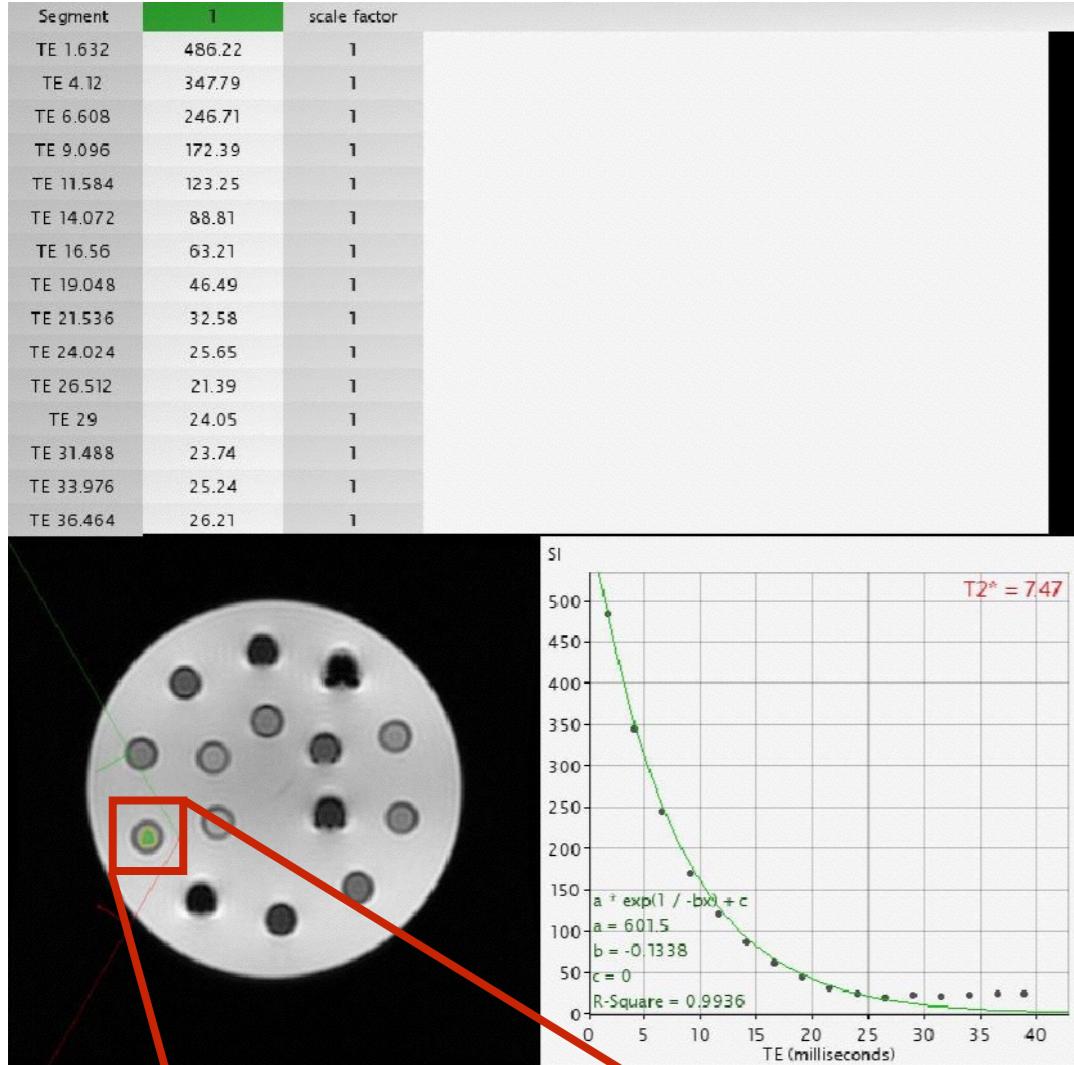


Phantom

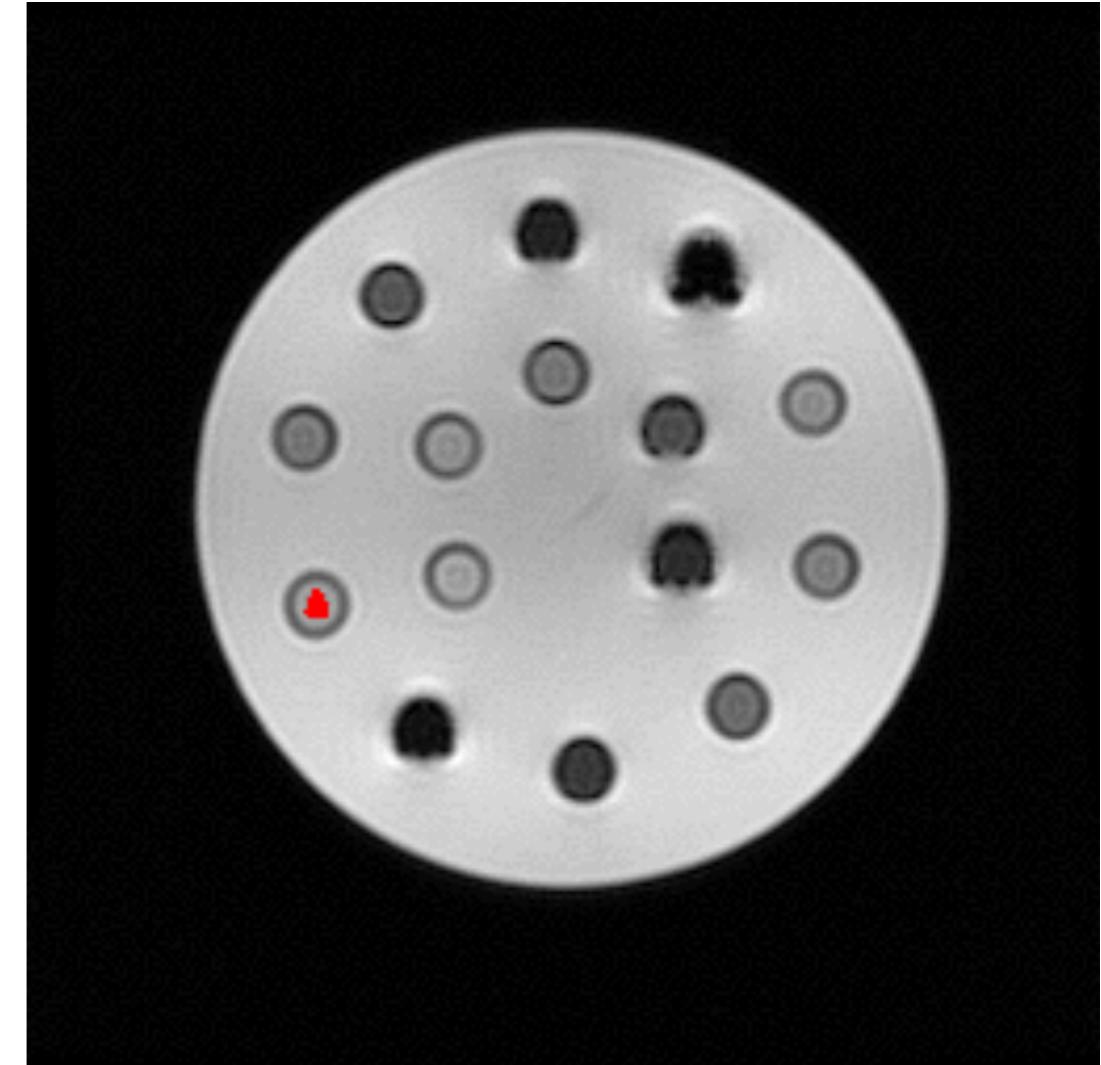
transfer function

Transfer ROI from CMRtools to 1.5T

DICOM from CMRtools



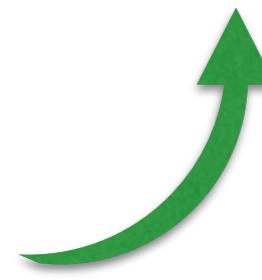
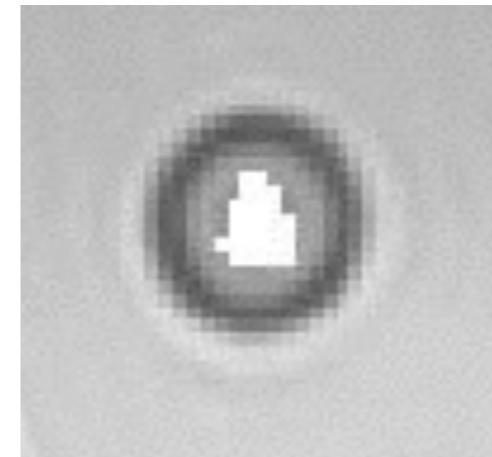
DICOM 1.5 Tesla



Transfer ROI

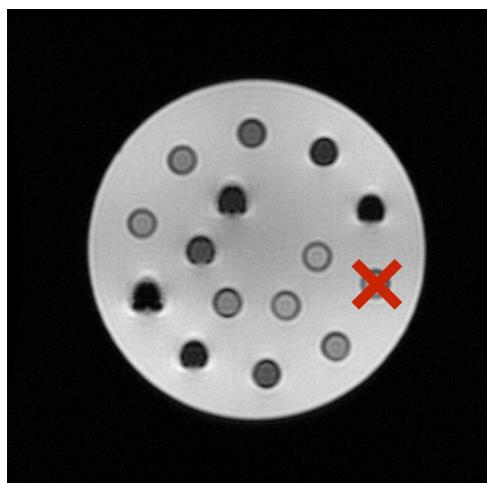


Extract ROI
by Green Colour

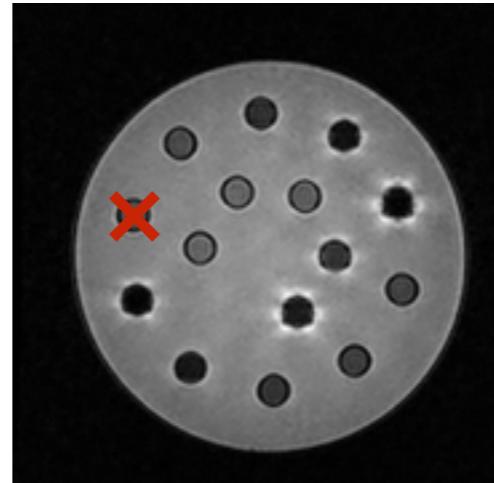


Resize ROI
for DICOM 1.5 Tesla

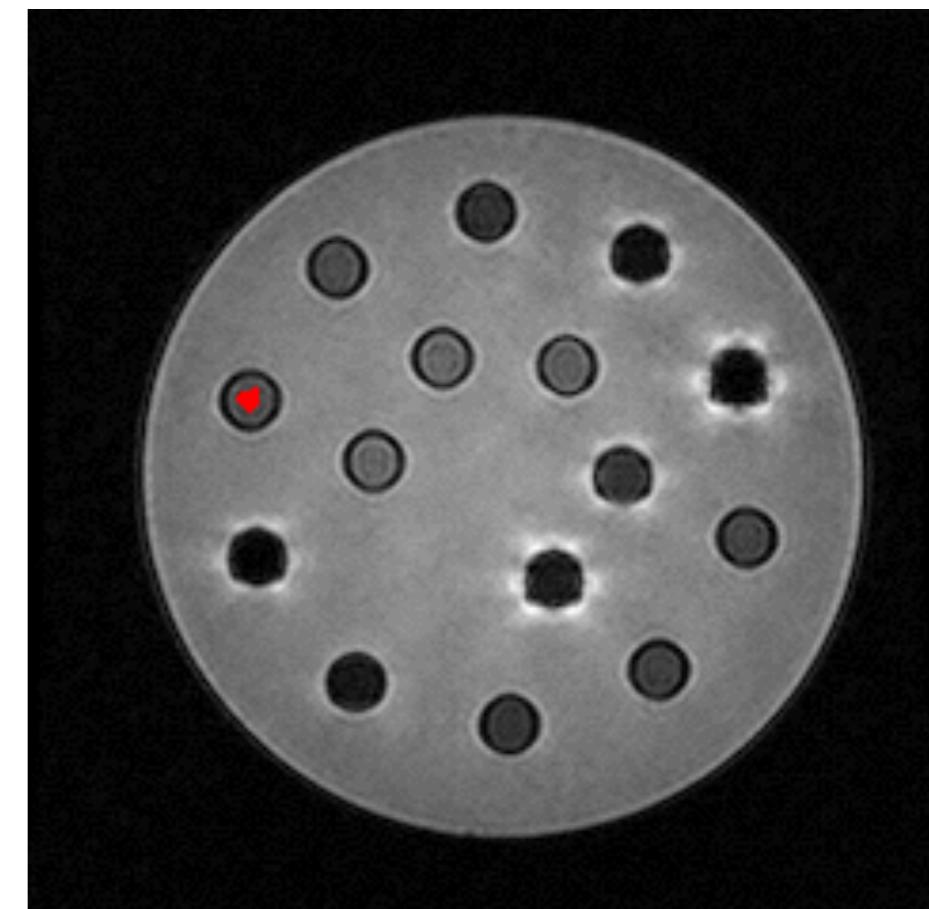
Transfer ROI from 1.5T to 3T



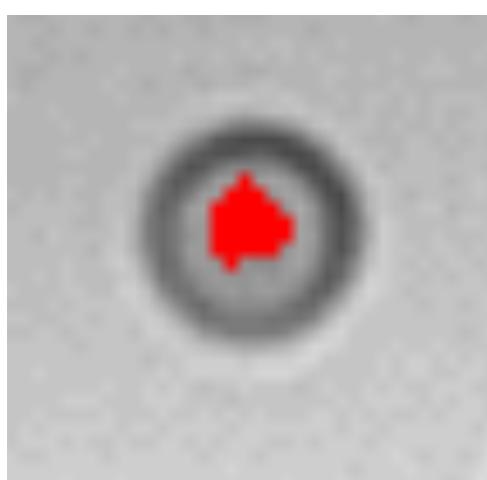
resize and get position
on DICOM 1.5 Tesla



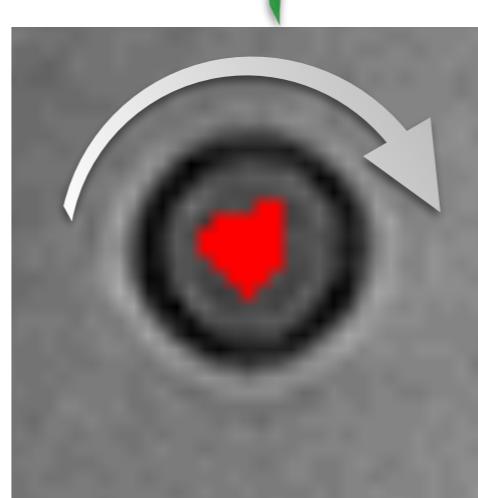
get position on
DICOM 3 Tesla



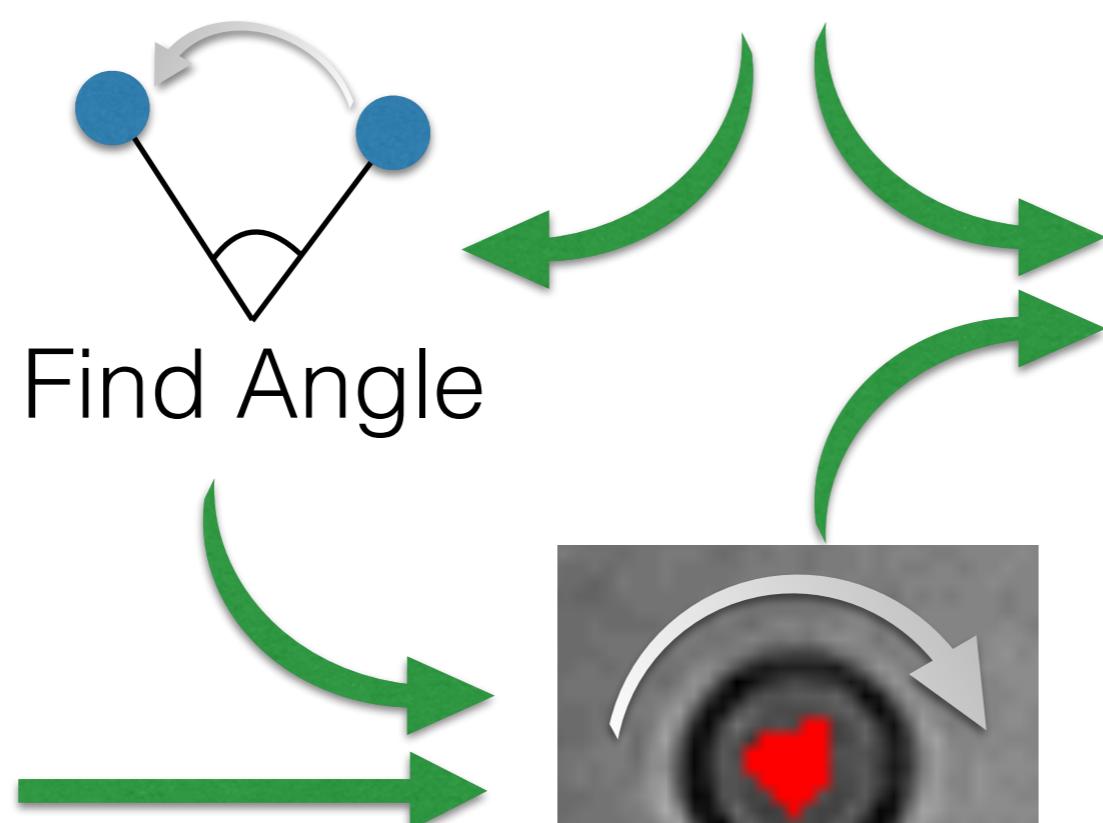
Translation to position
on DICOM 3 Tesla



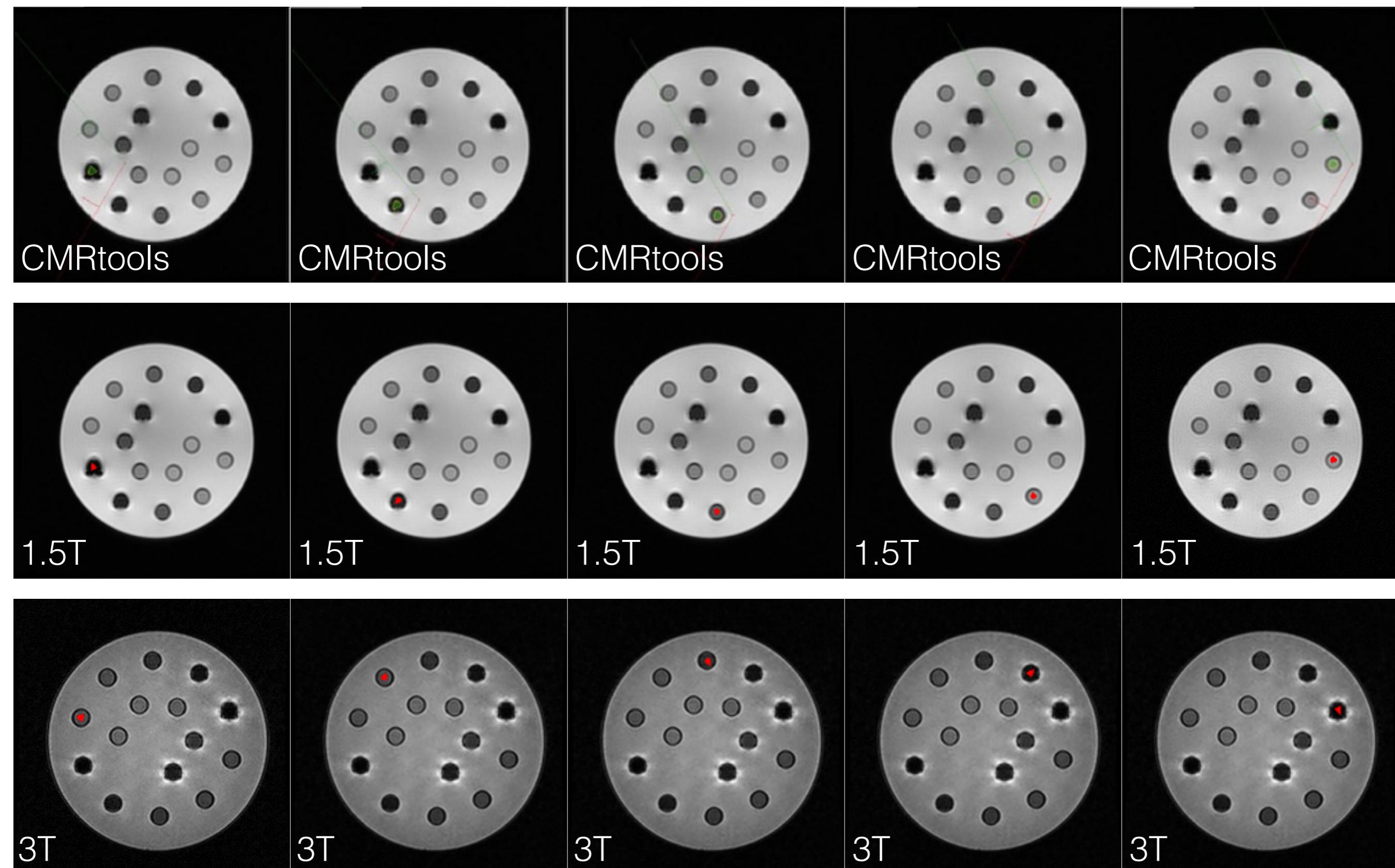
ROI from DICOM 1.5 Tesla



Rotation Matrix



Result Transfer ROI



Improve MRIM

T2* value (ms) 1.5T

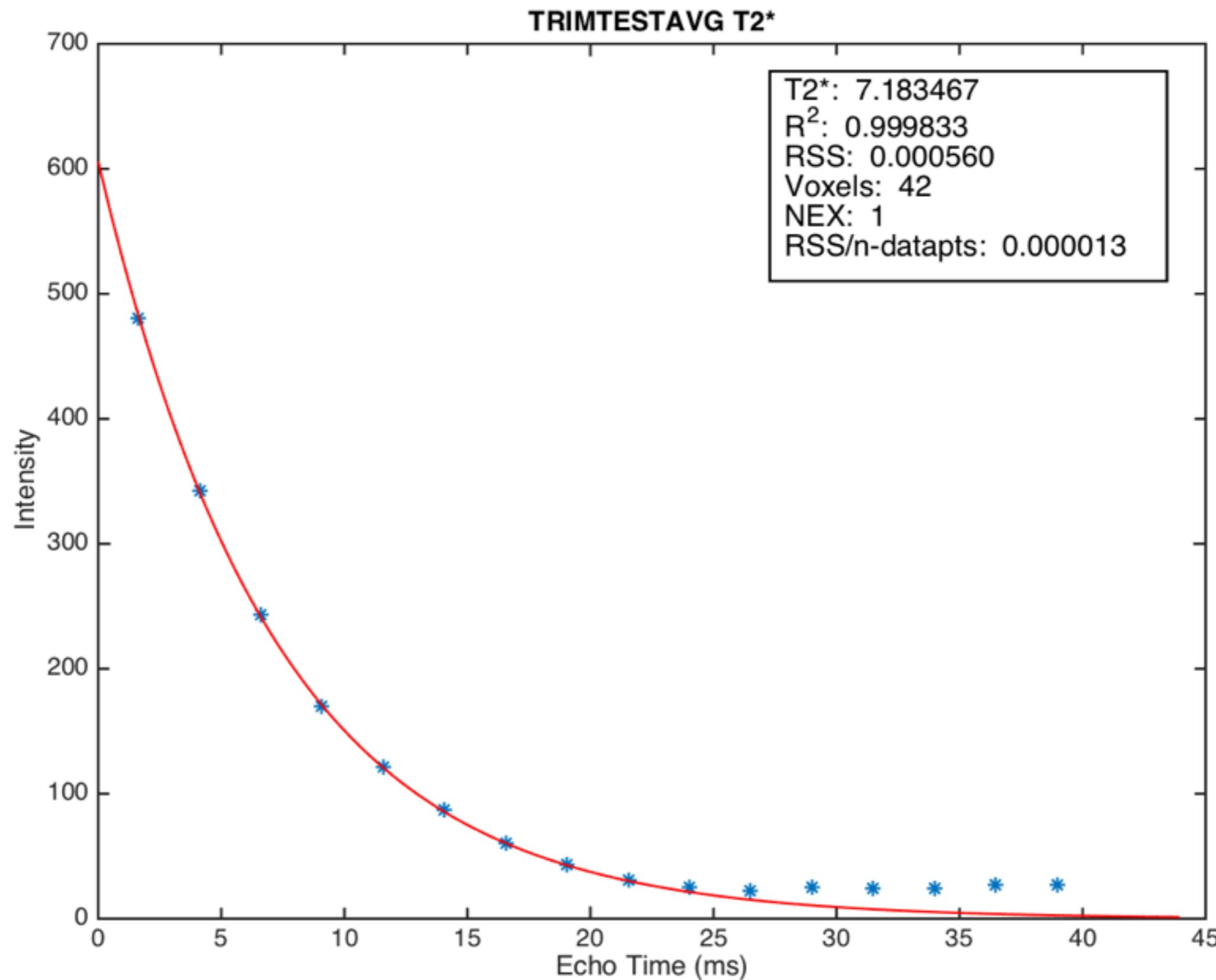
position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	7.18	3.61	2.01	1.74	-34.93	8.89	4.23	2.23	1.24	5.07	13.98	7.42	3.62	1.92	1.53
week2	7.47	3.64	1.94	1.58	12.37	9.49	4.37	2.20	1.30	6.03	14.51	7.16	3.78	2.42	1.59
week3	7.63	3.68	1.80	1.65	55.78	9.92	4.55	2.31	1.18	4.35	14.97	7.73	3.91	2.33	1.64
week4	7.50	3.67	2.09	1.52	17.98	9.96	4.50	2.25	1.14	6.02	14.20	7.39	3.98	2.38	1.50
week5	7.56	3.64	1.93	1.60	16.71	9.74	4.40	2.28	1.23	4.54	14.63	7.64	3.75	2.44	1.56
week6	7.44	3.63	2.05	1.69	-213.31	9.49	4.48	2.27	1.12	3.73	14.33	7.32	3.60	2.43	1.60
week7	7.83	3.87	1.99	1.54	12.95	10.00	4.46	2.25	1.19	4.49	14.87	7.96	3.99	2.45	1.45
week8	8.15	4.24	2.13	1.42	7.24	10.18	4.57	2.26	1.24	2.78	15.81	8.28	4.20	2.43	1.50
week9	8.38	4.17	2.18	1.54	6.49	10.20	4.69	2.42	1.20	3.35	15.85	8.51	4.18	2.43	1.43
week10	8.01	3.85	1.93	1.33	7.15	9.98	4.69	2.26	1.16	2.10	14.63	7.75	4.03	2.22	1.35
week11	7.78	3.77	1.96	1.35	6.20	9.84	4.41	2.40	1.14	2.18	14.15	7.67	3.99	2.39	1.41
week12	7.94	3.93	1.99	1.33	6.61	9.94	4.50	2.35	1.17	2.11	14.93	7.88	4.10	2.22	1.42
week13	7.75	3.86	2.11	1.31	9.39	10.21	4.57	2.59	1.26	2.06	14.82	7.66	3.99	2.38	1.51
week14	7.84	3.95	2.09	1.73	8.14	10.37	4.82	2.52	1.31	2.75	15.02	8.00	4.01	2.50	1.56
week15	7.25	3.62	2.06	1.72	13.60	9.89	4.42	2.32	1.18	2.79	13.81	7.09	3.56	2.39	1.64
mean correct value	7.72	3.81	2.02	1.54	-	9.87	4.51	2.33	1.20	-	14.70	7.70	3.91	2.35	1.51

Improve Transfer Function

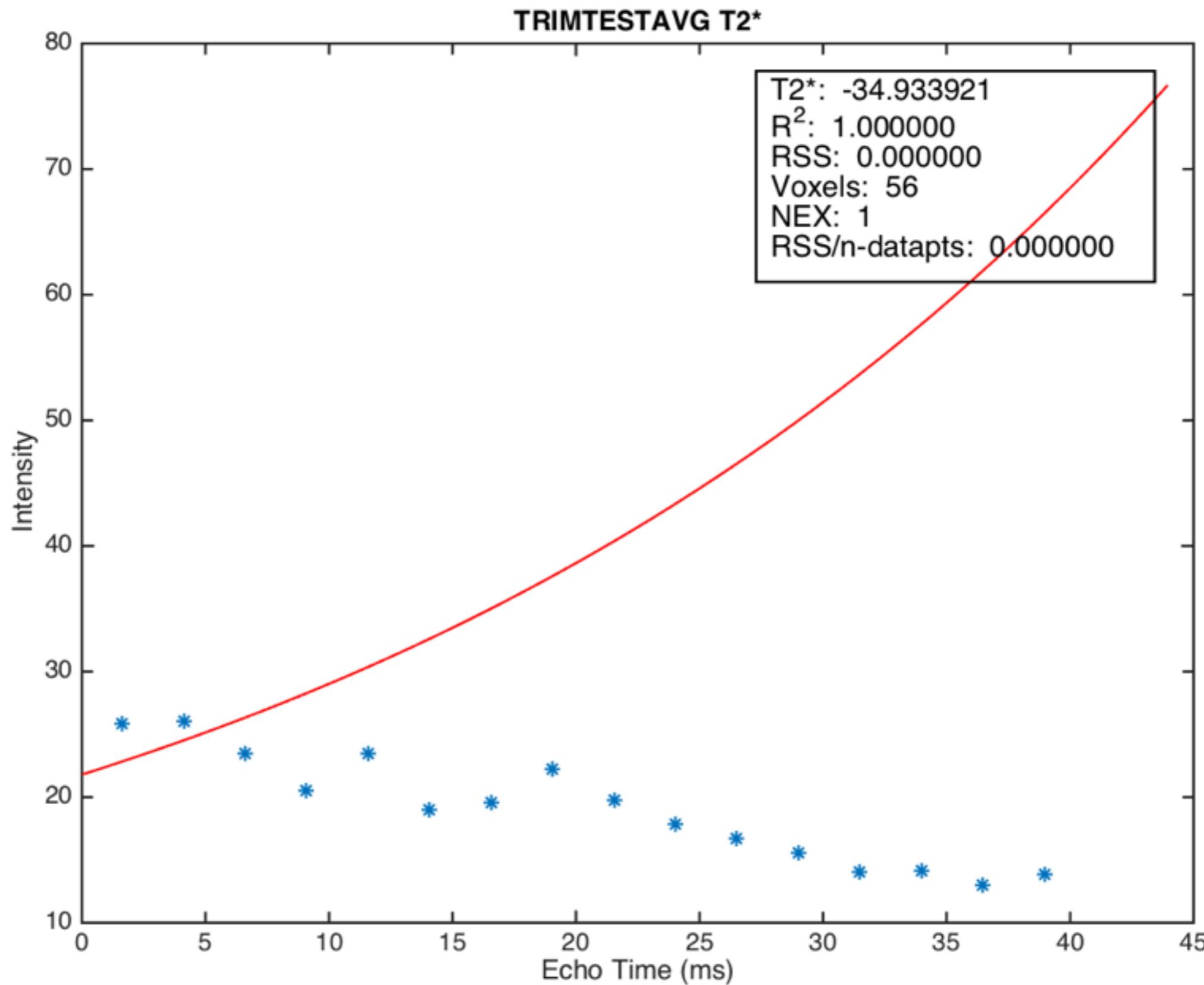
T2* value (ms) 3T

position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	5.46	2.82	1.65	1.42	-20.90	5.63	2.94	2.15	1.02	-7.69	13.83	6.02	2.86	1.60	1.17
week2	6.56	3.58	1.51	1.73	-55.54	7.53	4.29	2.34	1.27	-21.28	11.24	5.64	4.09	1.06	1.14
week3	6.73	3.62	1.50	1.52	-8.54	9.06	3.09	2.27	1.14	-4.03	13.39	6.78	3.73	1.20	1.12
week4	6.95	3.50	1.67	1.45	-14.40	8.37	3.67	1.72	1.03	-2.09	14.46	6.40	4.06	1.37	1.12
week5	7.77	3.45	1.38	2.94	-2.72	9.58	3.77	1.81	1.15	-3.33	12.68	6.18	3.26	1.86	1.61
week6	6.65	3.25	0.97	0.98	-105.13	6.49	4.78	1.97	1.08	-2.91	10.01	5.64	3.51	1.47	1.58
week7	6.98	3.50	1.37	1.23	-1.99	8.24	3.90	1.95	0.90	8.94	10.32	6.33	3.58	1.46	1.41
week8	8.44	3.78	1.21	0.94	7.65	9.76	3.03	1.62	0.99	-16.82	18.75	7.42	3.61	1.73	0.99
week9	6.51	3.41	1.31	1.02	7.00	6.12	3.50	1.62	1.01	2.40	9.96	6.11	3.39	1.50	1.13
week10	5.58	3.24	1.08	2.60	-5.19	8.66	3.11	1.60	1.26	100.45	7.52	4.99	2.66	1.75	1.78
week11	6.09	3.41	1.39	0.86	8.01	11.41	3.27	1.63	0.88	2.68	10.09	6.43	3.35	1.28	1.12
week12	6.68	3.34	1.25	1.22	-336.24	11.85	4.04	1.92	1.17	-7.05	11.62	6.33	3.55	1.43	1.48
week13	7.34	3.40	1.33	1.33	-3.18	12.54	4.17	1.67	1.04	8.40	11.00	6.49	3.32	1.53	1.03
week14	6.92	3.43	1.36	0.68	3.69	8.20	3.53	1.64	1.08	0.74	12.71	6.25	3.56	1.75	0.85
week15	5.33	3.93	1.49	1.52	-3.89	11.06	3.41	2.01	1.26	-2.00	10.16	6.11	3.93	1.41	1.29
mean correct value	6.67	3.44	1.36	1.13	-	8.97	3.63	1.86	1.08	0.74	11.85	6.21	3.50	1.49	1.17

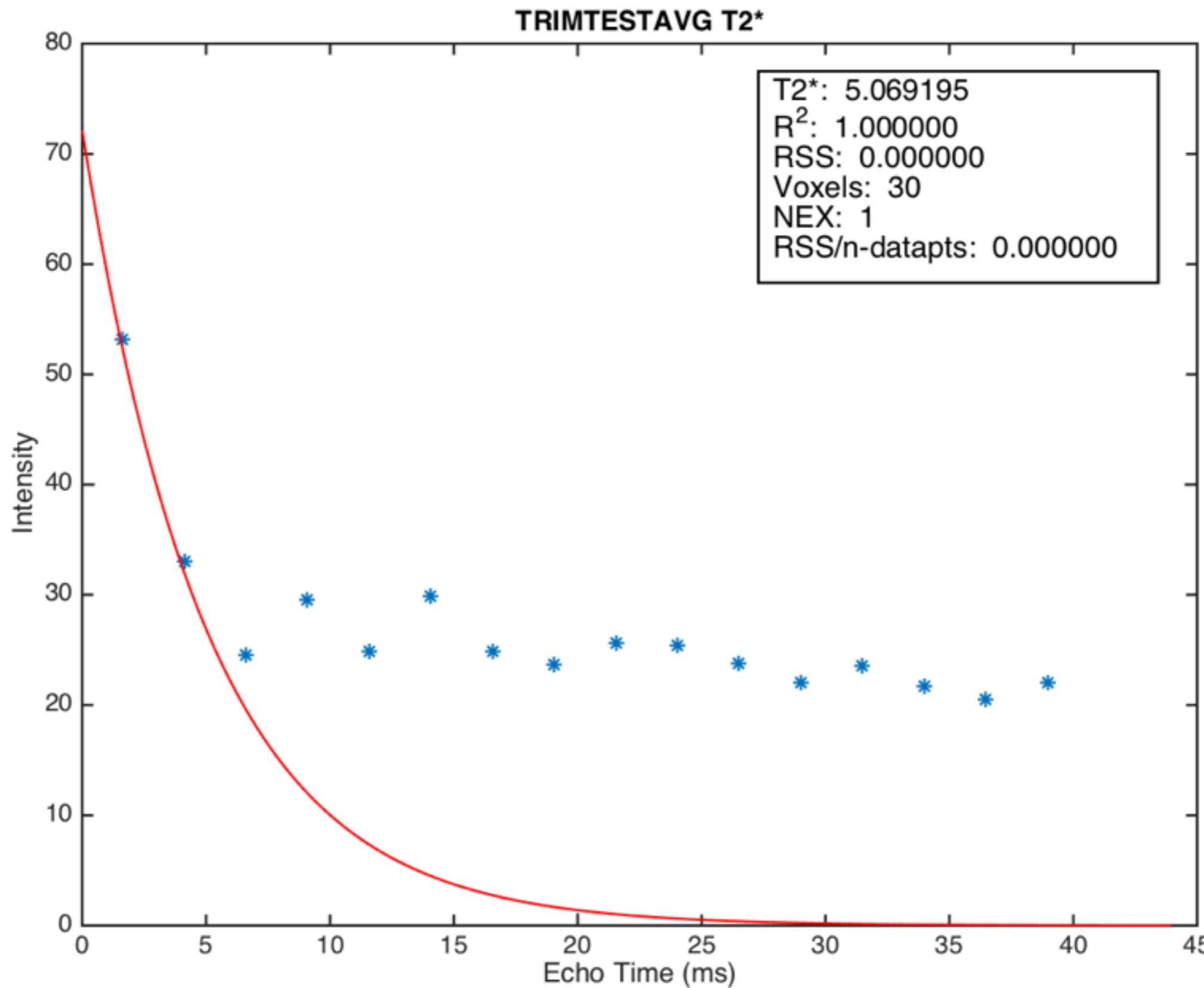
Improve Transfer Function



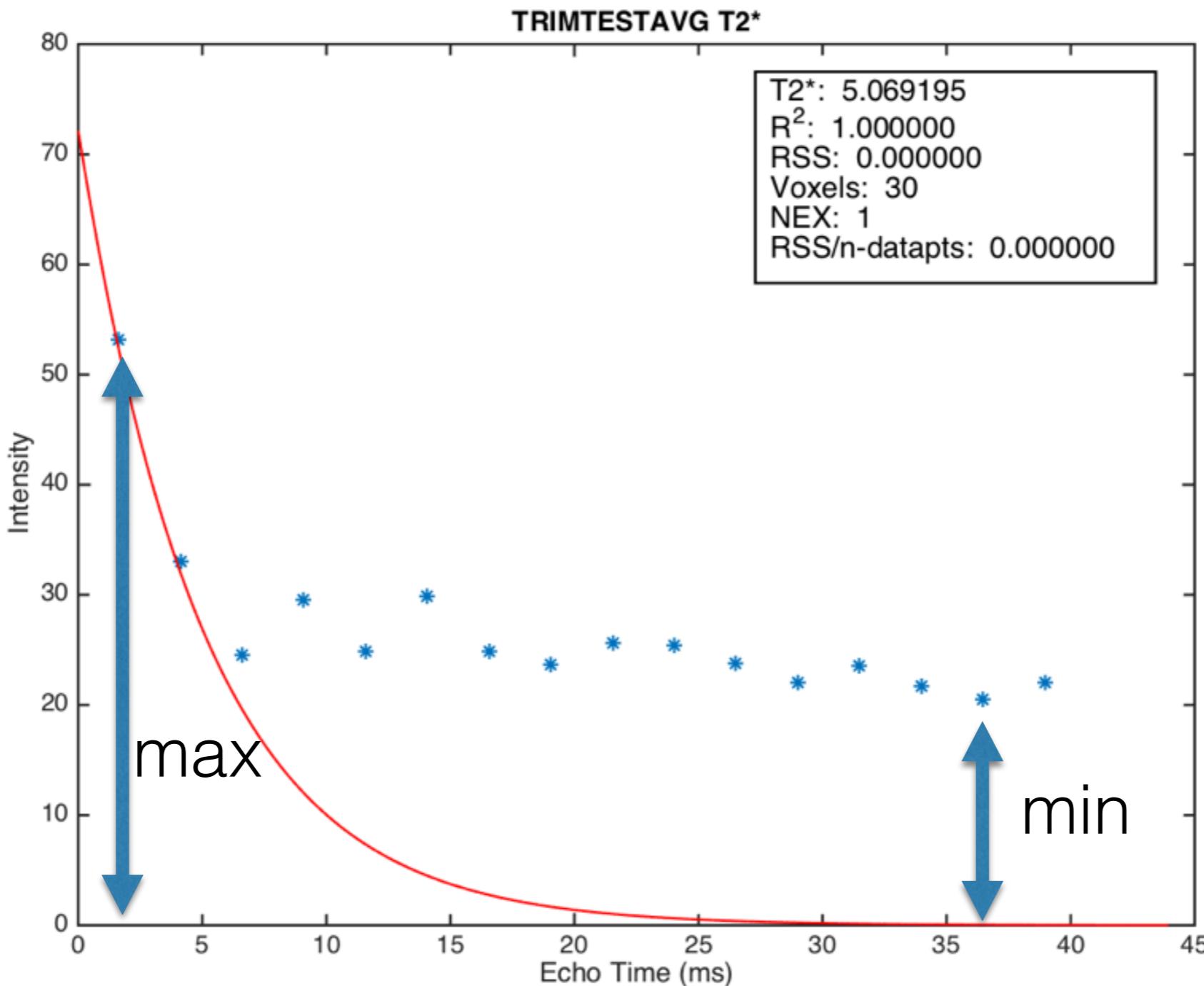
Improve Transfer Function



Improve Transfer Function



Improve Transfer Function



$$\text{Ratio} = \frac{\text{min}}{\text{max}}$$

Improve Transfer Function

Ratio 1.5T

position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	0.046	0.057	0.086	0.153	0.497	0.040	0.047	0.066	0.116	0.385	0.081	0.045	0.051	0.076	0.125
week2	0.048	0.056	0.070	0.163	0.615	0.040	0.050	0.062	0.142	0.473	0.082	0.044	0.054	0.066	0.118
week3	0.046	0.052	0.077	0.159	0.599	0.045	0.055	0.065	0.139	0.411	0.099	0.043	0.053	0.070	0.130
week4	0.044	0.053	0.071	0.138	0.656	0.052	0.053	0.064	0.128	0.479	0.086	0.040	0.048	0.059	0.124
week5	0.046	0.056	0.076	0.166	0.610	0.053	0.048	0.060	0.146	0.442	0.097	0.049	0.054	0.070	0.126
week6	0.049	0.052	0.071	0.178	0.670	0.052	0.047	0.065	0.123	0.441	0.086	0.040	0.055	0.061	0.136
week7	0.046	0.057	0.079	0.144	0.552	0.044	0.049	0.060	0.135	0.471	0.090	0.043	0.045	0.064	0.108
week8	0.046	0.053	0.076	0.150	0.523	0.047	0.059	0.066	0.132	0.347	0.102	0.043	0.048	0.061	0.110
week9	0.048	0.048	0.077	0.130	0.489	0.037	0.055	0.065	0.127	0.399	0.114	0.044	0.050	0.058	0.102
week10	0.051	0.056	0.077	0.128	0.522	0.054	0.046	0.069	0.122	0.333	0.112	0.045	0.051	0.067	0.102
week11	0.045	0.055	0.071	0.133	0.520	0.044	0.050	0.062	0.120	0.324	0.116	0.053	0.050	0.062	0.099
week12	0.047	0.055	0.077	0.132	0.511	0.061	0.049	0.060	0.115	0.312	0.111	0.046	0.051	0.056	0.103
week13	0.047	0.051	0.078	0.142	0.499	0.047	0.047	0.065	0.096	0.257	0.119	0.051	0.044	0.071	0.126
week14	0.047	0.046	0.075	0.149	0.626	0.040	0.054	0.063	0.115	0.338	0.096	0.046	0.045	0.062	0.119
week15	0.047	0.055	0.079	0.163	0.557	0.047	0.053	0.067	0.108	0.342	0.072	0.049	0.043	0.077	0.138
mean correct value	0.047	0.053	0.076	0.148	0.563	0.047	0.051	0.064	0.124	0.384	0.098	0.045	0.049	0.065	0.118

