

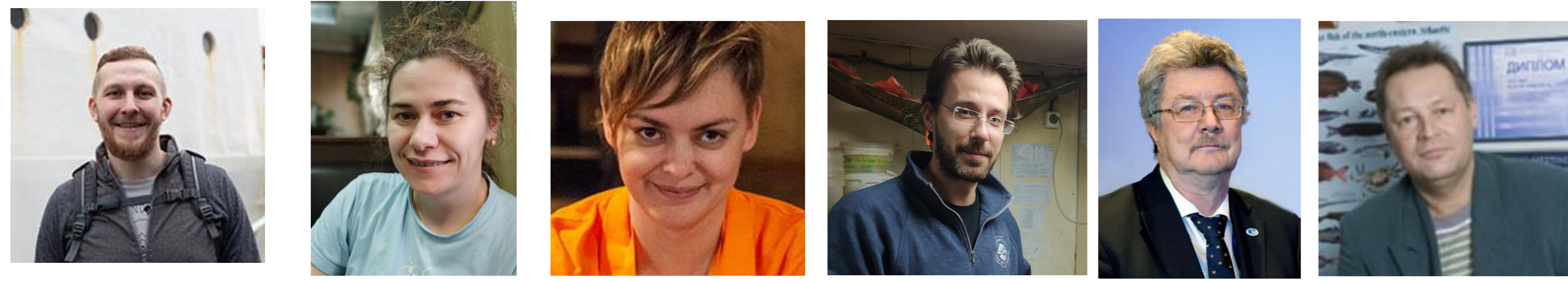
Features of spatial distribution of dominant groundfish species on the Koko Seamount (Emperor Seamounts) in 2019

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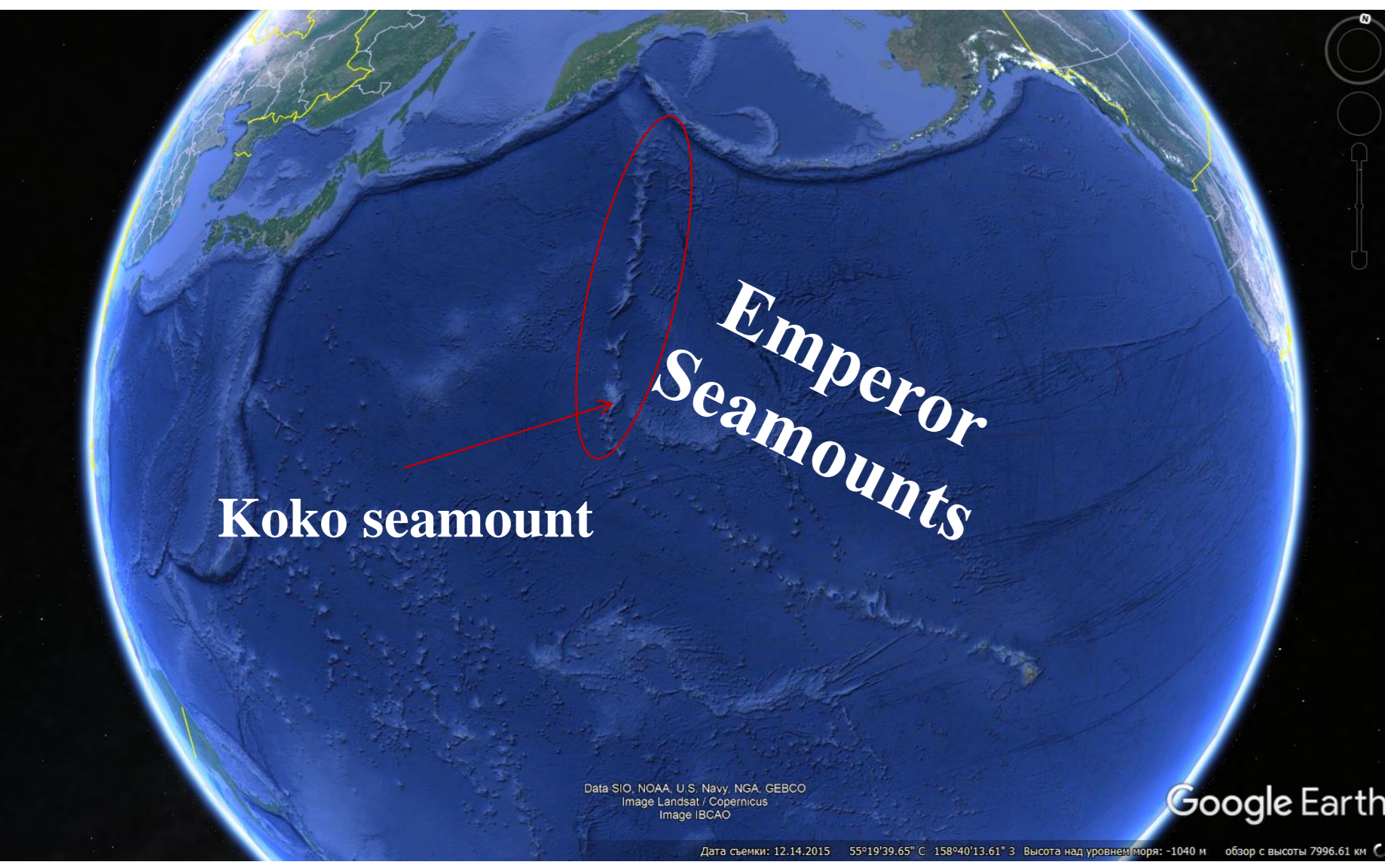
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Russian fisheries research on the Emperor Seamounts began in the 1960s with discovery of significant fishery resources especially slender armorhead (*Pentaceros wheeleri*). After that severe exploitation of Koko Seamount resources began with annual catch varied from 5.1 to 202.1 thousand tonnes during 1968-1976. After that slender armorhead stock dramatically fell and probably caused changes in the species structure. Modern research on the Emperor Seamounts are scarce. Bottom trawl survey was conducted by R/V TINRO in 2010 which showed changes in the species structure and low abundance of slender armorhead. In April 2019, R/V Professor Kaganovsky repeated bottom trawl survey on the Koko Seamount. Six bottom trawl hauls were carried out on the Koko Seamount.

