

**Jack mackerel
(*Trachurus murphyi*)
distribution peculiarities
in the high seas of the South
Pacific
in relation to the population
structure**

**Soldat V.T., Kolomeiko F.V., Glubokov A.I.,
Nesterov A.A., Chernyshkov P.P., Timokhin E.N.
Russia**

Purposeful study by Russia of jack mackerel in the high seas of the South-East part of the Pacific Ocean (SEPO) (outside the 200-mile zones of Peru and Chile) began in 1978 and was carried out concurrently with the commercial development of this area. In 1977-1978, the Soviet fleet discovered commercial jack mackerel aggregations accessible for trawl fishing. The Soviet research and searching vessels collected the material in that area in 1978-1991 (Chur et al., 1984; Elizarov et al., 1992; Arcos, Grechina, 1994; Kotenev et al., 2006). In 1981-1991, a vast area was investigated in the South-West Pacific Ocean (SWPO) at 30-49°S and 100-175°W, where commercial aggregations of spawning and foraging jack mackerel occurred.

The maximum annual jack mackerel catch amounted to 1,17 mln. t in 1990, and a total catch in the course of 13 years of fishing made up 12,8 mln. t of fish.

After 1991 the Russian fleet resumed the fishery in 2003-2005, and a total catch made up 76,9 ths. t.

The goal of this paper is to consider jack mackerel distribution peculiarities in different years for the purpose of selecting groupings at the possible population levels.

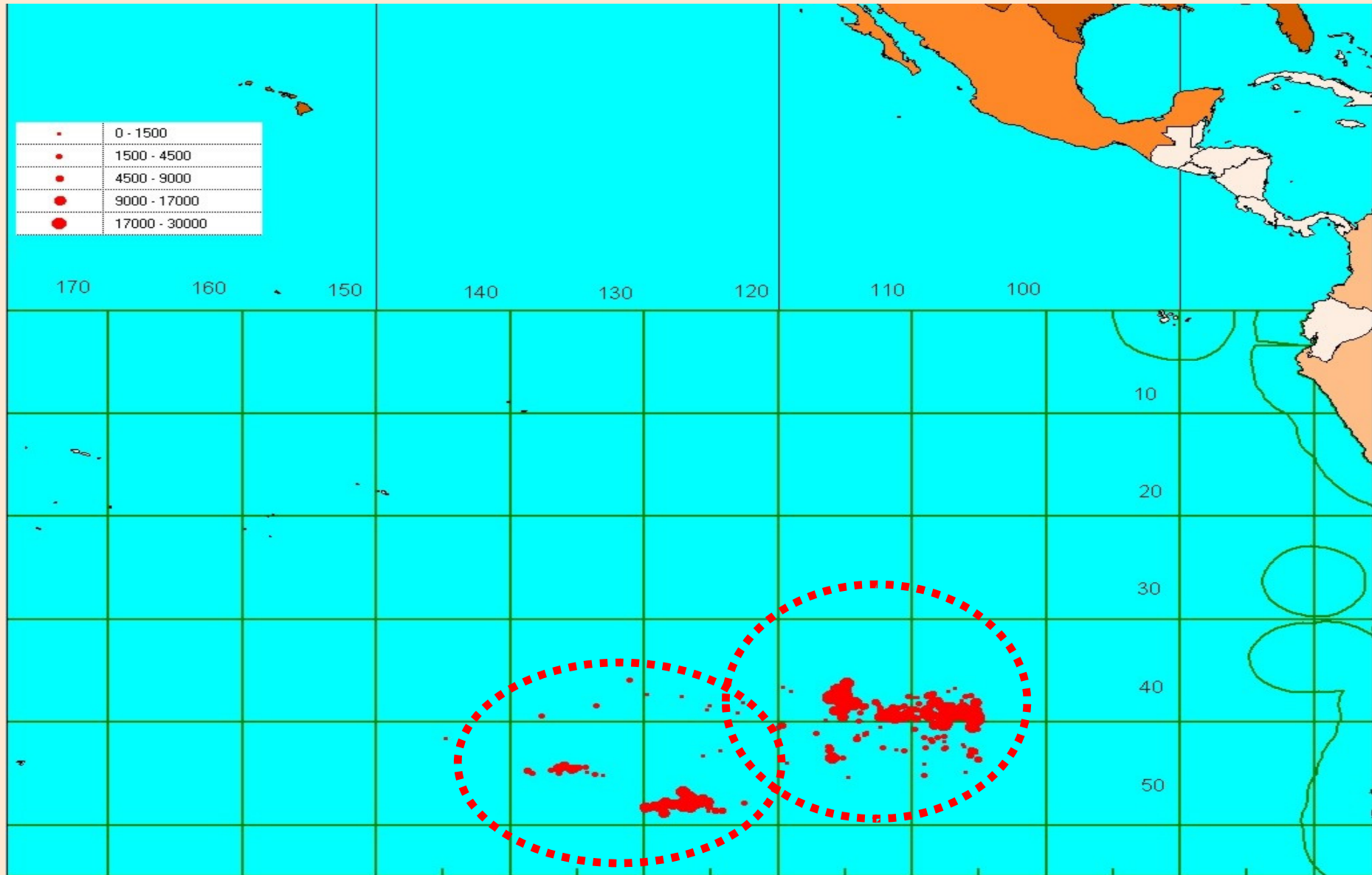
**Available data on jack mackerel in the South Pacific Ocean
(1978-1991 & 2002) AtlantNIRO**

