

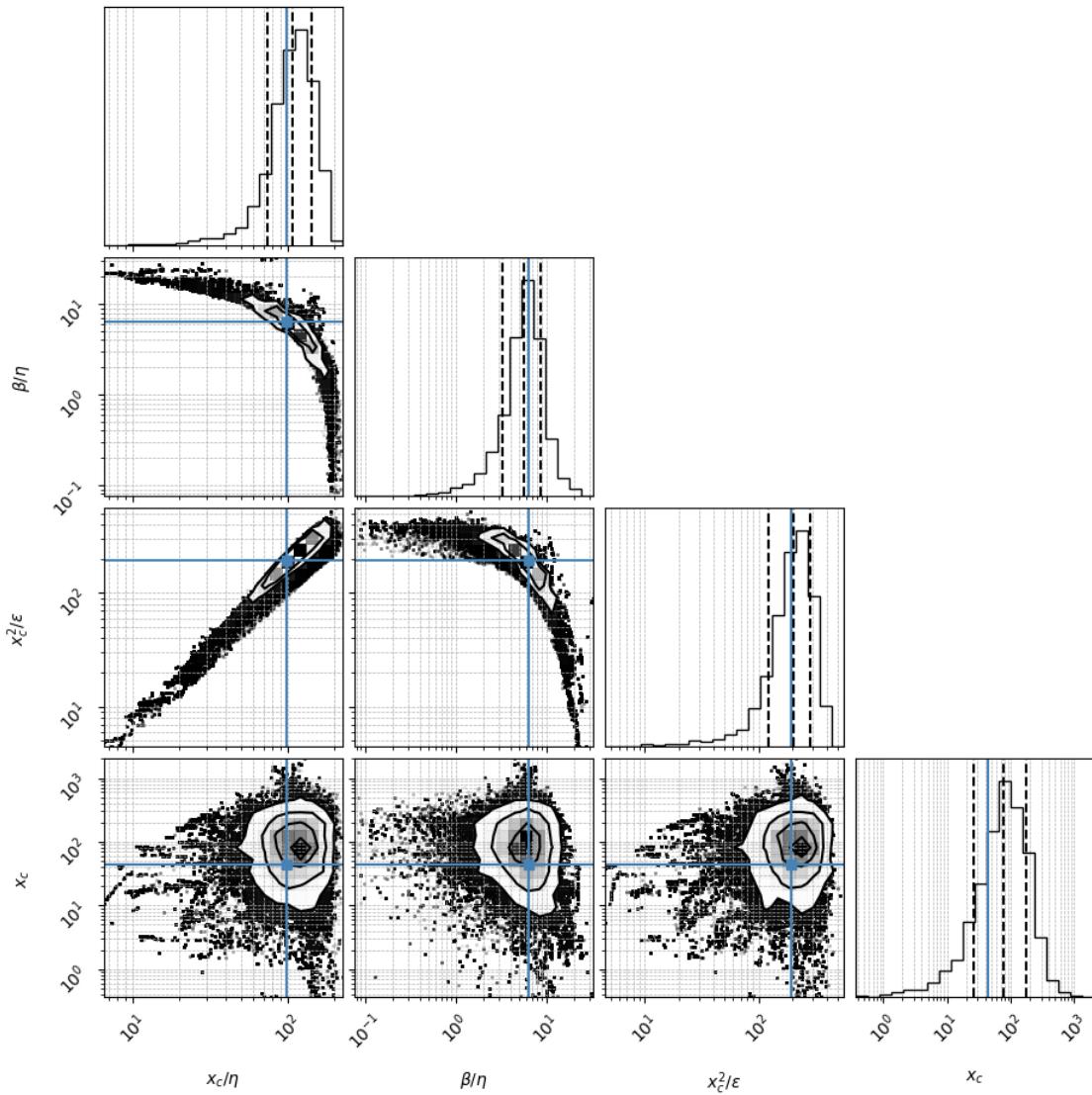
mcmc_analysis_celegans_baysian