Improve Transfer Function

Ratio 3T

position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	0.061	0.085	0.131	0.225	0.363	0.065	0.097	0.093	0.188	0.505	0.126	0.065	0.058	0.104	0.185
week2	0.079	0.076	0.107	0.277	0.614	0.095	0.101	0.122	0.315	0.546	0.175	0.061	0.067	0.135	0.184
week3	0.064	0.082	0.080	0.256	0.673	0.099	0.083	0.131	0.226	0.563	0.170	0.060	0.051	0.116	0.205
week4	0.084	0.080	0.105	0.177	0.492	0.077	0.067	0.097	0.188	0.603	0.100	0.061	0.056	0.100	0.158
week5	0.065	0.087	0.084	0.356	0.705	0.088	0.086	0.129	0.266	0.534	0.101	0.052	0.065	0.110	0.182
week6	0.076	0.105	0.089	0.372	0.610	0.082	0.080	0.089	0.243	0.608	0.083	0.047	0.060	0.122	0.224
week7	0.062	0.089	0.097	0.274	0.492	0.103	0.065	0.116	0.177	0.523	0.098	0.053	0.053	0.089	0.188
week8	0.061	0.065	0.072	0.183	0.514	0.117	0.084	0.097	0.169	0.650	0.147	0.062	0.054	0.100	0.154
week9	0.111	0.072	0.096	0.233	0.564	0.110	0.067	0.090	0.159	0.417	0.113	0.053	0.049	0.081	0.139
week10	0.063	0.071	0.086	0.284	0.480	0.061	0.068	0.078	0.150	0.497	0.050	0.036	0.041	0.071	0.122
week11	0.070	0.072	0.079	0.178	0.591	0.073	0.074	0.097	0.120	0.505	0.050	0.044	0.040	0.069	0.071
week12	0.059	0.088	0.087	0.278	0.658	0.077	0.064	0.122	0.257	0.587	0.116	0.059	0.051	0.118	0.215
week13	0.064	0.069	0.085	0.256	0.589	0.078	0.069	0.077	0.199	0.574	0.125	0.049	0.065	0.102	0.180
week14	0.039	0.060	0.064	0.137	0.674	0.065	0.041	0.066	0.126	0.227	0.087	0.025	0.025	0.070	0.114
week15	0.067	0.096	0.097	0.313	0.670	0.084	0.074	0.088	0.185	0.515	0.098	0.068	0.061	0.102	0.221
mean correct value	0.068	0.080	0.091	0.216	0.579	0.085	0.075	0.099	0.198	0.524	0.109	0.053	0.053	0.099	0.163

Improve Transfer Function

เพิ่มเงื่อนไขตรวจสอบค่า $T2^*$

การตรวจสอบว่าค่า $T2^*$ ที่ได้ถูกต้องหรือไม่

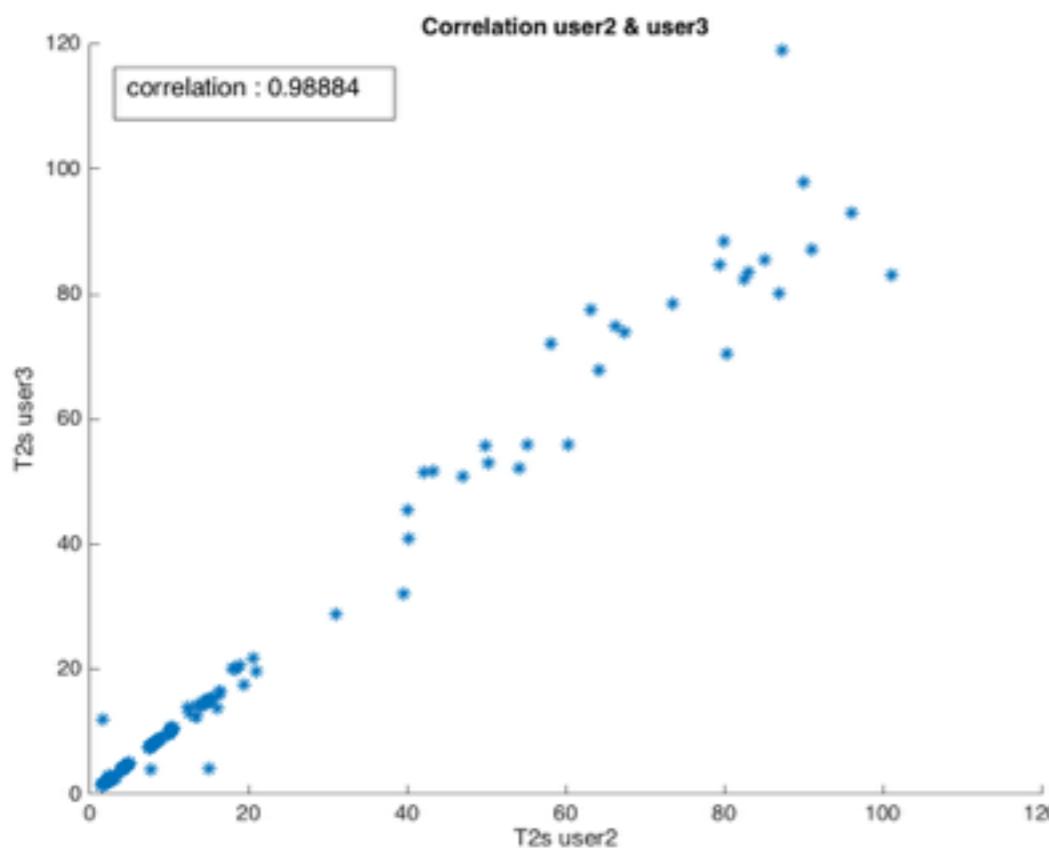
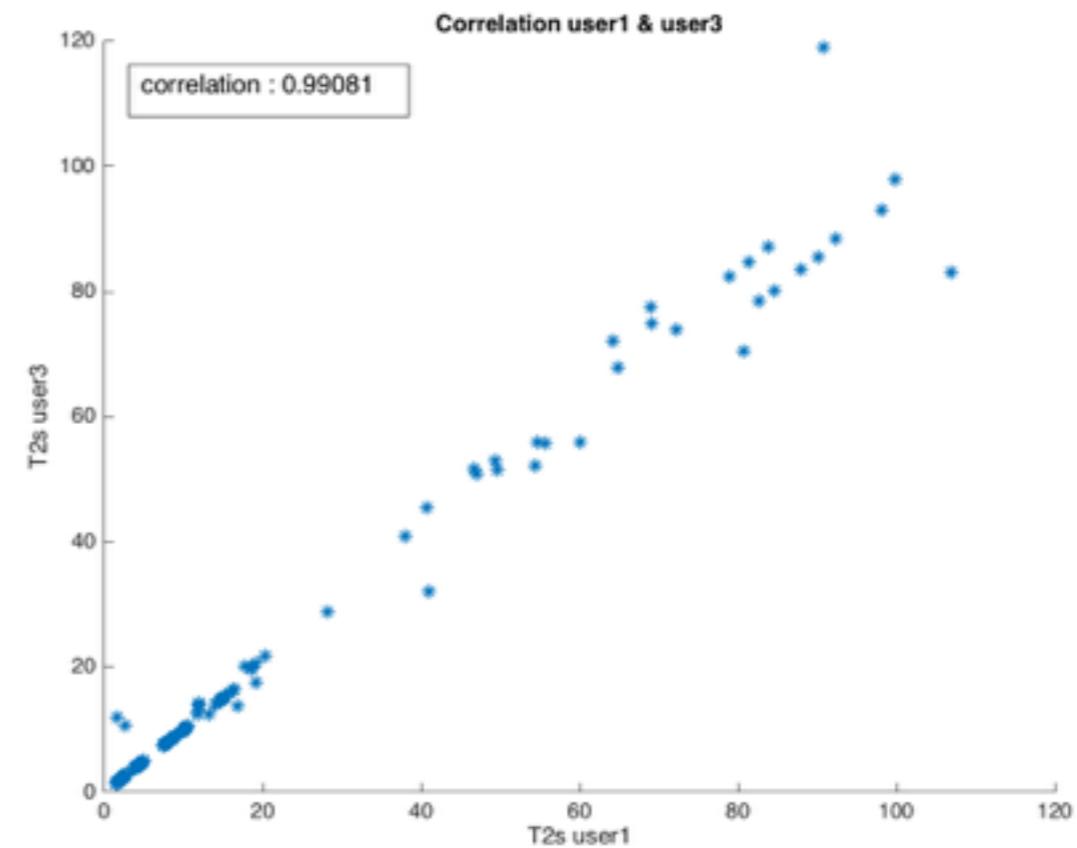
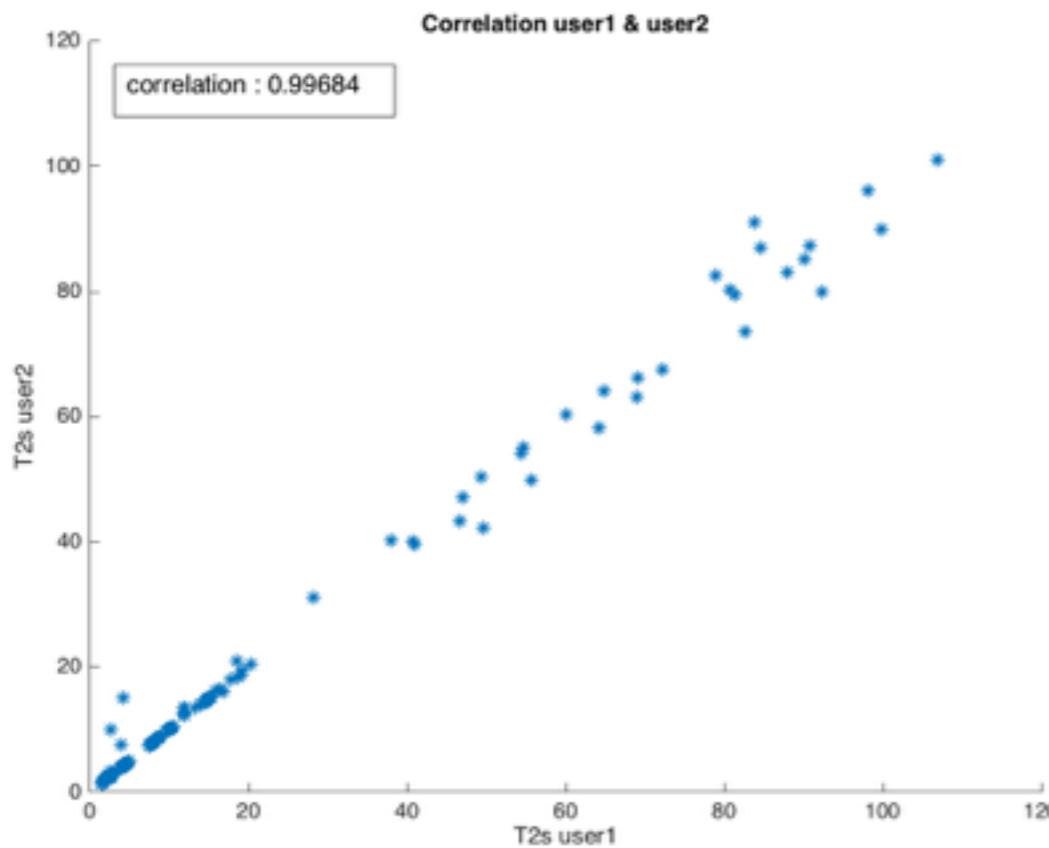
- ค่า ratio ต้องมีค่าต่ำกว่า 0.148 ใน 1.5T และ 0.216 ใน 3T
- ค่า $T2^*$ ต้องไม่ติดลบ\

ถ้าไม่ถูกต้องจะกำหนดให้

- ใน 1.5T ให้ค่า $T2^*$ มีค่าต่ำกว่า 1.205 โดยกำหนดให้มีค่าเท่ากับ 0.603 เพื่อจ่ายแก่การ plot chart
- ใน 3T ให้ค่า $T2^*$ มีค่าต่ำกว่า 1.084 โดยกำหนดให้มีค่าเท่ากับ 0.542 เพื่อจ่ายแก่การ plot chart

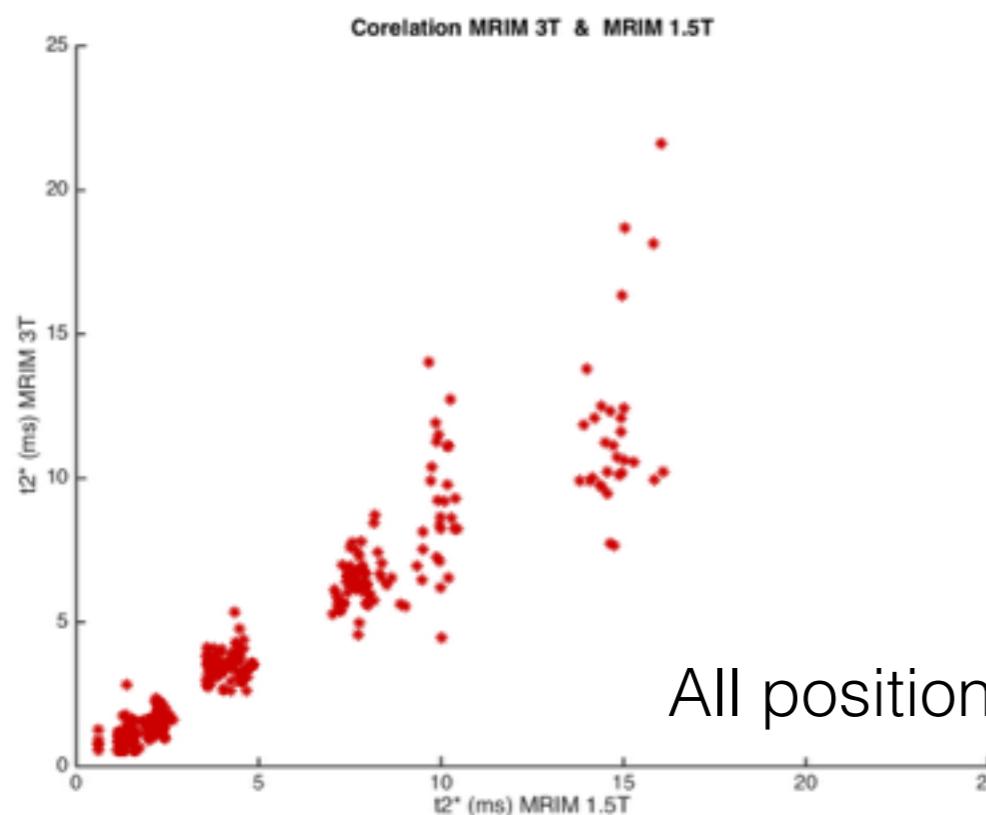
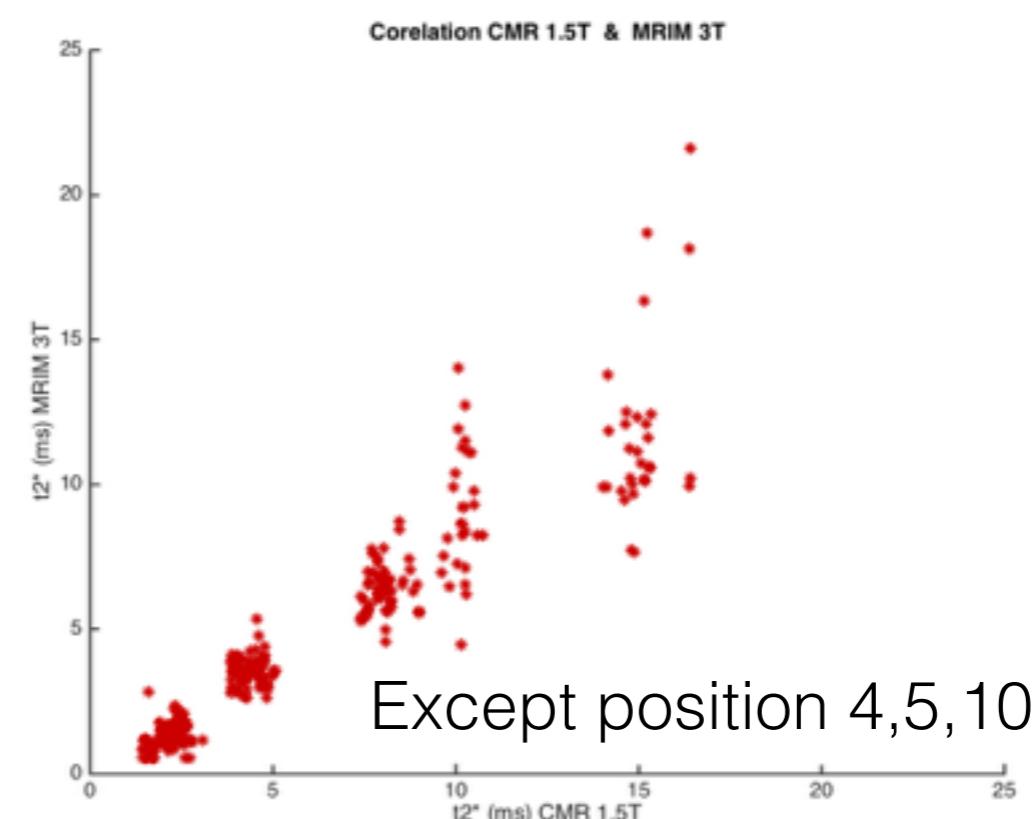
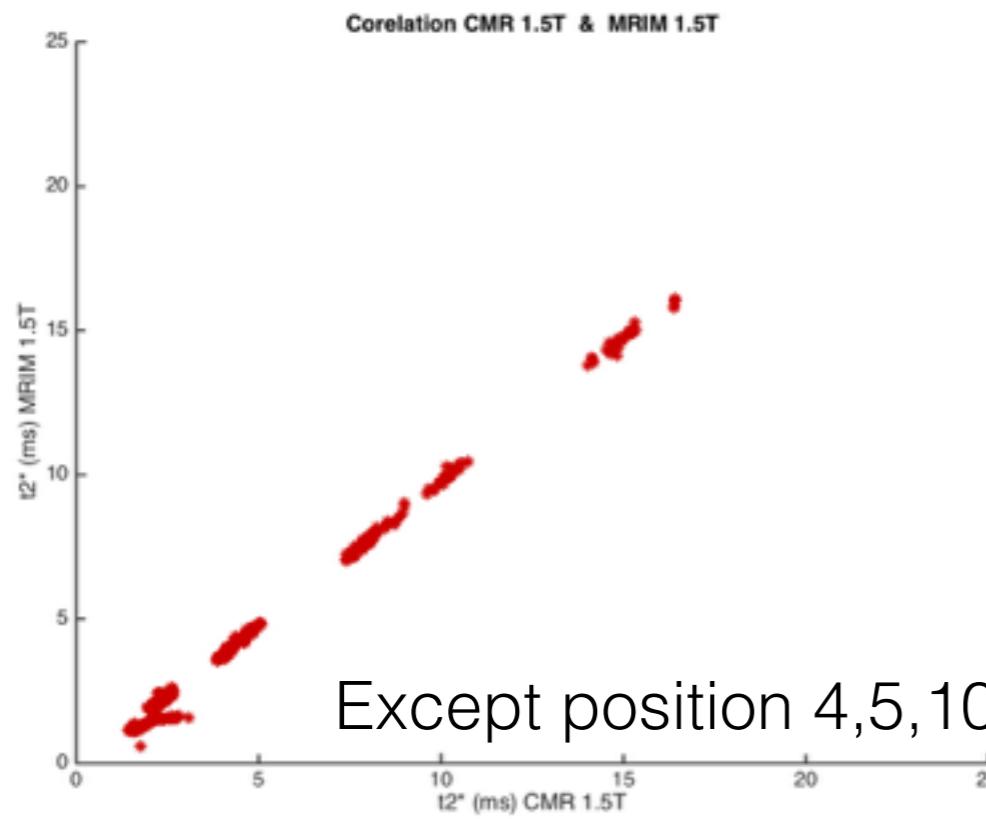
	1.5T	3T
ratio for check $T2^*$	0.148	0.216
min $T2^*$	1.205	1.084
$T2^*$ for plot	0.6025	0.542

Correlation between user



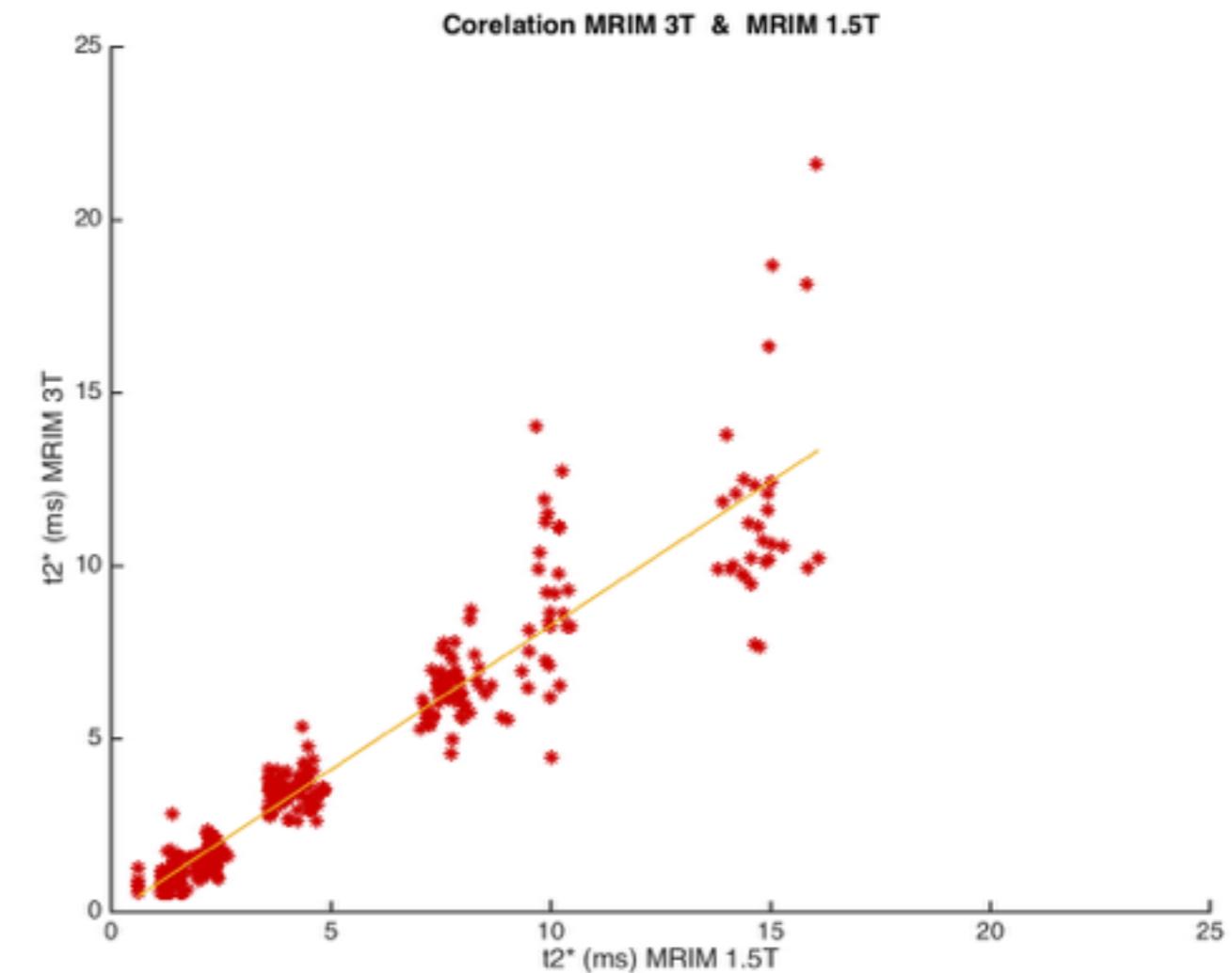
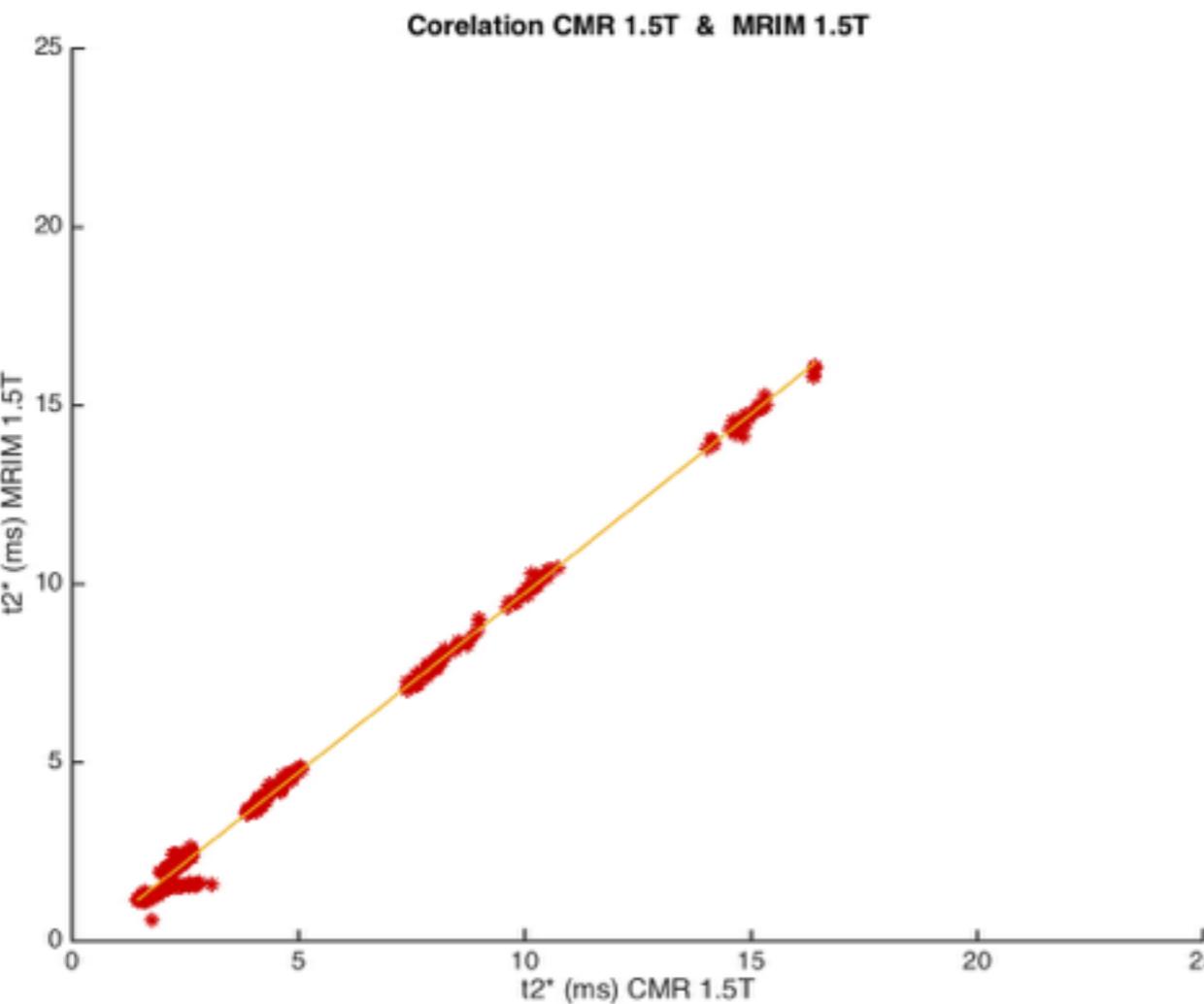
Correlation	r	n	
user1	user2	0.9968	225
user1	user3	0.9908	255
user2	user3	0.9888	255

Correlation between program



Correlation	r	n
CMRtools MRIM1.5T	0.9985	179
CMRtools MRIM 3T	0.9421	179
MRIM1.5T MRIM 3T	0.9523	225

Mapping Function



$$\text{MRIM1.5T} = 1 \times \text{CMRtools} + (-0.3)$$

$$(\text{MRIM3T}) = 0.83 \times (\text{MRIM1.5T}) + (-0.05)$$

Guidelines for Iron Assessment

CMRtools

<i>Myocardial loading</i>	<i>Myocardial T2*</i>
None	> 20 ms
Mild	>14-20 ms
Moderate	10-14 ms
Severe*	< 10 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i>	<i>Dry weight</i>
None	> 6.3 ms	< 2 mg/g
Mild	>2.7-6.3 ms	2- 5 mg/g
Moderate	1.4-2.7 ms	>5-10 mg/g
Severe	< 1.4 ms	> 10 mg/g

MRIM 1.5T

<i>Myocardial loading</i>	<i>Myocardial T2* (New Calculate)</i>
None	> 19.79 ms
Mild	>13.76-19.79 ms
Moderate	9.74-13.76 ms
Severe*	< 9.74 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms) (New Calculate)</i>	<i>Dry weight</i>
None	> 6.03 ms	< 2 mg/g
Mild	>2.41-6.03 ms	2- 5 mg/g
Moderate	1.11-2.41 ms	>5-10 mg/g
Severe	< 1.11 ms	> 10 mg/g

MRIM 3T

<i>Myocardial loading</i>	<i>Myocardial T2* (New Calculate)</i>
None	> 16.43 ms
Mild	>11.41-16.43 ms
Moderate	8.07-11.41 ms
Severe*	< 8.07 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms) (New Calculate)</i>	<i>Dry weight</i>
None	> 4.97 ms	< 2 mg/g
Mild	>1.96-4.97 ms	2- 5 mg/g
Moderate	0.87-1.96 ms	>5-10 mg/g
Severe	< 0.87 ms	> 10 mg/g

Result in 1st week

CMRtools

p	user1	user2	user3	mean
1	7.472	7.472	7.553	7.499
2	3.863	3.878	3.865	3.869
3	2.106	2.109	2.089	2.101
4	13.252	13.393	12.476	13.040
5	54.442	54.138	52.136	53.572
6	8.986	9.004	9.004	8.998
7	4.294	4.288	4.293	4.292
8	2.392	2.398	2.378	2.389
9	1.694	1.685	1.671	1.683
10	47.031	47.031	50.799	48.287
11	14.164	14.155	14.167	14.162
12	7.833	7.830	7.853	7.839
13	4.083	4.094	4.065	4.081
14	2.179	2.178	2.203	2.187
15	2.202	2.191	2.196	2.196

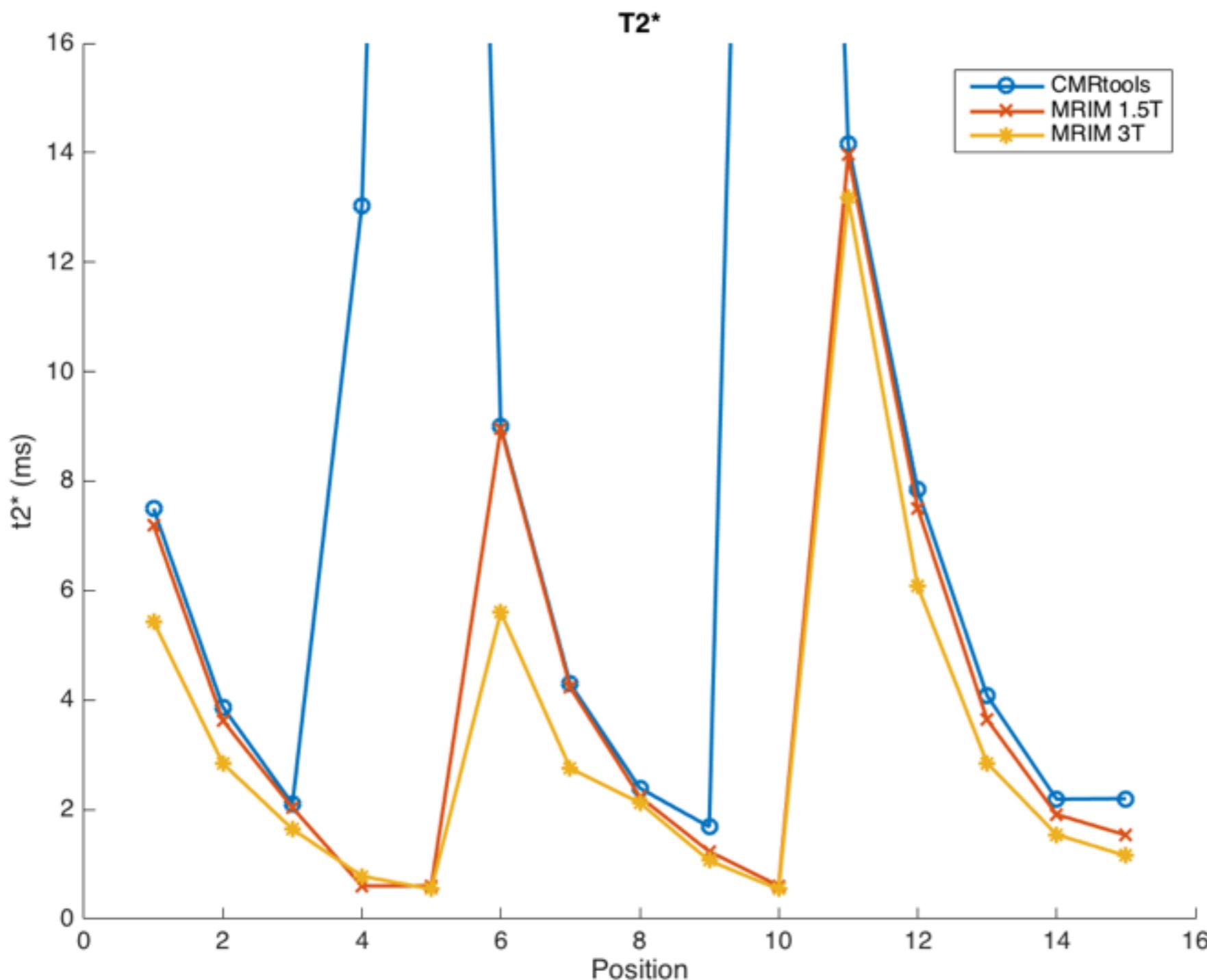
MRIM 1.5T

p	user1	user2	user3	mean
1	7.183	7.171	7.248	7.201
2	3.613	3.674	3.577	3.622
3	2.006	2.025	2.067	2.033
4	0.603	0.603	0.603	0.603
5	0.603	0.603	0.603	0.603
6	8.891	8.963	9.022	8.958
7	4.231	4.211	4.238	4.226
8	2.232	2.249	2.212	2.231
9	1.238	1.211	1.243	1.231
10	0.603	0.603	0.603	0.603
11	13.985	13.975	13.909	13.957
12	7.423	7.481	7.620	7.508
13	3.622	3.607	3.694	3.641
14	1.921	1.922	1.877	1.907
15	1.535	1.554	1.501	1.530

