Revealing Invisible Changes in Seemingly Stable Mesopelagic Fish Community

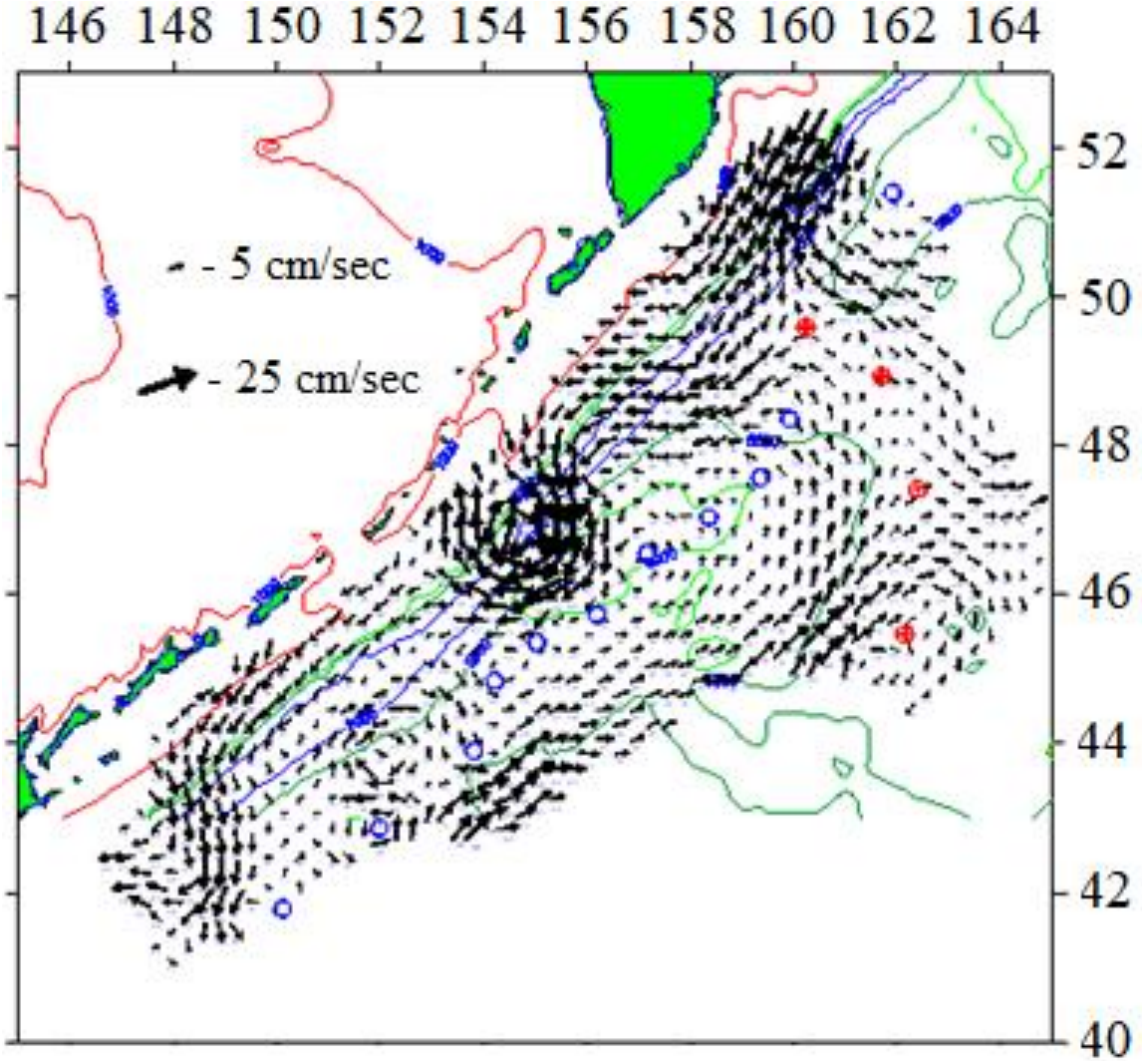


Vladimir I. Radchenko, Vladivostok, TINRO, Russia

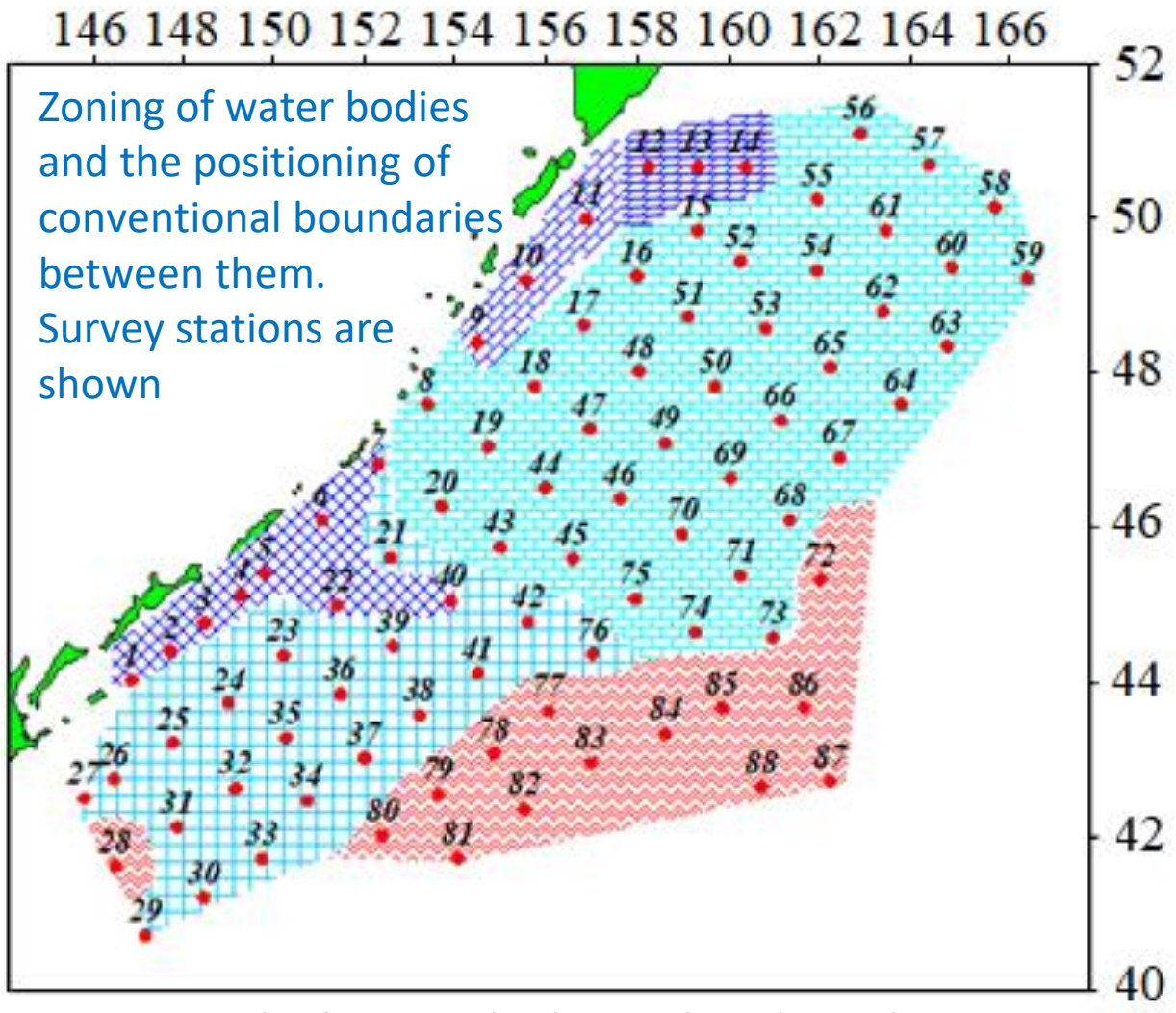
PICES-2026, W2

illustration: https://media.easy-peasy.ai/

General oceanographic description of survey area used in this study, June – July of 2004, 2006-2026



Geostrophic currents in the surface layer. Open circles represent the axis of divergence; circles with a cross represent a zone of convergence



Navy - Kamchatka, Kamchatka-Kuril, and Oyashio Currents

Light blue – Subarctic waters of the Western subarctic gyre interior region of the in the northern and southern sectors