Period	Number of vessel-cruises	Trawl cards	Mass measurements (ind.)	Biological analysis (ind.)
1978	10	1232	246400	40876
1979	10	2153	430600	88650
1980	7	1096	219200	51700
1981	11	1482	296400	98022
1982	11	1565	313000	58972
1983	13	2013	402600	88380
1984	12	2052	410400	89783
1985	10	2206	441200	100088
1986	12	2462	492400	111523
1987	8	2263	452600	95310
1988	9	2082	416400	96423
1989	9	2050	410000	83033
1990	9	2156	431800	86261
1991	7	1058	211600	48300
2002	1	126	25200	9429
Total	139	25999	5199800	1146750

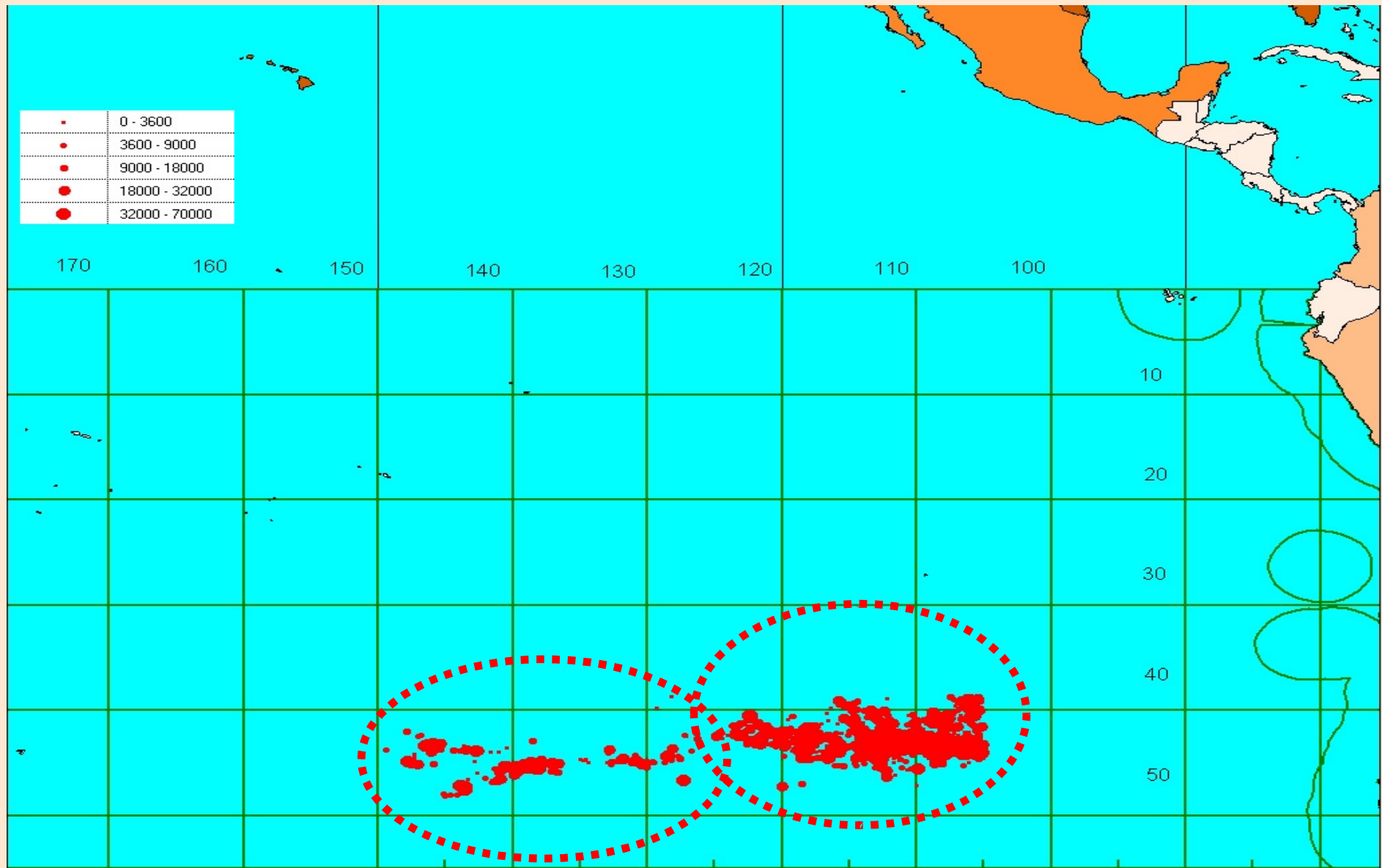


