Wavelet Filtering of 3D atmospheric turbulence

April 11, 2003

Abstract

1 Introduction

2 Results

2.1 Pressure

2.1.1 Total

2.1.4 PDFs

2.1.5 Horizontal Spectra

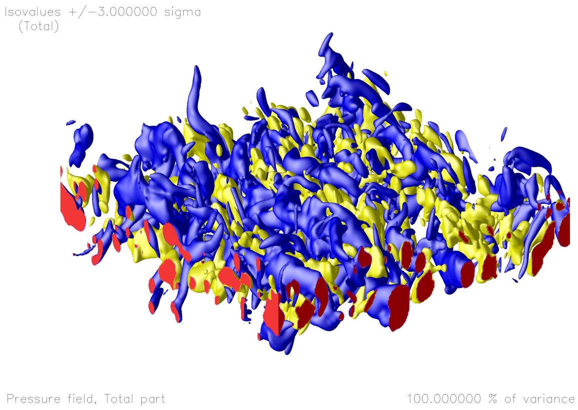


Figure 1: Total part, with isovalue equal to $3\sigma_{tot}$

2.1.2 Coherent

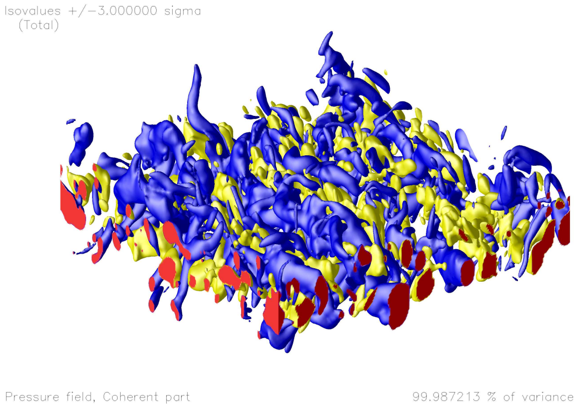


Figure 2: Coherent part, with isovalue equal to $3\sigma_{tot}$

2.1.3 Incoherent

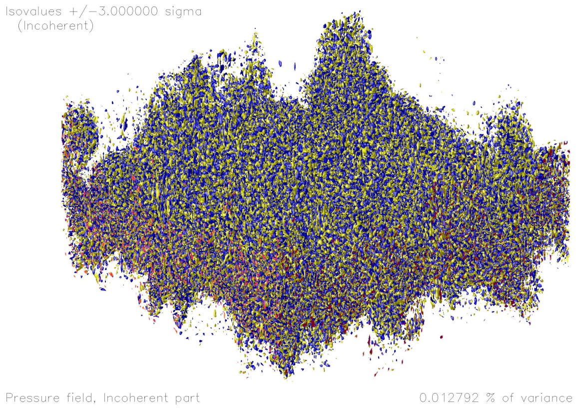
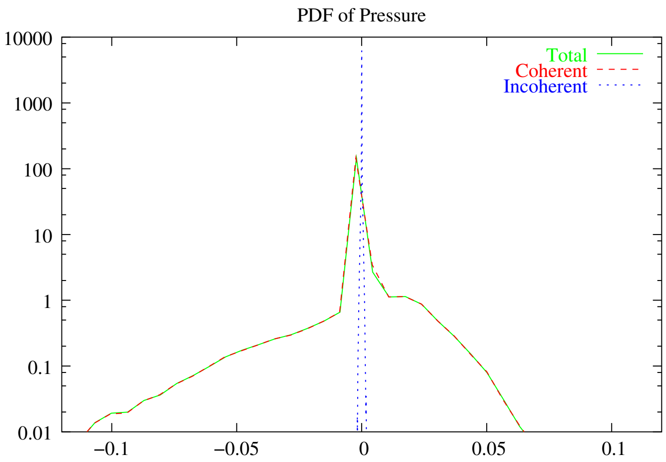


