

# Analysis of some data from microstructure database

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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  $\gamma$  and the ratio of  $\epsilon_\chi/\epsilon$ , where  $\epsilon_\chi$  is computed as

$$\epsilon_\chi = \frac{N^2\chi}{2\gamma < T_z^2} \quad (1)$$

## 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](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

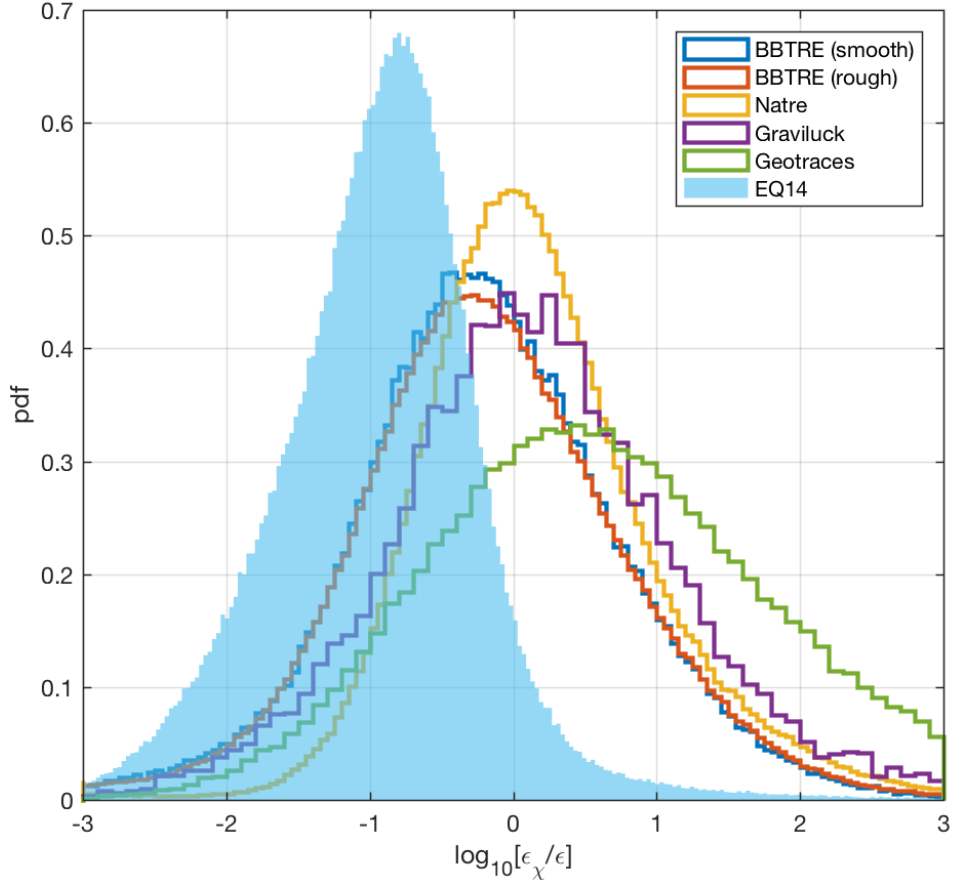


Figure 1: Histograms of  $(\log_{10})$  the ratio  $\epsilon_{\chi}/\epsilon$ .

