



## **Physical control of primary production on the Faroe Shelf**

Solva Eliassen, Karin Margretha Larsen, and Bogi Hansen

Faroe Marine Research Institute, Torshavn, Faroe Islands (solvae@hav.fo)

The Faroe Islands are surrounded by a shelf with tidally mixed water, partly isolated from the open ocean by a tidal front. The on-shelf areas support a relatively uniform shelf ecosystem, distinct from the off-shelf waters. Earlier studies have shown high inter-annual variability in biological production on-shelf, with high correlation between fluctuations in the various trophic levels. It seems as if phytoplankton production is the prime driver in the ecosystem since grazing pressure by the zooplankton community during the spring bloom is not large enough to postpone and/or suppress the phytoplankton spring bloom. This indicates that physical effects are the dominant control of the primary production on the Faroe Shelf. For a well-mixed shelf water mass, solar radiation is an obvious candidate as a controlling factor, but inter-annual variations in light intensity show no correlation with primary production. Instead, it appears that variations in the horizontal exchange rate on-shelf and between on-shelf and off-shelf waters can explain the main features in both the inter-annual and shorter term variations of the spring bloom on-shelf. Two competing forcing factors seem to control the exchange rate: the homogenizing tidal currents and the air-sea heat exchange, which tends to induce both vertical and horizontal density gradients. In the presentation, a simple model is proposed to explain how the variations in these two factors affect the horizontal exchange rate and through that the spring bloom on the Faroe shelf.