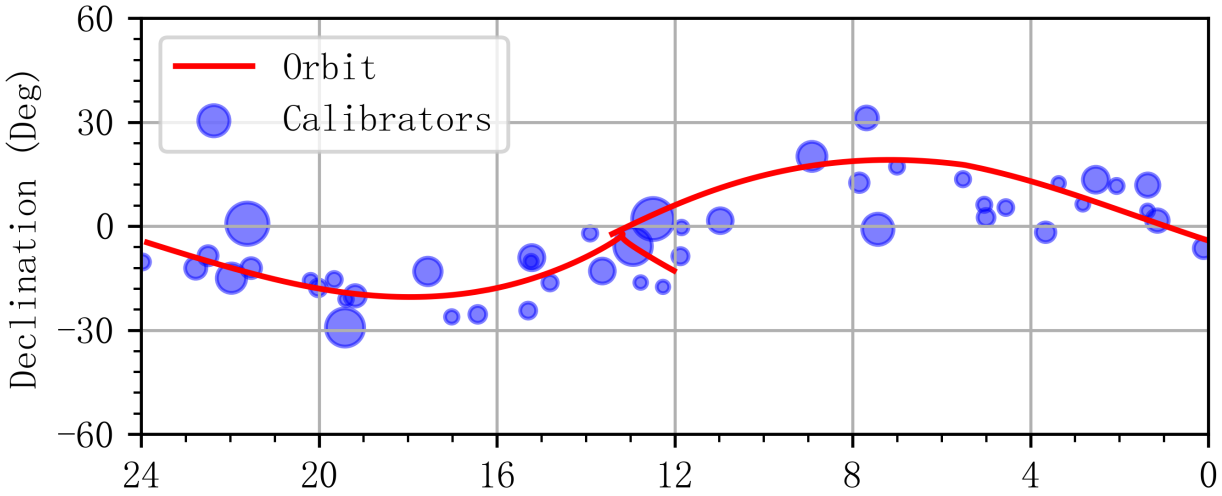
Contribution of AOV observations to the ICRF3