Figure 3: Incoherent part, with isovalue equal to $3\sigma_{inc}$



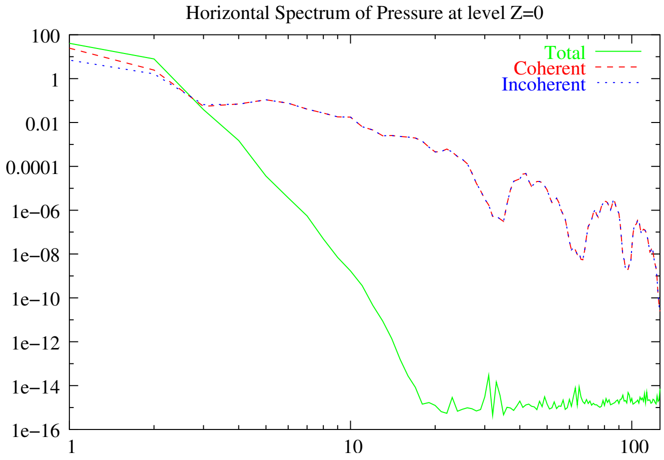


Figure 4: Horizontal spectral at $Z = 0$

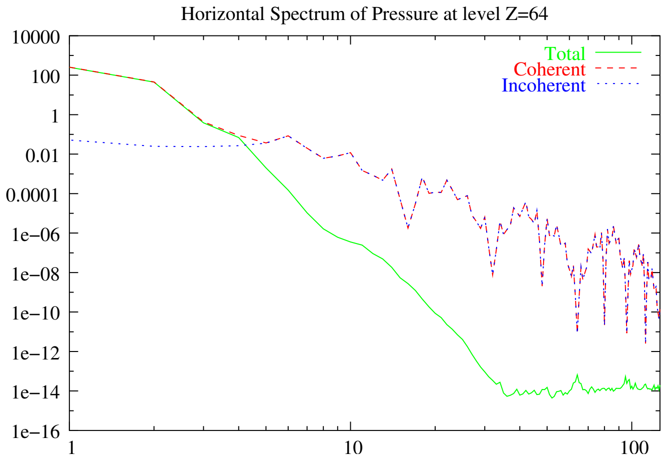


Figure 5: Horizontal spectral at $Z = 64$

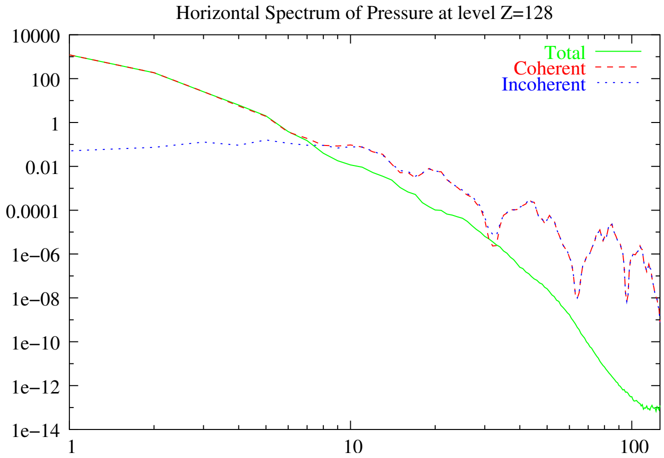


Figure 6: Horizontal spectral at $Z = 128$

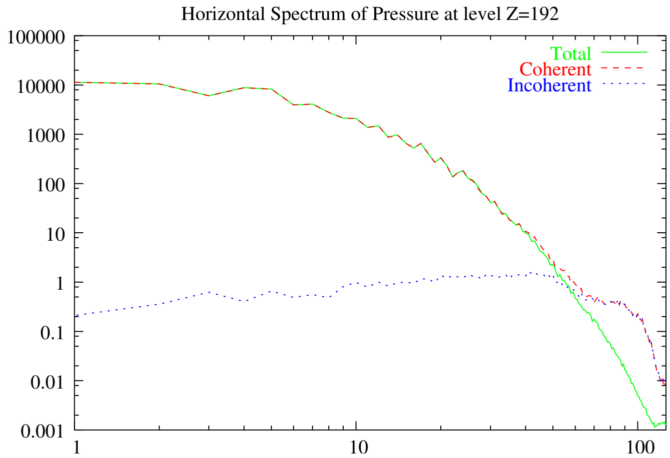


Figure 7: Horizontal spectral at $Z = 192$

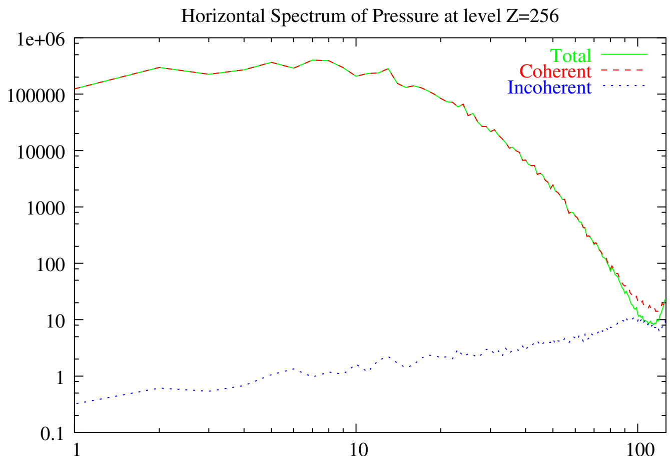


Figure 8: Horizontal spectral at $Z = 256$

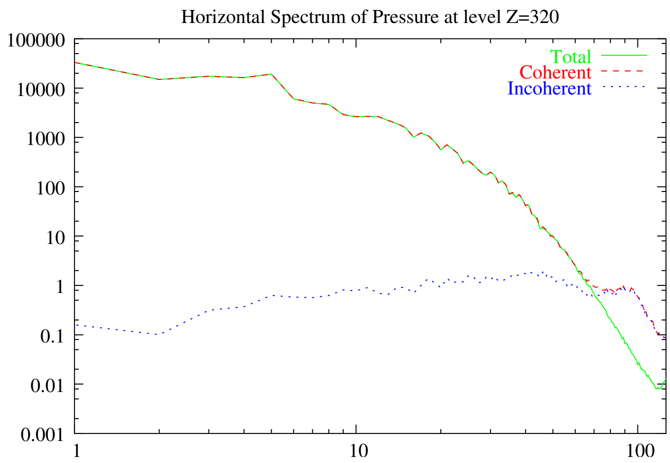


Figure 9: Horizontal spectral at $Z = 320$

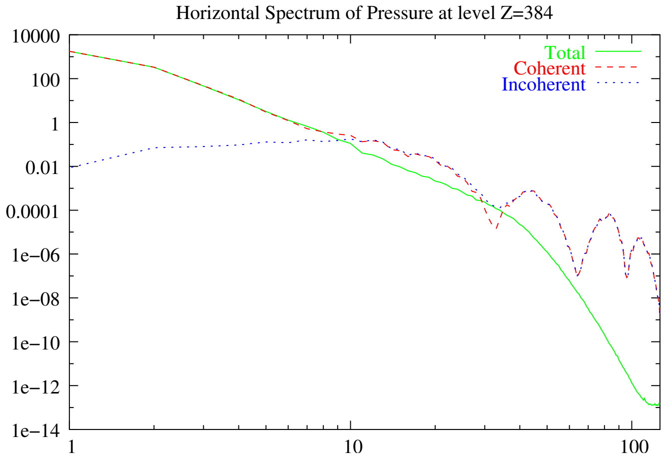


Figure 10: Horizontal spectral at $Z = 384$

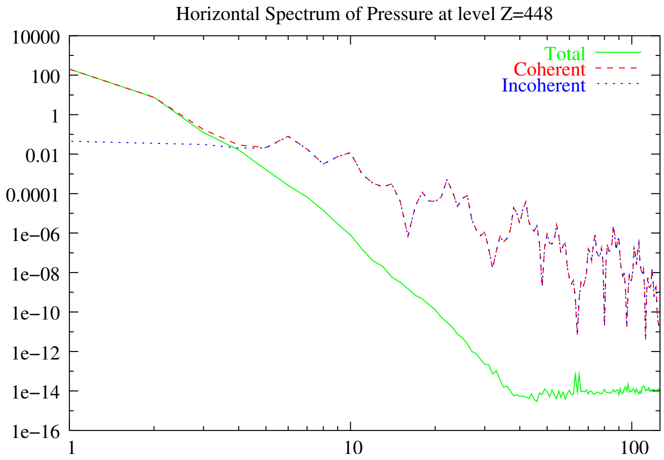


Figure 11: Horizontal spectral at $Z = 448$

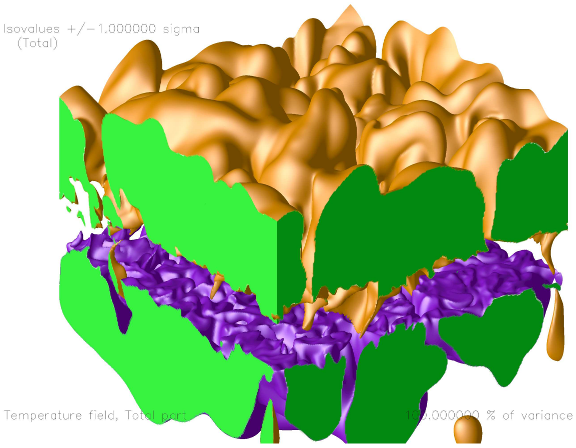


