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Vertical velocities associated with deep open-ocean convection in the Northwestern Mediterranean Sea as indirectly observed by gliders

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During winter 2012-2013, deep open-ocean convection occurred in the Gulf of Lions (Northwestern Mediterranean Sea) and has been thoroughly documented thanks to the deployment of several gliders at the same time, Argo profiling floats, dedicated ship cruises, and a mooring located within the mixed patch.

The data collected represent an unprecedented density of profiles during a event of open-ocean deep convection. We applied a method able to infer the vertical velocity signal from the glider navigation data. During active phase of mixing, the gliders faced significant vertical velocities (upward and downward displacement stronger than 10cm/s). Moving along a saw-tooth trajectory between the surface and 1000m, they could cross small scale convective plumes (L$\sim$1km) over a dive or ascent (2km and 2h between the surface and maximum depth), while recording temperature and salinity, as well as biogeochemical properties (dissolved oxygen, fluorescence, turbidity, ...). Our study provides a comprehensive dataset to get a characterization of convective plumes and a deeper understanding of their role in deep open-ocean convection.