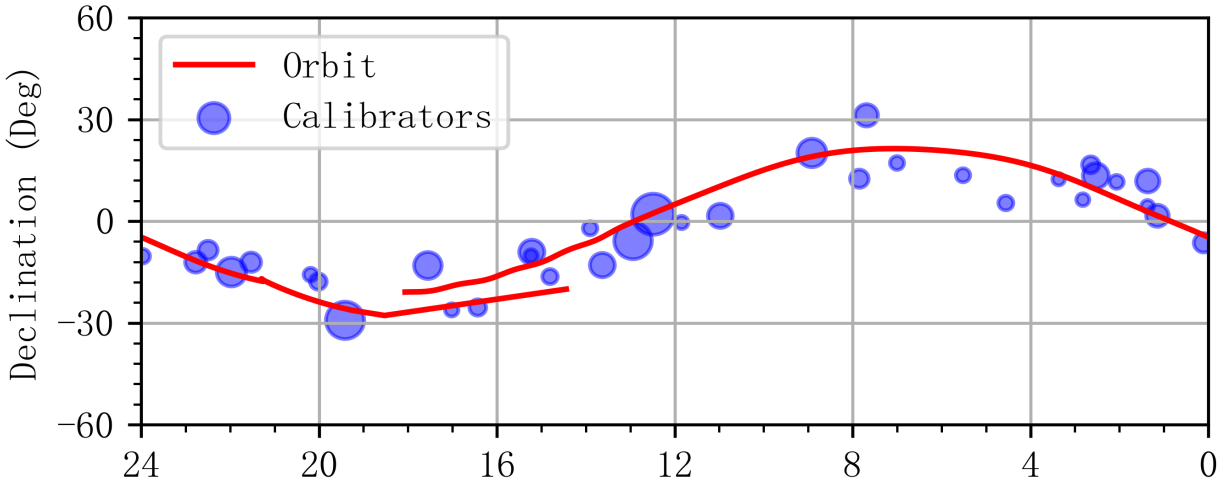
Fengchun Shu

Shanghai Astronomical Observatory

Calibrator sources for Chang’ e-4



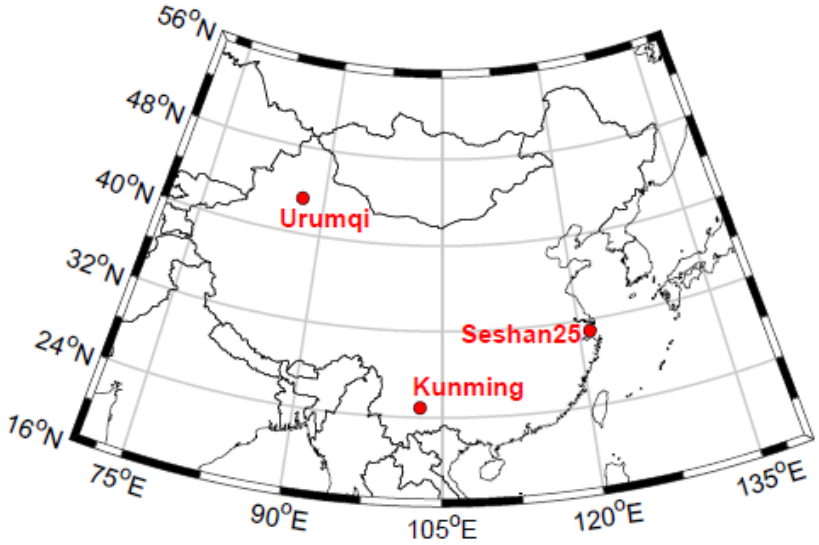
- data relay satellite

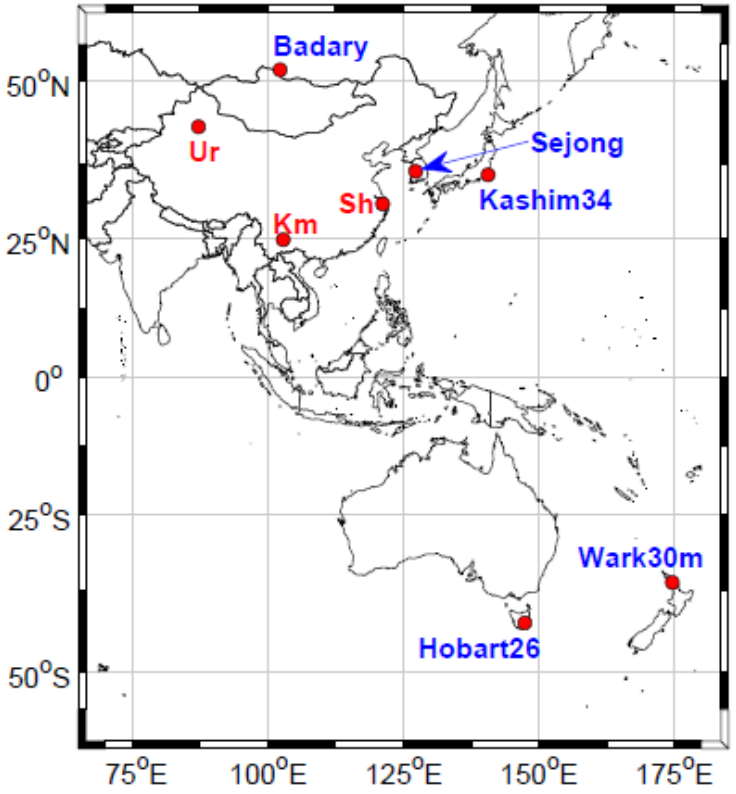


- lunar lander

Search for new ecliptic plane sources

- Core stations
  - Sh, Km, Ur
- Cooperation stations
  - Kv, Kb, Ho, Wa, Bd





Observing sessions in search mode

Date yyyy-mm-dd	Code	Stations	#source
2015-02-13	VEPS01	ShKmUr	293
2015-02-14	VEPS02	ShKmUr	338
2015-04-23	VEPS03	ShKmUrKv	300
2015-04-24	VEPS04	ShKmUrKv	400
2015-08-10	VEPS05	ShKmKvHo	252
2015-08-19	VEPS06	ShKmKvHo	277
2016-03-02	VEPS07	ShKmUrKb	333
2016-03-11	VEPS08	ShKmUrKb	477
2016-05-13	VEPS09	ShUrHo	291
2016-05-14	VEPS10	ShUrKv	322
2016-07-06	VEPS11	ShUrKb	307
2016-09-02	VEPS12	ShKmUr	424
2016-09-03	VEPS13	ShKmUr	344
2017-04-15	VEPS14	ShKmUr	408
2017-09-22	VEPS15	ShKmWa	231
2017-09-23	VEPS16	ShKmWa	213
2017-12-14	VEPS17	KmUrBd	291

- Observed sources > 4000
- 2 scans every source
- Total observing time > 400h
- Data volumn > 900TB

Note :

