```
%~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
%
% Examine_TIWE_Data
%
%
%
% 10/21/16 - A.Pickering
%~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```
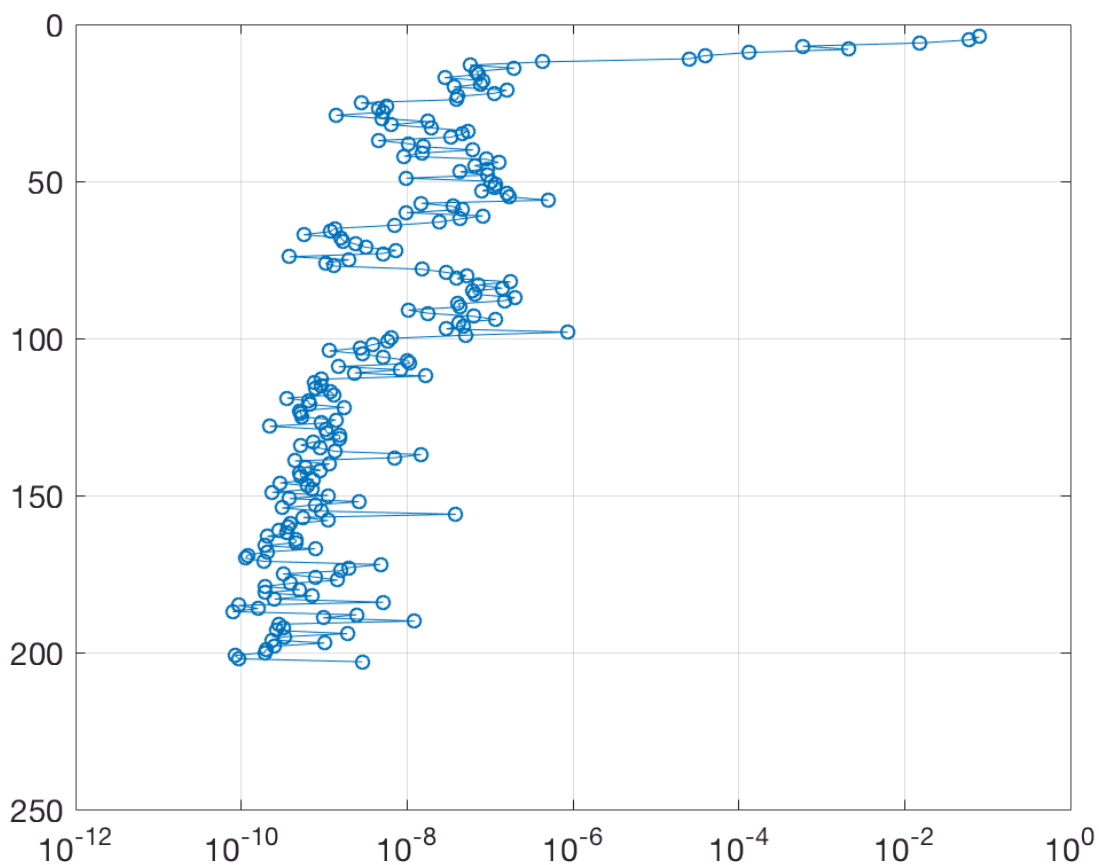
```
clear ; close all

load('/Users/Andy/Dropbox/ap_share_with_jn/date_from_jim/Tiwe91/mat_Greg_analysis/tw910031.mat

figure(1);clf
semilogx(avg.EPSILON,avg.P,'o-')
axis ij
grid on
```



```
% loop over all profiles and get variables N2,dtdz,chi,eps so we
```

```matlab
% can look at distributions and compare to EQ14

n2=[];
dtdz=[];
chi=[];
eps=[];

file_list=dir( fullfile( '/Users/Andy/Dropbox/ap_share_with_jn/date_from_jim/Tiwe91/mat_Greg_a
```

