

mcmc_analysis_drosophila_217_baysian

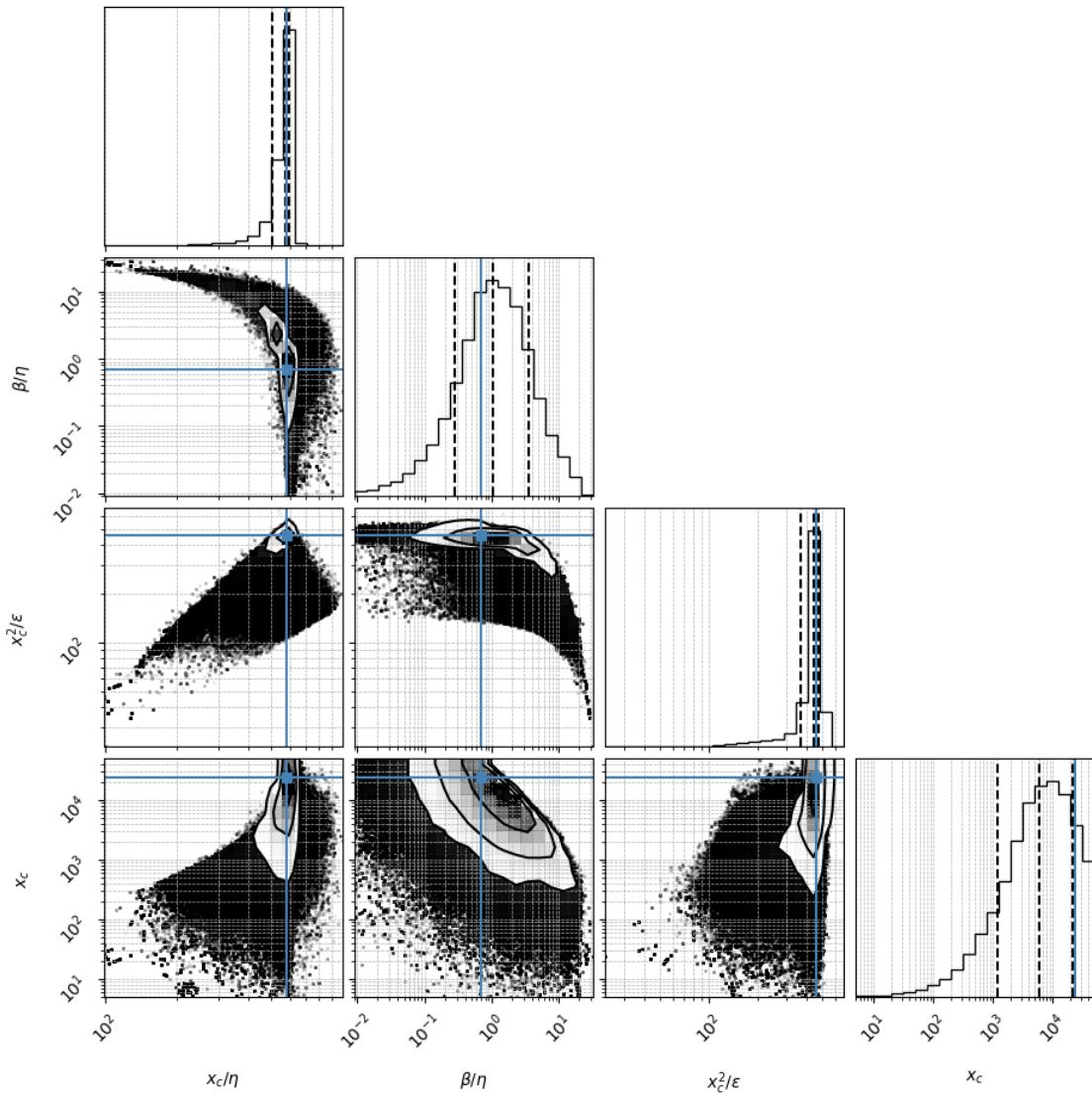
November 24, 2025

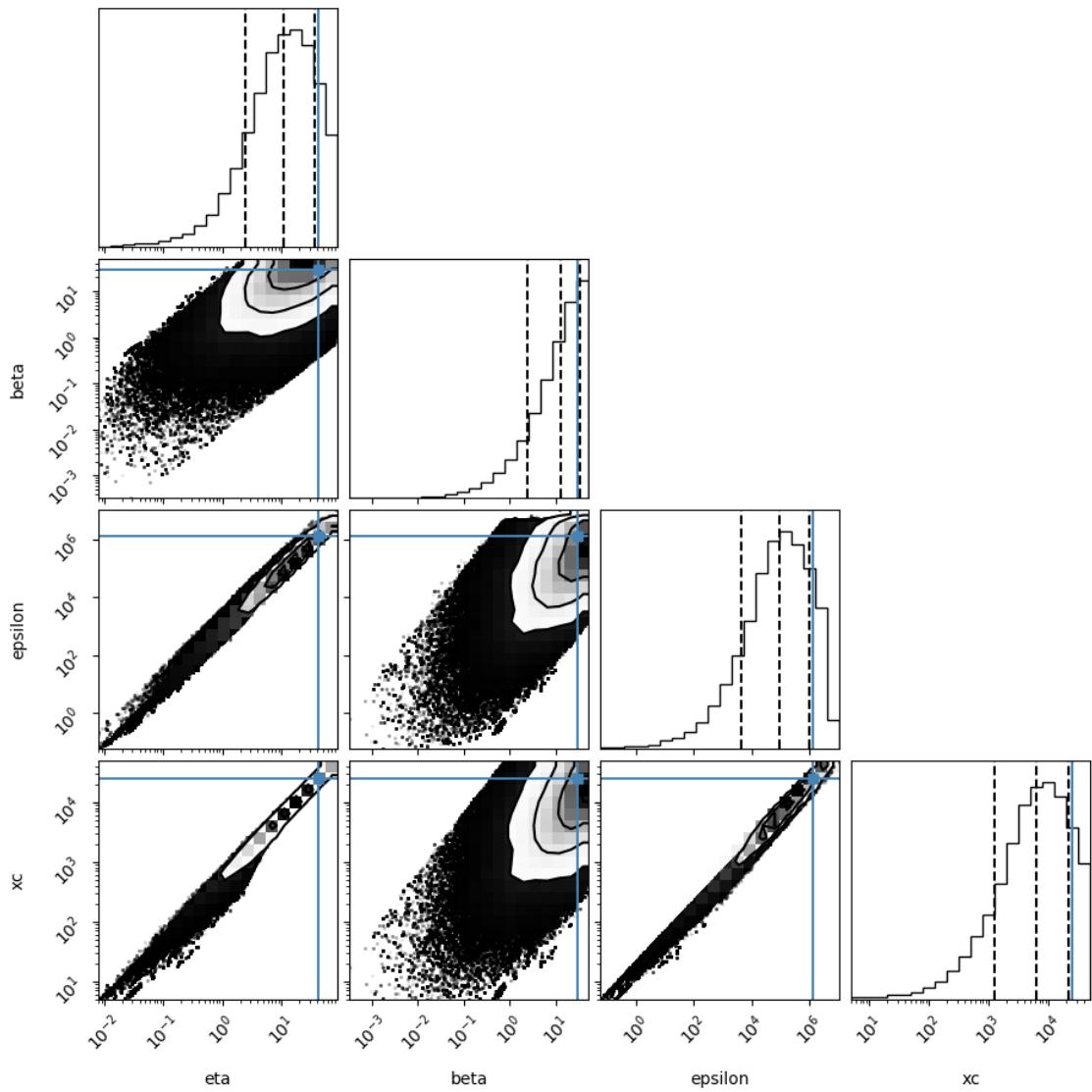
1 # 1. Density corner plot

A sample is 1 parameter set scanned. For the corner plot below, the quantiles (represented by the solid lines) are 0.16,0.5,0.84 of the samples. Dots represent individual samples (outside the line surrounding 0.84 of the samples) The parameter search is performed in the transformed space of x_c/η , β/η , x_c^2/ϵ , x_c but we also show the regular parameters

