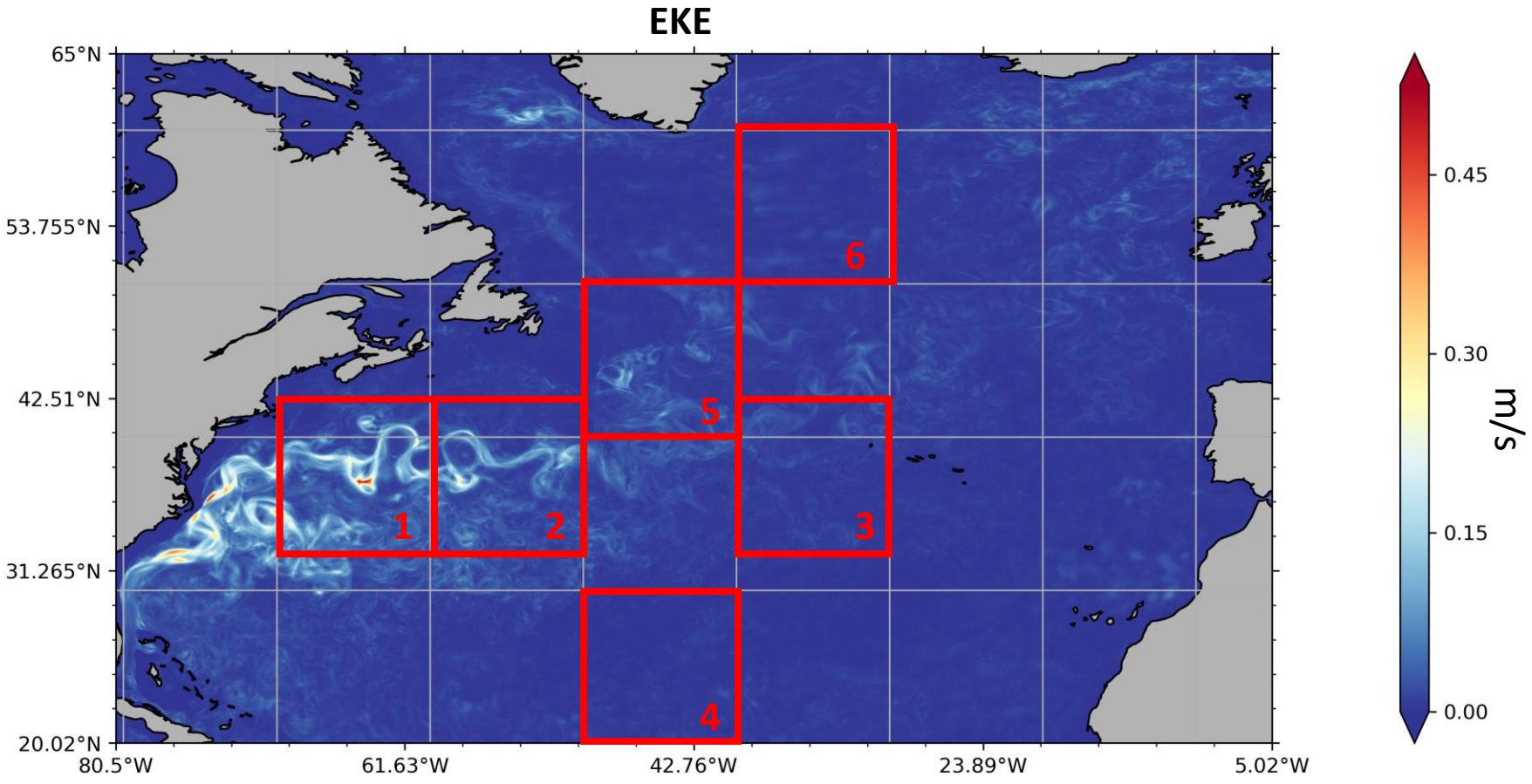