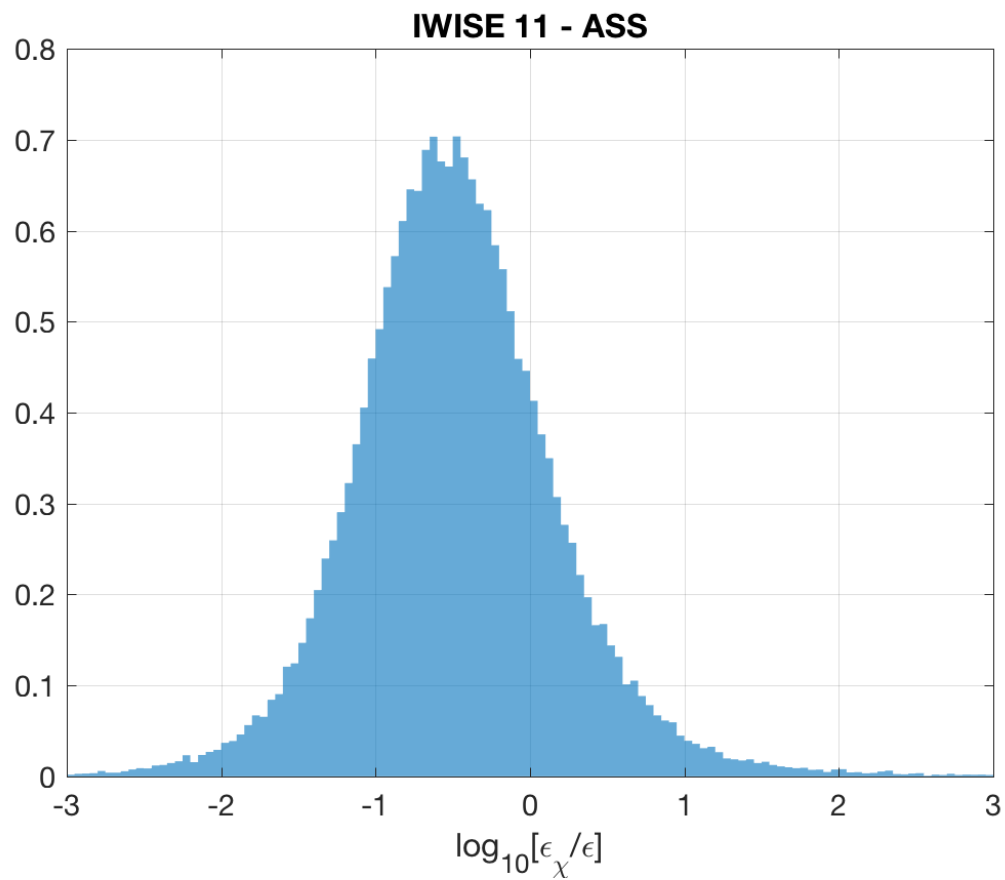


Figure 2: Histograms of  $(\log_{10})$  the ratio  $\epsilon_{\chi}/\epsilon$ .