```
 file_list =
 3319x1 struct array with fields:

    name
    date
    bytes
    isdir
    datenum
```

```matlab
for ip=1:length(file_list)
    clear avg
    try
    load( fullfile('/Users/Andy/Dropbox/ap_share_with_jn/date_from_jim/Tiwe91/mat_Greg_analysi
    n2=[n2 ; avg.N2(:) ];
    dtdz=[dtdz ; avg.DTDZ(:)];
    chi=[chi ; avg.CHI(:) ];
    eps=[eps; avg.EPSILON(:) ] ;
    end

end % ip

disp('Done')
```

```matlab
% plot distrbutions of variables

figure(1);clf
agutwocolumn(1)
wysiwyg

subplot(221)
histogram(real(log10(n2(:))),'edgecolor','none')
xlabel('log_{10}N^2')
grid on

subplot(222)
histogram(real(log10(dtdz(:))),'edgecolor','none')
xlabel('log_{10}dT/dz')
grid on

subplot(223)
histogram(log10(chi(:)),'edgecolor','none')
xlabel('log_{10}\chi')
grid on

subplot(224)
histogram(log10(eps(:)),'edgecolor','none')
xlabel('log_{10}\epsilon')
grid on
```
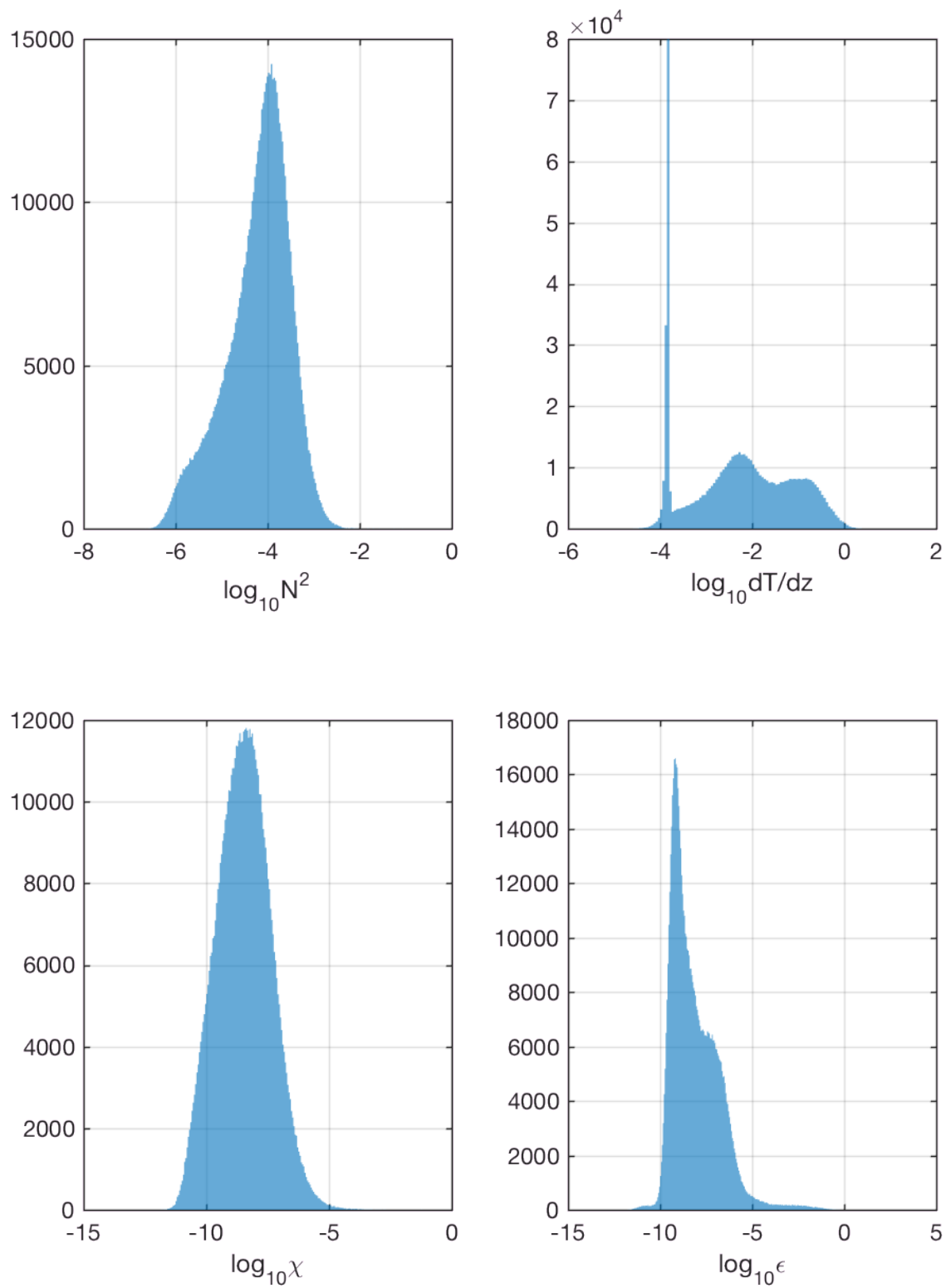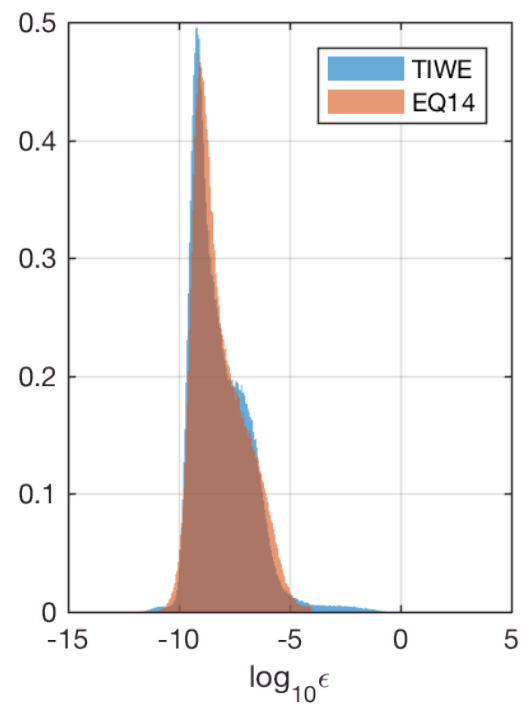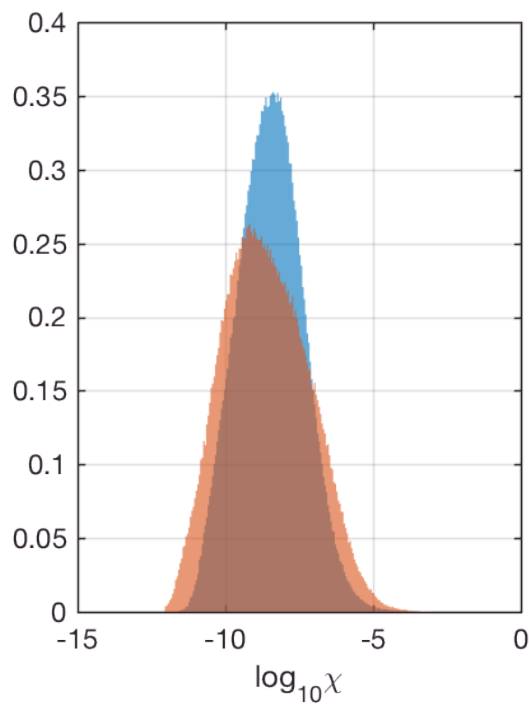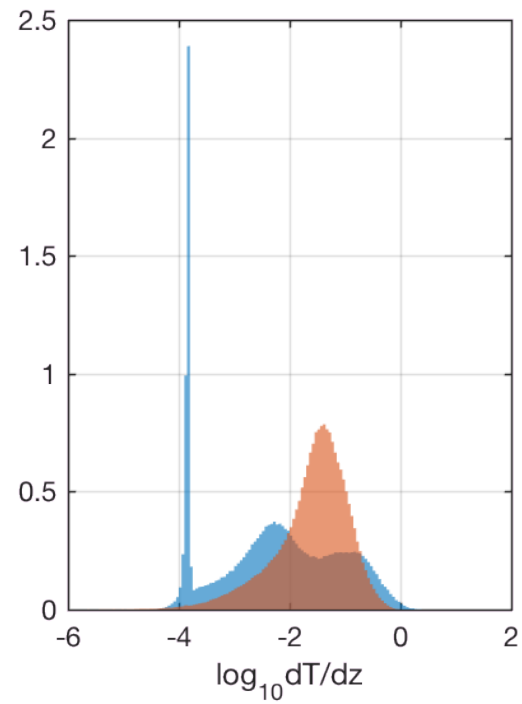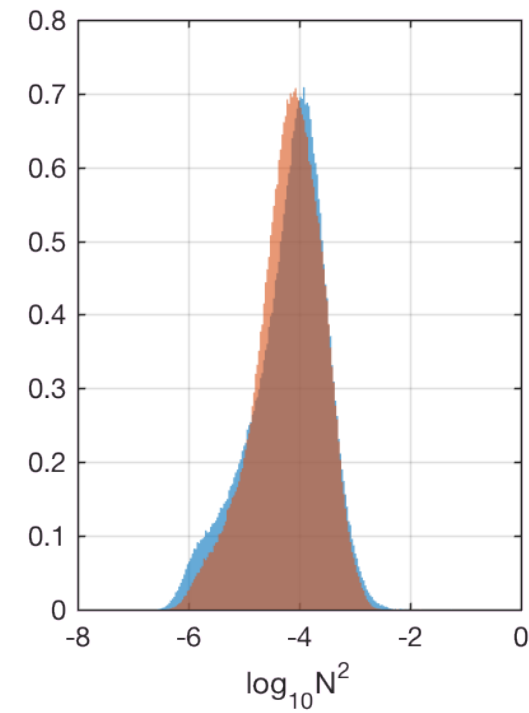
Next I compare distributions from the TIWE data to the EQ14 data. N2 looks very similar. dT/dz from TIWE looks a little strange. There are two peaks, and then a sharp spike at very small values which is probably junk. Chi looks similar, with EQ14 being centered at a slightly smaller value. Epsilon looks very similar.

