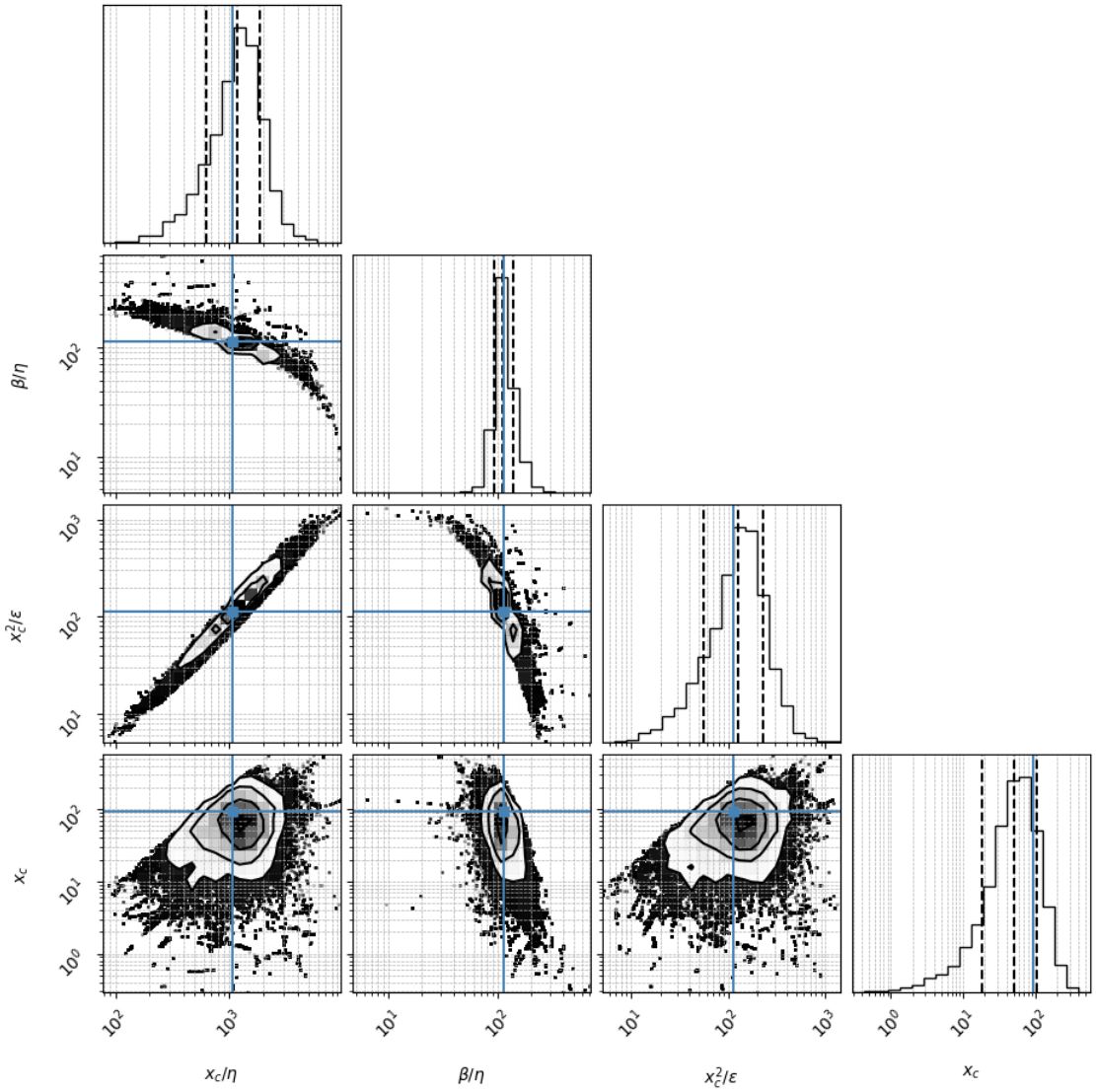
mcmc_analysis_mice_F_baysian

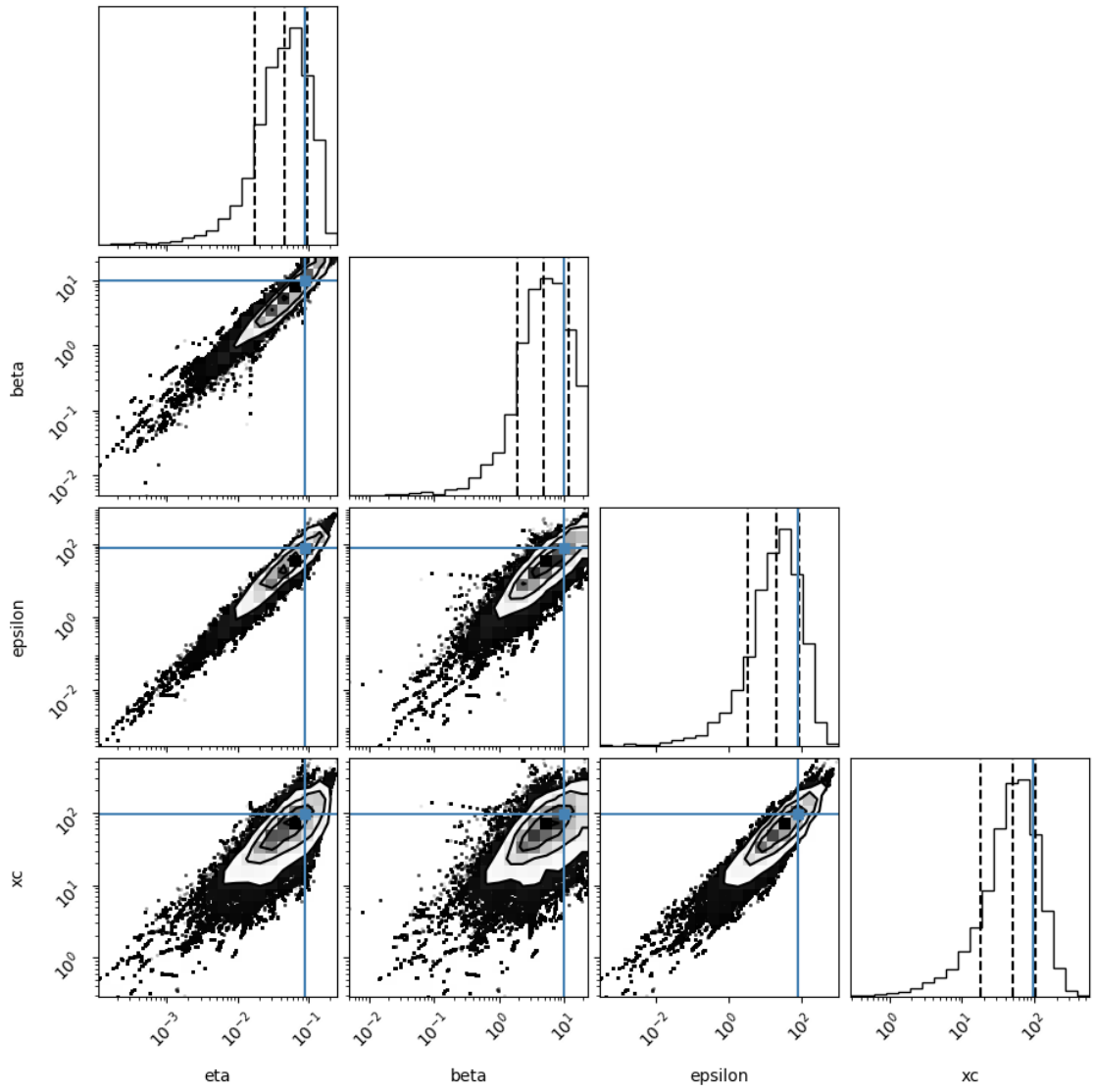
November 24, 2025

