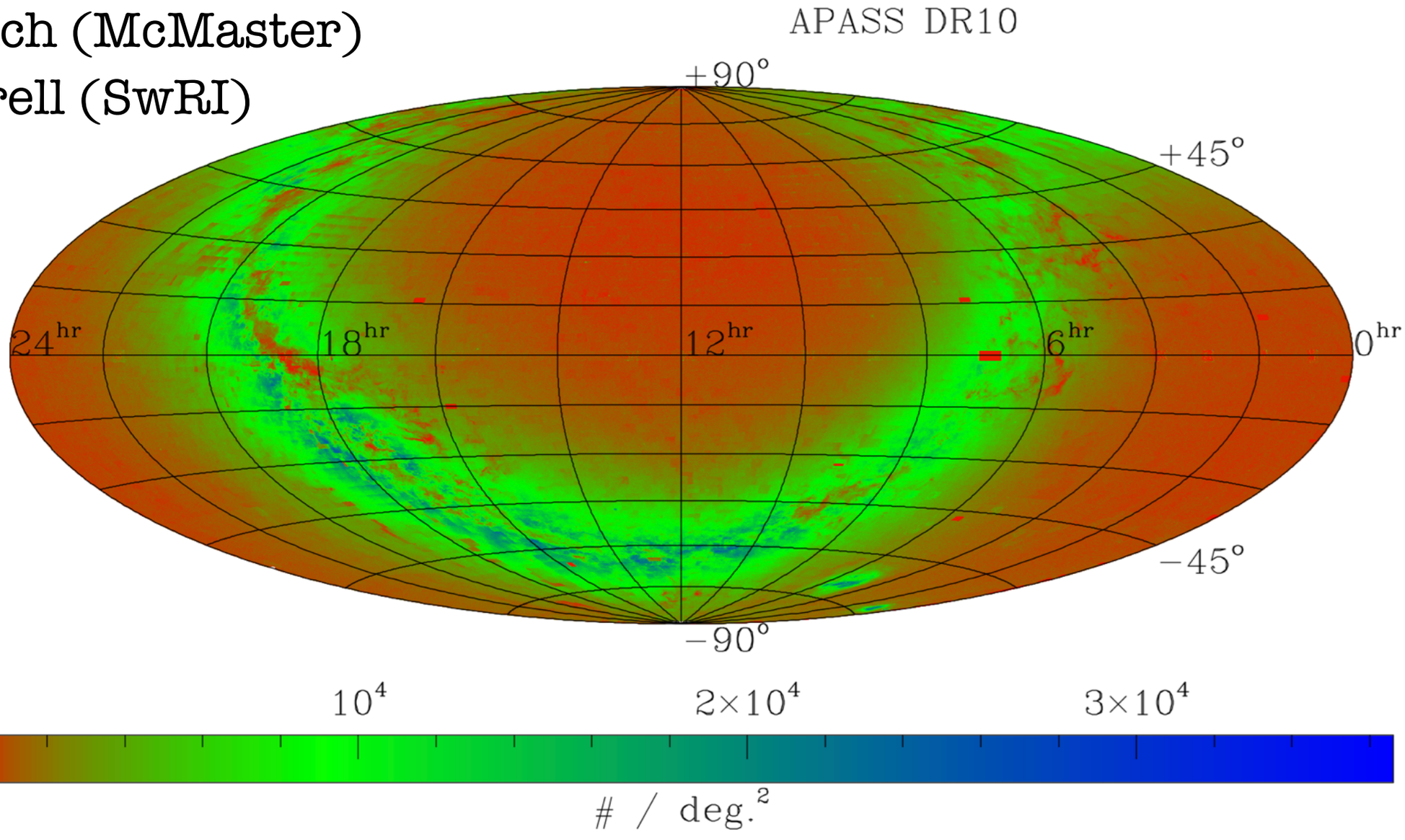
Solar System Objects in APASS

Digging out Moving objects in The AAVSO Photometric All-Sky Survey (APASS)

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APASS - specs

	Original Specs		Extended Specs
Colors:	B, V, g', r', i'		u', z', Y
Magnitudes:	10 < V < 17	+/- 0.02mag	7 < V < 10
Positions:	All-sky	+/- 0.15 arcsec	+/- 0.10 arcsec

