

# **PINRO Complex Airborne Research on Mackerel Distribution and Environment Conditions Study in the Norwegian Sea**

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**Abstract – This paper is presented some basis approach for complex air surveys of feeding mackerel in the Norwegian Sea and results of it.**

**Keywords:** Norwegian Sea, complex air surveys, mackerel.

## **1. INTRODUCTION**

PINRO is carried out airborne researches in the Norwegian Sea in the interest of fisheries oceanography information providing as regular beginning 1997. The main task of it is study of mackerel feeding distribution and current oceanography conditions in the sea surface and subsurface layers. Today these researches are carried out on base of modern remote sensing technology, including remote sensing equipments, methods of processing and presentation of research results. All airborne researches have a complex character, and they carry out onboard of research two engine aircraft “Antonov-26” (An-26) named “Arktika”.

## **2. THE MAIN TASKS AND DIRECTIONS, PRINCIPLES RESULTS**

The main directions and tasks of considered research are following:

- collection, analyze, interpretation, generalization and presentation data about current sea surface and subsurface layers oceanographic conditions, and its structure with purpose to use these information in ecosystem research;
- collection, analyze, interpretation, generalization and presentation data of marine mammals and seabirds distribution and then assessment of their numbers with using of special mathematics methods for future estimation of their influence to mackerel feeding. These data use in ecosystem modeling also;
- collection, analyze, interpretation, generalization and presentation data of mackerel feeding schools distribution and then assessment of their biomass. These use as element of ecosystem research also;
- control for position and number of fisheries and other type vessels;
- control for pollution including oil slick.

For collection of initial data use following remote sensing equipment:

- IR-radiometer and scanner;
- LIDAR;
- Synthetic Aperture Radar (SAR);
- digital and analog foto-and video equipments.

Besides, above equipment carries out standard visual observation.

All measured and observed data, effects and parameters put on computer system in the real time and position with using GPS and then after special computer processing present in the mapping form in GIS.

Airborne research in the Norwegian Sea as complex research allow to get many difference information about oceanographic conditions on sea surface and subsurface layers (SST, hydrodynamics structure and position, transparency, pycnocline depth, chlorophyll concentration) distribution, and numbers of biological objects (marine mammals, sea birds, mackerel schools and so-on) simultaneously from great area for the short period in the real time and position. It is the main advantage of airborne surveys against vessels surveys. This circumstance allows to use complex airborne research in the Norwegian Sea not only in the interest of fisheries oceanography information providing, but also as importance part of ecosystem research and modelling.

## **5. CONCLUSIONS**

In the future PINRO plans to continue complex fisheries oceanography airborne research of feeding mackerel in the Norwegian Sea. For this purpose PINRO specialists will use LIDAR methods as main for mackerel schools identification including biomass calculation.