Figure 12: Total part, with isovalue equal to σ_{tot}

2.2 Temperature

2.2.1 Total

2.2.2 Coherent

2.2.3 Incoherent

2.2.4 PDFs

2.2.5 Horizontal Spectra

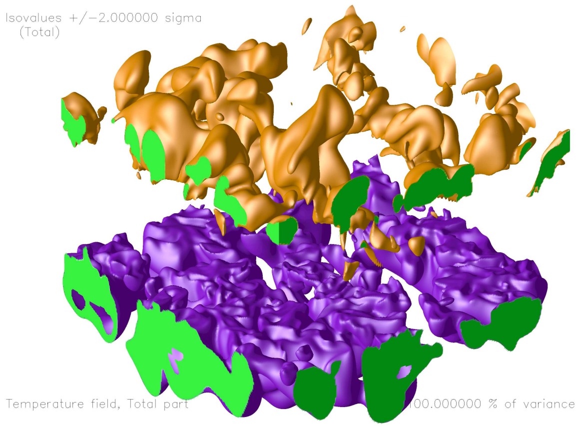


Figure 13: Coherent part, with isovalue equal to $2\sigma_{tot}$

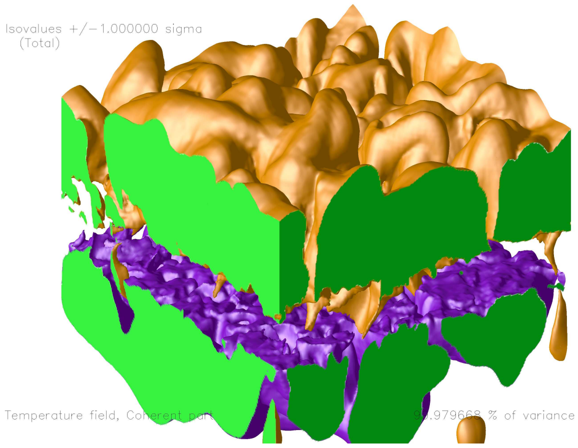
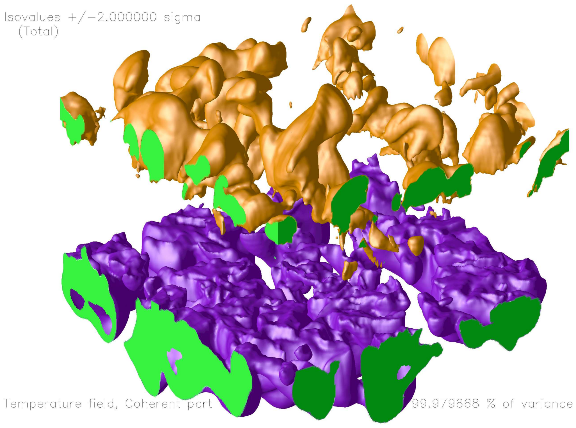
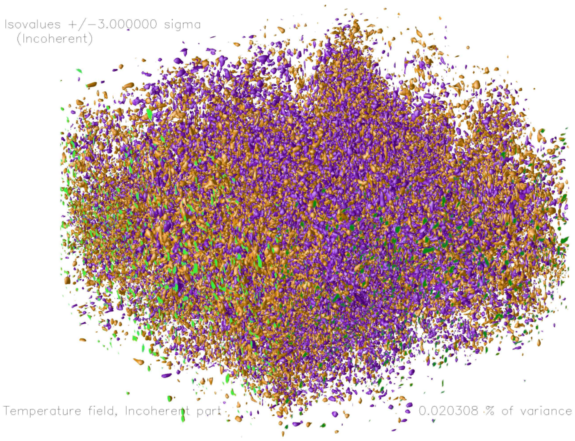
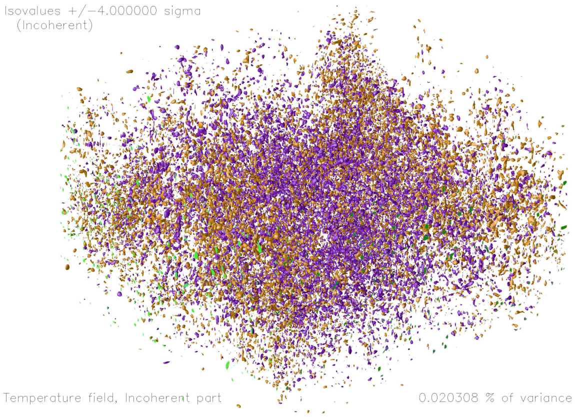
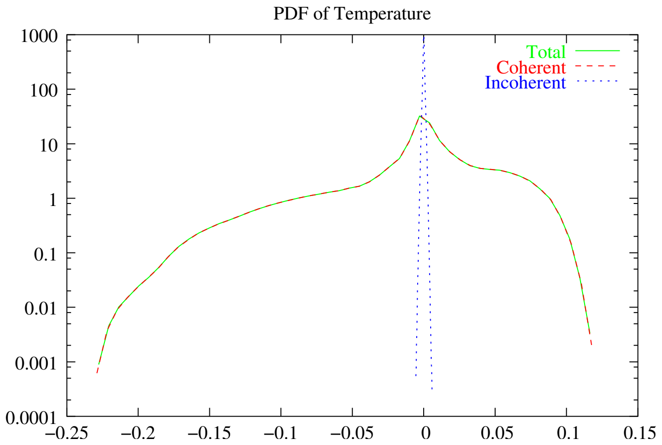


Figure 14: Incoherent part, with isovalue equal to σ_{inc}


Isovalues +/−2.000000 sigma
(Total)
Temperature field, Coherent part
99.979668 % of variance


Isovalues +/−3.000000 sigma
(Incoherent)
Temperature field, Incoherent part
0.020308 % of variance


Isovalues +/−4.000000 sigma
(Incoherent)
Temperature field, Incoherent part
0.020308 % of variance