WARNING:root:Too few points to create valid contours

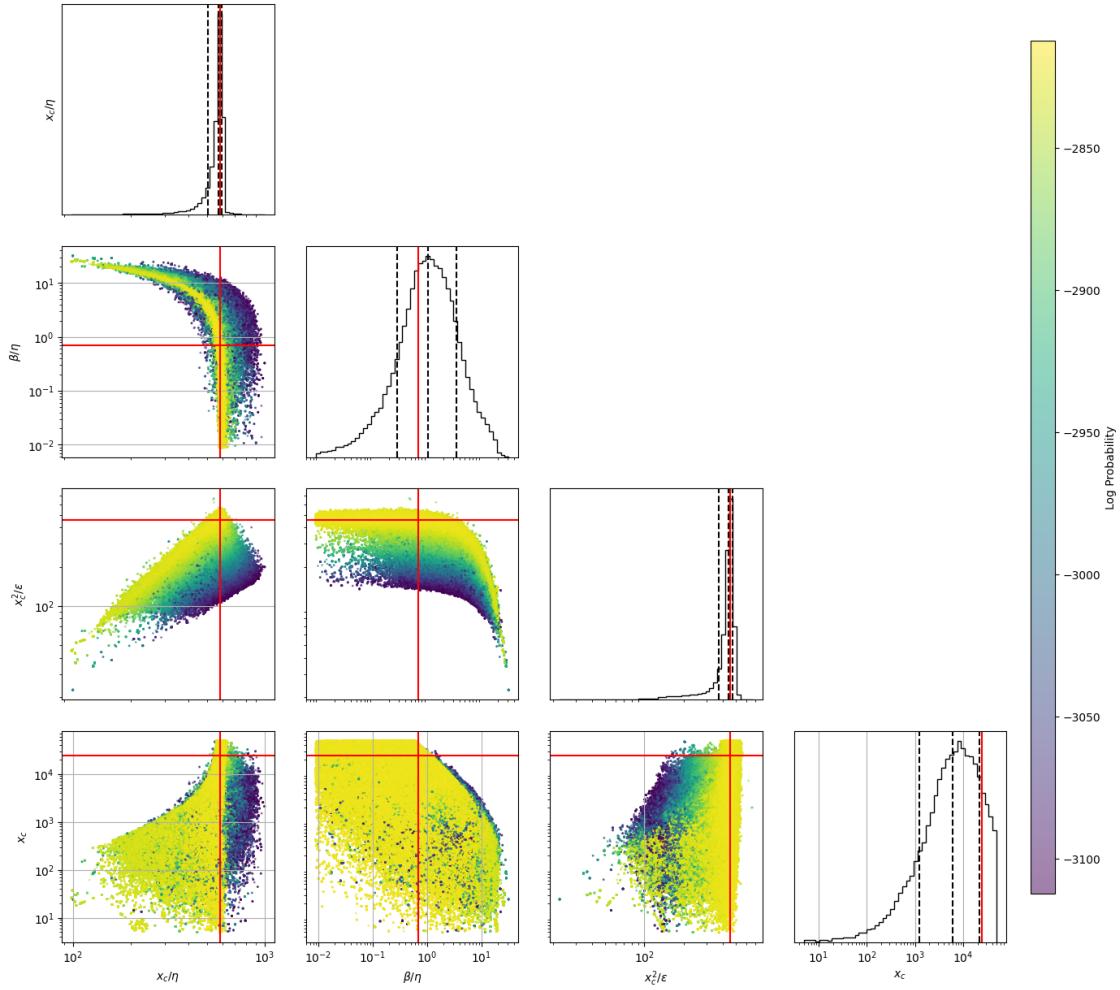
(16,)





