Analysis of some data from microstructure database

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May 26, 2017

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1 Overview

Analysis of some global microstructure data, to compare the results to my EQ14 analysis. Specifically I am looking at γ and the ratio of ϵ_χ/ϵ, where ϵ_χ is computed as

$$\epsilon_\chi = \frac{N^2\chi}{2\gamma < T_z^2} \tag{1}$$

2 Data

Data are from the microstructure data base at `https://microstructure.ucsd.edu/`. I am using matlab files made from the raw database files by Amy Waterhouse (shared w/ me via Google drive).

IWISE 11 vmp data were shared with me by Lou St. Laurent.

EQ14 data are from Jim Moum and company.

3 Code

Code and results (including figures and these notes) are available in a github repository: `https://github.com/OceanMixingGroup/Analysis/tree/master/Andy_Pickering/micro_database`

- `Plot_micro_data_AP.m`
- `Plot_hist_chieps_chi_all.m`
- `Plot_epschi_eps_2Dhist_all.m`
- `Plot_chi_eps_norm_all.m`

4 Results

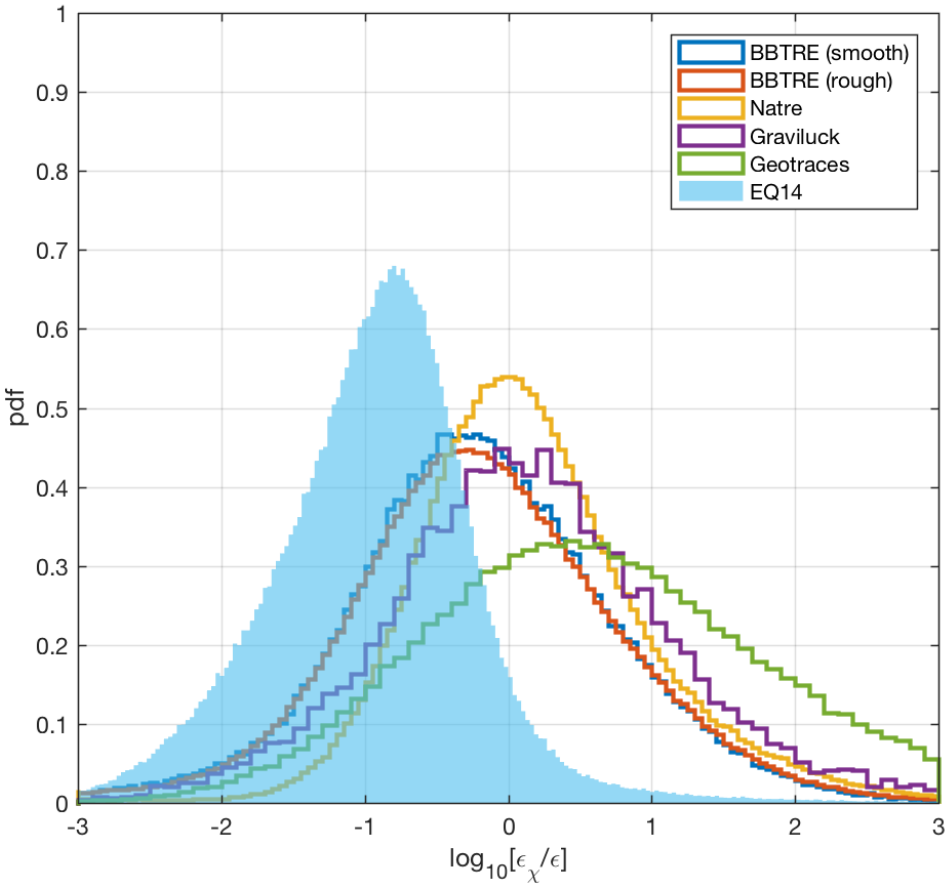

Figure 1: Histograms of (log10) the ratio ϵ_χ/ϵ.