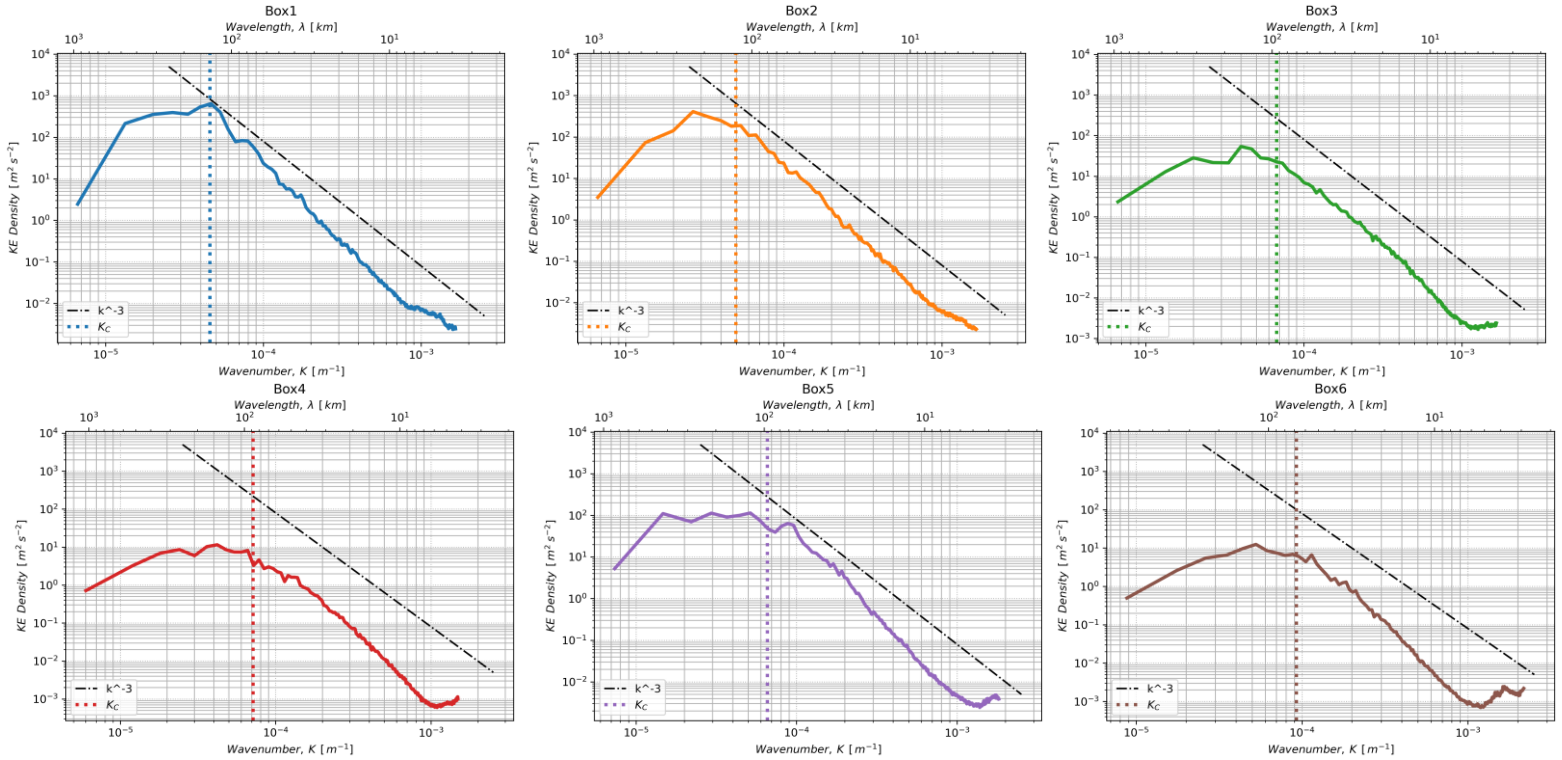
ICON-o Submesoscale Telescope model