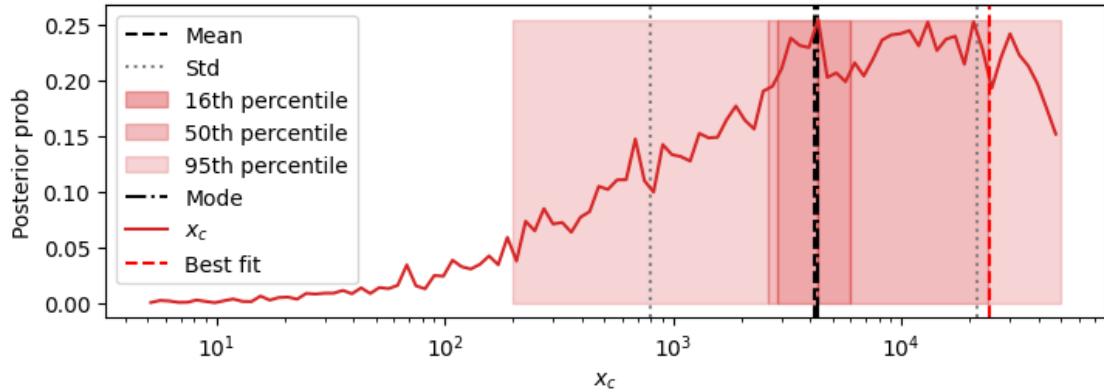
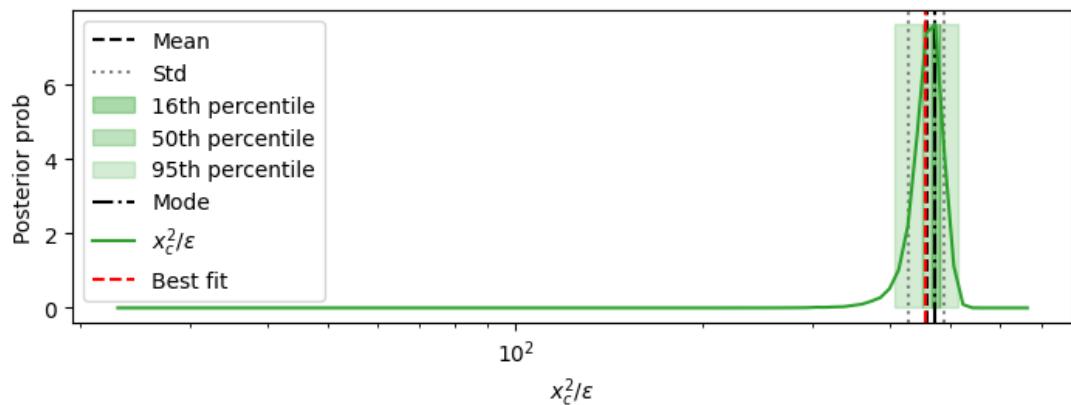
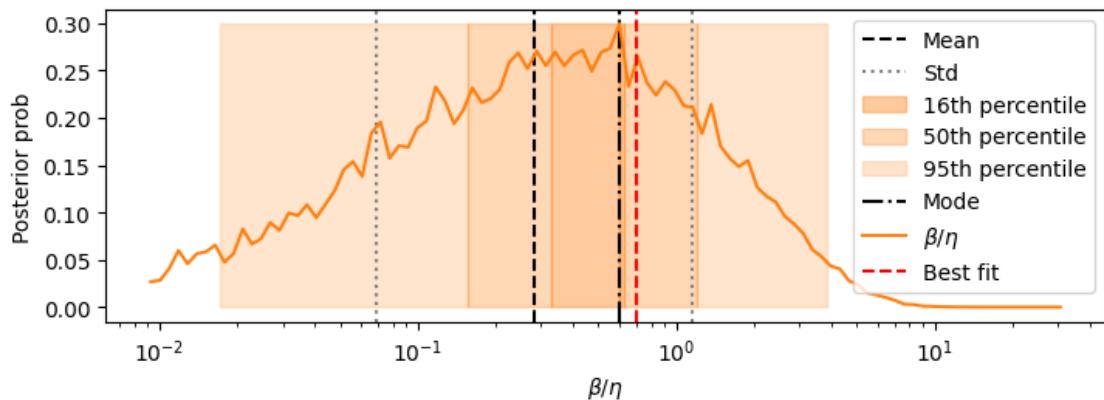
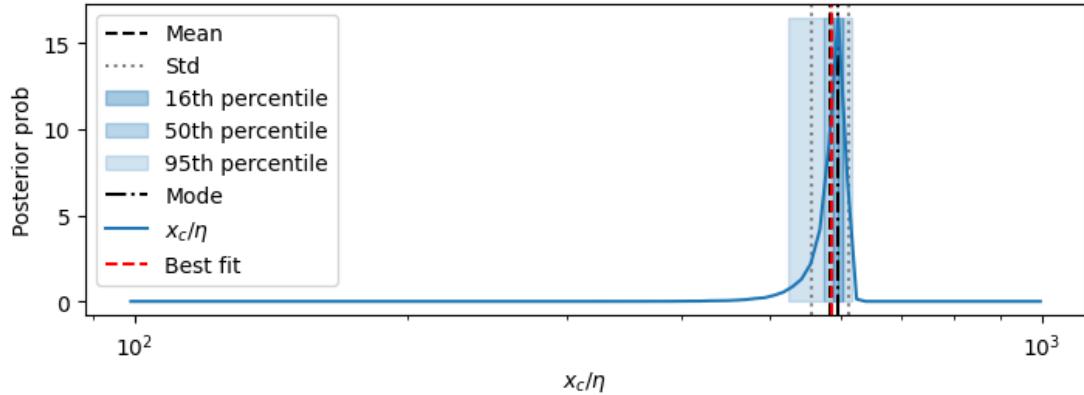
2 2. Heat map corner plot of raw samples