Trawl hauls were carried out with a bottom trawl DT 27.1/24.4 (horizontal opening 14–16 m, vertical opening 4–6 m, mesh size in the codend 10 mm) at depths from 290 to 380 m.

The top surface of the Koko Seamount, measuring about 55 miles from north to south and 18 miles from west to east, is delineated by an isobath of 390 m. The plateau is characterized by a relatively flat bottom, covered with multigrained sands with inclusions of fragments of dense limestones with isolated outcrops of bedrock.

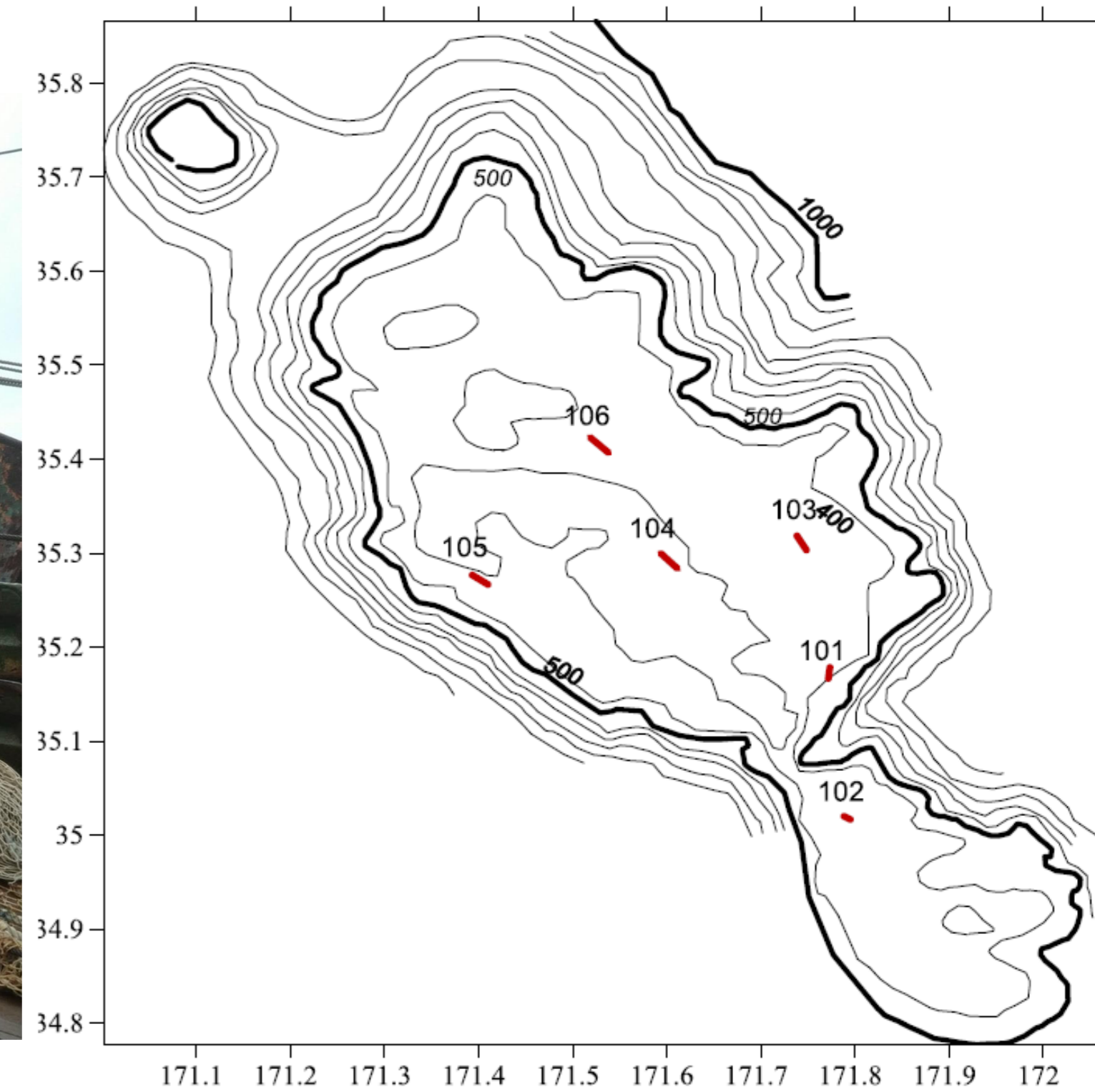


Pencil cardinal (*Epigonus denticulatus*)

The main concentrations were near the steep slope areas, while lower catches, on the contrary, were observed in the central part of the plateau.



The size composition (mean length 16 cm) of pencil cardinal in different parts of the plateau was not uniform. The largest individuals were observed in the central part, while smallest ones in the northeast. Catch distribution was different when compared to 2010, with an increase in catches at the northern sites. In 2010, the highest catches were observed in the southeastern part of the plateau, while pencil cardinal was absent in catches in the central part of the plateau.



Bottom trawl locations on the Koko Seamount

Japanese codling (*Physiculus japonicus*)