```matlab
% compare to EQ distributions

dir_base='/Users/Andy/Cruises_Research/ChiPod/Cham_Eq14_Compare/Data/chameleon/processed';
clear cham
load( fullfile( dir_base, '/Cstar=0_01366/sum/eq14_sum.mat') )

Nm='pdf';

figure(1);clf
agutwocolumn(1)
wysiwyg

subplot(221)
h1=histogram(real(log10(n2(:))),'edgecolor','none','Normalization',Nm);
hold on
h2=histogram(real(log10(cham.N2(:))),h1.BinEdges,'edgecolor','none','Normalization',Nm);
xlabel('log_{10}N^2')
grid on

subplot(222)
h1=histogram(real(log10(dtdz(:))),'edgecolor','none','Normalization',Nm);
hold on
h2=histogram(real(log10(cham.DTDZ(:))),h1.BinEdges,'edgecolor','none','Normalization',Nm);
xlabel('log_{10}dT/dz')
grid on

subplot(223)
h1=histogram(log10(chi(:)),'edgecolor','none','Normalization',Nm);
hold on
h2=histogram(real(log10(cham.CHI(:))),h1.BinEdges,'edgecolor','none','Normalization',Nm);
xlabel('log_{10}\chi')
grid on

subplot(224)
h1=histogram(log10(eps(:)),'edgecolor','none','Normalization',Nm);
hold on
h2=histogram(real(log10(cham.EPSILON(:))),h1.BinEdges,'edgecolor','none','Normalization',Nm);

xlabel('log_{10}\epsilon')
grid on
legend([h1 h2],'TIWE','EQ14')
```

Next I compute gamma from both datasets and compare the distribution. The EQ14 distribution appears to be slightly smaller. The TIWE distribution has a second hump at high values, which I think are just bogus data where dT/dz is really small or something.