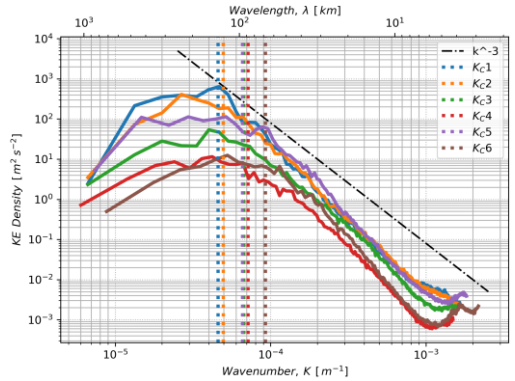
model two weeks output

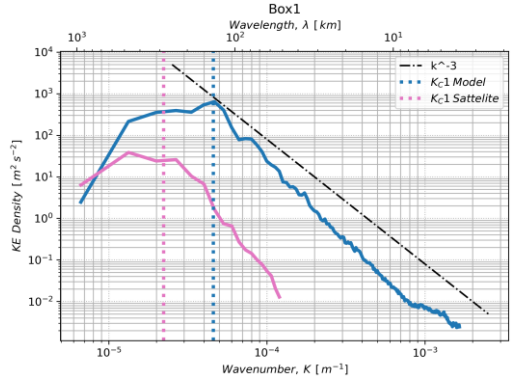


-6 boxes defined based on EKE field, to compare different turbulent regimes, at different locations