1 # 1. Density coner 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

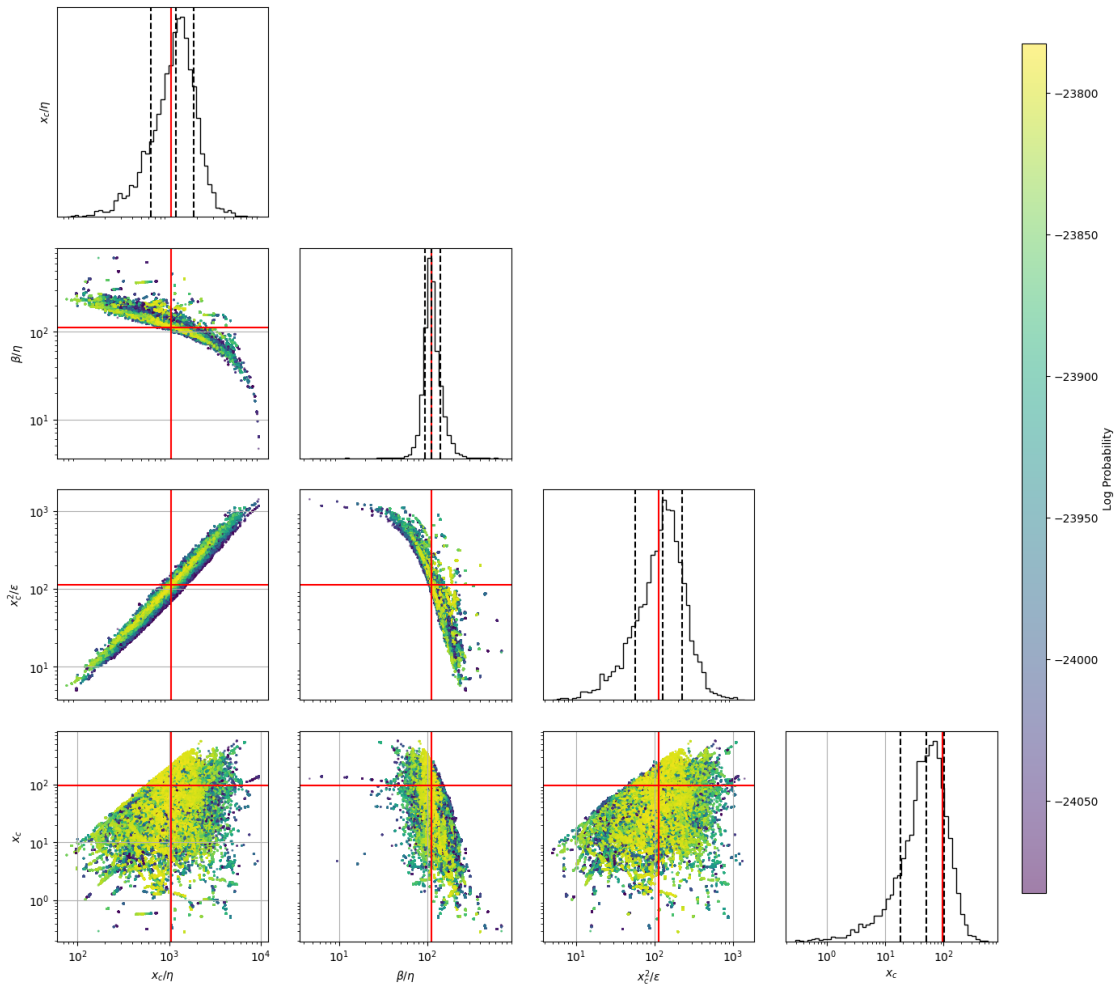
