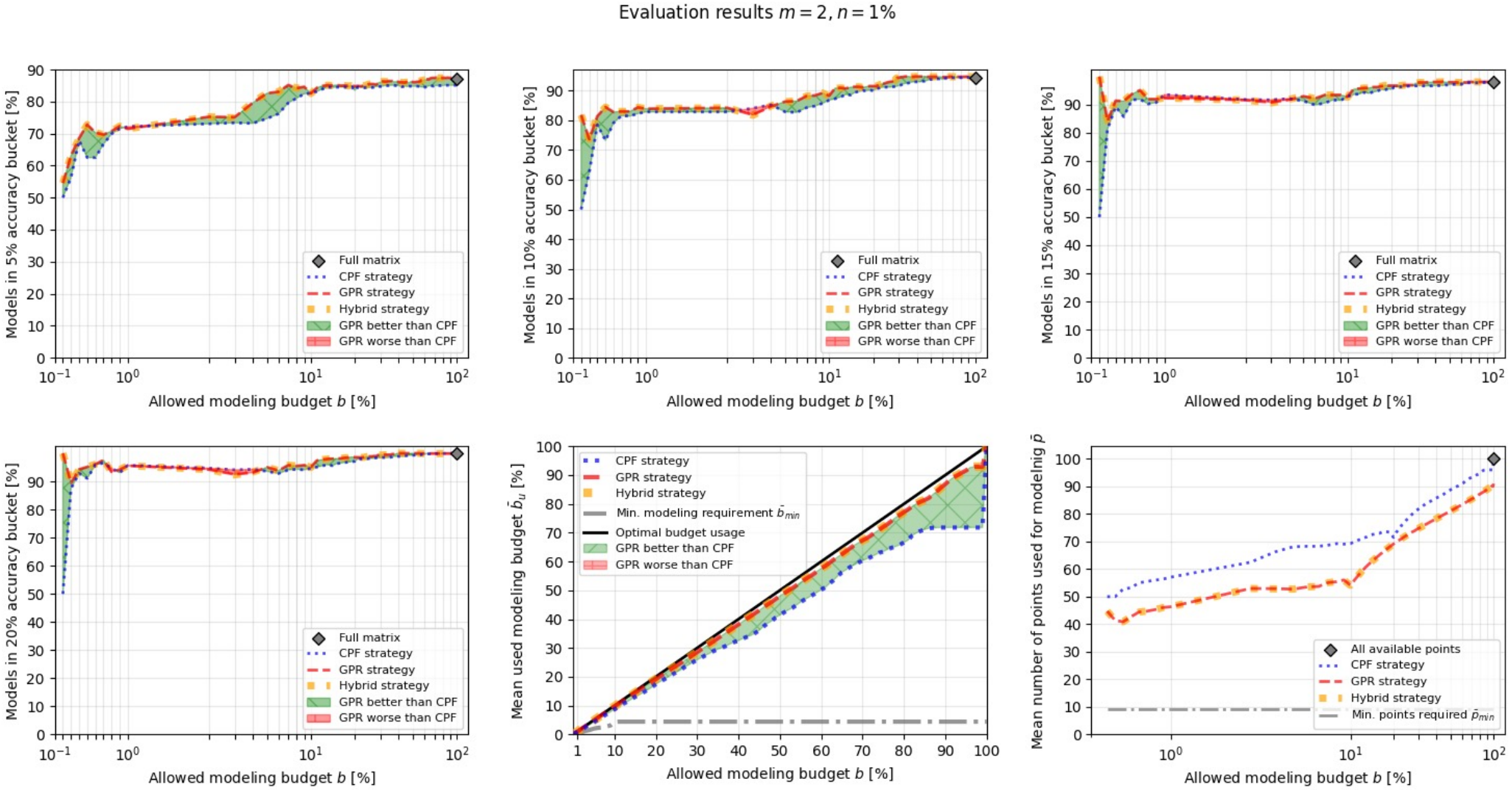
Config 2: rep. selection for ad. + base points



Config 3: rep. selection for ad. + base points + weighted point cost function

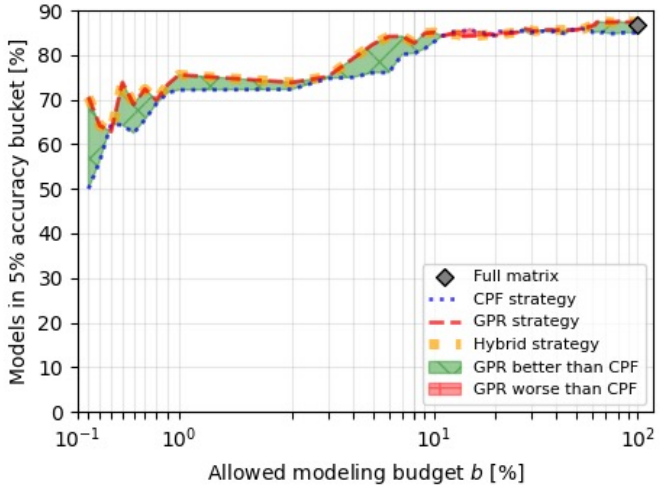


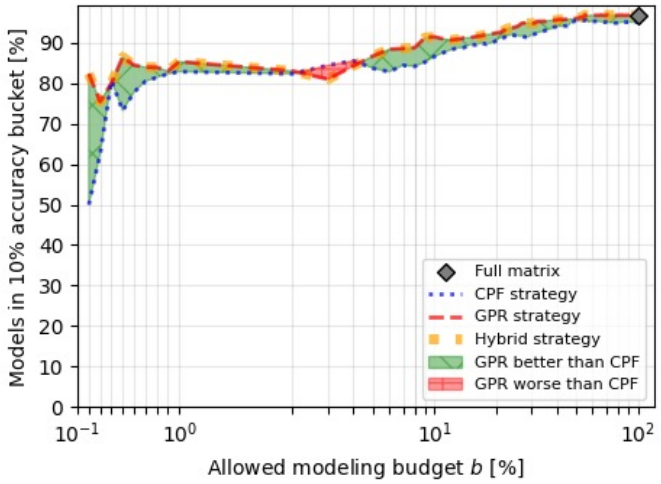
Config 5: rep. selection for ad. + base points + weighted point cost function + cor. cost calc + 2 base points