Sh-Seshan25 ,

Km-Kunming ,

Ur-Urumqi ,

Kv-Sejong ,

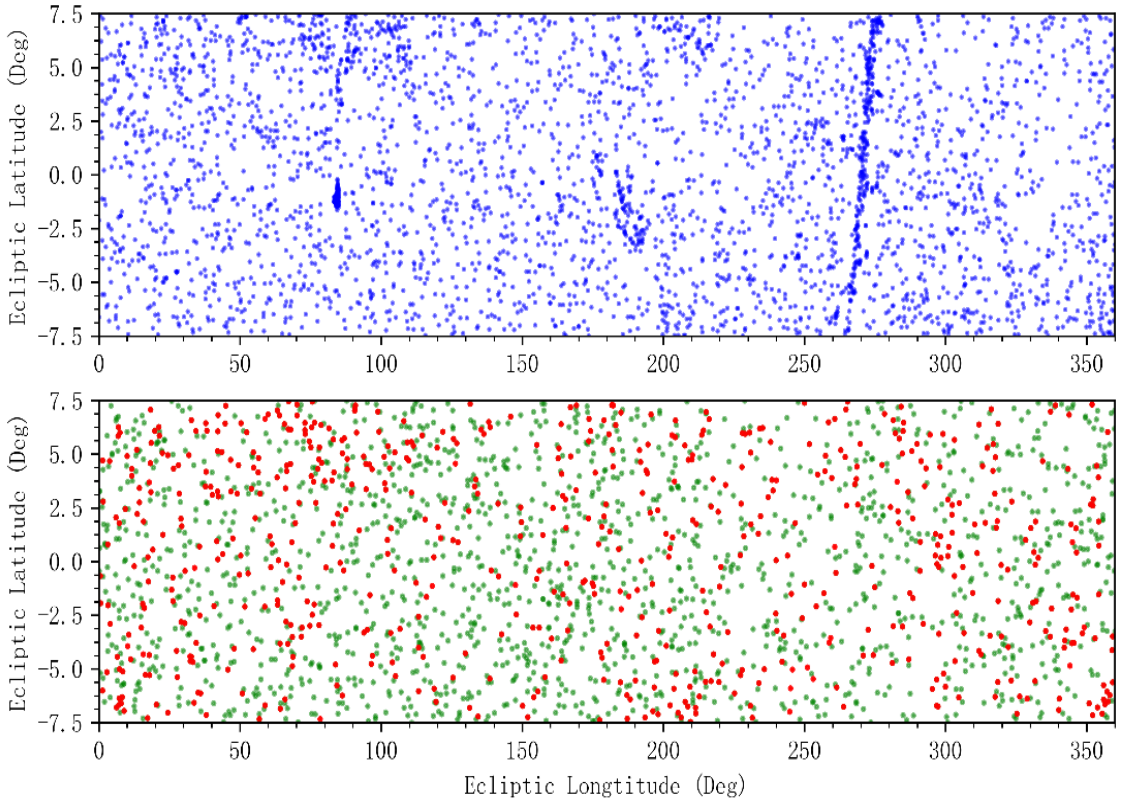
Ho-Hobart26 ,

Kb-Kashim34 ,

Wa-Wark30m ,

Bd-Badary

Distribution of ecliptic plane calibrator sources



- Blue: 3557 sources observed but not detected
- Red: 662 sources newly detected
- Green: 1554 sources detected in other program

Absolute astrometry of weak sources

- VLBA
  - BS250: 4*8h, 110 target sources
  - BS264: 6*8h, 124 target sources
- EVN
  - ES087(T6+Ef): 24h, 115 sources
- AOV
  - AOV
  - APSG

AOV sessions scheduled by SHAO

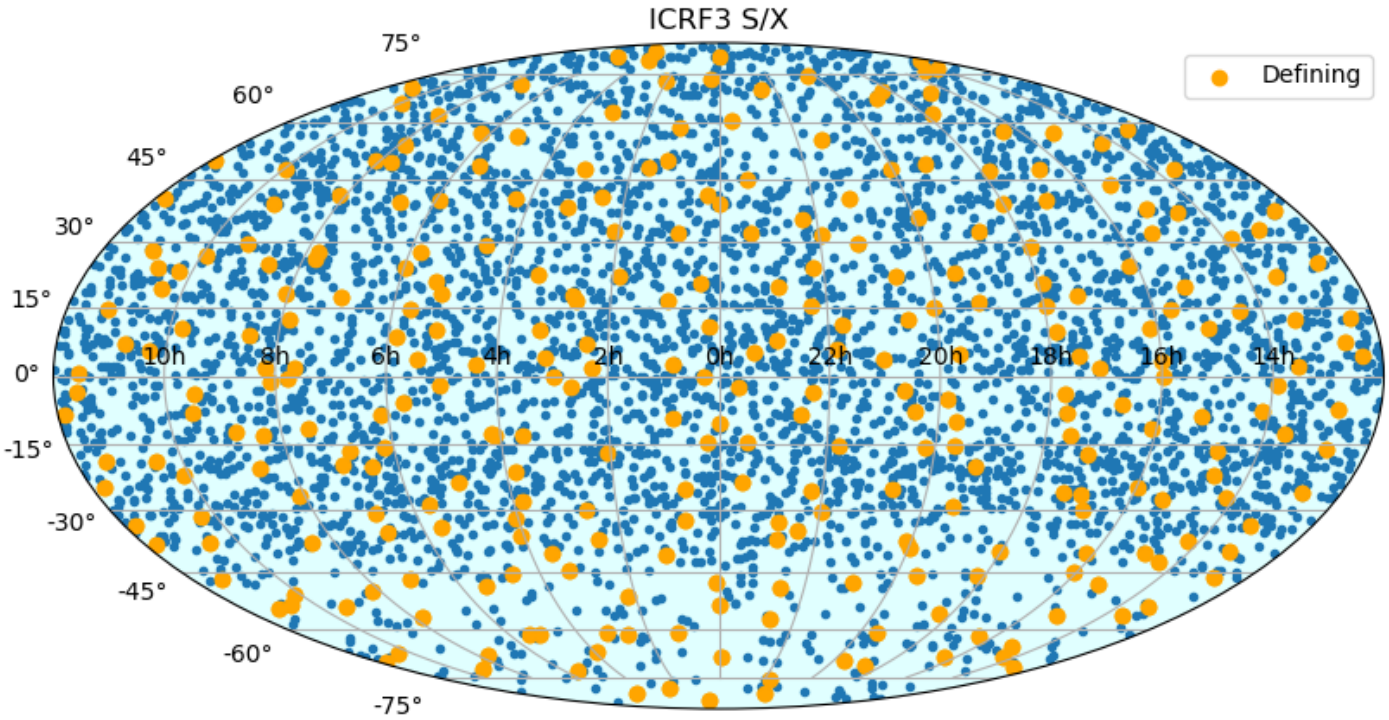
- Observing code and number of target sources are shown below

2015	AOV004(10)	AOV006(29)					
2016	AOV010(48)	AUA012(38)	AOV012(27)	APSG39(20)			
2017	AOV015(16)	AOV016(41)	AOV017(70)	APSG40(16)	APSG41(16)		
2018	AOV019(78)	AOV021(30)	AOV025(65)	AOV027(30)	AOV029(?)	APSG42(14)	APSG43(11)