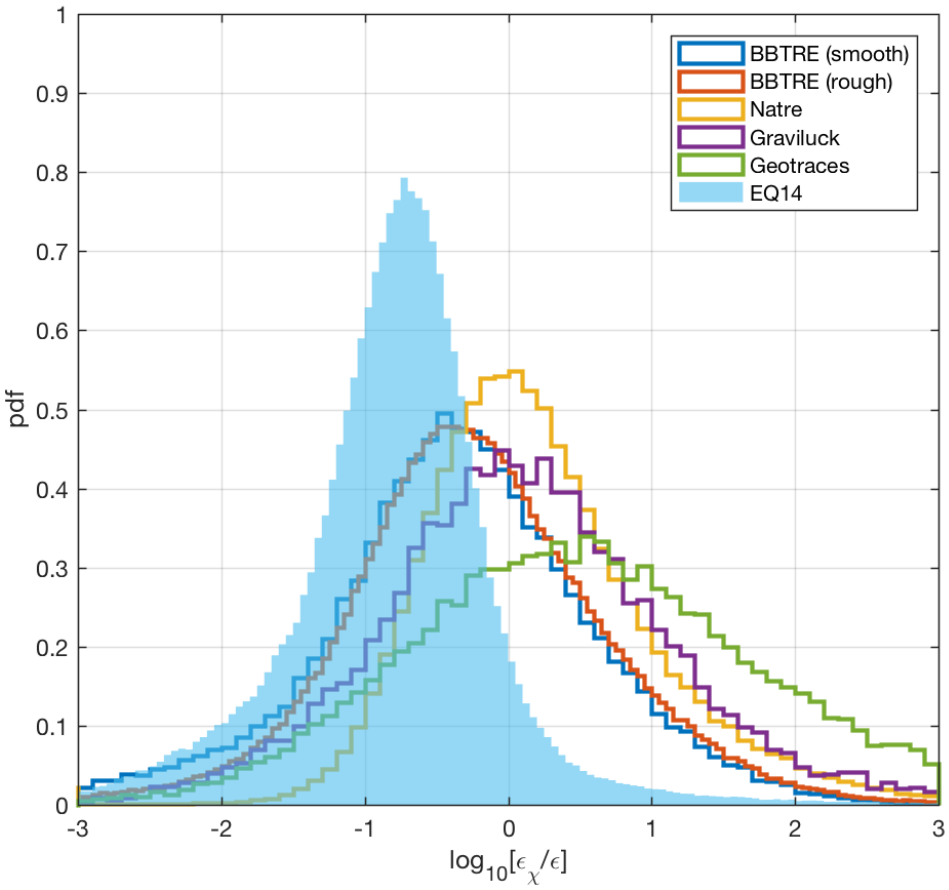

Figure 2: Histograms of (log10) the ratio ϵ_χ/ϵ. Values below estimated noise level of $log_{10}[\epsilon] = -10$ discarded.