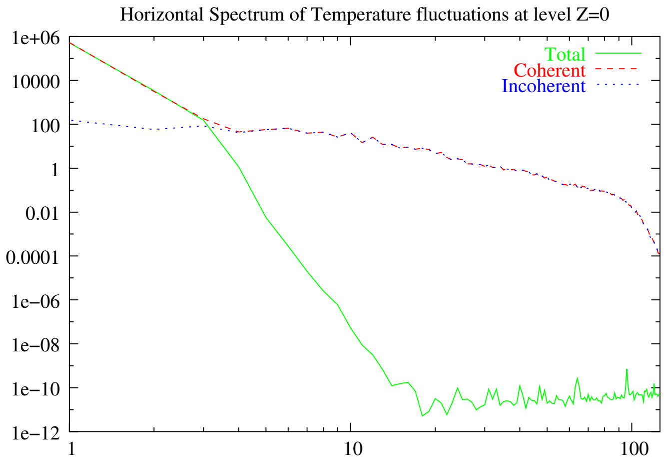


Figure 15: Horizontal spectral at $Z = 0$

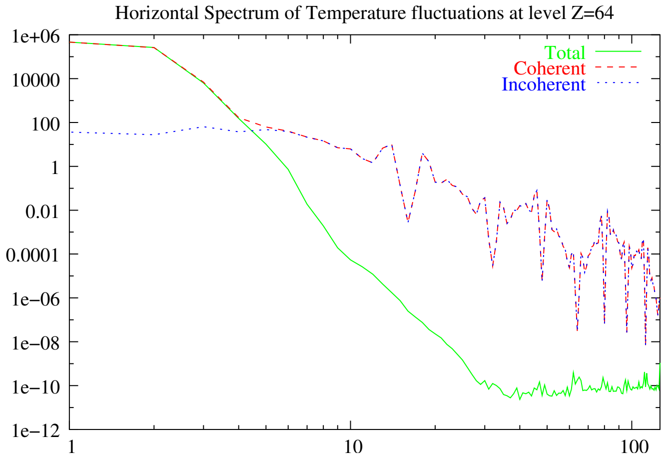


Figure 16: Horizontal spectral at $Z = 64$

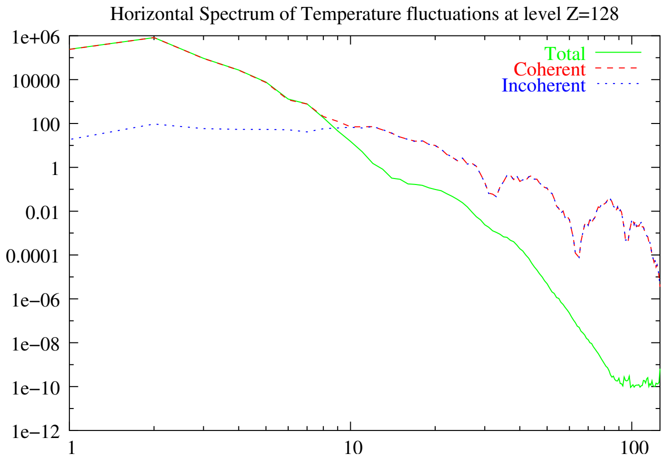


Figure 17: Horizontal spectral at $Z = 128$

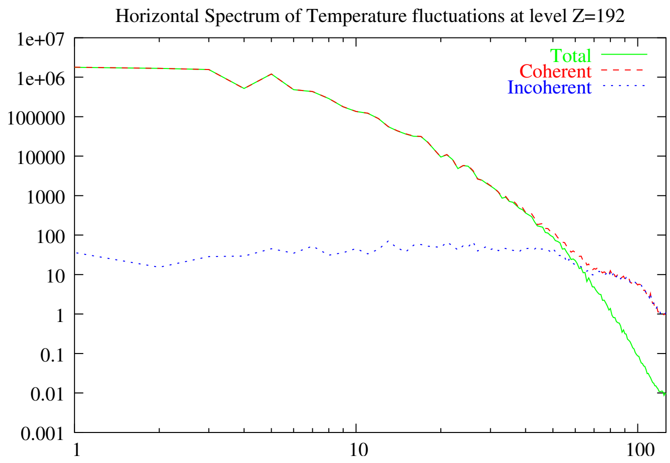


Figure 18: Horizontal spectral at $Z = 192$

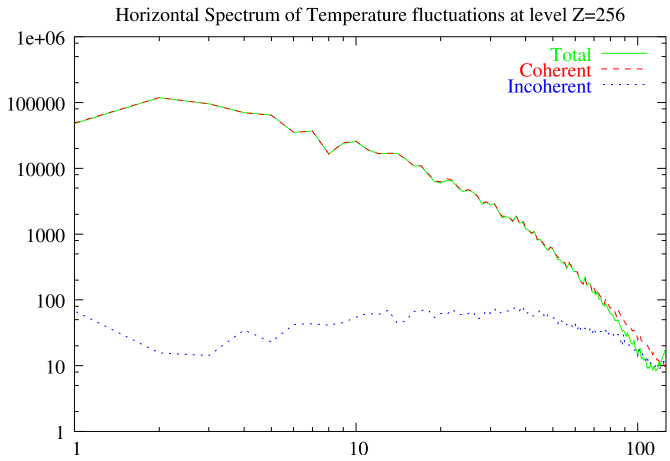


Figure 19: Horizontal spectral at $Z = 256$

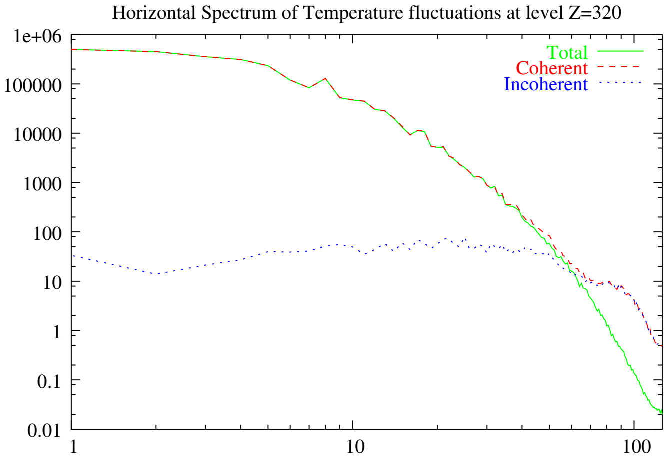


Figure 20: Horizontal spectral at $Z = 320$

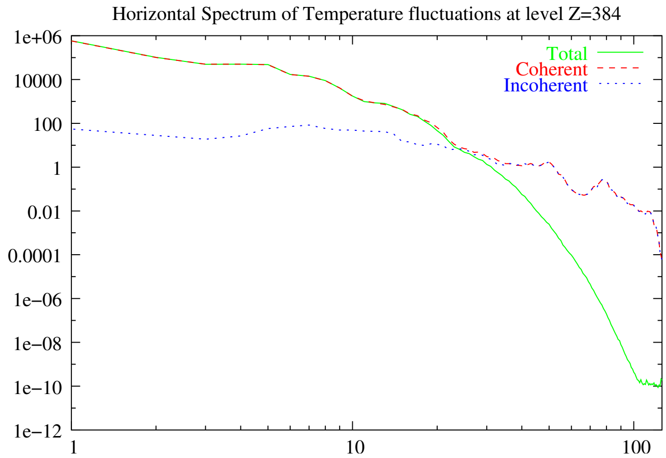


Figure 21: Horizontal spectral at $Z = 384$

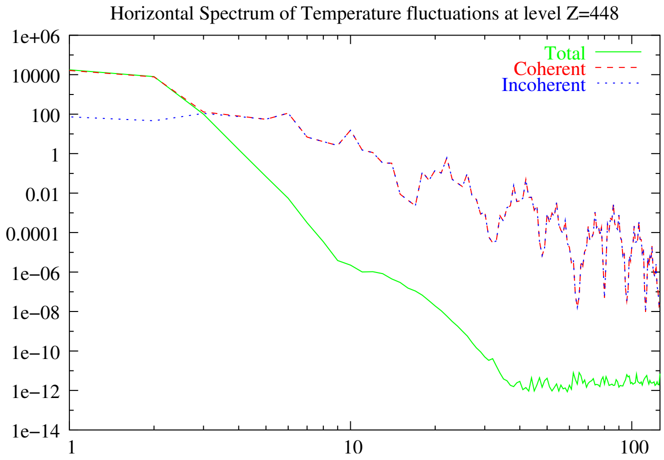


Figure 22: Horizontal spectral at $Z = 448$

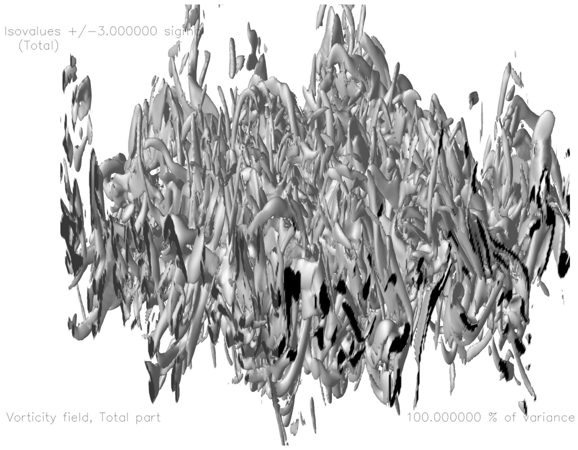


Figure 23: Total part, with isovalue equal to $3\sigma_{tot}$

2.3 Vorticity

2.3.1 Total

2.3.2 Coherent

2.3.4 PDFs

2.3.5 Horizontal Spectra

Figure 24: Coherent part, with isovalue equal to $3\sigma_{tot}$

2.3.3 Incoherent

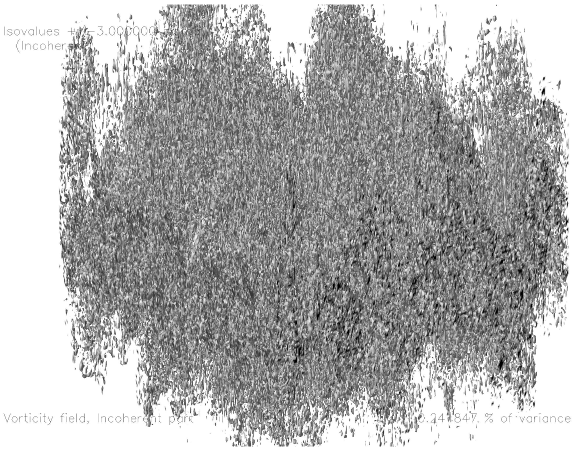
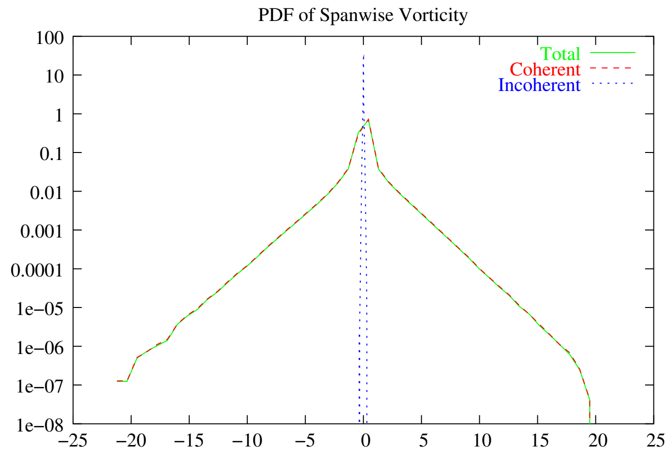


