



## **From the European slope to the North Sea**

Andy Dale and Marie Porter

SAMS, Scottish Marine Institute, Oban, Scotland, United Kingdom (Mark.Inall@sams.ac.uk)

The European slope current is a density driven poleward current tracing the shelf edge from the Bay of Biscay into the Nordic Seas. This current is not entirely coherent along its length and is known to be disrupted by the wind, bathymetric irregularities and local circulation, potentially providing a source of relatively warm and nutrient rich water to the local shelf. On the Malin Shelf, to the north of Ireland and the west of Scotland, persistent intrusions of oceanic water occur onto the shelf near a bend in the slope. Additional pathways onto the shelf result from strong wind events, which cause ingress of slope water at multiple locations, while eddies in the Rockall Trough are known to pull water off the slope into deeper, abyssal regions.

In July 2013, 30 surface drifters, 15 drogued at 15 m and 15 at 70 m, were deployed on the Malin Shelf slope. Of these drifters, all of those drogued at 15 m and 10 of those drogued at 70 m moved north-eastward from their release onto the shelf. The majority crossed onto the shelf within a relatively small area, within a 30km radius of 55.5°N, 10°W, and continued as a coherent group along the edge of the Irish coastal front for approximately 38 days. This current, estimated to transport approximately 0.5 Sv of water towards the Scottish coast, follows the Irish Coastal front and then the Islay front until it bifurcates around the Outer Hebrides, with half of the drifters passing inside, to the east through the Minch, and half passing outside, to the west. The control over the path taken is likely to have been the position and strength of the Islay Front.

The tendency for the shallow drifters to cross onto the shelf more readily than the deeper ones suggests that the ingress onto the shelf varies with depth and is strongest at the surface. The deeper drifters generally spent longer in the slope region and were frequently pulled into the Rockall Trough. The drifter trajectories highlight a pathway for surface water (15 m) from the European slope, around the Scottish coast and islands and into the North Sea. Highly variable subsurface (70 m) water movement is also seen, with flow both onto and away from the shelf as well as stagnation at points along the slope.