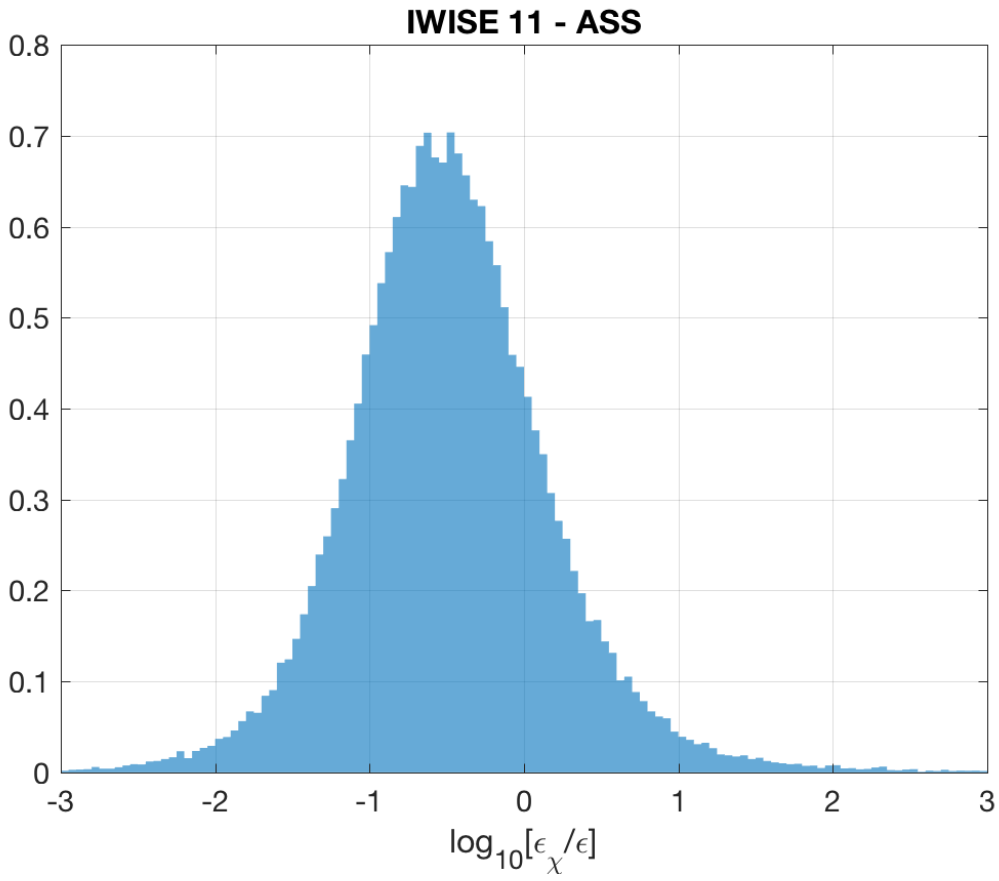

Figure 3: Histograms of (log10) the ratio ϵ_χ/ϵ.

