

2024_17_Civil_JC: The energetics behind ocean mixing and climate change

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Department: Department of Civil and Environmental Engineering

The ocean circulation plays an integral role in climate change through the uptake of anthropogenic heat and carbon dioxide. It depends on turbulence induced by various processes, such as waves in the ocean interior, that mix waters of different density. Such mixing enables deep waters to resurface and therefore sustains the circulation. The focus of this project is to understand the energy conversions behind ocean mixing so that the latter can be correctly represented in climate models.

The PhD project will involve analysing the energetics behind stratified turbulence using data from direct numerical simulations performed on the College's high performance supercomputer. The results will be used to understand the energy conversions that take place across all scales of turbulence in order to develop sub-grid parameterisations of ocean mixing.

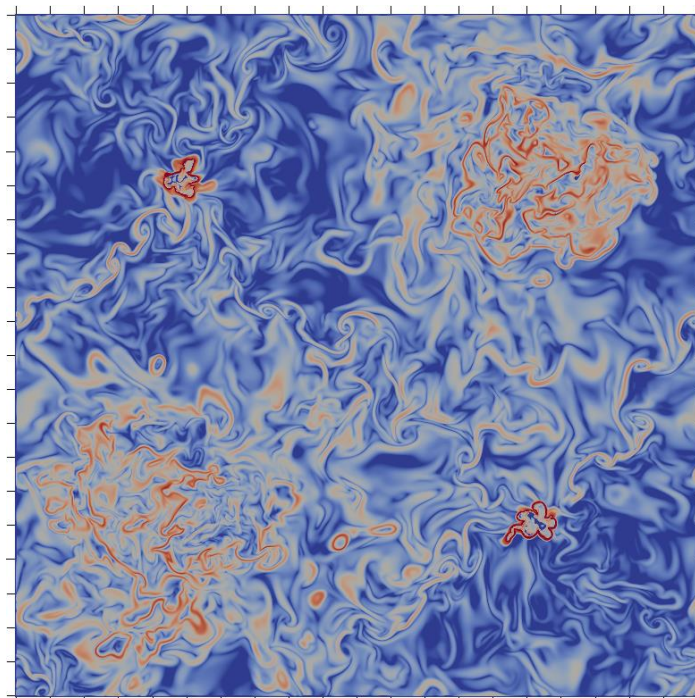
You will work within a vibrant community of over 100 faculty members across departments who are experts in fluid dynamics. Within the Department of Civil and Environmental Engineering, you will interact with researchers performing complementary investigations of waves, stratified turbulence and mixing using experiments in a world-class laboratory, numerical simulations and field measurements, for applications across a wide range of natural and built environments relating to climate change.

Candidates who are interested in this project should contact john.craske07@imperial.ac.uk.

For background reading, we suggest the following:

<https://doi.org/10.1175/2009JPO4162.1>

<https://doi.org/10.1017/jfm.2021.435>



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