	AOV with Tianma
	AOV without Tianma
	APSG

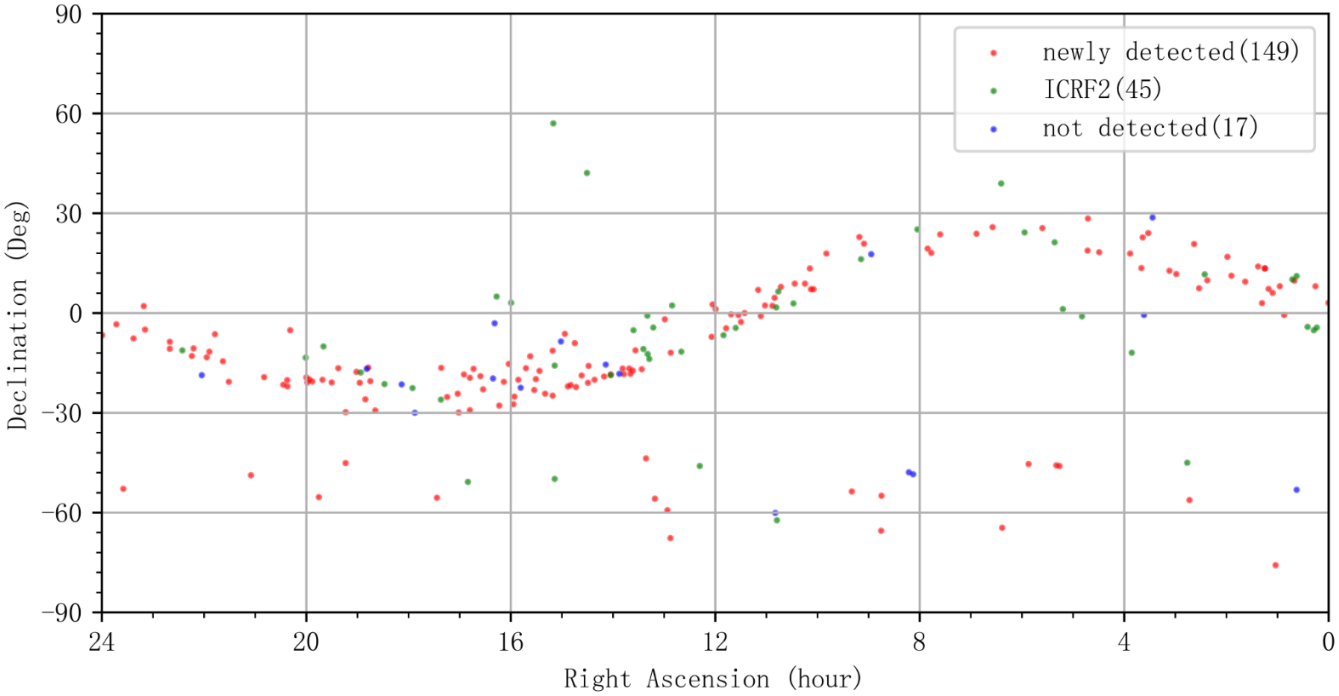
- APSG39-42 were observed at 512Mbps
- All other sessions were observed at 1Gbps

4536 S/X sources in the ICRF3 released in 2018



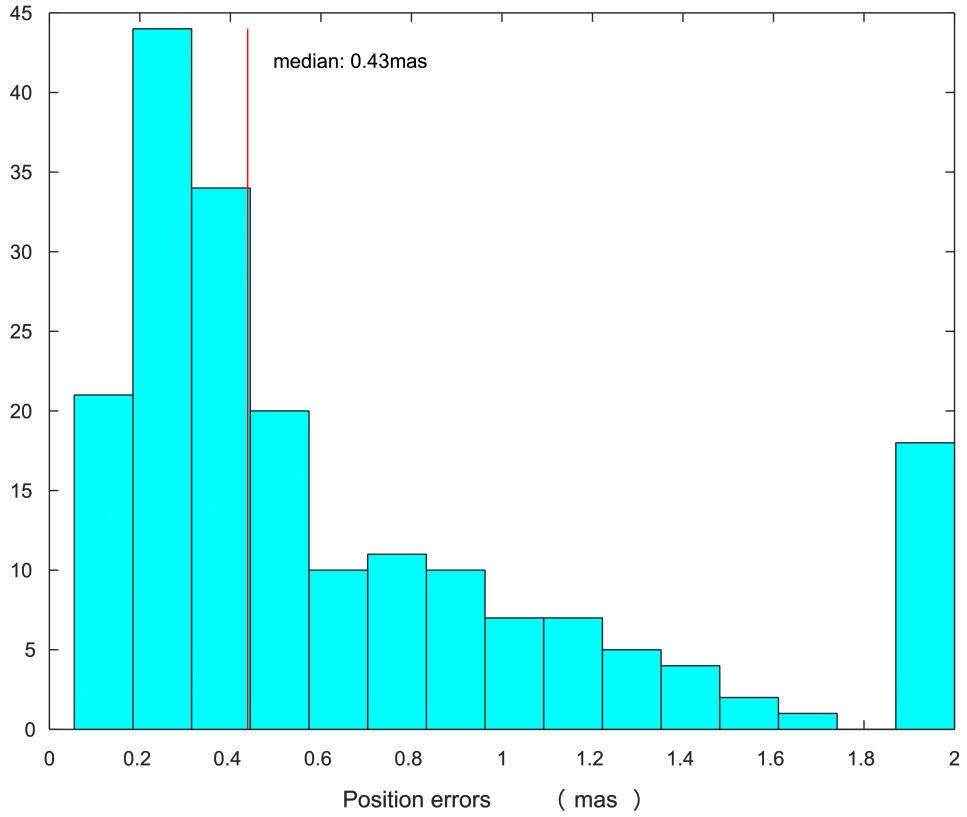
available at http://hpiers.obspm.fr/icrs-pc/newwww/icrf/index.php