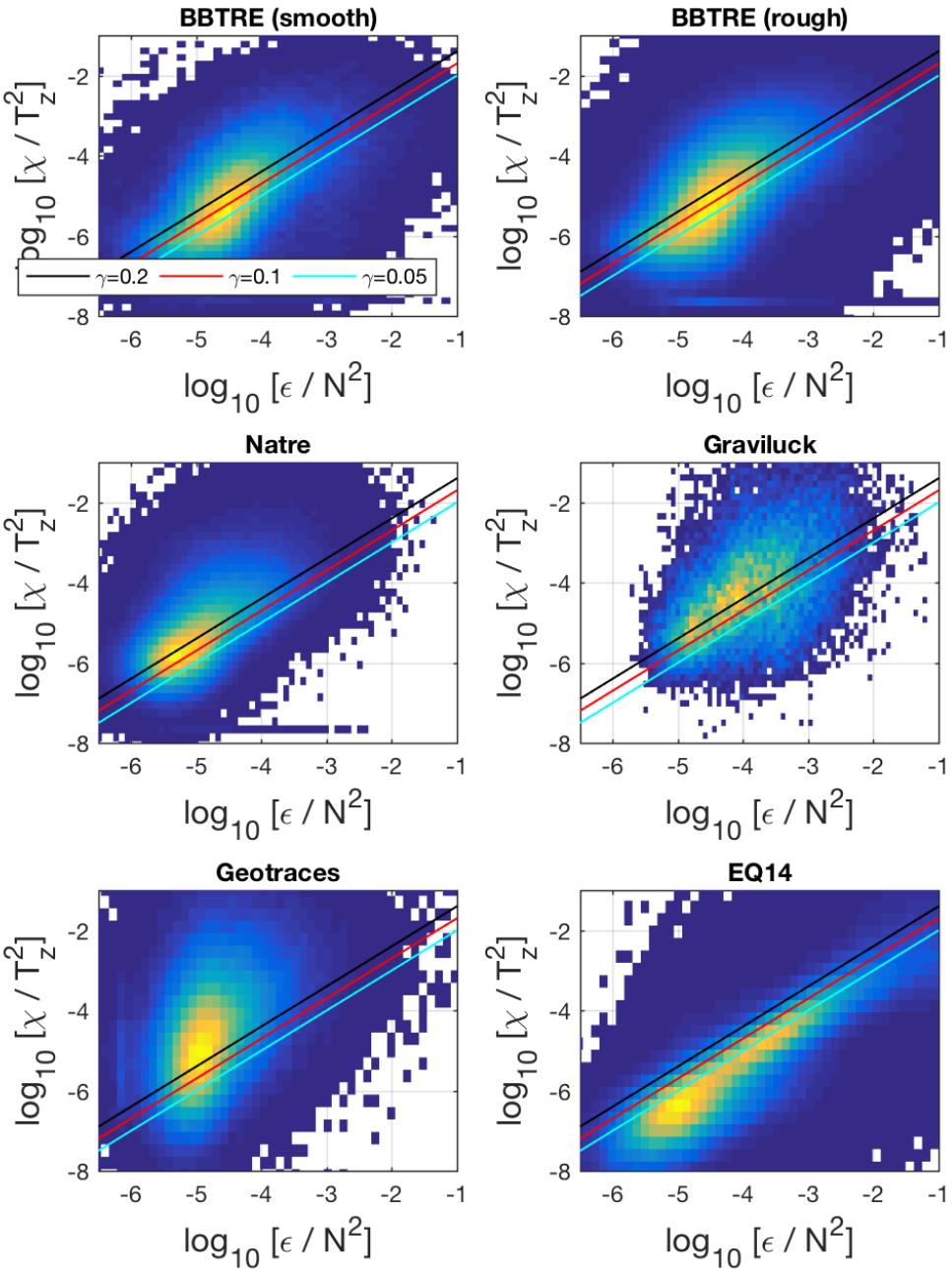

Figure 4: χ vs ϵ, normalized such that the slope is proportional to γ.

