Wirewalker Signature 1000 turbulence data is arranged in a structure called “turb”. This is a final, gridded product. Data is sorted into profiles and depth binned. Turbulence is calculated from direct measurements of turbulent velocity fluctuations using the pulse-coherent, or HR mode on the Nortek Signature 1000 ADCP. Only data from upcasts are saved.

Variables:

ep: Turbulent dissipation of kinetic energy, epsilon, calculated using a spectral method. Spectra of turbulent velocity fluctuations are fitted at wavenumbers between 0.5 m^-1 and the resolution of the sonar. Epsilon is calculated from the fit parameter A. Units: W/kg, Dimensions: depth-bin x profiles x beam

N: a raw fit parameter for spectral fits, representing the estimated noise floor. Units s^-2m^1, Dimensions: depth-bin x profiles x beam

SNR: A/N, an estimate of the signal to noise ratio at a wavenumber of 1 m^-1. Units: ratio, Dimensions: depth-bin x profiles x beam

A: a raw fit parameter for the spectral fits, used to estimate epsilon. Units: s^-2m^1, Dimensions: depth-bin x profiles x beam

ep\_struct: Turbulent dissipation of kinetic energy, epsilon, calculated using a structure function method. Structure functions are fitted at separations between 1 and 15x the cell. Epsilon is calculated from the fit parameter A\_struct. Units: W/kg, Dimensions: depth-bin x profiles x beam

N\_struct: A raw fit parameter from structure function fits. Can be used to estimate the noise floor. Units: m^2s^-2, Dimensions: depth-bin x profiles x beam

time: time in matlab date-time. A mean time for each profile is given. Units: days, Dimensions: 1 x profiles

depth: depth in meters.

A\_struct: A raw fit parameter from structure function fits. A is used to estimate epsilon. Units: m^2s^-2, Dimensions: depth-bin x profiles x beam

spec: Depth averaged wavenumber spectra used in spectra -> epsilon calculations. These spectra are interpolated onto a constant wavenumber grid. Units s^-2m^1, Dimensions: depth-bin x profiles x wavenumber x beam

struct\_fun: Depth averaged structure functions used in structure function -> epsilon calculations. Units: m^2s^-2, Dimensions: depth-bin x profiles x separation x beam

r: separation scale for structure functions Units: meters, Dimensions: separation

k: along-beam wavenumber for spectra. Units: m^-1, Dimensions: wavenumber

corr: average signal correlation for all data-points used for a given epsilon calculation. Units: percent, Dimensions: depth-bin x profiles x beam

spec\_num: number of spectra averaged. Units: count, Dimensions: depth-bin x profiles x wavenumber x beam

slope: estimate of spectral slope between 0.5m^-1 and the noise cutoff. Units: ratio, Dimensions: Dimensions: depth-bin x profiles x beam

N\_slope: a raw fit parameter representing the noise estimate from the slope fit. Units: s^-2m^1, Dimensions: Dimensions: depth-bin x profiles x beam

z: depth. Units: meters, Dimensions: depth-bin

beam\_number: Nortek beam number corresponding to each beam dimension. Units: beam, Dimensions: beam