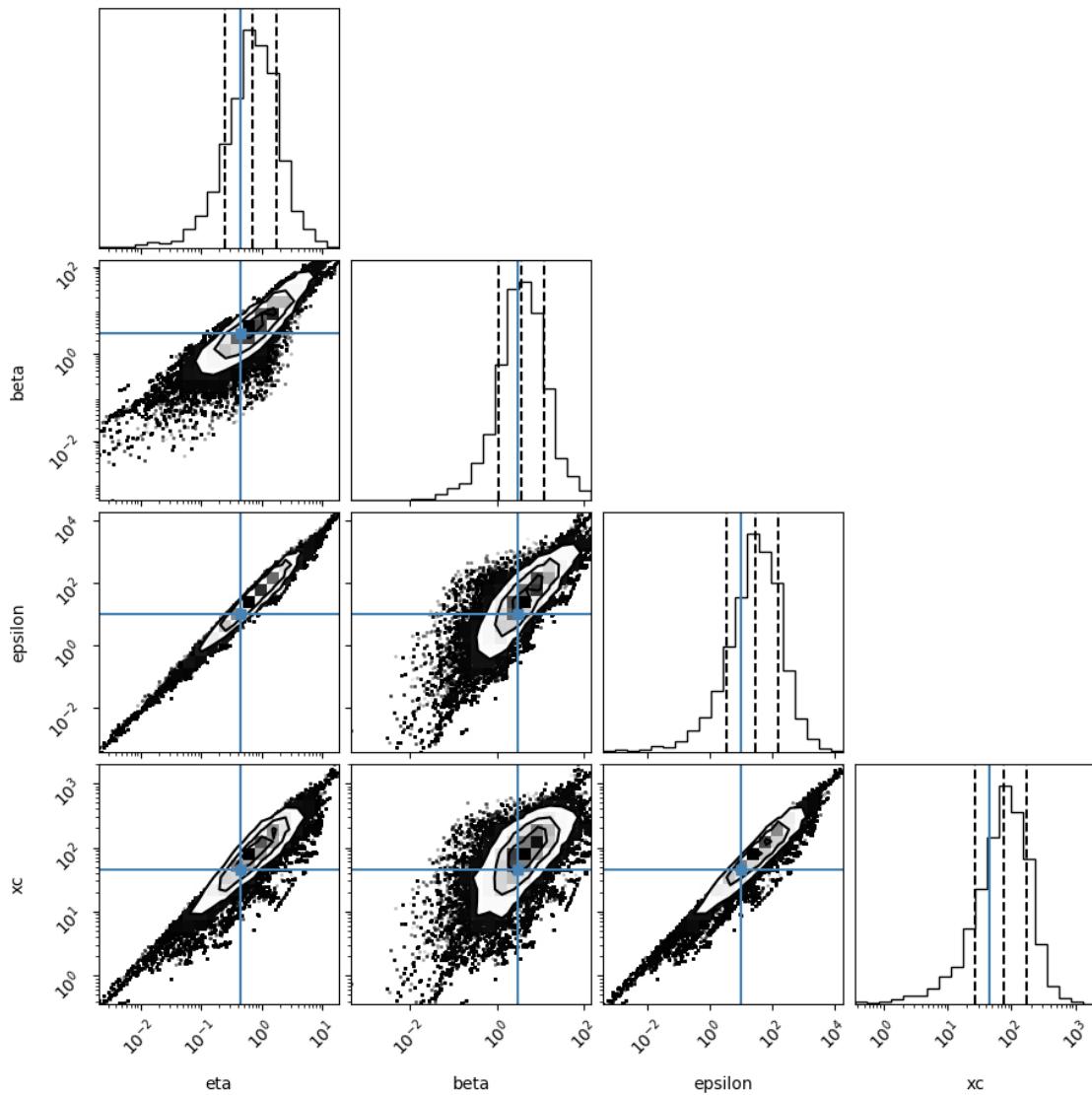
November 24, 2025