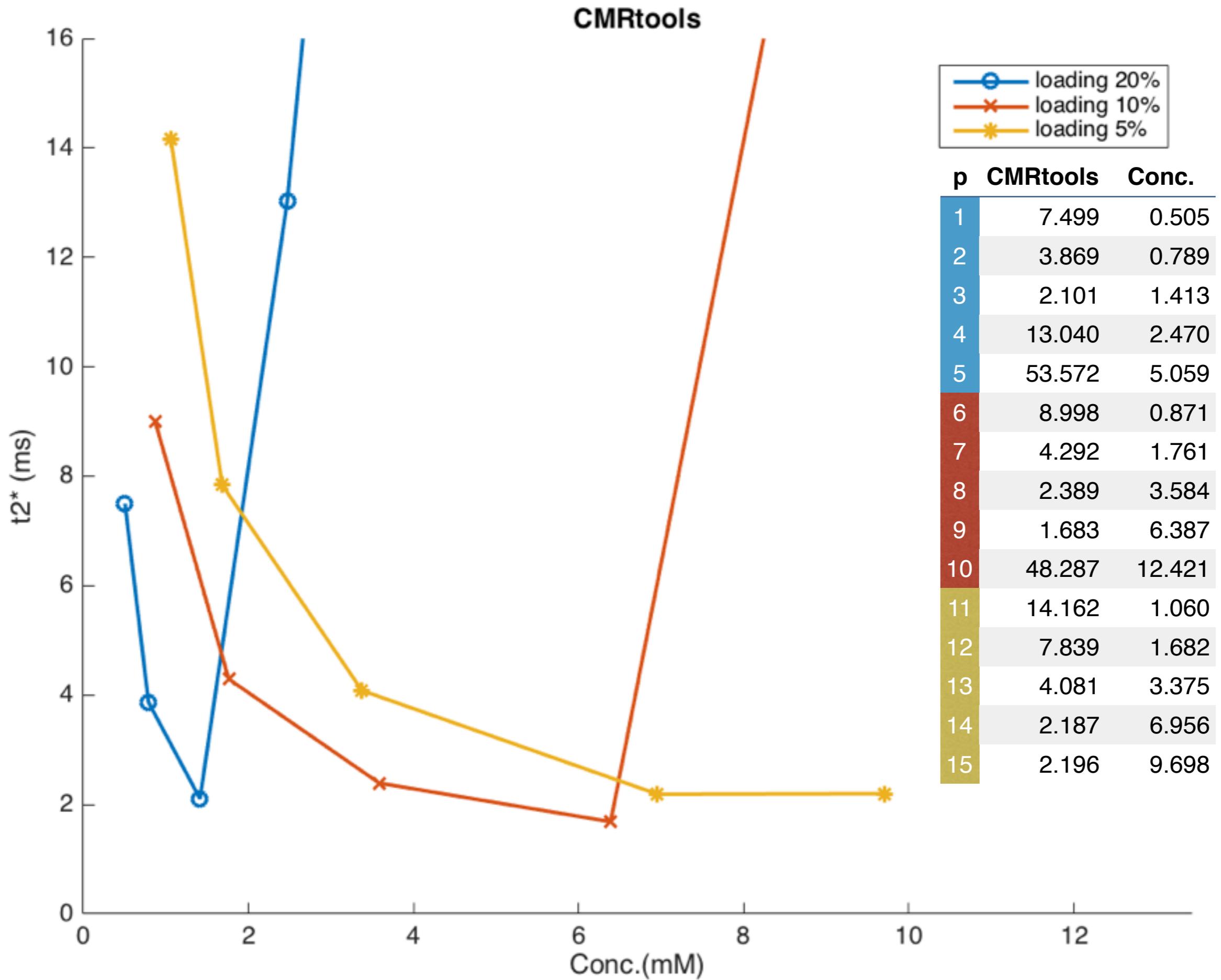
MRIM 3T

p	user1	user2	user3	mean
1	5.460	5.423	5.416	5.433
2	2.820	2.853	2.839	2.837
3	1.650	1.639	1.635	1.641
4	0.542	0.542	1.256	0.780
5	0.542	0.542	0.542	0.542
6	5.635	5.624	5.547	5.602
7	2.940	2.663	2.643	2.749
8	2.125	2.086	2.157	2.123
9	1.021	1.208	0.965	1.065
10	0.542	0.542	0.542	0.542
11	13.775	13.870	11.869	13.171
12	6.021	5.987	6.223	6.077
13	2.777	2.837	2.931	2.848
14	1.605	1.556	1.463	1.541
15	1.170	1.140	1.145	1.152

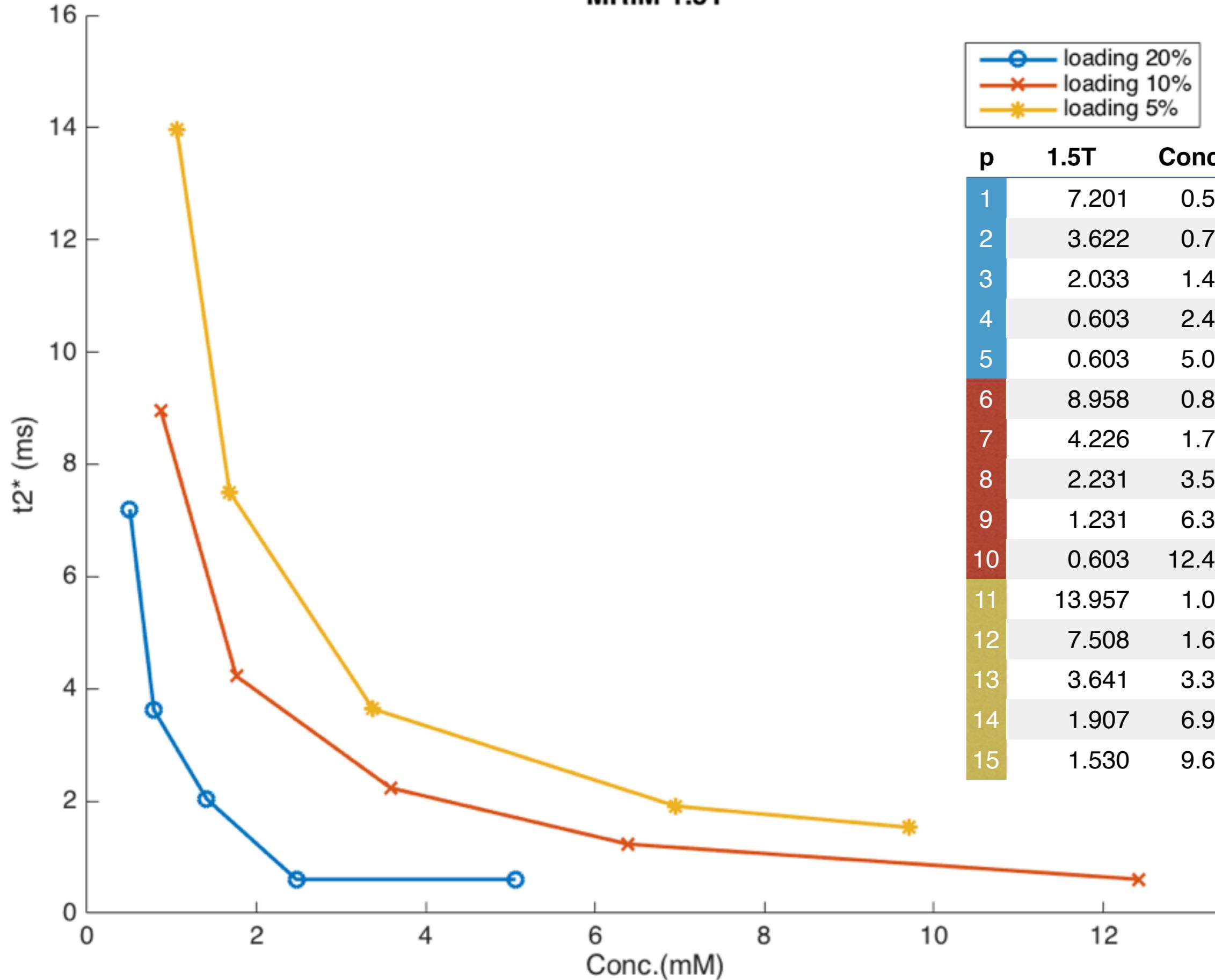
Result in 1st week



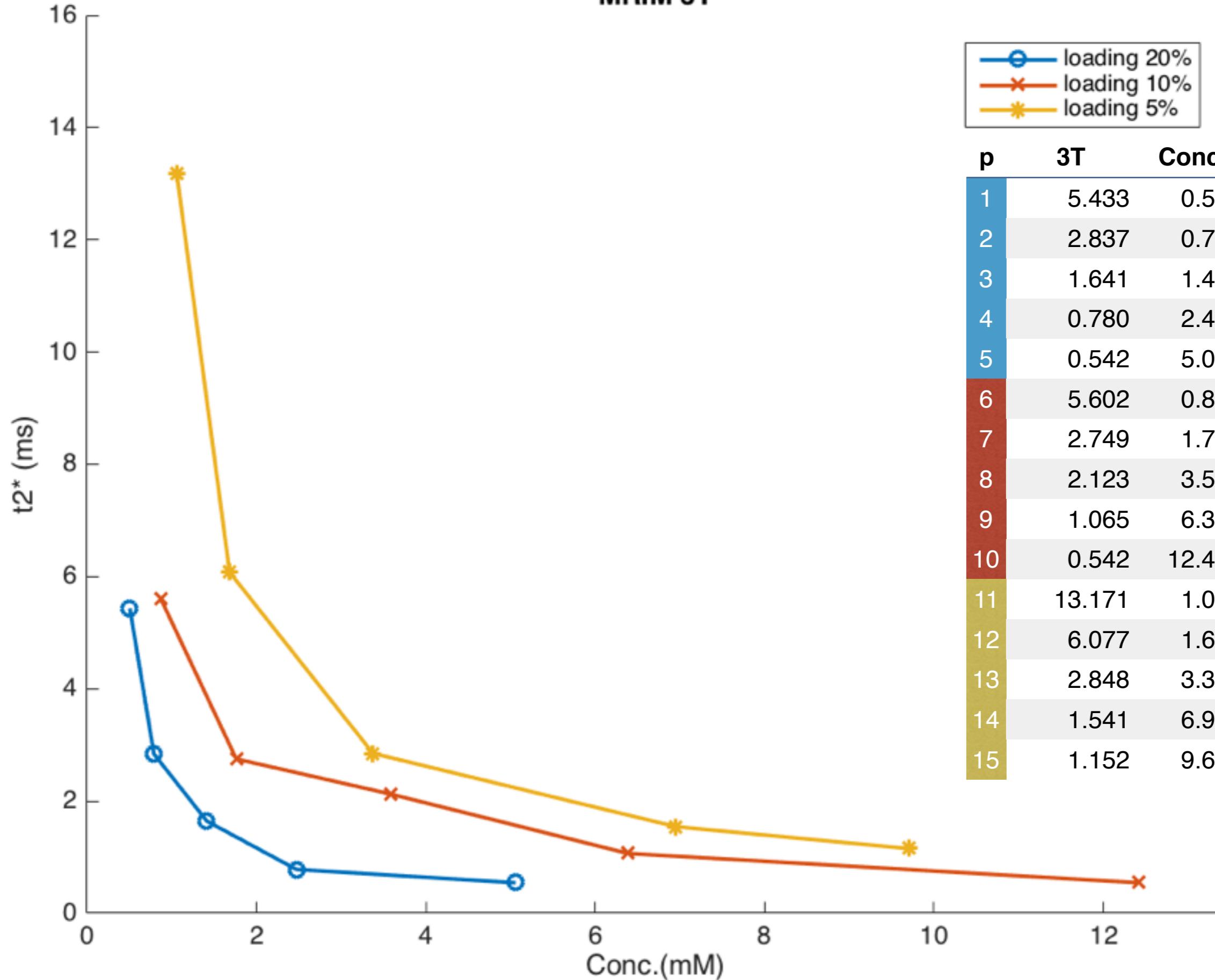
p	CMRtools	1.5T	3T	Conc.
1	7.499	7.201	5.433	0.505
2	3.869	3.622	2.837	0.789
3	2.101	2.033	1.641	1.413
4	13.040	0.603	0.780	2.470
5	53.572	0.603	0.542	5.059
6	8.998	8.958	5.602	0.871
7	4.292	4.226	2.749	1.761
8	2.389	2.231	2.123	3.584
9	1.683	1.231	1.065	6.387
10	48.287	0.603	0.542	12.421
11	14.162	13.957	13.171	1.060
12	7.839	7.508	6.077	1.682
13	4.081	3.641	2.848	3.375
14	2.187	1.907	1.541	6.956
15	2.196	1.530	1.152	9.698



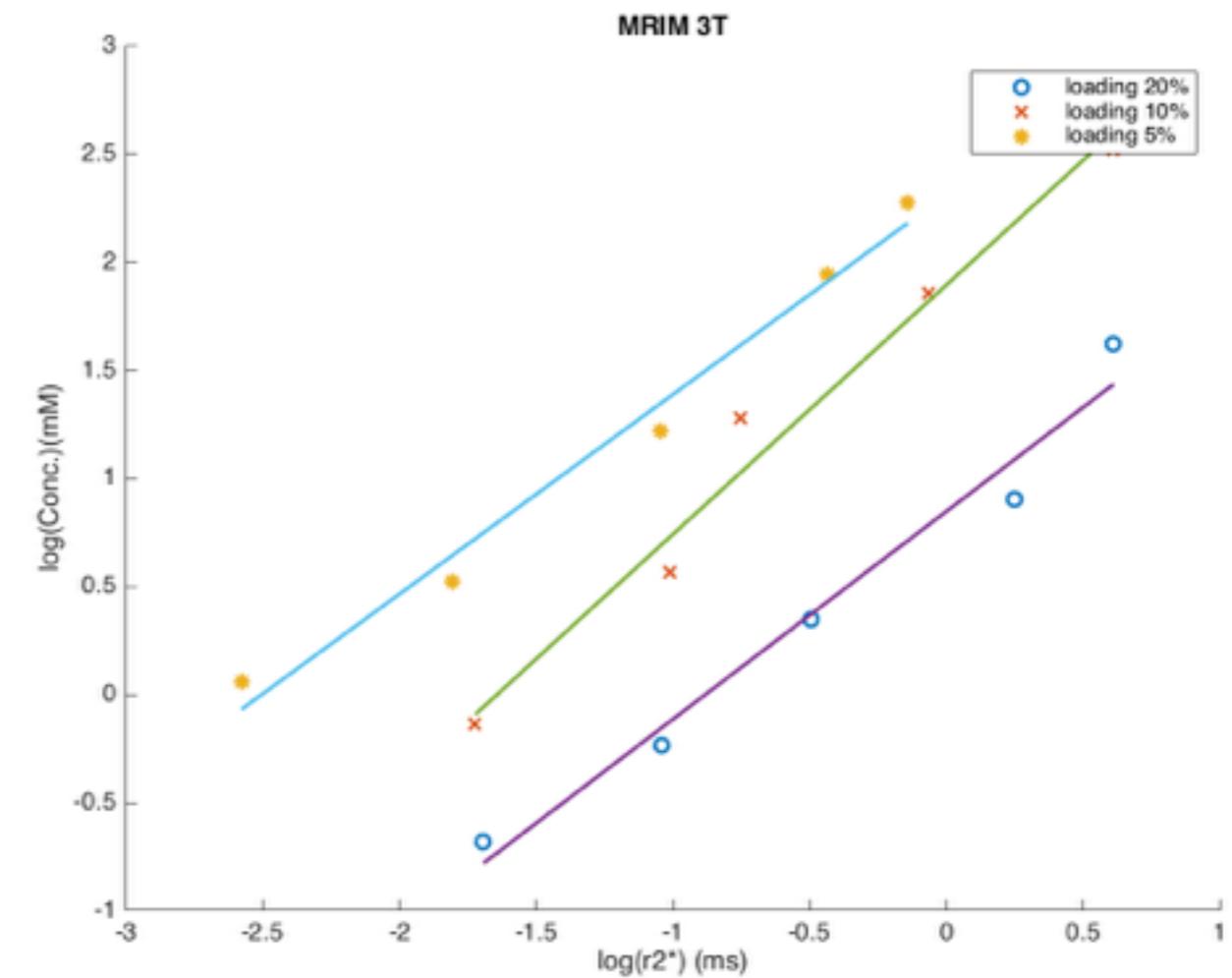
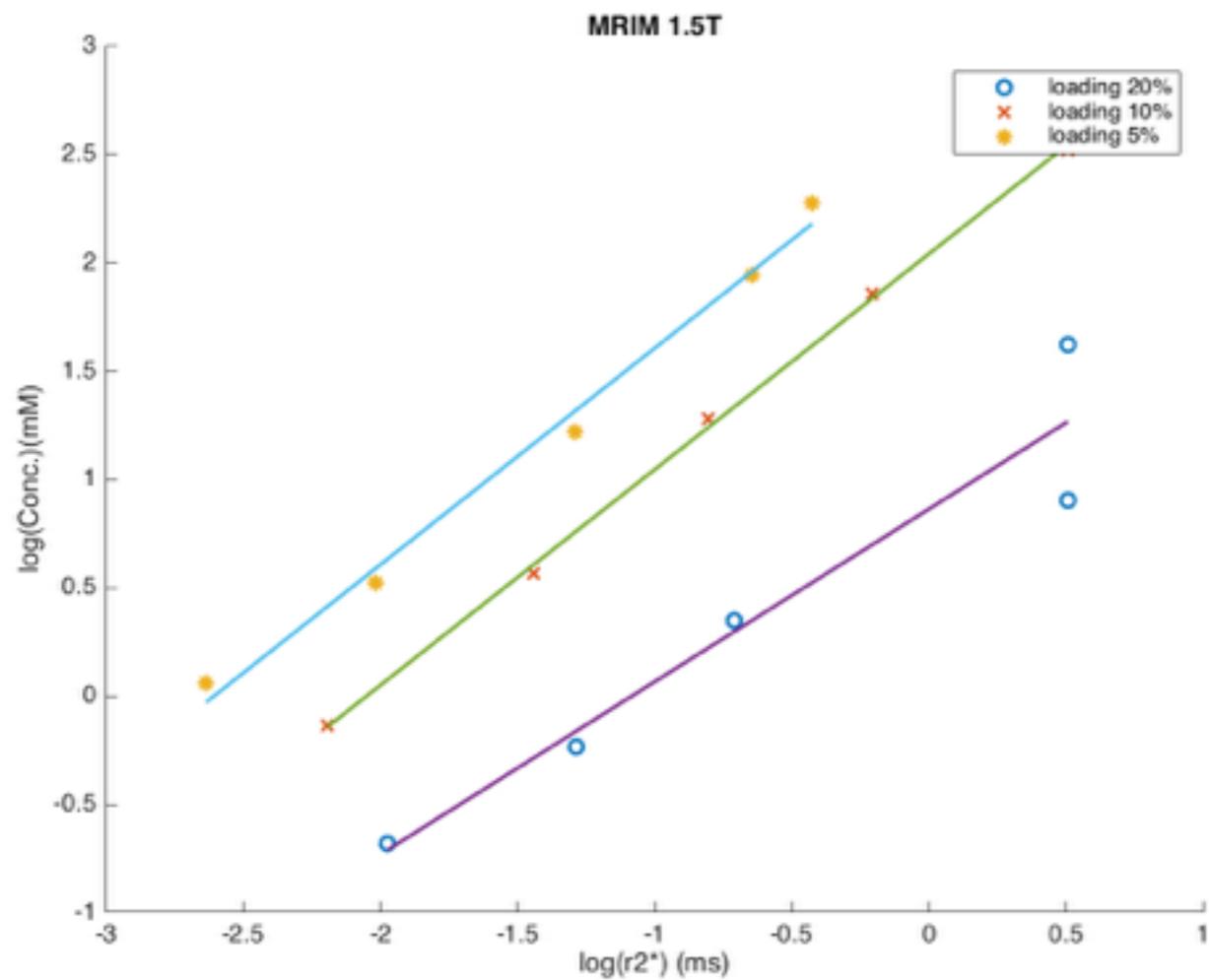
MRIM 1.5T



MRIM 3T



T₂* & Conc.



Tesla	loading	a	b
1.5T	20%	0.797	0.861
	10%	0.995	2.039
	5%	0.999	2.603
	20%	0.961	0.846
3T	10%	1.153	1.893
	5%	0.923	2.309

$$\log(\text{Conc.}) = a * \log(r2s) + b$$

$$\log(\text{Conc.}) = a * \log(1/T2s) + b$$

$$\text{Conc.} = e^{(a * \log(1/T2s) + b)}$$

$$\text{Conc.} = e^{(b - a * \log(T2s))}$$

Guidelines for Iron Assessment

MRIM 1.5T

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i> <i>(New Calculate)</i>	<i>Dry weight CMR</i>	<i>Dry weight 20%</i>	<i>Dry weight 10%</i>	<i>Dry weight 5%</i>
None	> 6.03 ms	< 2 mg/g	< 0.57 mg/g	< 1.29 mg/g	< 2.24 mg/g
Mild	>2.41-6.03 ms	2- 5 mg/g	0.57- 1.17 mg/g	1.29- 3.2 mg/g	2.24- 5.6 mg/g
Moderate	1.11-2.41 ms	>5-10 mg/g	>1.17-2.18 mg/g	>3.2-6.94 mg/g	>5.6-12.19 mg/g
Severe	< 1.11 ms	> 10 mg/g	> 2.18 mg/g	> 6.94 mg/g	> 12.19 mg/g

MRIM 3T

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i> <i>(New Calculate)</i>	<i>Dry weight CMR</i>	<i>Dry weight 20%</i>	<i>Dry weight 10%</i>	<i>Dry weight 5%</i>
None	> 4.97 ms	< 2 mg/g	< 0.50 mg/g	< 1.05 mg/g	< 2.29 mg/g
Mild	>1.96-4.97 ms	2- 5 mg/g	0.50- 1.22 mg/g	1.05- 3.06 mg/g	2.29- 5.41 mg/g
Moderate	0.87-1.96 ms	>5-10 mg/g	> 1.22-2.66 mg/ g	>3.06-7.79 mg/g	>5.41-11.45 mg/ g
Severe	< 0.87 ms	> 10 mg/g	> 2.66 mg/g	> 7.79 mg/g	> 11.45 mg/g

Guidelines for Iron Assessment

CMRtools

<i>Myocardial loading</i>	<i>Myocardial T2*</i>
None	> 20 ms
Mild	>14-20 ms
Moderate	10-14 ms
Severe*	< 10 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i>	<i>Dry weight</i>
None	> 6.3 ms	< 2 mg/g
Mild	>2.7-6.3 ms	2- 5 mg/g
Moderate	1.4-2.7 ms	>5-10 mg/g
Severe	< 1.4 ms	> 10 mg/g

MRIM 1.5T

<i>Myocardial loading</i>	<i>Myocardial T2*</i>
None	> 20 ms
Mild	>14-20 ms
Moderate	10-14 ms
Severe*	< 10 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i>	<i>Dry weight (New Calculate)</i>
None	> 6.3 ms	< 2 mg/g
Mild	>2.7-6.3 ms	2- 5 mg/g
Moderate	1.4-2.7 ms	>5-10 mg/g
Severe	< 1.4 ms	> 10 mg/g

MRIM 3T

<i>Myocardial loading</i>	<i>Myocardial T2*</i>
None	> 20 ms
Mild	>14-20 ms
Moderate	10-14 ms
Severe*	< 10 ms

<i>Hepatic loading</i>	<i>Hepatic T2* (ms)</i>	<i>Dry weight (New Calculate)</i>
None	> 6.3 ms	< 2 mg/g
Mild	>2.7-6.3 ms	2- 5 mg/g
Moderate	1.4-2.7 ms	>5-10 mg/g
Severe	< 1.4 ms	> 10 mg/g

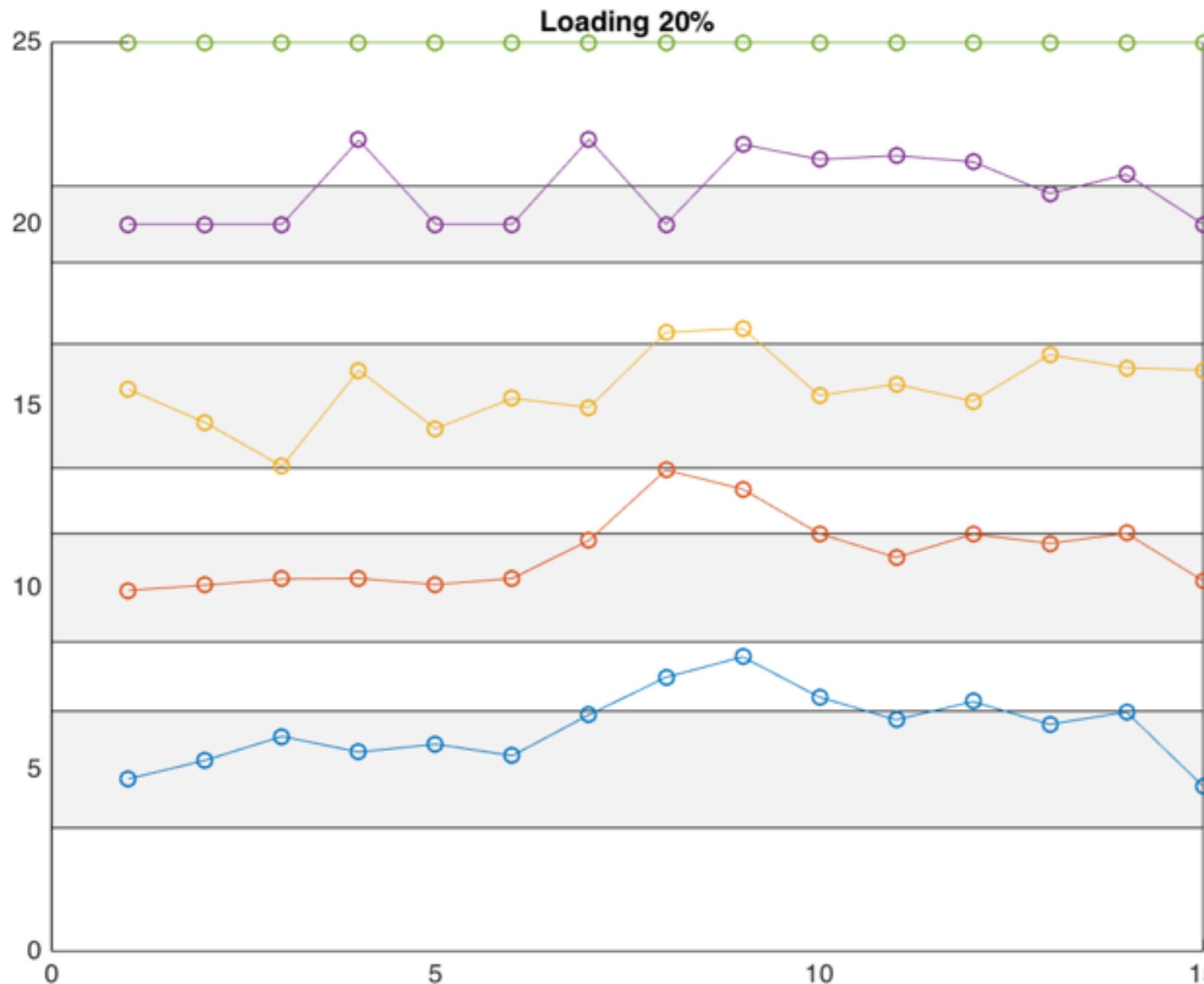
Normalisation T2*

$$\text{norm T2}^* = (\text{T2}^* - \text{Initial T2}^*) \times \text{SD}$$

Normalisation T2*

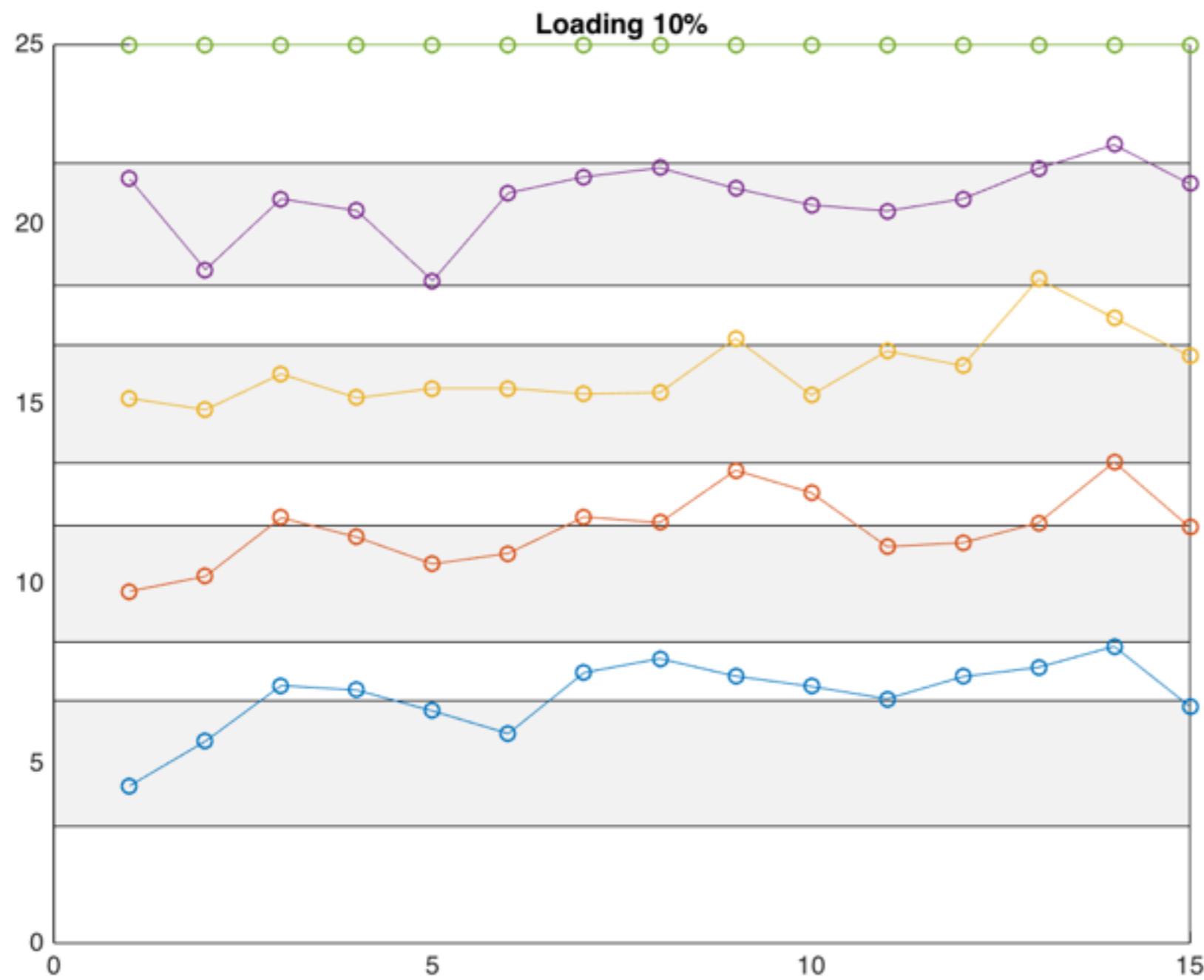
	week1	week2	week3	week4	week5	week6	week7	week8	week9	week10	week11	week12	week13	week14	week15
position1	-0.26	0.26	0.91	0.48	0.70	0.38	1.51	2.54	3.10	1.99	1.37	1.87	1.24	1.58	-0.46
position2	-0.07	0.07	0.24	0.26	0.09	0.26	1.31	3.24	2.71	1.49	0.83	1.47	1.22	1.50	0.19
position3	0.46	-0.46	-1.66	0.98	-0.63	0.21	-0.04	2.02	2.13	0.29	0.60	0.13	1.41	1.05	0.99
position4	0.00	0.00	0.00	2.32	0.00	0.00	2.34	0.00	2.20	1.78	1.88	1.72	0.85	1.37	0.00
position5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
position6	-0.62	0.62	2.17	2.04	1.46	0.83	2.53	2.92	2.43	2.14	1.80	2.42	2.68	3.26	1.59
position7	-0.21	0.21	1.84	1.30	0.55	0.85	1.86	1.70	3.16	2.54	1.03	1.14	1.70	3.39	1.57
position8	0.16	-0.16	0.84	0.17	0.44	0.44	0.28	0.32	1.83	0.25	1.47	1.07	3.48	2.39	1.33
position9	1.26	-1.26	0.71	0.38	-1.57	0.87	1.32	1.57	1.00	0.54	0.37	0.71	1.56	2.21	1.13
position10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
position11	-0.49	0.49	1.27	0.09	0.72	0.34	1.39	2.82	2.88	0.76	0.07	1.22	1.09	1.24	-0.50
position12	0.43	-0.43	0.99	0.25	0.96	-0.04	1.64	2.43	3.04	0.97	0.79	1.31	0.85	1.81	-0.60
position13	-0.30	0.30	0.61	1.10	0.40	-0.65	1.05	2.49	2.29	1.47	1.16	2.14	1.20	1.57	-0.68
position14	-1.92	1.92	1.17	1.21	1.80	1.84	1.40	1.61	1.69	0.45	1.31	0.37	0.90	2.22	1.62
position15	-0.26	0.26	0.74	-0.26	-0.10	0.55	-0.97	-0.56	-1.61	-2.46	-2.13	-1.60	-0.54	-0.03	0.59

Normalisation T2*



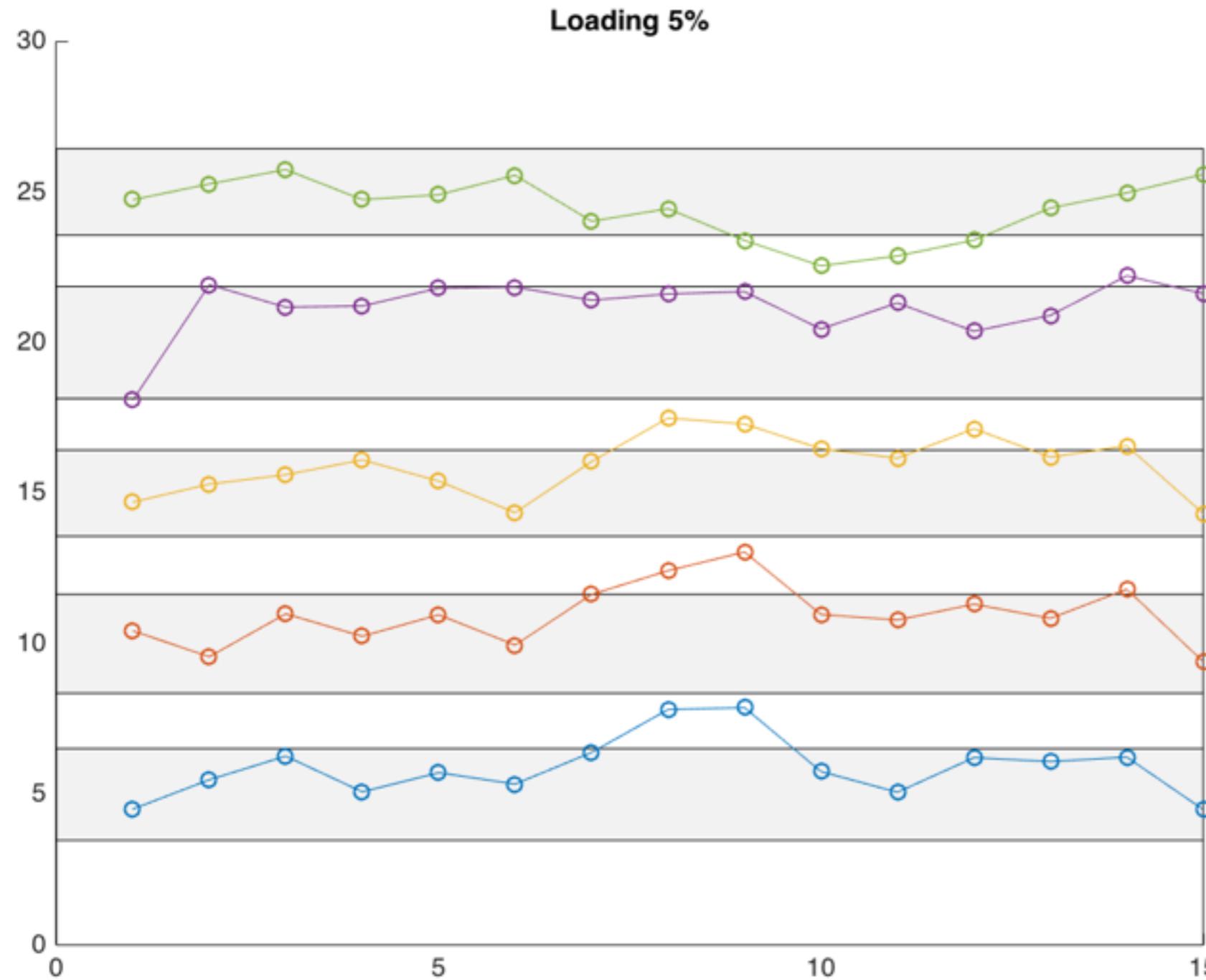
	initial	SD	range
position1	7.30	0.34	3.21
position2	3.61	0.22	2.98
position3	1.98	0.12	3.41
position4	0.60	0.42	2.10
position5	0.60	0.00	0.00
position6	9.19	0.37	3.49
position7	4.27	0.16	3.23
position8	2.20	0.12	3.27
position9	1.10	0.11	3.40
position10	0.60	0.00	0.00
position11	14.24	0.60	3.05
position12	7.35	0.41	3.28
position13	3.72	0.21	2.86
position14	2.16	0.14	3.72
position15	1.54	0.09	2.87