Jack mackerel was caught during research and searching cruises by BATM, RTMK-S of 5700 and 9260 t GRT, respectively, or by other vessels of similar GRT and capacity. The trawls 120/980 m and 120/1120 m equipped with cod-ends of mesh 37 mm without a cover and 34 mm with a cover made of netting with mesh 68 mm

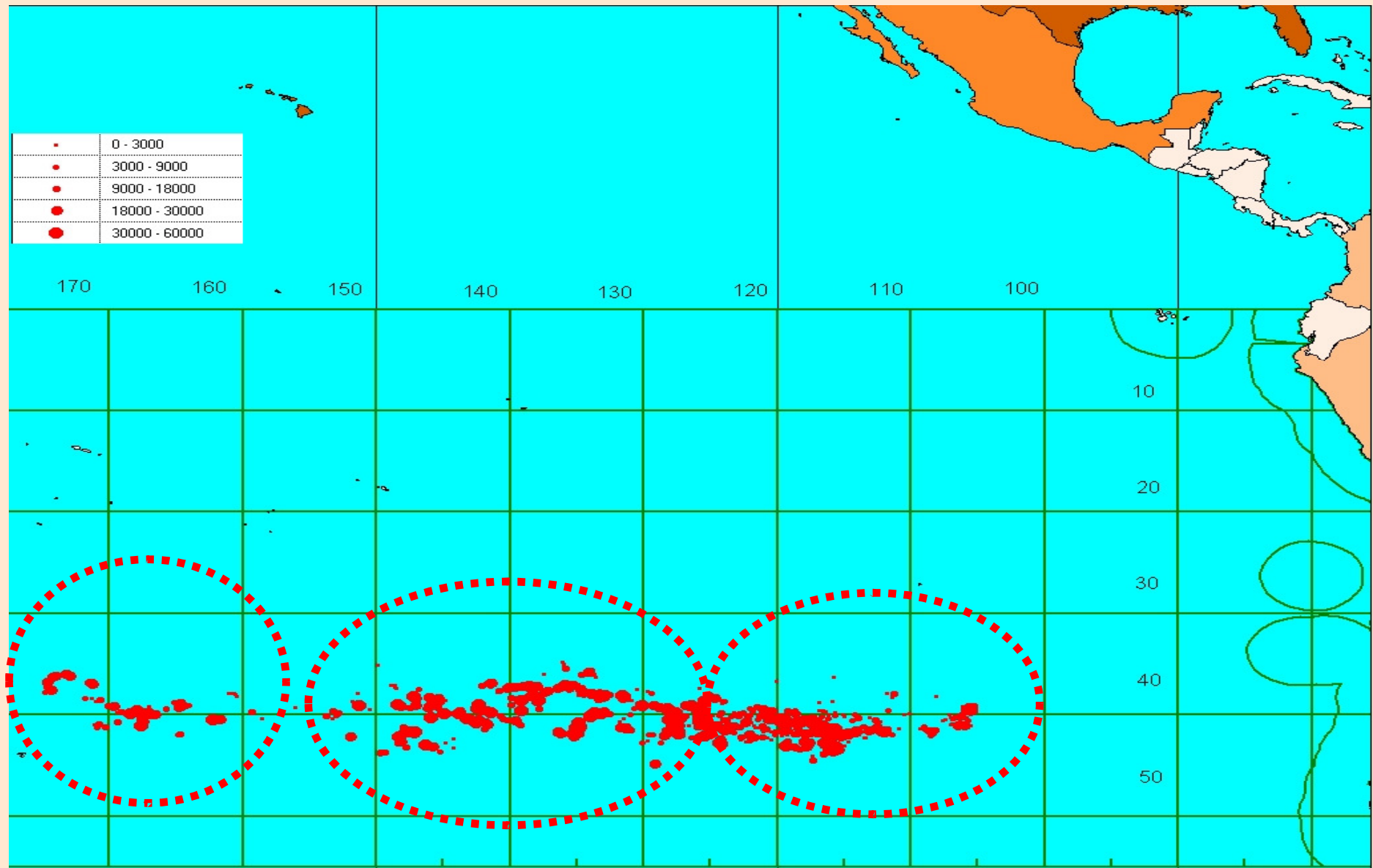
Jack mackerel distribution in the catches of the Russian research and searching vessels westward of 105°W in quarter I, 1982-1991 (334 trawls, catch in kg).