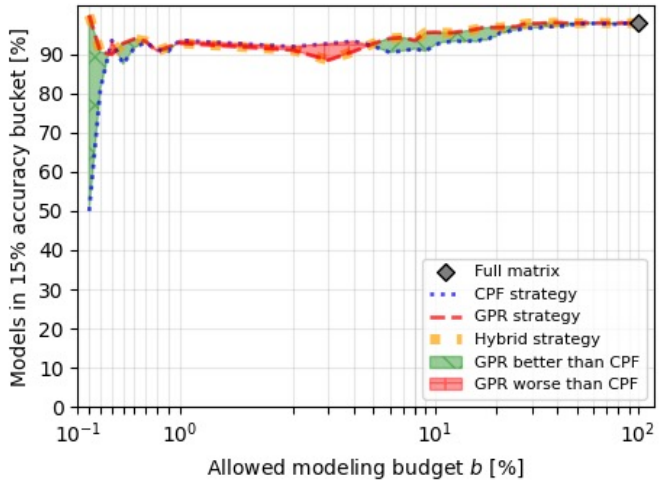


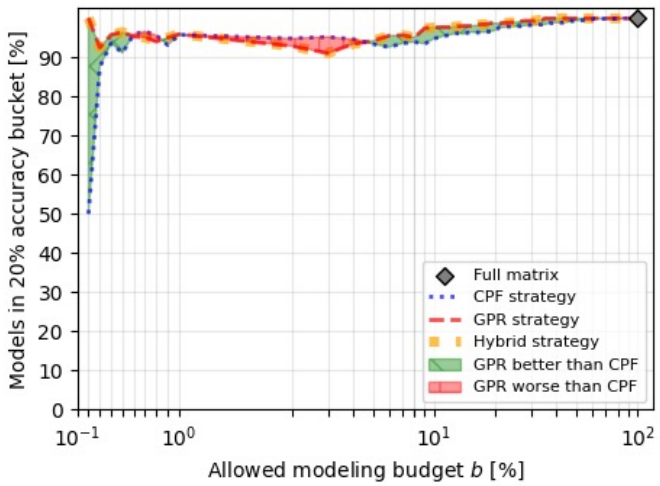
Config 6: rep. selection for ad. + base points + weighted point cost function + cor. cost calc + 2 base points + 5 reps total + fixed points calc.