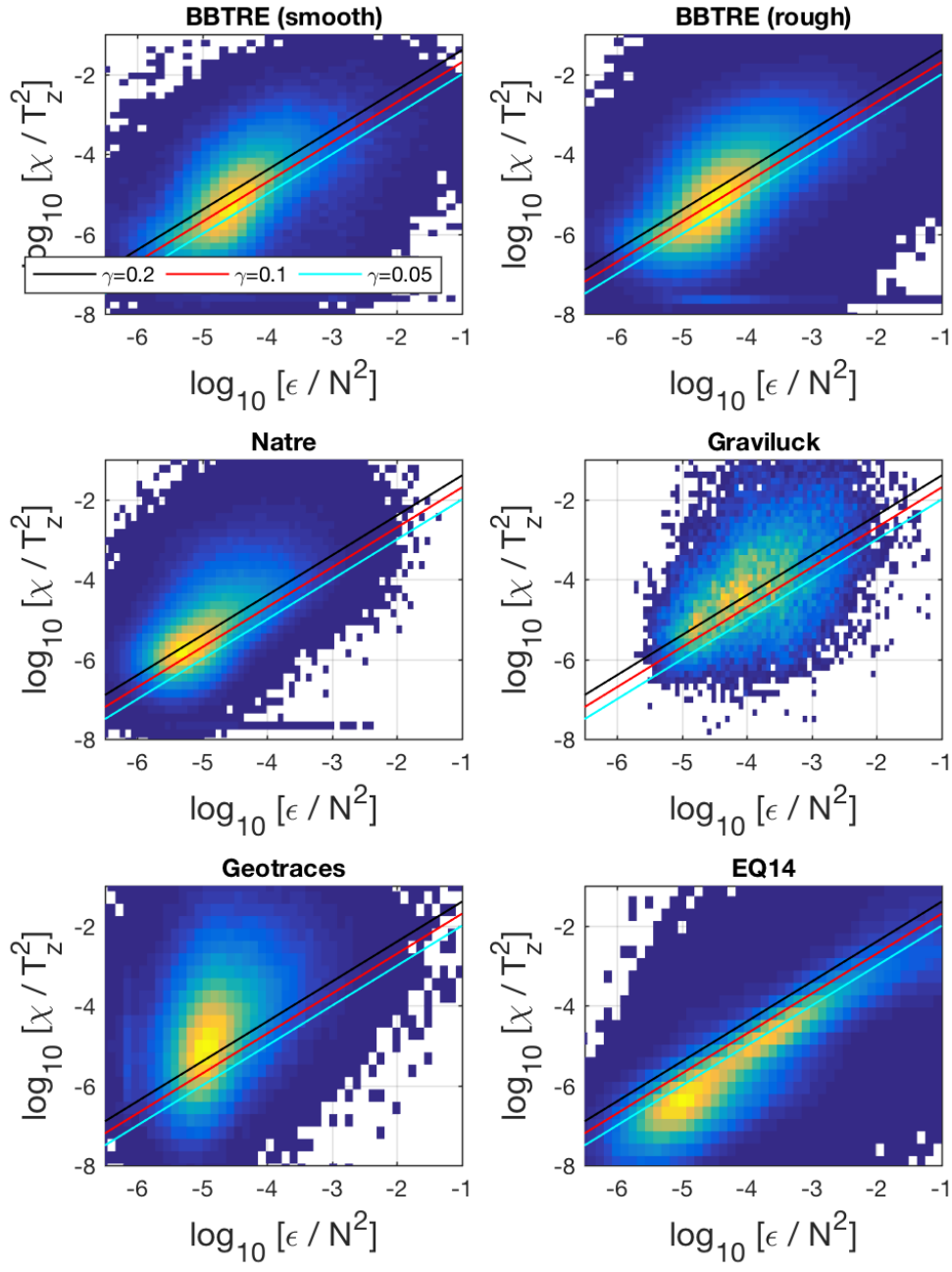


Figure 3:  $\chi$  vs  $\epsilon$ , normalized such that the slope is proportional to  $\gamma$ .