This plot shows all the raw sample points and their lnprobability



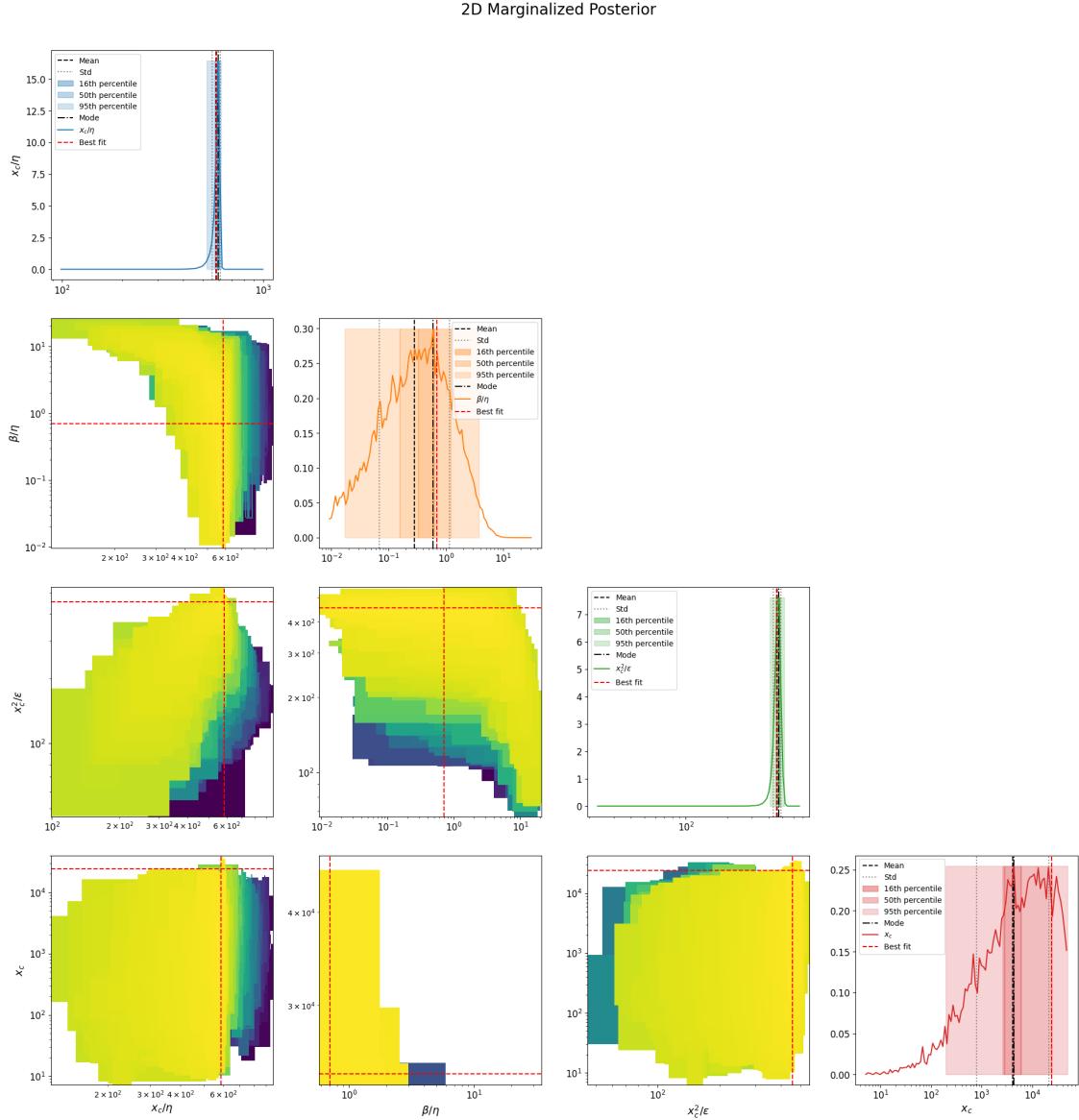
3 3. Posterior distributions of parameters

1d marginalizations of posterior distributions. we use a grid of size nbins=100-150



2D marginalizations of posterior distributions

/Volumes/alon/navehr/SRtools/SRtools/samples_utils.py:474: UserWarning: The input coordinates to pcolormesh are interpreted as cell centers, but are not monotonically increasing or decreasing. This may lead to incorrectly calculated cell edges, in which case, please supply explicit cell edges to pcolormesh.
`ax.pcolormesh(X, Y, Z, **kwargs)`