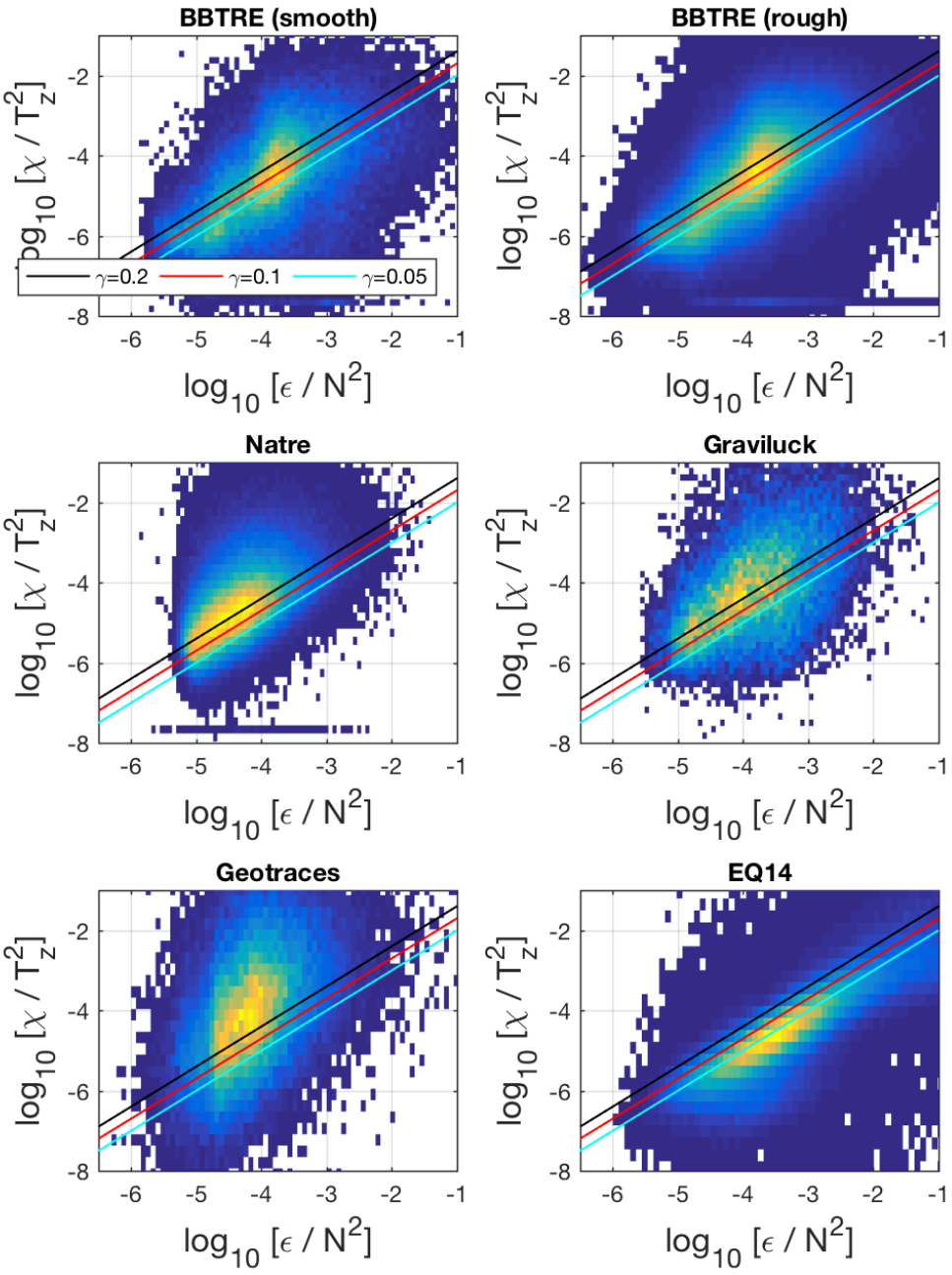

Figure 5: χ vs ϵ, normalized such that the slope is proportional to γ. Values below estimated noise level of $log_{10}[\epsilon] = -10$ discarded.