Normalisation T2*



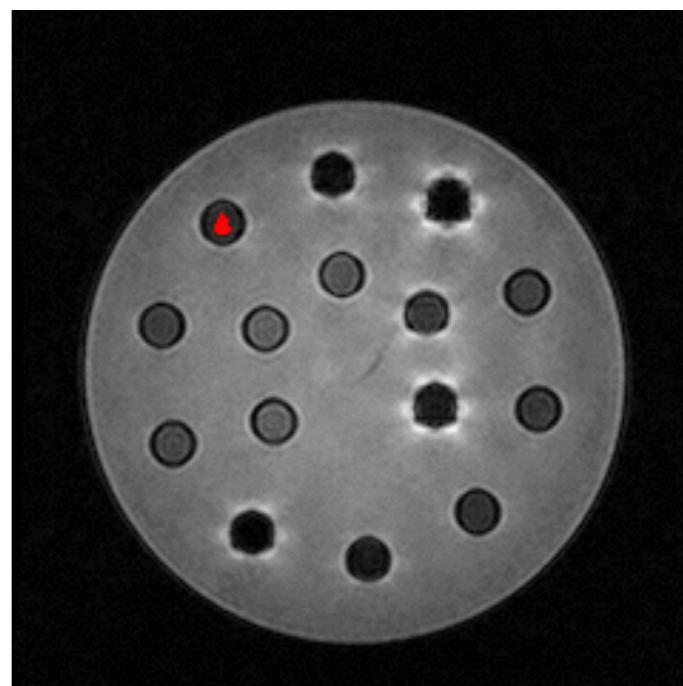
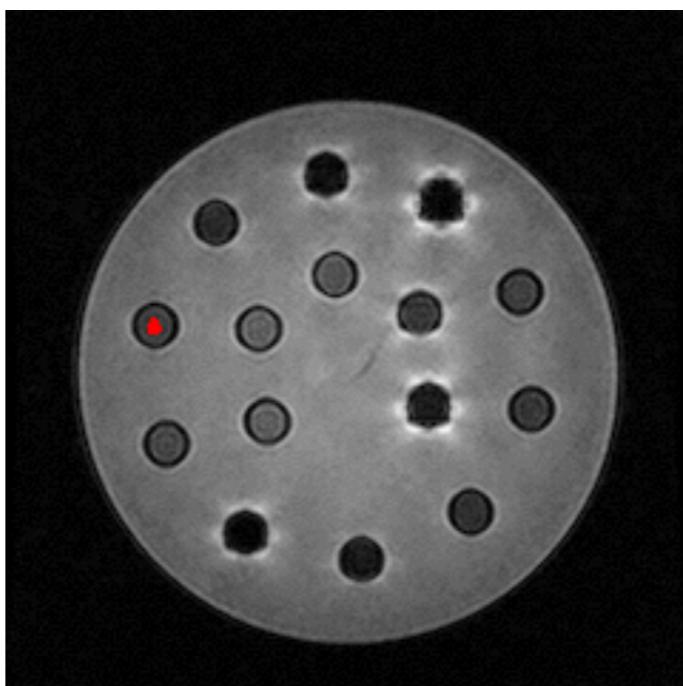
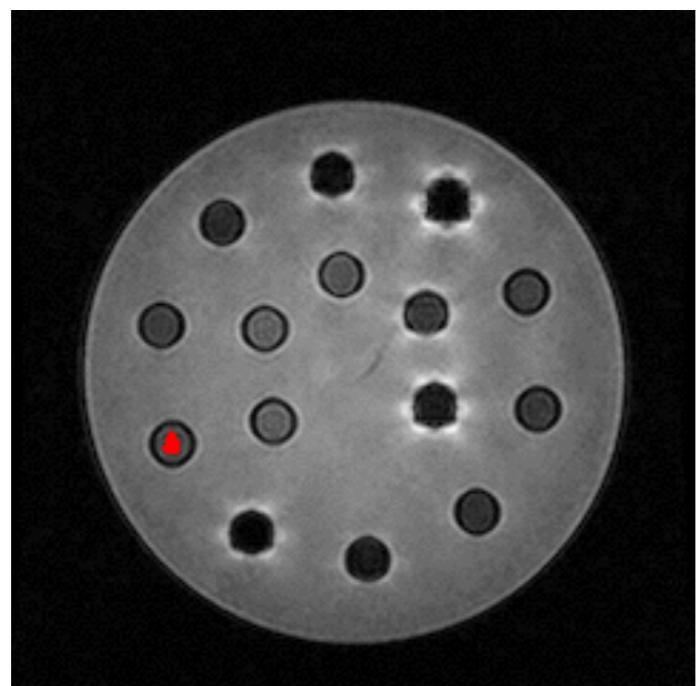
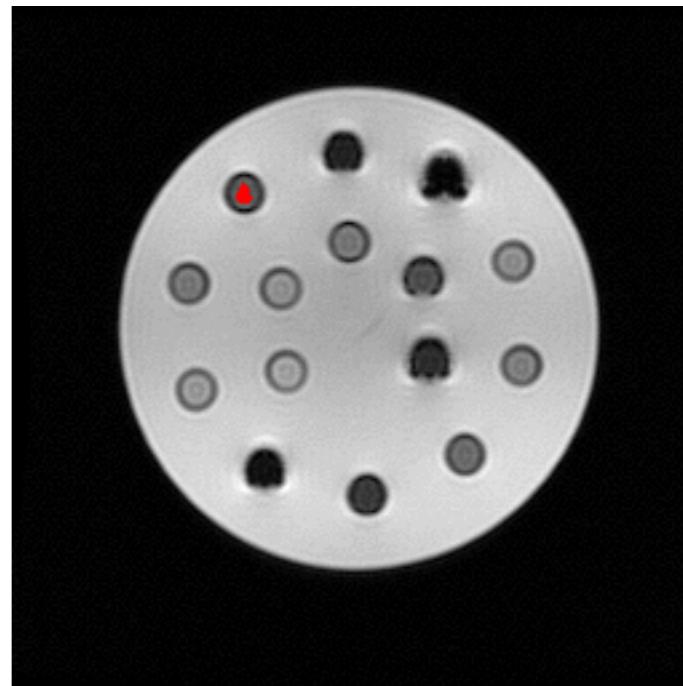
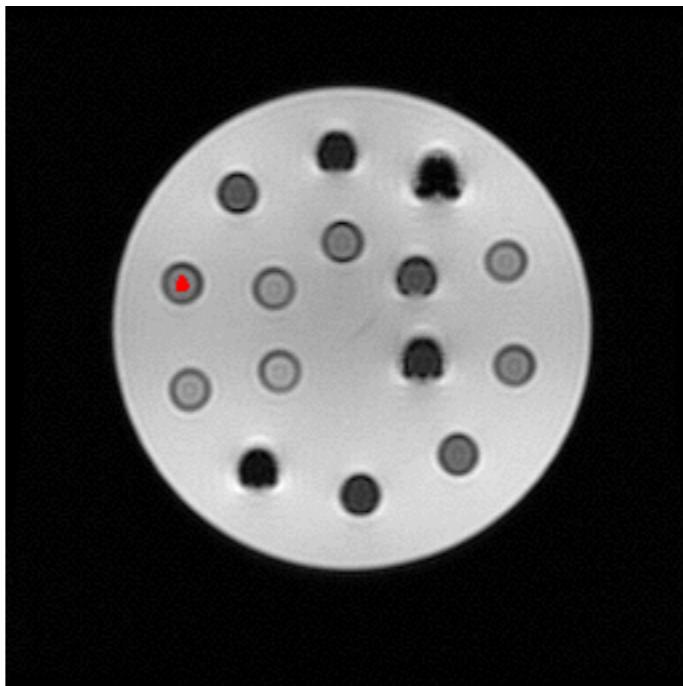
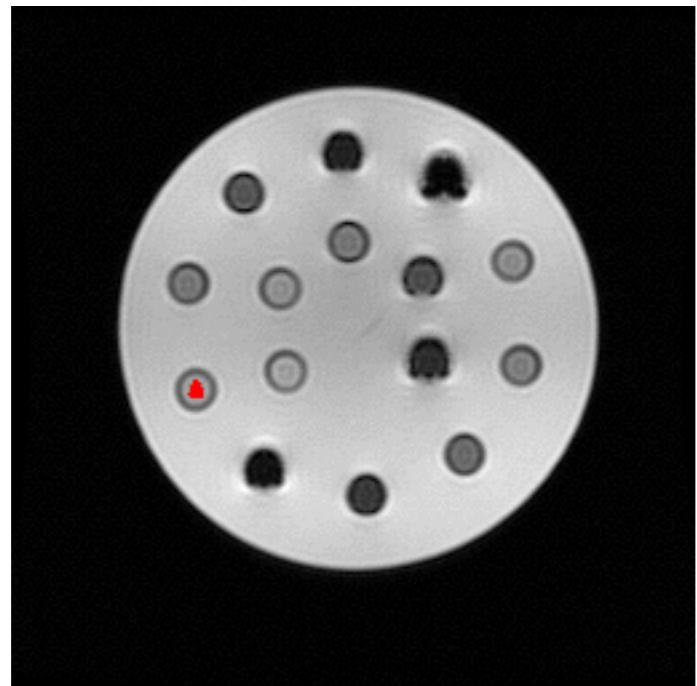
	initial	SD	range
position1	7.30	0.34	3.21
position2	3.61	0.22	2.98
position3	1.98	0.12	3.41
position4	0.60	0.42	2.10
position5	0.60	0.00	0.00
position6	9.19	0.37	3.49
position7	4.27	0.16	3.23
position8	2.20	0.12	3.27
position9	1.10	0.11	3.40
position10	0.60	0.00	0.00
position11	14.24	0.60	3.05
position12	7.35	0.41	3.28
position13	3.72	0.21	2.86
position14	2.16	0.14	3.72
position15	1.54	0.09	2.87

Normalisation T2*

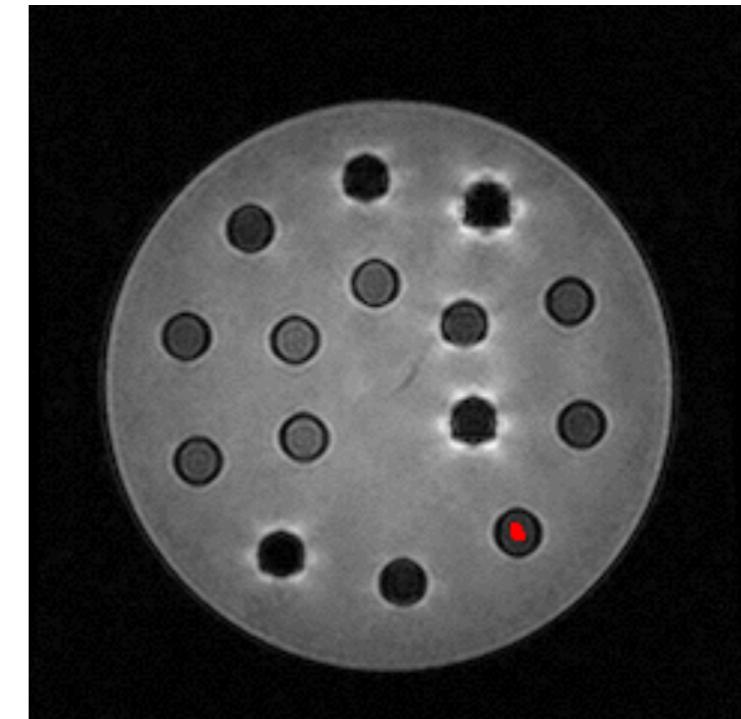
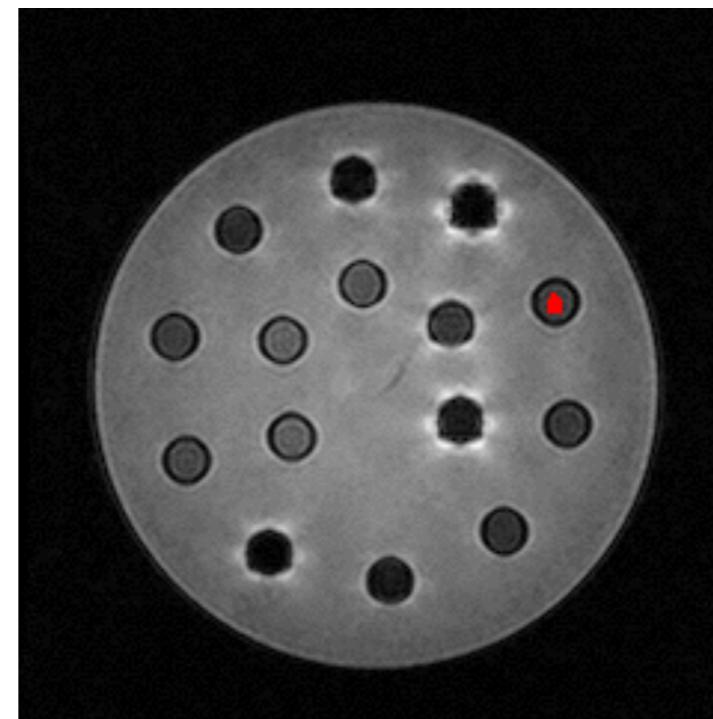
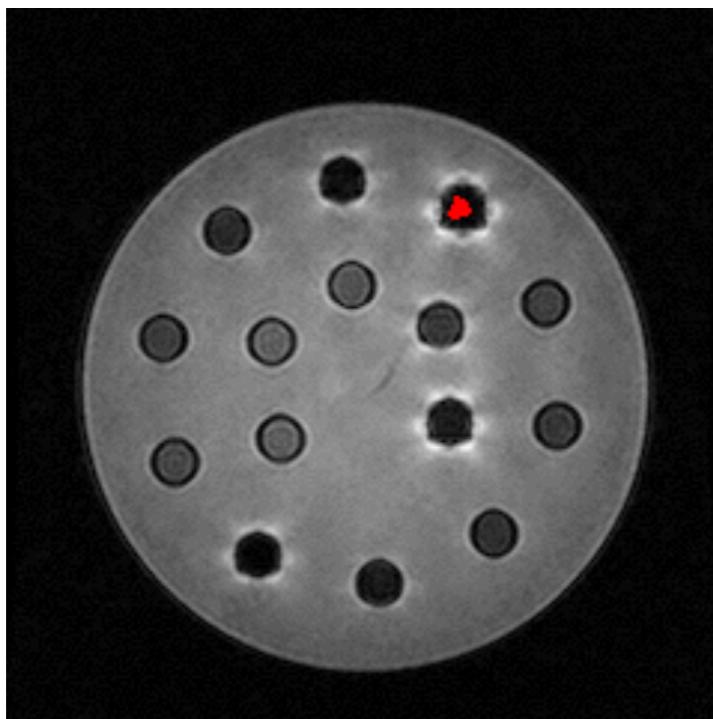
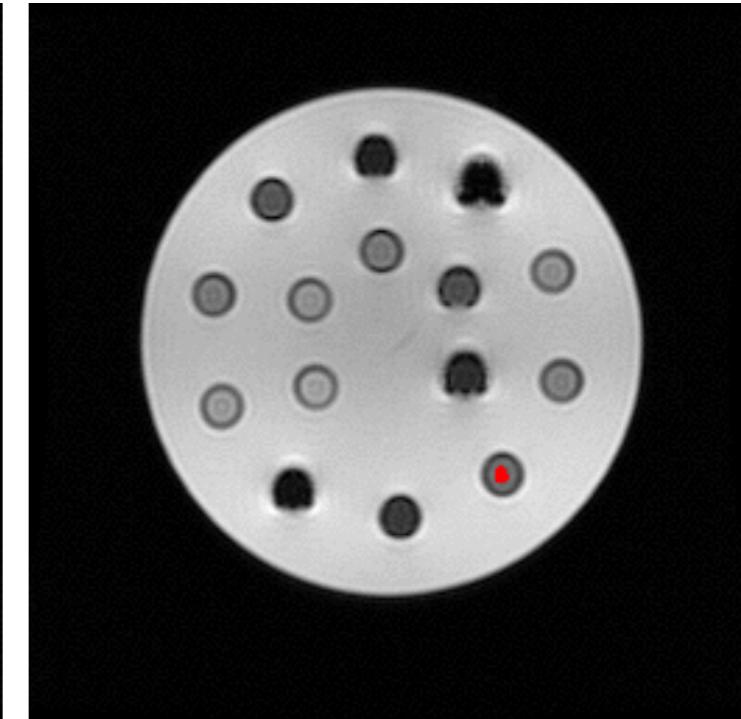
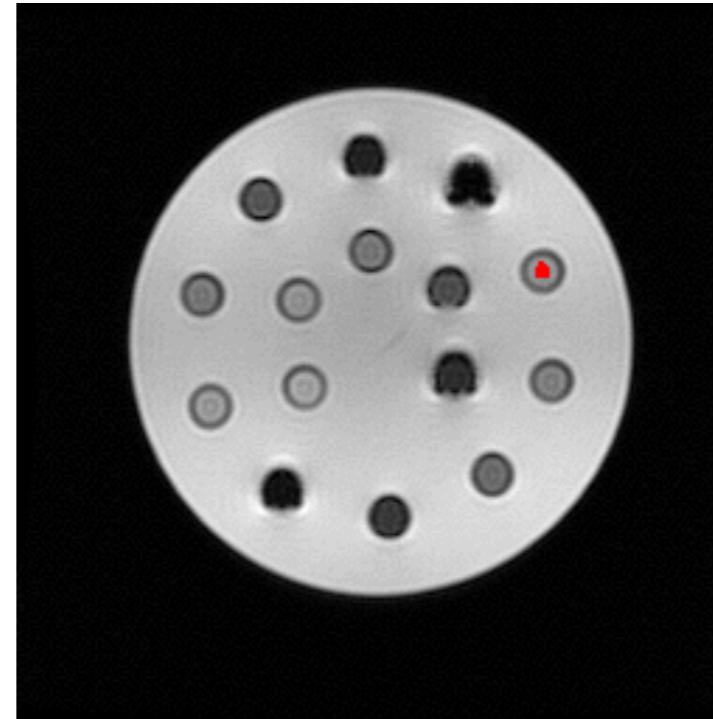
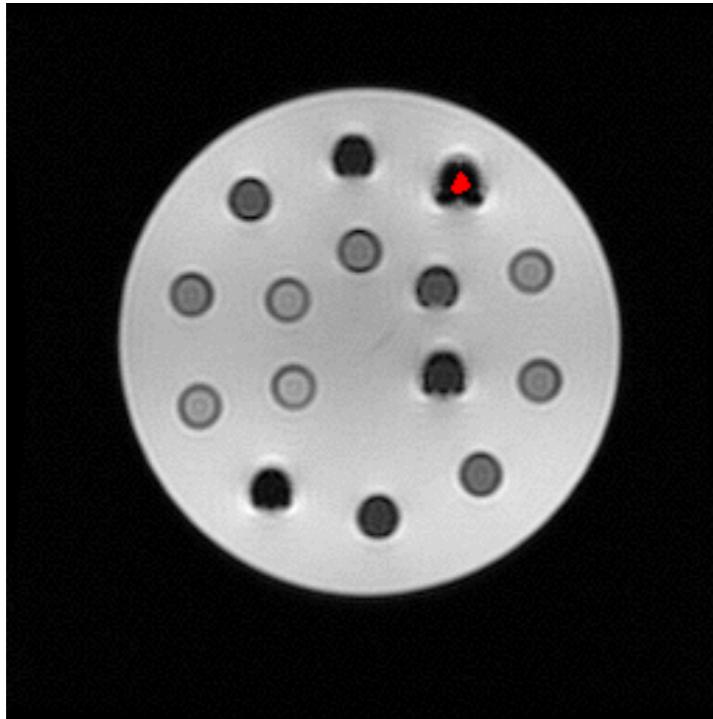


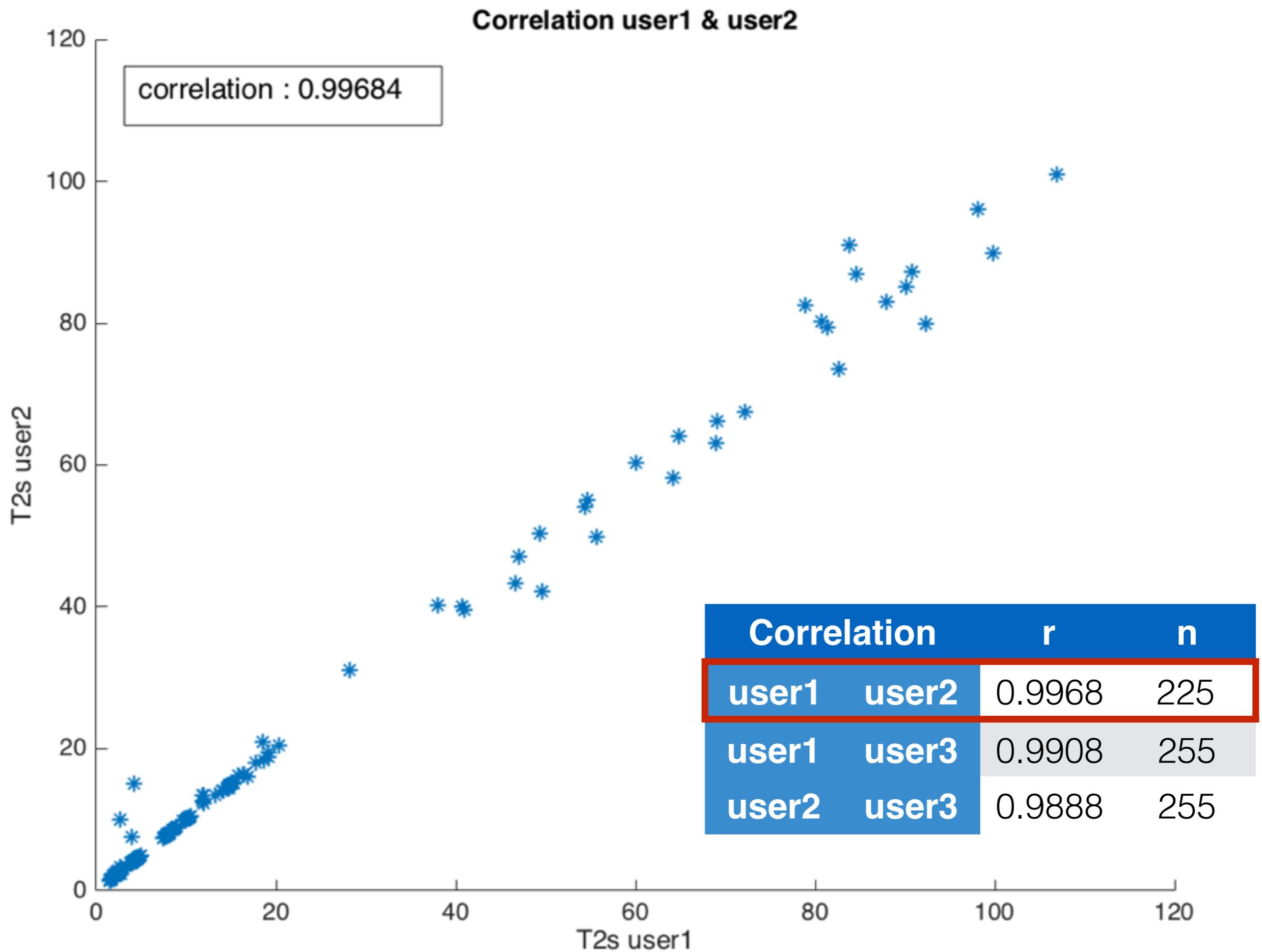
	initial	SD	range
position1	7.30	0.34	3.21
position2	3.61	0.22	2.98
position3	1.98	0.12	3.41
position4	0.60	0.42	2.10
position5	0.60	0.00	0.00
position6	9.19	0.37	3.49
position7	4.27	0.16	3.23
position8	2.20	0.12	3.27
position9	1.10	0.11	3.40
position10	0.60	0.00	0.00
position11	14.24	0.60	3.05
position12	7.35	0.41	3.28
position13	3.72	0.21	2.86
position14	2.16	0.14	3.72
position15	1.54	0.09	2.87

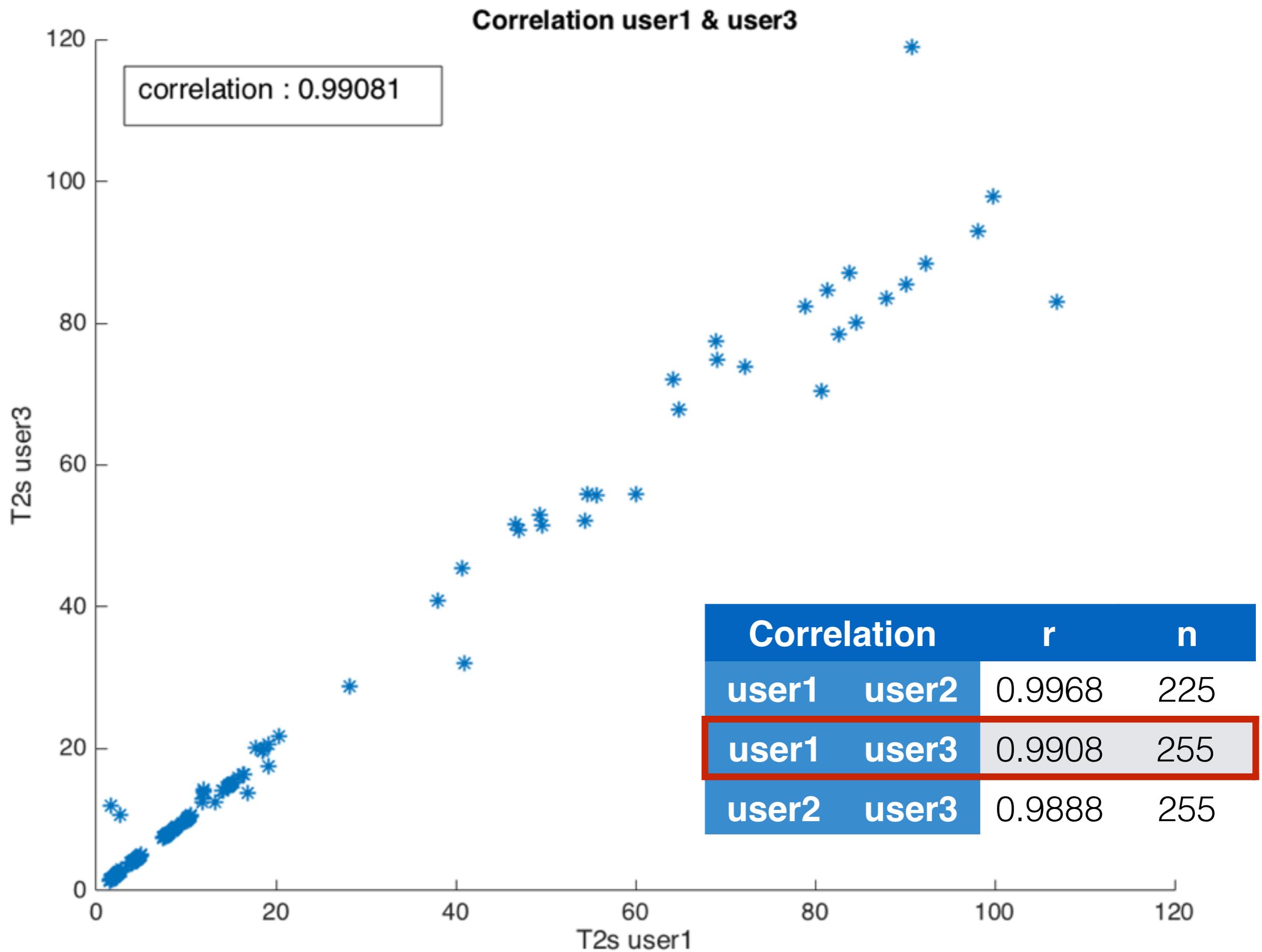
transfer roi from 1.5 to 3 Tesla

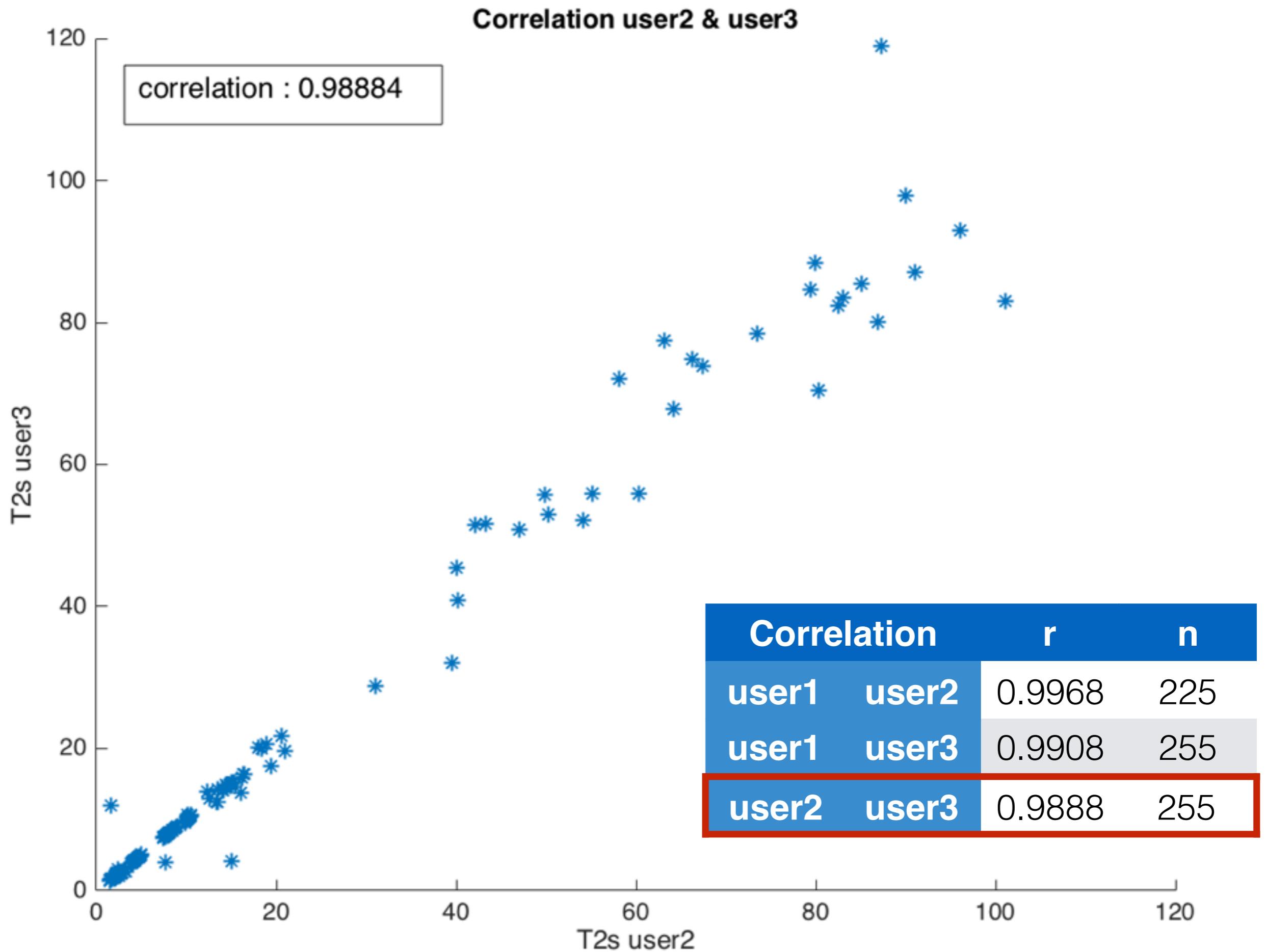


transfer roi from 1.5 to 3 Tesla

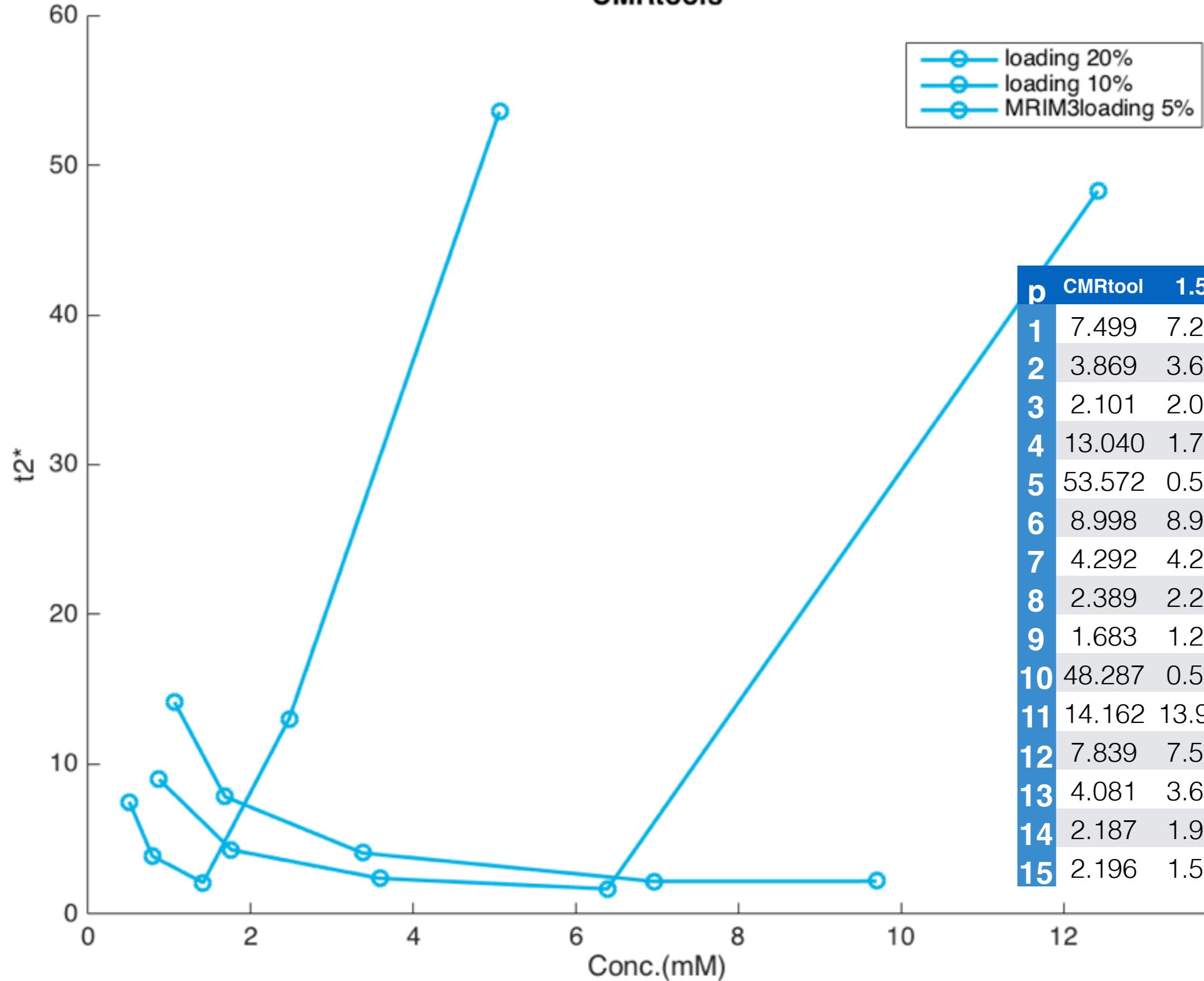






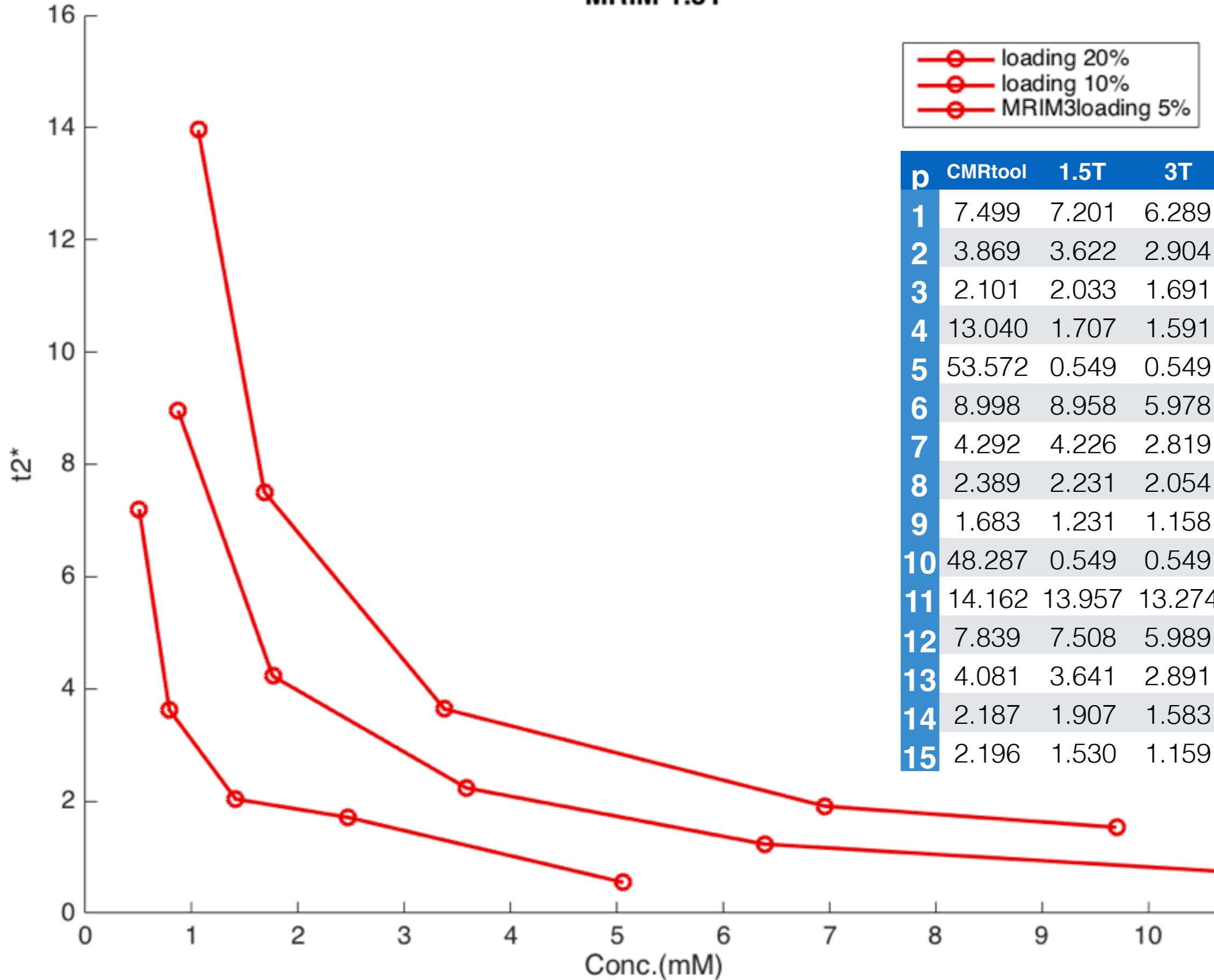


CMRtools

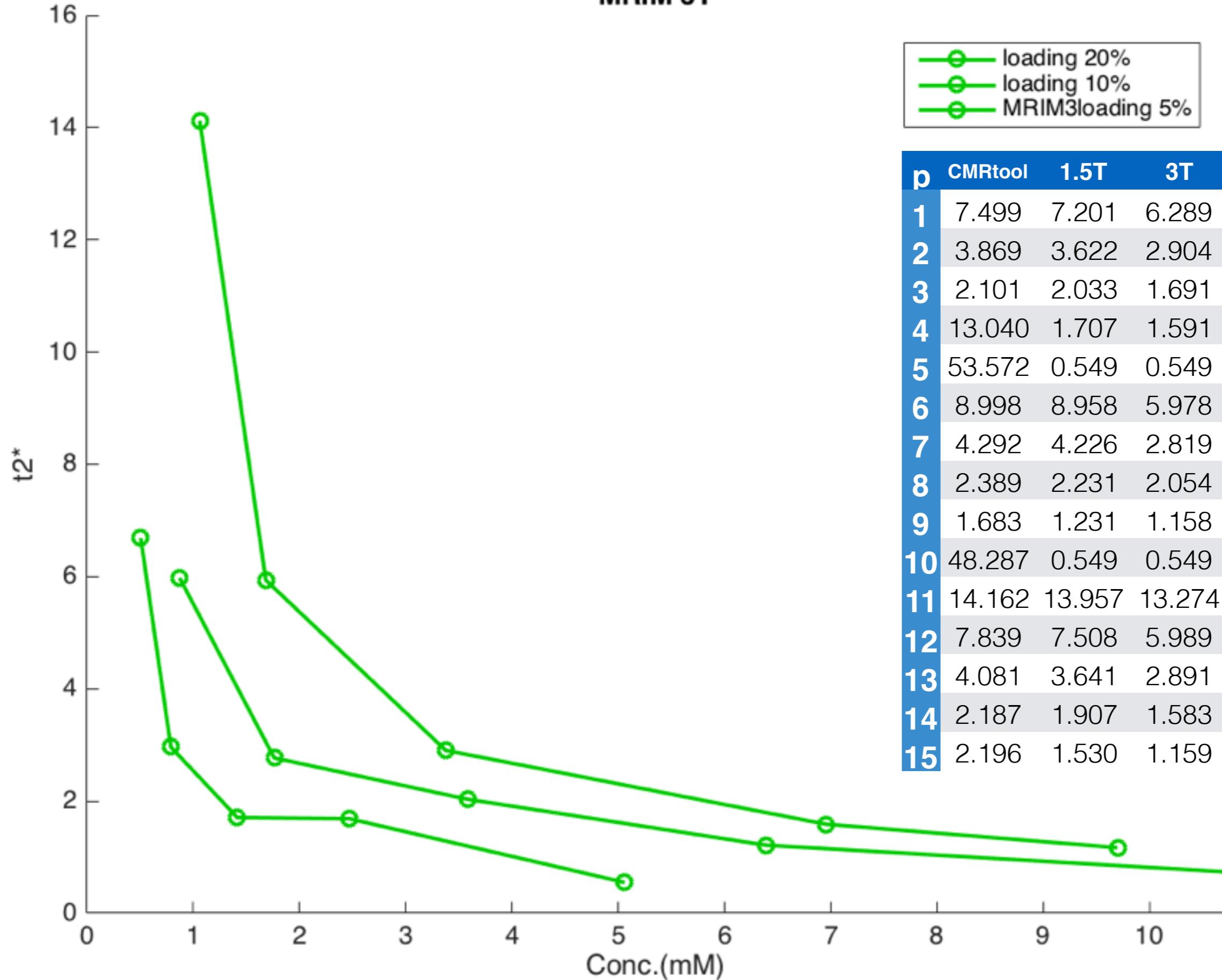


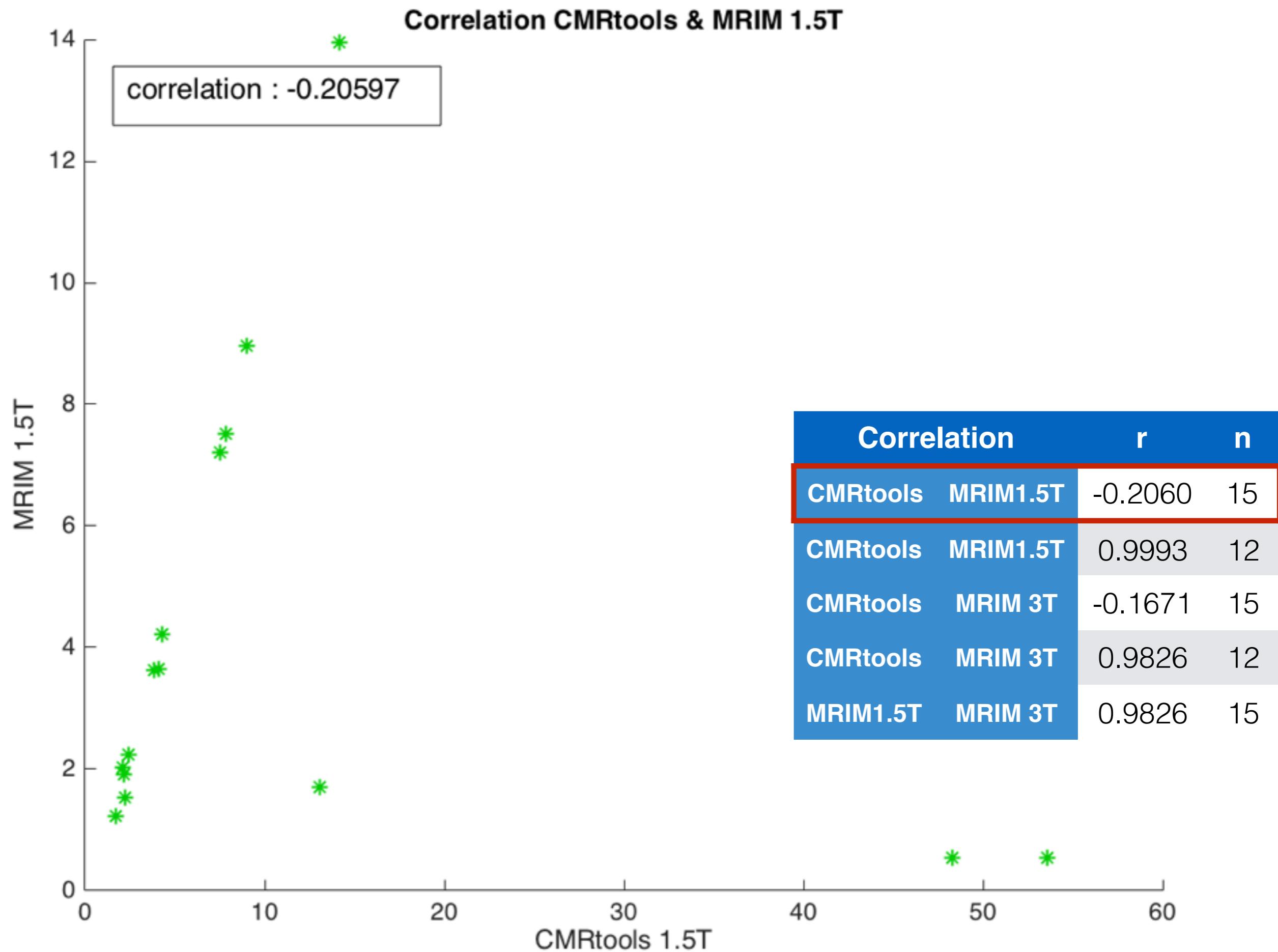
p	CMRtool	1.5T	3T
1	7.499	7.201	6.289
2	3.869	3.622	2.904
3	2.101	2.033	1.691
4	13.040	1.707	1.591
5	53.572	0.549	0.549
6	8.998	8.958	5.978
7	4.292	4.226	2.819
8	2.389	2.231	2.054
9	1.683	1.231	1.158
10	48.287	0.549	0.549
11	14.162	13.957	13.274
12	7.839	7.508	5.989
13	4.081	3.641	2.891
14	2.187	1.907	1.583
15	2.196	1.530	1.159