4 4. Table of results

mode is the marginalized mode, max_likwlihood is the sample with highest likelihood mode_overall is the 4D posterior mode

	mean \
xc/eta	583.353
beta/eta	0.282
xc^2/epsilon	456.734
xc	4147.123
eta	4.351
beta	0.885
epsilon	14053.337
sqrt(xc/eta)	24.142
s= eta^0.5*xc^1.5/epsilon	18.904
beta*xc/epsilon	0.232
eta*xc/epsilon	0.784
Fx=beta^2/eta*xc	0.000147
Dx =beta*epsilon/eta*xc^2	0.000639
Pk=beta*k/epsilon	0.000029
Fk=beta^2/eta*k	0.505
Dk =beta*epsilon/eta*k^2	18714.708
Fk^2/Dk=beta^3/eta*epsilon	0.000014
epsilon/beta^2	15487.967
k/beta	0.446
k^2/epsilon	0.000013
eta/xc	0.00171
beta/xc	0.00047
epsilon/xc^2	0.00219
k/xc	0.000127
best fit no ext hazard_MedianLifetime	31.59
best fit no ext hazard_MaxLifetime	53.83
best fit_MedianLifetime	31.43
best fit_MaxLifetime	55.75
data_MedianLifetime	31.0
data_MaxLifetime	53.0
ML_lnprob	-2812.106954
std \	
xc/eta	[27.483,
28.841]	
beta/eta	[0.213,
0.864]	
xc^2/epsilon	[28.255,
30.118]	
xc	[3345.529,
17308.415]	

```

eta [3.702,
24.819]
beta [0.764,
5.578]
epsilon [13742.587,
621493.619]
sqrt(xc/eta) [0.58,
0.594]
s= eta^0.5*xc^1.5/epsilon [0.907,
0.953]
beta*xc/epsilon [0.174,
0.693]
eta*xc/epsilon [0.0335,
0.035]
Fx=beta^2/eta*xc [0.000137,
0.00222]
Dx =beta*epsilon/eta*xc^2 [0.000483,
0.00198]
Pk=beta*k/epsilon [2.7e-05,
0.000402]
Fk=beta^2/eta*k [0.477,
8.785]
Dk =beta*epsilon/eta*k^2 [18097.503,
548747.366]
Fk^2/Dk=beta^3/eta*epsilon [1.36e-05,
0.00117]
epsilon/beta^2 [14700.27,
289041.55]
k/beta [0.383,
2.728]
k^2/epsilon [1.25e-05,
0.000496]
eta/xc [8.23e-05,
8.65e-05]
beta/xc [0.000361,
0.00155]
epsilon/xc^2 [0.000138,
0.000147]
k/xc [0.000103,
0.000548]
best fit no ext hazard_MedianLifetime
0.51
best fit no ext hazard_MaxLifetime
0
best fit_MedianLifetime
0.51
best fit_MaxLifetime

```

```

0
data_MedianLifetime
0.49
data_MaxLifetime
0
ML_lnprob [-2812.1069542078462,
-2812.1069542078462]

mode \
xc/eta 596.01
beta/eta 0.603
xc^2/epsilon 472.371
xc 4331.645
eta 4.72
beta 0.816
epsilon 390906.247
sqrt(xc/eta) 24.413
s= eta^0.5*xc^1.5/epsilon 18.961
beta*xc/epsilon 0.308
eta*xc/epsilon 0.775
Fx=beta^2/eta*xc 0.00014
Dx =beta*epsilon/eta*xc^2 0.00122
Pk=beta*k/epsilon 0.000009
Fk=beta^2/eta*k 0.21
Dk =beta*epsilon/eta*k^2 204956.033
Fk^2/Dk=beta^3/eta*epsilon 0.000002
epsilon/beta^2 8720.207
k/beta 0.613
k^2/epsilon 0.000001
eta/xc 0.00168
beta/xc 0.000605
epsilon/xc^2 0.00212
k/xc 0.000115
best fit no ext hazard_MedianLifetime 31.59
best fit no ext hazard_MaxLifetime 53.83
best fit_MedianLifetime 31.43
best fit_MaxLifetime 55.75
data_MedianLifetime 31.0
data_MaxLifetime 53.0
ML_lnprob -2812.106954

percentile_16 \
xc/eta [589.107,
602.994]
beta/eta [0.326,
0.628]
xc^2/epsilon [464.411,