The highest concentrations of Japanese codling were observed on the steep slopes of the eastern and western parts of plateau.



Slender armorhead (*Pentaceros wheeleri*)

The obtained values of the abundance of slender armorhead, similar to the data of the expedition in 2010, indicate an extremely low abundance and continued depression of this species' population.



There was an increase in the average size of slender armorhead compared to catches in 2010.

Helicolenus avius



The main catches were observed along the depth drop.

The comparison of the results of catches in 2010 and 2019 showed that the species structure of ichthyocene has not changed in principle, however several species changed their abundance. Specific biomass of the dominant pencil cardinal were 7.5 t/km² in 2010 and 3.7 t/km² in 2019. Estimates of slender armorhead abundance did not differ significantly between 2010 and 2019. A more than an order of magnitude increase in the concentration of Japanese codling and alfonsino *Beryx decadactylus* was observed in 2019 compared to 2010.

Table – Biomass estimates of main species on Koko Seamount in 2019

Species	Kg/km ²	Ratio of relative biomass estimates to survey 2010
<i>Epigonus denticulatus</i>	3722.7	-2.0
<i>Physiculus japonicus</i>	597.6	+34.0
<i>Pentaceros wheeleri</i>	356.8	+1.7
<i>Beryx decadactylus</i>	227.3	+22.1
<i>Helicolenus avias</i>	156.6	-2.0