Kinetic energy spectrum

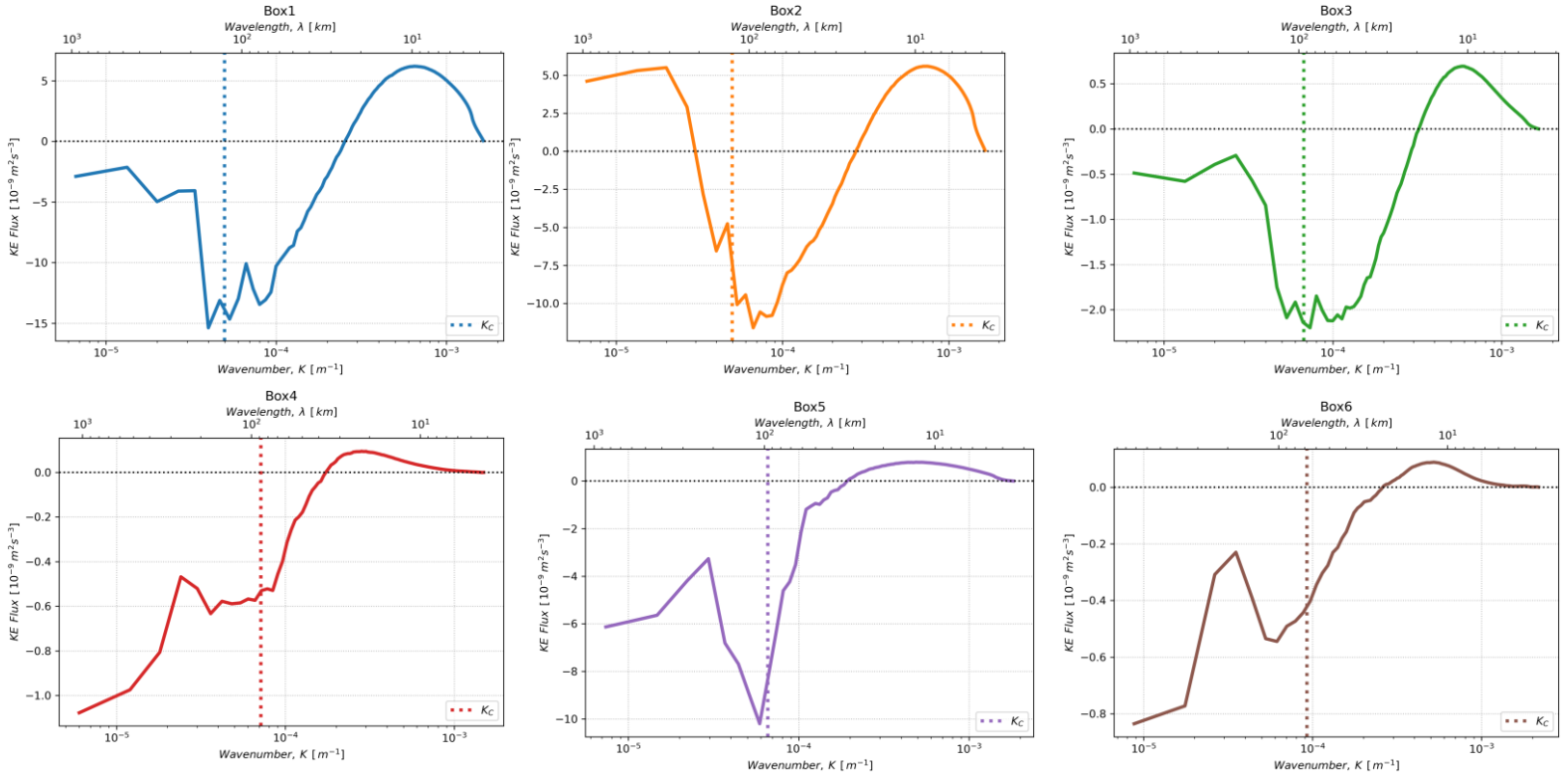


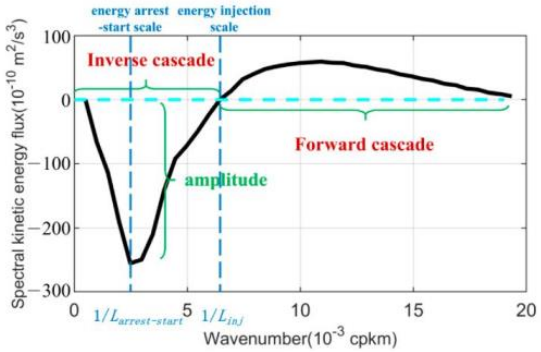


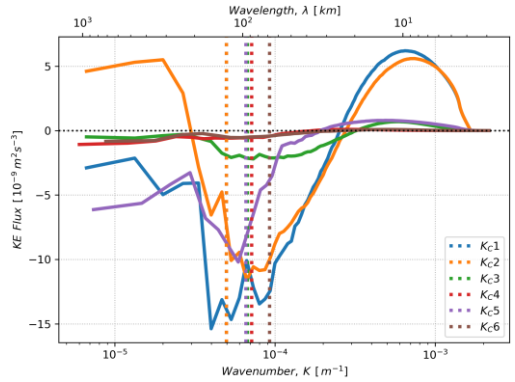


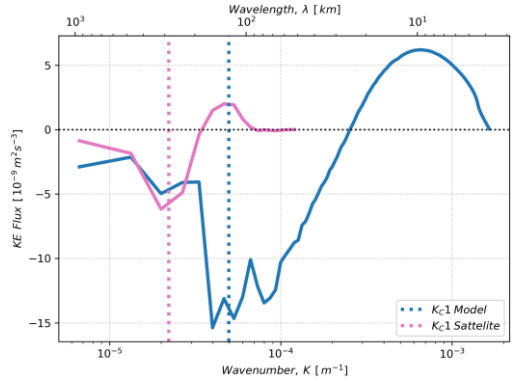
-Kc (vertical line)- the energy-containing scale, which represents the scale of the most energetic eddy structure.
-Kc- varies with latitude
-Spectral densities from model agree well with an approximate slope of -3, a value characteristic for QuasiGeostrophic prediction.
-More energy in regions, where we see also high EKE values.