```

```

480.466]
xc [2860.548,
5981.515]
eta [3.406,
7.882]
beta [0.477,
1.099]
epsilon [136759.557,
762654.016]
sqrt(xc/eta) [24.272,
24.556]
s= eta^0.5*xc^1.5/epsilon [18.722,
19.204]
beta*xc/epsilon [0.248,
0.455]
eta*xc/epsilon [0.767,
0.783]
Fx=beta^2/eta*xc [0.000128,
0.000458]
Dx =beta*epsilon/eta*xc^2 [0.000821,
0.00162]
Pk=beta*k/epsilon [3.03e-06,
9.79e-06]
Fk=beta^2/eta*k [0.157,
0.611]
Dk =beta*epsilon/eta*k^2 [65950.958,
279230.217]
Fk^2/Dk=beta^3/eta*epsilon [1.48e-06,
1.57e-05]
epsilon/beta^2 [3159.485,
11502.046]
k/beta [0.358,
0.93]
k^2/epsilon [3.96e-07,
1.83e-06]
eta/xc [0.00166,
0.0017]
beta/xc [0.000469,
0.000957]
epsilon/xc^2 [0.00208,
0.00215]
k/xc [8.36e-05,
0.000175]
best fit no ext hazard_MedianLifetime [31.1,
32.1]
best fit no ext hazard_MaxLifetime [53.83,
53.83]

```

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best fit_MedianLifetime [30.94,
31.94]
best fit_MaxLifetime [55.75,
55.75]
data_MedianLifetime [30.57,
31.49]
data_MaxLifetime [53.0,
53.0]
ML_lnprob [-2812.1069542078462,
-2812.1069542078462]

percentile_50 \
xc/eta [575.54,
602.994]
beta/eta [0.156,
1.209]
xc^2/epsilon [448.893,
480.466]
xc [2608.579,
23850.072]
eta [3.406,
50.86]
beta [0.233,
4.608]
epsilon [7798.443,
1636995.578]
sqrt(xc/eta) [23.99,
24.556]
s= eta^0.5*xc^1.5/epsilon [18.251,
19.699]
beta*xc/epsilon [0.124,
0.912]
eta*xc/epsilon [0.767,
0.814]
Fx=beta^2/eta*xc [6.18e-05,
0.00339]
Dx =beta*epsilon/eta*xc^2 [0.000333,
0.00254]
Pk=beta*k/epsilon [2.17e-06,
0.000102]
Fk=beta^2/eta*k [0.0718,
5.204]
Dk =beta*epsilon/eta*k^2 [5556.578,
636942.612]
Fk^2/Dk=beta^3/eta*epsilon [1.48e-06,
0.00136]
epsilon/beta^2 [867.876,

```

```

72850.164]
k/beta [0.0673,
1.331]
k^2/epsilon [2.23e-07,
3.2e-05]
eta/xc [0.00166,
0.00174]
beta/xc [0.00023,
0.00195]
epsilon/xc^2 [0.00208,
0.00223]
k/xc [2.1e-05,
0.00021]
best fit no ext hazard_MedianLifetime [31.1,
32.1]
best fit no ext hazard_MaxLifetime [53.83,
53.83]
best fit_MedianLifetime [30.94,
31.94]
best fit_MaxLifetime [55.75,
55.75]
data_MedianLifetime [30.57,
31.49]
data_MaxLifetime [53.0,
53.0]
ML_lnprob [-2812.1069542078462,
-2812.1069542078462]

percentile_95 \
xc/eta [524.325,
617.208]
beta/eta [0.0171,
3.803]
xc^2/epsilon [405.382,
514.259]
xc [197.305,
49871.4]
eta [0.119,
88.979]
beta [0.0271,
50.196]
epsilon [9.76,
6230995.089]
sqrt(xc/eta) [22.898,
24.844]
s= eta^0.5*xc^1.5/epsilon [16.909,
20.728]

