Floe Scale Model of Anomalous Diffusion in Sea Ice Dynamics

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

$\alpha =$ Hurst exponent, a measure of anomalous diffusion.

Measured from bouy position data. Detects ice pack crowding and advective forcing.

J.V. Lukovich, J.K. Hutchings, D.G. Barber ***Annals of Glaciology*** **2015**

diffusive	$\alpha = 1$	Sparse packing, uncorrelated advective field.
sub-diffusive	$\alpha < 1$	Dense packing, crowding dominates advection.
super-diffusive	$\alpha = 5/4$	Sparse packing, shear dominates advection.
	$\alpha = 5/3$	Sparse packing, vorticity dominates advection.

Goal: Develop numerical model to analyze regimes of transport in terms of ice pack crowding and advective conditions.