```
% compute gamma
```

```matlab
gam_tiwe=n2 .* chi ./2 ./ eps ./ (dtdz.^2);
gam_eq14=cham.N2 .* cham.CHI ./2 ./cham.EPSILON ./(cham.DTDZ.^2);

% plot distributions
figure(1);clf
h1=histogram(real(log10(gam_tiwe(:))),'edgecolor','none','Normalization','pdf');
hold on
h2=histogram(log10(gam_eq14(:)),h1.BinEdges,'edgecolor','none','Normalization','pdf');
grid on
xlim([-6 6])
legend([h1 h2],'tiwe','eq14')
```
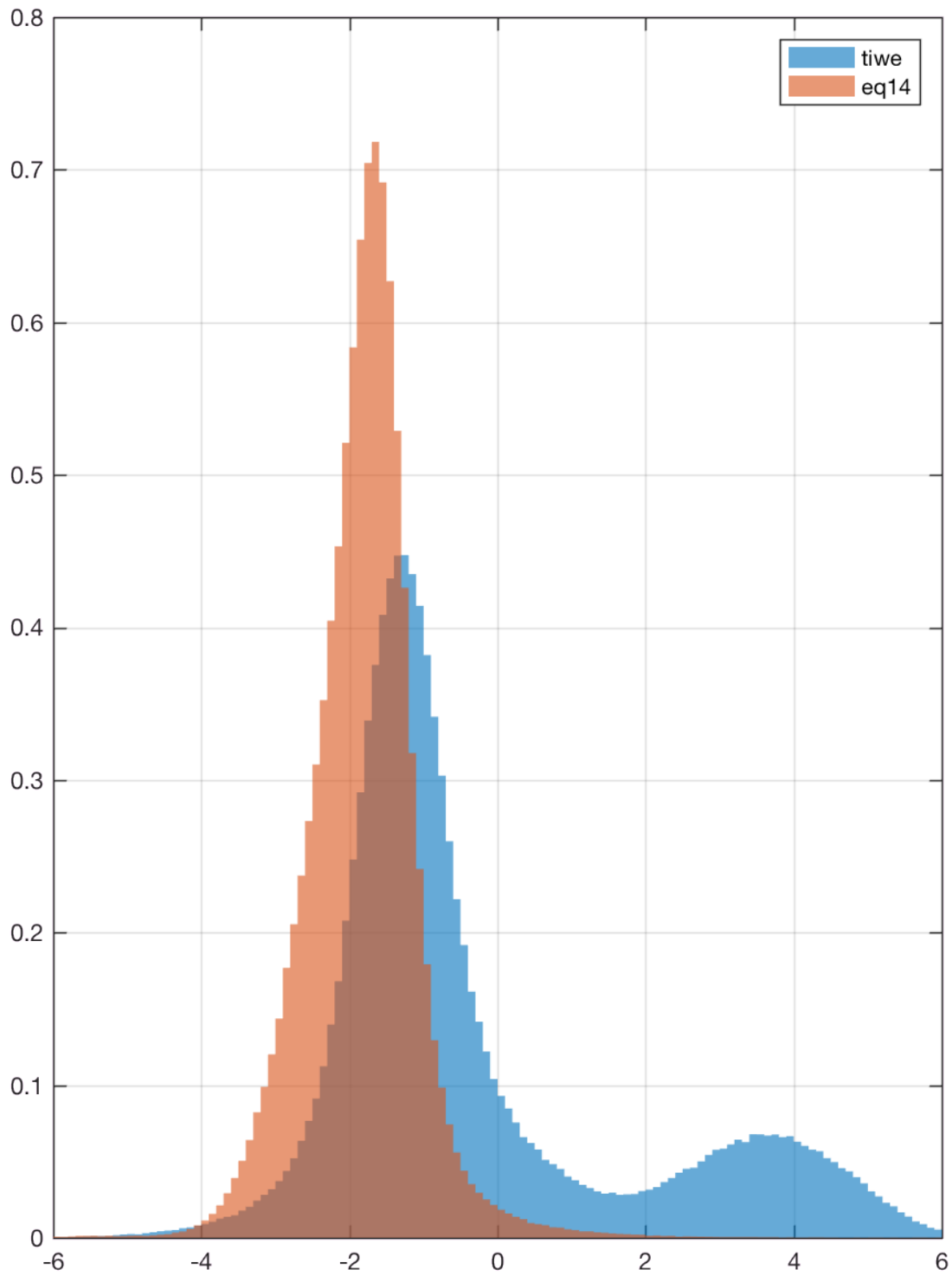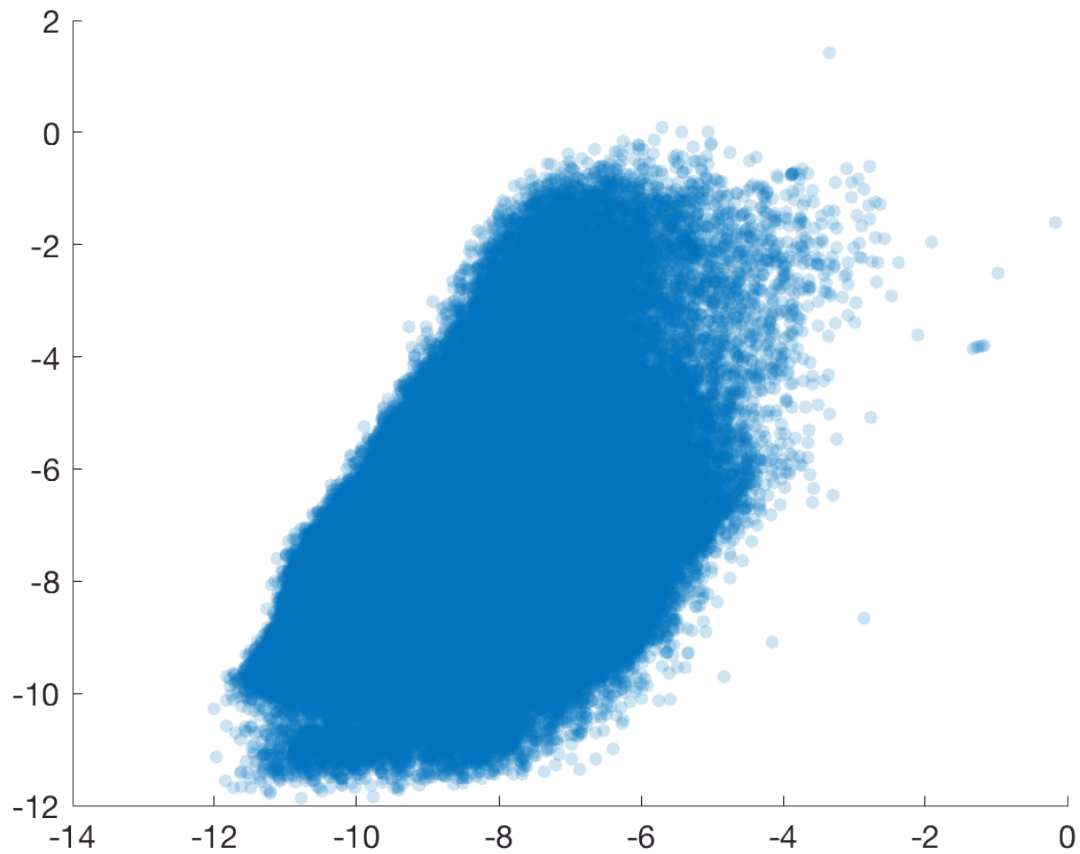
```
xlabel('log_{10}\Gamma','fontsize',16)
```

```
% try identifying overturns/patches in tiwe and compare to the patch data Bill shared
```

```
%figure(2);clf
%loglog(chi(:),eps(:),'.')
%scatter(log10(chi(:)), log10(eps(:)),'filled','markerfacealpha',0.2)
```



```
%figure(3);clf
%histogram2(log10(chi(ig)),log10(eps(ig)),'DisplayStyle','tile')
%colorbar
%caxis([0 500])
```