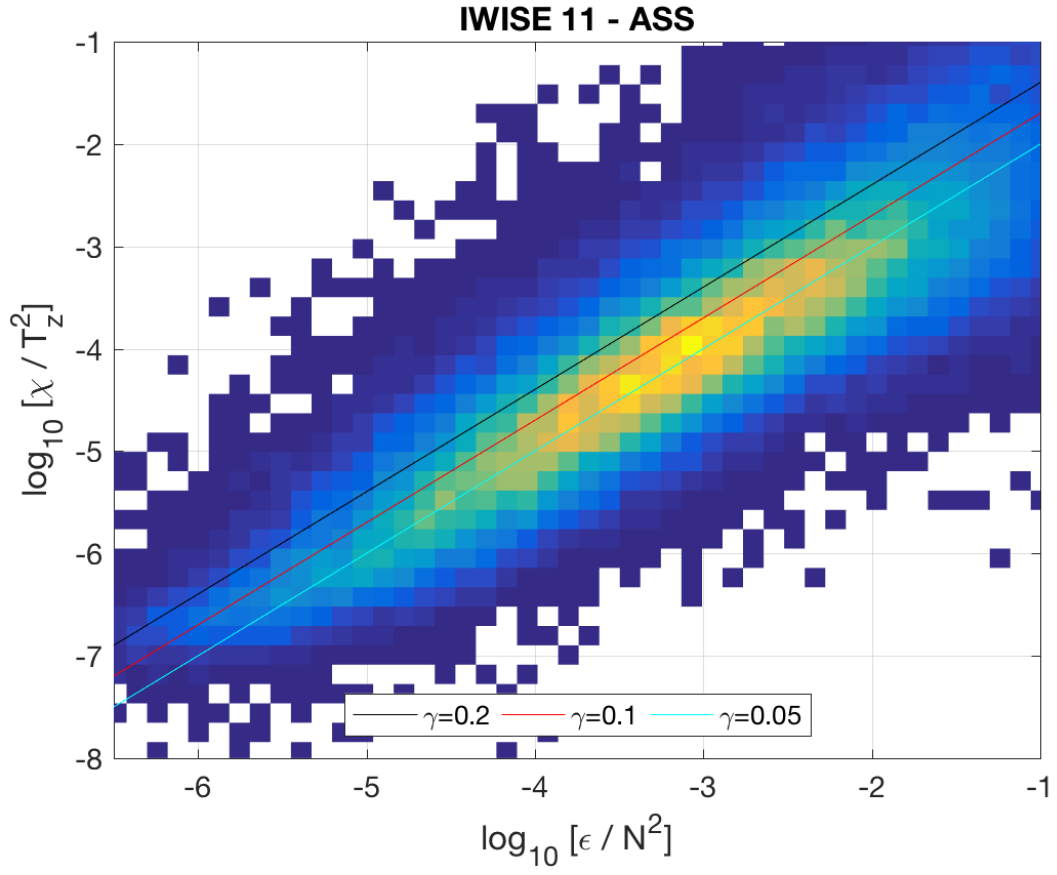


Figure 4:  $\chi$  vs  $\epsilon$ , normalized such that the slope is proportional to  $\gamma$ .