```
(16,)
```


x_c/η
β/η
x_c^2/ε
x_c



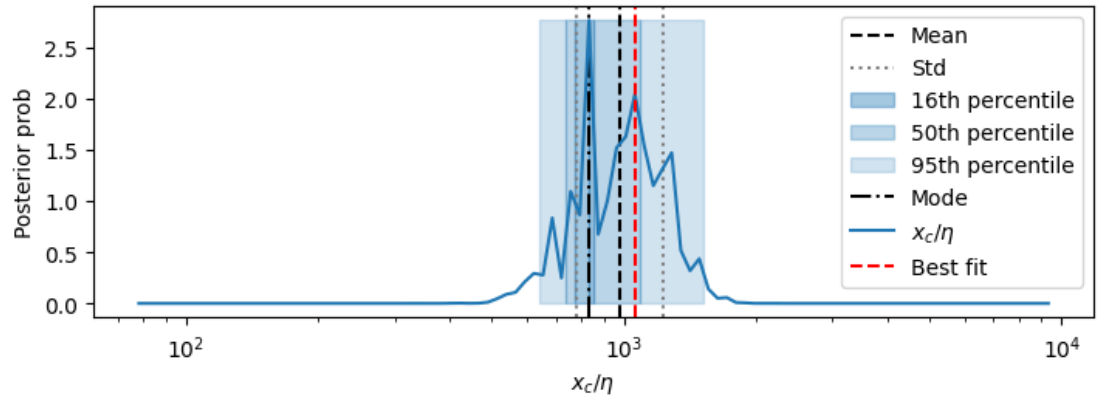
2 2. Heat map corner plot of raw samples