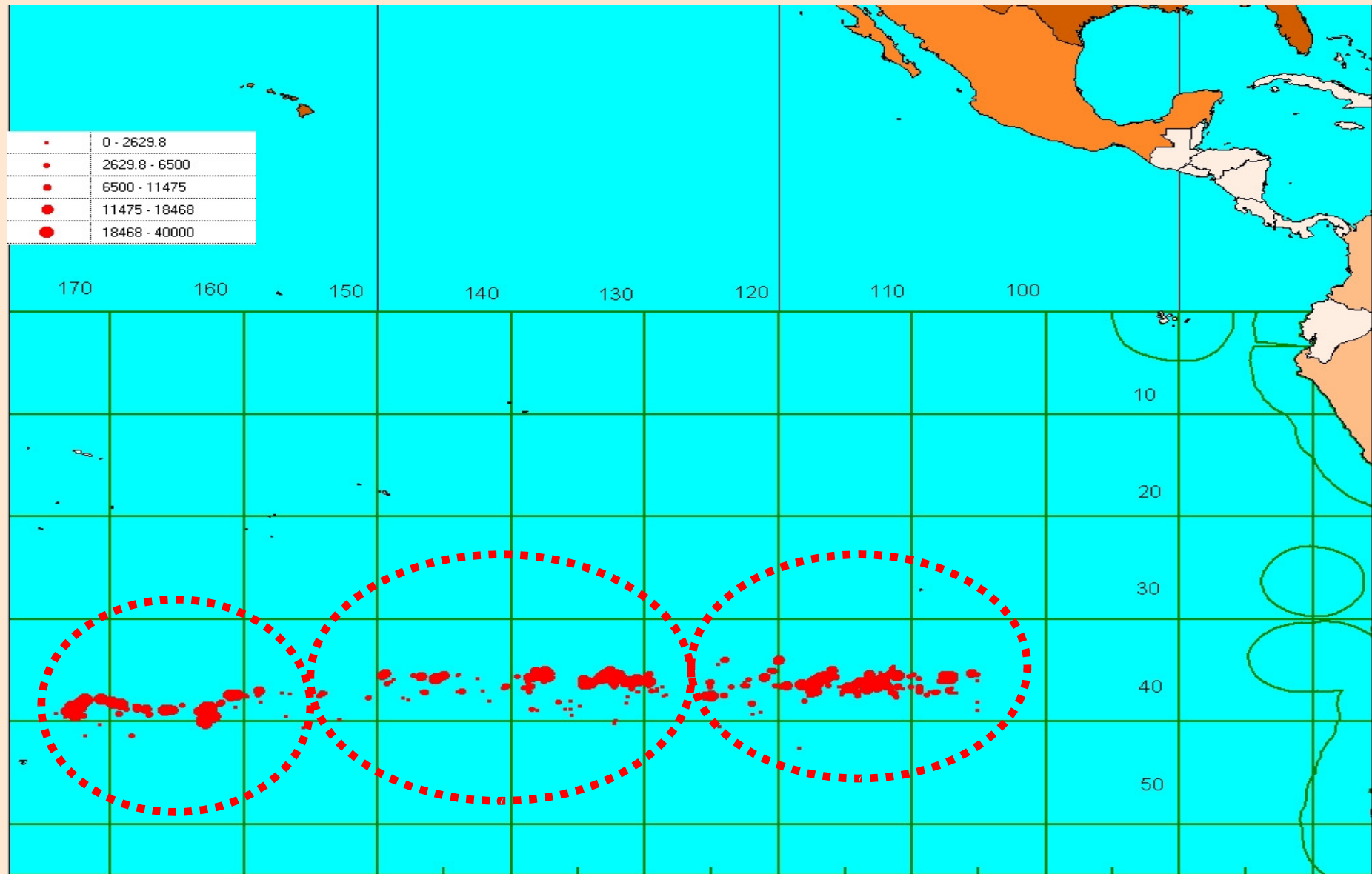
Jack mackerel distribution in the catches of the Russian research and searching vessels westward of 105°W in quarter II, 1982-1991 (1284 trawls, catch in kg).