Kinetic energy spectral flux



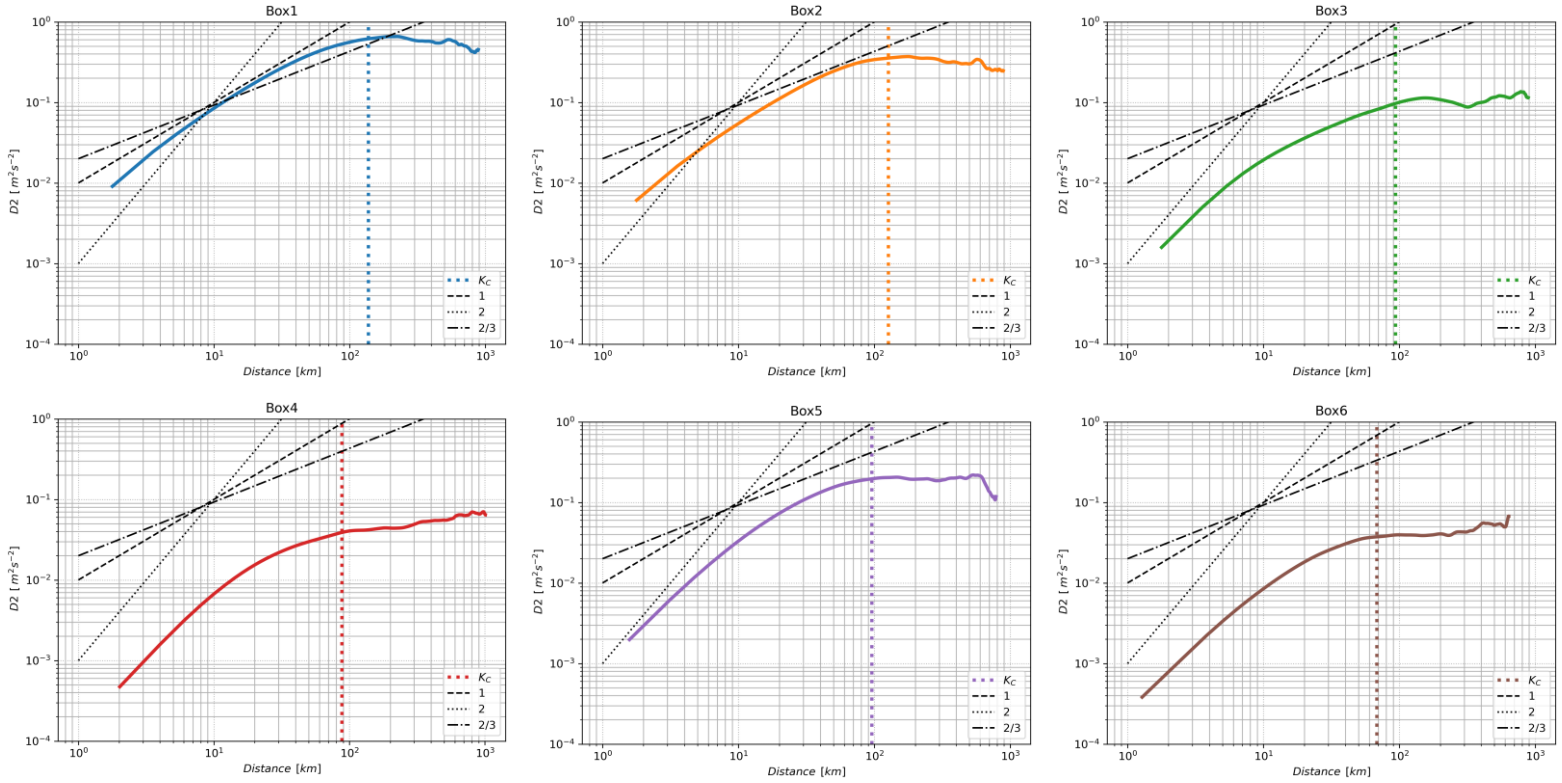


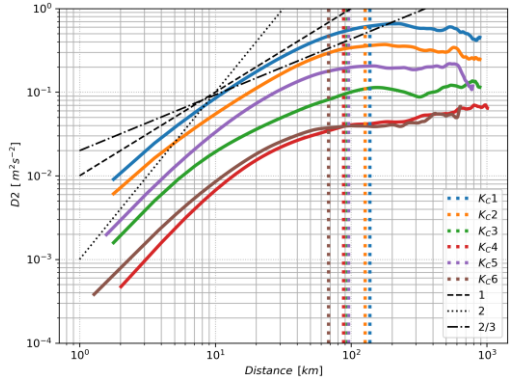


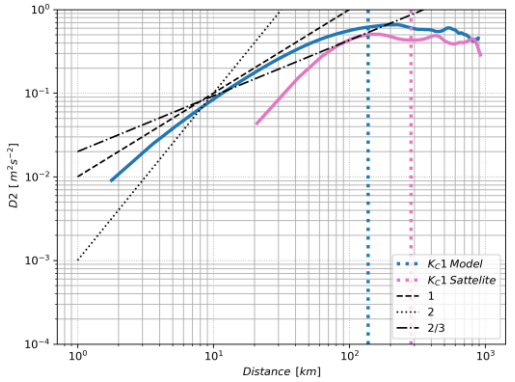


-Amplitude of Inverse Cascade is higher in regions, where higher EKE values occur.
-Kc coincides with Inverse Cascade, energy arrest.
-Forward Flux in high wavenumbers/low wavelength.
-Still to do, if possible- energy injection scale (Zero crossing) -> calculate First baroclinic Rossby radius. according to literature they should overlap

