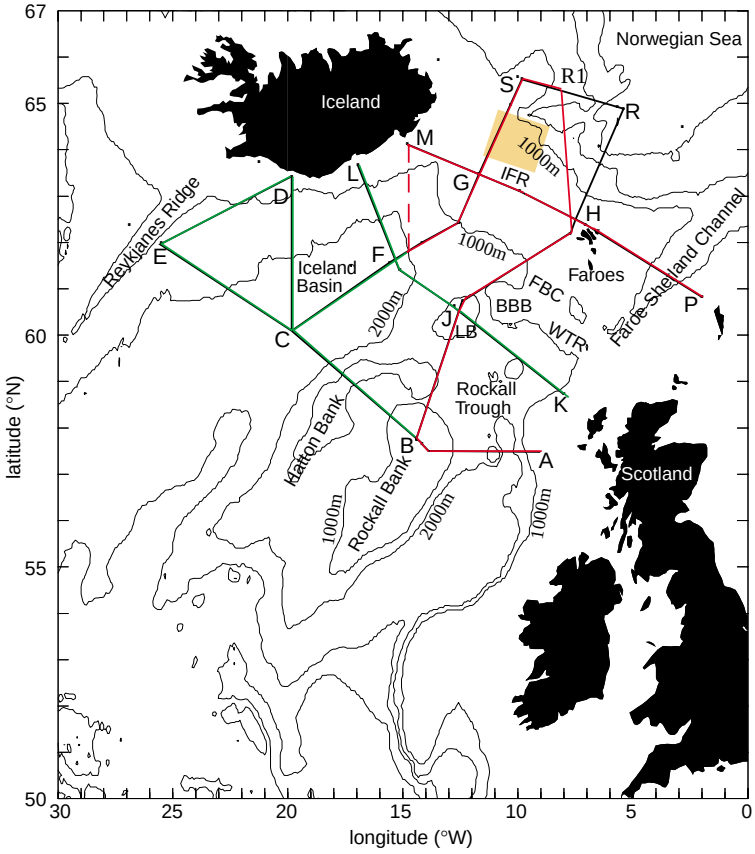

Figure 1: Cruise track for FISHES, green lines are the CTD sections prior to the boat transfer on the 19th May, red lines are the CTD sections after the 19th May but prior to the end of leg 1 of the cruise and the orange box shows the location of the three high resolution SeaSoar surveys during leg 2 of the cruise.

During the first leg of D253, a detailed comparison between two CTD systems was made. The timing of the FISHES cruise caught the SOC in a transition period between Neil Brown and SeaBird CTD systems. The cruise provided an ideal opportunity to inter-calibrate the two systems over a number of hydrographic sections for which the SOC holds a significant time series of CTD measurements. An optical particle counter (OPC) had been added to the Neil Brown instrumented CTD frame and data from this and the CTD were handled using two superimposed FSK signals that could be separated at the deck unit. Deck incubations under controlled light environments were carried out using samples from early morning CTD stations. However, the usual measurements of N^{15} uptake were paralleled by measurements of Si^{32} uptake. These latter measurements are quite novel and provide a new insight to primary productivity in diatom dominated regimes. In total, 132 CTD and net haul stations were completed in 24 days.

The three repeat high resolution multi-disciplinary SeaSoar surveys that dominated the second leg of D253 covered an area of approximately 100 km * 100 km. The position for these surveys was determined from an analysis of satellite IR and ocean colour images. A regional multi-disciplinary process model was used to forecast the observations in near real-time. The design of repeated SeaSoar surveys, in terms of cross track spacing, the direction of the survey relative to the propagation of instabilities and the primary direction of survey legs, was determined using a genetic algorithm technique to optimise sampling patterns according to