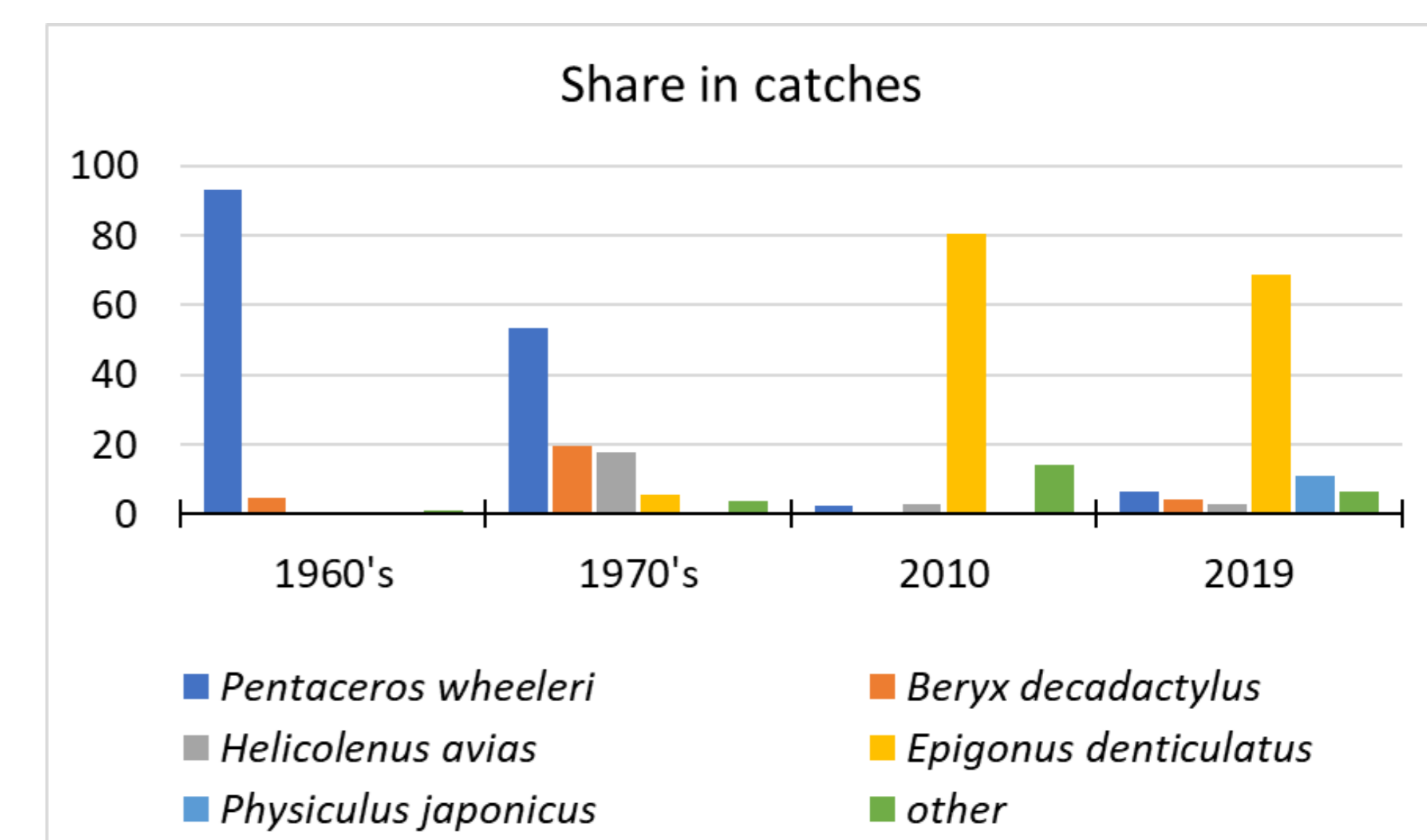


Table – Species structure of ichthyocene on Koko seamount in different periods

In the 1960s and 1970s, the most abundant species in the ichthyocene were slender armorhead *Pentaceros wheeleri* and alfonsino *Beryx decadactylus*, which served as targets of active fishing with annual catches of up to 50-80 thousand tons. The proportion of slender armorhead in catches during this period was 53-93%, and that of alfonsino - 5-19%. In recent years, the proportion of these species in catches has significantly decreased to 2.2-6.6% of slender armorhead and 0.1-4.3% of alfonsino. At present, the dominant species in the ichthyocene is *Epigonus denticulatus*, accounting for 69-80% of the total biomass of fish on Koko Seamount.

Conclusion:

Since the 1960s to the present, significant changes in the structure of fish communities have been observed on the Koko Seamount. In the 2000s, pencil cardinal began to dominate here, which in the 1960s-1970s was found only once in this area, while slender armorhead, *B. decadactylus*, and *H. avius* dominated in catches. In general, the northward extension of the ranges of some fish species was observed, which is probably due to climatic changes.