Eulerian Structure Function 2D

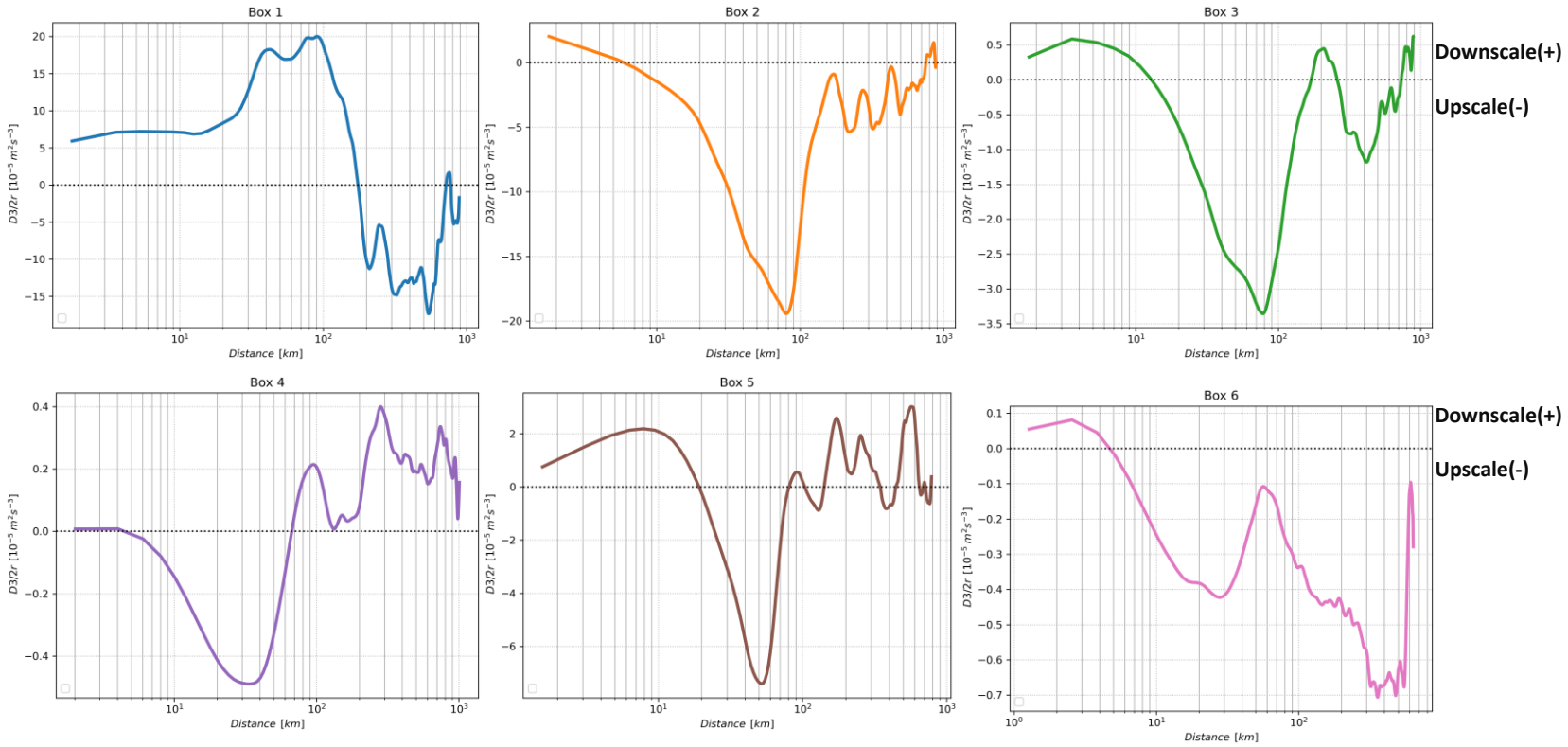






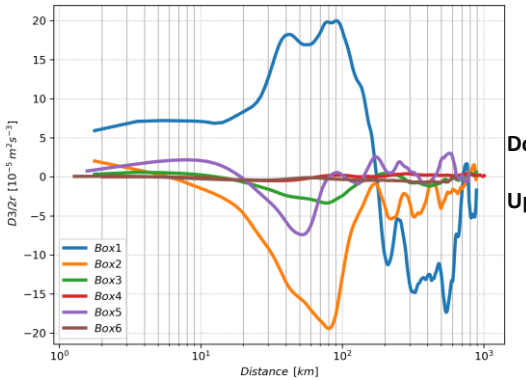
-reflects how KE is distributed as a function of scale; D2 behaves roughly as a cumulative sum of KE up to a particular scale, and larger SF2 values suggest greater levels of KE at scales near and smaller than a particular scale.
- Higher levels of KE at location, where we observed higher EKE
-smaller scales slope near 2. slope flattens out with increasing distance, until it saturates around Kc

Eulerian Structure Function 3D



Downscale(+)

Upscale(-)



Downscale(+)

Upscale(-)

-The sign, under a certain hypothesis, is associated with the direction of the KE transfer, with a negative D3 indicating an inverse, upscale cascade