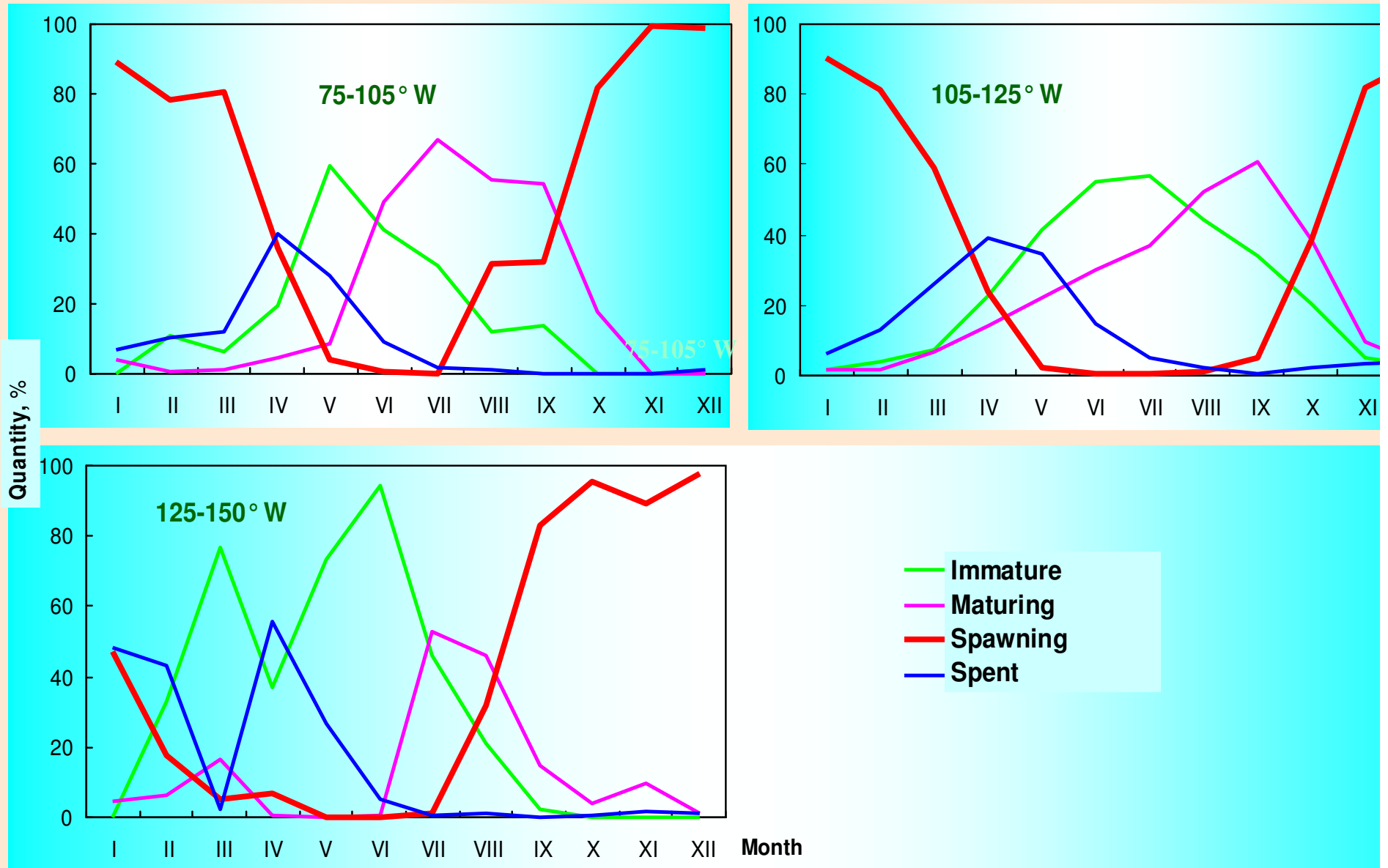
Jack mackerel distribution in the catches of the Russian research and searching vessels westward of 105°W in quarter III, 1982-1991 (794 trawls, catch in kg).



