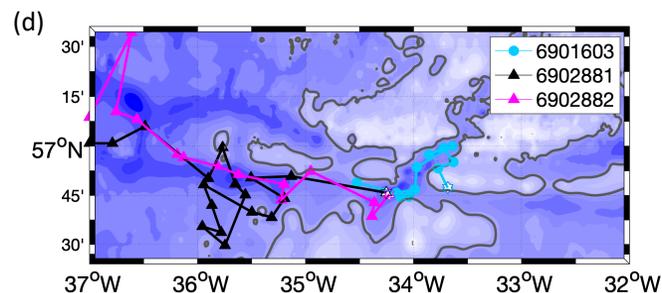
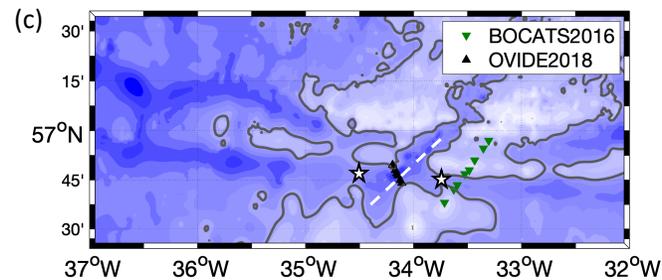
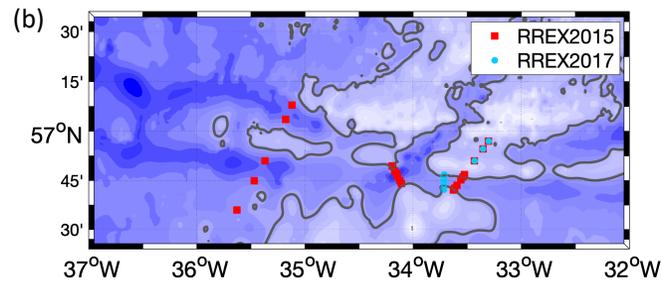
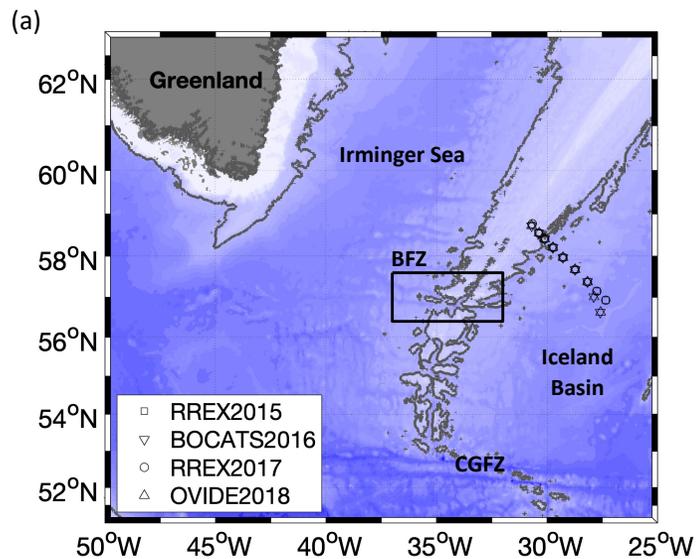