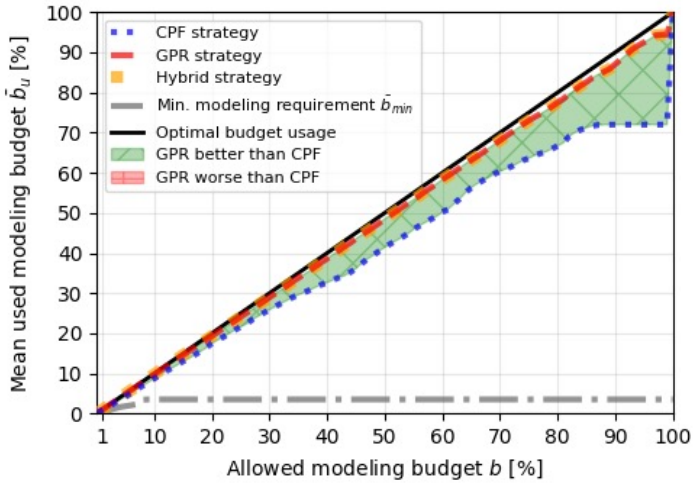
Evaluation results $m = 2, n = 1\%$

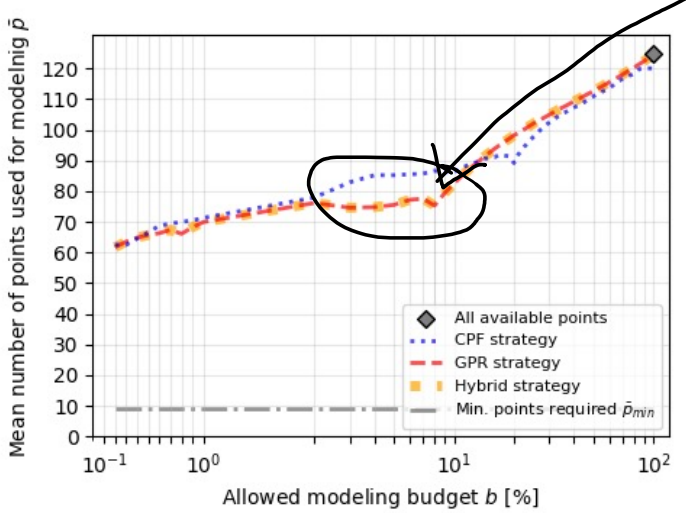






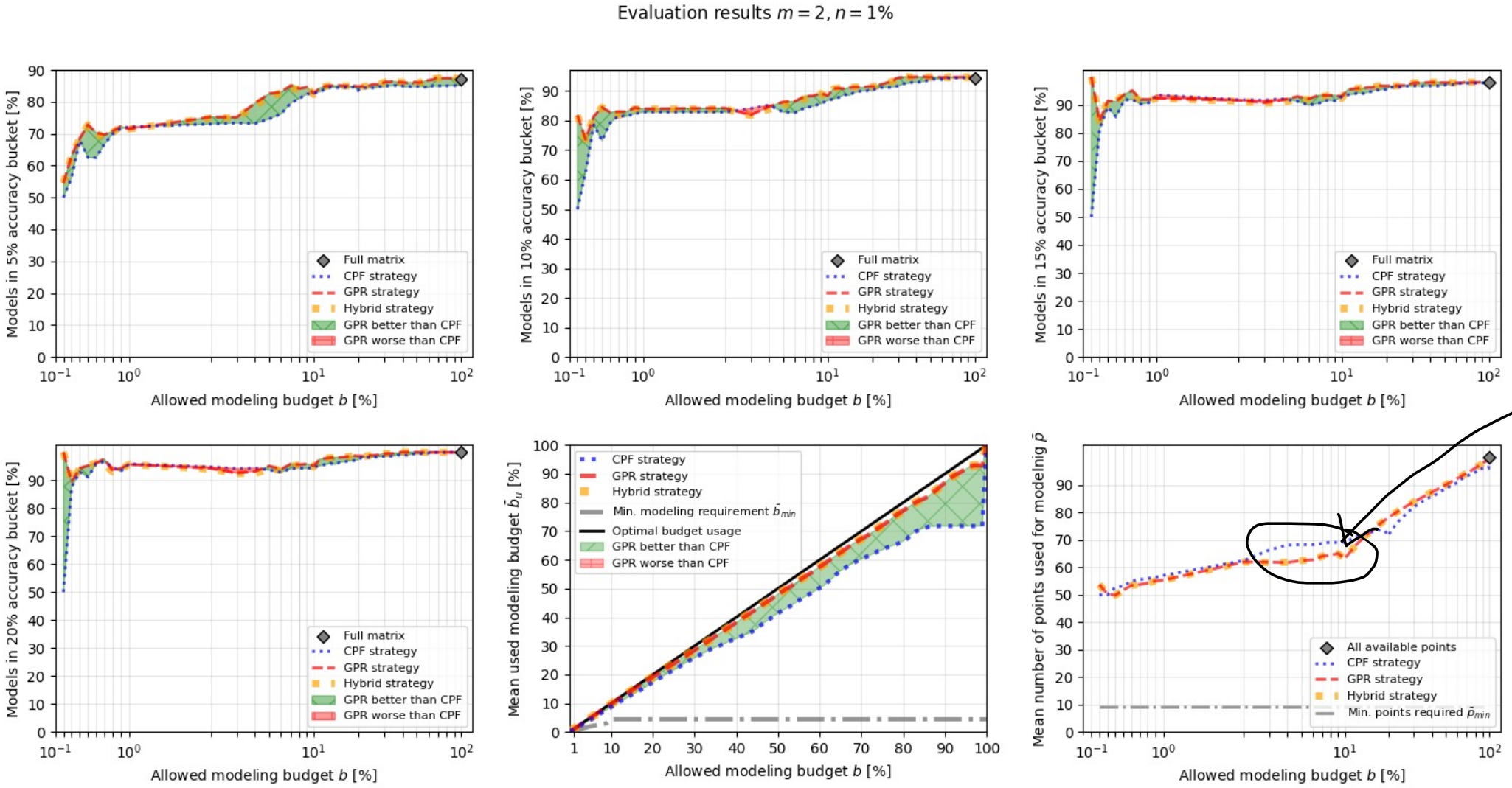






Here the GPR strategy has more budget available, so it can choose more expensive points than before, which can lead to an overall smaller number of measurement points used for modeling, than before with less budget.

Config 7: rep. selection for ad. + base points + weighted point cost function + cor. cost calc + 2 base points + 4 reps total + fixed points calc. + fixed hybrid strat. selection switch 10



Here the GPR strategy has more budget available, so it can choose more expensive points than before, which can lead to an overall smaller number of measurement points used for modeling, than before with less budget.