Red - Transformed subtropical waters of Subarctic Current

Common myctophid fish species in this study



Stenobrachius leucopsarus



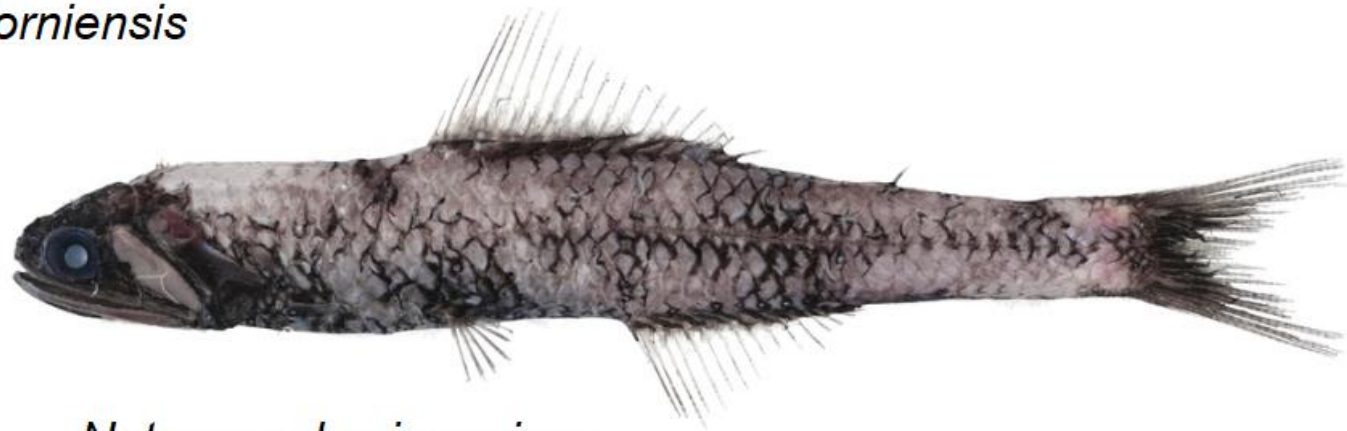
Diaphus theta



Symbolophorus californiensis

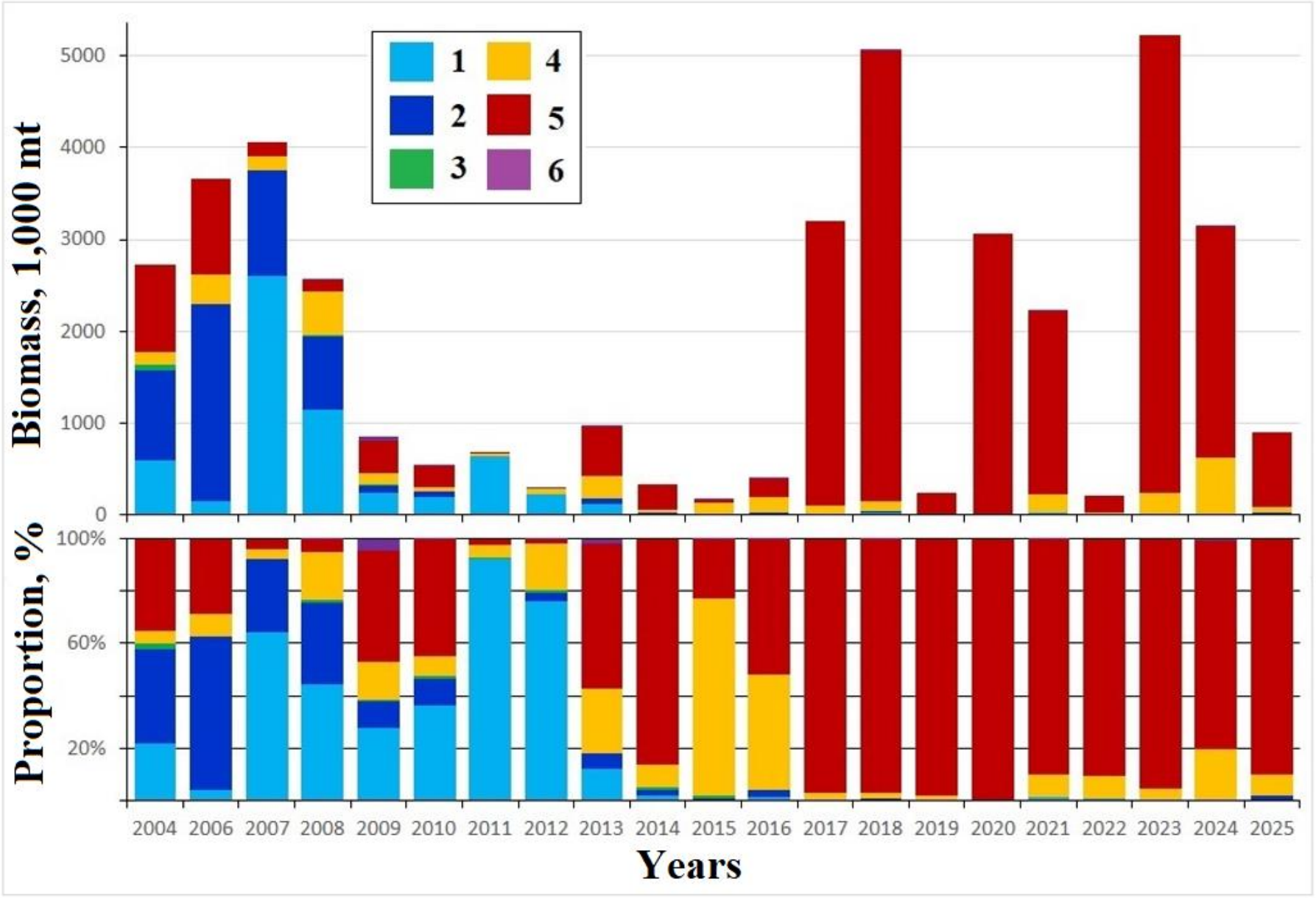


Tarletonbeania crenularis



Notoscopelus japonicus

Changes in composition of myctophid fish in catches at night in the upper epipelagic layer in summer trawl surveys, 2004-2025