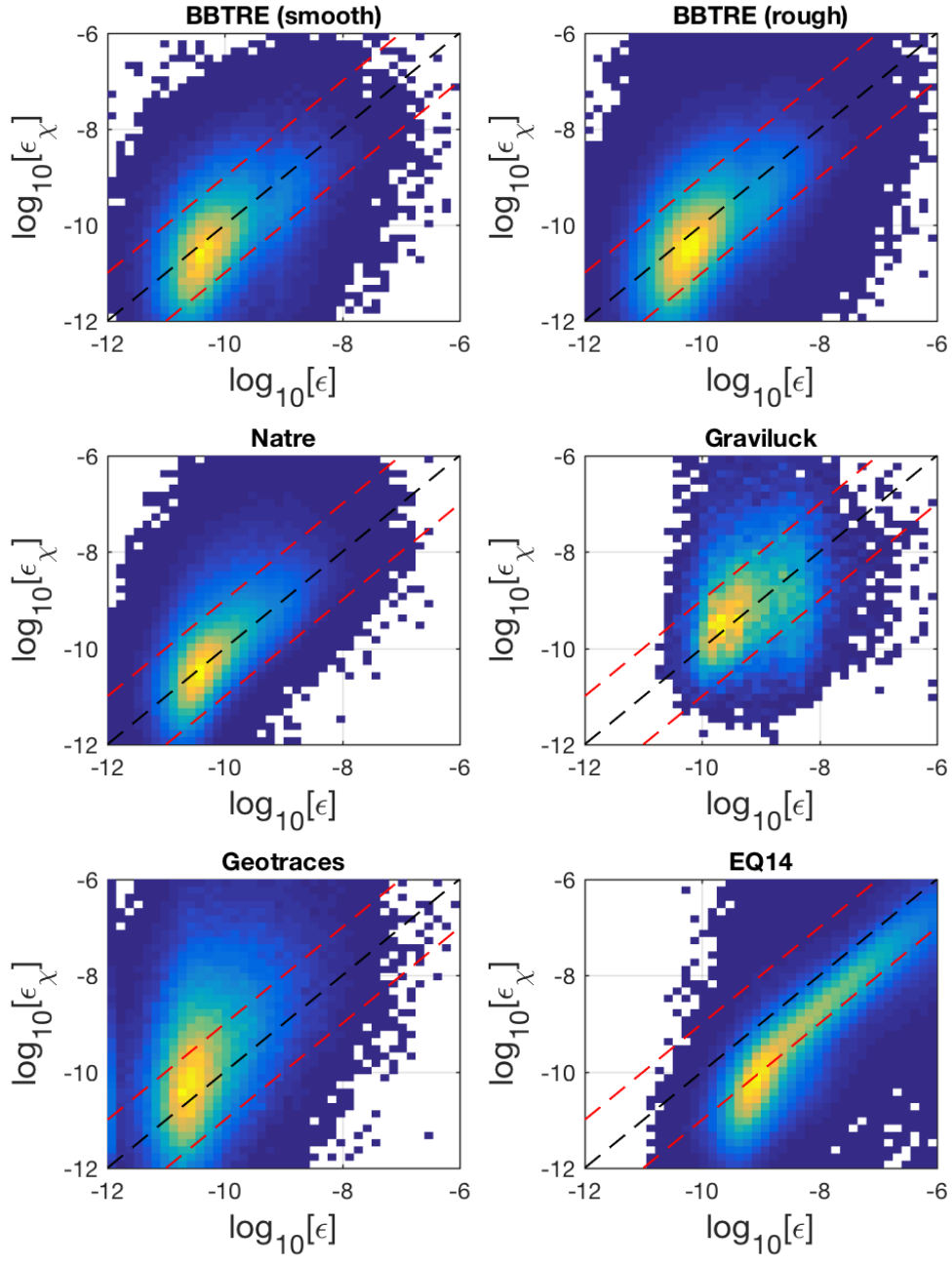


Figure 5: 2D histograms of  $\epsilon_\chi$  vs  $\epsilon$ .

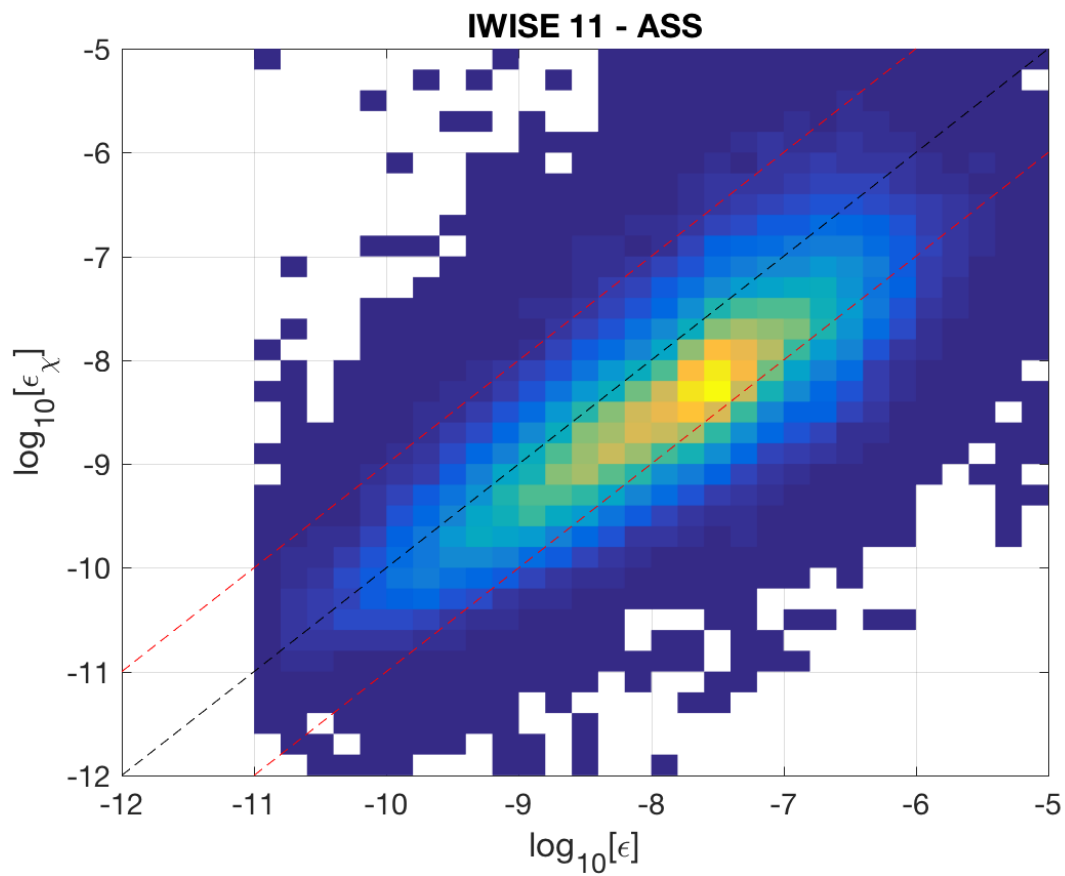


Figure 6: 2D histograms of  $\epsilon_\chi$  vs  $\epsilon$ .