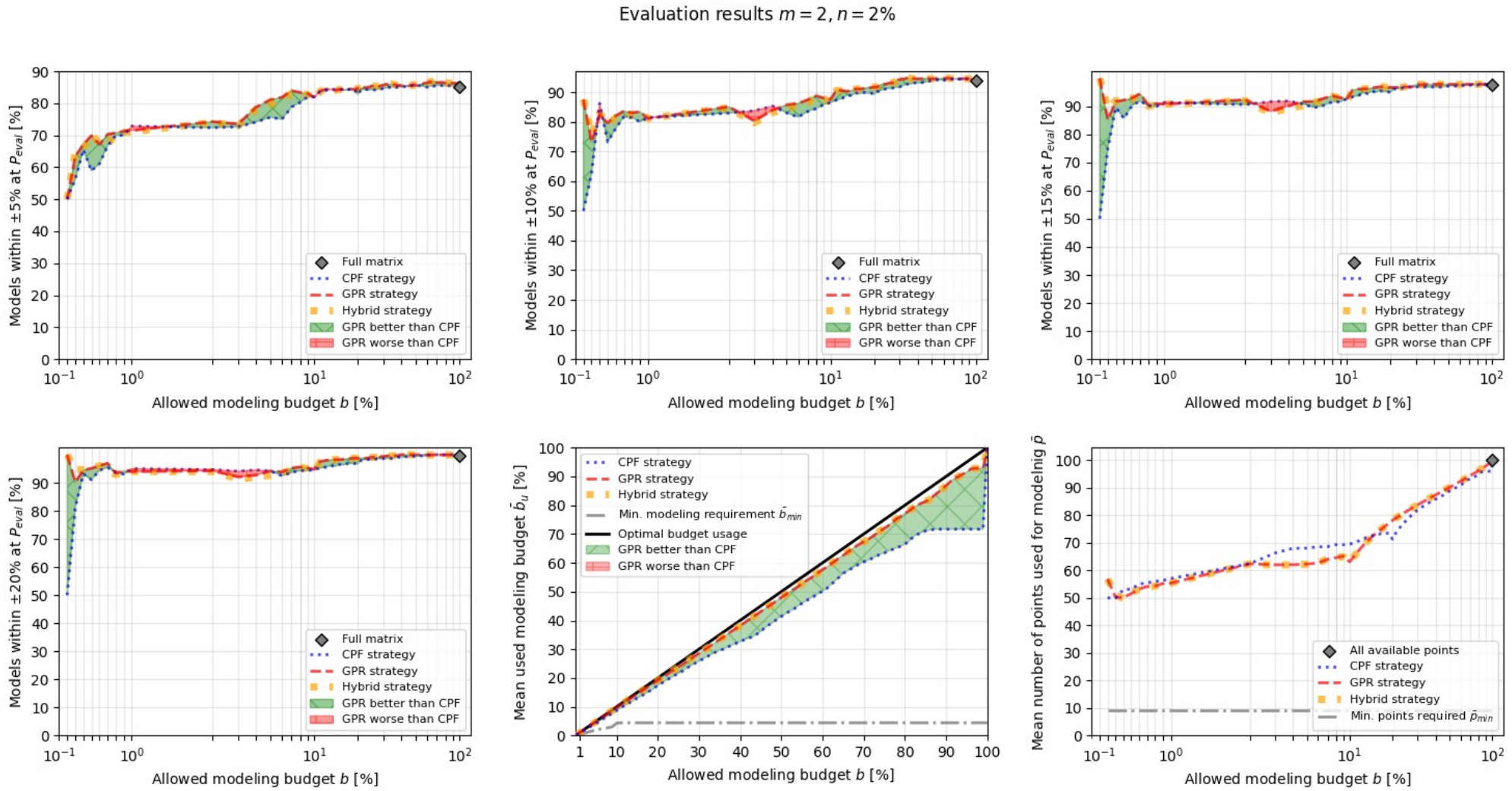
Conclusion

- Use config 7: overall best results and most consistent

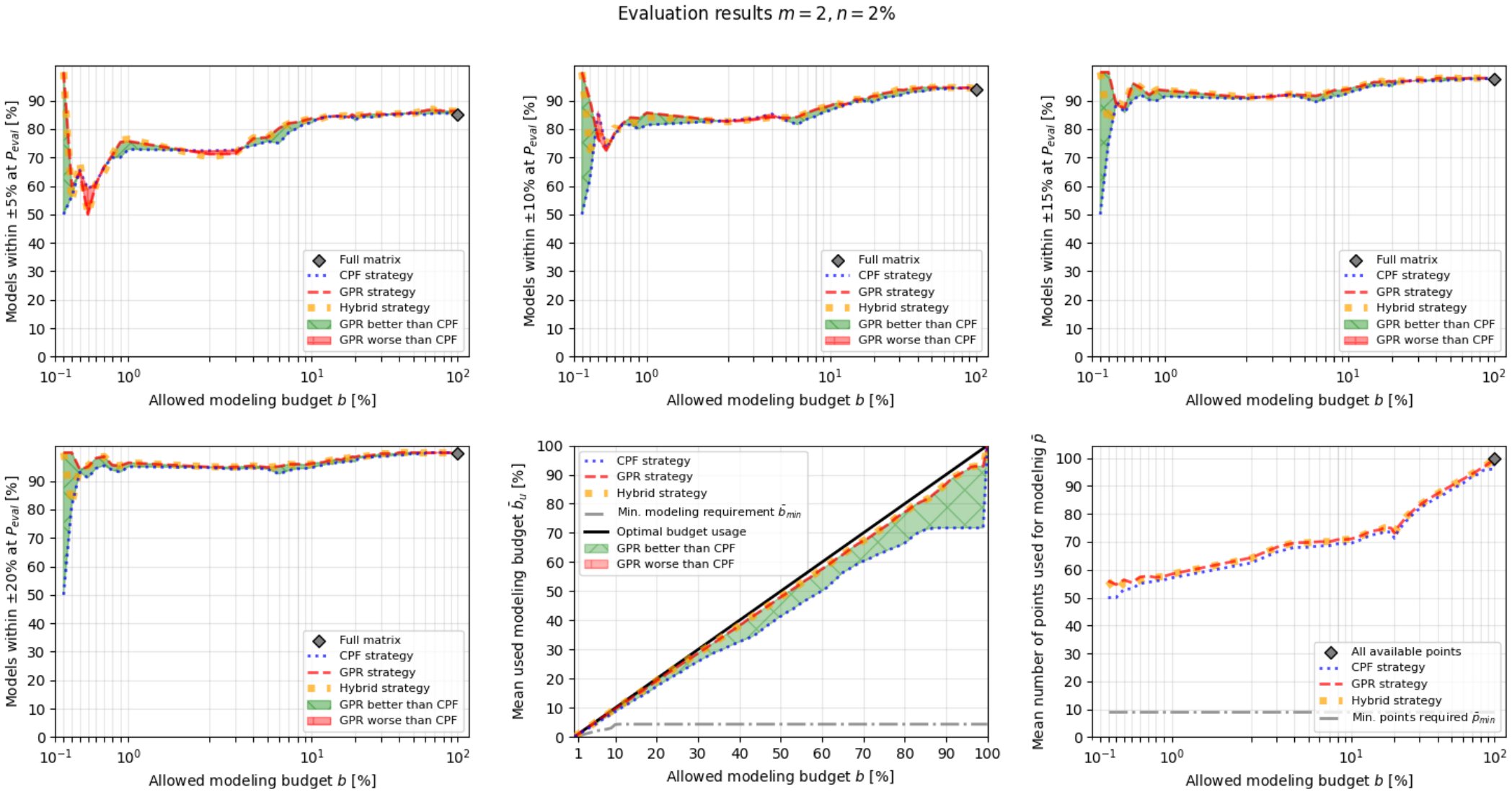
Grid Search for best configuration of GPR strategy

2 parameter, 2% noise

Config 3:


