Svetlana Glebova
Cyclicity in formation of the types of synoptic situation above the Far East seas as a factor of their ecosystems changes

Pacific Fisheries Research Centre (TINRO-centre), Vladivostok, Russia
The present report is devoted to search links of periodic changes of atmosphere regime with dynamics of some biological factors.

To indicate interannual changes in ecosystems of the Far-East Seas the cited data on dynamics of the biomass of pollock and plankton of the Okhotsk and Bering Seas were used. The sources are listed here:

- Shuntov, 2001
- Smirnov et al., 2001
- Stepanenko, 2001
- Klyshtorin, 2000
Types of atmospheric processes formed over the Okhotsk and Bering Seas were used for describing a condition of an atmosphere.

The types were defined for 10-days averaged charts of surface pressure analyzed for the period of 1980-2000.

The position and intensity criterion of the centers of action of atmosphere, in particular the Aleutian depression, and also direction of wind over the each sea were used as the main criteria for definition of the types.

In total, six characteristic synoptic situations or types had been allocated both for the Okhotsk and Bering Seas.
Generalized synoptic situations appropriate to certain types of atmospheric processes over the Okhotsk and Bering Seas (after Glebova, 1999; 2001)
Catches in the Pacific Ocean (from Klyshtorin, 2000)
Dynamics of the pollock biomass in the Okhotsk Sea (from Smirnov, 2001) and in the Bering Sea (from Stepanenko, 2001) in the last two decades.
Year-to-year variability of total repeatability of the types of atmospheric processes, 10-days per year
Interannual dynamics of the pollock biomass in the Okhotsk Sea (A) and in the eastern Bering Sea (B) on a background of long-term change of repeatability of the types of atmospheric processes.
Synoptic situations lead to “warm” (A) and “cold” (B) types of atmospheric processes over the Okhotsk and Bering Seas.

**The “warm” types**

**The “cold” types**
Interannual dynamics of the abundance of spawning pollock in the Okhotsk Sea with 5 years shift on a background of long-term variability of repeatability of the IVo type of atmospheric processes.
Interannual dynamics of the abundance of spawning pollock in Bering Sea with 5 years shift on a background of long-term variability of repeatability of the IVb type of atmospheric processes.

Graph showing the biomass (in thousands of tons) over the years from 1980 to 2000. The graph also includes a map indicating the IVb type atmospheric processes with regions labeled as H and L.
Interannual dynamics of number of a spawning pollock in the Bering and Okhotsk Seas with 5 years shift on a background of long-term variability of repeatability of the “warm” types of atmospheric processes.
Interannual variability of macroplankton biomass in the southwest (A) and West-Kamchatka (B) areas of the Okhotsk Sea on a background of fluctuations of repeatability of the Vlo type of atmospheric circulation.

A macroplankton of southwest area

B macroplankton of West Kamchatka area

Years

Biomass, mg/m³

The quantity of decades
Interannual variability of a biomass of various groupings of plankton (Sagitta and Copepoda) in the Bering Sea (from Shuntov, 2001) on a background of fluctuation of repeatability of type of the atmospheric processes.
Long-term fluctuations of a biomass of the various groupings zooplankton (Euphausia and Amphipoda) in the Bering Sea (from Shuntov, 2001) on a background of an interannual course of repeatability of III type.
1. Rhythmic fluctuations with period 8-10 years are revealed both in atmosphere and in the ecosystem of Far Eastern Seas, for example, in the dynamics of pollock in the Okhotsk and Bering Seas.

2. Abundant generations of the pollock in the Okhotsk and Bering Seas appear on a background of increase of repeatability of the "moderate cold" IVo and "cold" IVb synoptic types accordingly. Both these types are characterized by stable west winds over the pollock spawning grounds.

3. On the contrary, growth of macroplankton biomass in the sea of Okhotsk occurs on a background of intensive formation of the warm type Vlo.

4. In the Bering Sea, an abundance of various zooplankton groups (Sagitta, Copepoda, Euphausia, Amphipoda) is linked with formation of certain synoptic situations, each of which, causing the certain wind carry, promotes the favorable or unfavorable hydrological regime in the areas of their habitation.
Thanks for attention