Fróðskaparsetur Føroya
University of the Faroe Islands

Náttúruvísindadeildin
Department of Science and Technology

Fall 2023

Course description

Course number	4105.23
Title	Ecologically relevant oceanographic processes in the Northeastern Atlantic
ECTS	6
Prerequisites	MSc in Natural Sciences
Level	PhD
Purpose	To provide a thorough introduction to the oceanography of the Northeastern Atlantic, with emphasis on physical drivers of ecological processes, and focus on the waters off and on the Faroe shelf. This course will provide the students basic understanding of the physics behind major regime shifts in this region. Students with physical and/or biogeochemical background and motivation should will acquire a solid basis for continued in-depth studies of this region. Students with biological background should will obtain a broad overview of the most ecologically/economically important species in the Northeastern Atlantic, their main prey and predators and the most likely physical drivers associated with observed changes in biomass and distributions.
Content	The course will contain an introduction to the main bathymetric features, water masses, ocean currents, the thermohaline circulation, gyre circulation systems (e.g. the subpolar gyre), principal atmospheric drivers, winter convection, nutrient upwelling, stratification and ocean-shelf interactions. The ecological responses to oceanographic variability and processes (including distributions, productivities, phenologies) will be presented and summarized for ecologically important species from all trophic levels: primary production, spring bloom, key zooplankton species/-groups, forage fish species, benthic and pelagic fish stocks and top predators (whales and seabirds).

	Finally, the main biogeographic shifts and variations in the northeast Atlantic, physical indicator records - e.g. the North Atlantic Oscillation (NAO), Atlantic Multidecadal Oscillation (AMO) and the sub-polar gyre index, ecological indicators and management of marine resources (e.g harvest control rules) will be presented.
Learning and teaching approaches	Reading of provided key papers prior to the course. Lectures, data analyses/modelling exercises, hands-on learning onboard a research vessel, oral presentations, written assignment.
Learning outcomes	On completion of the course, students will be able to demonstrate ability to: - extract, process and analyze data from physical oceanographic models. - describe the characteristics of main biogeographical zones in the subpolar North Atlantic, including: water masses, biota at all trophic levels, mean distributions laterally and vertically, main expansion and contraction events (regime shifts). - discuss their research topic in both a climate variability (natural) and in a climate change (anthropogenic) perspective. Students with physical focus should be able to describe the physical processes behind principal environmental indicator records for the North Atlantic Ocean (e.g. the NAO, the gyre index, the AMO). Biologically focused students should be able to describe bio-physical linkages between such indicator records and key ecological changes.
Assessment method	*i*) A written assignment of 5-10 A4 pages with a summary of the lectures given, *ii*) a short presentation of data sampled (onboard the research vessel, or from the student's own projects) and *iii*) an oral presentation of a chosen/given scientific paper. Satisfactory deliverables at all three parts are required, in order to pass the course.
Examination	Internal.
Marking scale	Pass/fail
Bibliography	Scientific papers provided by the lecturers prior to the course and the lecture-presentations themselves (e.g. Power Point slides)

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