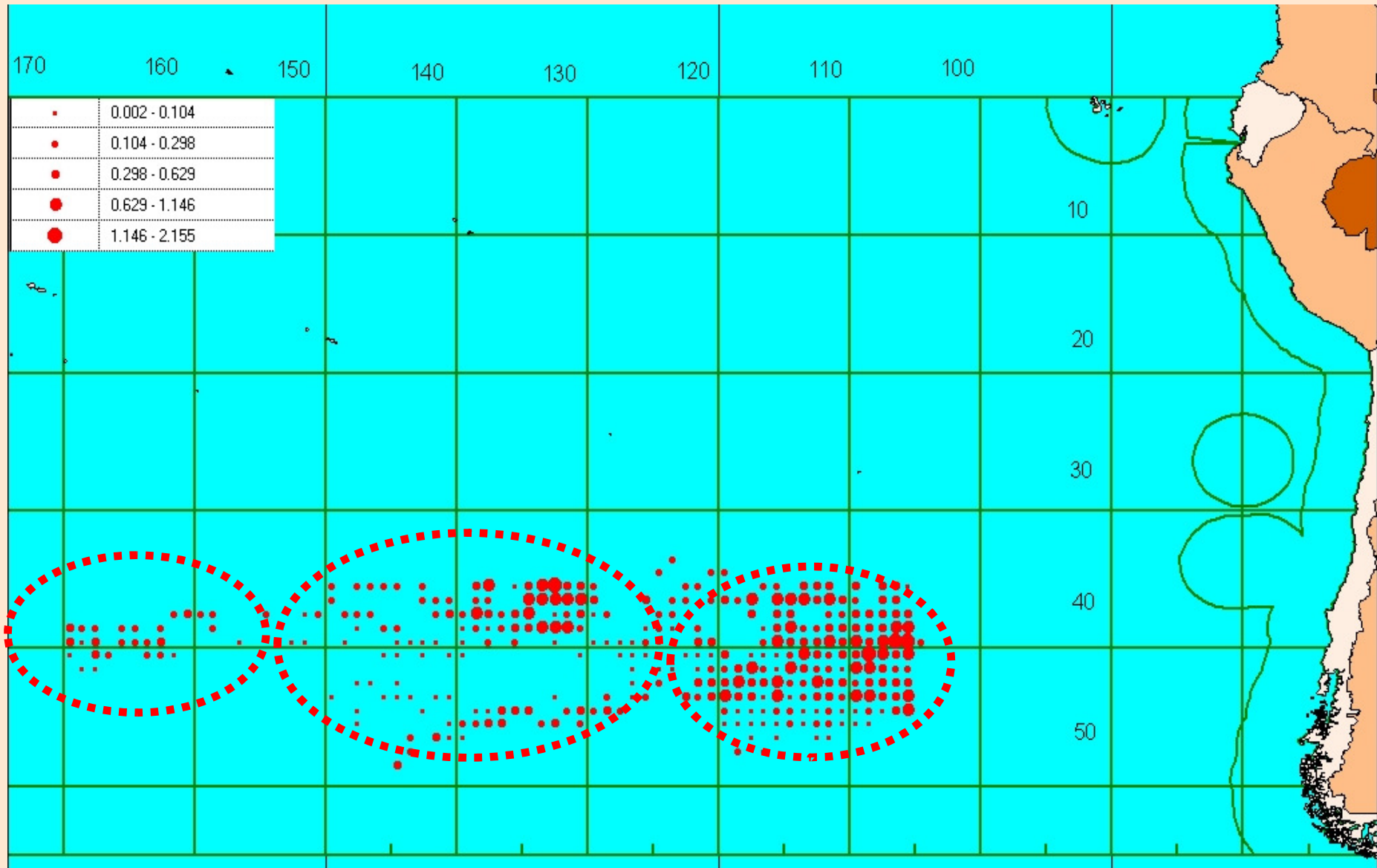
Jack mackerel distribution in the catches of the Russian research and searching vessels westward of 105°W in quarter IV, 1982-1991 (470 trawls, catch in kg).