MRIM 1.5T



MRIM 3T

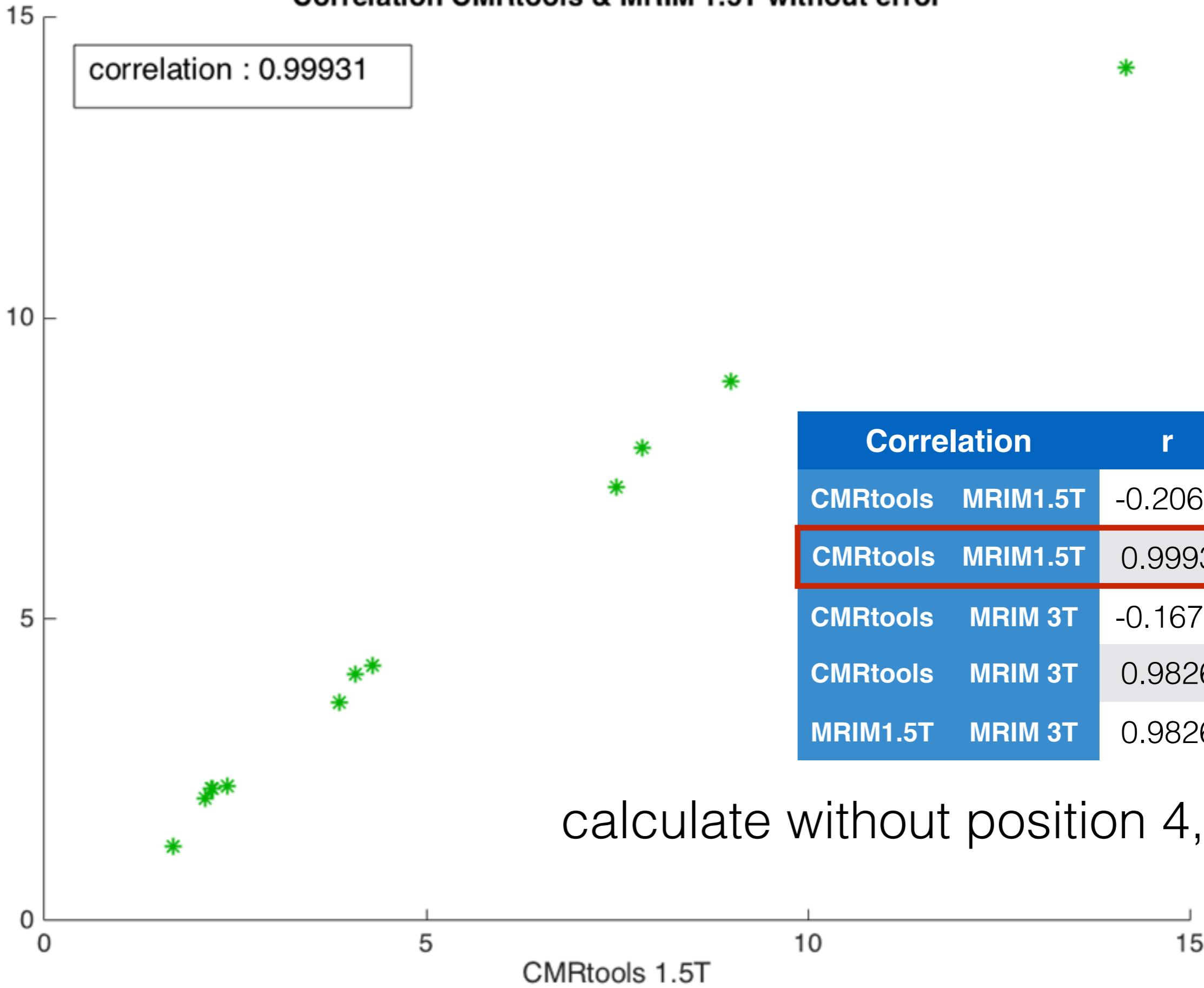




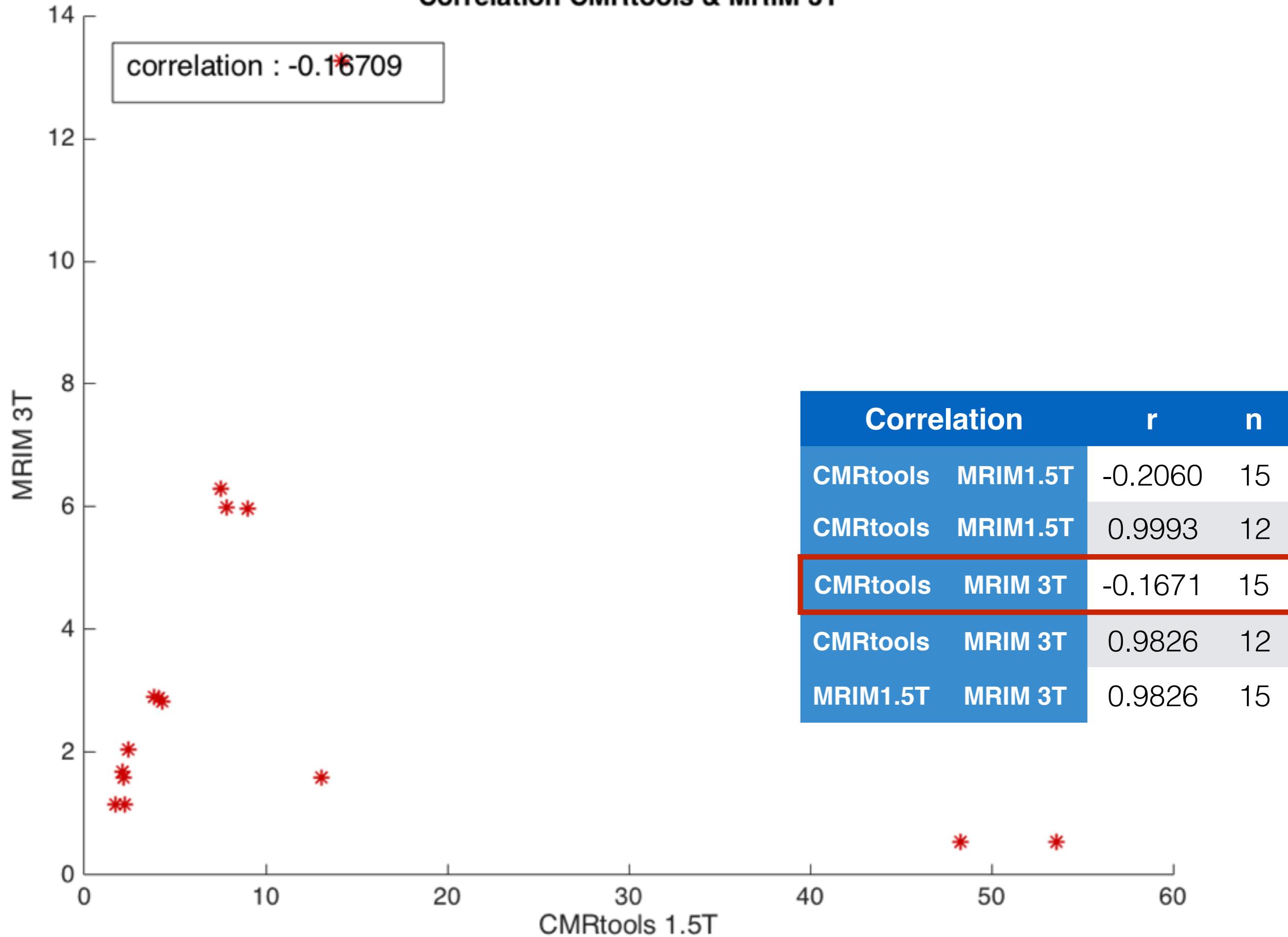
Correlation CMRtools & MRIM 1.5T without error

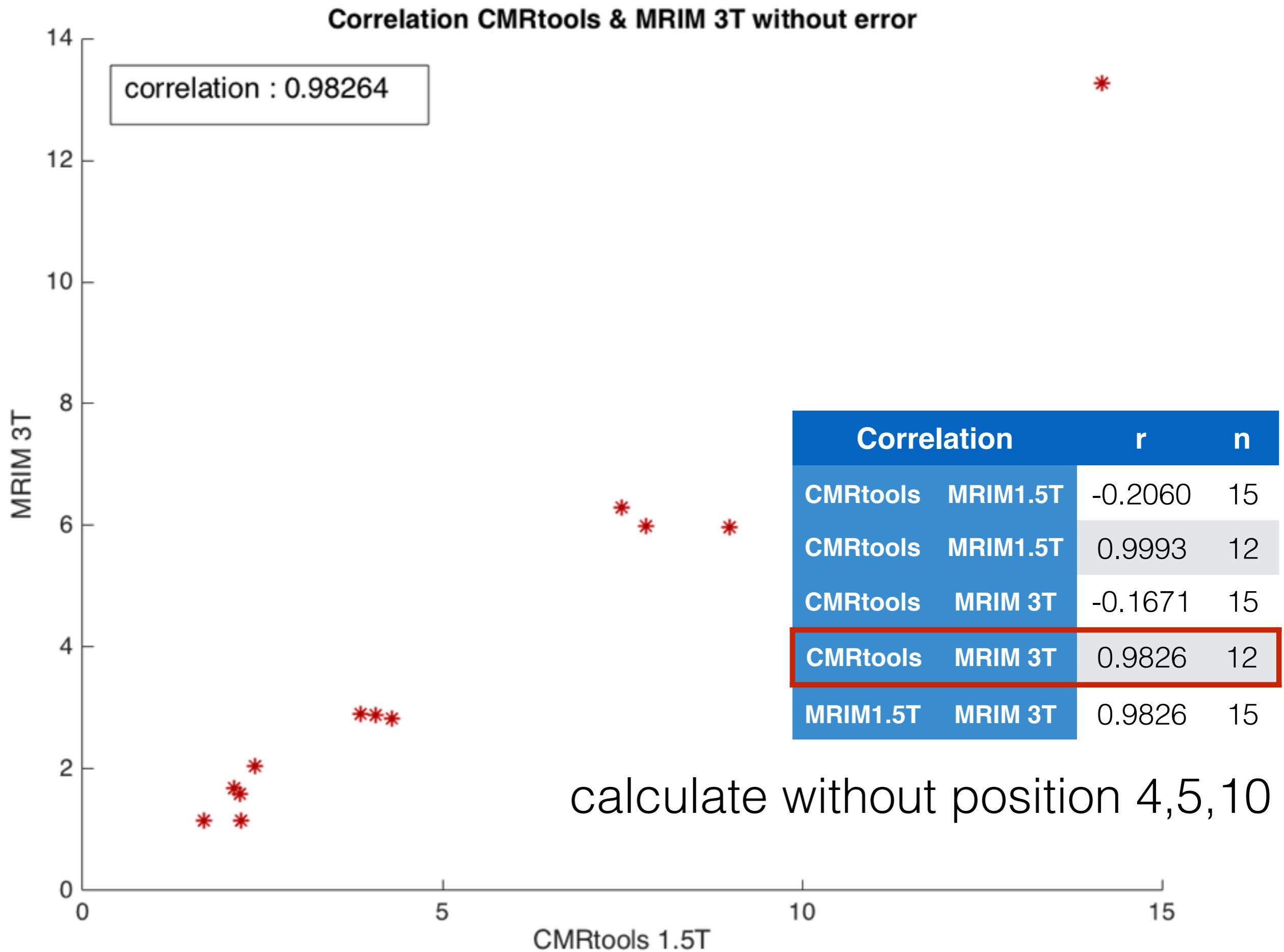
correlation : 0.99931

MRIM 1.5T

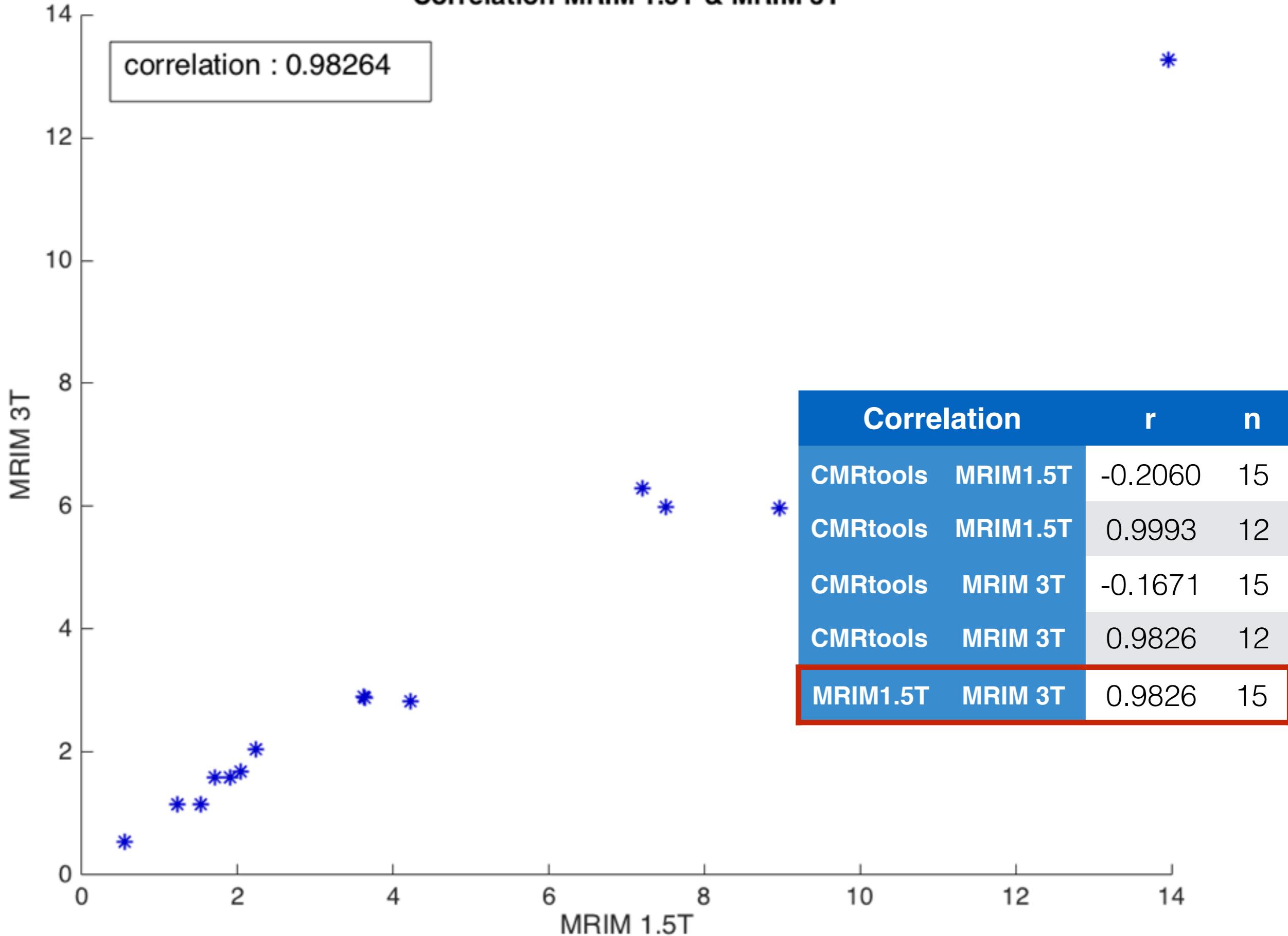


Correlation CMRtools & MRIM 3T

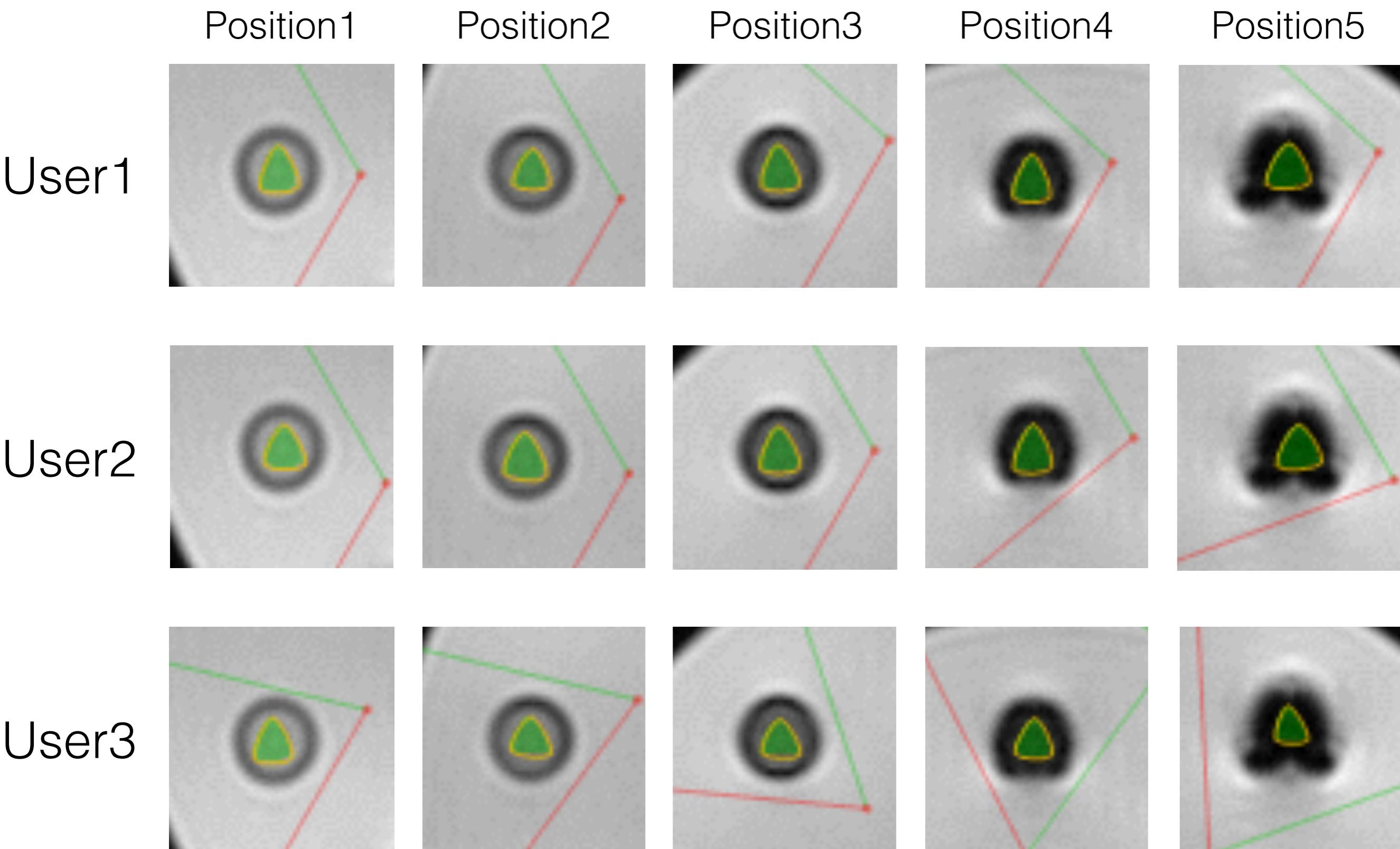




Correlation MRIM 1.5T & MRIM 3T



ตัวอย่างการวัดด้วยโปรแกรม CMRtools ของทั้ง 3 คน



T2* CMRtools User1

position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	7.47	3.86	2.11	13.25	54.44	8.99	4.29	2.39	1.69	47.03	14.16	7.83	4.08	2.18	2.20
week2	7.60	3.92	1.96	19.14	92.33	9.66	4.53	2.33	1.76	64.82	14.76	7.59	4.01	2.22	2.22
week3	7.99	3.99	2.07	18.61	80.75	10.20	4.76	2.39	1.70	54.69	15.15	7.95	4.17	2.28	2.80
week4	7.76	3.96	2.11	17.79	99.77	10.26	4.68	2.36	1.63	69.01	14.63	7.84	4.10	2.30	2.37
week5	7.71	3.96	2.23	18.55	90.83	9.99	4.62	2.39	1.67	64.20	14.95	7.92	4.15	2.45	2.43
week6	7.65	3.87	2.12	20.31	98.07	9.83	4.61	2.41	1.57	72.22	14.53	7.56	3.87	2.31	2.72
week7	8.03	4.10	2.20	15.74	83.79	10.18	4.77	2.45	1.64	69.06	15.18	8.23	4.26	2.42	2.10
week8	8.45	4.39	2.43	14.75	84.56	10.51	4.87	2.51	1.71	49.39	16.39	8.73	4.49	2.57	2.10
week9	8.53	4.44	2.44	11.79	87.89	10.27	4.99	2.55	1.61	55.73	16.39	8.84	4.60	2.61	1.97
week10	8.12	4.15	2.23	11.76	82.64	10.18	4.81	2.46	1.48	46.62	14.80	8.08	4.24	2.32	1.92
week11	7.98	4.05	2.18	2.67	78.90	10.08	4.63	2.42	1.45	40.70	14.82	8.00	4.20	2.34	1.95
week12	8.15	4.17	2.22	11.90	81.42	10.27	4.73	2.43	1.51	38.04	15.24	8.16	4.30	2.33	1.93
week13	7.87	4.14	2.24	11.95	60.04	10.41	4.78	2.63	1.56	28.21	15.07	8.07	4.26	2.37	2.08
week14	7.97	4.18	2.29	16.89	106.90	10.57	4.99	2.66	1.66	41.03	15.33	8.20	4.30	2.53	2.31
week15	7.42	3.86	2.16	19.12	90.14	10.17	4.66	2.57	1.48	49.62	14.01	7.41	3.85	2.30	2.60

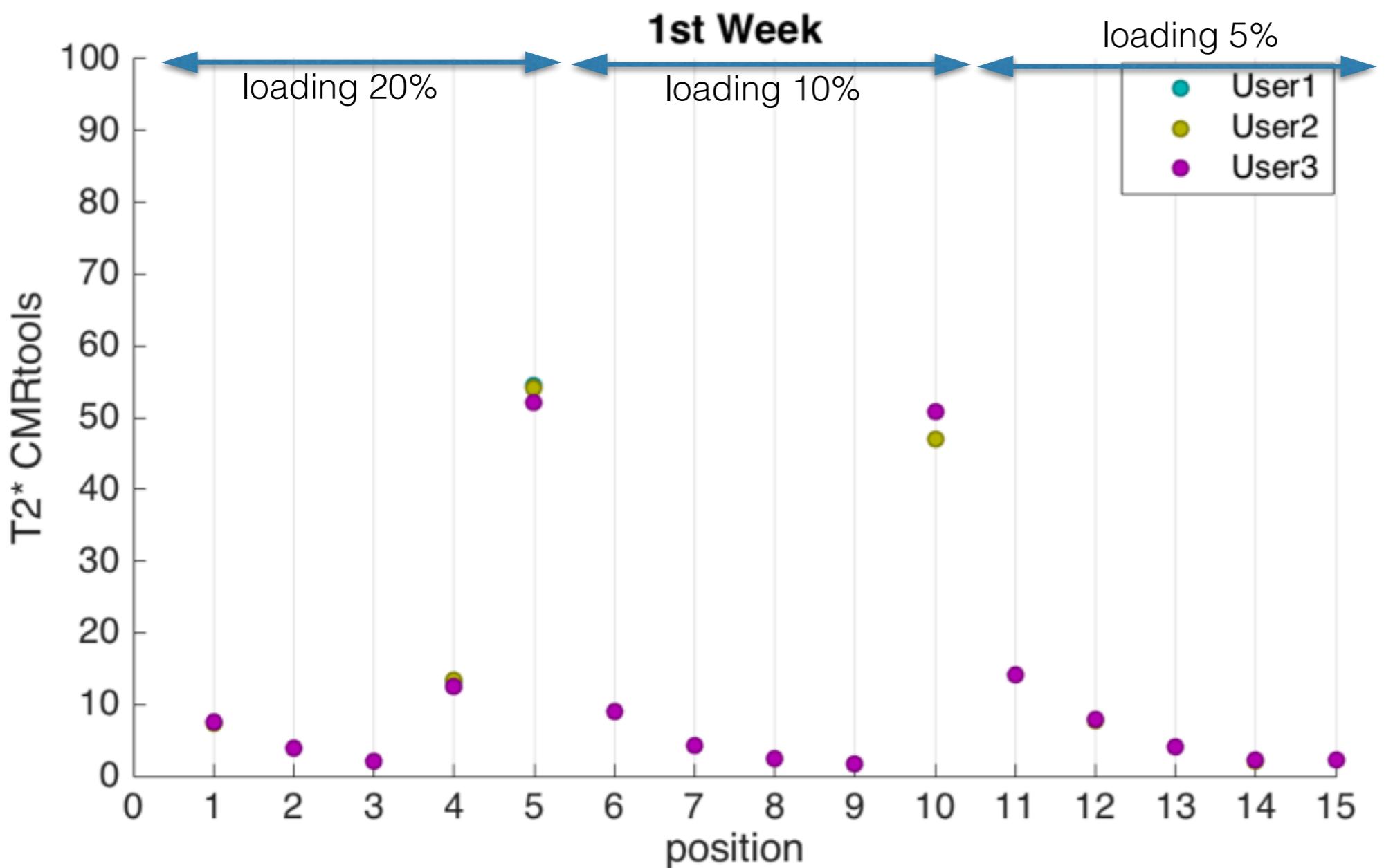
T2* CMRtools User2

position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	7.47	3.88	2.11	13.39	54.14	9.00	4.29	2.40	1.68	47.03	14.15	7.83	4.09	2.18	2.19
week2	7.58	3.95	1.96	18.88	79.90	9.81	4.50	2.33	1.76	64.15	14.91	7.61	7.61	2.18	2.78
week3	8.02	4.01	2.06	18.39	18.39	10.23	4.78	2.41	1.63	55.17	15.08	15.08	15.08	2.28	2.37
week4	7.73	3.95	2.10	17.99	89.95	10.31	4.67	2.34	1.67	63.10	14.56	7.78	4.07	2.32	2.89
week5	7.62	7.62	2.19	21.03	87.26	9.95	4.56	2.37	1.62	58.12	14.86	7.94	4.19	2.48	2.77
week6	7.62	3.94	2.13	20.54	96.02	9.85	4.55	2.42	1.51	67.46	14.49	7.50	3.89	2.46	3.19
week7	7.97	4.10	2.19	16.17	91.10	10.21	4.69	2.41	1.70	66.28	15.13	8.15	4.28	2.53	2.54
week8	8.47	4.34	2.35	14.43	86.91	10.56	4.81	2.49	1.59	50.29	16.33	8.65	4.49	2.60	2.17
week9	8.50	4.43	2.40	13.42	83.01	10.32	4.93	2.55	1.57	49.85	16.44	8.88	4.61	2.67	2.05
week10	8.05	4.12	2.21	12.63	73.54	10.16	4.76	2.44	1.47	43.27	14.75	8.04	4.27	2.40	2.05
week11	7.99	4.07	2.16	10.07	82.51	10.15	4.66	2.44	1.45	40.07	14.82	8.03	4.25	2.32	2.19
week12	8.12	4.17	2.17	13.54	79.36	10.29	4.65	2.41	1.45	40.25	15.16	8.17	4.32	2.39	2.13
week13	7.85	4.14	2.25	12.36	60.31	10.37	4.76	2.62	1.57	31.02	15.05	8.08	4.24	2.32	2.19
week14	7.97	4.16	2.28	16.03	101.04	10.57	4.99	2.64	1.62	39.54	15.33	8.21	4.29	2.55	2.32
week15	7.39	3.87	2.17	19.44	85.09	10.14	4.72	2.57	1.51	42.12	14.05	7.41	3.82	2.37	3.33

T2* CMRtools User3

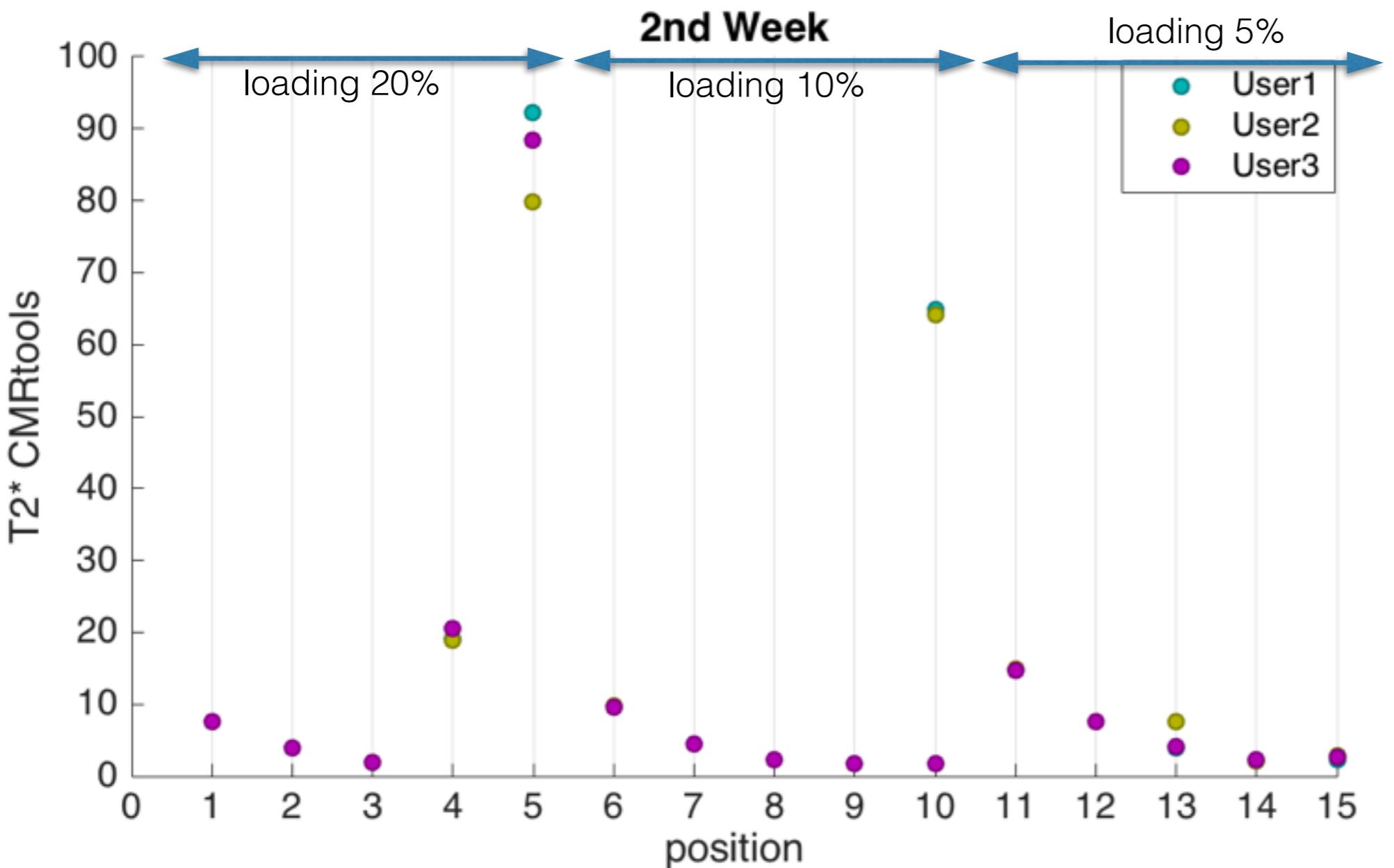
position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
week1	7.55	3.87	2.09	12.48	52.14	9.00	4.29	2.38	1.67	50.80	14.17	7.85	4.06	2.20	2.20
week2	7.58	3.95	1.95	20.56	88.36	9.62	4.52	2.31	1.76	1.76	14.78	7.65	4.05	2.27	2.72
week3	8.04	4.00	2.07	19.96	70.49	10.21	4.77	2.40	1.61	55.99	15.23	8.00	4.21	2.29	3.08
week4	7.81	3.97	2.16	20.23	97.95	10.26	4.67	2.36	1.70	77.48	14.67	7.87	4.16	2.33	2.58
week5	7.72	3.94	2.24	19.66	118.88	9.93	4.59	2.38	11.97	72.10	14.97	7.97	4.16	2.48	2.30
week6	7.66	3.93	2.15	21.79	93.00	9.77	4.56	2.41	1.57	73.80	14.60	7.60	3.89	2.38	2.61
week7	8.04	4.14	2.20	15.91	87.09	10.15	4.76	2.43	1.74	74.78	15.31	8.24	4.29	2.49	2.10
week8	8.46	4.38	2.45	14.87	80.09	10.51	4.85	2.49	1.69	52.99	16.42	8.76	4.52	2.63	2.10
week9	8.55	4.46	2.46	12.41	83.58	10.29	5.03	2.56	1.59	55.75	16.42	8.93	4.61	2.64	1.80
week10	8.07	4.14	2.23	12.99	78.41	10.14	4.81	2.44	1.49	51.64	14.87	8.07	4.23	2.40	1.90
week11	8.01	4.06	2.19	10.69	82.37	10.05	4.63	2.41	1.43	45.44	14.86	8.02	4.26	2.42	1.81
week12	8.15	4.17	2.16	14.27	84.62	10.25	4.70	2.41	1.43	40.96	15.29	8.20	4.33	2.43	1.91
week13	7.86	4.15	2.27	13.94	55.89	10.34	4.74	2.61	1.55	28.80	15.14	8.07	4.26	2.49	2.10
week14	8.05	4.20	2.23	13.75	83.00	10.74	5.07	2.66	1.61	32.09	15.20	8.23	4.29	2.50	2.12
week15	7.40	3.89	2.16	17.49	85.42	10.07	4.67	2.57	1.53	51.52	14.12	7.48	3.90	2.29	2.60

T2^{*} Value



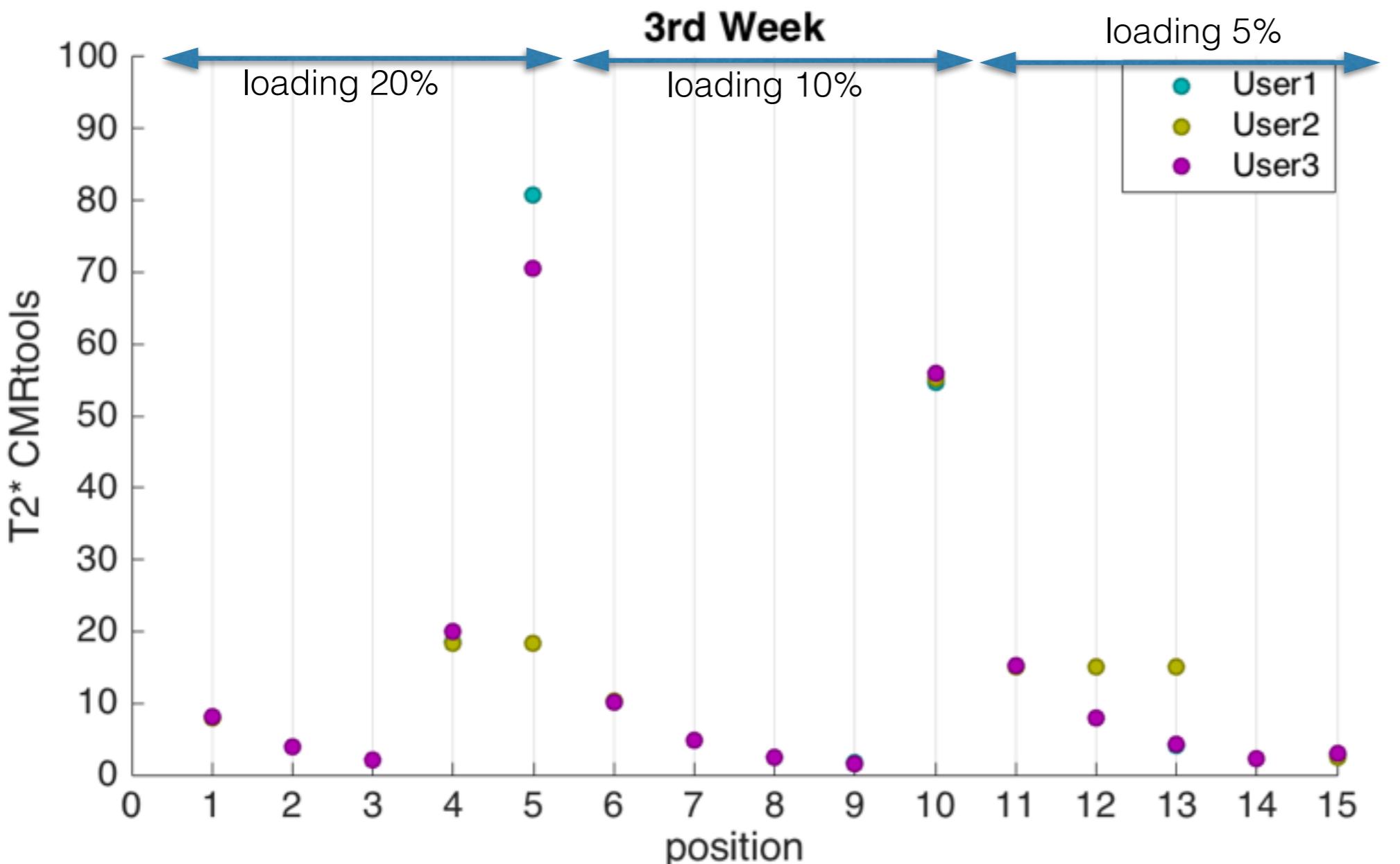
position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
mean	7.50	3.87	2.10	13.04	53.57	9.00	4.29	2.39	1.68	48.29	14.16	7.84	4.08	2.19	2.20
SD	0.47	0.08	0.11	4.94	12.53	0.10	0.03	0.10	0.11	21.75	0.06	0.13	0.15	0.14	0.05