Evaluation results $m = 2, n = 2\%$
Models within ±5% at P_{eval} [%]
Models within ±10% at P_{eval} [%]
Models within ±15% at P_{eval} [%]
Models within ±20% at P_{eval} [%]
Mean used modeling budget $\bar{b}_u$ [%]
Mean number of points used for modelnig $\bar{p}$
Allowed modeling budget b [%]
Full matrix
CPF strategy
GPR strategy
Hybrid strategy
GPR better than CPF
GPR worse than CPF
Min. modeling requirement $\bar{b}_{min}$
Optimal budget usage
All available points
Min. points required $\bar{p}_{min}$

Config 4:


Evaluation results $m = 2, n = 2\%$
Models within ±5% at P_{eval} [%]
Models within ±10% at P_{eval} [%]
Models within ±15% at P_{eval} [%]
Models within ±20% at P_{eval} [%]
Allowed modeling budget b [%]
Mean used modeling budget $\bar{b}_u$ [%]
Mean number of points used for modelnig $\bar{p}$
Full matrix
CPF strategy
GPR strategy
Hybrid strategy
GPR better than CPF
GPR worse than CPF
Min. modeling requirement $\bar{b}_{min}$
Optimal budget usage
All available points
Min. points required $\bar{p}_{min}$

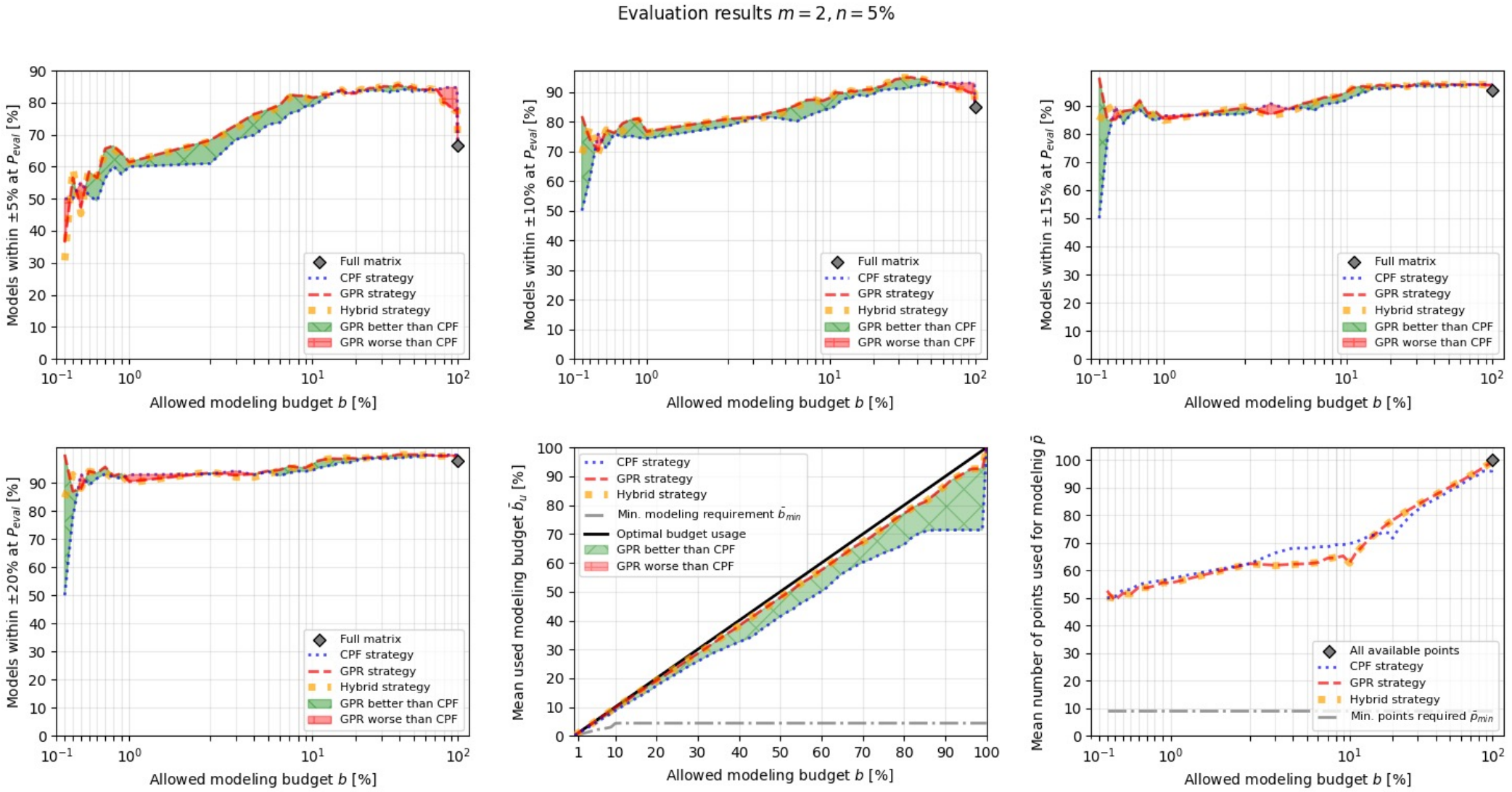
Conclusion

- Use config 3: with the reps of base points and weighted functions gives overall best results and most consistent