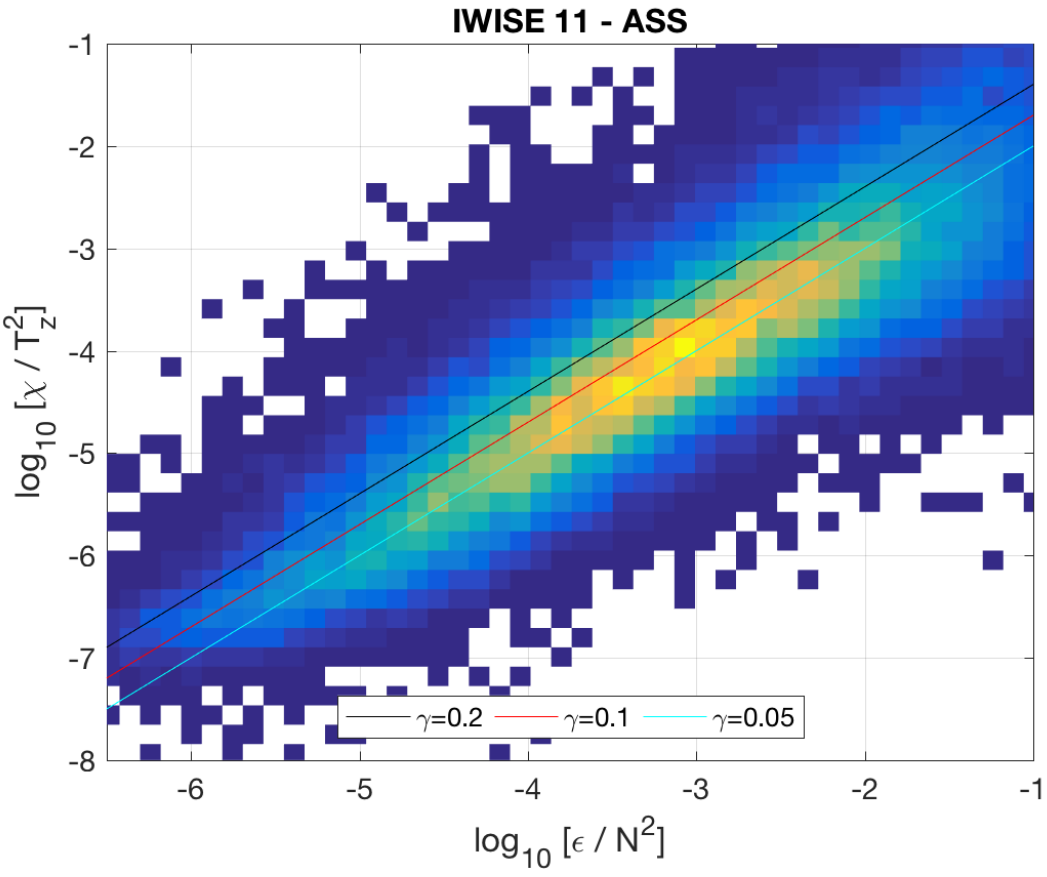

Figure 6: χ vs ϵ, normalized such that the slope is proportional to γ.