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

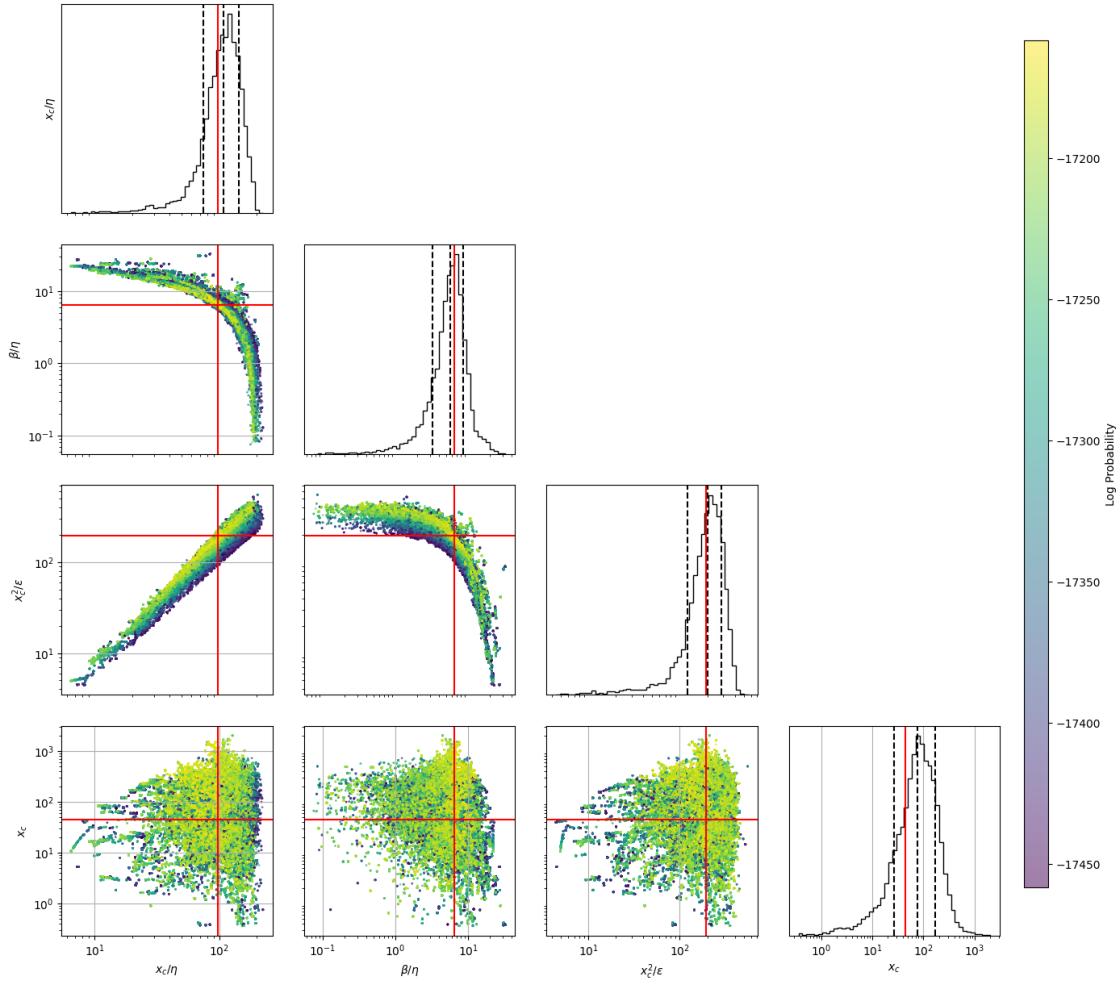
(16,)