Contribution to the ICRF3



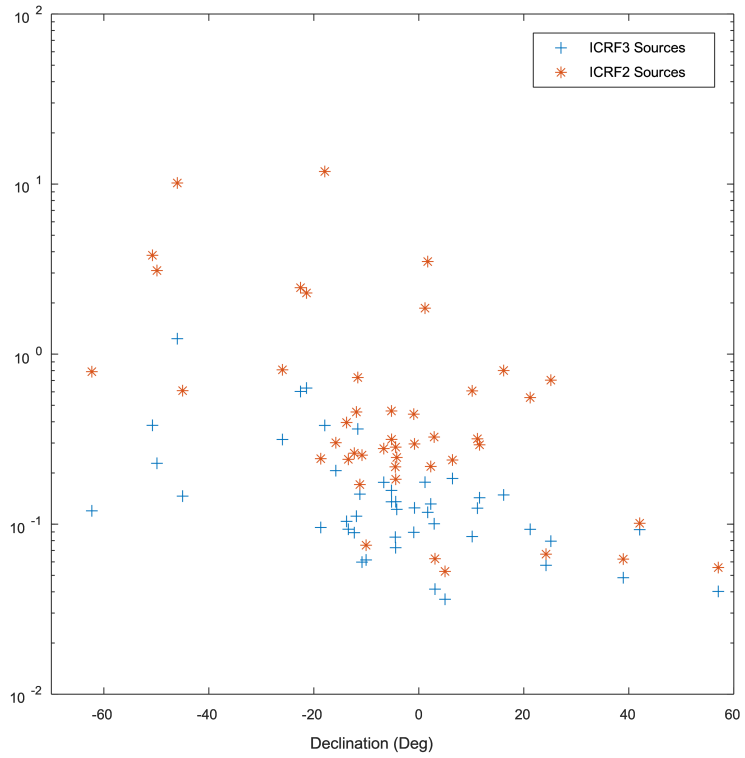
- Compared with ICRF2, the ICRF3 has 1122 new sources. Among them, 149 sources (13.3%) have been observed by AOV sessions, and 132 sources were firstly observed in the AOV.

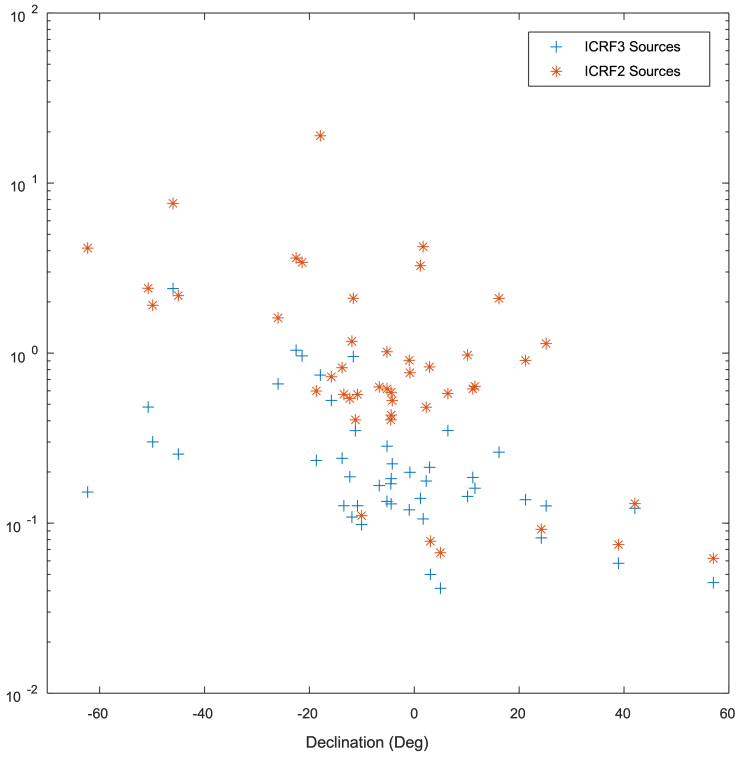
Statistics on position errors of 194 sources