JACK MACKEREL OCCURRENCE AT DIFFERENT STAGES OF REPRODUCTIVE CYCLE IN THE CATCHES OF THE RUSSIAN VESSELS (1978-1991) IN THE SOUTH PACIFIC (30-55°S) BY AREA AND MONTH.

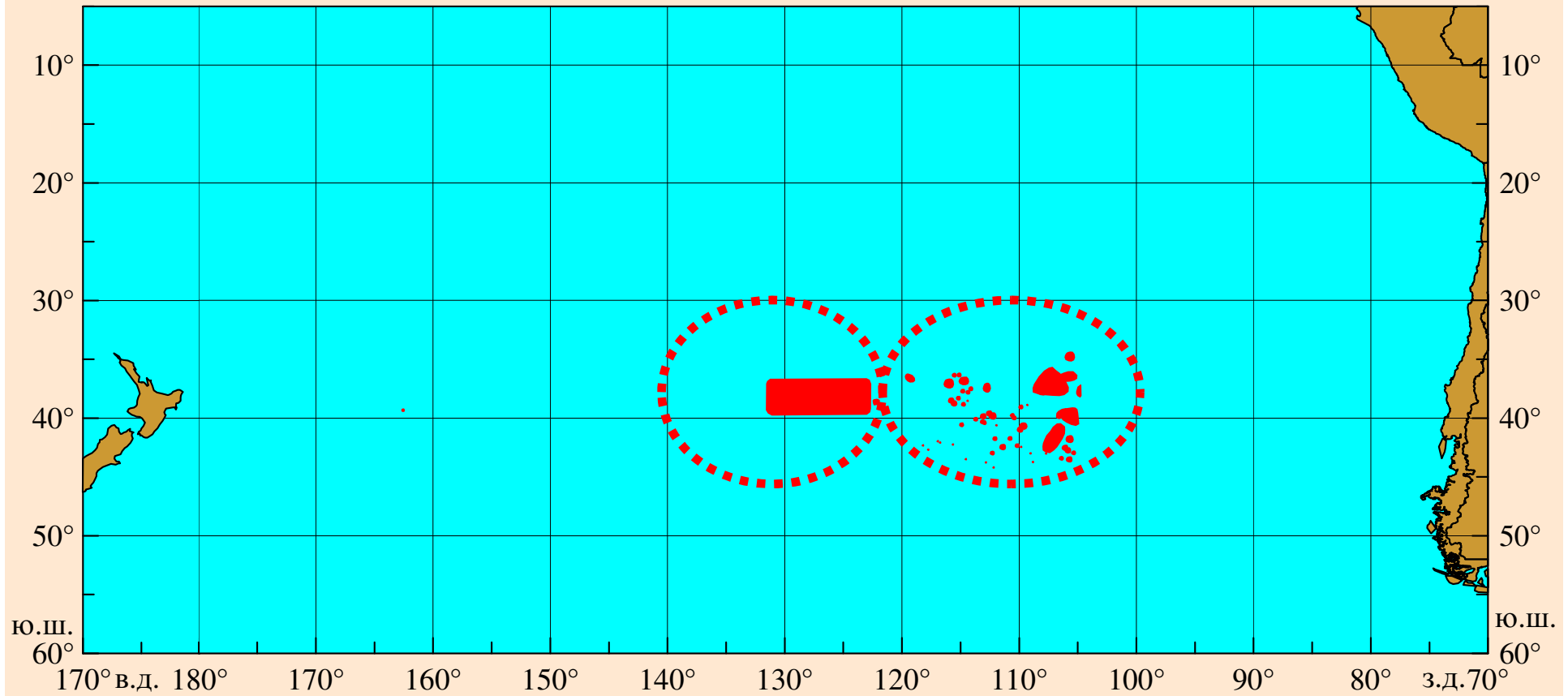


Distribution of jack mackerel spawning individuals by 1°x1° squares in 1982-1991 westward of 105°W (%).