Deep through-flow in the Bight Fracture Zone

Tillys Petit^{1,2}, Virginie Thierry¹ and Herlé Mercier¹

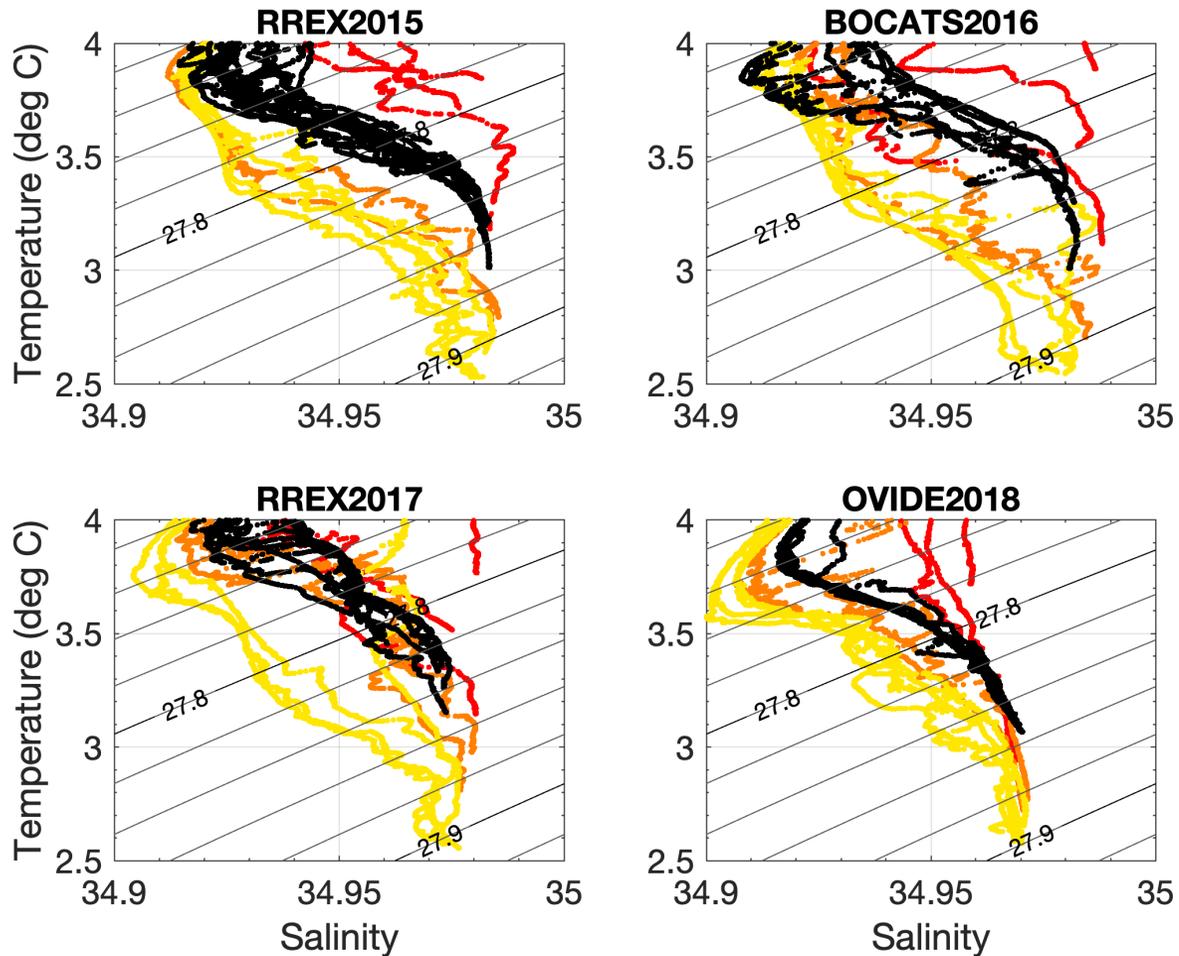
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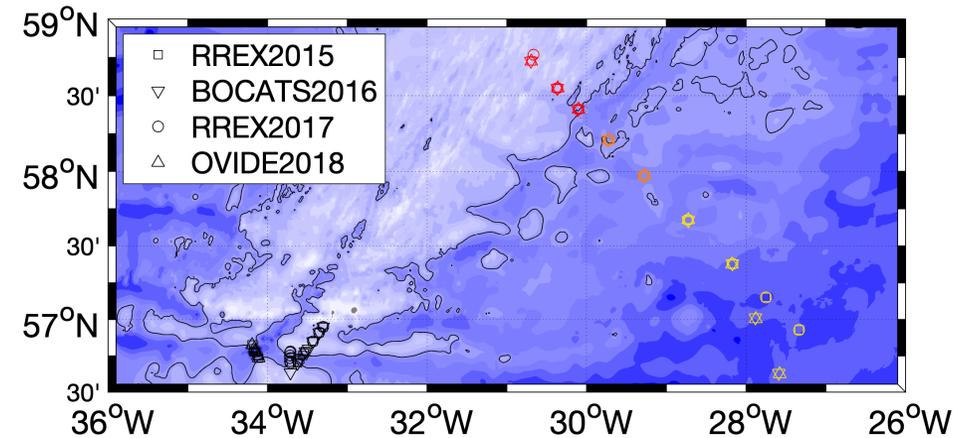


A combination of ship-based (panels a-c) and Deep-Argo (panel d) data gathered between 2015 and 2018 allow us to investigate the pathways and hydrographic evolution of ISOW as it flows through the BFZ, as well as its influence on the North Atlantic Deep Water properties in the Irminger Sea