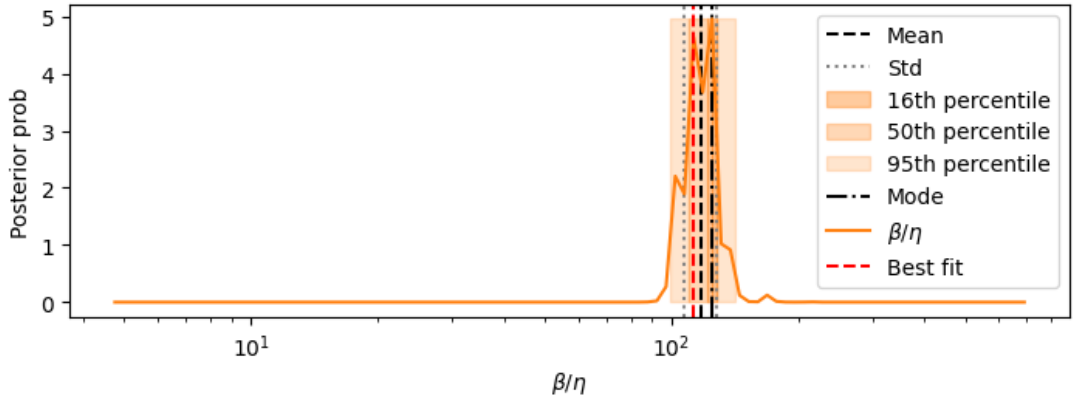
This plot shows all the raw sample points and their lnprobability

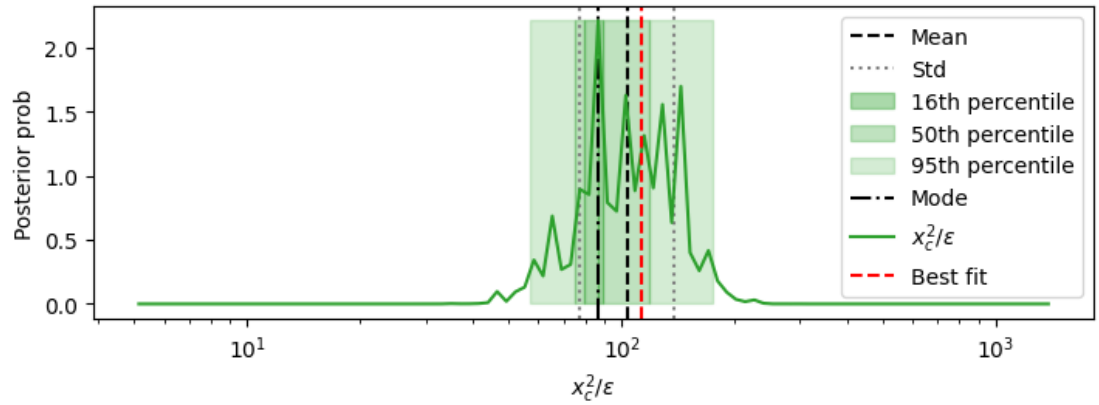


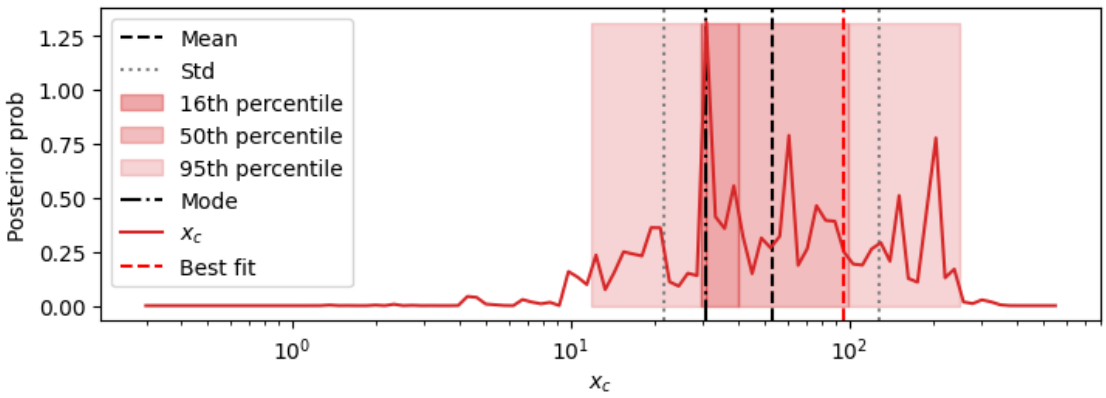
3 3. Posterior distributions of parameters