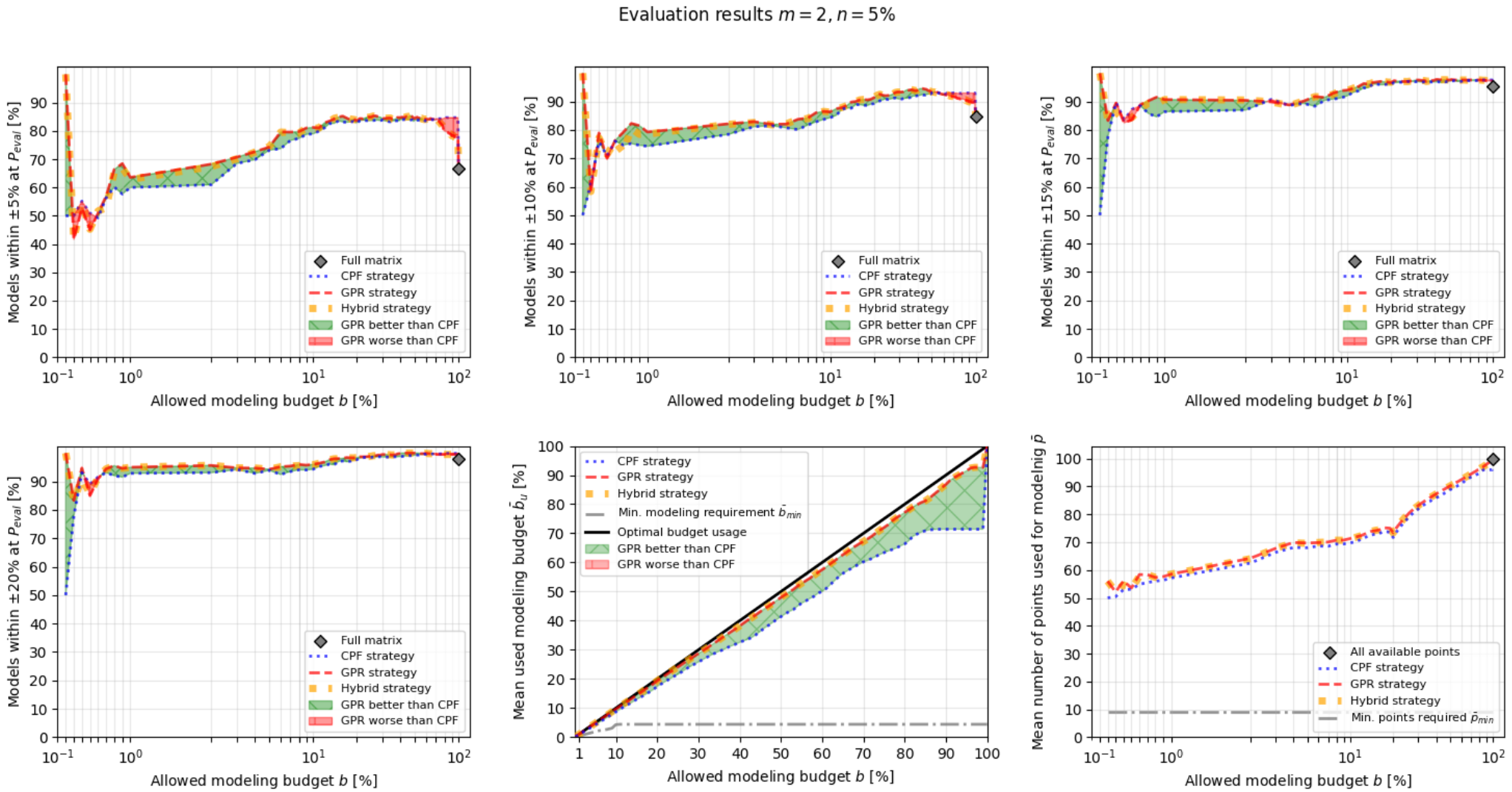
Grid Search for best configuration of GPR strategy

2 parameter, 5% noise

Config 3:


Evaluation results $m = 2, n = 5\%$
Models within ±5% at P_{eval} [%]
Models within ±10% at P_{eval} [%]
Models within ±15% at P_{eval} [%]
Models within ±20% at P_{eval} [%]
Mean used modeling budget $\bar{b}_u$ [%]
Mean number of points used for modelnig $\bar{p}$
Allowed modeling budget b [%]
Full matrix
CPF strategy
GPR strategy
Hybrid strategy
GPR better than CPF
GPR worse than CPF
Min. modeling requirement $\bar{b}_{min}$
Optimal budget usage
All available points
Min. points required $\bar{p}_{min}$

Config 4:


Evaluation results $m = 2, n = 5\%$
Models within ±5% at P_{eval} [%]
Models within ±10% at P_{eval} [%]
Models within ±15% at P_{eval} [%]
Models within ±20% at P_{eval} [%]
Mean used modeling budget $\bar{b}_u$ [%]
Mean number of points used for modelnig $\bar{p}$
Allowed modeling budget b [%]
Full matrix
CPF strategy
GPR strategy
Hybrid strategy
GPR better than CPF
GPR worse than CPF
Min. modeling requirement $\bar{b}_{min}$
Optimal budget usage
All available points
Min. points required $\bar{p}_{min}$