Formal errors in RA & Dec

- 45 AOV sources common to ICRF2 and ICRF3

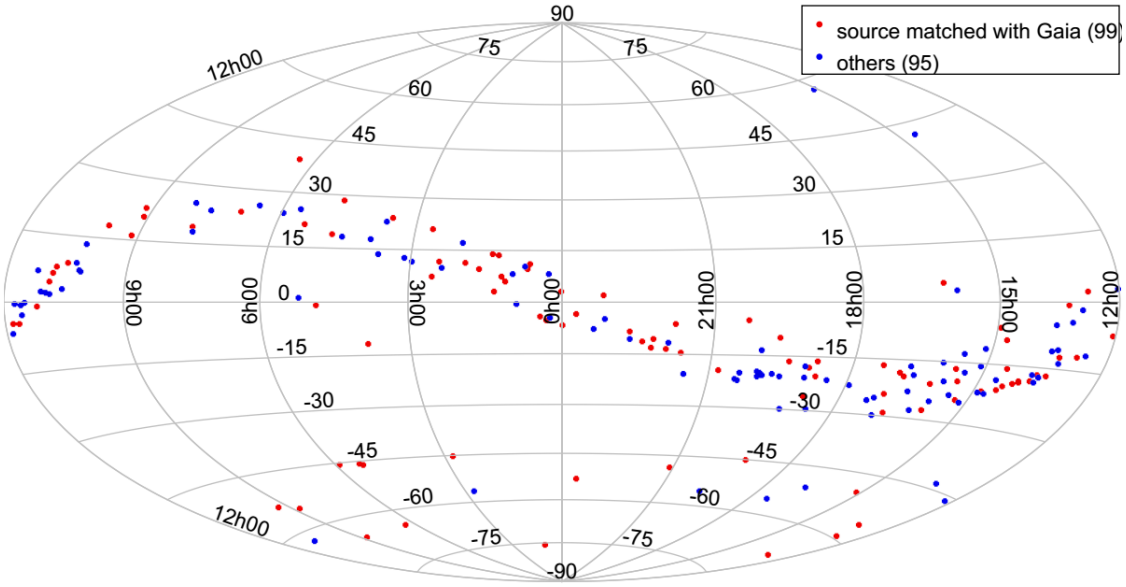




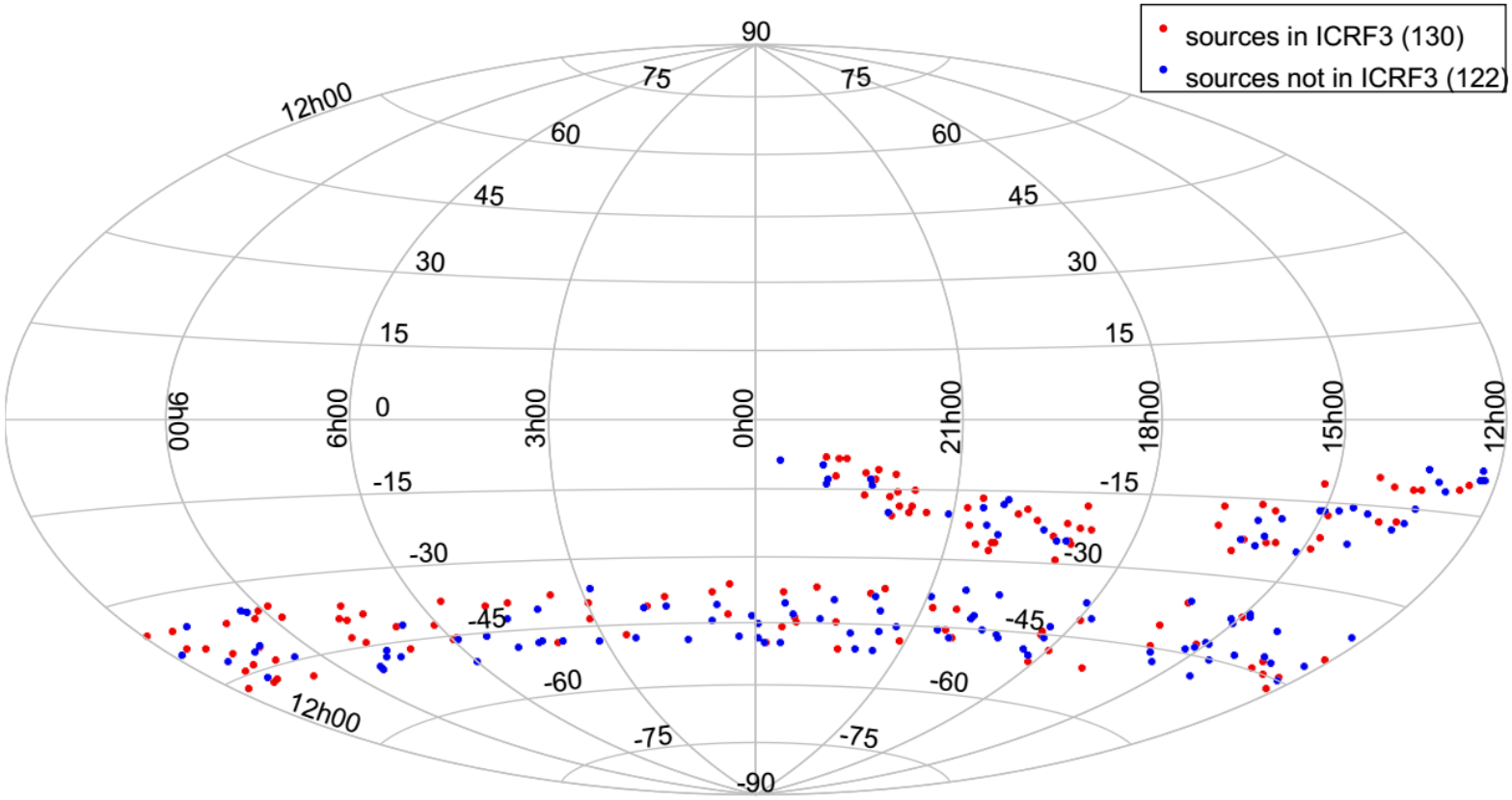
Cross match with Gaia DR2