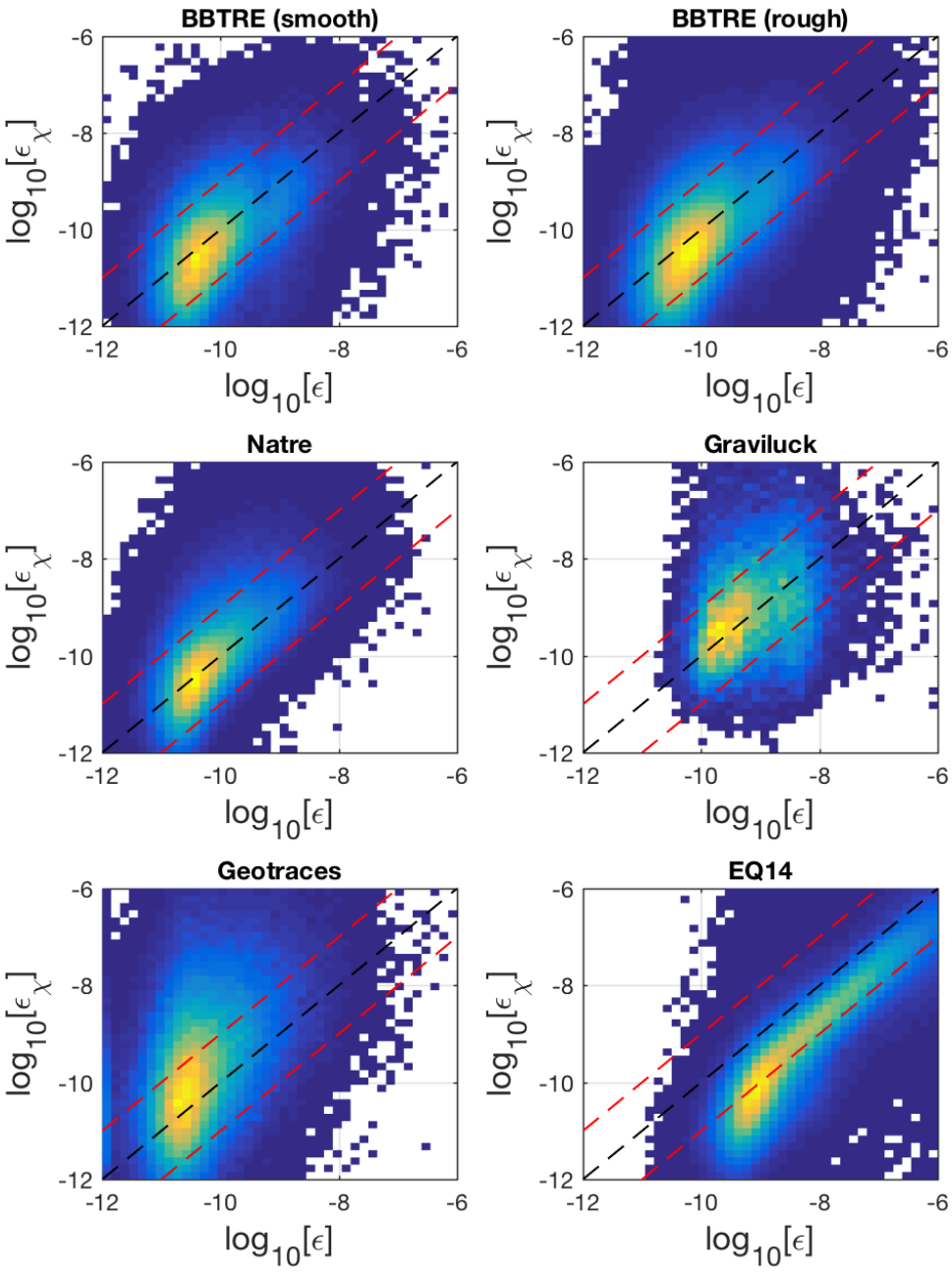

Figure 7: 2D histograms of ϵ_χ vs ϵ.