Conclusion

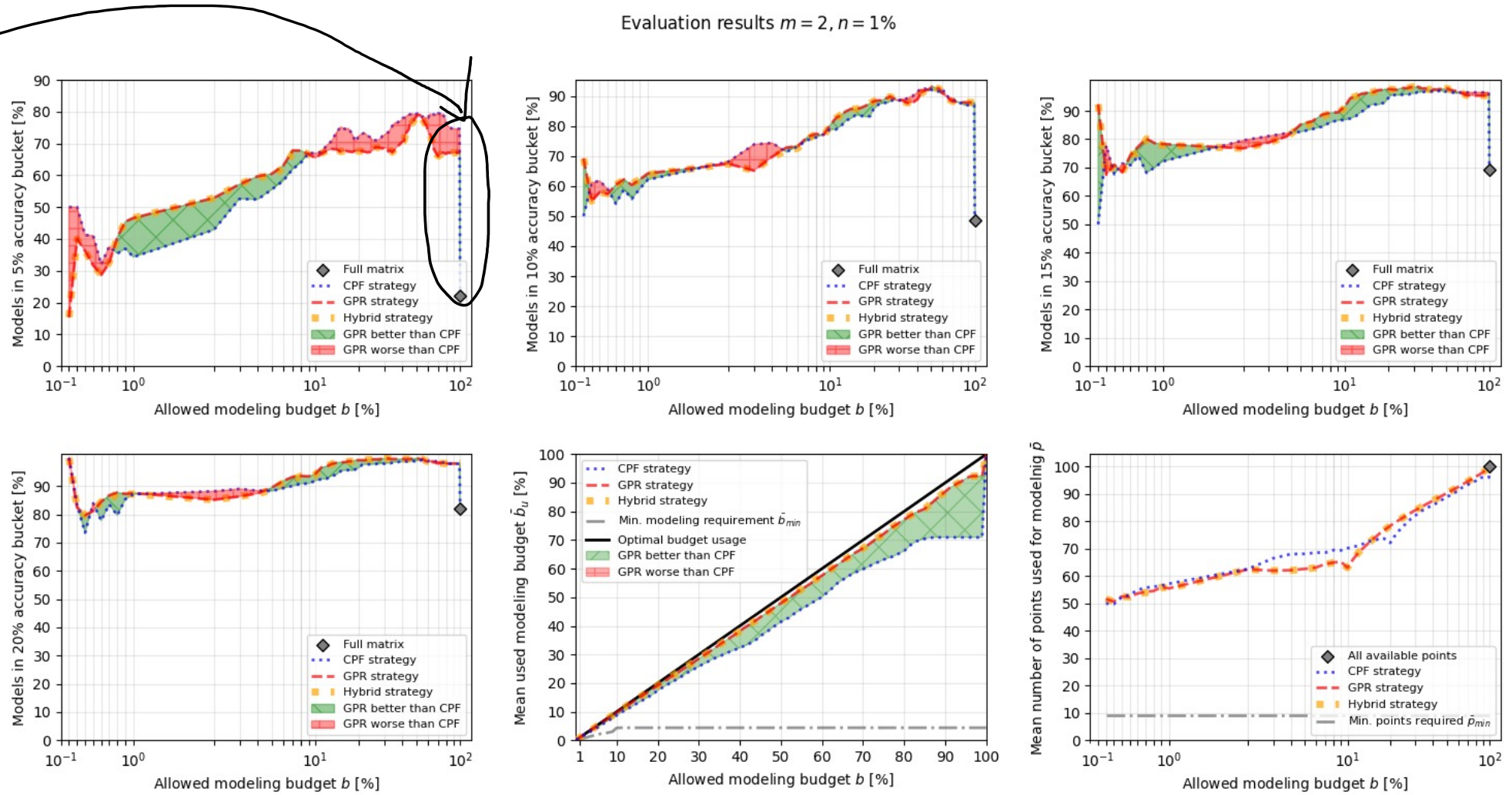
- Use config 3: with the reps of base points and weighted functions gives overall best results and most consistent