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


Posterior prob
Mean
Std
16th percentile
50th percentile
95th percentile
Mode
x_c/η
Best fit
x_c/η

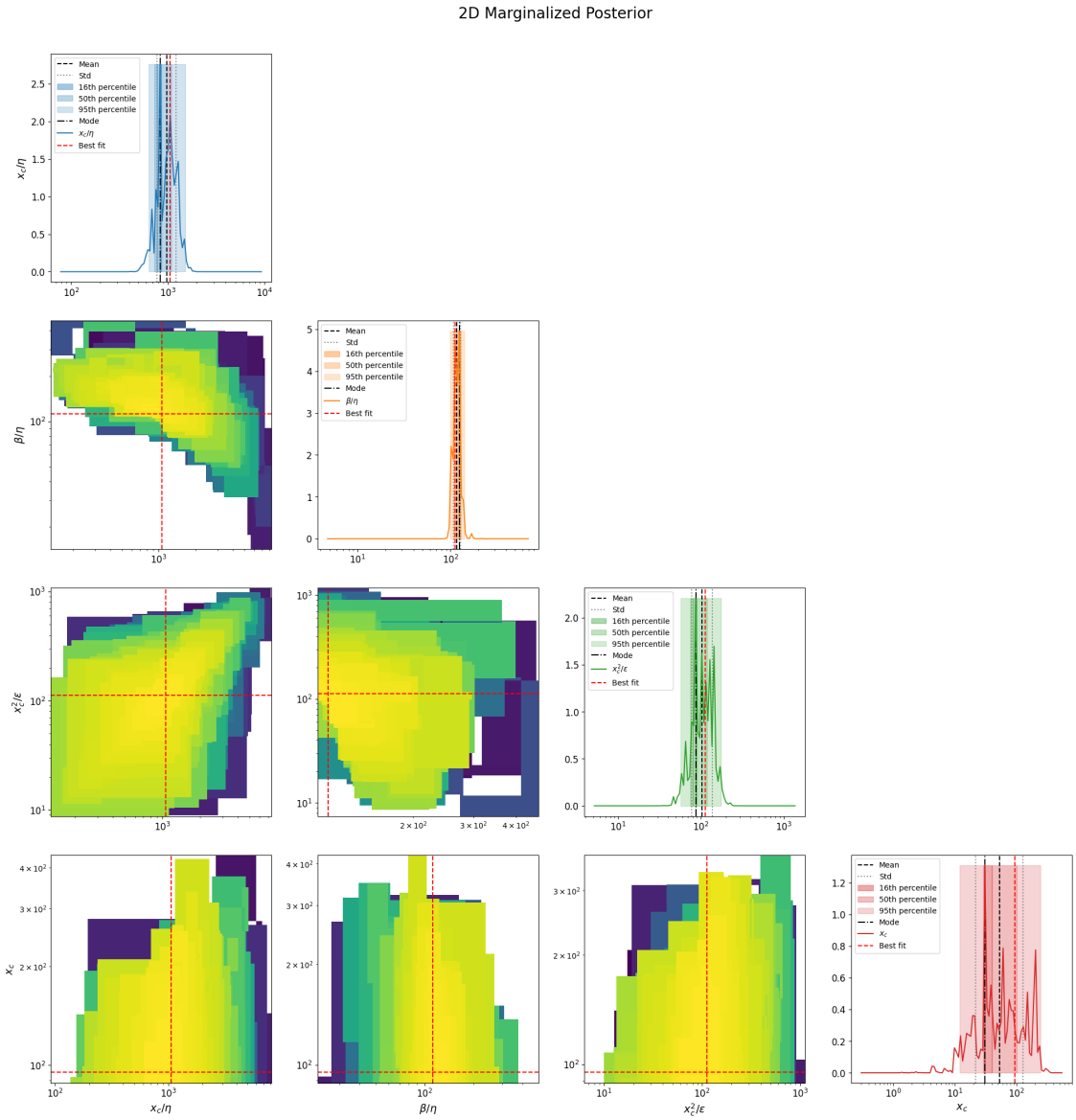

Posterior prob
Mean
Std
16th percentile
50th percentile
95th percentile
Mode
β/η
Best fit
β/η


Posterior prob
Mean
Std
16th percentile
50th percentile
95th percentile
Mode
x_c^2/ε
Best fit
x_c^2/ε


Posterior prob
Mean
Std
16th percentile
50th percentile
95th percentile
Mode
x_c
Best fit
x_c