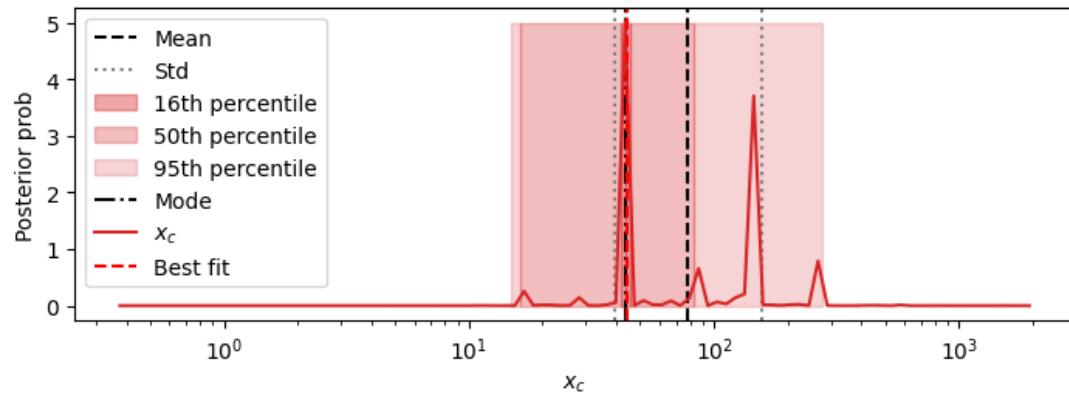
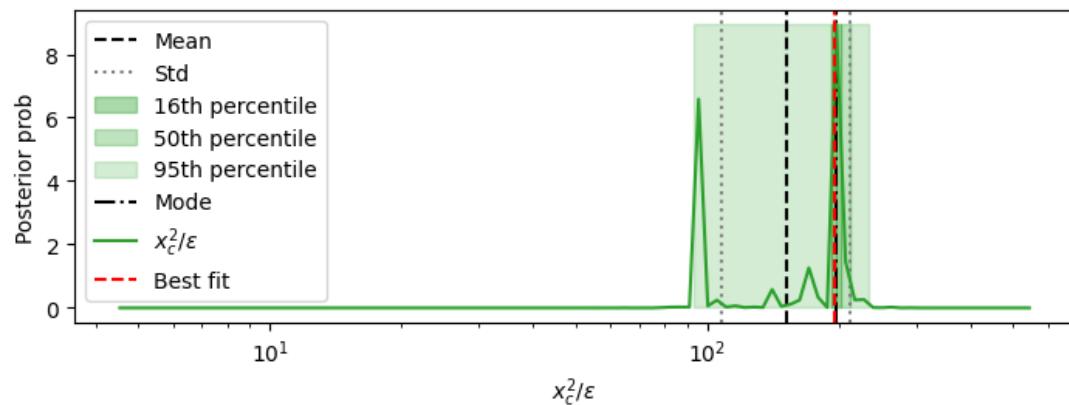
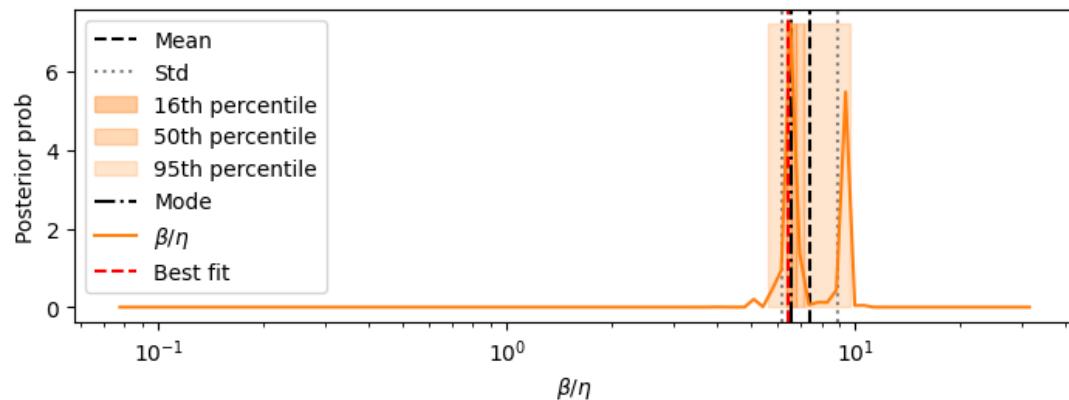
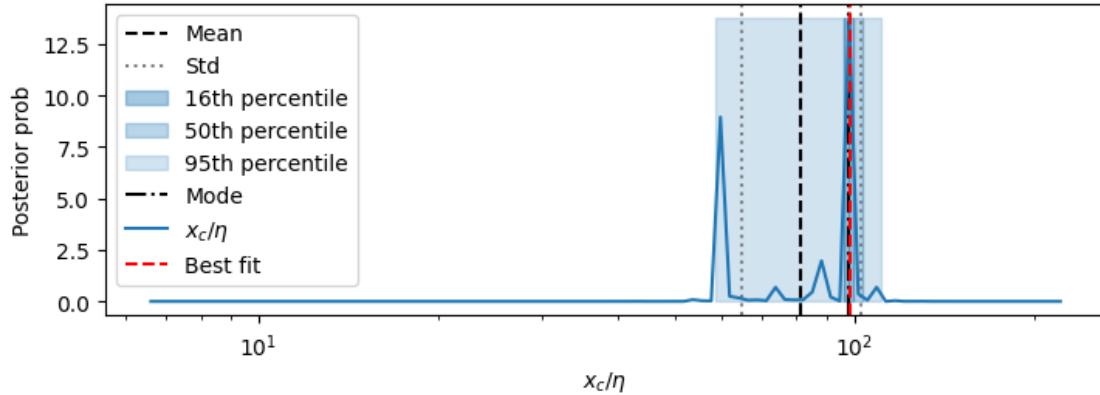
2 2. Heat map corner plot of raw samples