1. Connection between the along-ridge current and the BFZ through-flow

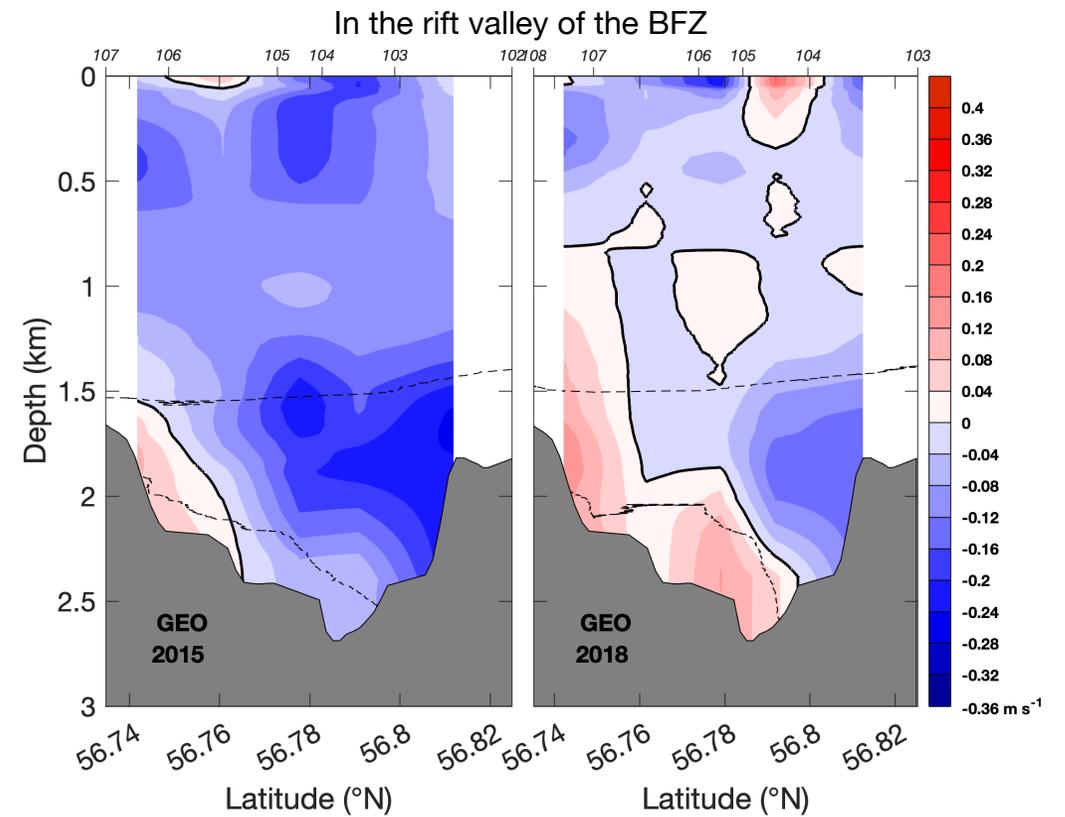
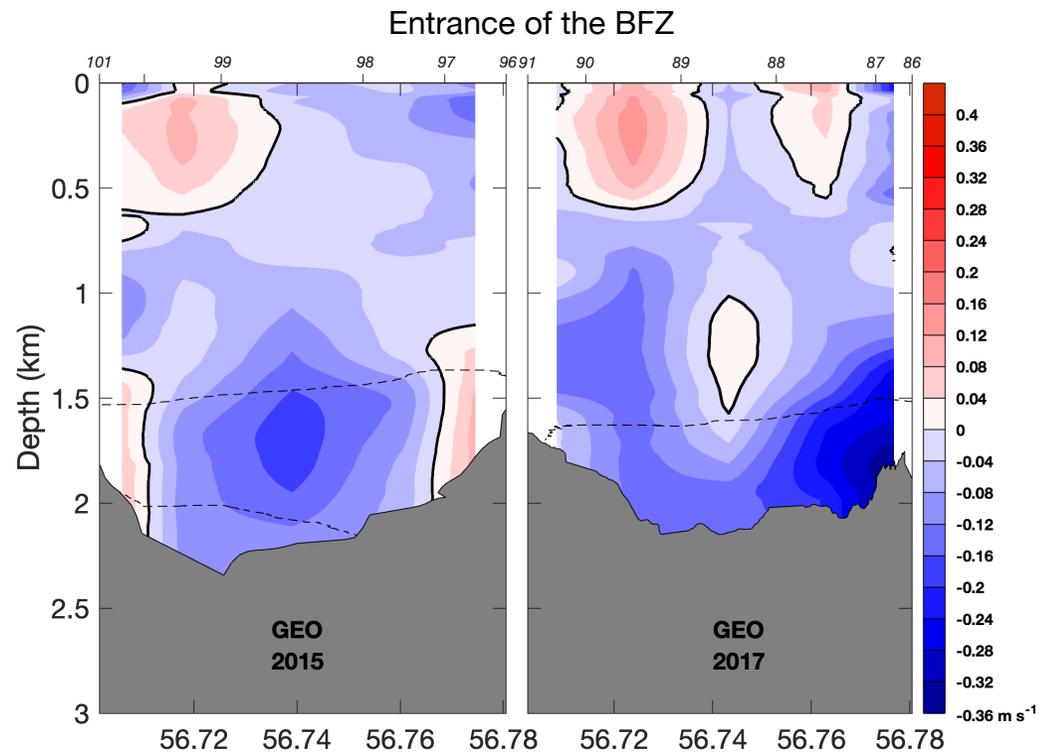