Figure 25: Incoherent part, with isovalue equal to $3\sigma_{inc}$



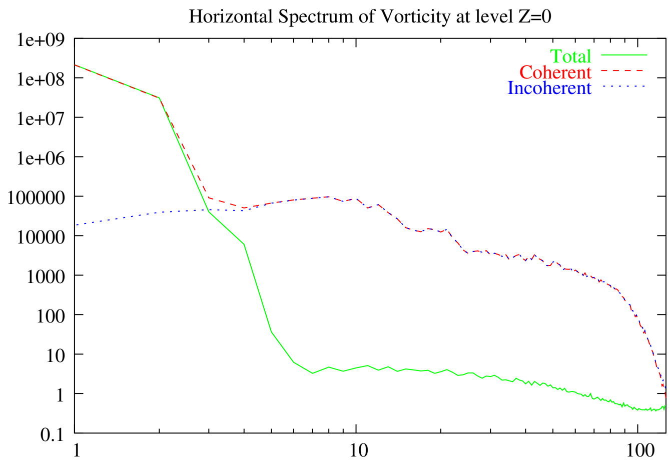


Figure 26: Horizontal spectral at $Z = 0$

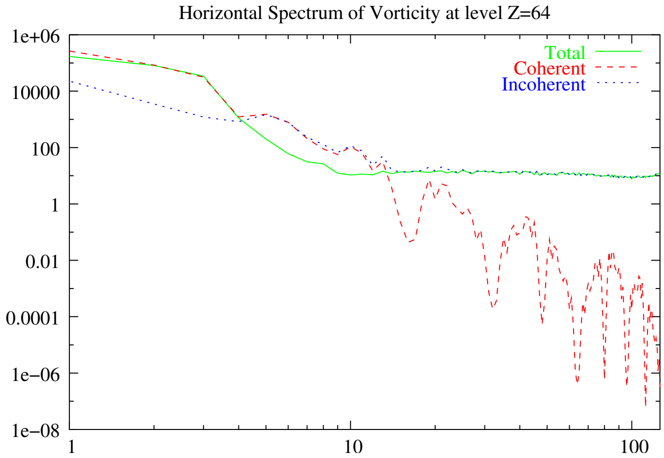


Figure 27: Horizontal spectral at $Z = 64$

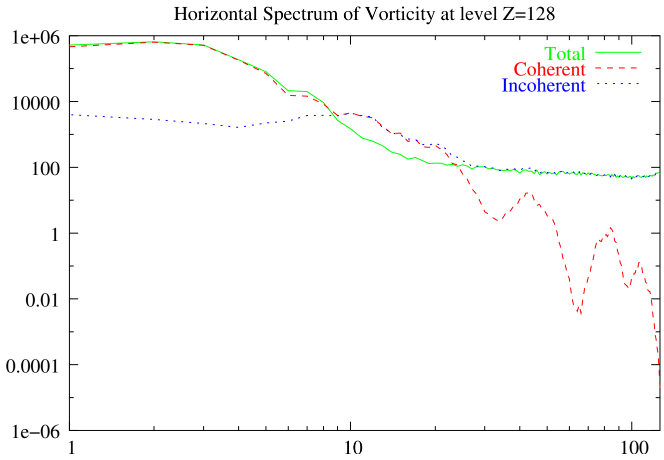


Figure 28: Horizontal spectral at $Z = 128$

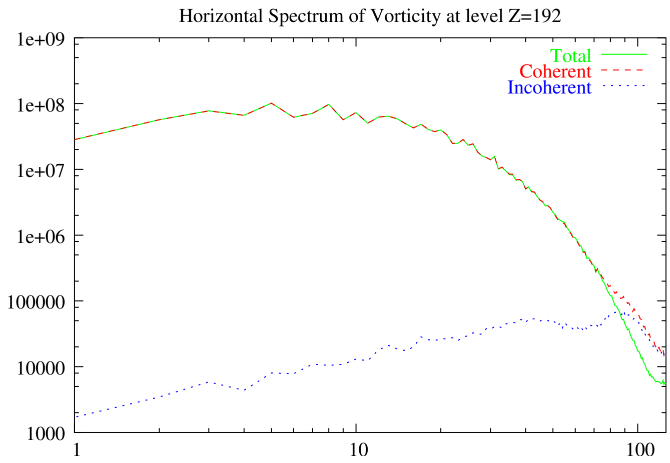


Figure 29: Horizontal spectral at $Z = 192$

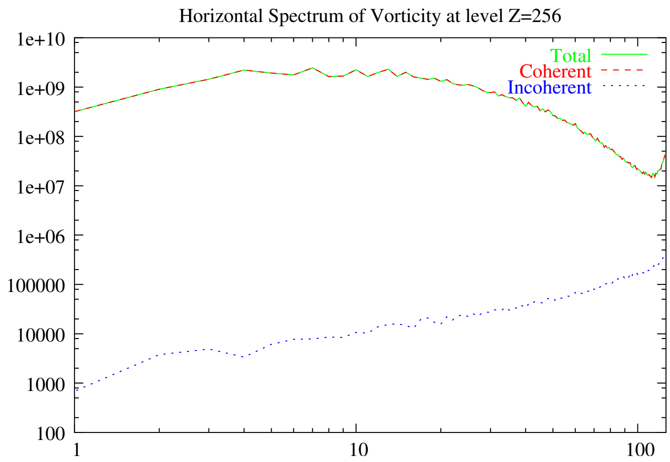


Figure 30: Horizontal spectral at $Z = 256$

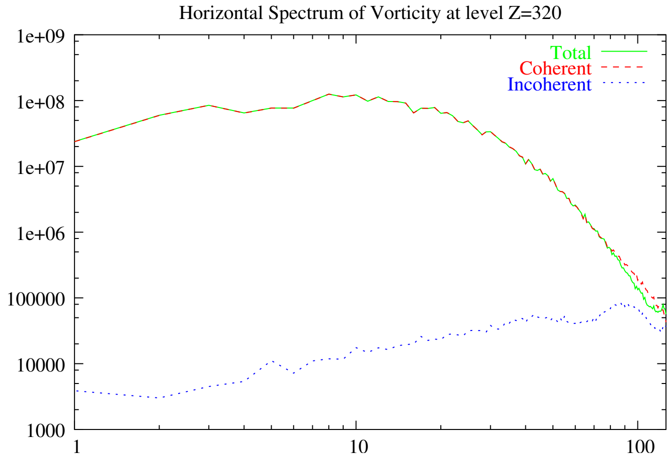


Figure 31: Horizontal spectral at $Z = 320$

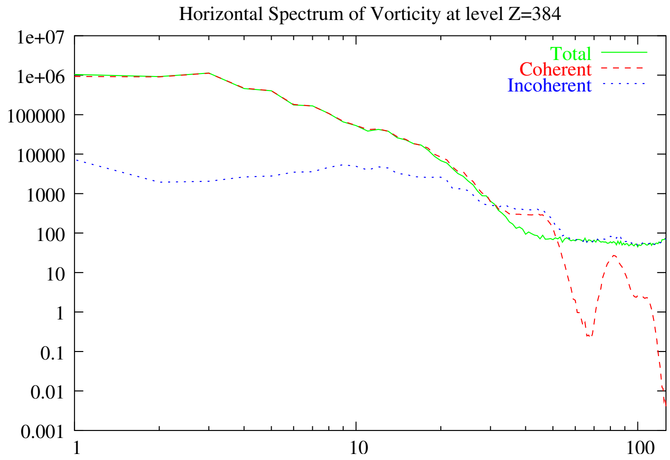


Figure 32: Horizontal spectral at $Z = 384$

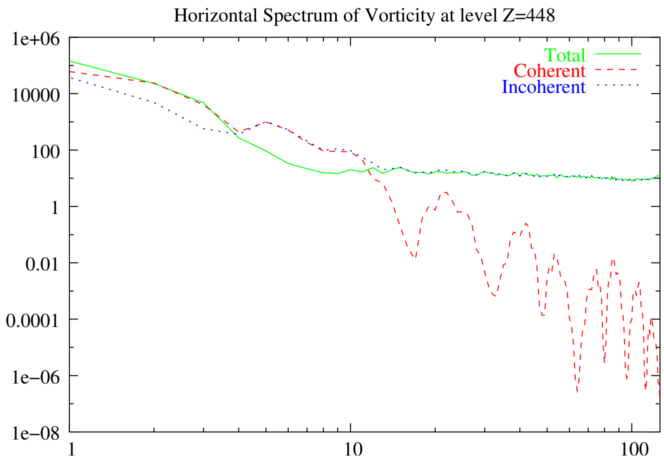


Figure 33: Horizontal spectral at $Z = 448$

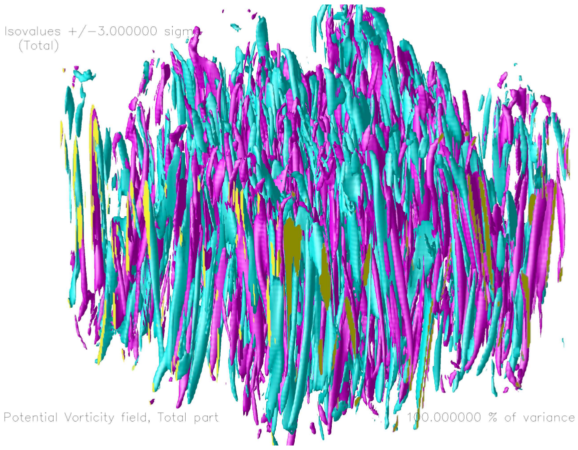


Figure 34: Total part, with isovalue equal to $3\sigma_{tot}$

2.4 Potential Vorticity

2.4.1 Total

2.4.2 Coherent

2.4.3 Incoherent

2.4.4 PDFs

2.4.5 Horizontal Spectra

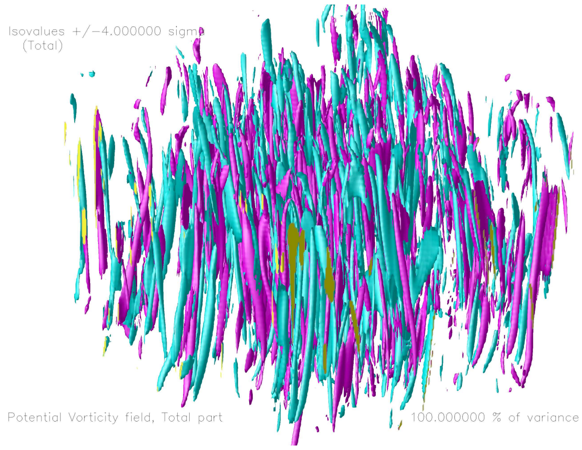


Figure 35: Total part, with isovalue equal to $4\sigma_{tot}$

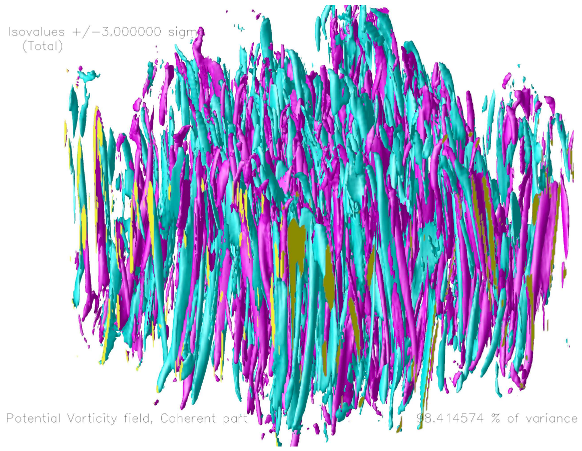


Figure 36: Coherent part, with isovalue equal to $3\sigma_{tot}$

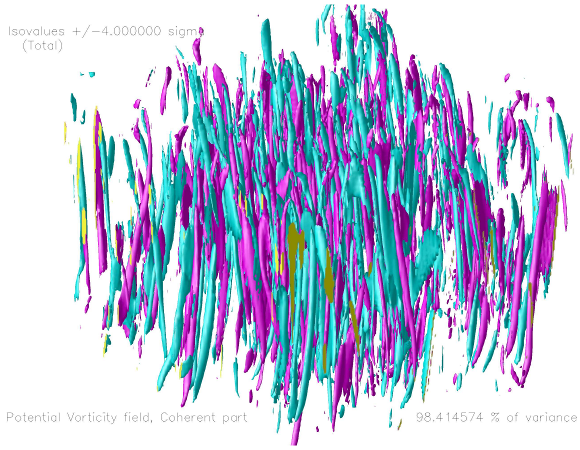


Figure 37: Coherent part, with isovalue equal to $4\sigma_{tot}$

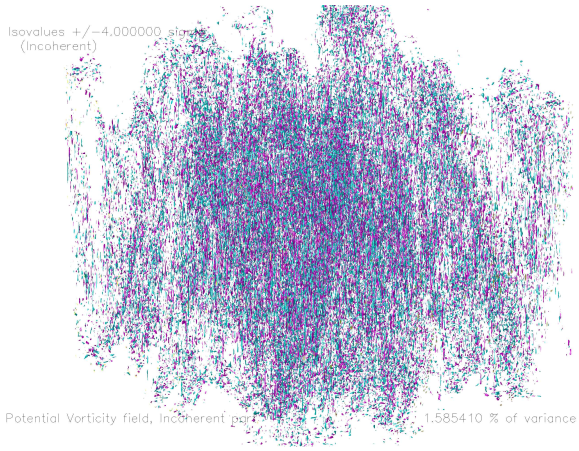
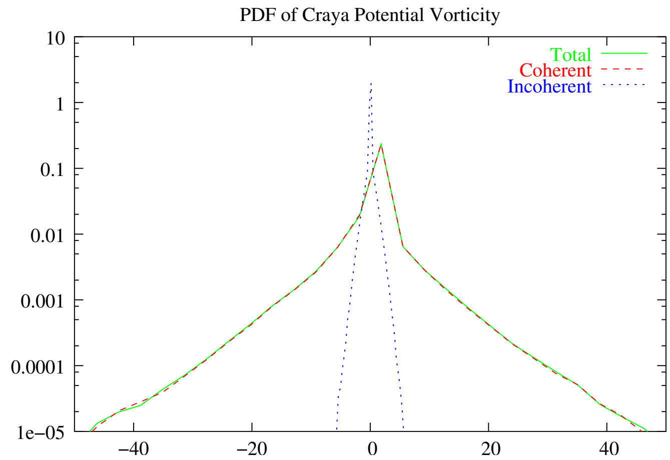