This plot shows all the raw sample points and their lnprobability



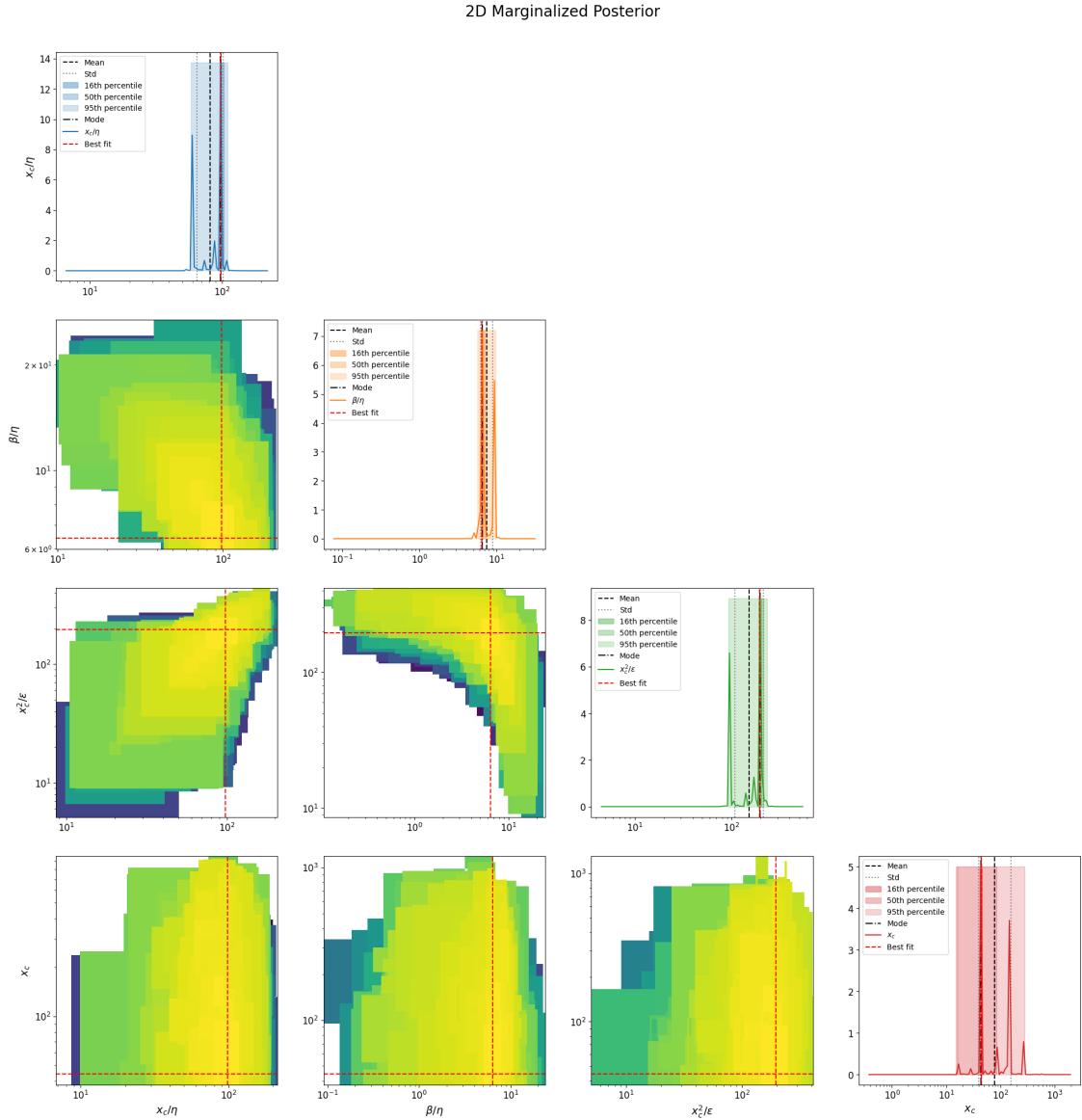
3.3. Posterior distributions of parameters

