Steady three-dimensional ideal flows with vorticity

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There is by now an extensive theory of travelling water waves with vorticity in two dimensions and without vorticity in three dimensions, but so far extremely little is known in the three-dimensional setting with vorticity. I'll discuss a negative result for flows with constant vorticity and then turn to some existence results in the simpler setting of fixed boundaries with in- and outflow on parts of the boundary.

These results have been obtained together with Boris Buffoni and Douglas Svensson Seth.