



Coarse-graining as a technique to reveal sub-grid scale fluxes and test the diffusive assumption.

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In climate simulation applications, parameterizations are omnipresent and a necessity to numerically simulate climate, weather and ocean dynamics. The go-to approach is to use diffusive parameterizations to account for various sub-grid scale effects. Many advanced parametrization techniques like the Dynamical Smagorinsky Diffusion or backscatter approaches build on the core assumption of non-local non-organized sub-grid scale fluxes. This study aims to verify this core assumption using a coarse-graining technique to make commonly diffusively parametrized processes such as the turbulent shear production $\epsilon|_{sh}$ term visible. Early results indicate very organized and localized structures of $\epsilon|_{sh}$ and hence the diffusive assumption may potentially be flawed. This may be of large consequence to the entirety of dynamics modeling.