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	81.435	
beta/eta	7.427	
xc^2/epsilon	151.323	
xc	78.211	
eta	3.576	
beta	26.73	
epsilon	495.599	
sqrt(xc/eta)	9.263	
s= eta^0.5*xc^1.5/epsilon	17.913	
beta*xc/epsilon	13.37	
eta*xc/epsilon	1.947	
Fx=beta^2/eta*xc	0.494	
Dx =beta*epsilon/eta*xc^2	0.037	
Pk=beta*k/epsilon	0.0919	
Fk=beta^2/eta*k	154.228	
Dk =beta*epsilon/eta*k^2	4281.489	
Fk^2/Dk=beta^3/eta*epsilon	16.486	
epsilon/beta^2	0.56	
k/beta	0.0569	
k^2/epsilon	0.00572	
eta/xc	0.0107	
beta/xc	0.0692	
epsilon/xc^2	0.00536	
k/xc	0.00872	
best fit no ext hazard_MedianLifetime	18.4	
best fit no ext hazard_MaxLifetime	28.15	
best fit_MedianLifetime	18.38	
best fit_MaxLifetime	27.33	
data_MedianLifetime	18.3	
data_MaxLifetime	30.46	
ML_lnprob	-17158.071828	
		std
\		
xc/eta		[16.841, 21.232]
beta/eta		[1.239, 1.487]
xc^2/epsilon		[43.481, 61.012]
xc		[38.984, 77.727]
eta		[1.88, 3.965]
beta		[15.204, 35.257]
epsilon		[377.882, 1590.929]

sqrt(xc/eta)	[0.716, 0.776]
s= eta^0.5*xc^1.5/epsilon	[2.609, 3.054]
beta*xc/epsilon	[1.186, 1.301]
eta*xc/epsilon	[0.117, 0.124]
Fx=beta^2/eta*xc	[0.159, 0.234]
Dx =beta*epsilon/eta*xc^2	[0.0103, 0.0143]
Pk=beta*k/epsilon	[0.063, 0.2]
Fk=beta^2/eta*k	[101.056, 293.118]
Dk =beta*epsilon/eta*k^2	[3268.575, 13815.952]
Fk^2/Dk=beta^3/eta*epsilon	[7.189, 12.749]
epsilon/beta^2	[0.26, 0.486]
k/beta	[0.0446, 0.207]
k^2/epsilon	[0.00537, 0.0884]
eta/xc	[0.00116, 0.0013]
beta/xc	[0.0141, 0.0177]
epsilon/xc^2	[0.000804, 0.000946]
k/xc	[0.00419, 0.00806]
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	0.52
data_MaxLifetime	0
ML_lnprob	[-17158.07182790857, -17158.07182790857]

	mode \
xc/eta	98.0
beta/eta	6.522
xc^2/epsilon	197.255
xc	43.416
eta	3.161
beta	19.957
epsilon	422.062
sqrt(xc/eta)	9.386
s= eta^0.5*xc^1.5/epsilon	18.25
beta*xc/epsilon	12.906
eta*xc/epsilon	1.985
Fx=beta^2/eta*xc	0.428
Dx =beta*epsilon/eta*xc^2	0.0319
Pk=beta*k/epsilon	0.1
Fk=beta^2/eta*k	395.024
Dk =beta*epsilon/eta*k^2	7987.52
Fk^2/Dk=beta^3/eta*epsilon	23.141
epsilon/beta^2	0.337
k/beta	0.247
k^2/epsilon	0.122
eta/xc	0.0102