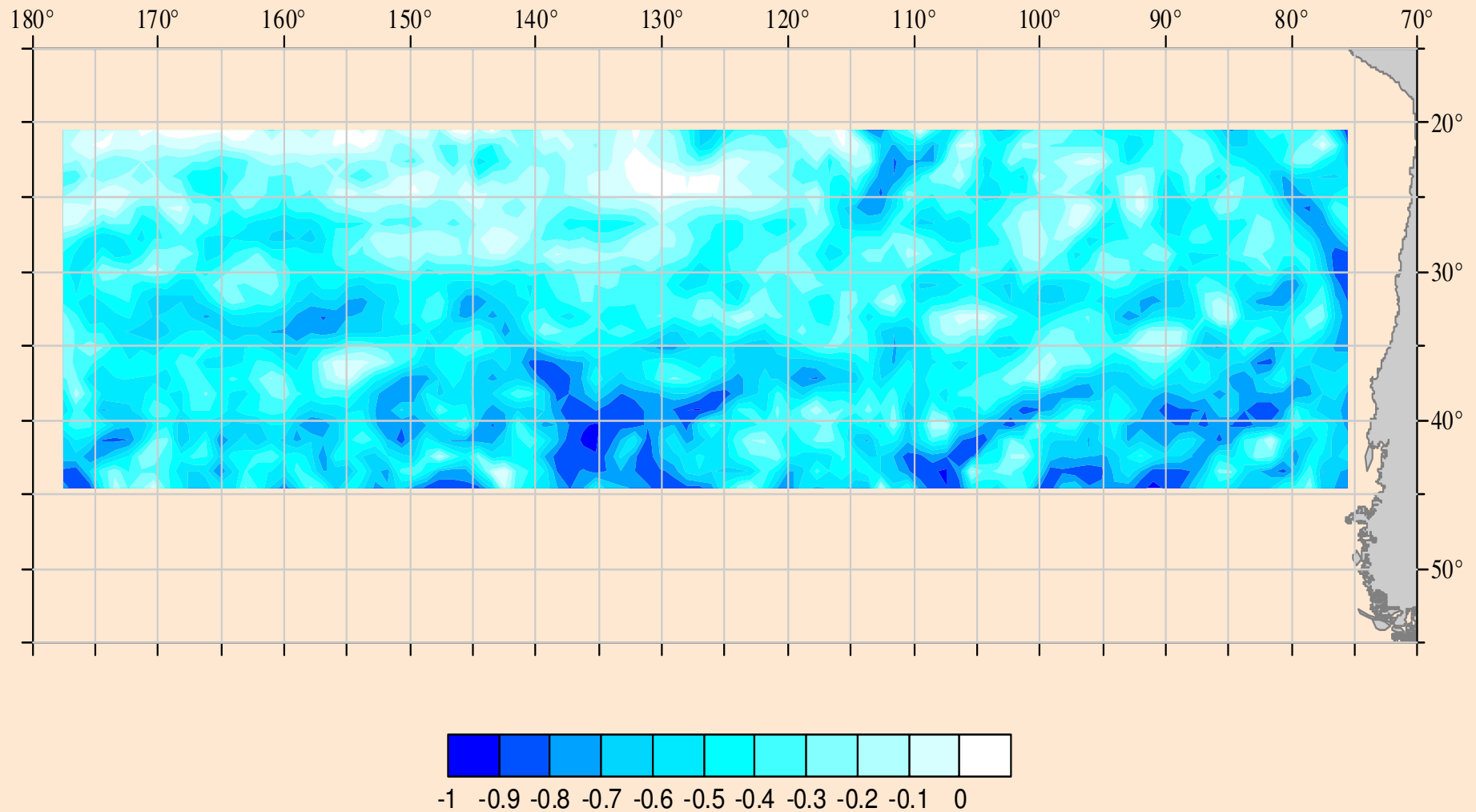


Immature jack mackerel distribution (below 25 cm in length) westward of 105°W according to the data of the Russian searching and commercial vessels for 1978-1991.

.



Distribution of eddy kinetic energy loads for the SPO area 20-45°S, 75-180°W (1992-2008) (AVISO, 2008).



Conclusions

- **According to Russian studies, jack mackerel aggregations in the period from 1979 to 1991, and in 2002-2003 were recorded in the area at 105°-175°W year-round.**
- **Zoning by density is traced on the maps of immature and mature jack mackerel distribution in 1979-1991. At least three areas can be singled out including 105-125°W, 125-155°W, 155-175°W.**
- **Mass spawning of jack mackerel was observed in each area.**
- **The conditions for jack mackerel reproduction and their life cycle completion exist all over the area of the southern part of the Pacific Ocean outside the EEZs.**
- **Mean annual data on eddy kinetic energy load distribution are indicative of existence in the South Pacific of the zones with stable characteristics differing from adjacent areas.**
- **The availability of relatively isolated jack mackerel groupings, and specific climatic and oceanological conditions within the limits of singled out zones requires additional studies both of the causes of grouping formation and their isolation degree, and the search of similarity and distinctions between jack mackerel from different areas of the South Pacific in order to determine their population status.**