Telescope: ASA N8 20cm f/3.6 astrograph

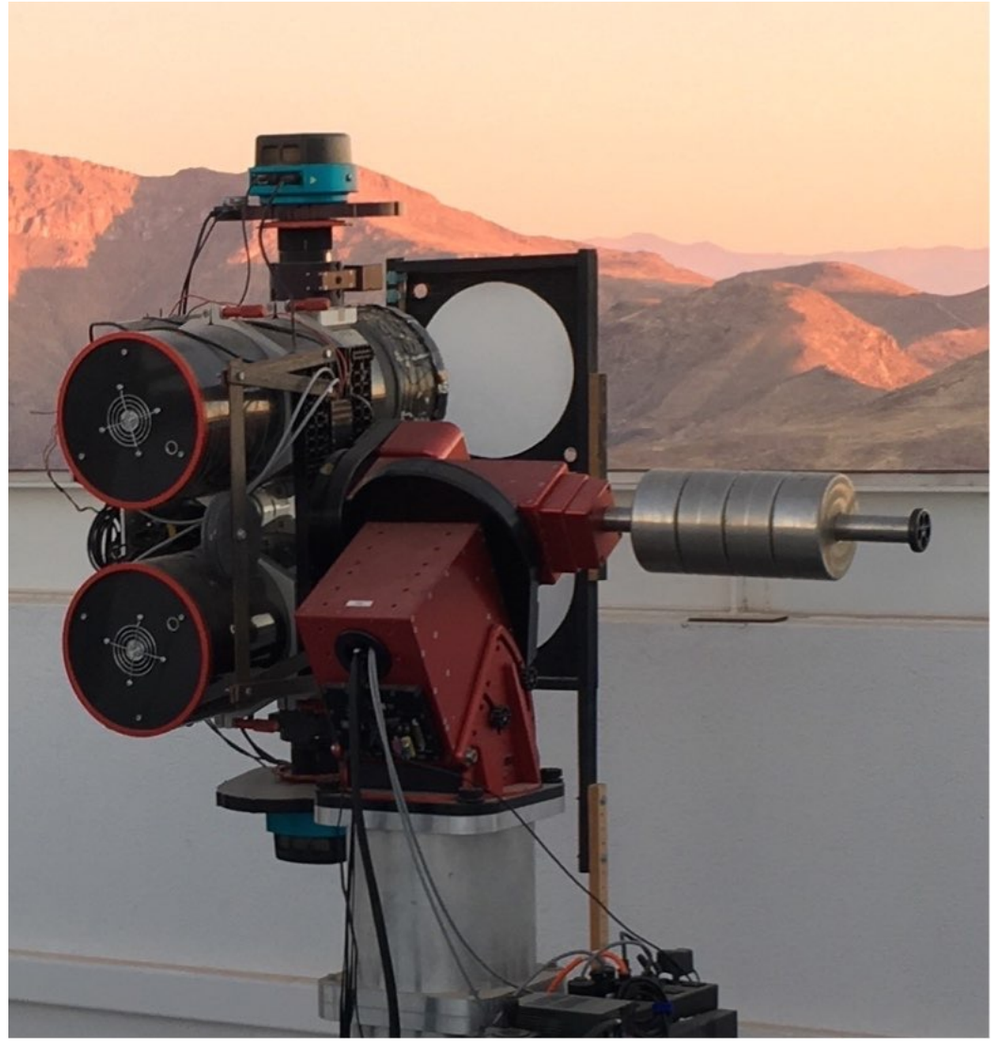
Camera: Apogee U16m16803 CCD
FoV: 2.9x2.9deg, 2.56asec/pix

Filter Wheel: u', g', r', i', z', B, V, Y & clear

Software: Control: MaximDL, ACP
Reduction: Custom

Sites: North: DRO, New Mexico
South: CTIO, Chile

Mount: Paramount ME



A search for moving objects

Between survey start in 2009, and today, the APASS systems have taken over 500,000 images.

We have begun the work of compiling a catalogue of all the serendipitous observations of asteroids and comets in those images.

For the bulk of the survey data, we have contemporaneous five color (B, V, g', r', & i') imaging.

Search details

For each night, for each image, query the MPC for objects brighter than 18th mag at that time (actually once per pointing - which really means within 2 minutes, for a field at least 10arcminutes larger than the APASS FoV).

Compare the returned list with the APASS detection lists

- pre-sort the lists in Dec to speed up the process
- matches must be within +/-10arcseconds

Merge the matched lists within each night by target field.

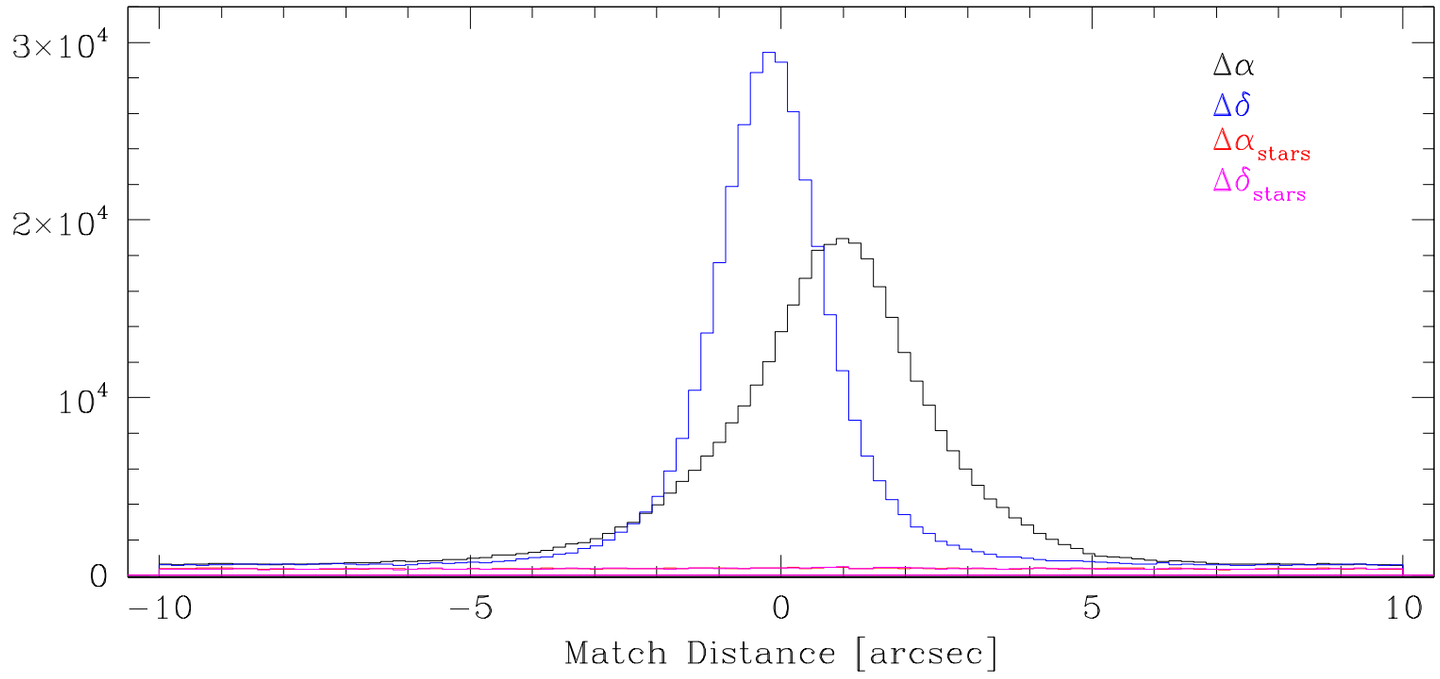
Check for possible match against catalogue stars.

