

# 18 May, 2016

Peter Yoachim presented - Astrometric metrics: DCR-Parallax factor correlations

Our previous astrometric metrics looked at correlations between HA (hour angle) and Parallax factor. When Dave Monet evaluated the same opsim runs, he would find more troubling results than we were finding – mostly because he looks at DCR (differential chromatic refraction) and parallax, rather than just HA and parallax.

Peter upgraded our MAF parallax metrics to look at DCR-parallax factor correlations, rather than HA-parallax factor correlations, and found that using DCR rather than HA produced much stronger correlations.

His investigation of this change can be followed in this ipython notebook: [https://github.com/yoachim/ScratchStuff/blob/master/correlation\\_check/Check%20DCR%20vals\\_newrun.ipynb](https://github.com/yoachim/ScratchStuff/blob/master/correlation_check/Check%20DCR%20vals_newrun.ipynb) (for minion\_1016).

He also looked at opsim3.61, as Dave thought this was a better run with less correlation: [https://github.com/yoachim/ScratchStuff/blob/master/correlation\\_check/Check%20DCR%20vals.ipynb](https://github.com/yoachim/ScratchStuff/blob/master/correlation_check/Check%20DCR%20vals.ipynb) (for opsim3\_61).

Dave's analysis and Peter's analysis are slightly different - Dave fits x and y parallax and DCR factors independently, while Peter fits them simultaneously, and Dave was not using the 5-sigma limits from opsim while Peter was - but the bulk results are very similar.

From Peter in email:

"I don't expect this to perfectly match Dave's values since I'm fitting everything simultaneously and including the observation metadata, but hopefully the fields are ranked somewhat similarly.

I do see that 3\_61 is a tiny bit better (11,000 healpixels have correlation > 0.7, while minion\_1016 has 13,500). You can also see the bias flip from east to west between the two sims."

I believe that after this exchange, Peter and Dave agree fairly well on how "good" a particular opsim run is, and it looks like we now have a pretty good parallax accuracy metric ready for MAF. Dave did some simulations to evaluate what a reasonable "correlation factor" cutoff value could be and came up with a value of 0.7 (i.e. correlations greater than 0.7 would be "bad" for parallax, while correlations less than 0.7 should be okay .. obviously, this is somewhat arbitrary and should be revisited when a particular science case regarding parallax accuracy is required).

We should update previous MAF 'science' runs, where this astrometric result is calculated.