Figure 38: Incoherent part, with isovalue equal to $4\sigma_{inc}$



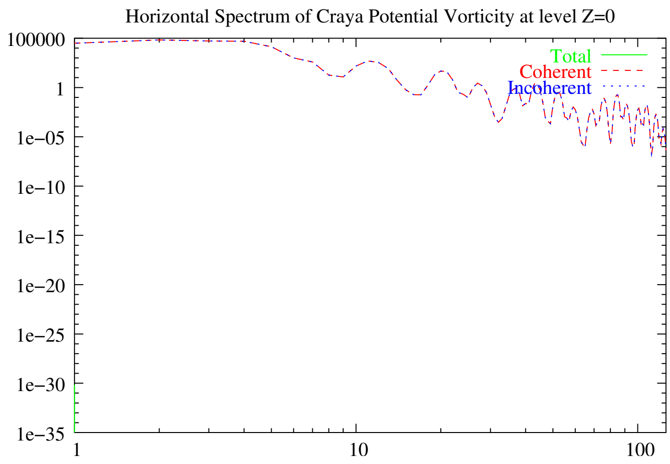


Figure 39: Horizontal spectral at $Z = 0$

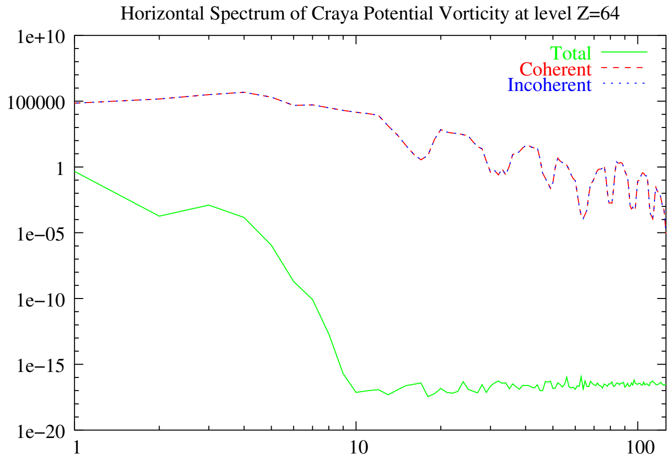


Figure 40: Horizontal spectral at $Z = 64$

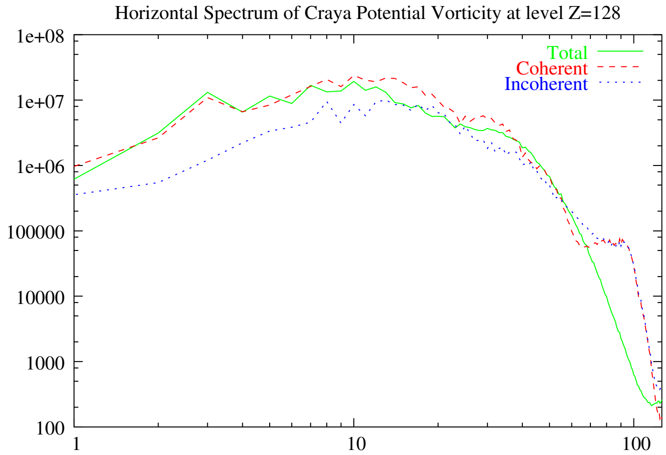


Figure 41: Horizontal spectral at $Z = 128$

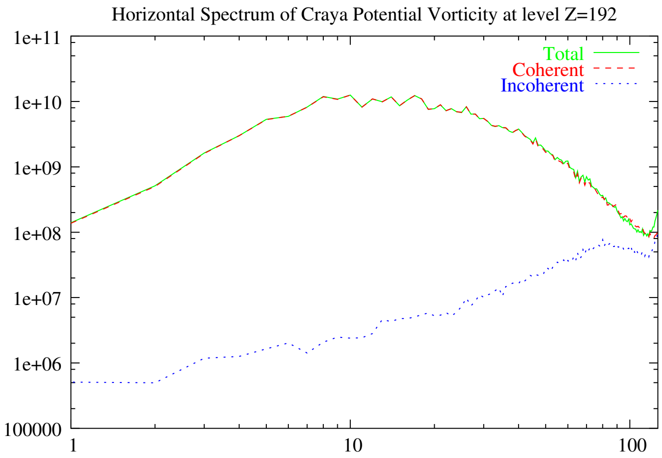


Figure 42: Horizontal spectral at $Z = 192$

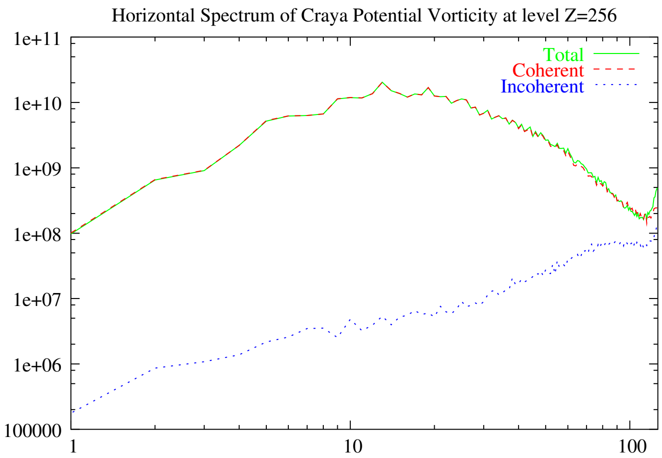


Figure 43: Horizontal spectral at $Z = 256$

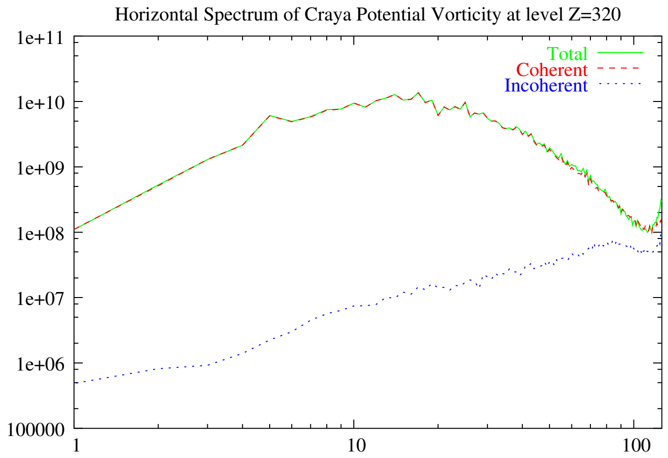


Figure 44: Horizontal spectral at $Z = 320$

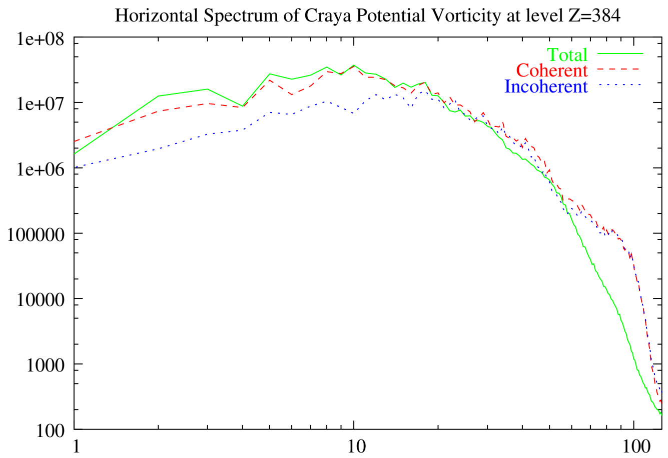


Figure 45: Horizontal spectral at $Z = 384$

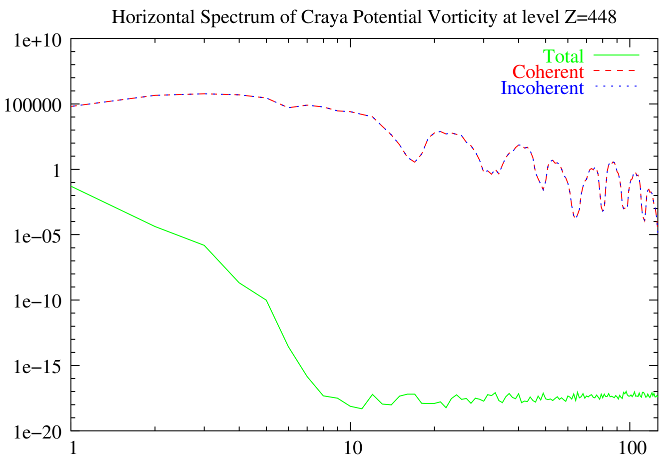


Figure 46: Horizontal spectral at $Z = 448$

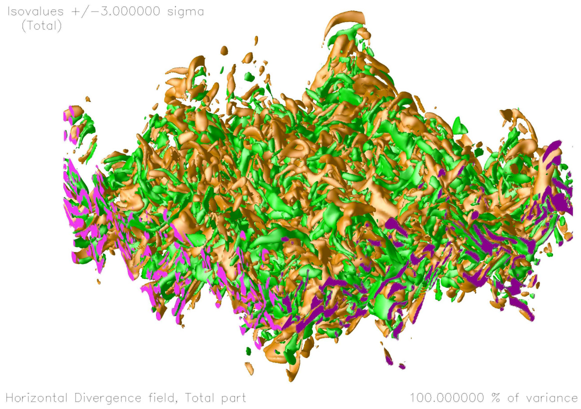


Figure 47: Total part, with isovalue equal to $3\sigma_{tot}$

2.5 Horizontal Divergence

2.5.1 Total

2.5.2 Coherent

2.5.3 Incoherent

2.5.4 PDFs

2.5.5 Horizontal Spectra

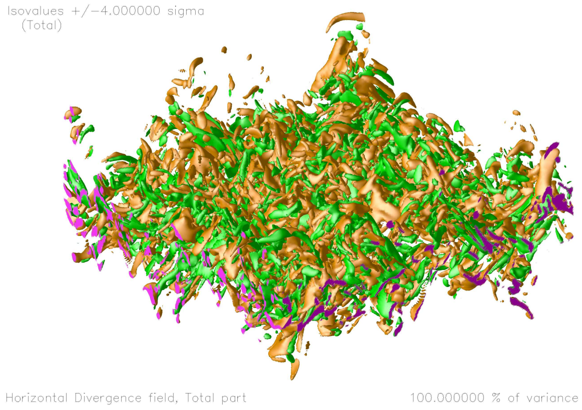


Figure 48: Total part, with isovalue equal to $4\sigma_{tot}$

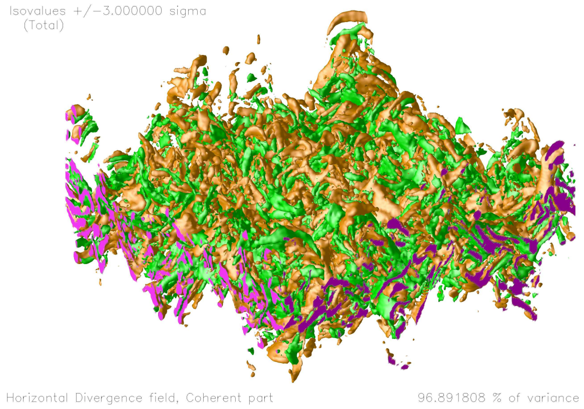


Figure 49: Coherent part, with isovalue equal to $3\sigma_{tot}$

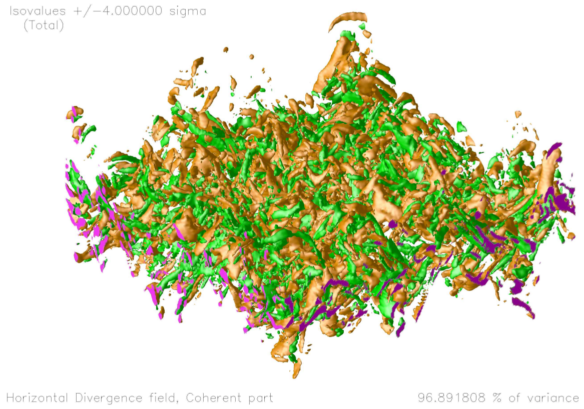


Figure 50: Coherent part, with isovalue equal to $4\sigma_{tot}$

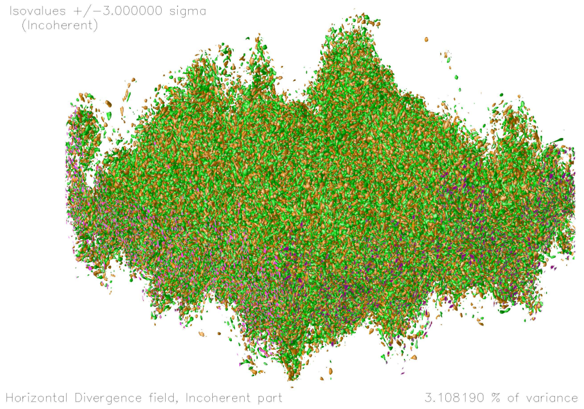
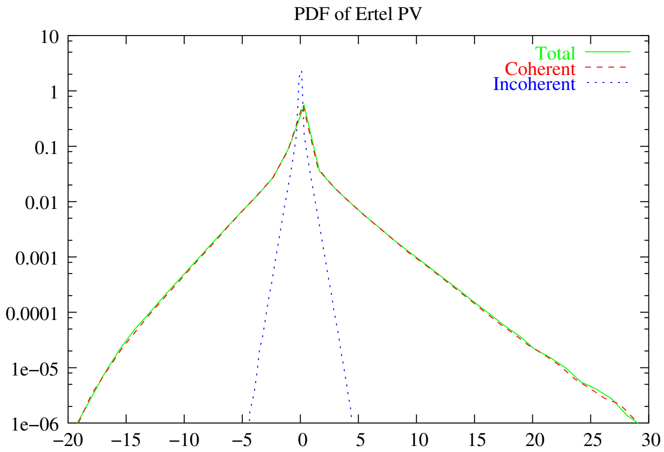