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)
```



Rescaling the samples TIME by 7

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	977.575	
beta/eta	117.264	
xc^2/epsilon	103.573	
xc	52.76	
eta	0.0601	
beta	6.921	
epsilon	32.103	
sqrt(xc/eta)	31.498	
s= eta^0.5*xc^1.5/epsilon	3.307	
beta*xc/epsilon	12.317	
eta*xc/epsilon	0.105	
Fx=beta^2/eta*xc	13.434	
Dx =beta*epsilon/eta*xc^2	1.102	
Pk=beta*k/epsilon	0.131	
Fk=beta^2/eta*k	1220.864	
Dk =beta*epsilon/eta*k^2	17944.173	
Fk^2/Dk=beta^3/eta*epsilon	172.569	
epsilon/beta^2	0.632	
k/beta	0.0893	
k^2/epsilon	0.0127	
eta/xc	0.00105	
beta/xc	0.126	
epsilon/xc^2	0.01	
k/xc	0.0108	
best fit no ext hazard_MedianLifetime	126.67	
best fit no ext hazard_MaxLifetime	200.99	
best fit_MedianLifetime	126.46	
best fit_MaxLifetime	205.31	
data_MedianLifetime	126.57	
data_MaxLifetime	208.0	
ML_lnprob	-23782.520433	

std \	
xc/eta	[198.715, 249.414]
beta/eta	[10.074, 11.021]
xc^2/epsilon	[26.082, 34.861]
xc	[31.146, 76.028]

```
eta                                                    [0.0353,
0.0856]
beta                                                     [3.921,
9.045]
epsilon                                                [26.795,
162.052]
sqrt(xc/eta)                                             [3.379,
3.785]
s= eta^0.5*xc^1.5/epsilon                                [0.528,
0.628]
beta*xc/epsilon                                          [0.602,
0.633]
eta*xc/epsilon                                        [0.00631,
0.00671]
Fx=beta^2/eta*xc                                          [4.34,
6.411]
Dx =beta*epsilon/eta*xc^2                                [0.331,
0.473]
Pk=beta*k/epsilon                                       [0.0738,
0.169]
Fk=beta^2/eta*k                                       [619.349,
1257.062]
Dk =beta*epsilon/eta*k^2                           [14684.499,
80836.682]
Fk^2/Dk=beta^3/eta*epsilon                               [49.32,
69.056]
epsilon/beta^2                                           [0.202,
0.296]
k/beta                                                   [0.0519,
0.124]
k^2/epsilon                                             [0.0108,
0.0715]
eta/xc                                                [0.000213,
0.000268]
beta/xc                                                  [0.0356,
0.0495]
epsilon/xc^2                                          [0.00252,
0.00337]
k/xc                                                     [0.00653,
0.0164]
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
0.51
data_MaxLifetime
0
ML_lnprob [-23782.520433176218,
-23782.520433176218]

	mode	\
xc/eta	833.378	
beta/eta	124.846	
xc^2/epsilon	86.728	
xc	30.72	
eta	0.111	
beta	12.411	
epsilon	103.811	
sqrt(xc/eta)	34.187	
s= eta^0.5*xc^1.5/epsilon	3.595	
beta*xc/epsilon	12.154	
eta*xc/epsilon	0.107	
Fx=beta^2/eta*xc	11.233	
Dx =beta*epsilon/eta*xc^2	0.969	
Pk=beta*k/epsilon	0.178	
Fk=beta^2/eta*k	753.466	
Dk =beta*epsilon/eta*k^2	49516.427	
Fk^2/Dk=beta^3/eta*epsilon	172.907	
epsilon/beta^2	0.71	
k/beta	0.0939	
k^2/epsilon	0.0172	
eta/xc	0.0012	
beta/xc	0.106	
epsilon/xc^2	0.0115	
k/xc	0.0163	
best fit no ext hazard_MedianLifetime	126.67	
best fit no ext hazard_MaxLifetime	200.99	
best fit_MedianLifetime	126.46	
best fit_MaxLifetime	205.31	
data_MedianLifetime	126.57	
data_MaxLifetime	208.0	
ML_lnprob	-23782.520433	

percentile_16	\
xc/eta	[775.114,
853.756]	
beta/eta	[121.746,
128.025]	
xc^2/epsilon	[79.681,