T2* Value



position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
mean	7.59	3.94	1.96	19.53	86.87	9.70	4.52	2.32	1.76	43.57	14.81	7.62	5.22	2.22	2.57
SD	0.11	0.14	0.06	9.04	63.46	1.01	0.14	0.11	0.03	362.16	0.81	0.34	20.64	0.49	3.08

T2^{*} Value



position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
mean	8.02	4.00	2.06	18.99	56.54	10.21	14.77	2.40	1.65	55.28	15.15	10.34	7.82	2.28	2.75
SD	0.23	0.09	0.06	8.50	334.36	0.14	0.10	0.11	0.45	6.60	0.74	41.05	2.87	0.09	3.57

เพิ่มเงื่อนไขตรวจสอบค่า $T2^*$

- การตรวจสอบว่าค่า $T2^*$ ที่ได้ถูกต้องหรือไม่
 - 1. ค่า ratio ต้องมีค่าต่ำกว่า 0.317
 - 2. ค่า $T2^*$ ต้องไม่ติดลบ
- ถ้าไม่ถูกต้องจะกำหนดให้ค่า $T2^*$ มีค่าต่ำกว่า 1.097 โดยกำหนดให้มีค่าเท่ากับ 0.549 เพื่อง่ายแก่การ plot chart

Result

1.5Tesla CMRtools Result

date	T2* value														
	position1	position2	position3	position4	position5	position6	position7	position8	position9	position10	position11	position12	position13	position14	position15
2014-09-30'	7.472	3.860	2.094	12.325	55.463	8.954	4.320	2.377	1.683	51.289	14.185	7.781	4.056	2.160	2.079
2014-10-08'	7.617	3.926	1.958	17.812	88.170	9.677	4.505	2.350	1.802	63.018	14.653	7.503	3.959	2.077	2.714
2014-10-15'	8.033	4.015	2.069	17.659	82.364	10.235	4.758	2.418	1.638	55.377	15.233	7.933	4.152	2.170	2.612
2014-10-22'	7.733	3.981	2.103	16.333	99.779	10.323	4.708	2.386	1.673	64.793	14.631	7.857	4.067	2.199	2.391
2014-11-05'	7.672	3.933	2.198	19.128	98.721	10.082	4.626	2.408	1.727	58.036	14.813	7.833	4.088	2.328	2.294
2014-11-12'	7.579	3.885	2.129	19.123	104.508	9.946	4.633	2.417	1.575	69.908	14.425	7.528	3.844	2.228	2.726
2014-11-19'	7.957	4.128	2.162	14.417	90.513	10.242	4.753	2.462	1.727	62.562	15.178	8.150	4.178	2.299	2.309
2014-11-26'	8.363	4.320	2.316	13.467	89.903	10.683	4.893	2.554	1.668	49.213	16.303	8.689	4.442	2.444	2.114
2014-12-03'	8.453	4.375	2.384	11.064	83.863	10.372	5.004	2.571	1.617	49.300	16.338	8.792	4.517	2.456	1.910
2014-12-10'	8.037	4.180	2.196	8.043	79.613	10.233	4.773	2.530	1.490	42.714	14.799	8.030	4.195	2.248	1.818
2014-12-17'	7.981	4.110	2.192	2.392	88.821	10.259	4.673	2.466	1.487	40.002	14.936	8.020	4.148	2.187	1.769
2014-12-24'	8.146	4.167	2.197	12.296	70.749	10.327	4.750	2.466	1.527	36.942	15.194	8.184	4.206	2.260	1.919
2015-01-21'	7.914	4.166	2.260	9.619	60.496	10.507	4.804	2.636	1.609	27.603	15.063	8.042	4.184	2.257	1.819
2015-01-28'	7.981	4.216	2.304	14.208	112.086	10.664	4.980	2.663	1.671	40.998	15.403	8.218	4.290	2.334	2.053
2015-02-04'	7.421	3.892	2.169	18.980	101.124	10.182	4.718	2.596	1.597	46.076	14.100	7.394	3.805	2.185	2.540
mean	7.891	4.077	2.182	13.791	87.078	10.179	4.727	2.487	1.633	50.522	15.017	7.997	4.142	2.256	2.205

Result

1.5Tesla MRIM Result

date	T2* value														
	position1	position2	position3	position4	position5	position6	position7	position8	position9	position10	position11	position12	position13	position14	position15
2014-09-30'	7.207	3.644	2.031	1.807	0.549	8.906	4.248	2.207	1.316	0.549	13.905	7.425	3.701	1.891	1.487
2014-10-08'	7.440	3.686	1.868	1.494	0.549	9.271	4.253	2.245	1.242	0.549	14.382	7.053	3.633	2.431	1.636
2014-10-15'	7.741	3.705	1.826	1.620	0.549	10.015	4.431	2.333	1.209	0.549	15.131	7.572	3.778	2.394	1.628
2014-10-22'	7.449	3.685	2.054	1.691	0.549	9.890	4.370	2.294	1.110	0.549	14.322	7.463	3.910	1.869	1.514
2014-11-05'	7.494	3.679	1.936	1.637	0.549	9.629	4.454	2.337	1.158	0.549	14.522	7.408	3.651	1.896	1.580
2014-11-12'	7.420	3.680	2.020	1.773	0.549	9.539	4.556	2.339	1.136	0.549	14.363	7.281	3.583	2.443	1.600
2014-11-19'	7.795	3.904	1.906	1.564	0.549	9.954	4.456	2.297	1.212	0.549	14.953	7.803	3.924	1.975	1.536
2014-11-26'	8.149	4.043	2.040	1.434	0.549	10.152	4.545	2.374	1.247	0.549	15.928	8.268	4.098	2.402	1.507
2014-12-03'	8.297	4.070	2.028	1.422	0.549	10.086	4.861	2.437	1.205	0.549	16.331	8.506	4.224	2.376	1.407
2014-12-10'	7.919	3.933	1.910	1.312	0.549	9.950	4.529	2.388	1.174	0.549	14.711	7.678	3.809	2.144	1.370
2014-12-17'	7.670	3.858	1.889	1.332	0.549	9.997	4.486	2.430	1.184	0.549	14.873	7.730	3.954	2.128	1.395
2014-12-24'	7.901	3.911	1.907	1.264	0.549	9.937	4.445	2.397	1.206	2.037	14.909	7.770	4.026	2.163	1.448
2015-01-21'	7.647	3.970	2.091	1.286	0.549	10.280	4.693	2.647	1.332	1.867	14.823	7.585	3.968	2.198	1.396
2015-01-28'	7.934	3.952	2.072	1.489	0.549	10.348	4.700	2.542	1.353	0.549	15.234	7.839	3.932	1.935	1.503
2015-02-04'	7.360	3.680	2.011	1.643	0.549	9.854	4.478	2.440	1.258	0.549	14.090	7.040	3.472	1.807	1.568
mean	7.695	3.827	1.973	1.518	0.549	9.854	4.500	2.380	1.223	0.736	14.832	7.628	3.844	2.137	1.505

T2* value on table = 0.549 mean T2* value less than 1.097

Result

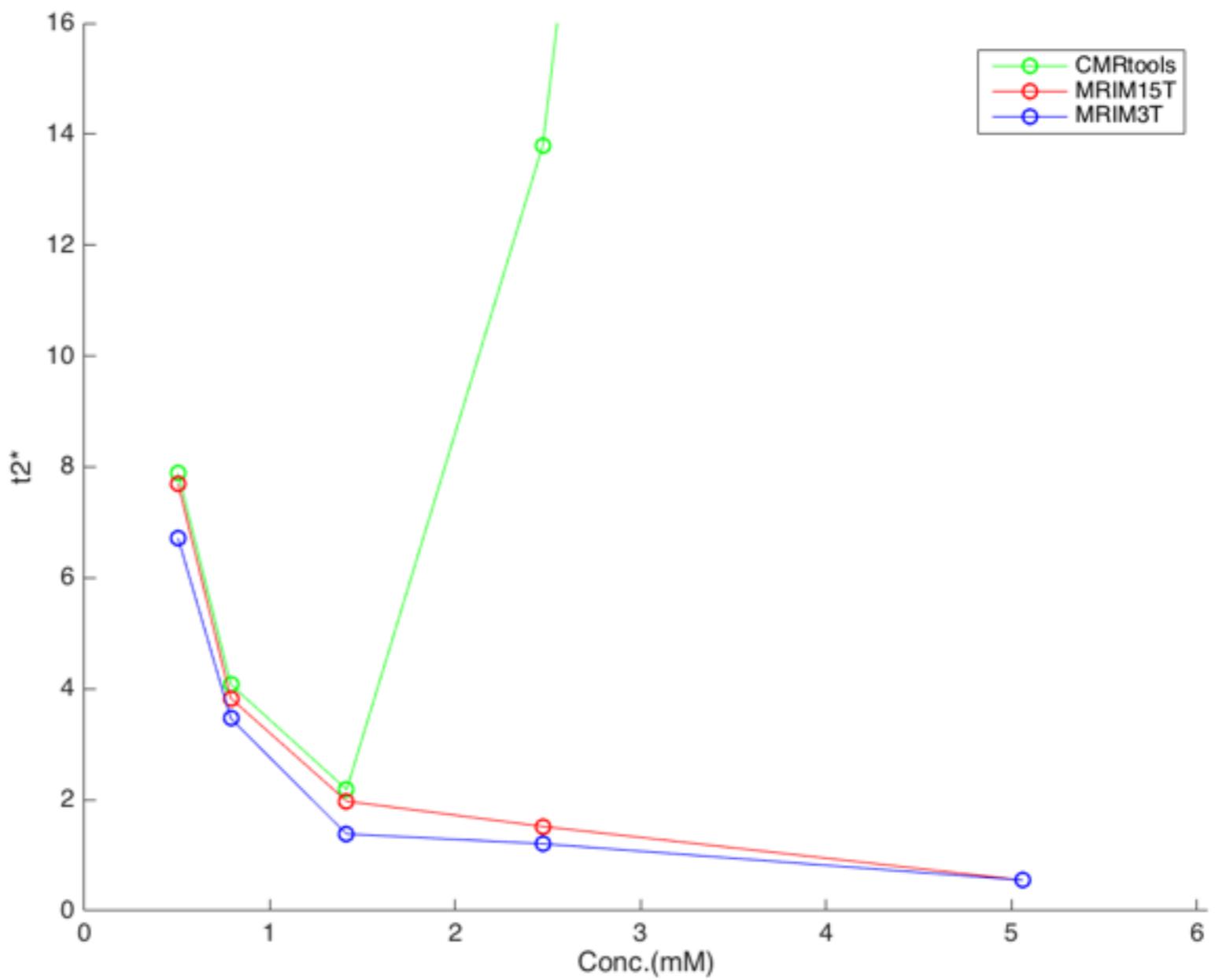
3Tesla MRIM Result

date	T2* value														
	position1	position2	position3	position4	position5	position6	position7	position8	position9	position10	position11	position12	position13	position14	position15
2014-09-30'	5.459	2.864	1.771	1.565	0.549	6.624	2.949	2.036	1.094	0.549	17.389	5.914	2.998	1.643	1.146
2014-10-08'	6.507	3.523	1.473	1.668	0.549	9.287	3.907	2.196	0.549	0.549	11.171	6.314	3.987	1.089	1.140
2014-10-15'	6.835	3.586	1.500	1.635	0.549	8.497	4.231	2.183	1.175	0.549	15.874	6.909	3.780	1.196	1.184
2014-10-22'	6.872	3.590	1.692	1.606	0.549	8.660	3.623	2.074	1.128	0.549	12.666	6.640	3.965	1.421	0.967
2014-11-05'	7.808	3.479	1.372	0.549	0.549	10.816	4.965	1.849	1.210	0.549	13.094	6.346	3.833	1.617	1.606
2014-11-12'	6.508	3.240	0.992	0.549	0.549	8.857	5.048	1.926	1.262	0.549	9.919	5.560	3.227	1.476	1.542
2014-11-19'	7.081	3.449	1.341	1.388	0.549	8.231	3.930	2.170	0.921	0.549	10.281	6.108	3.762	1.428	1.488
2014-11-26'	8.647	3.762	1.487	1.051	0.549	11.591	4.985	1.600	1.139	0.549	17.732	6.961	3.986	1.752	1.064
2014-12-03'	7.376	3.595	1.374	1.054	0.549	6.210	3.464	1.662	0.927	0.549	9.666	6.228	3.389	1.631	1.049
2014-12-10'	5.453	3.291	1.083	2.139	0.549	8.525	3.233	1.549	1.175	0.549	7.174	5.065	2.655	1.741	1.792
2014-12-17'	6.116	3.445	1.362	0.916	0.549	12.673	3.281	1.619	0.856	0.549	10.074	6.209	3.380	1.407	1.129
2014-12-24'	6.615	3.417	1.217	1.280	0.549	10.846	4.021	1.917	1.173	0.549	10.913	6.507	3.741	1.446	1.434
2015-01-21'	7.199	3.438	1.342	1.338	0.549	11.279	4.105	1.766	1.018	0.549	12.445	6.544	3.459	1.589	1.121
2015-01-28'	6.797	3.418	1.250	0.801	0.549	8.200	3.441	1.702	1.065	0.868	12.581	6.258	3.443	1.745	0.913
2015-02-04'	5.430	3.816	1.472	0.549	0.549	11.056	3.157	2.054	1.183	0.549	10.160	6.081	3.768	1.334	1.297
mean	6.714	3.461	1.382	1.206	0.549	9.423	3.889	1.887	1.058	0.570	12.076	6.243	3.558	1.501	1.258

T2* value on table = 0.549 mean T2* value less than 1.097

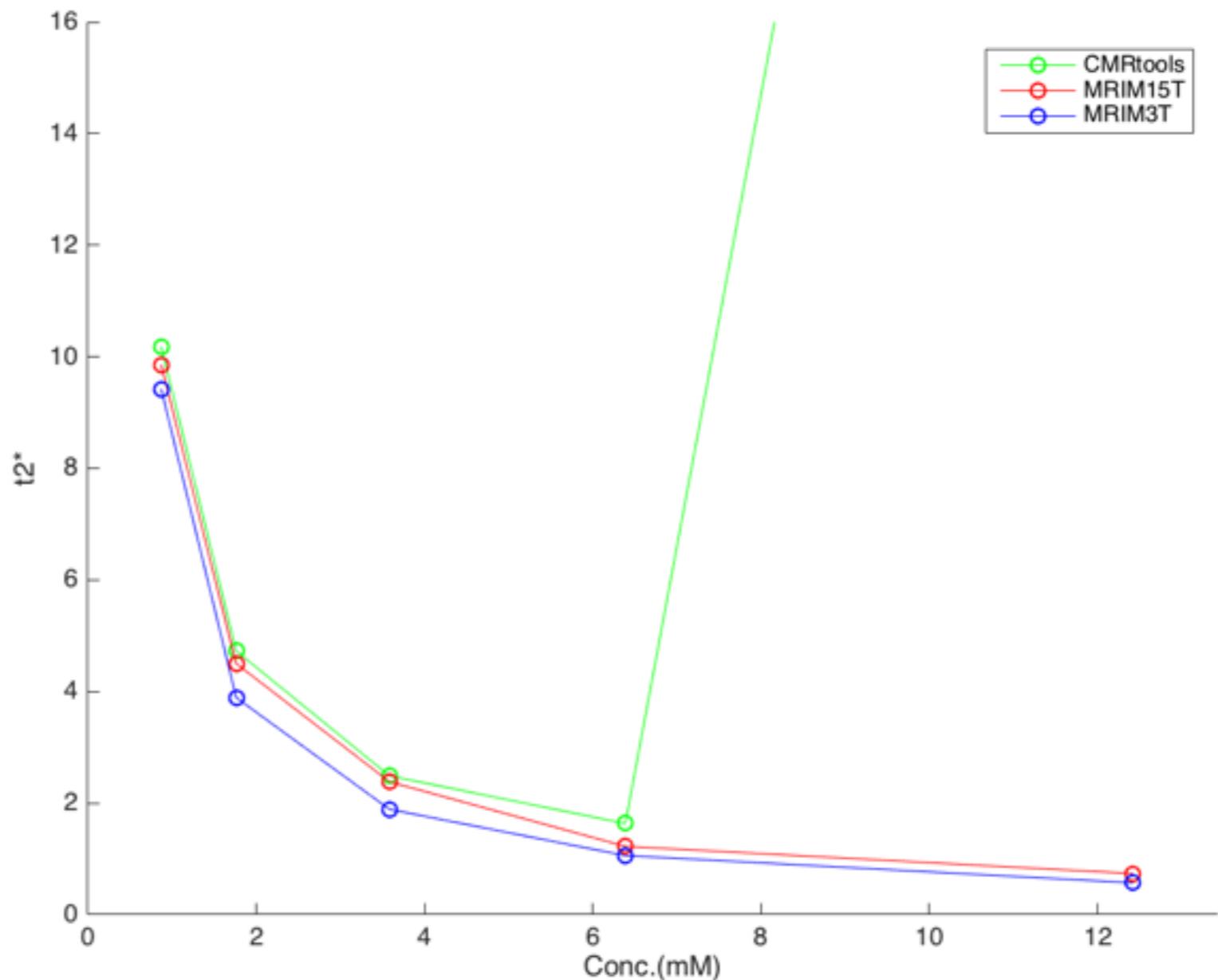
position	T2* mean value			Conc.
	CMRtools	1.5T	3T	
1	7.891	7.695	6.714	0.505
2	4.077	3.827	3.461	0.789
3	2.182	1.973	1.382	1.413
4	13.791	1.518	1.206	2.470
5	87.078	0.549	0.549	5.059
6	10.179	9.854	9.423	0.871
7	4.727	4.500	3.889	1.761
8	2.487	2.380	1.887	3.584
9	1.633	1.223	1.058	6.387
10	50.522	0.736	0.570	12.421
11	15.017	14.832	12.076	1.060
12	7.997	7.628	6.243	1.682
13	4.142	3.844	3.558	3.375
14	2.256	2.137	1.501	6.956
15	2.205	1.505	1.258	9.698

set1 loading 20%



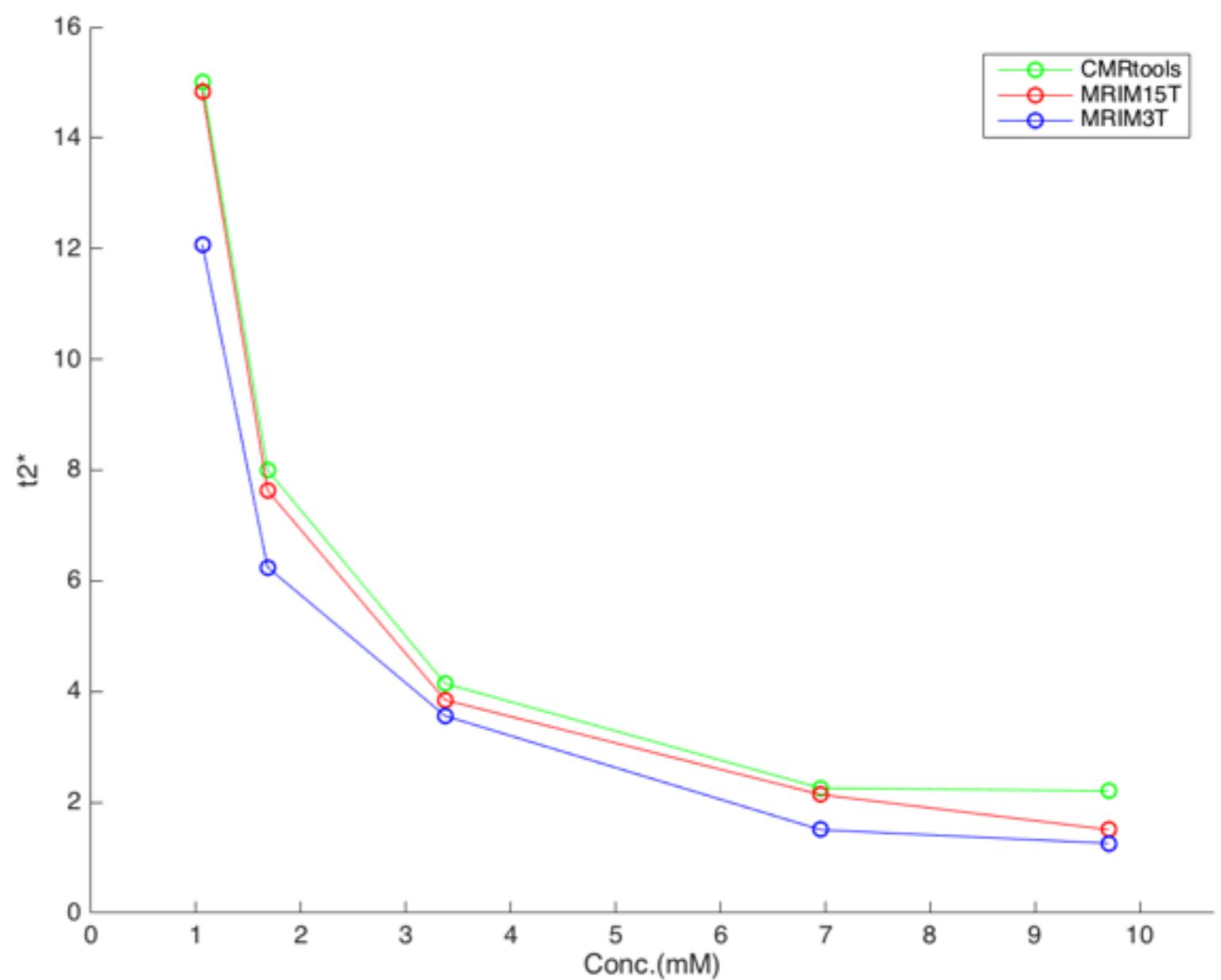
position	T2* mean value			Conc.
	CMRtools	1.5T	3T	
1	7.891	7.695	6.714	0.505
2	4.077	3.827	3.461	0.789
3	2.182	1.973	1.382	1.413
4	13.791	1.518	1.206	2.470
5	87.078	0.549	0.549	5.059
6	10.179	9.854	9.423	0.871
7	4.727	4.500	3.889	1.761
8	2.487	2.380	1.887	3.584
9	1.633	1.223	1.058	6.387
10	50.522	0.736	0.570	12.421
11	15.017	14.832	12.076	1.060
12	7.997	7.628	6.243	1.682
13	4.142	3.844	3.558	3.375
14	2.256	2.137	1.501	6.956
15	2.205	1.505	1.258	9.698

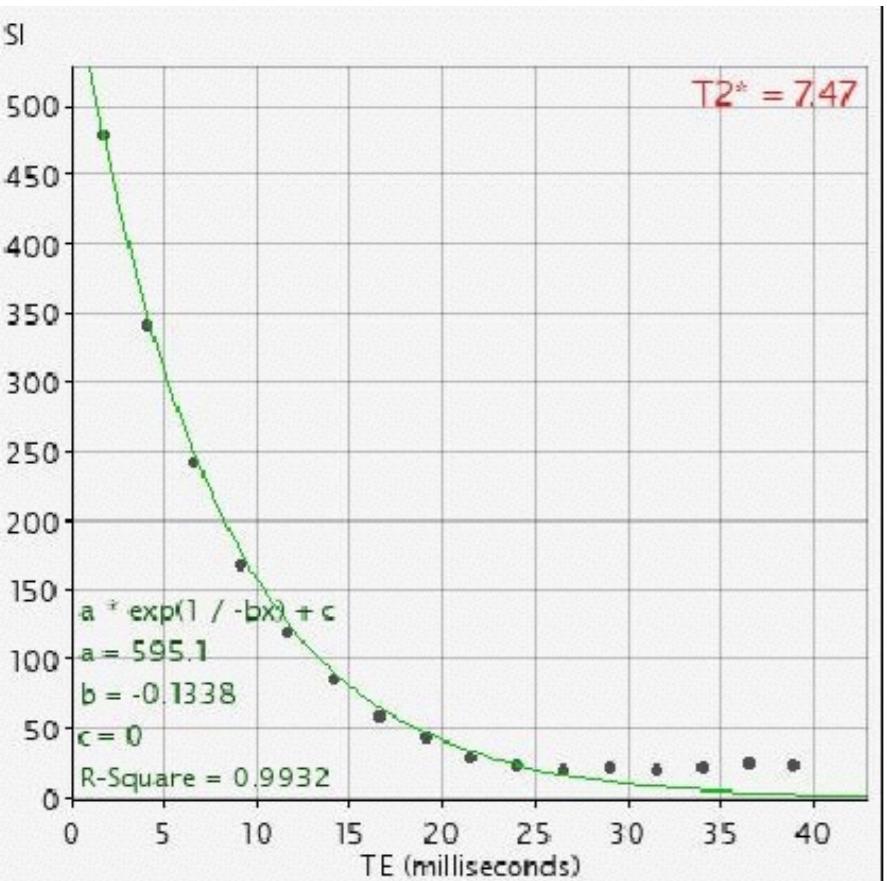
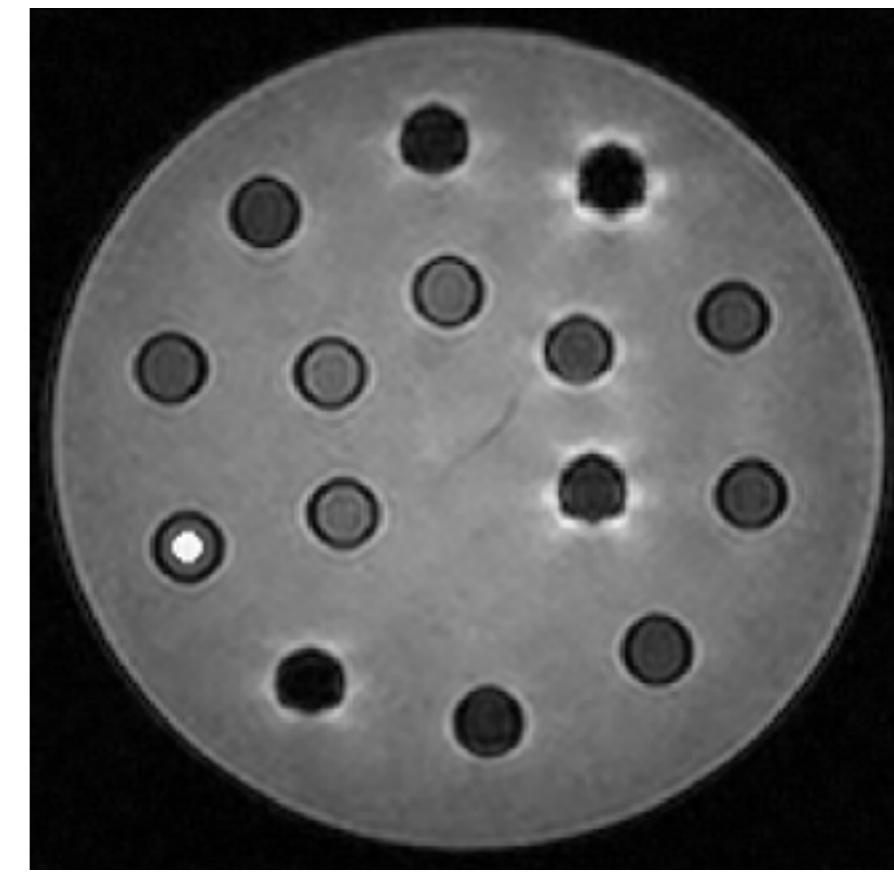
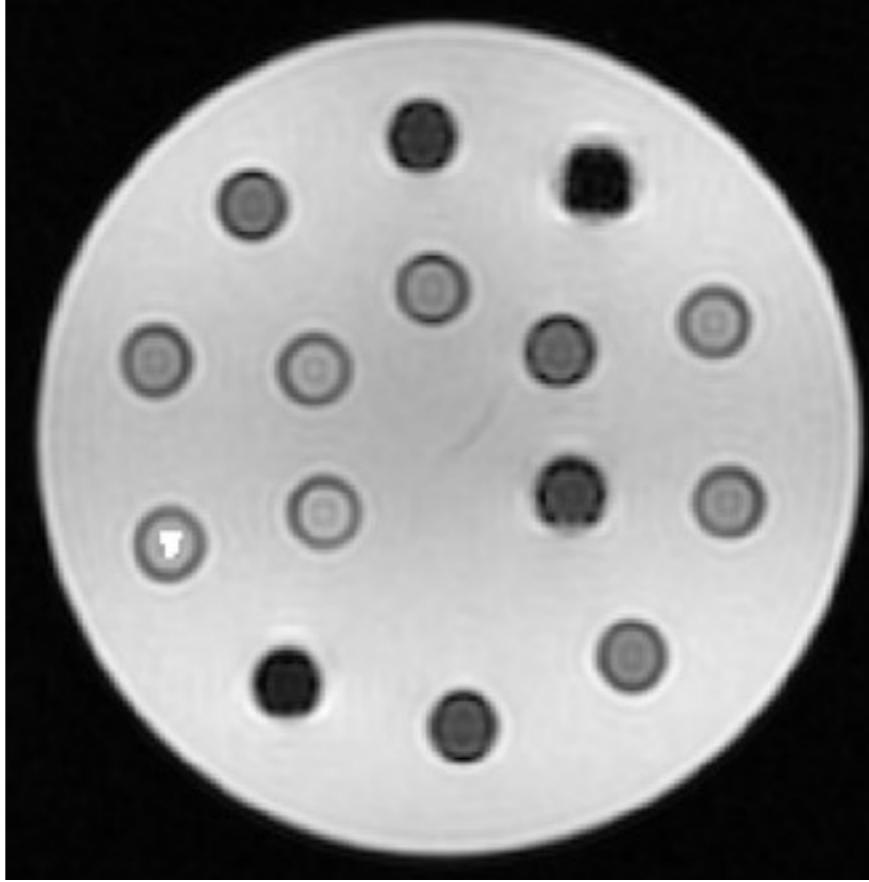
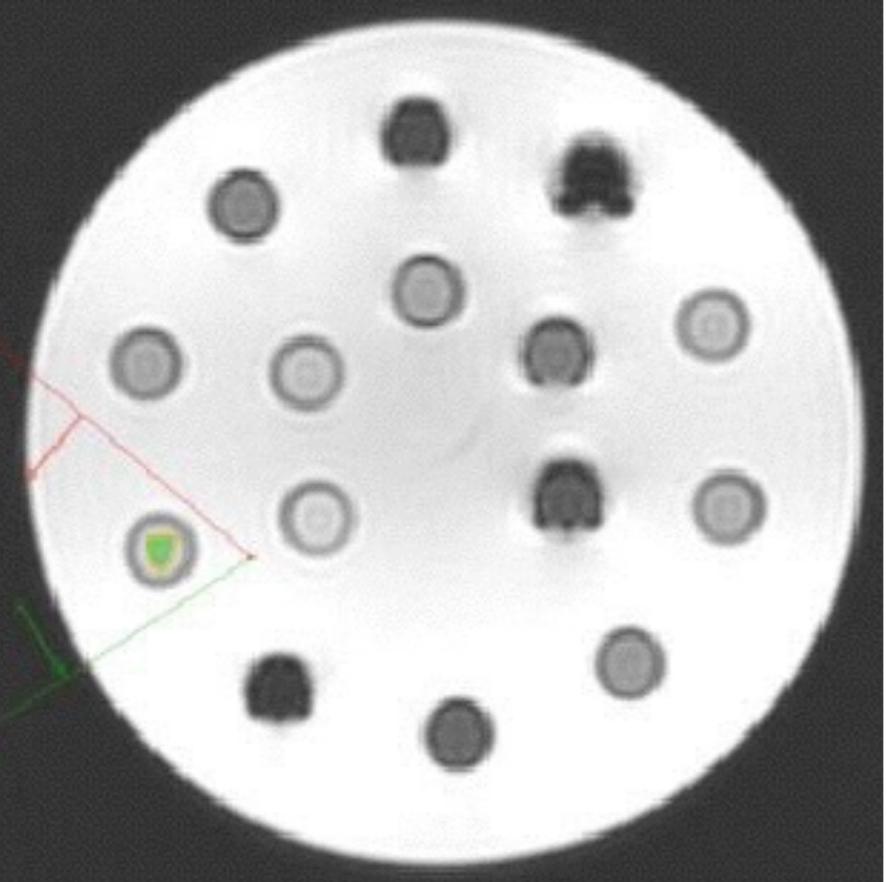
set2 loading 10%