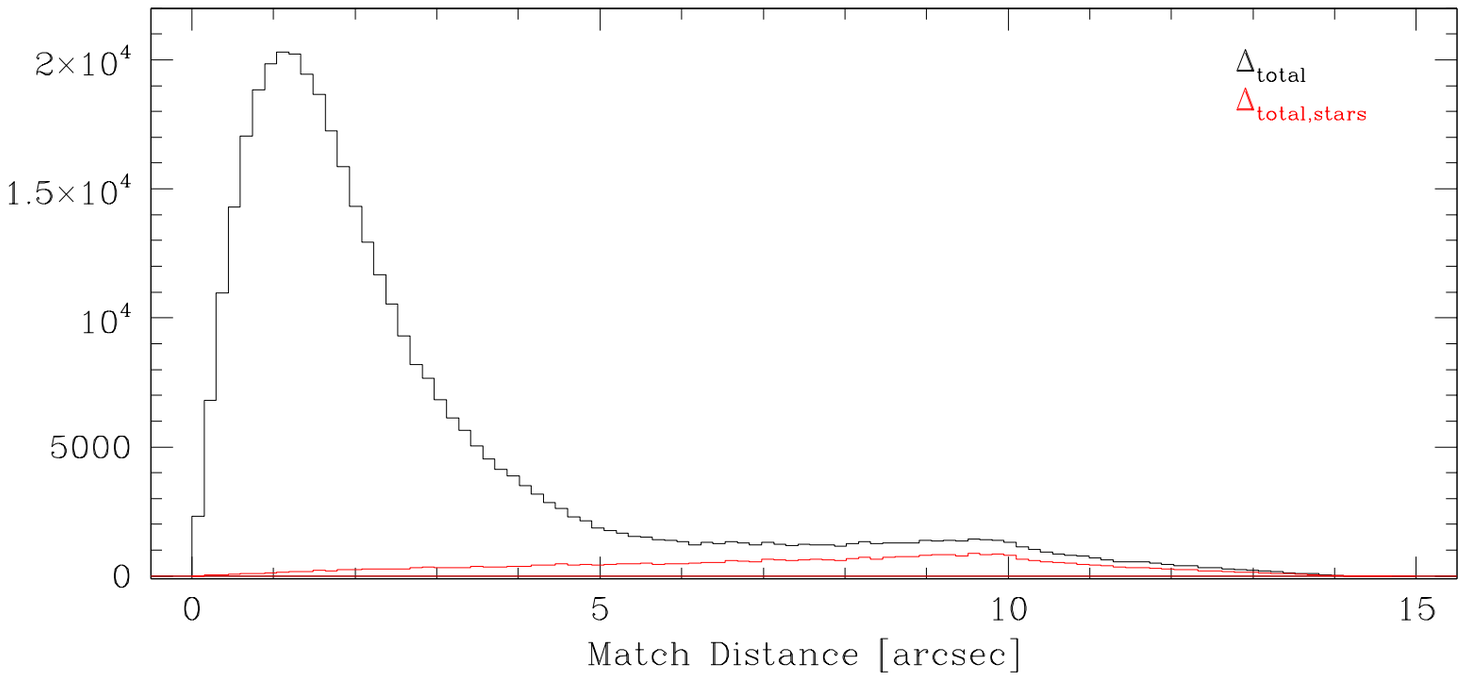
Initial findings

Found:

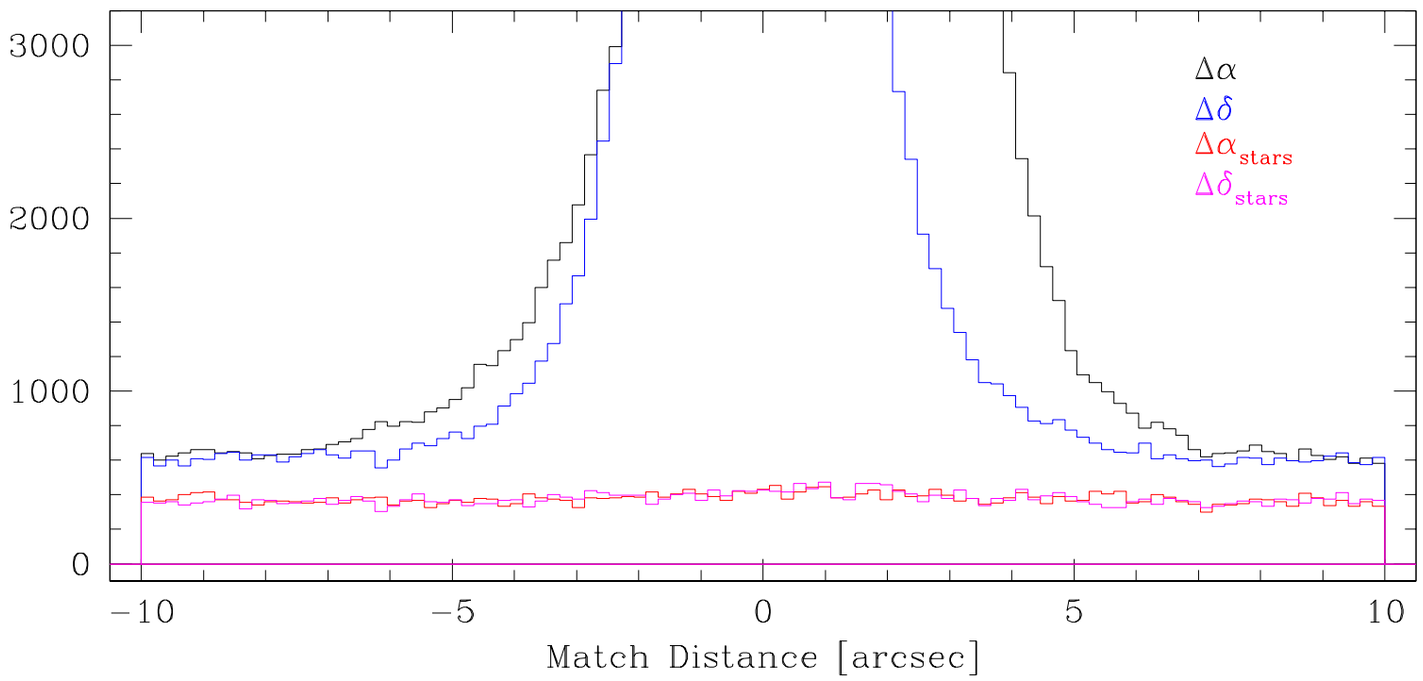
1. 388,791 matches between observations and predictions
2. Roughly 10% appear to match a catalogue star
3. For 32,582 objects
   A. One object with > 500 observations
   B. 356 objects with >= 100 observations
   C. 1,316 objects with >= 50 observations
   D. 10,517 objects with >= 10 observations
   E. 18,852 objects with >= 5 observations (one set)
   F. 591 comets, presumably the rest are asteroids