89.213]
xc [29.576,
40.068]
eta [0.107,
0.116]
beta [11.896,
12.948]
epsilon [96.239,
111.98]
sqrt(xc/eta) [33.777,
35.449]
s= eta^0.5*xc^1.5/epsilon [3.415,
3.656]
beta*xc/epsilon [11.883,
12.431]
eta*xc/epsilon [0.105,
0.108]
Fx=beta^2/eta*xc [10.471,
12.052]
Dx =beta*epsilon/eta*xc^2 [0.838,
1.018]
Pk=beta*k/epsilon [0.169,
0.188]
Fk=beta^2/eta*k [710.454,
799.083]
Dk =beta*epsilon/eta*k^2 [46018.203,
53280.58]
Fk^2/Dk=beta^3/eta*epsilon [157.572,
189.736]
epsilon/beta^2 [0.663,
0.76]
k/beta [0.09,
0.107]
k^2/epsilon [0.016,
0.0216]
eta/xc [0.00117,
0.00129]
beta/xc [0.101,
0.121]
epsilon/xc^2 [0.0106,
0.0119]
k/xc [0.0125,
0.0169]
best fit no ext hazard_MedianLifetime [126.18,
127.18]
best fit no ext hazard_MaxLifetime [200.99,
200.99]

```
best fit_MedianLifetime                                          [125.97,
126.97]
best fit_MaxLifetime                                             [205.31,
205.31]
data_MedianLifetime                                [126.08999999999999,
127.08]
data_MaxLifetime                                                 [208.0,
208.0]
ML_lnprob                          [-23782.520433176218,
-23782.520433176218]

percentile_50  \
xc/eta                                                        [738.553,
1087.063]
beta/eta                                                       [110.096,
128.025]
xc^2/epsilon                                                    [75.303,
118.336]
xc                                                              [29.576,
99.627]
eta                                                              [0.0847,
0.199]
beta                                                            [10.042,
21.527]
epsilon                                                        [71.085,
376.218]
sqrt(xc/eta)                                                    [30.666,
37.204]
s= eta^0.5*xc^1.5/epsilon                                          [2.88,
3.656]
beta*xc/epsilon                                                 [11.883,
13.005]
eta*xc/epsilon                                                     [0.101,
0.11]
Fx=beta^2/eta*xc                                                [10.471,
18.378]
Dx =beta*epsilon/eta*xc^2                                         [0.838,
1.363]
Pk=beta*k/epsilon                                                [0.0996,
0.232]
Fk=beta^2/eta*k                                               [561.595,
1278.841]
Dk =beta*epsilon/eta*k^2                                   [46018.203,
148608.593]
Fk^2/Dk=beta^3/eta*epsilon                                     [157.572,
228.465]
epsilon/beta^2                                                     [0.579,
```

```
0.87]
k/beta                                                          [0.0386,
0.138]
k^2/epsilon                                                    [0.00192,
0.0252]
eta/xc                                                        [0.00092,
0.00135]
beta/xc                                                          [0.101,
0.159]
epsilon/xc^2                                                   [0.00845,
0.0133]
k/xc                                                           [0.00431,
0.0169]
best fit no ext hazard_MedianLifetime                           [126.18,
127.18]
best fit no ext hazard_MaxLifetime                              [200.99,
200.99]
best fit_MedianLifetime                                         [125.97,
126.97]
best fit_MaxLifetime                                            [205.31,
205.31]
data_MedianLifetime                              [126.08999999999999,
127.08]
data_MaxLifetime                                                [208.0,
208.0]
ML_lnprob                          [-23782.520433176218,
-23782.520433176218]

percentile_95  \
xc/eta                                                       [638.894,
1524.557]
beta/eta                                                        [99.56,
141.573]
xc^2/epsilon                                                   [56.771,
175.744]
xc                                                             [11.895,
247.719]
eta                                                            [0.00825,
0.232]
beta                                                             [1.314,
23.43]
epsilon                                                        [0.558,
437.751]
sqrt(xc/eta)                                                    [25.894,
40.0]
s= eta^0.5*xc^1.5/epsilon                                       [2.347,
4.642]
```

