The Norwegian and Barents Seas: current temperature conditions (based on satellite data).

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The potential use of satellite data in assessing temperature conditions in the major fishing areas for fishery forecasts continues to expand successfully. The main advantage of satellite monitoring, in particular of the Norwegian and Barents Seas is the ability to obtain real time information on SST which makes it possible to draw up SST maps of different time discretion and to evaluate the current state of SST dynamics within the synoptic, monthly, seasonal and interannual cycles. Digital and analogue SST map database established at VNIRO since 1987 is used as an additional information resource for the analysis and forecast of the fishery situation, for detecting years with the same pattern of temperatures as in the current period. Authors have analyzed indirect influence of SST (the NOAA satellites data) on abundance of the North-east Atlantic (NEA) cod at age 3+. Four areas have been selected in the area of the cod distribution to analyze SST in particular months: spawning grounds off the Lofoten islands (1) to analyze SST (March –April), and three zones of the larval drift and the pelagic young fish distribution: the West-Spitsbergen waters (2); Bear- Spitsbergen (Nordcap) area (3), and Murman-Novaya Zemlya area (4) to analyze SST in June-October. Mean monthly SST and anomalous values are computed for the selected areas on the basis of the weekly SST maps for the period of 1998-2009. These maps were plotted with the satellite SST data, as well as information of vessel, buoy, and coastal stations. All data on each area were classified by seasons and years.

The results indicate that poor generations of cod (2001, 2006, 2007) occurred in years with negative or extremely high positive anomalies of SST in the spawning grounds in March –April. The SST anomalies which were close to normal provide conditions for appearance of generations with average abundance (1999, 2003, 2004, 2005) or even high abundance (1998, 2000, 2002).

Examination of the SST influence on the cod year-class strength during the early life history (March-October), i.. spawning till migration to the bottom layer allows us to identify a relatively narrow range of the SST anomalies which are optimal for appearance of strong generations of cod (+0.1 - +0.7) and a broader range of the SST anomalies (-0.1 - +1.1) which are favorable for appearance of generations with average abundance. Poor generations are very likely to occur outside these ranges, i.. when the SST anomalies exceed +1.2 or are below -0.1.

On the whole, the analysis of variations in temperature conditions of the Norwegian and Barents Seas in recent years (mean seasonal SST values and SST anomalies) helped to find out the following characteristics:

- average values of SST and SST anomalies in all zones in 1998-2006 increased;

- average values of SST and positive SST anomalies in zones 2 and 3 in 2004-2009 remained to be relatively "high";

- on the other hand there was a significant drop in mean seasonal values of SST and SST anomalies in the central and eastern Barents Sea (zone 4) after 2007. So the mean seasonal temperatures of water and SST anomalies in zone 4 of the Barents Sea changed in "pivotal" years as follows: 1998 – m.= 4,37º, an.= -0,55º; 2004 – m.= 5,70º, an.= +0,78º; 2008 – m.= 4,82º, an.= -0,10º.

The comparison of such data with the results of biologic research of the NEA cod allows us to observe the direct or indirect impact of temperature conditions on the success of spawning, larval development and survival of the young, as well as to use it as an additional factor in forecasting the recruitment to fishing stock.

Key words: the Norwegian and Barents Seas, satellite data, SST, dynamics of seasonal anomalies and mean SST data, North-east Atlantic cod.