beta/xc	0.0635	percentile_16
epsilon/xc^2	0.00507	
k/xc	0.0115	
best fit no ext hazard_MedianLifetime	18.4	
best fit no ext hazard_MaxLifetime	28.15	
best fit_MedianLifetime	18.38	
best fit_MaxLifetime	27.33	
data_MedianLifetime	18.3	
data_MaxLifetime	30.46	
ML_lnprob	-17158.071828	
\		
xc/eta	[96.276, 99.756]	
beta/eta	[6.327, 6.723]	
xc^2/epsilon	[192.544, 202.082]	
xc	[41.582, 45.33]	
eta	[3.021, 3.309]	
beta	[18.726, 21.268]	
epsilon	[386.202, 461.252]	
sqrt(xc/eta)	[9.303, 9.47]	
s= eta^0.5*xc^1.5/epsilon	[17.957, 18.547]	
beta*xc/epsilon	[12.528, 13.296]	
eta*xc/epsilon	[1.969, 2.001]	
Fx=beta^2/eta*xc	[0.397, 0.461]	
Dx =beta*epsilon/eta*xc^2	[0.0303, 0.0336]	
Pk=beta*k/epsilon	[0.0944, 0.107]	
Fk=beta^2/eta*k	[361.643, 431.485]	
Dk =beta*epsilon/eta*k^2	[7225.354, 8830.083]	
Fk^2/Dk=beta^3/eta*epsilon	[20.939, 25.575]	
epsilon/beta^2	[0.314, 0.362]	
k/beta	[0.204, 0.34]	
k^2/epsilon	[0.111, 0.19]	
eta/xc	[0.01, 0.0104]	
beta/xc	[0.0606, 0.0664]	
epsilon/xc^2	[0.00495, 0.00519]	
k/xc	[0.011, 0.012]	
best fit no ext hazard_MedianLifetime	[17.91, 18.91]	
best fit no ext hazard_MaxLifetime	[28.15, 28.15]	
best fit_MedianLifetime	[17.89, 18.89]	
best fit_MaxLifetime	[27.33, 27.33]	
data_MedianLifetime	[17.82, 18.82]	
data_MaxLifetime	[30.46, 30.46]	
ML_lnprob	[-17158.07182790857, -17158.07182790857]	
\		percentile_50

xc/eta	[96.276, 103.361]
beta/eta	[6.327, 7.144]
xc^2/epsilon	[192.544, 212.092]
xc	[16.09, 82.946]
eta	[3.021, 3.309]
beta	[18.726, 21.268]
epsilon	[386.202, 461.252]
sqrt(xc/eta)	[9.14, 9.47]
s= eta^0.5*xc^1.5/epsilon	[17.386, 19.156]
beta*xc/epsilon	[12.528, 13.296]
eta*xc/epsilon	[1.969, 2.001]
Fx=beta^2/eta*xc	[0.397, 0.461]
Dx =beta*epsilon/eta*xc^2	[0.0272, 0.0336]
Pk=beta*k/epsilon	[0.0216, 0.412]
Fk=beta^2/eta*k	[178.458, 874.398]
Dk =beta*epsilon/eta*k^2	[7225.354, 8830.083]
Fk^2/Dk=beta^3/eta*epsilon	[20.939, 31.238]
epsilon/beta^2	[0.273, 0.555]
k/beta	[0.0573, 0.73]
k^2/epsilon	[0.0065, 0.386]
eta/xc	[0.01, 0.0104]
beta/xc	[0.0606, 0.0664]
epsilon/xc^2	[0.00495, 0.00519]
k/xc	[0.011, 0.012]
best fit no ext hazard_MedianLifetime	[17.91, 18.91]
best fit no ext hazard_MaxLifetime	[28.15, 28.15]
best fit_MedianLifetime	[17.89, 18.89]
best fit_MaxLifetime	[27.33, 27.33]
data_MedianLifetime	[17.82, 18.82]
data_MaxLifetime	[30.46, 30.46]
ML_lnprob	[-17158.07182790857, -17158.07182790857]

	percentile_95
\	
xc/eta	[58.57, 110.966]
beta/eta	[5.604, 9.678]
xc^2/epsilon	[93.233, 233.625]
xc	[14.759, 277.715]
eta	[0.104, 9.019]
beta	[7.684, 111.21]
epsilon	[0.646, 2723.794]
sqrt(xc/eta)	[7.386, 10.534]
s= eta^0.5*xc^1.5/epsilon	[12.185, 22.516]
beta*xc/epsilon	[11.805, 16.864]
eta*xc/epsilon	[1.669, 2.21]
Fx=beta^2/eta*xc	[0.253, 1.528]
Dx =beta*epsilon/eta*xc^2	[0.0245, 0.097]