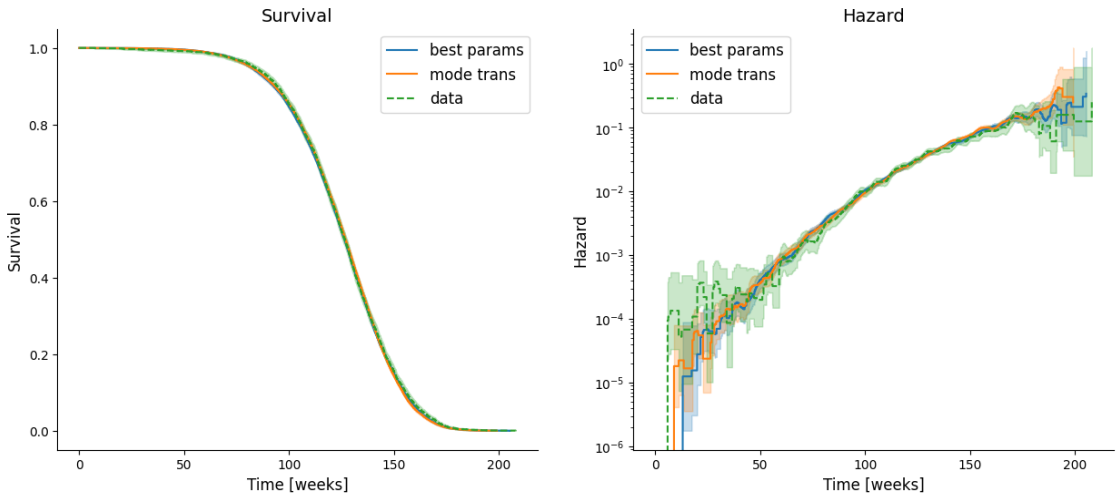
```
beta*xc/epsilon                                                  [11.359,
13.605]
eta*xc/epsilon                                                    [0.0924,
0.12]
Fx=beta^2/eta*xc                                                  [5.965,
28.025]
Dx =beta*epsilon/eta*xc^2                                         [0.568,
2.217]
Pk=beta*k/epsilon                                                 [0.0252,
0.487]
Fk=beta^2/eta*k                                                 [443.926,
5241.926]
Dk =beta*epsilon/eta*k^2                                      [365.455,
230654.415]
Fk^2/Dk=beta^3/eta*epsilon                                       [90.254,
398.872]
epsilon/beta^2                                                    [0.257,
1.496]
k/beta                                                            [0.0213,
0.38]
k^2/epsilon                                                     [0.000362,
0.705]
eta/xc                                                        [0.000656,
0.00157]
beta/xc                                                           [0.0644,
0.228]
epsilon/xc^2                                                    [0.00569,
0.0176]
k/xc                                                              [0.00202,
0.042]
best fit no ext hazard_MedianLifetime                             [126.18,
127.18]
best fit no ext hazard_MaxLifetime                                [200.99,
200.99]
best fit_MedianLifetime                                           [125.97,
126.97]
best fit_MaxLifetime                                              [205.31,
205.31]
data_MedianLifetime                                [126.08999999999999,
127.08]
data_MaxLifetime                                                  [208.0,
208.0]
ML_lnprob                            [-23782.520433176218,
-23782.520433176218]

                                    max_likelihood  mode_overall
xc/eta                                    1059.491       834.826
```

beta/eta	112.319	123.918
xc^2/epsilon	112.878	85.199
xc	95.099	29.7
eta	0.0898	0.109
beta	10.082	12.388
epsilon	80.12	108.962
sqrt(xc/eta)	32.55	33.85
s= eta^0.5*xc^1.5/epsilon	3.468	3.629
beta*xc/epsilon	11.966	11.943
eta*xc/epsilon	0.107	0.107
Fx=beta^2/eta*xc	11.907	11.482
Dx =beta*epsilon/eta*xc^2	0.995	0.968
Pk=beta*k/epsilon	0.0629	0.169
Fk=beta^2/eta*k	2264.717	726.115
Dk =beta*epsilon/eta*k^2	35995.864	49744.986
Fk^2/Dk=beta^3/eta*epsilon	142.487	160.74
epsilon/beta^2	0.788	0.504
k/beta	0.0496	0.0919
k^2/epsilon	0.00312	0.0167
eta/xc	0.000944	0.0012
beta/xc	0.106	0.148
epsilon/xc^2	0.00886	0.0117
k/xc	0.00526	0.0168
best fit no ext hazard_MedianLifetime	126.67	NaN
best fit no ext hazard_MaxLifetime	200.99	NaN
best fit_MedianLifetime	126.46	NaN
best fit_MaxLifetime	205.31	NaN
data_MedianLifetime	126.57	NaN
data_MaxLifetime	208.0	NaN
ML_lnprob	-23782.520433	-23782.520433

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')
```