The ISOW flow through the BFZ is mainly fed by the lighter part of the ISOW layer flowing west of 29-30°W (red and orange dots) as part of the East Reykjanes Ridge Current in the Iceland Basin

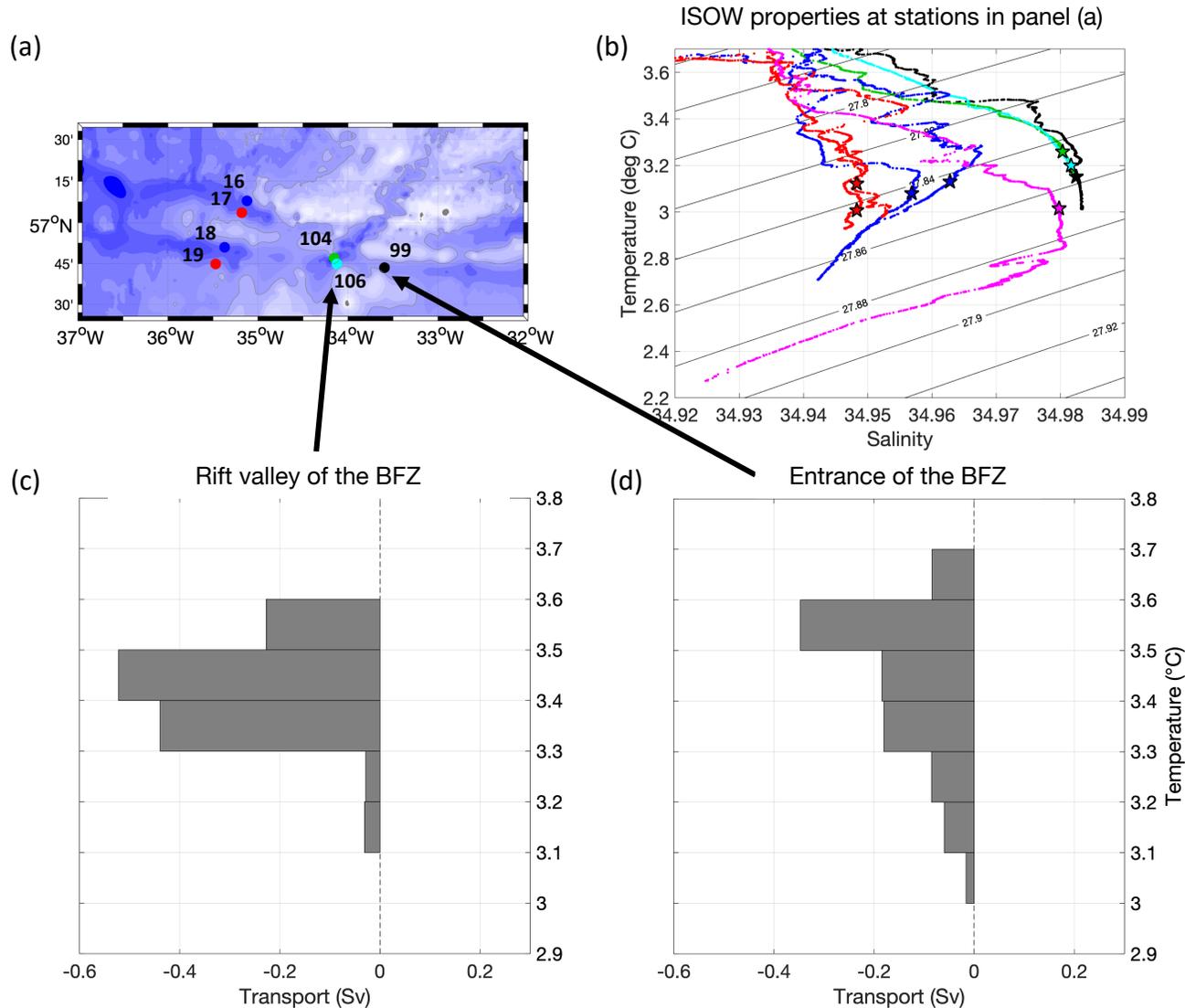


2. Quantification of the ISOW layer

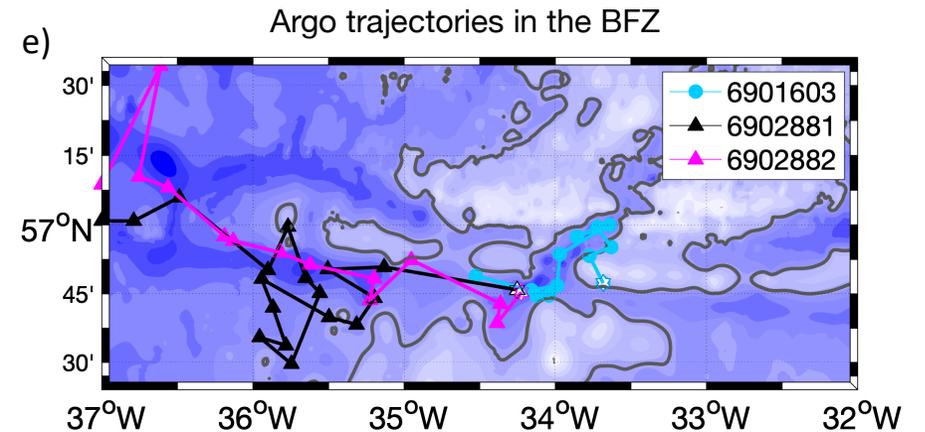
An average of 0.8 ± 0.2 Sv is estimated in the ISOW layer through the BFZ