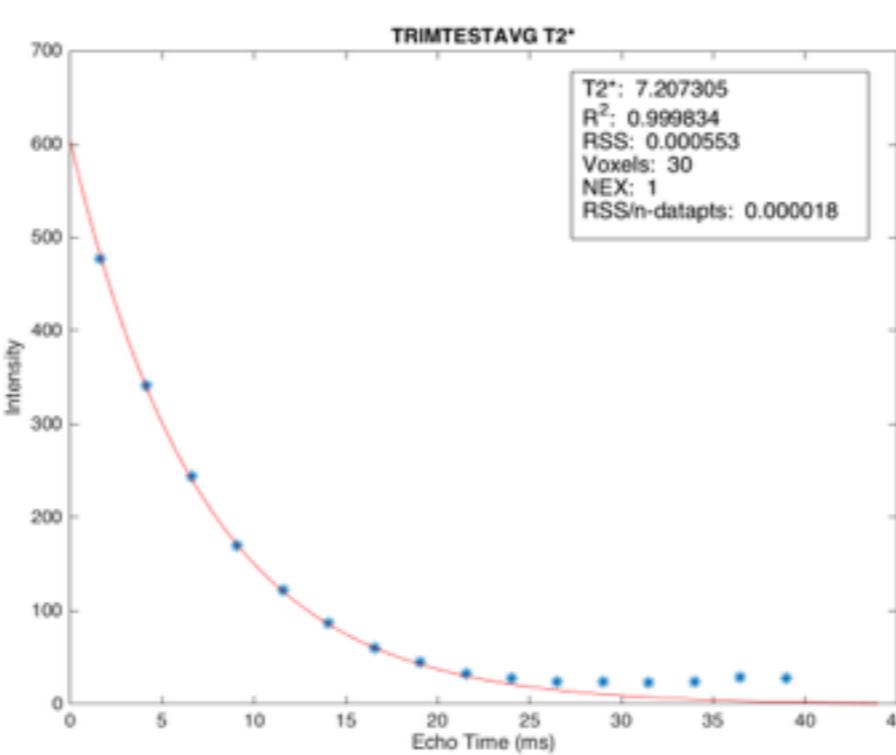
position	T2* mean value			Conc.
	CMRtools	1.5T	3T	
1	7.891	7.695	6.714	0.505
2	4.077	3.827	3.461	0.789
3	2.182	1.973	1.382	1.413
4	13.791	1.518	1.206	2.470
5	87.078	0.549	0.549	5.059
6	10.179	9.854	9.423	0.871
7	4.727	4.500	3.889	1.761
8	2.487	2.380	1.887	3.584
9	1.633	1.223	1.058	6.387
10	50.522	0.736	0.570	12.421
11	15.017	14.832	12.076	1.060
12	7.997	7.628	6.243	1.682
13	4.142	3.844	3.558	3.375
14	2.256	2.137	1.501	6.956
15	2.205	1.505	1.258	9.698

set3 loading 5%

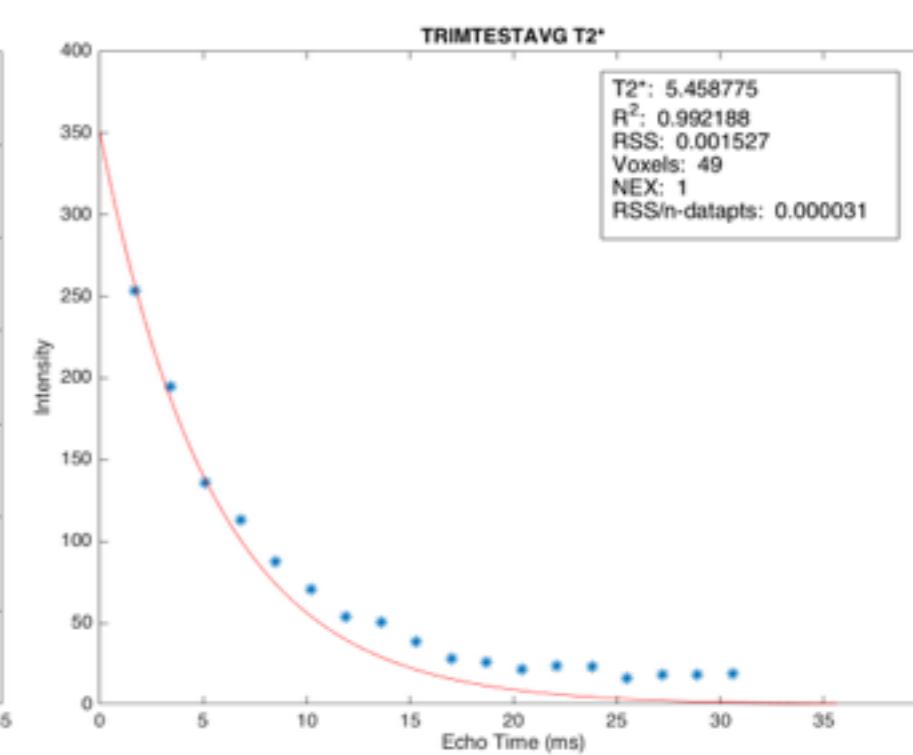




$T2^* = 7.47$
CMRtools 1.5T

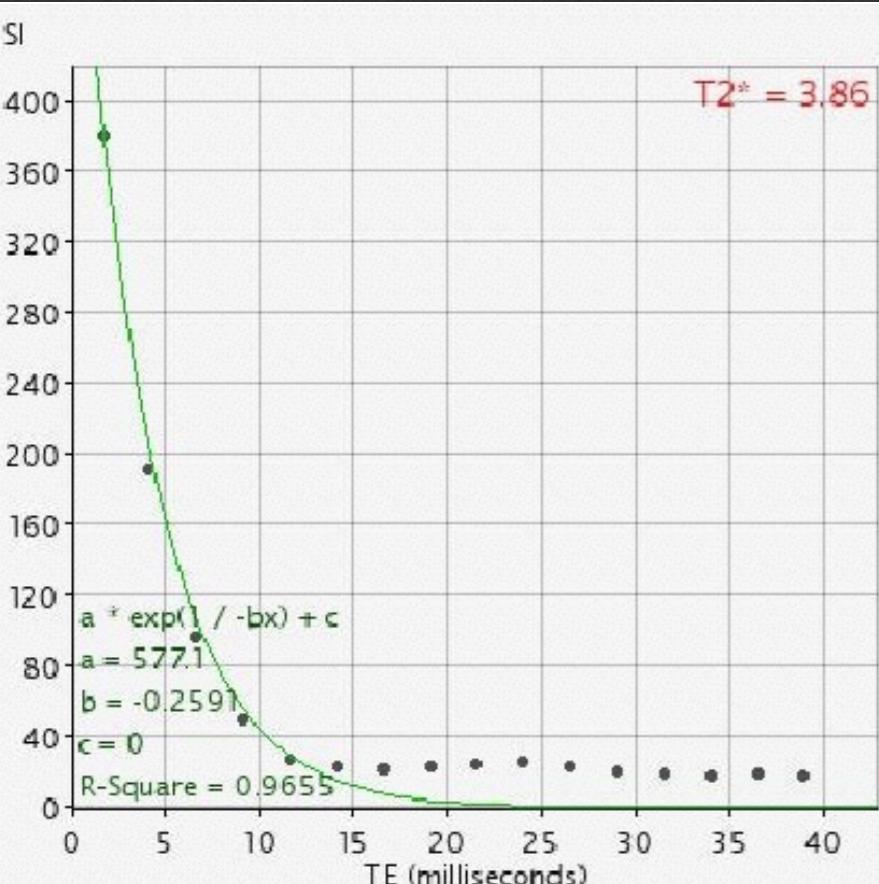
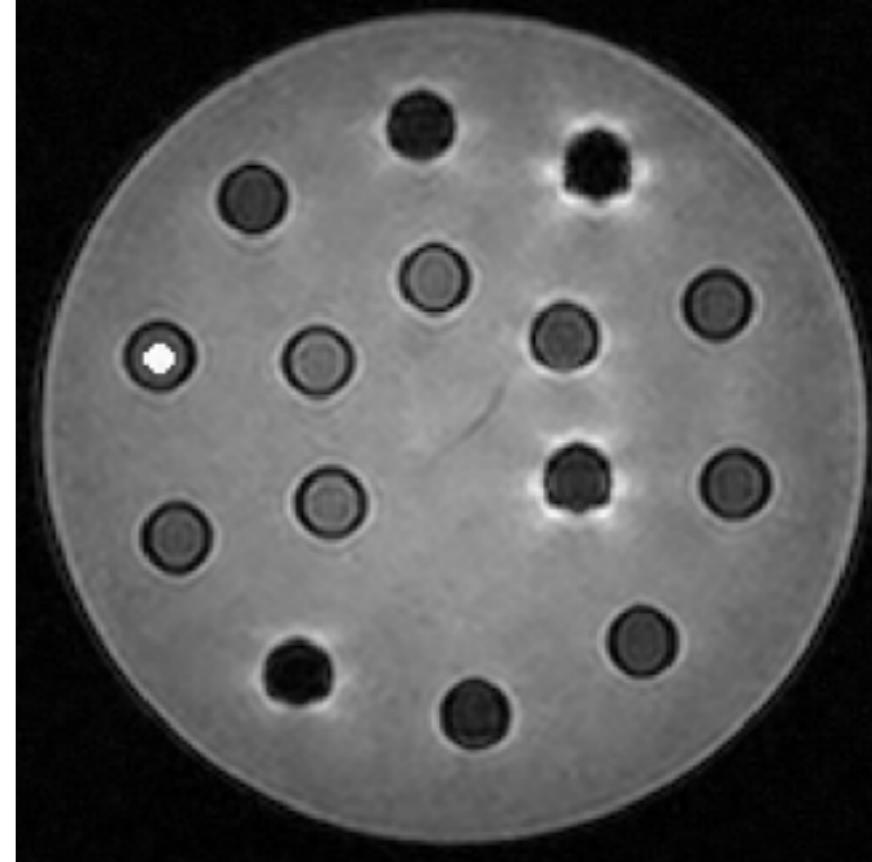
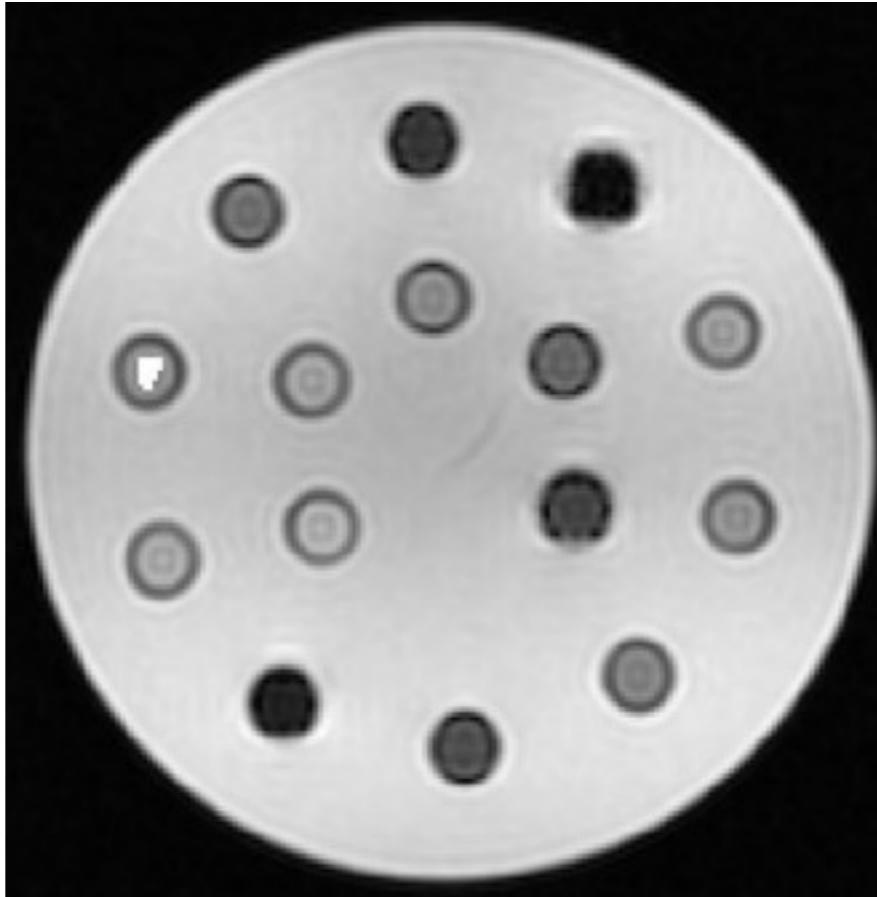
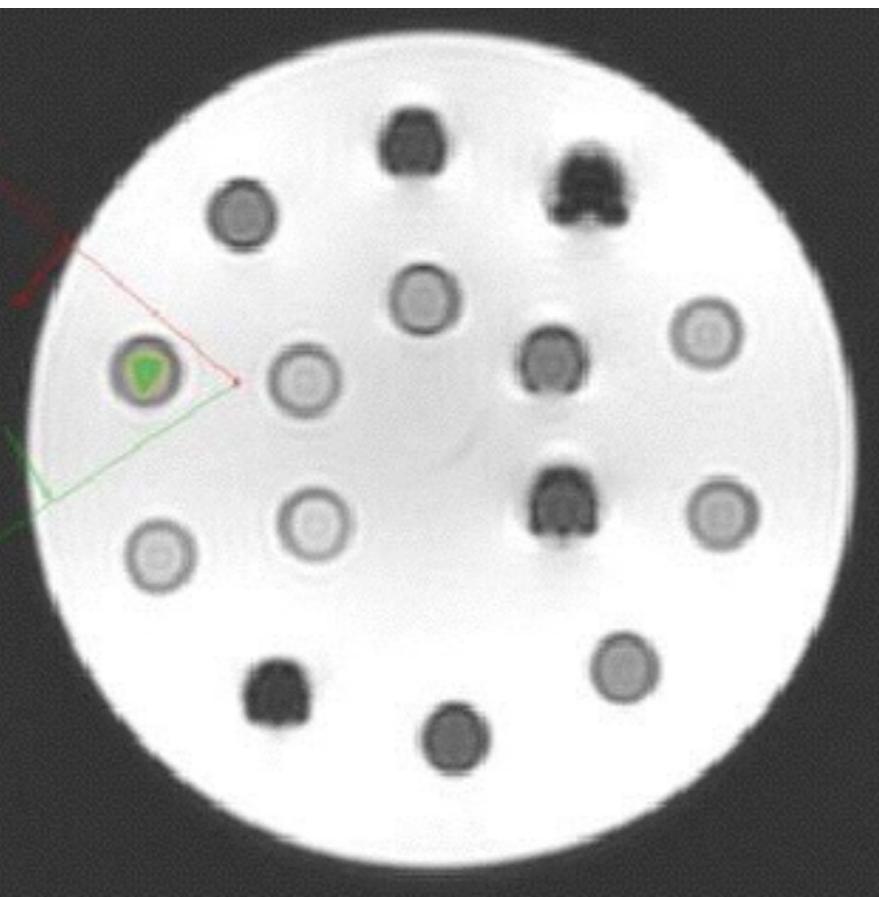


$T2^* = 7.207$
MRIM 1.5T

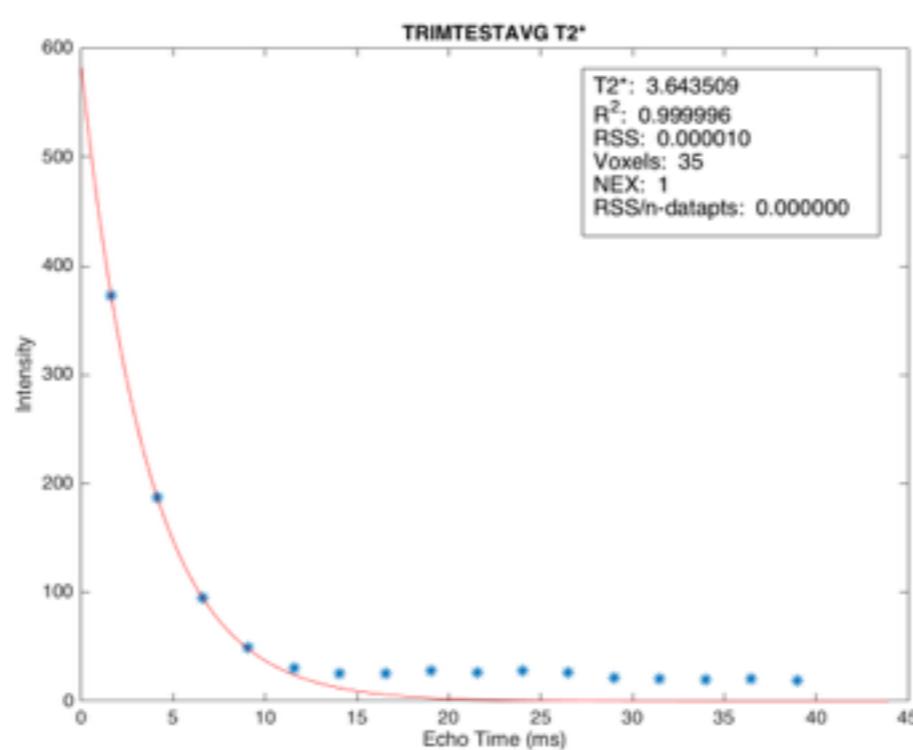


$T2^* = 5.459$
MRIM 3T

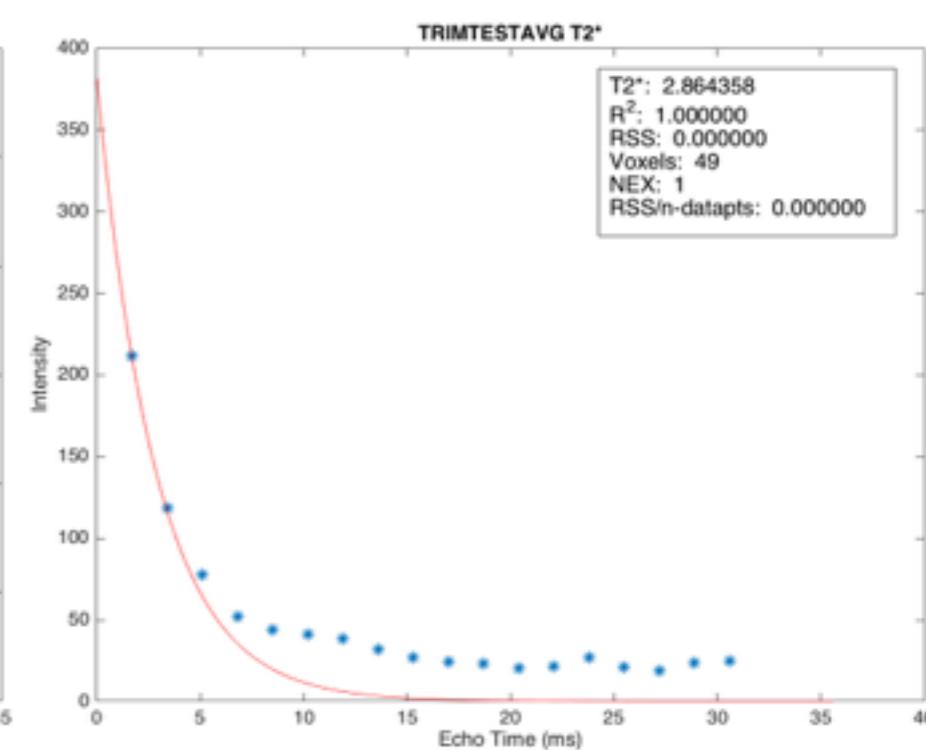
position 1 Conc. 0.505



$T2^* = 3.86$
CMRtools 1.5T

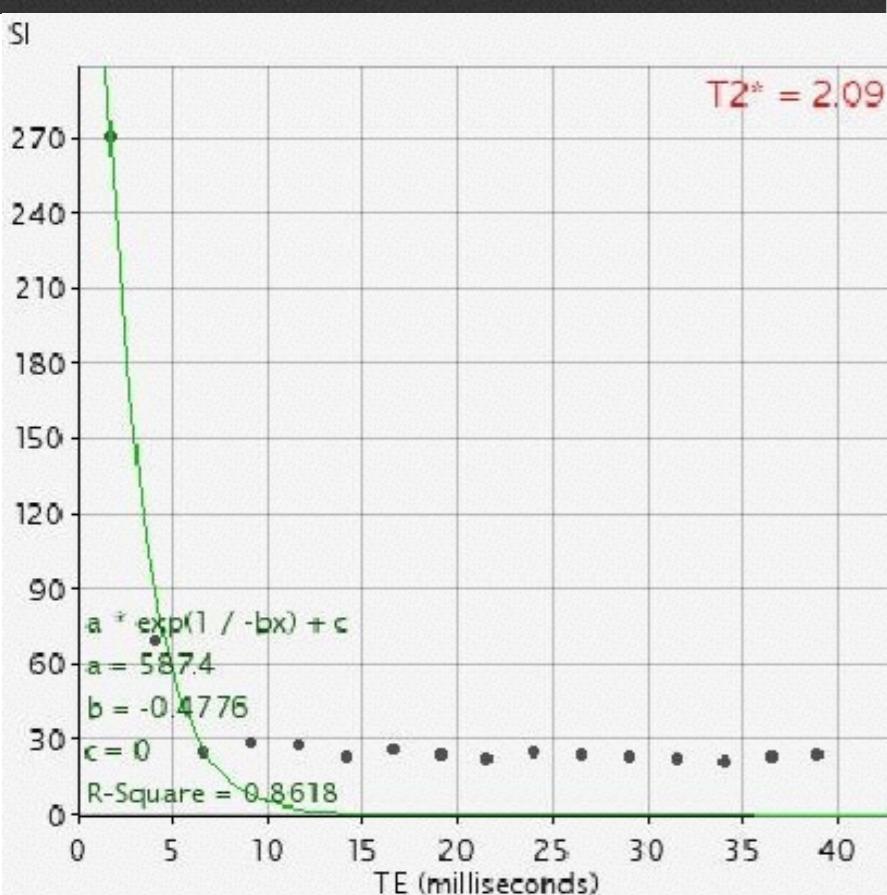
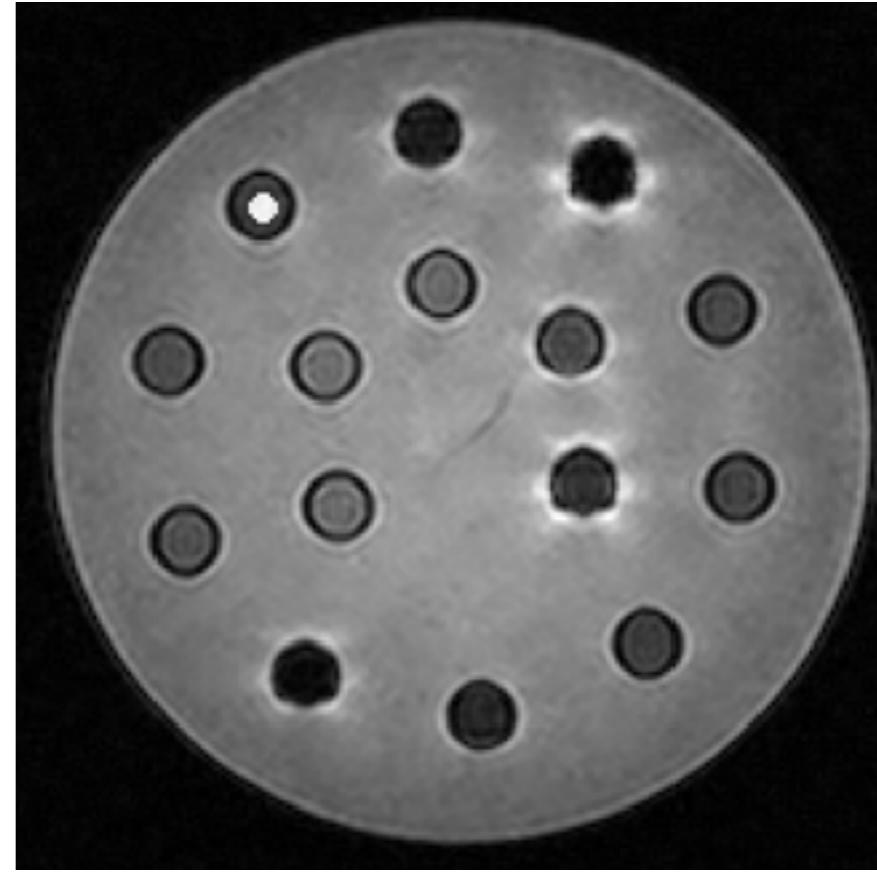
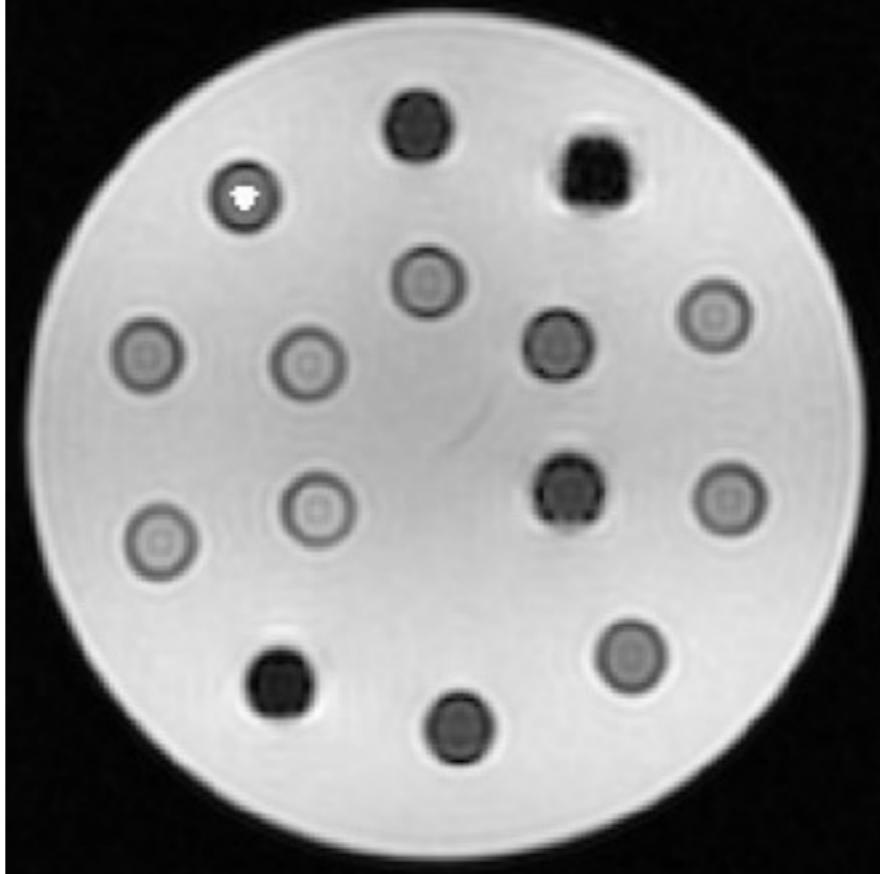
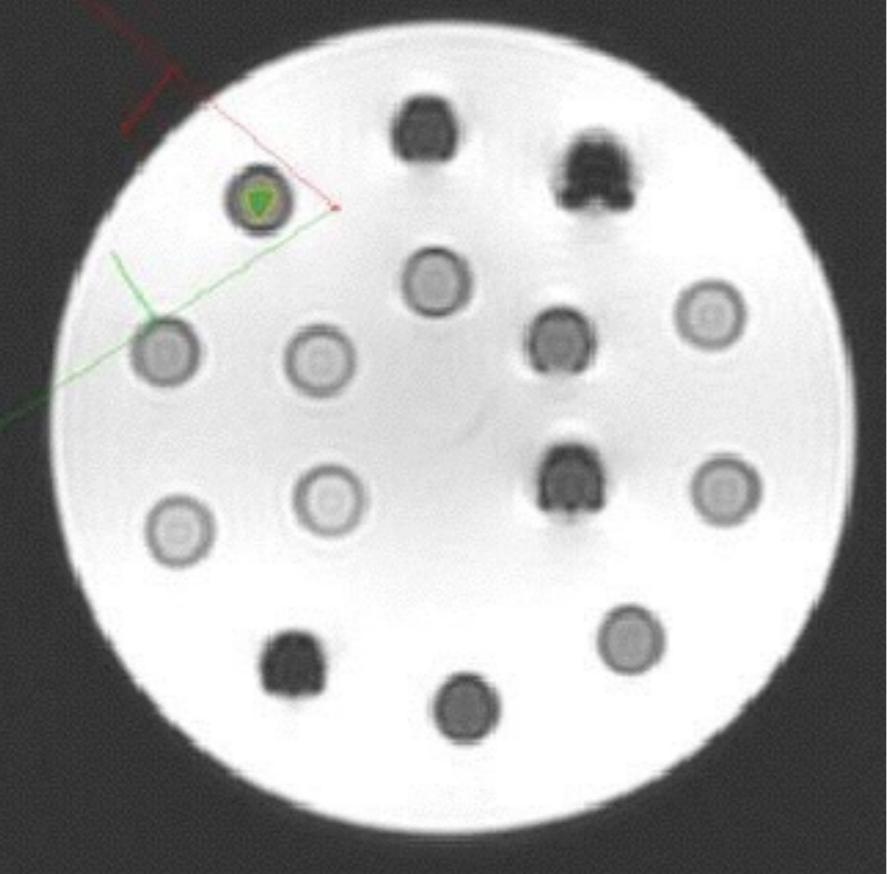


$T2^* = 3.644$
MRIM 1.5T

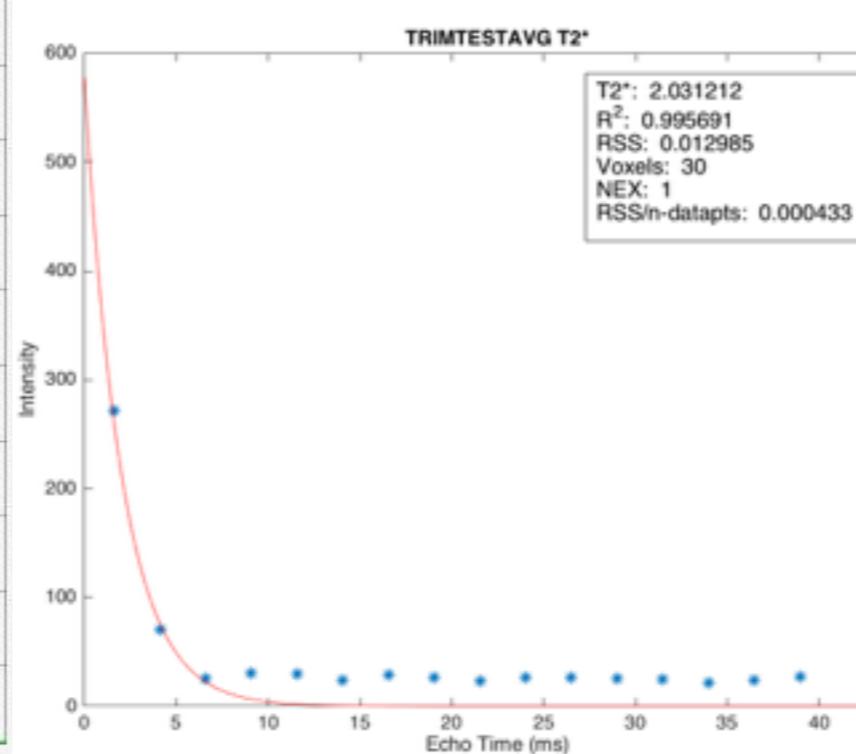


$T2^* = 2.864$
MRIM 3T

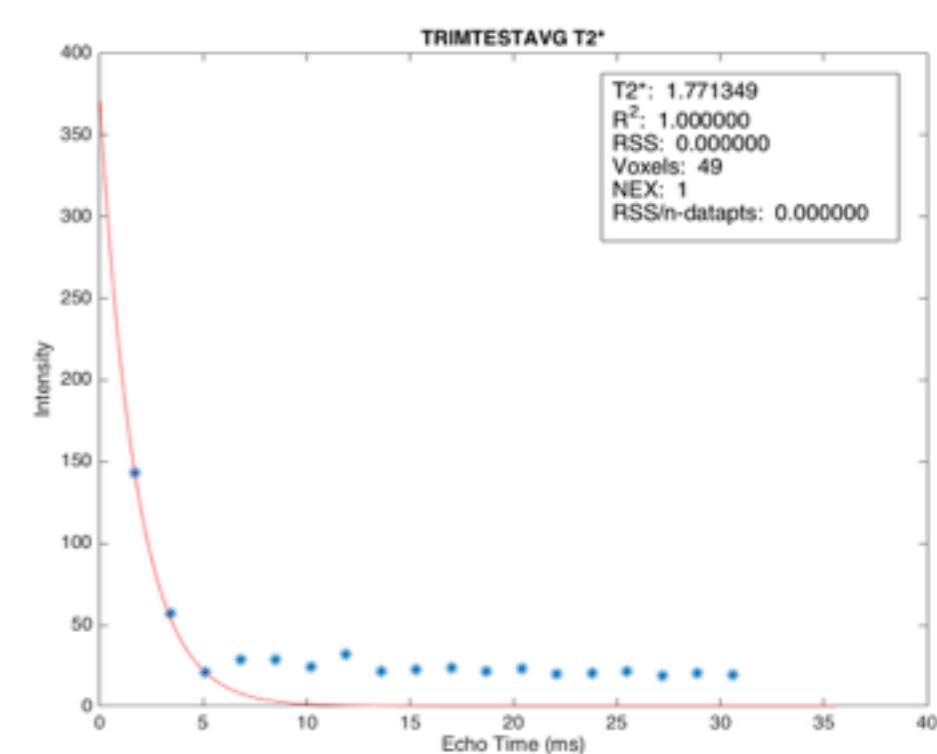
position 2 Conc. 0.789



$T2^* = 2.09$
CMRtools 1.5T

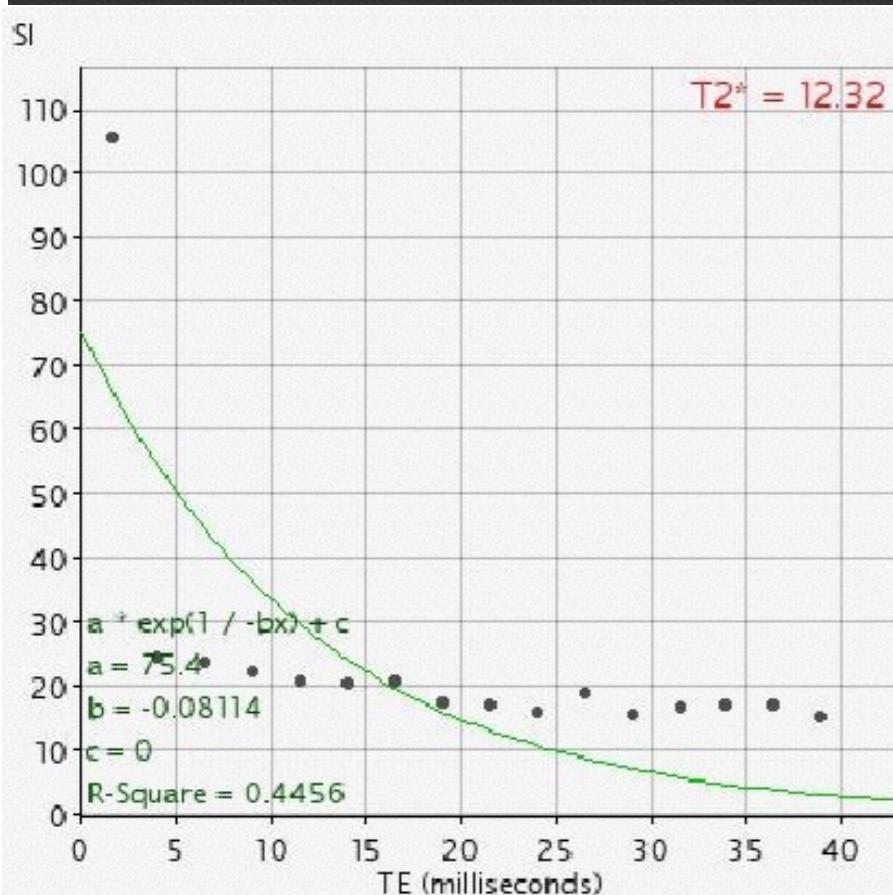
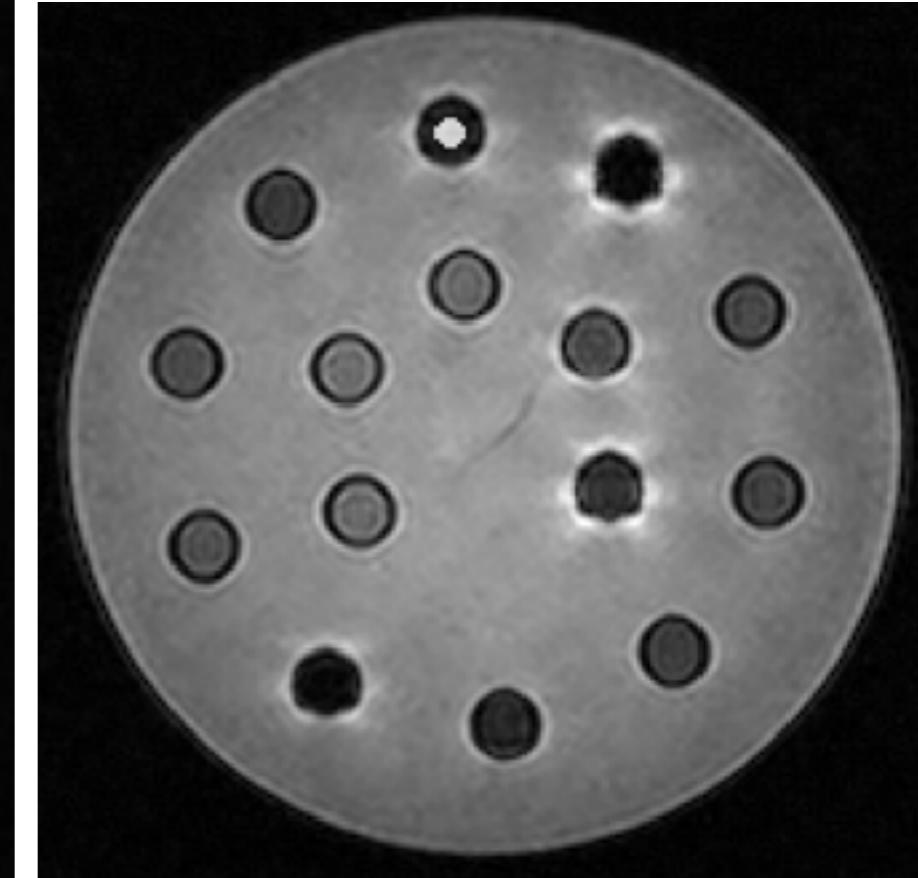
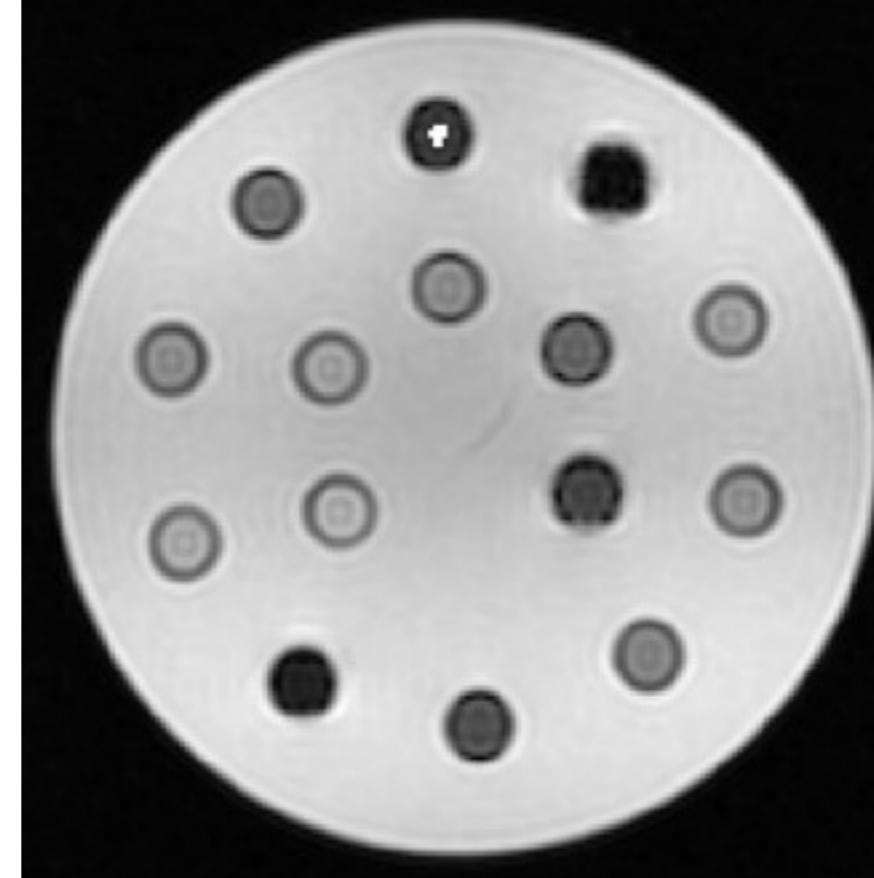
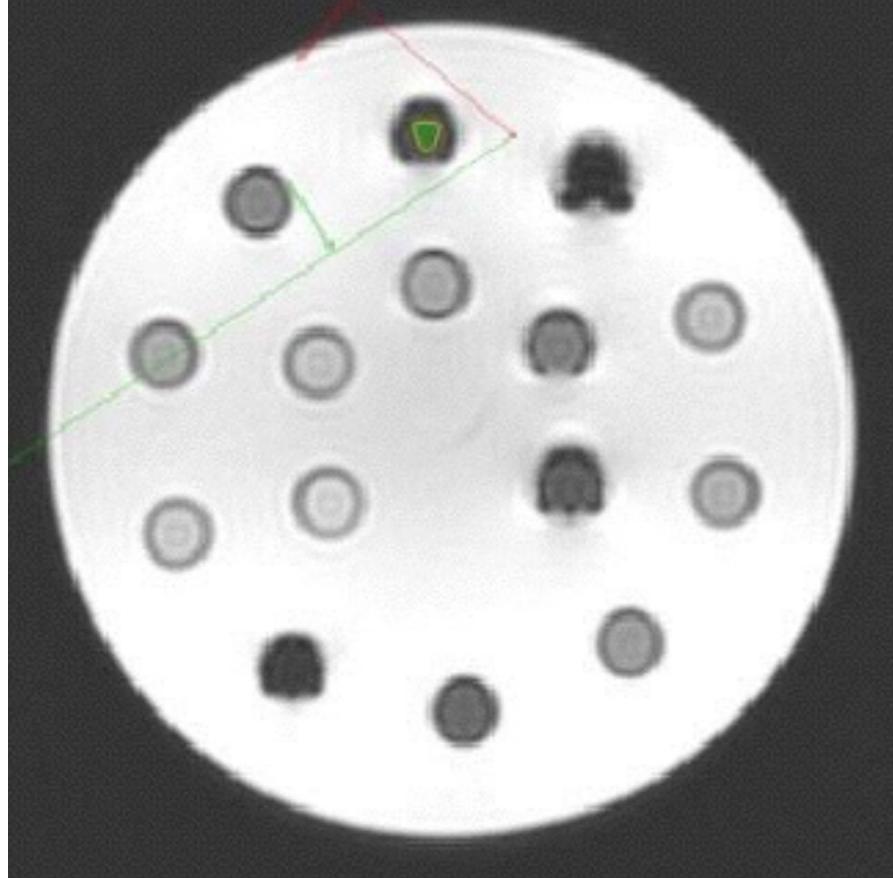