Figure 51: Incoherent part, with isovalue equal to $3\sigma_{inc}$



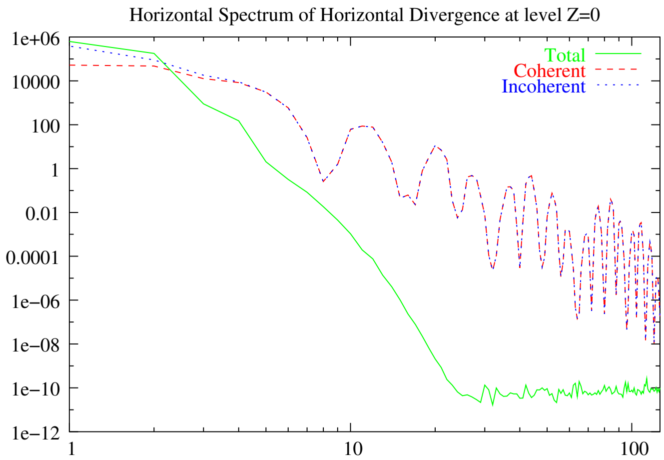


Figure 52: Horizontal spectral at $Z = 0$

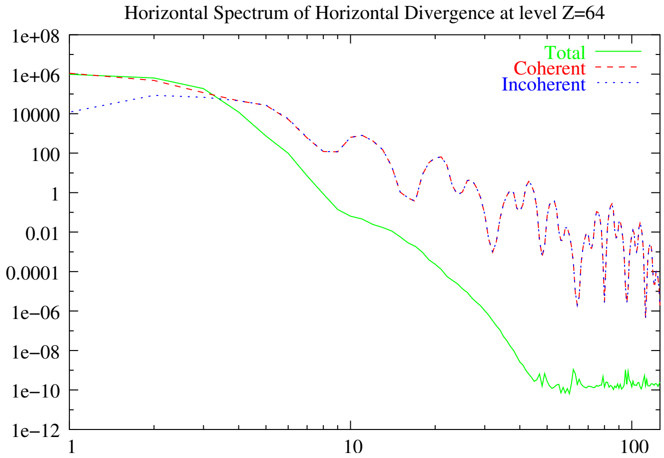


Figure 53: Horizontal spectral at $Z = 64$

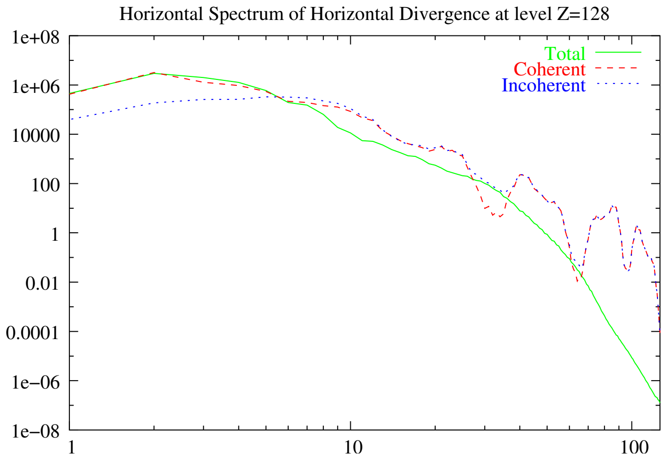


Figure 54: Horizontal spectral at $Z = 128$

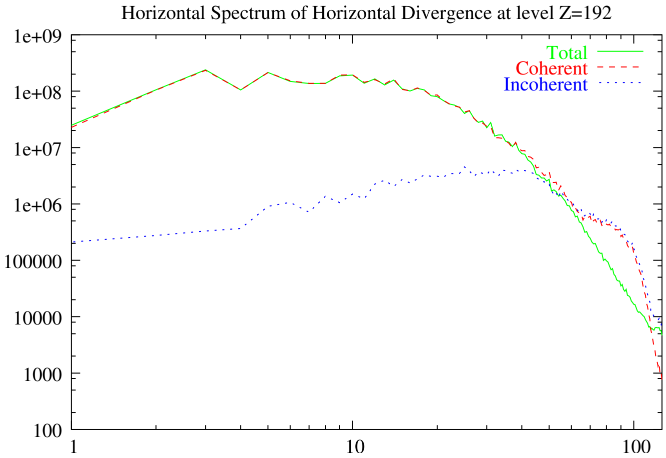


Figure 55: Horizontal spectral at $Z = 192$

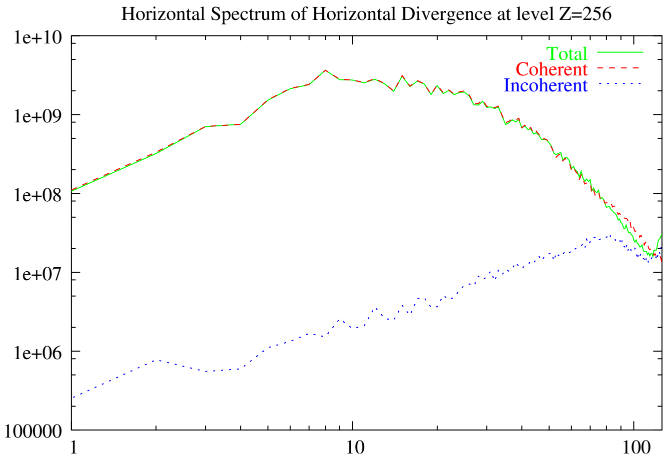


Figure 56: Horizontal spectral at $Z = 256$

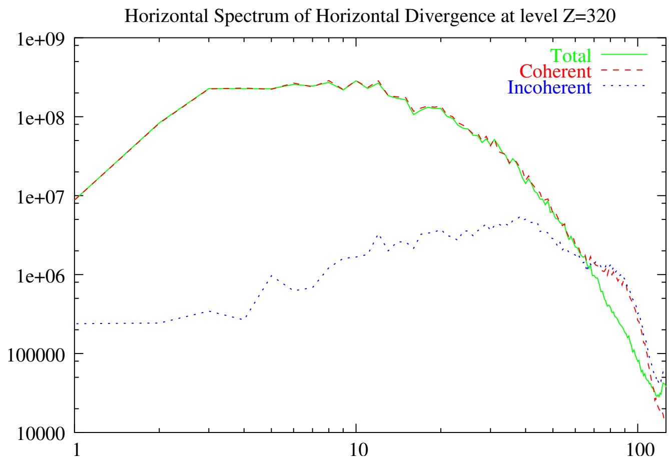


Figure 57: Horizontal spectral at $Z = 320$

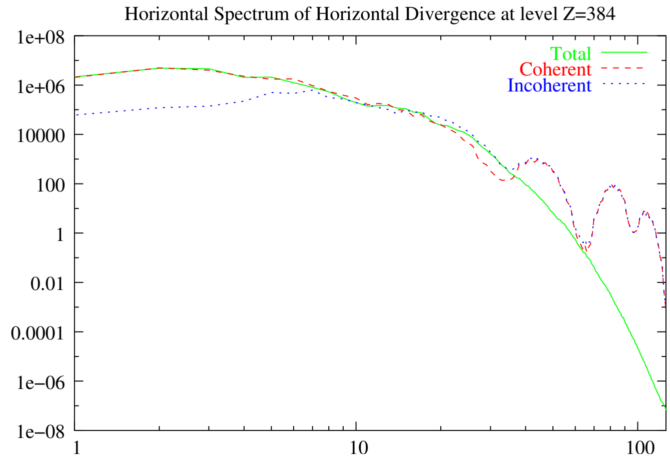


Figure 58: Horizontal spectral at $Z = 384$

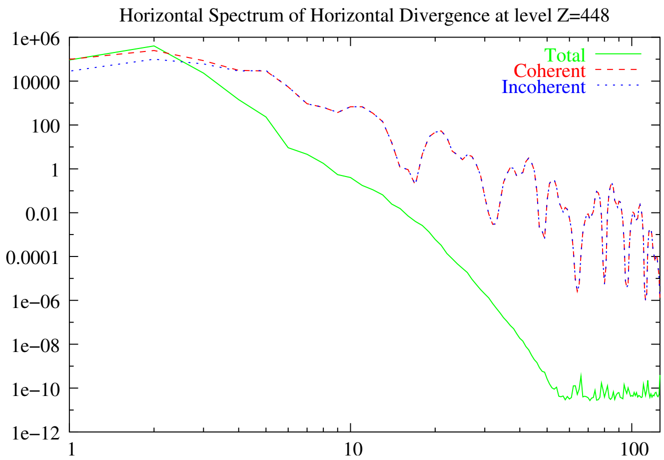


Figure 59: Horizontal spectral at $Z = 448$

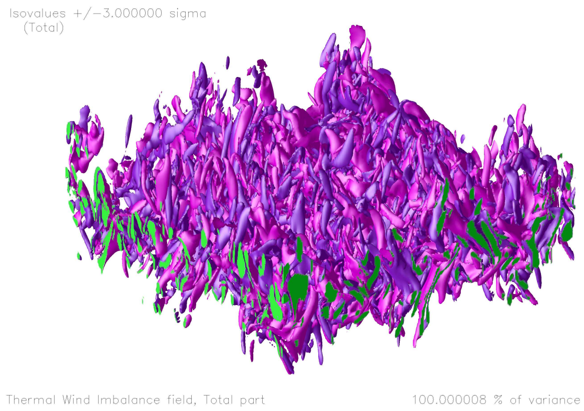


Figure 60: Total part, with isovalue equal to $3\sigma_{tot}$

2.6 Thermal Wind Imbalance

2.6.1 Total

2.6.2 Coherent

2.6.3 Incoherent

2.6.4 PDFs

2.6.5 Horizontal Spectra

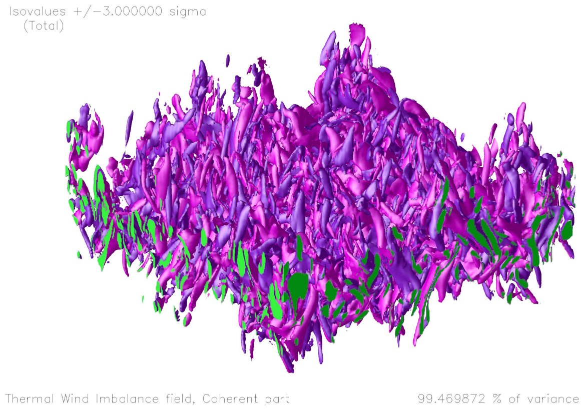


Figure 61: Coherent part, with isovalue equal to $3\sigma_{tot}$

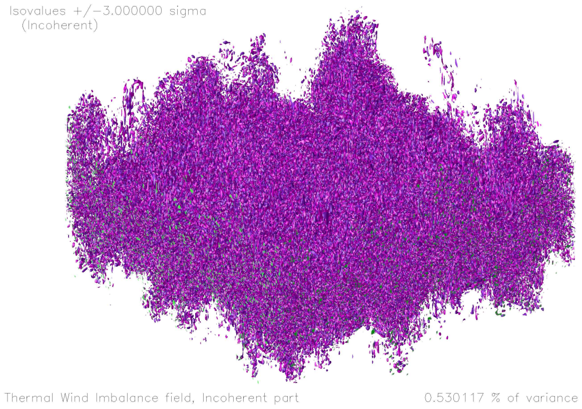
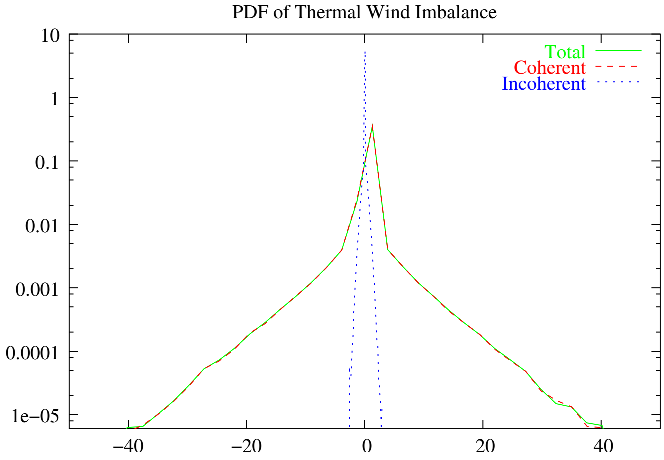