VLBI/Gaia association for 195 sources

search radius	Matched sources
100 mas	135
50 mas	126
20 mas	99

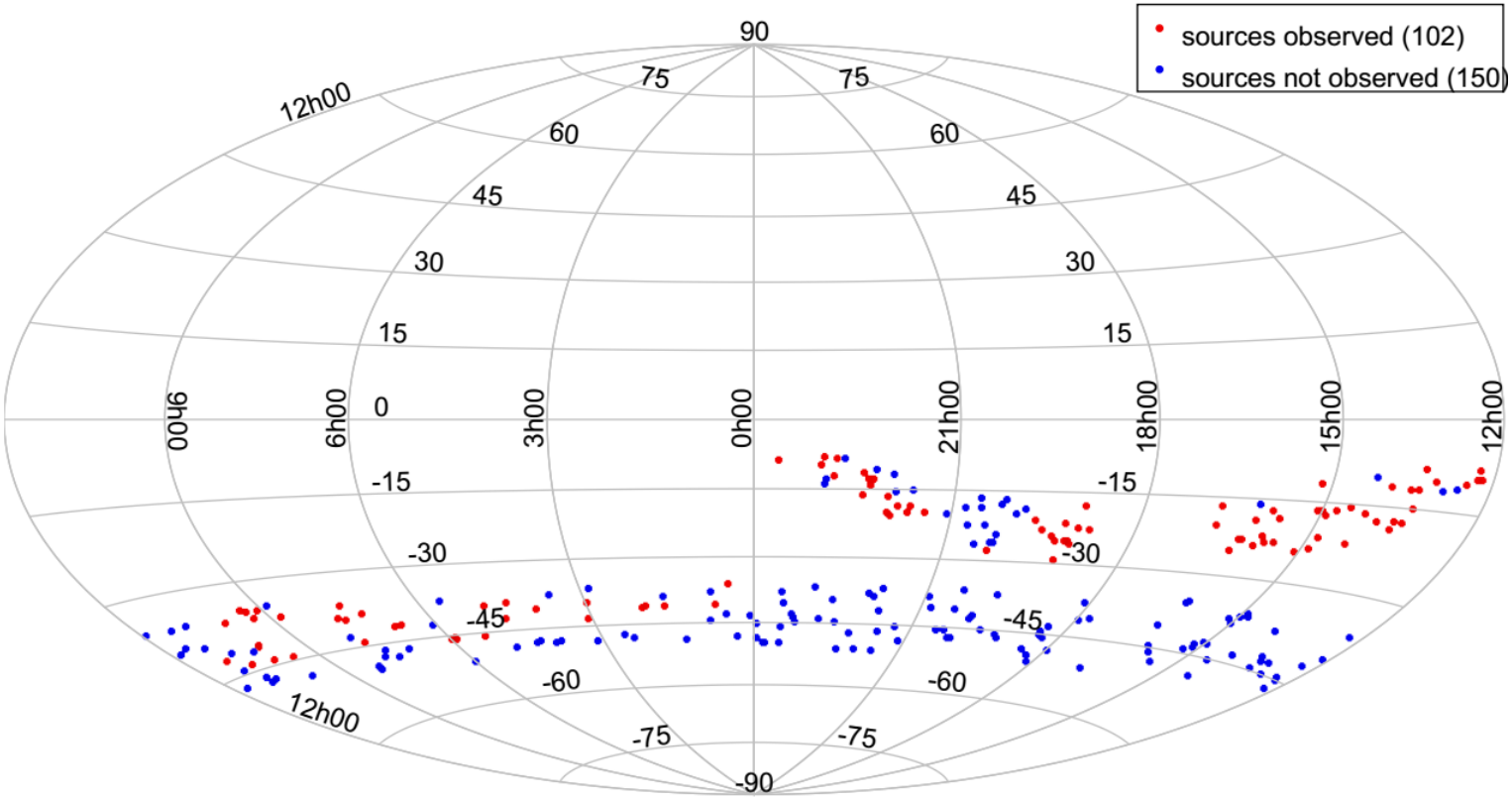


2018 AOV sessions with T6



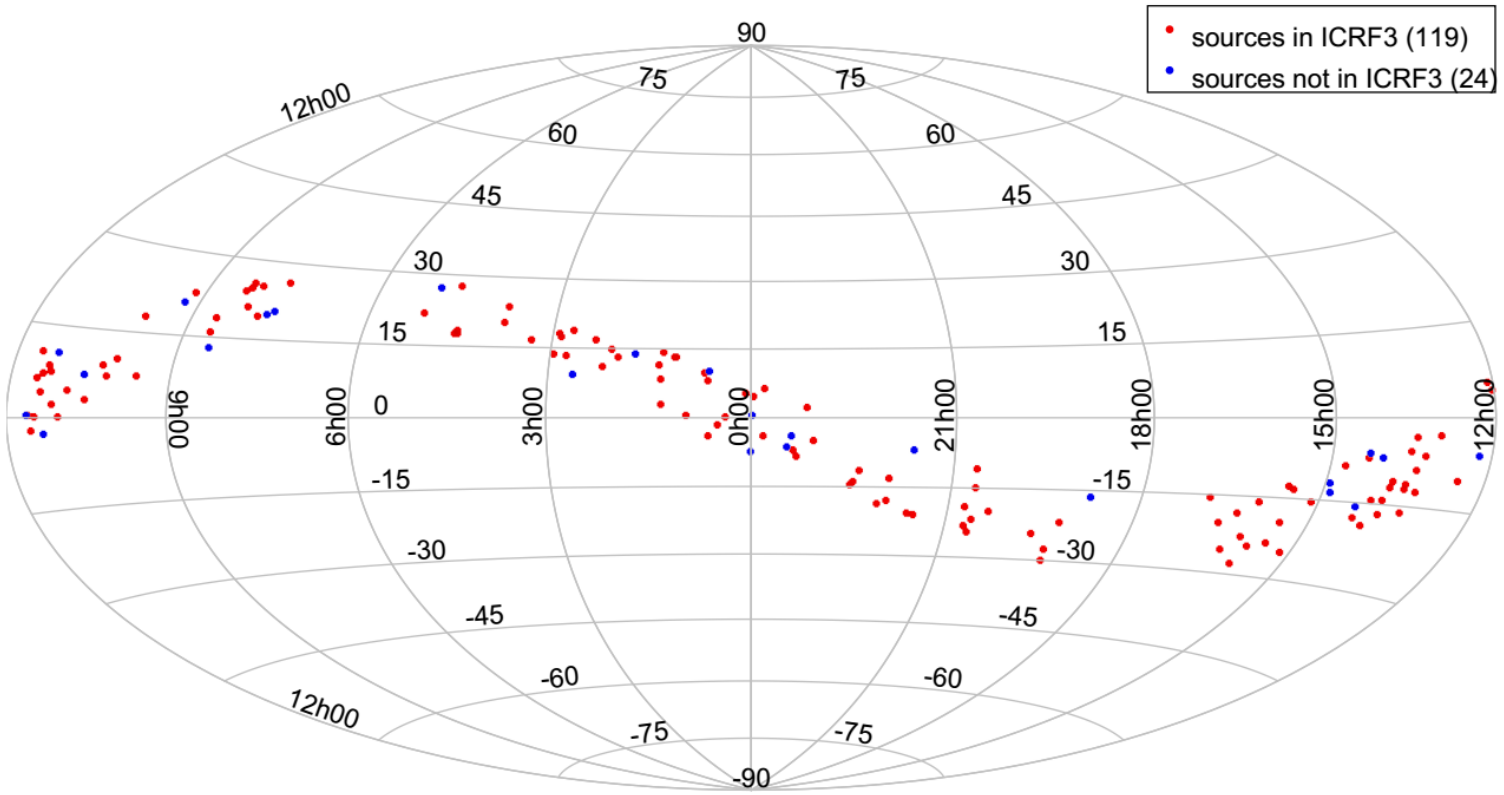