$T2^* = 2.031$
MRIM 1.5T

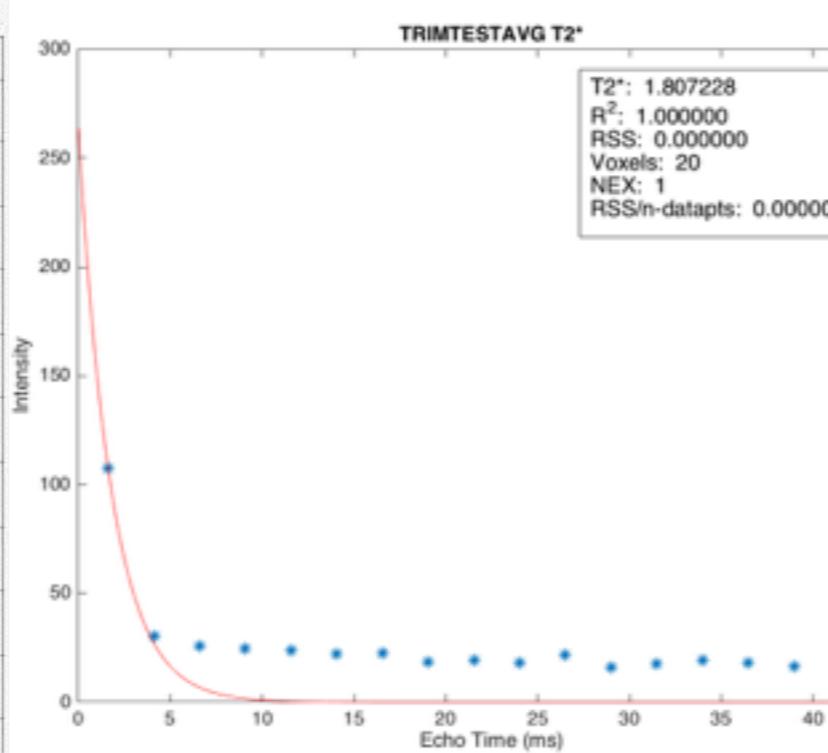


$T2^* = 1.771$
MRIM 3T

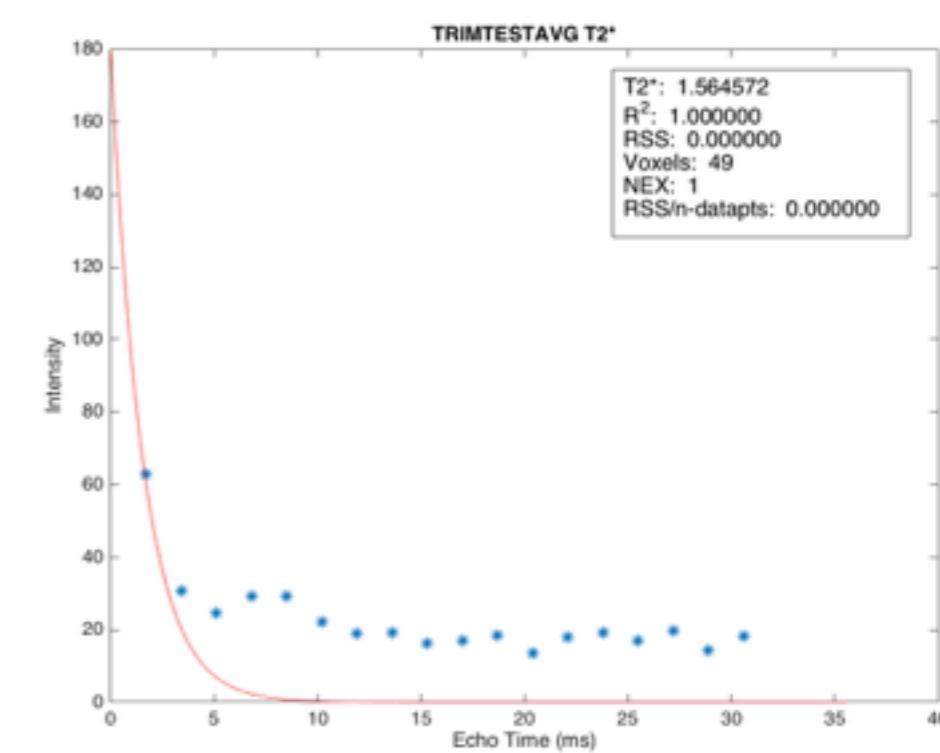
position 3 Conc. 1.413



$T2^* = 12.32$
CMRtools 1.5T

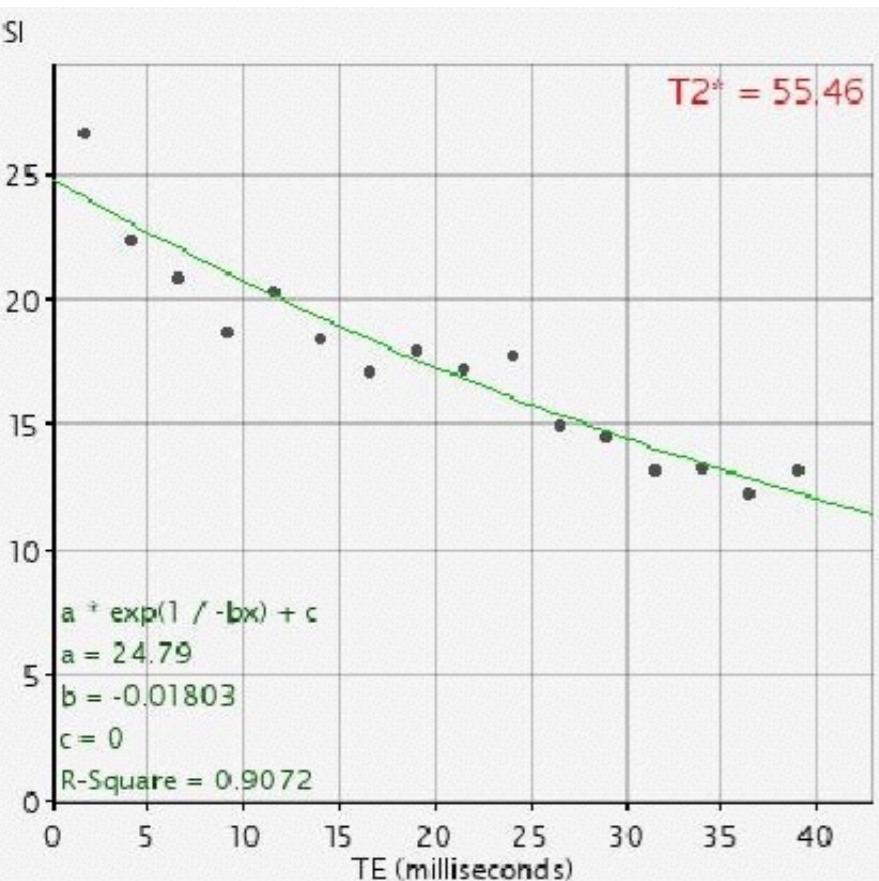
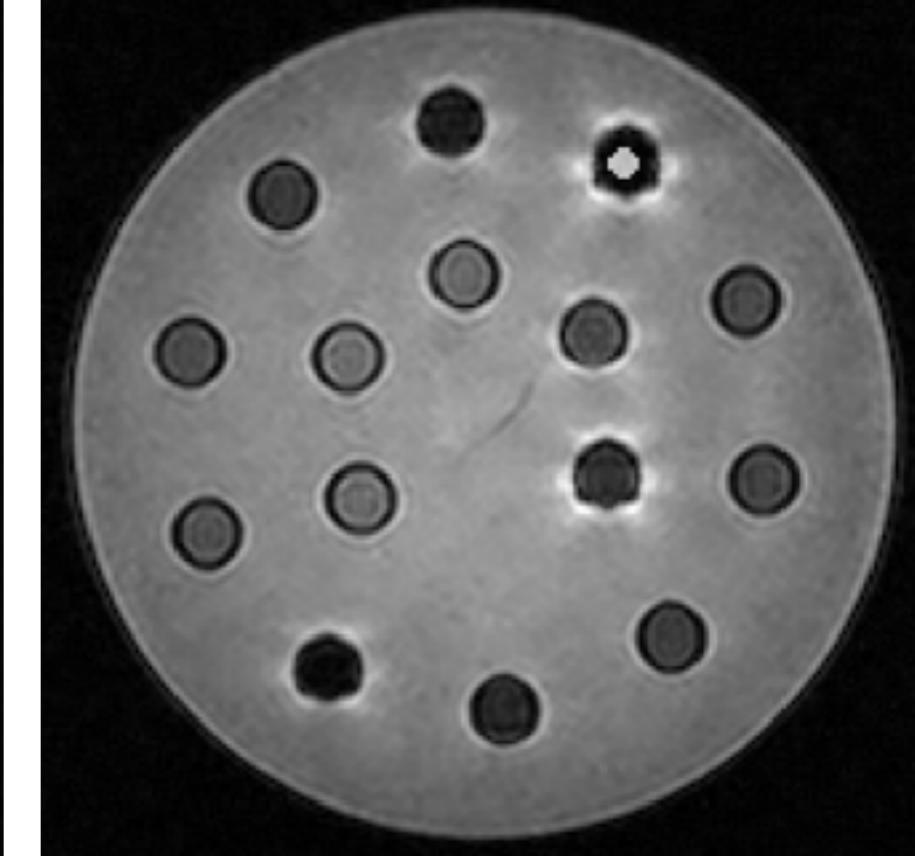
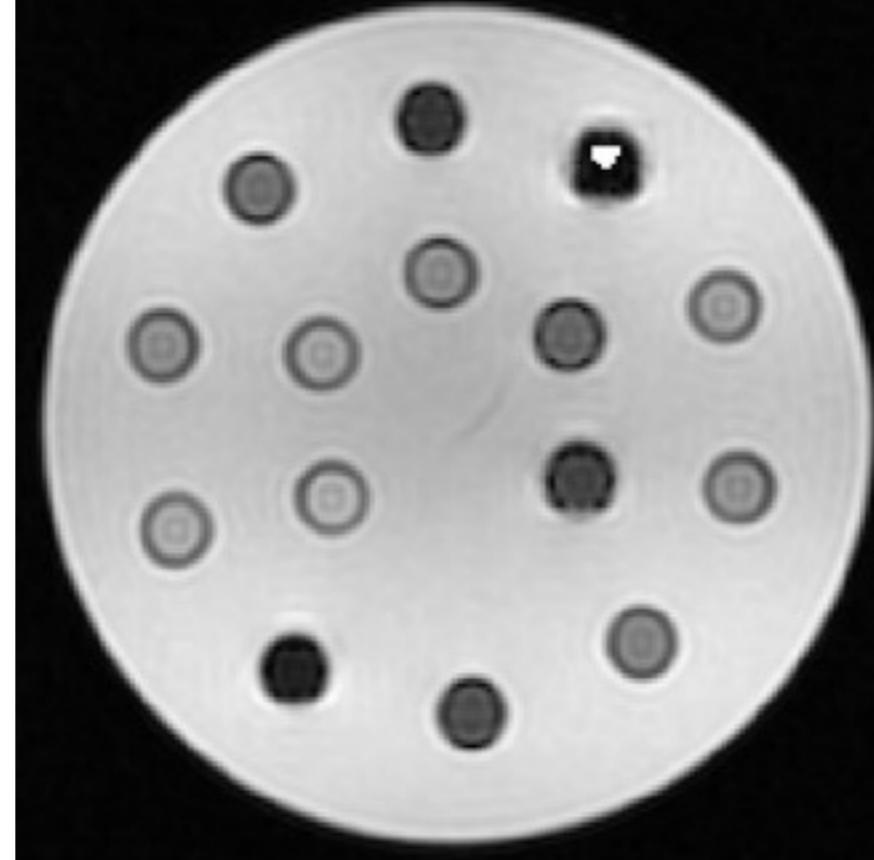
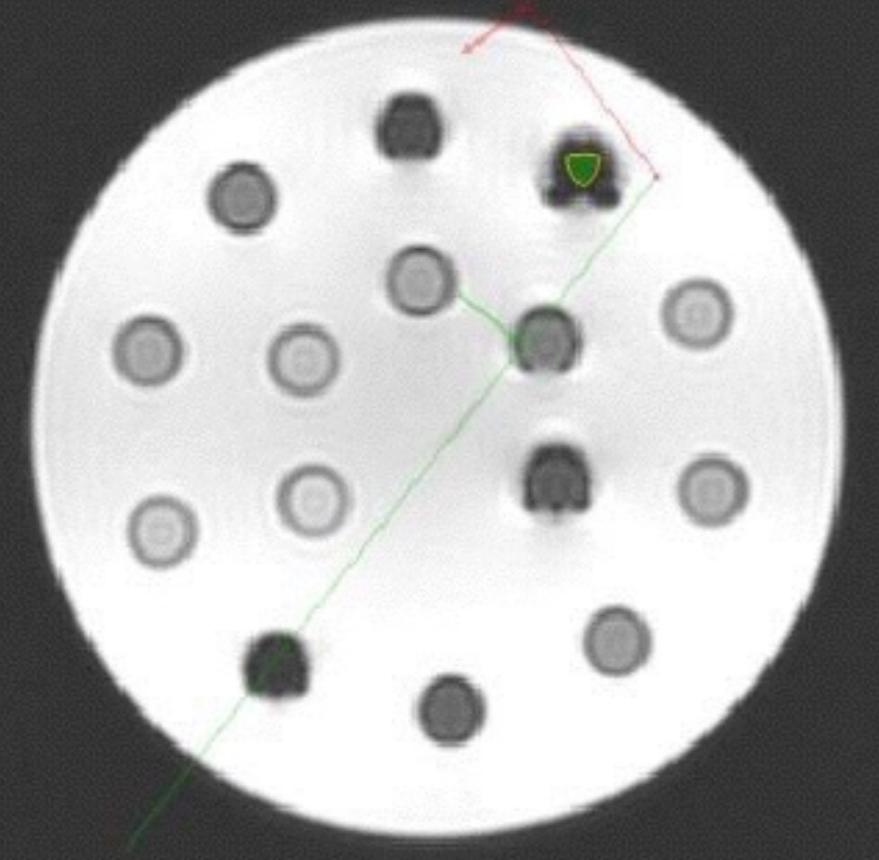


$T2^* = 1.807$
MRIM 1.5T

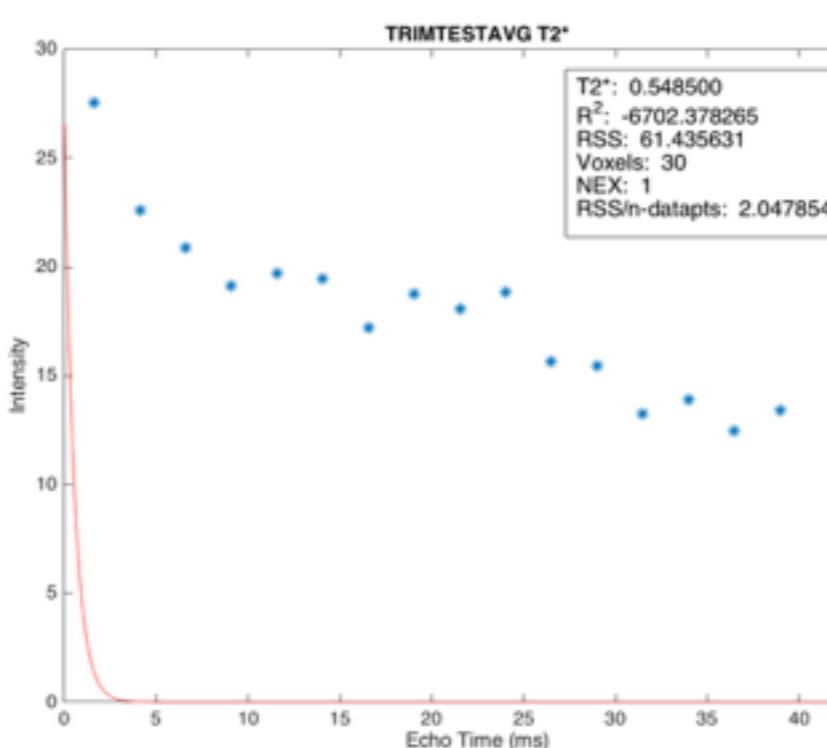


$T2^* = 1.565$
MRIM 3T

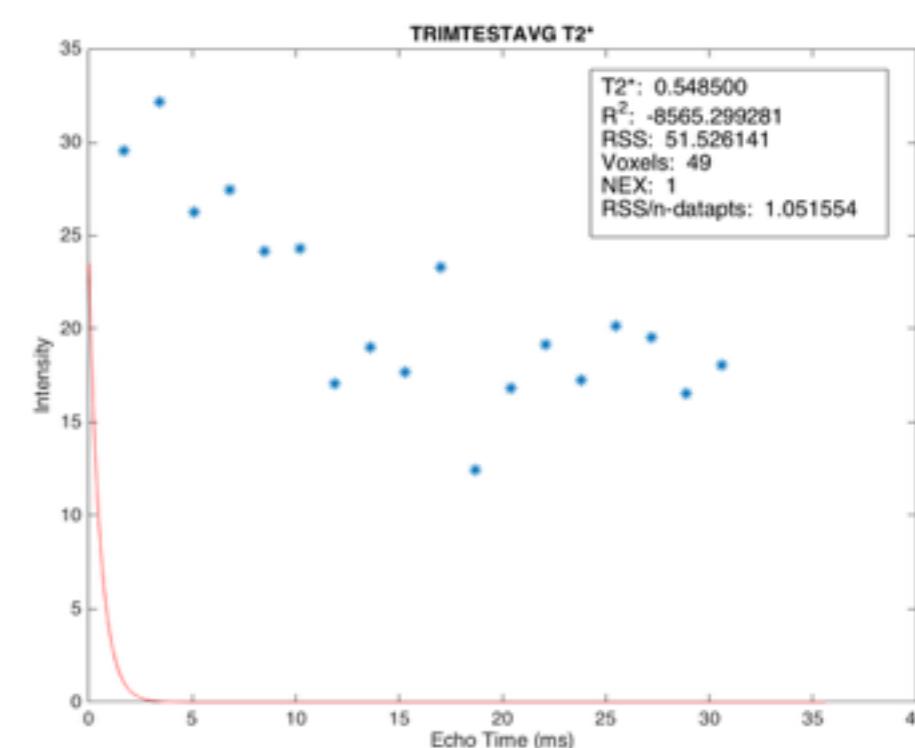
position 4 Conc. 2.470



$T2^* = 55.46$
CMRtools 1.5T

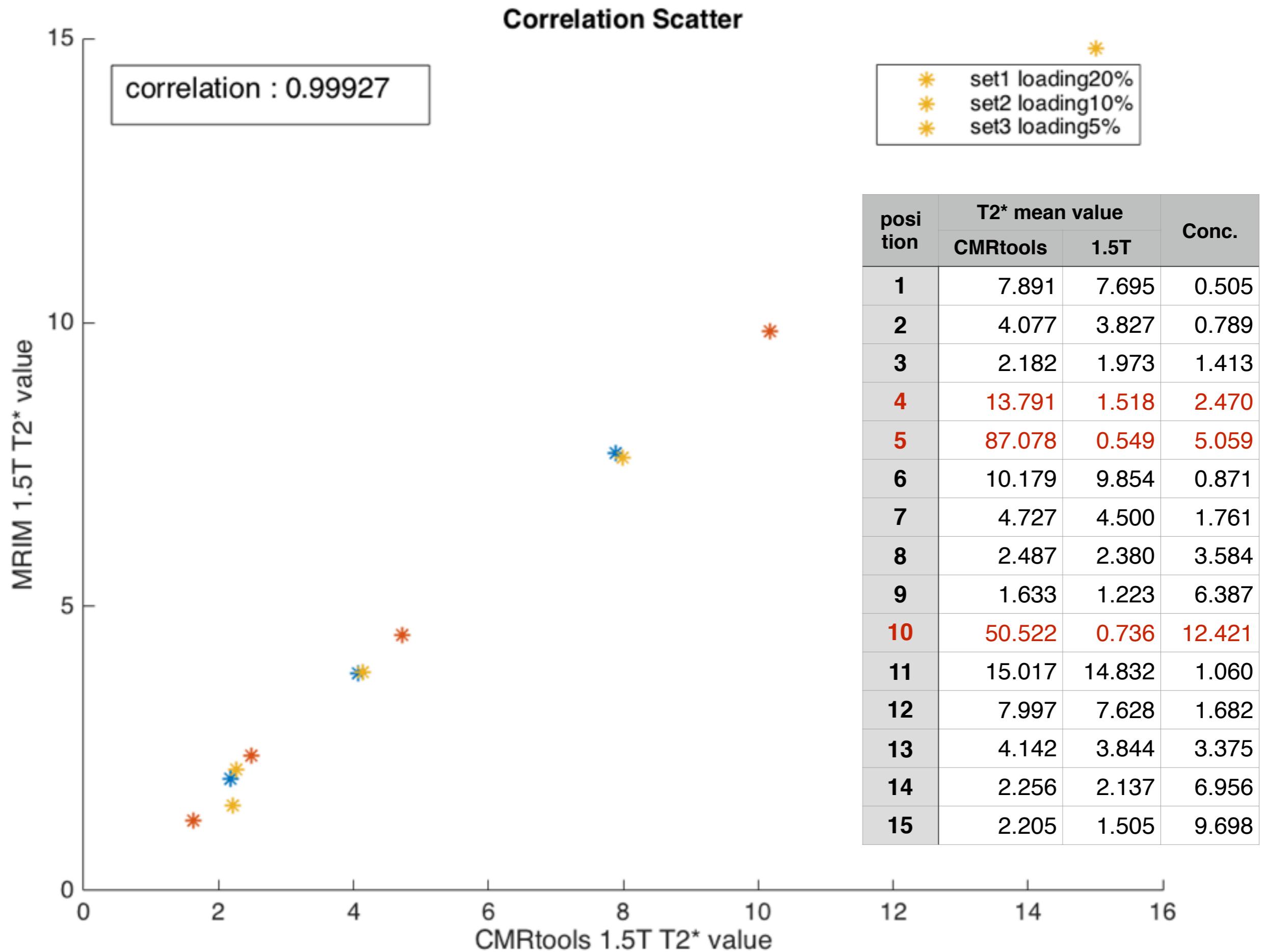


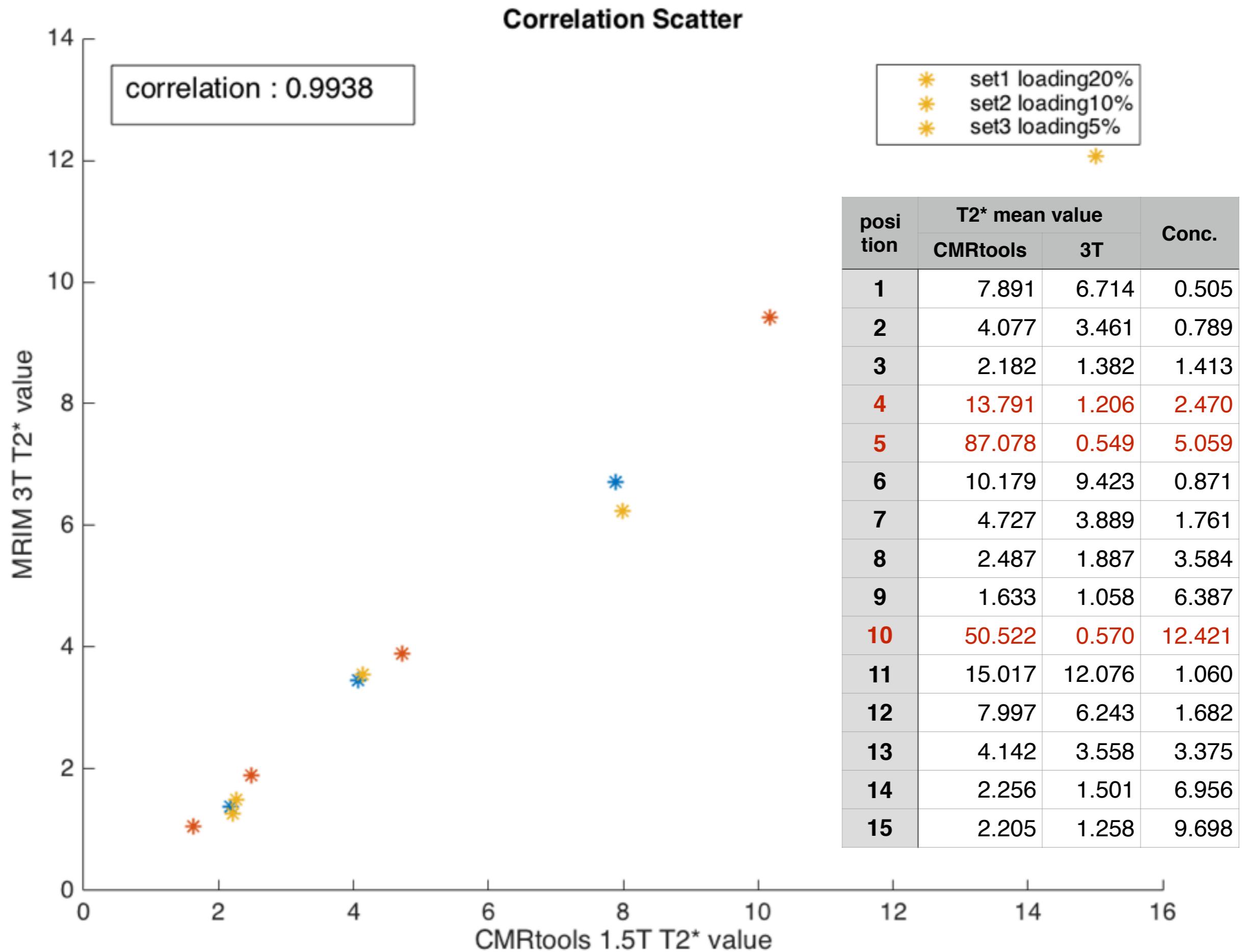
$T2^* = 0.549$
MRIM 1.5T

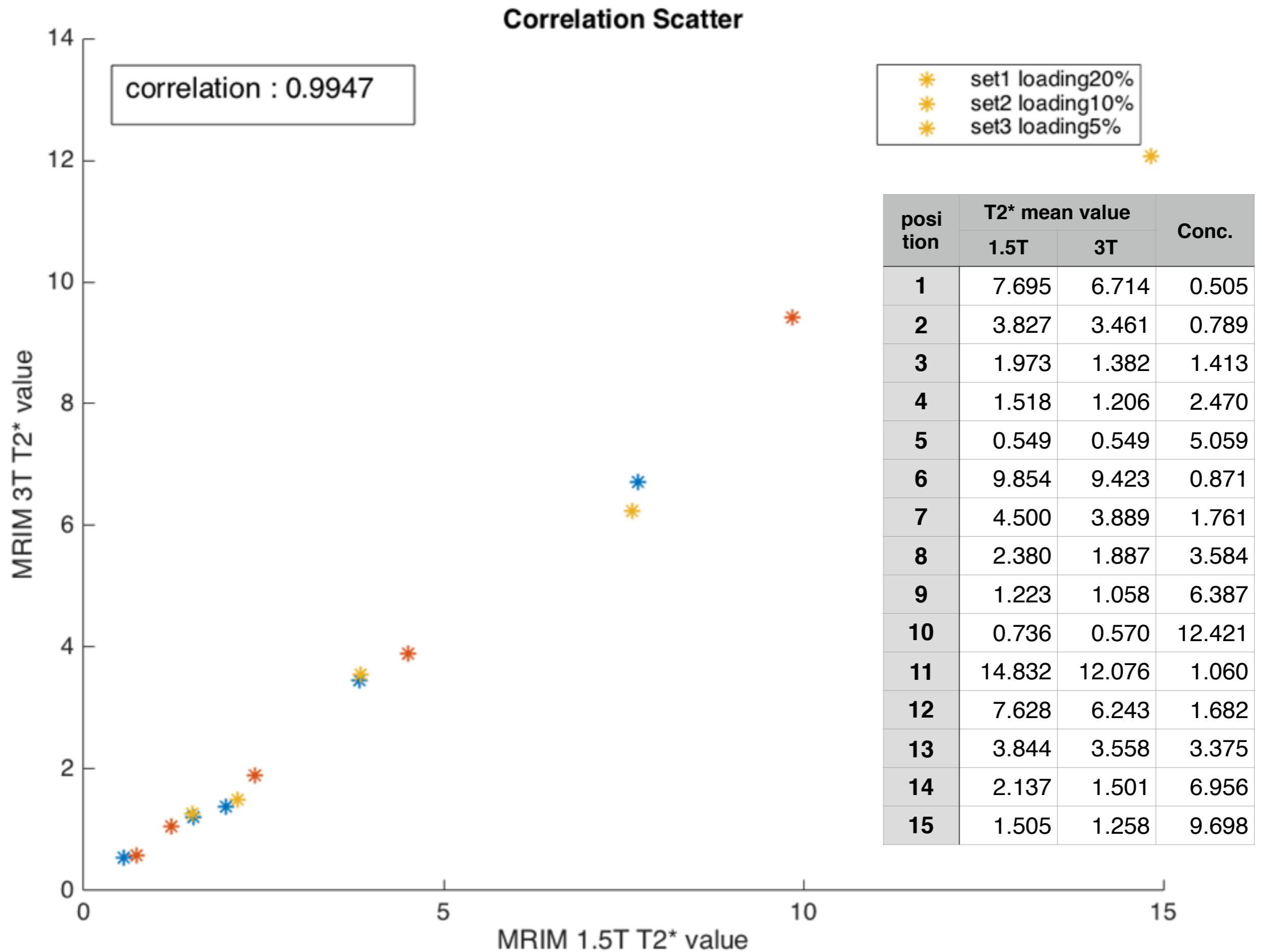


$T2^* = 0.549$
MRIM 3T

position 5 Conc. 5.059



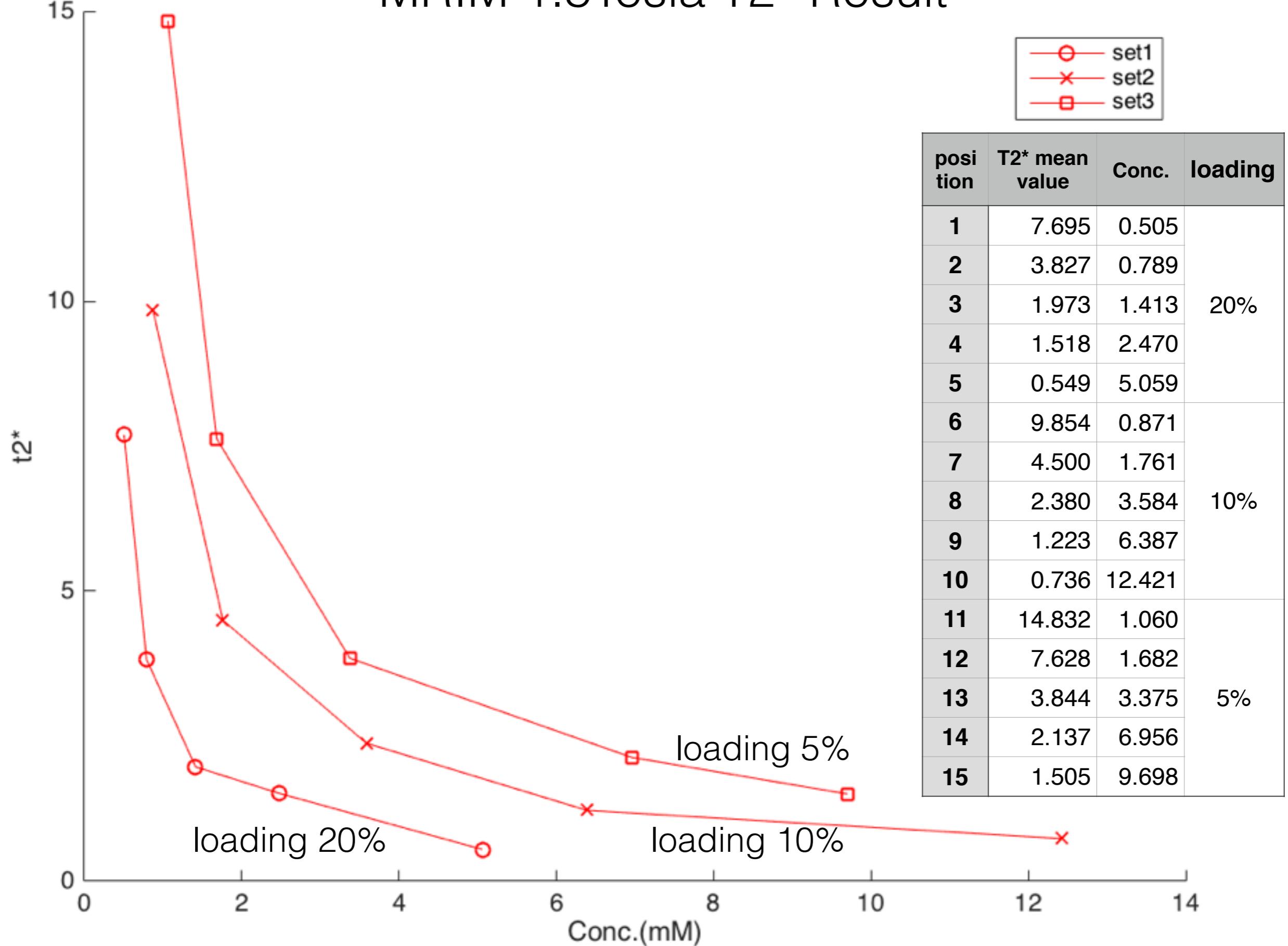




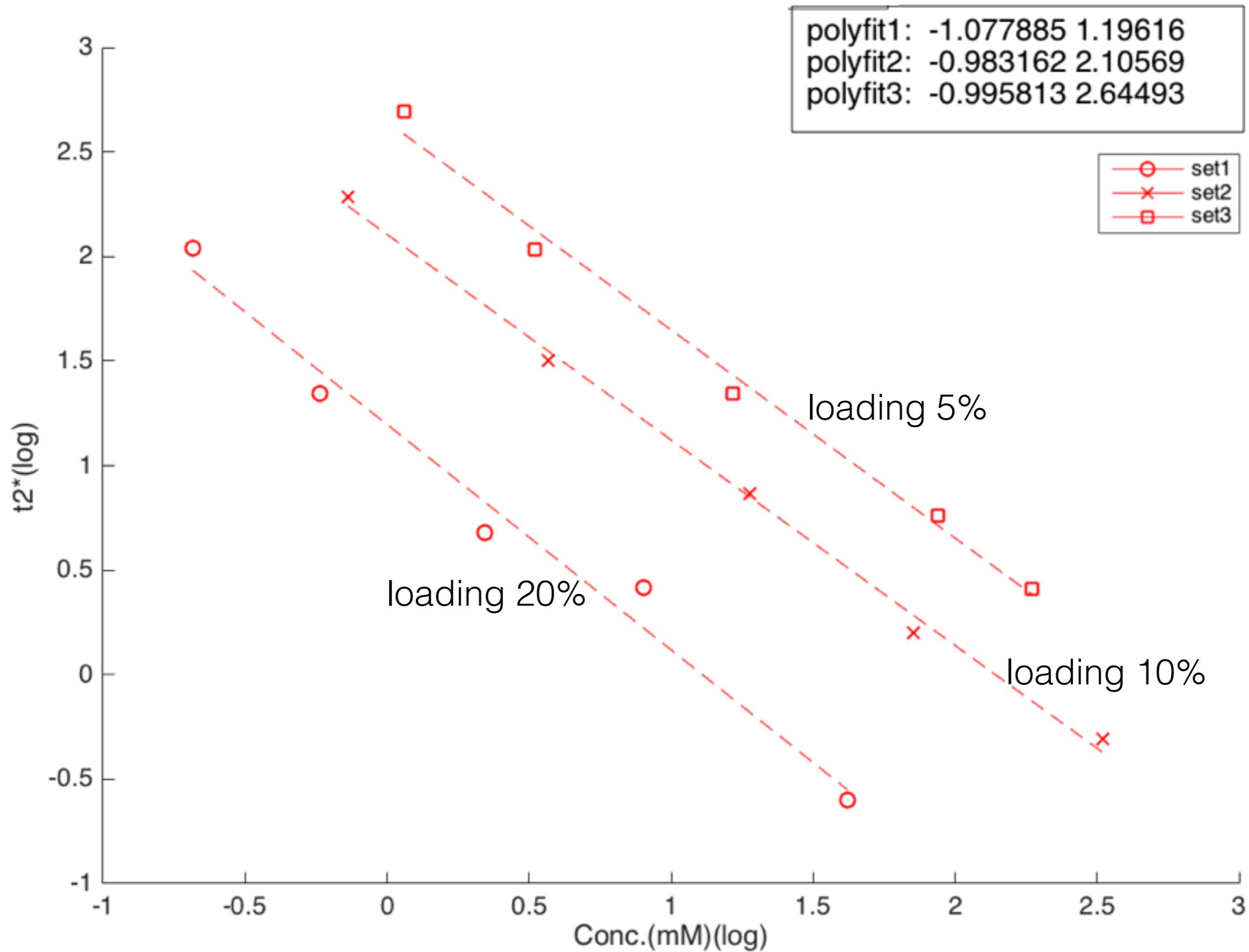
Correlation Between		r	n
CMRtools	MRIM 1.5T	0.9993	12
CMRtools	MRIM 3T	0.9938	12
MRIM 1.5T	MRIM 3T	0.9936	12*
MRIM 1.5T	MRIM 3T	0.9947	15

*ตัด position ตาม CMRtool ที่ให้ผล error

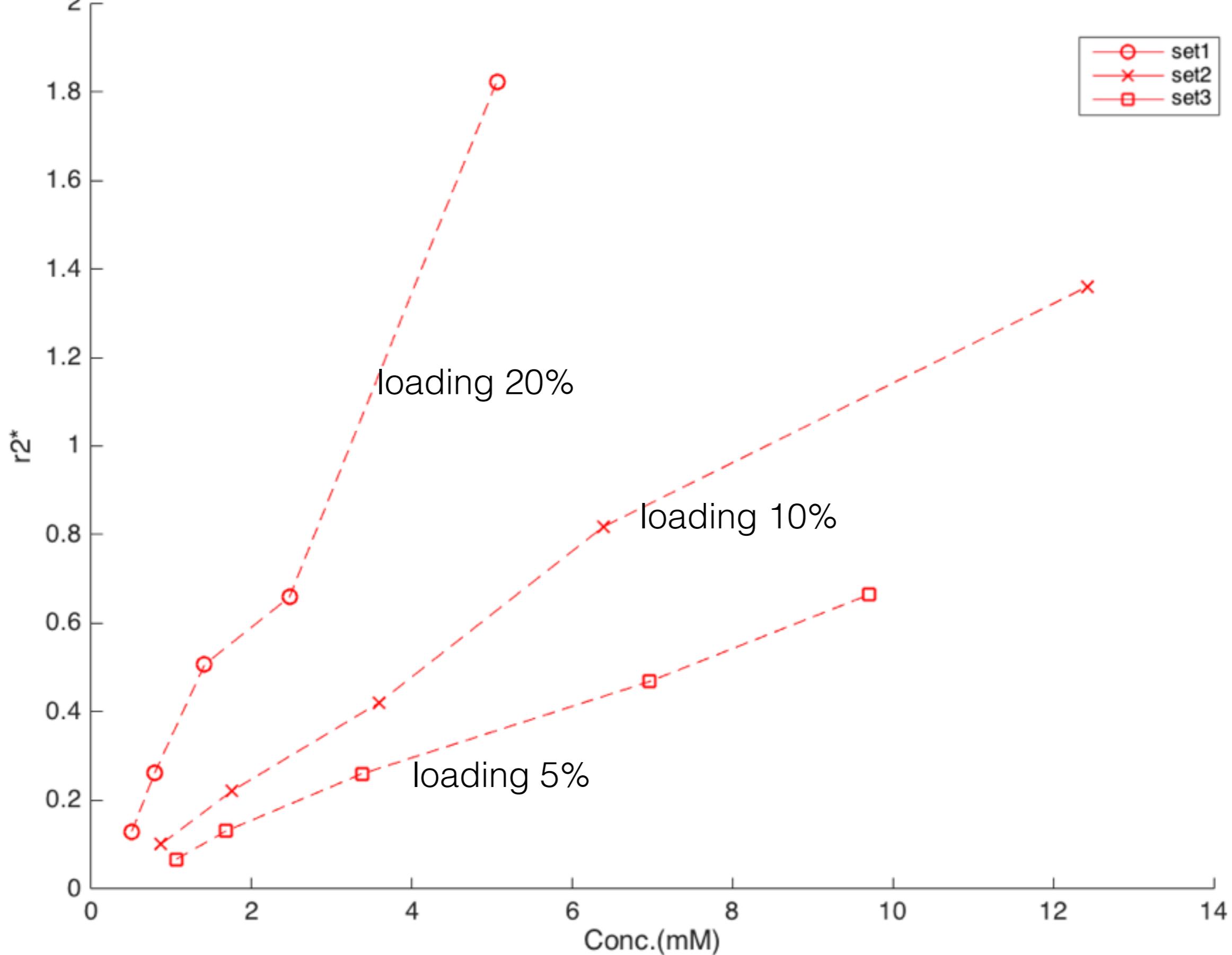
MRIM 1.5Tesla T2* Result



MRIM 1.5Tesla T2* Result



MRIM 1.5Tesla R2* Result



MRIM 1.5Tesla R2* Result