Grid Search for best configuration of GPR strategy

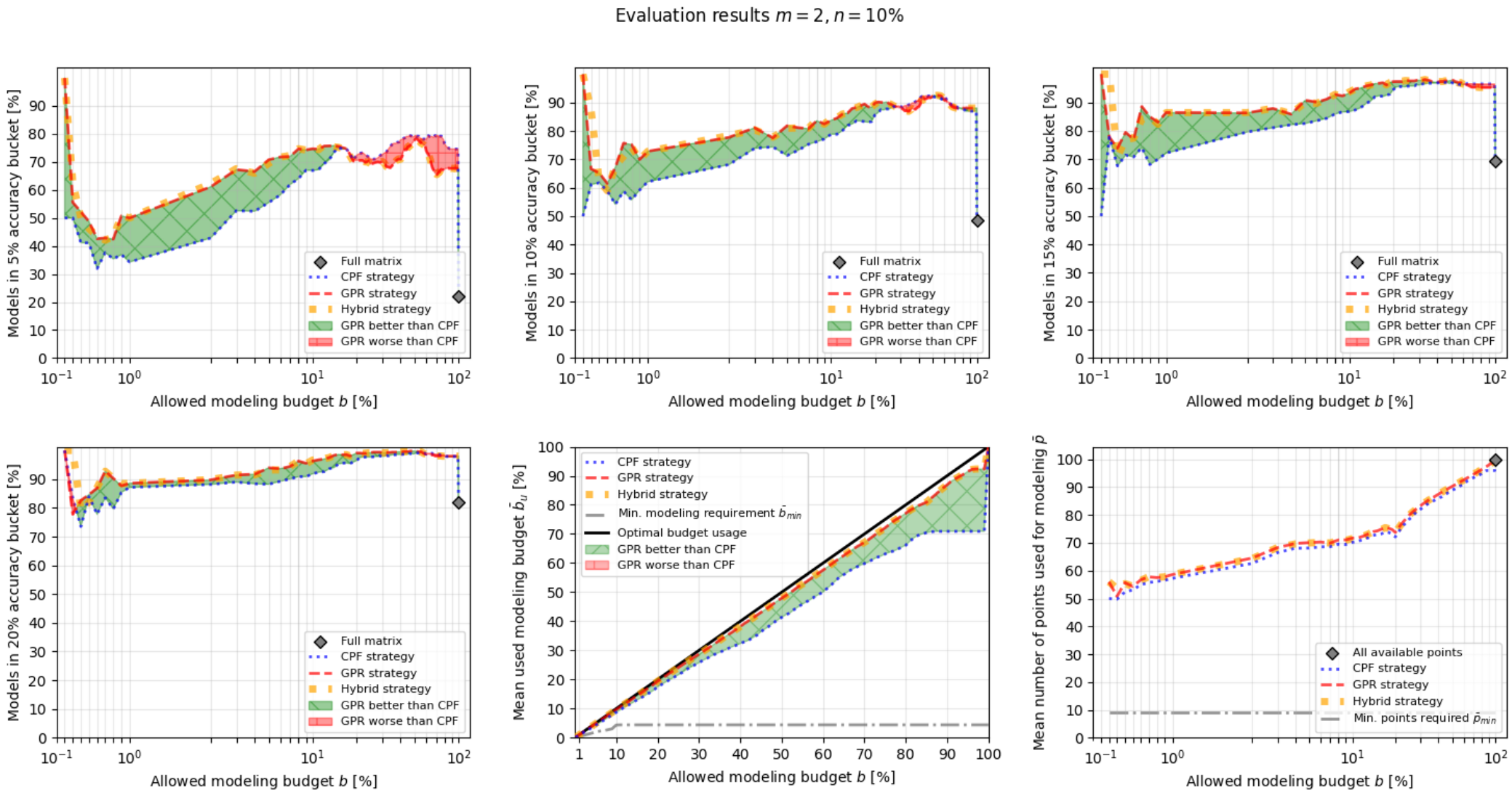
2 parameter, 10% noise

Config 1: rep. selection for ad. + base points + weighted point cost function + cor. cost calc + 2 base points + 4 reps total + fixed points calc. + hybrid switch 10

When adding the last and largest measurement the accuracy drops significantly, these large measurements are more effected by noise which makes them particularly bad for improving extrapolation accuracy of the models

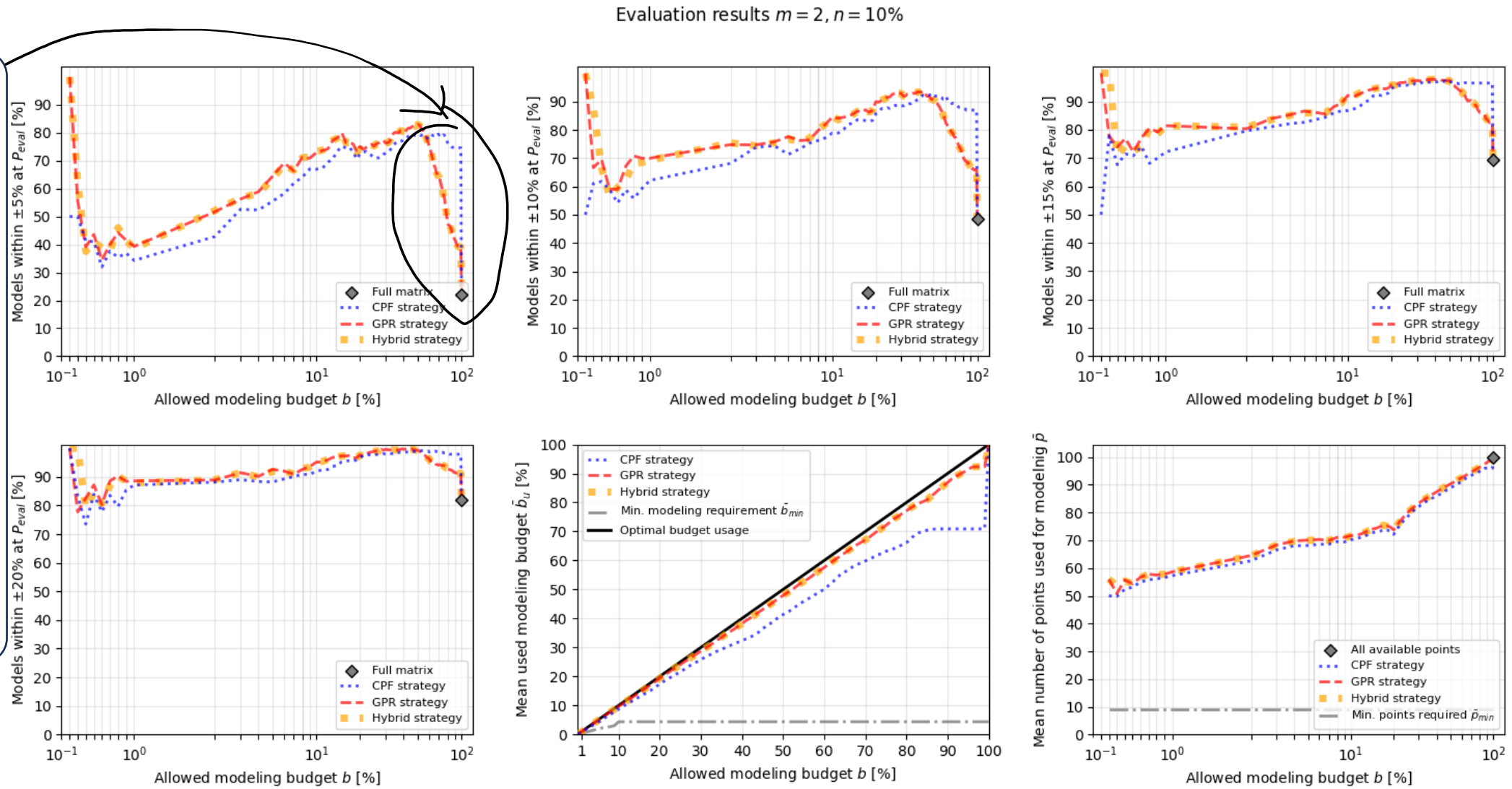


Config 1: rep. selection for ad. + cor. cost calc + 2 base points + 4 reps total + fixed points calc. + hybrid switch 20



Config 6: rep. selection for ad. + cor. cost calc + 2 base points + 4 reps total + fixed points calc. + hybrid switch 20 + fixed m.mean of reps is used in measurements

Adding more points does not help to improve the accuracy anymore especially for higher noise levels, all of these points are large points and their repetitions. GPR gets linearly worse because it did not take these points before, that's why it was better than the CPF strategy before...



Conclusion

- Use config 6: overall best results and most consistent