

Floe Scale Model of Anomalous Diffusion in Sea Ice Dynamics

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$$\langle |\mathbf{x}(t) - \mathbf{x}(0) - \langle \mathbf{x}(t) - \mathbf{x}(0) \rangle|^2 \rangle \sim t^\alpha$$

α = Hurst exponent

diffusive $\alpha = 1$
sub-diffusive $\alpha < 1$
super-diffusive $\alpha > 1$

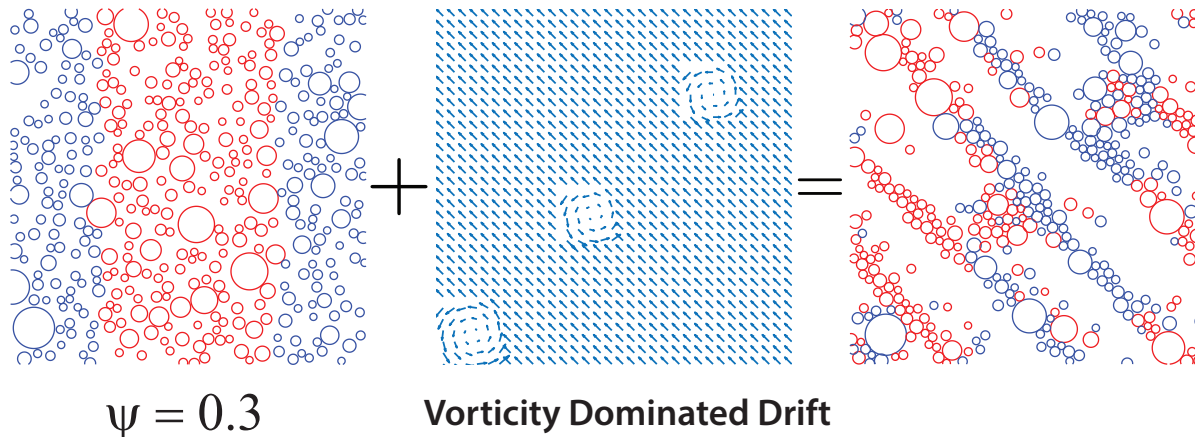
Model Approximations

Power Law Size Distribution: $N(D) \sim D^{-k}$

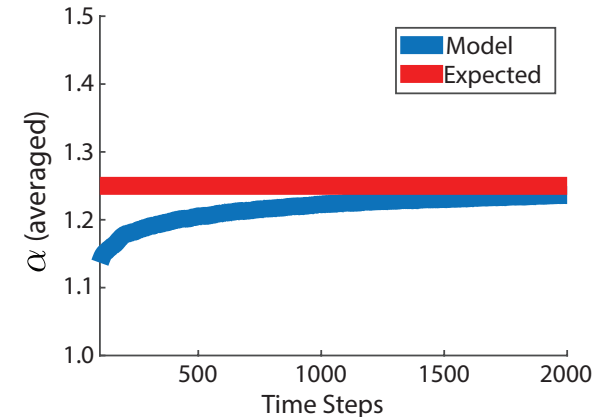
D. A. Rothrock and A. S. Thorndike Journal of Geophysical Research 1984

Floe-Floe Interactions: Linear Elastic Collisions

Advective Forcing: Passive, Linear Drag Law



Sparse Packing, Shear Dominated Drift



Crowding, Diffusive Drift