3. Propagation of ISOW through the BFZ

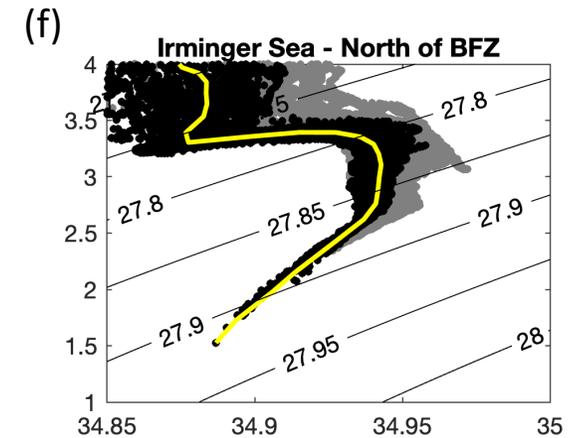
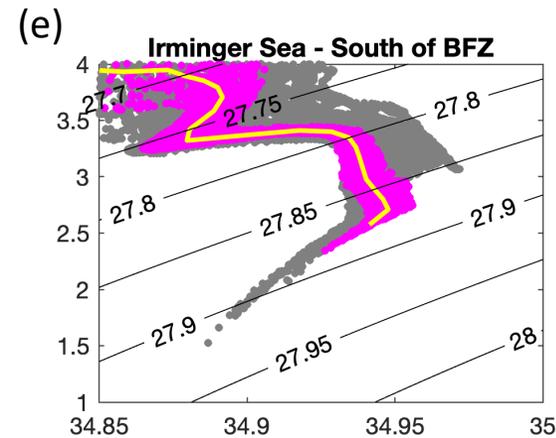
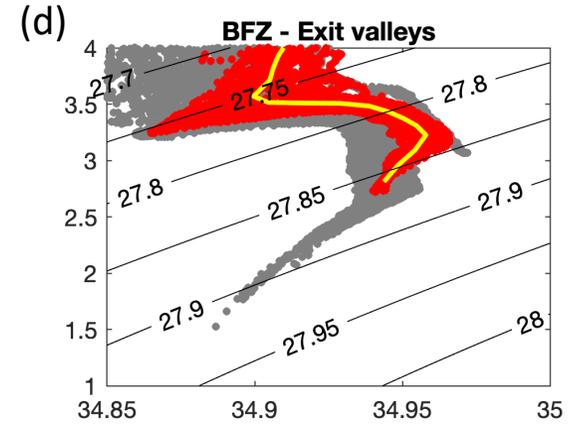
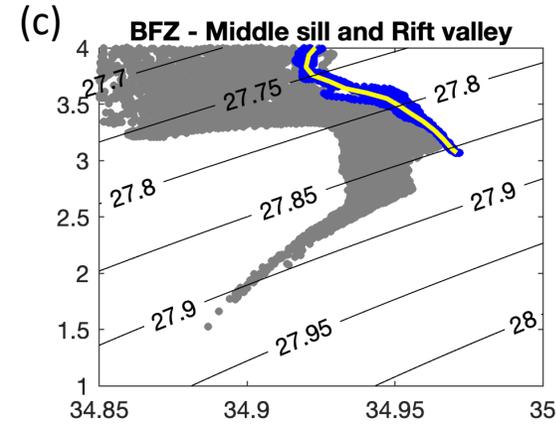
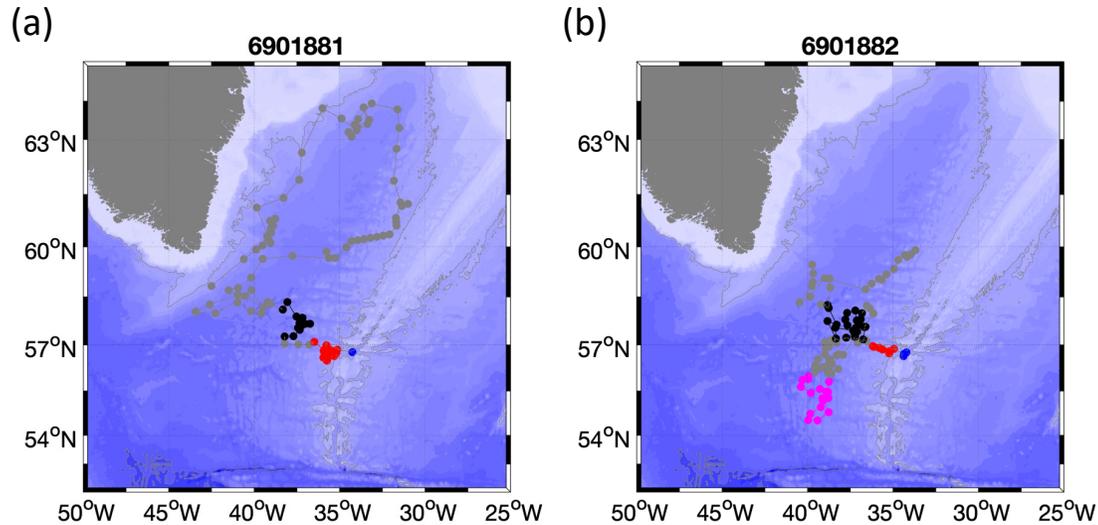


In the rift valley of the BFZ, between an eastern and a western sill, the bathymetry of the BFZ shapes a **cyclonic circulation** (blue dots in panel e) along which the ISOW layer is **homogenized** (panel c-d)



4. Impact of the BFZ through-flow on the hydrography of NADW

The largest changes in ISOW properties are observed downstream of the western sill, at the exit of the BFZ (red dots). There, ISOW is **mixed isopycnally** with comparatively fresher North Atlantic Deep Water circulating in the Irminger Sea.



Conclusions

- The ISOW flow through the BFZ amounts to 0.8 ± 0.2 Sv and is mainly fed by the lighter part of the ISOW layer flowing west of 29-30°W as part of the East Reykjanes Ridge Current in the Iceland Basin
- In the rift valley of the BFZ, between an eastern and a western sill, the bathymetry of the BFZ shapes a cyclonic circulation along which the ISOW layer is homogenized
- The largest changes in ISOW properties are observed downstream of the western sill, at the exit of the BFZ, where it mixes with fresher North Atlantic Deep Water

➤ Petit T., Thierry V. and Mercier H. (2022), Deep through-flow in the Bight Fracture Zone, *Ocean Science*, 18 (4), 1055-1071, <https://doi.org/10.5194/os-18-1055-2022>