



## **Comparison between local and non-local mixing estimations derived from microstructure measurements.**

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Mixing plays a primary role in aquatic ecosystems, affecting processes across a wide range of temporal and spatial scales. The present study compares the estimation of mixing parameters from local and non-local closure methods. The local method is based on the eddy diffusivity concept, which has been widely used to estimate turbulent transport, while the non-local method is based on transilient matrix. The non-local method overcomes some of the limitations of the eddy diffusivity but, due to its intrinsic complexity, requires a considerable quantity of field data for their application

The comparison was applied to three different series of microstructure data in order to show the applicability of the different approaches. The set of data was selected for two main reasons: 1) the data correspond to three series of consecutive field measurement and were selected because convective turbulent mixing (an example of non-local mixing phenomenon) was identified in one of them. 2) The number of profiles obtained in this set of data was relatively low, which represents a potential test to evaluate the applicability of the methods.

The final results indicate that it is possible to estimate transilient coefficients with a relatively low number of profiles. The mixing parameters derived from the transilient matrix are in accordance with what can be expected from the background external forcing and the observed thermal structure.