Figure 62: Incoherent part, with isovalue equal to $3\sigma_{inc}$



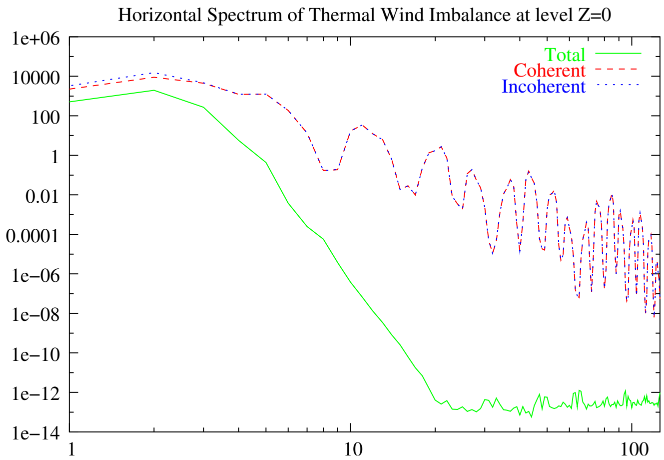


Figure 63: Horizontal spectral at $Z = 0$

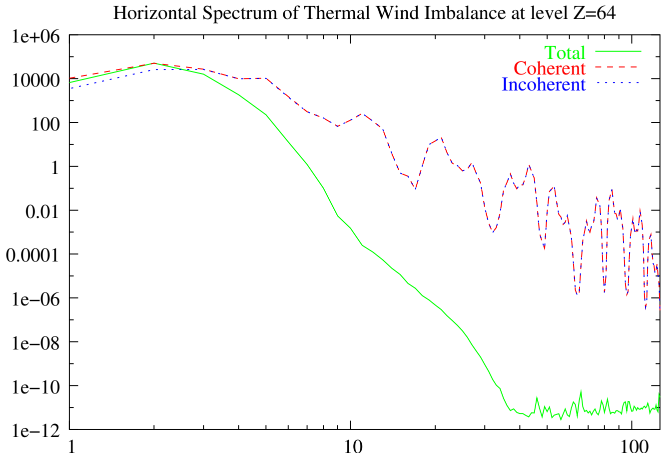


Figure 64: Horizontal spectral at $Z = 64$

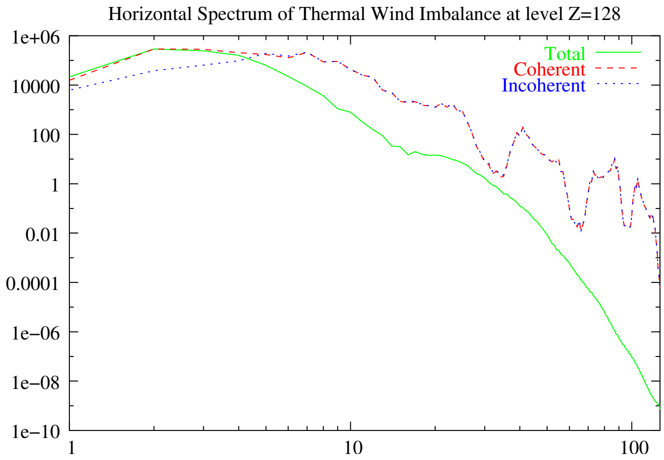


Figure 65: Horizontal spectral at $Z = 128$

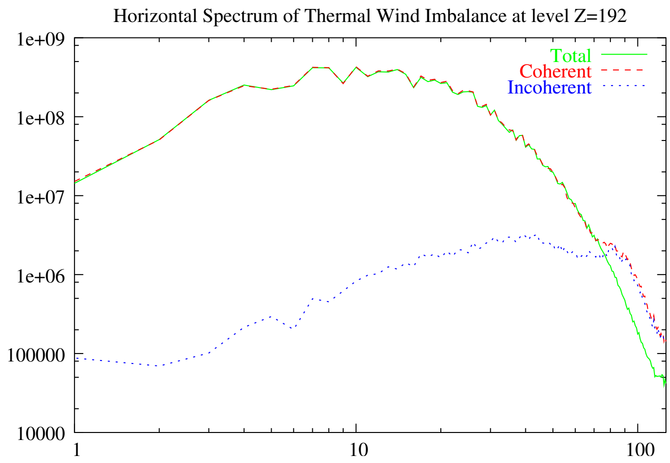


Figure 66: Horizontal spectral at $Z = 192$

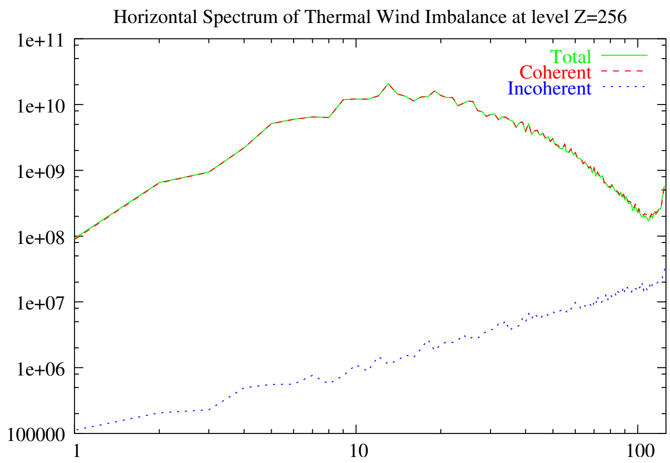


Figure 67: Horizontal spectral at $Z = 256$

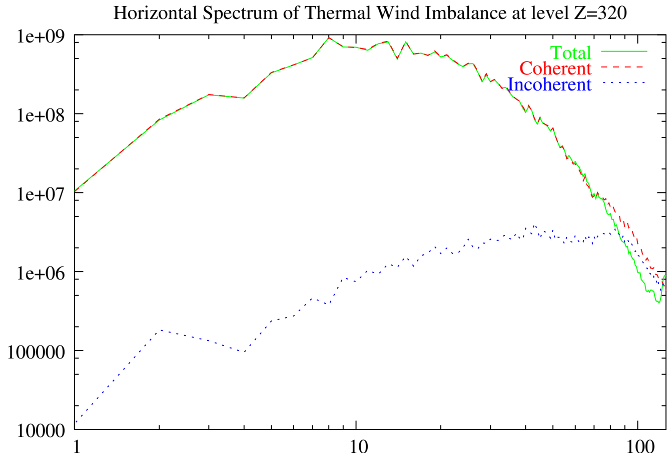


Figure 68: Horizontal spectral at $Z = 320$

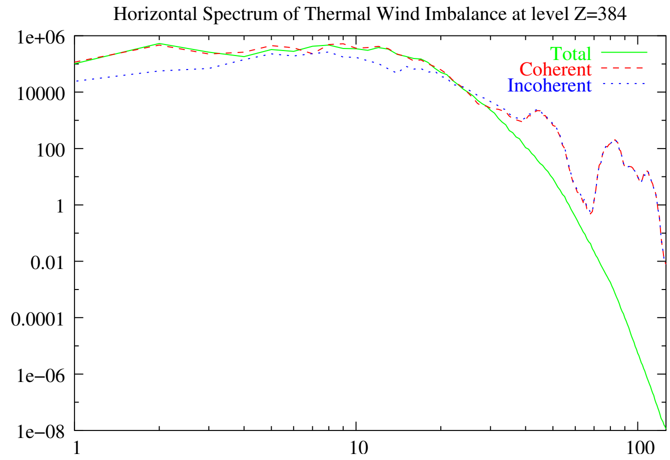


Figure 69: Horizontal spectral at $Z = 384$

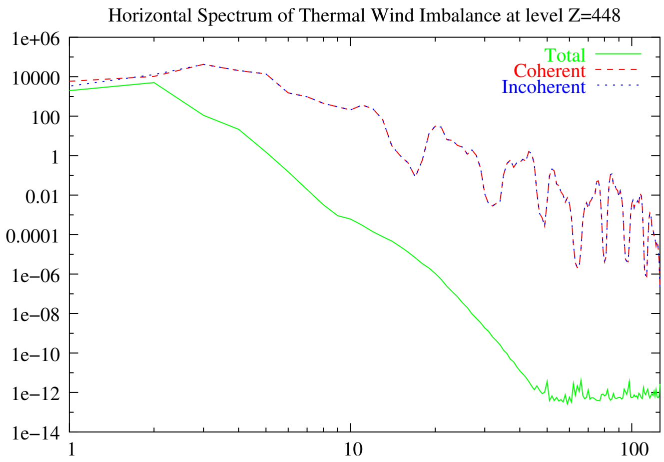


Figure 70: Horizontal spectral at $Z = 448$