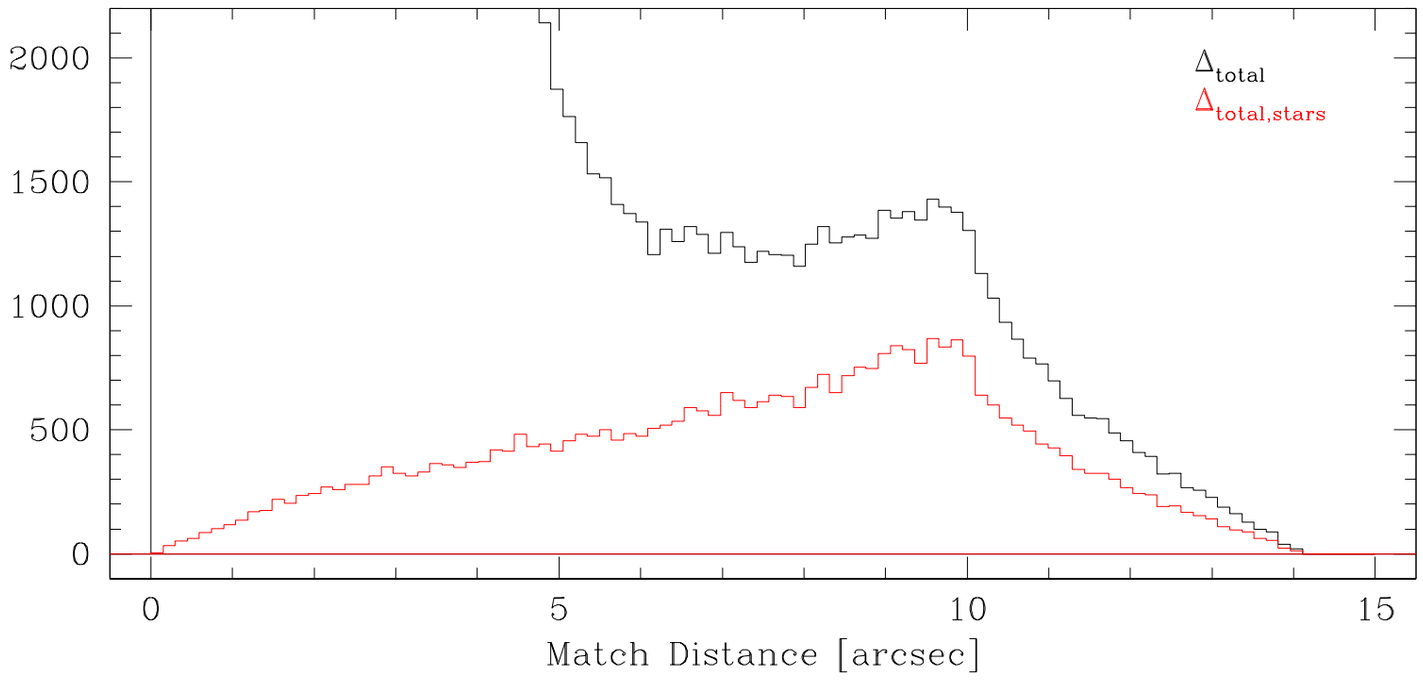
Displacement of all matches



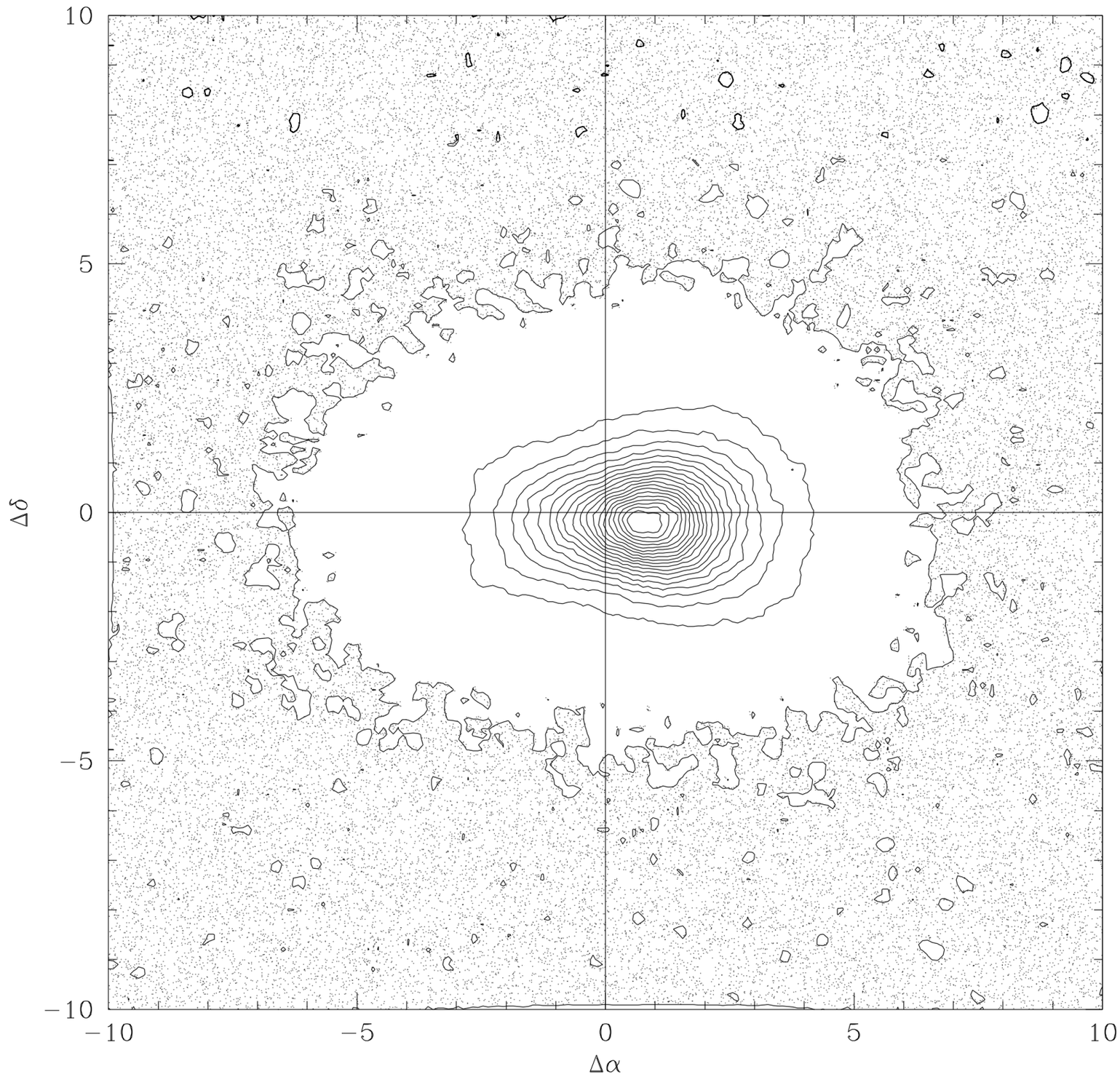


Displacement of all matches (2)