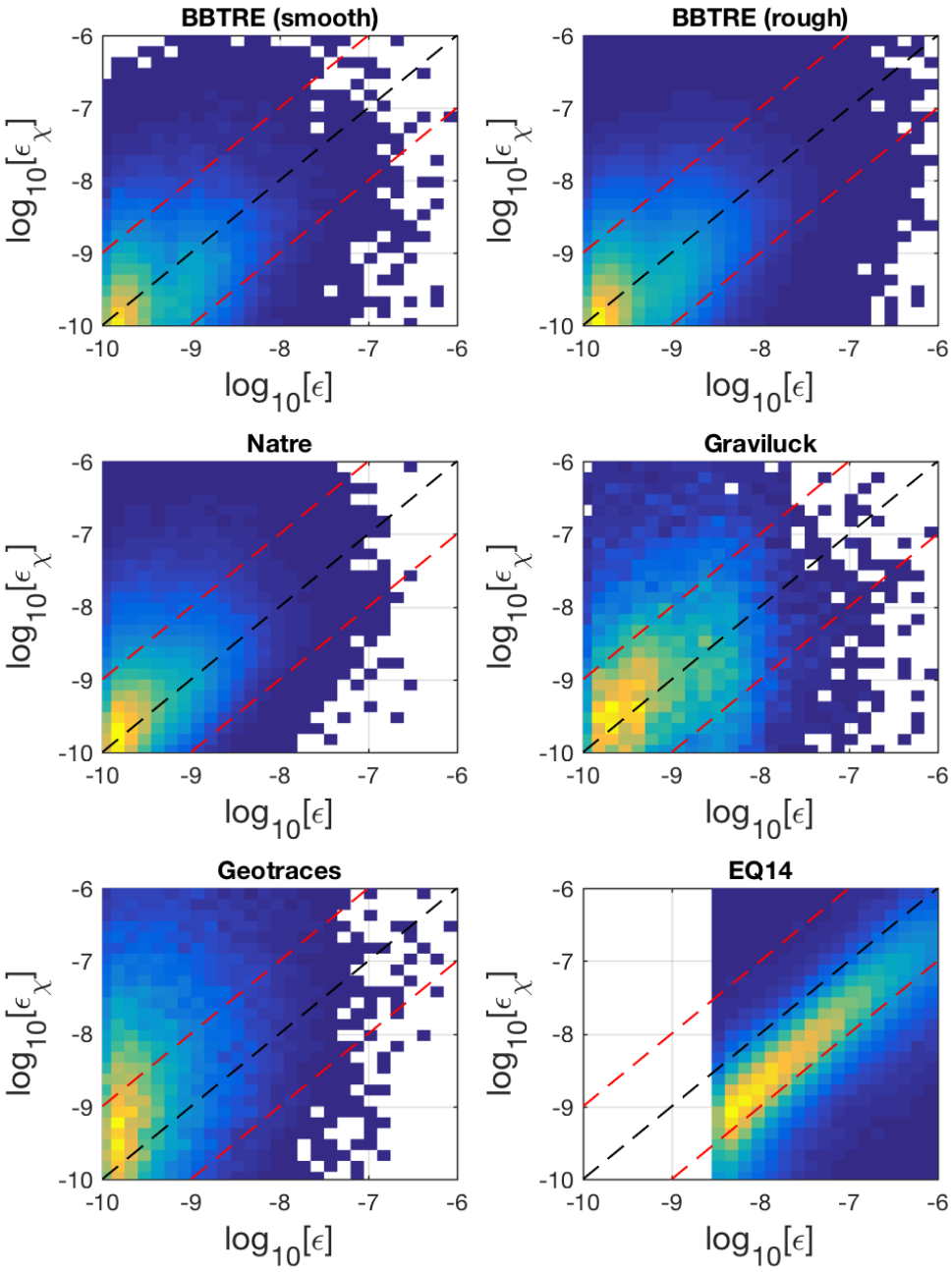

Figure 8: 2D histograms of ϵ_χ vs ϵ. Values below estimated noise level of $log_{10}[\epsilon] = -10$ discarded.

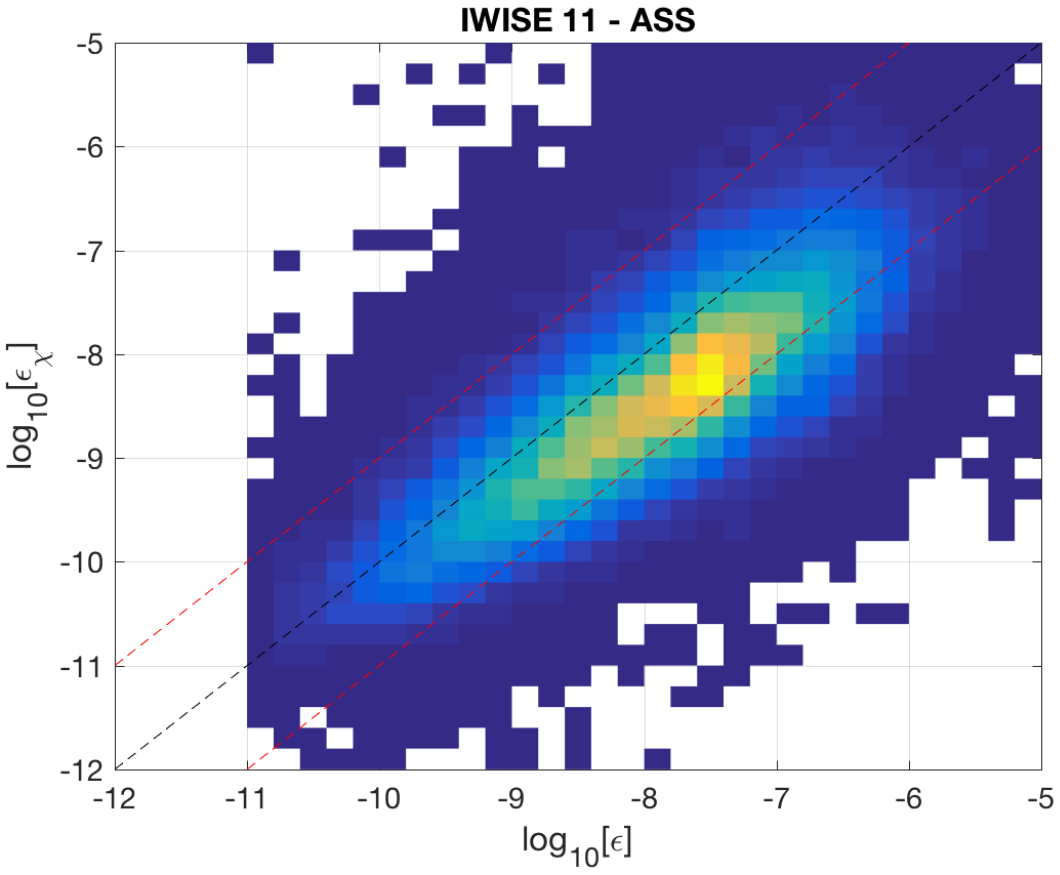

Figure 9: 2D histograms of ϵ_χ vs ϵ.