aov019/025

2018 AOV sessions with T6



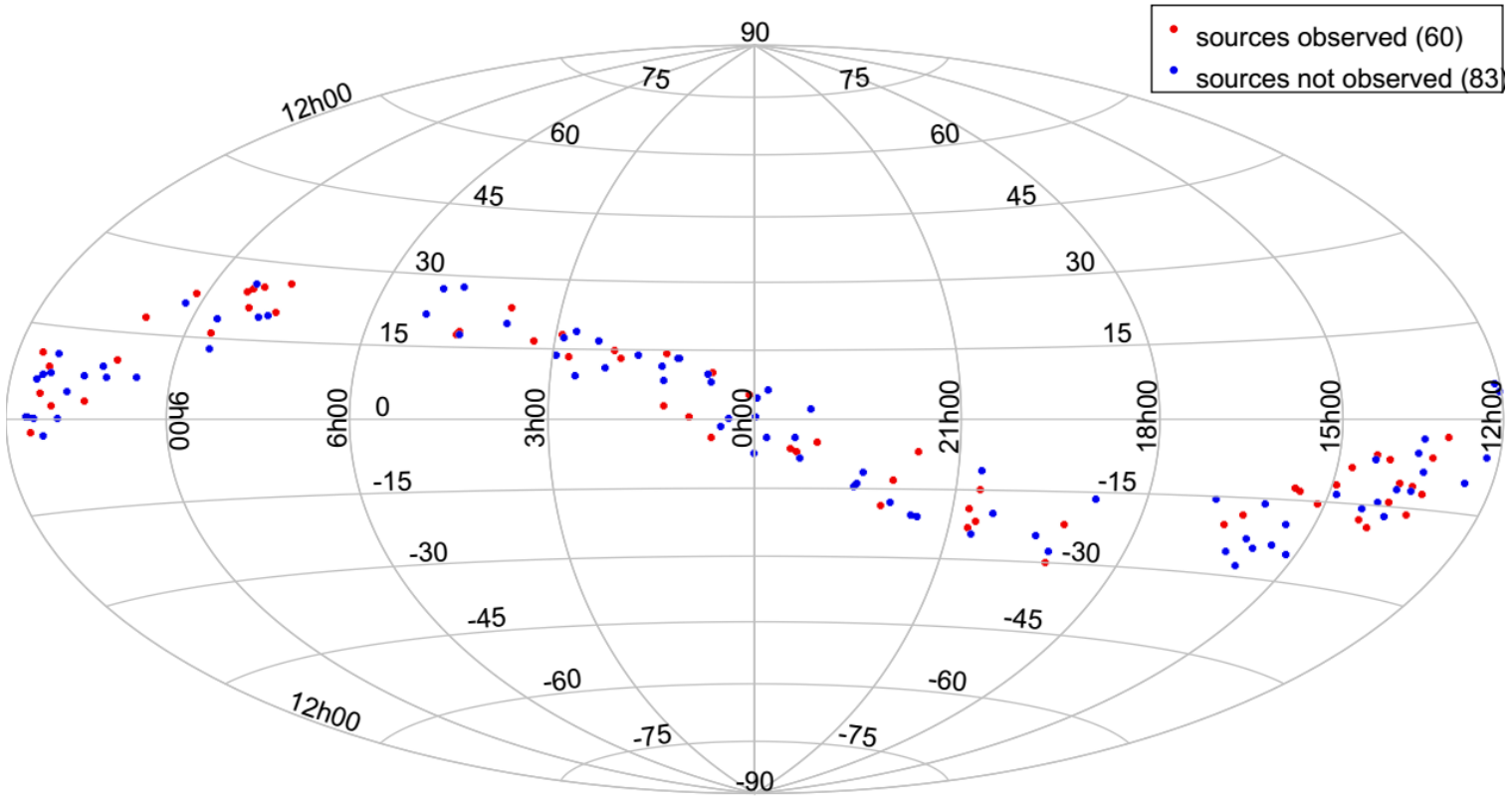
aov019/025

2018 AOV sessions without T6



aov021/027

2018 AOV sessions without T6



aov021/027

Thanks for your attention.