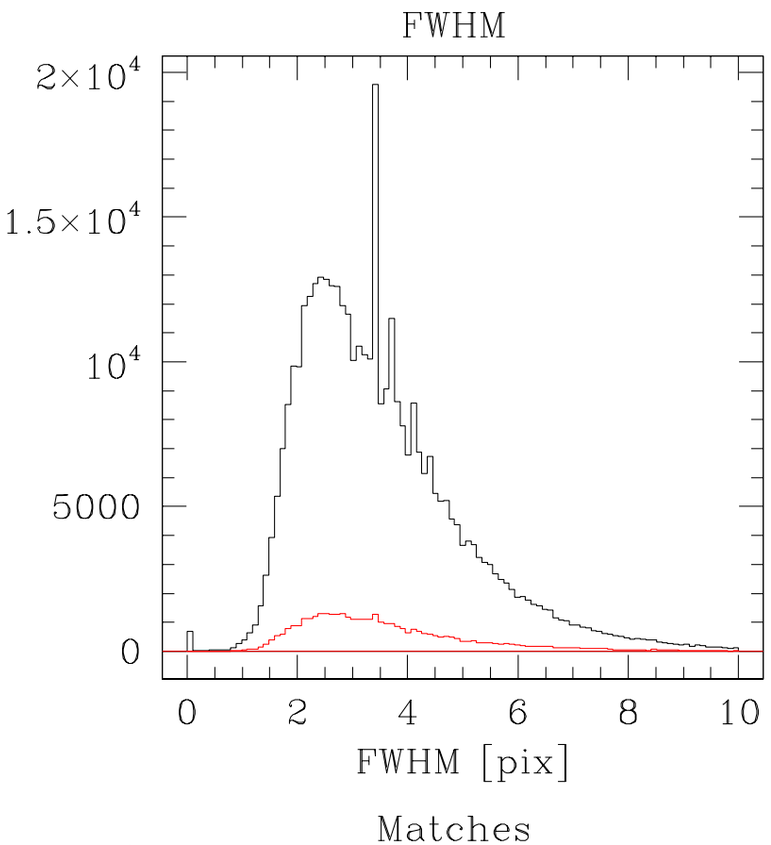


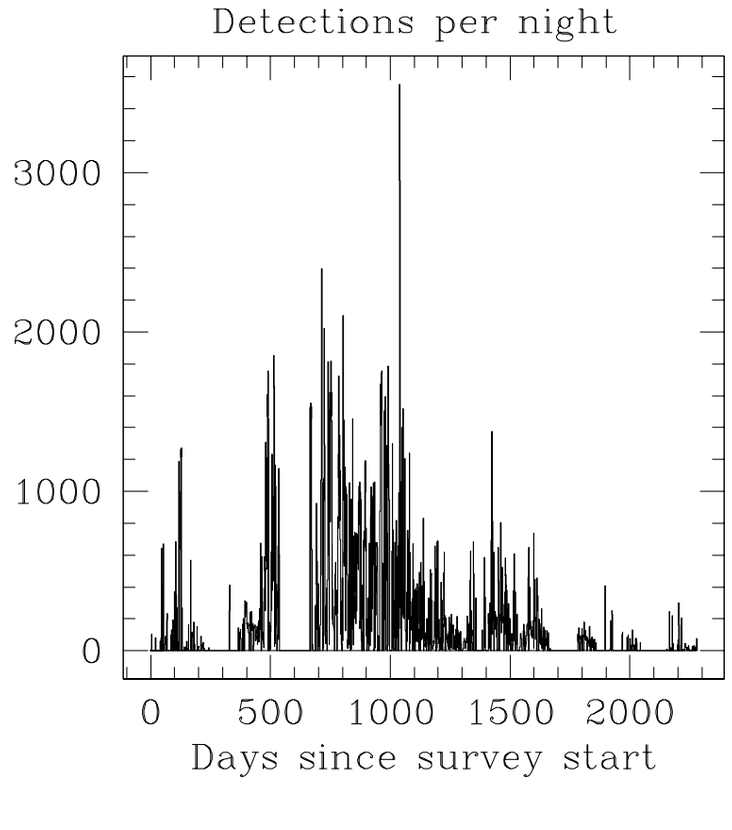


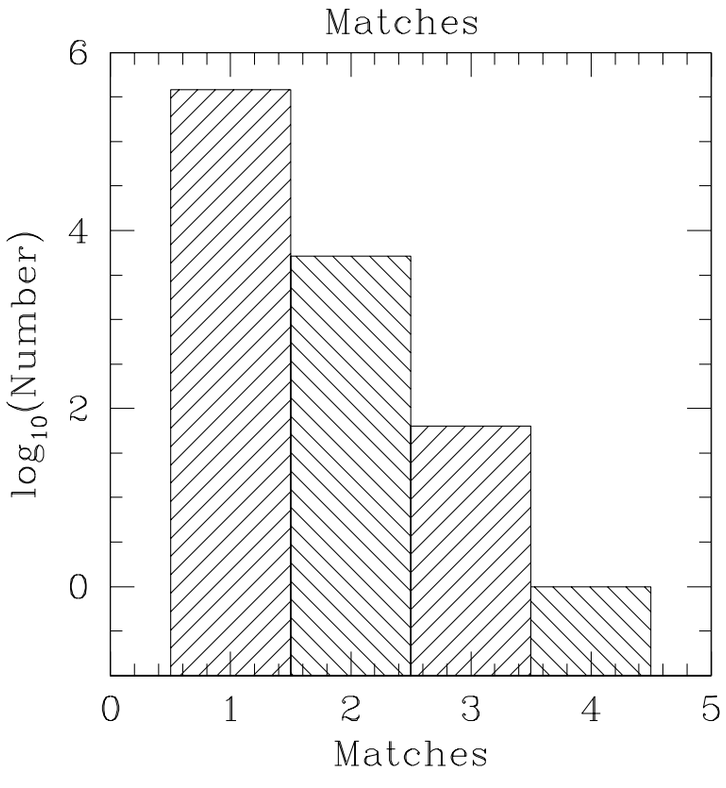
Displacement of all matches (3)