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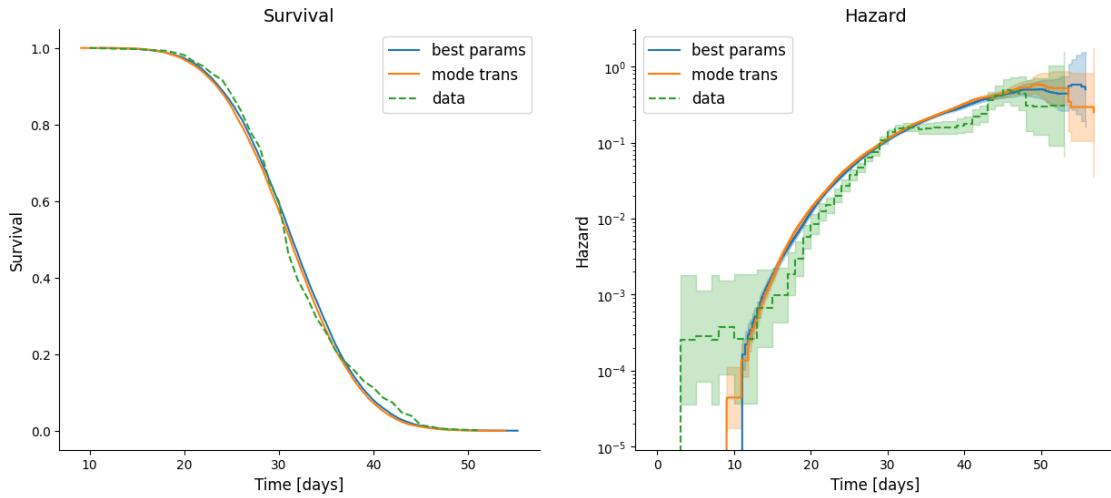
$\beta \cdot x_c / \epsilon$	[0.0141,
2.823]	
$\eta \cdot x_c / \epsilon$	[0.709,
0.847]	
$F_x = \beta^2 / \eta \cdot x_c$	[5.45e-07,
0.0251]	
$D_x = \beta \cdot \epsilon / \eta \cdot x_c^2$	[3.49e-05,
0.00878]	
$P_k = \beta \cdot k / \epsilon$	[2.08e-07,
0.0048]	
$F_k = \beta^2 / \eta \cdot k$	[0.00319,
142.425]	
$D_k = \beta \cdot \epsilon / \eta \cdot k^2$	[26.116,
7559863.858]	
$F_k^2 / D_k = \beta^3 / \eta \cdot \epsilon$	[2.72e-09,
0.0413]	
ϵ / β^2	[65.485,
5084379.976]	
k / β	[0.00995,
12.869]	
k^2 / ϵ	[4.85e-08,
0.0144]	
η / x_c	[0.00162,
0.00191]	
β / x_c	[2.7e-05,
0.00814]	
ϵ / x_c^2	[0.00194,
0.00247]	
k / x_c	[1e-05,
0.00278]	
best fit no ext hazard_MedianLifetime	[31.1,
32.1]	
best fit no ext hazard_MaxLifetime	[53.83,
53.83]	
best fit_MedianLifetime	[30.94,
31.94]	
best fit_MaxLifetime	[55.75,
55.75]	
data_MedianLifetime	[30.57,
31.49]	
data_MaxLifetime	[53.0,
53.0]	
ML_lnprob	[-2812.1069542078462,
-2812.1069542078462]	
xc / eta	max_likelihood mode_overall 585.064 554.274

beta/eta	0.702	1.403
xc^2/epsilon	454.47	431.02
xc	24244.711	3158.555
eta	41.439	0.47
beta	29.092	0.158
epsilon	1293388.112	154.881
sqrt(xc/eta)	24.188	24.507
s= eta^0.5*xc^1.5/epsilon	18.789	19.239
beta*xc/epsilon	0.545	0.0573
eta*xc/epsilon	0.777	0.811
Fx=beta^2/eta*xc	0.000842	0.000131
Dx =beta*epsilon/eta*xc^2	0.00154	0.00058
Pk=beta*k/epsilon	0.000011	0.000382
Fk=beta^2/eta*k	40.847	1.22
Dk =beta*epsilon/eta*k^2	3632023.408	213861.171
Fk^2/Dk=beta^3/eta*epsilon	0.000459	0.0
epsilon/beta^2	1528.205	759530.949
k/beta	0.0172	0.333
k^2/epsilon	0.0	0.0
eta/xc	0.00171	0.00166
beta/xc	0.0012	0.000122
epsilon/xc^2	0.0022	0.00212
k/xc	0.000021	0.000118
best fit no ext hazard_MedianLifetime	31.59	NaN
best fit no ext hazard_MaxLifetime	53.83	NaN
best fit_MedianLifetime	31.43	NaN
best fit_MaxLifetime	55.75	NaN
data_MedianLifetime	31.0	NaN
data_MaxLifetime	53.0	NaN
ML_lnprob	-2812.106954	-2812.106954

5 5. Fits of simulations to data

best params is the sample with highest likelihood. mode trans is the 4D posterior mode in the transformed space of x_c/η , β/η , x_c^2/ϵ , x_c

```
Text(0, 0.5, 'Hazard')
```



Text(0, 0.5, 'Prob density')

