

Validity domains and parametrizations for white-noise and multiscale models in **turbulence** and **wave-turbulence interactions**

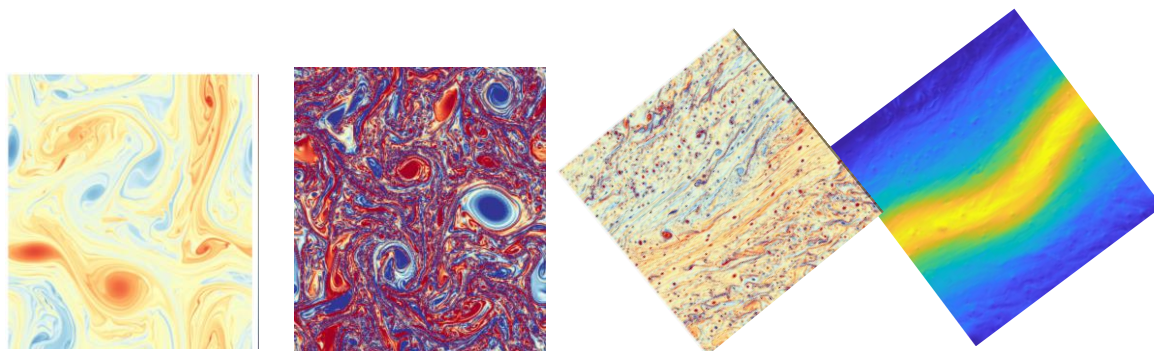
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Validity of the time decorrelation assumption for v' for **turbulence** / **wave-turbulence**:

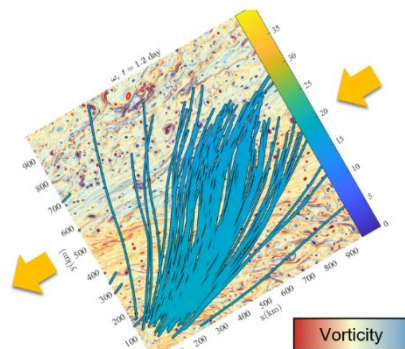
$$\frac{\left(\begin{array}{c} \text{Along-flow/ray} \\ v' \text{ correlation time} \end{array} \right)}{\left(\begin{array}{c} \text{characteristic time of} \\ \text{flow/wave group} \\ \text{properties evolution} \end{array} \right)} = \frac{\left(\frac{l_{v'}}{\|v\|/\|C_g^0\|} \right)}{\left(\frac{1}{\|\nabla v\|} \right)} \ll 1$$

Applied to

steep-spectrum (SQG) and flat-spectrum (2D Euler) dynamics; homogeneous and heterogeneous flows

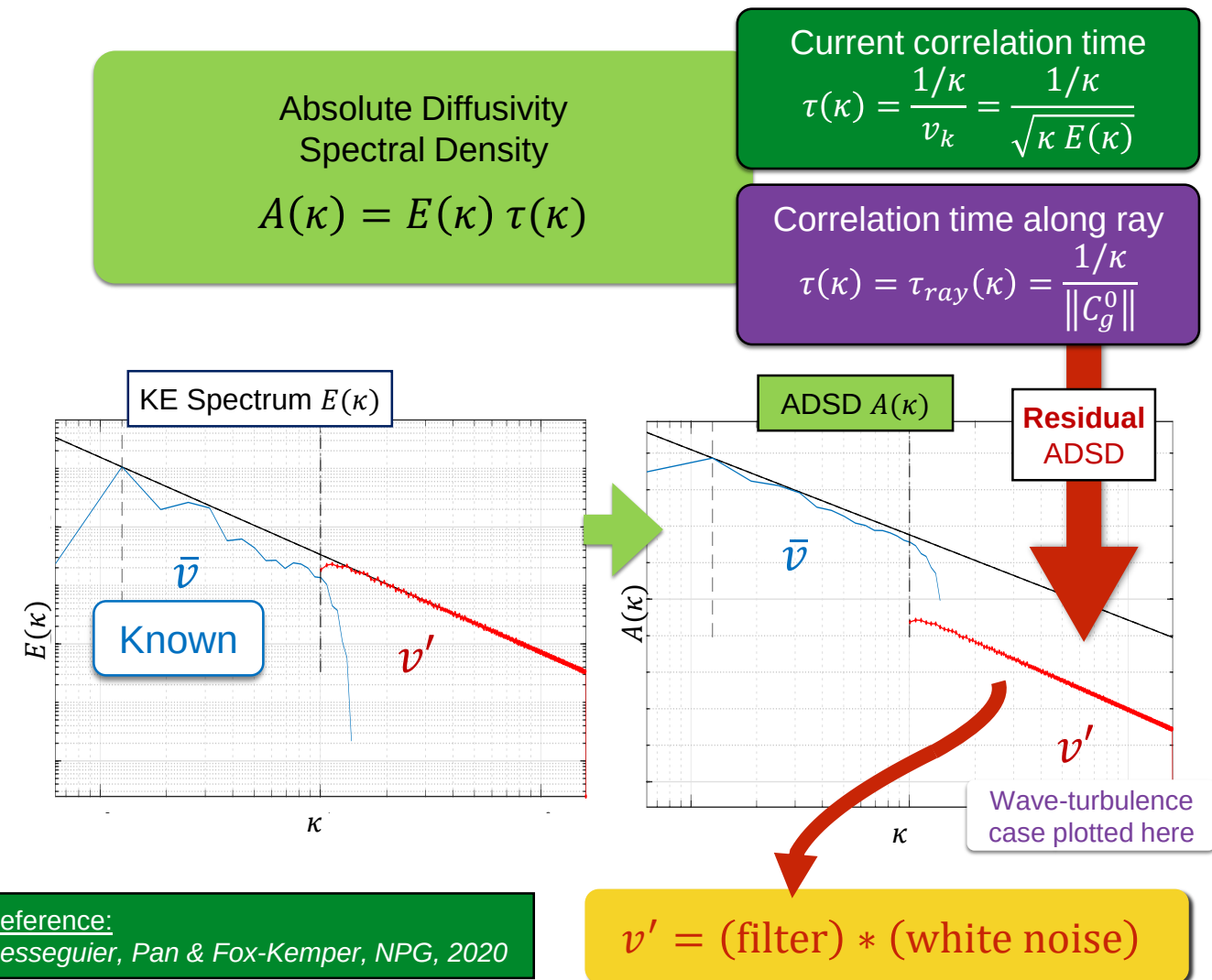


Example of ray tracing



Wave-spectrum, Significant wave heights, and **Currents** predictions, Uncertainty quantification for data assimilation

Parametrization of white v' for simulations



Parametrization of v' multiscale in space and time are also possible