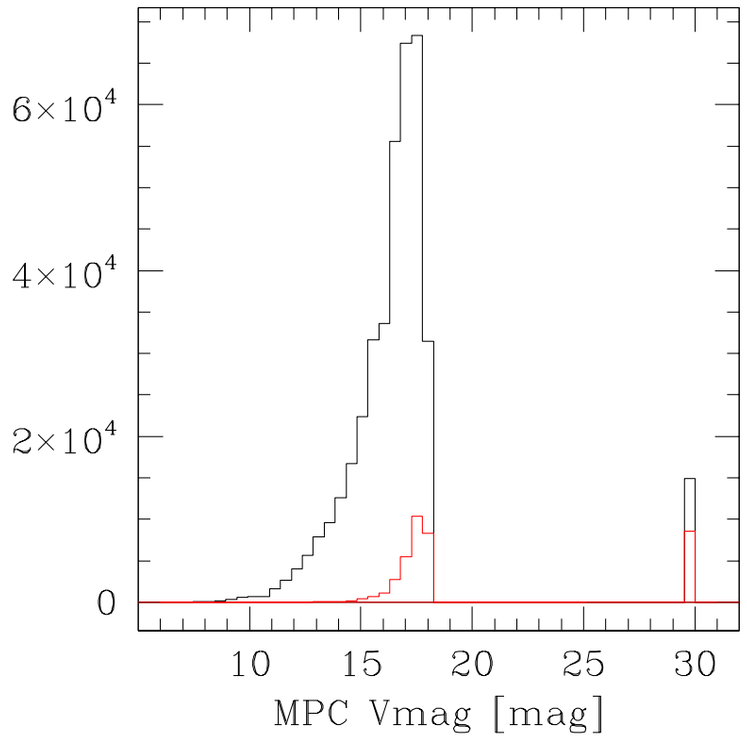


Match statistics

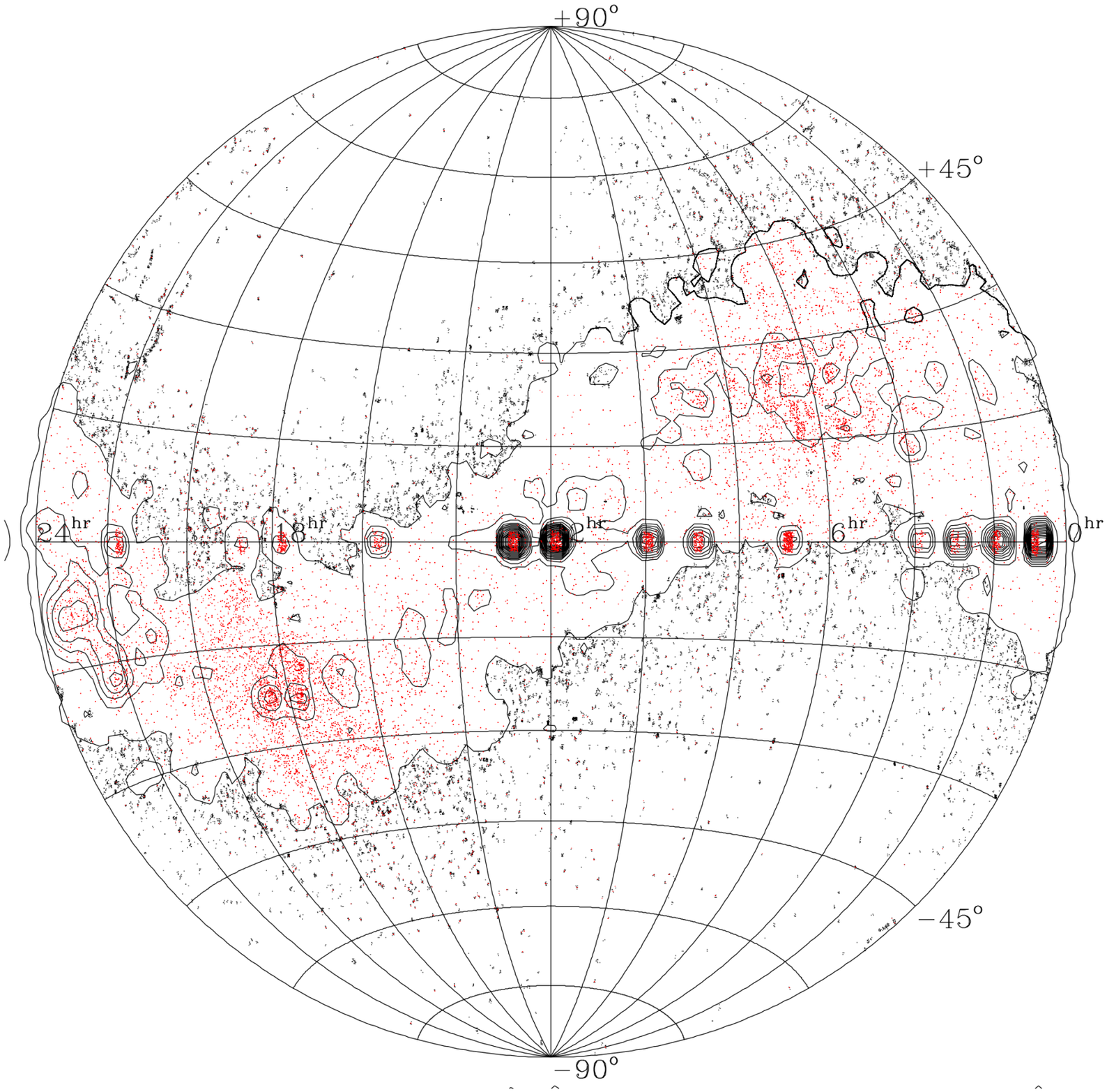




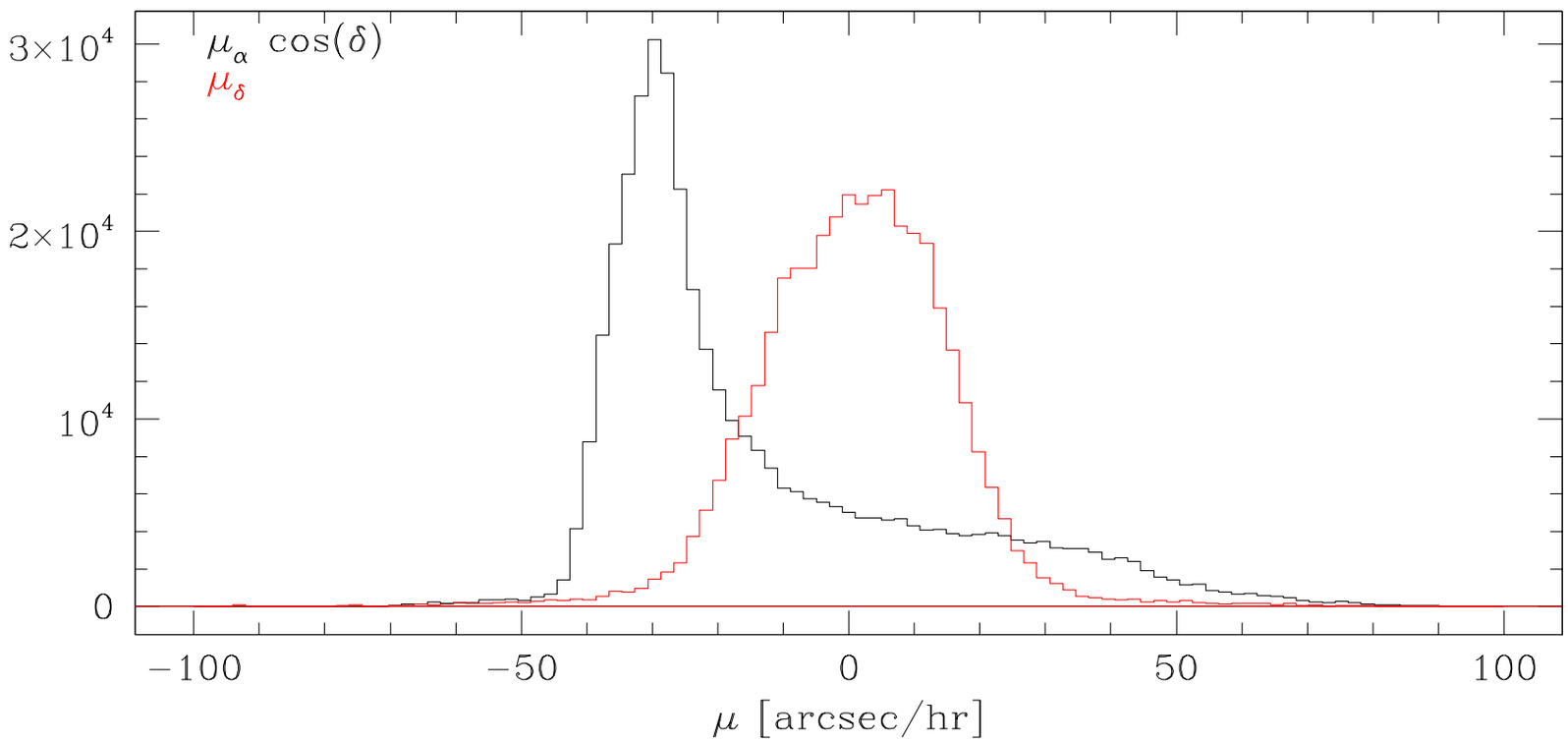


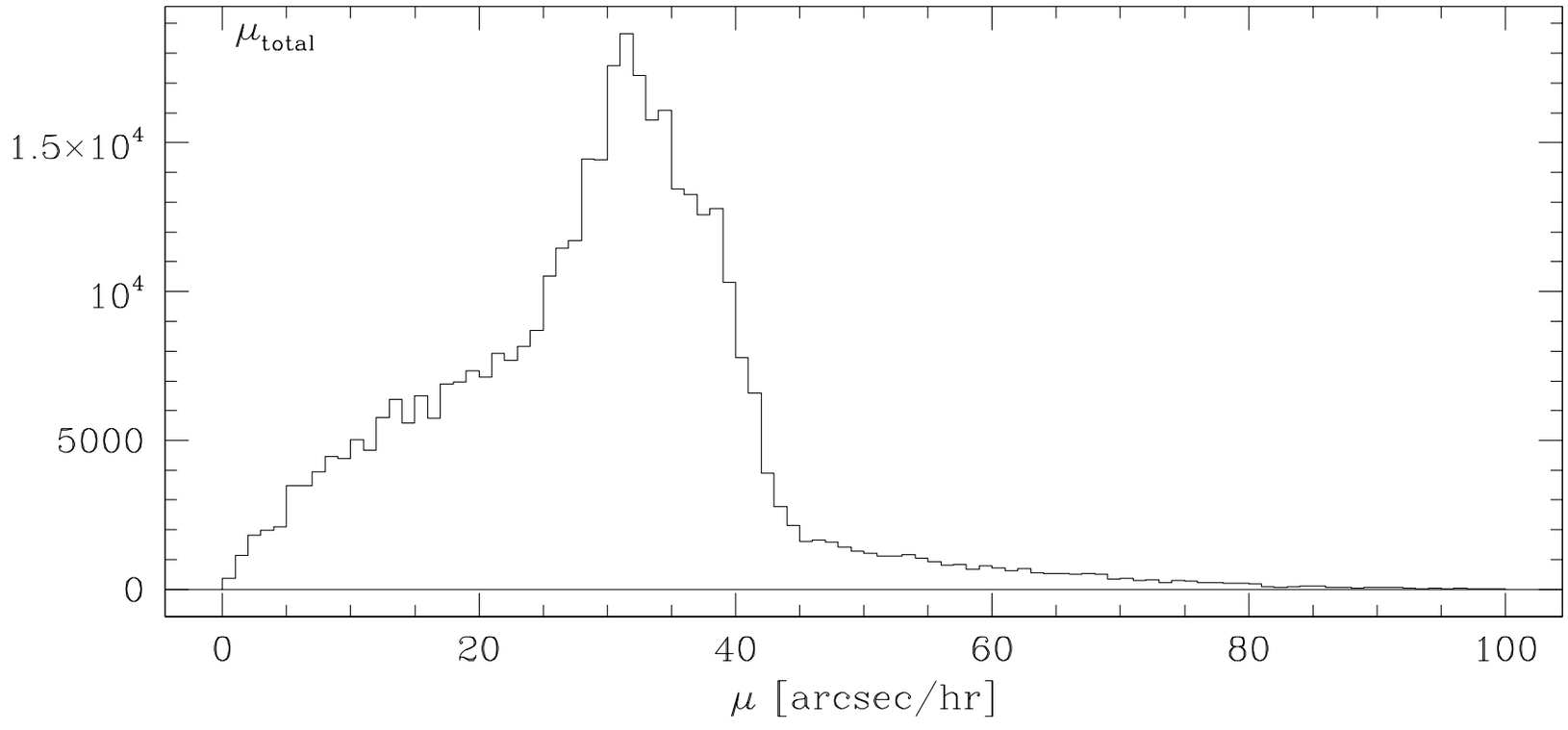


Matches over the sky



Motions of the found objects





Lots more to do

- Remove false positive matches.
- Merge in the photometry from the final DR10 catalogue.
- Use the matches to go back and determine offsets to the survey clocks.
- Submit photometry and astrometry to the MPC.
- Update the APASS database to flag all objects as moving objects.