Pk=beta*k/epsilon	[0.0104, 0.526]
Fk=beta^2/eta*k	[30.527, 874.398]
Dk =beta*epsilon/eta*k^2	[58.657, 119767.341]
Fk^2/Dk=beta^3/eta*epsilon	[7.702, 38.155]
epsilon/beta^2	[0.273, 1.993]
k/beta	[0.0051, 0.73]
k^2/epsilon	[6.43e-05, 0.386]
eta/xc	[0.00901, 0.0143]
beta/xc	[0.0505, 0.126]
epsilon/xc^2	[0.00428, 0.00842]
k/xc	[0.0018, 0.0311]
best fit no ext hazard_MedianLifetime	[17.91, 18.91]
best fit no ext hazard_MaxLifetime	[28.15, 28.15]
best fit_MedianLifetime	[17.89, 18.89]
best fit_MaxLifetime	[27.33, 27.33]
data_MedianLifetime	[17.82, 18.82]
data_MaxLifetime	[30.46, 30.46]
ML_lnprob	[-17158.07182790857, -17158.07182790857]

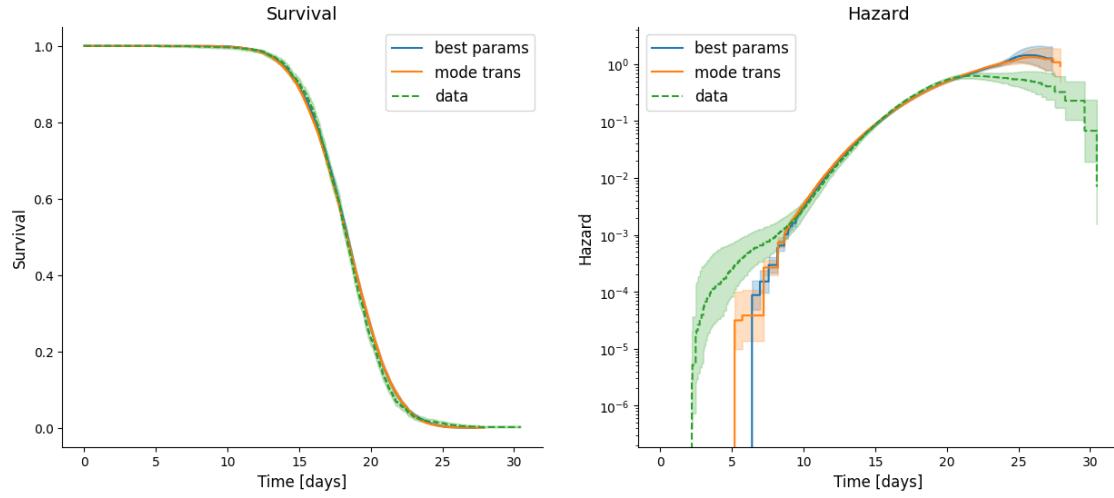
	max_likelihood	mode_overall
xc/eta	98.12	98.12
beta/eta	6.411	6.411
xc^2/epsilon	195.793	195.793
xc	44.248	44.248
eta	0.451	3.056
beta	2.891	20.921
epsilon	10.0	431.04
sqrt(xc/eta)	9.906	9.441
s= eta^0.5*xc^1.5/epsilon	19.766	18.229
beta*xc/epsilon	12.792	13.219
eta*xc/epsilon	1.995	1.995
Fx=beta^2/eta*xc	0.419	0.419
Dx =beta*epsilon/eta*xc^2	0.0327	0.0327
Pk=beta*k/epsilon	0.145	0.0974
Fk=beta^2/eta*k	37.067	368.28
Dk =beta*epsilon/eta*k^2	256.427	8065.971
Fk^2/Dk=beta^3/eta*epsilon	5.358	22.3
epsilon/beta^2	1.196	0.529
k/beta	0.173	0.25
k^2/epsilon	0.025	0.118
eta/xc	0.0102	0.0102
beta/xc	0.0653	0.0653
epsilon/xc^2	0.00511	0.00511
k/xc	0.0113	0.0113
best fit no ext hazard_MedianLifetime	18.4	NaN
best fit no ext hazard_MaxLifetime	28.15	NaN
best fit_MedianLifetime	18.38	NaN

best fit_MaxLifetime	27.33	NaN
data_MedianLifetime	18.3	NaN
data_MaxLifetime	30.46	NaN
ML_lnprob	-17158.071828	-17158.071828

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')