1-3 – boreal species



4 – southern boreal-subtropical species

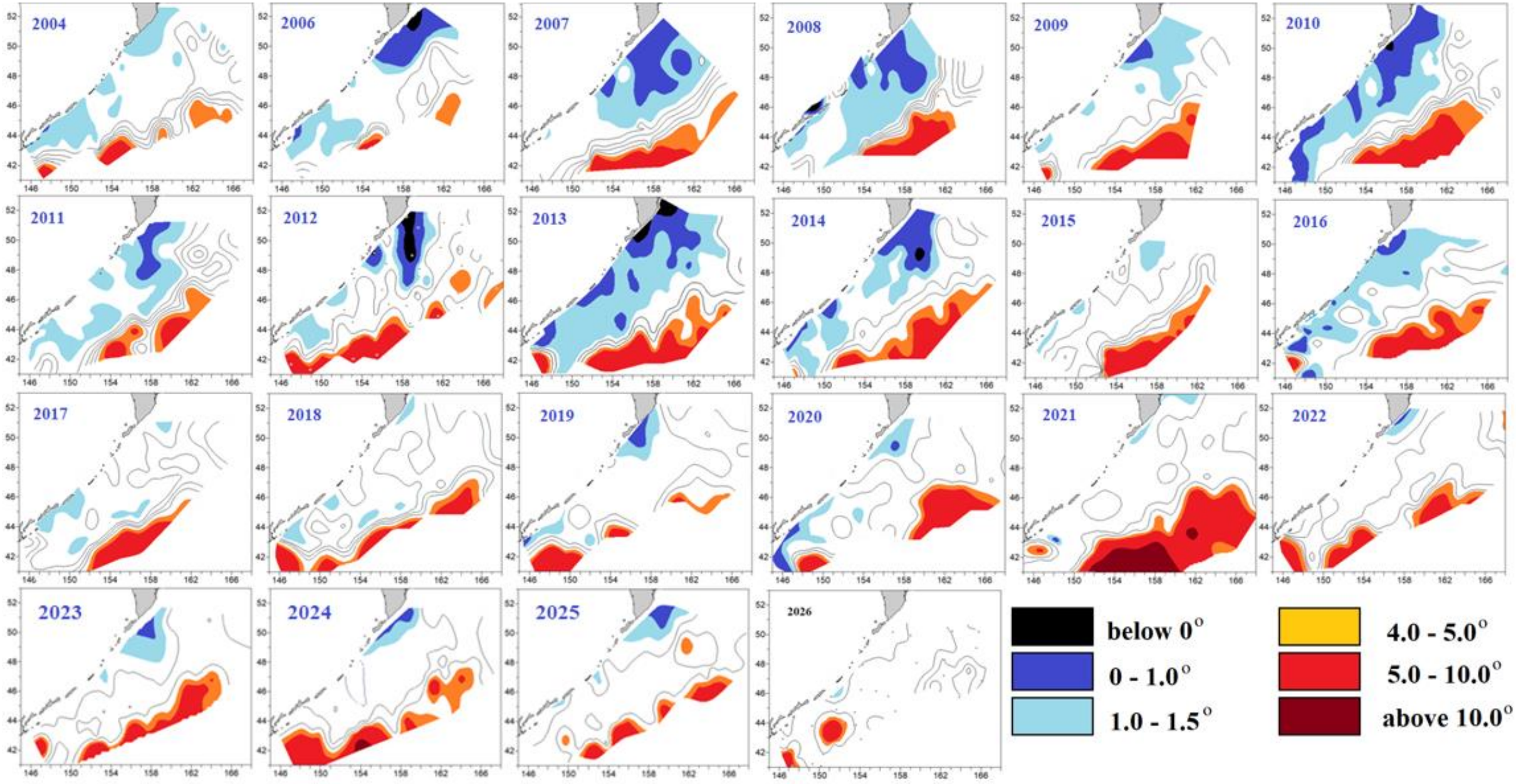


5 – subtropical species

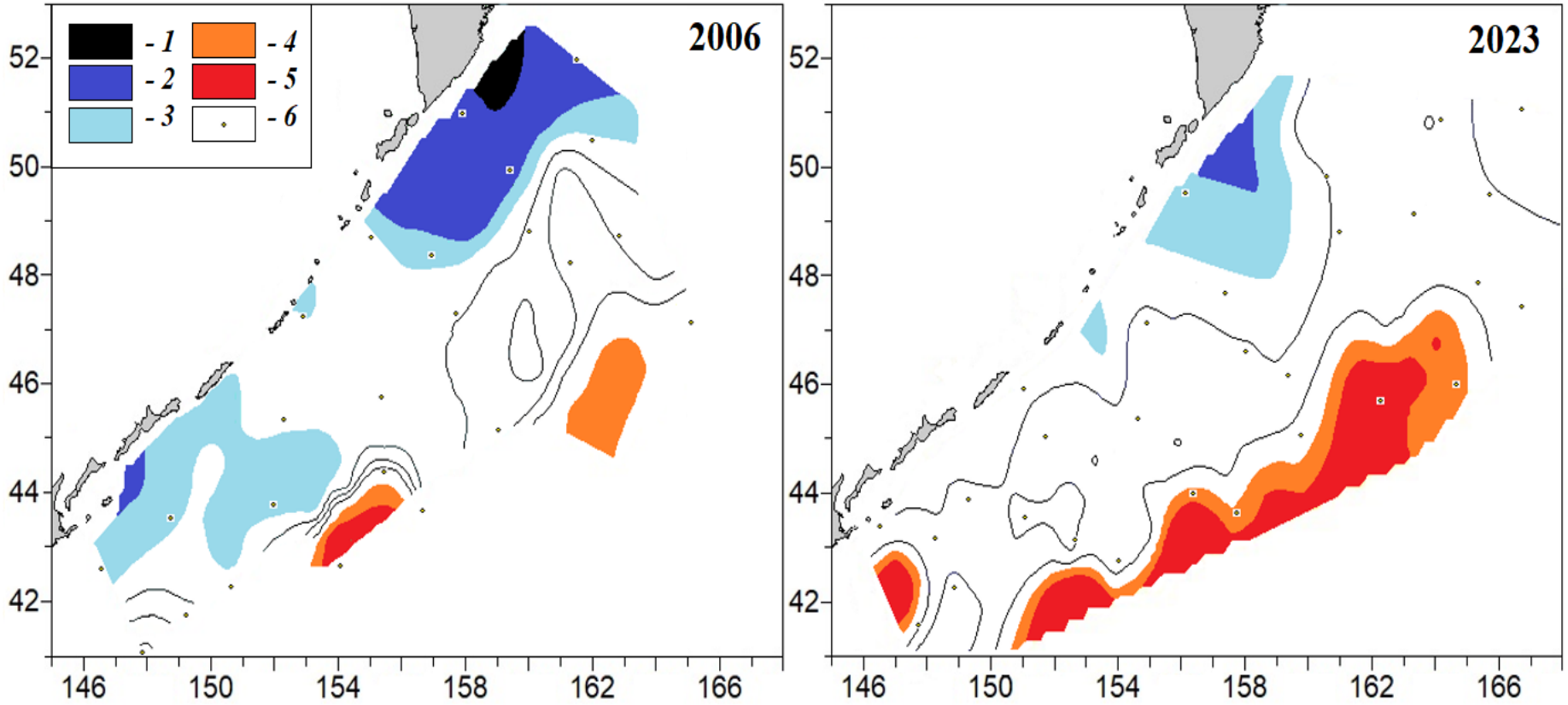


6 - others

Water temperature distribution at 100-m depth during summer trawl surveys in the northwestern Pacific Ocean, 2004-2026



Comparison of opposite biotope conditions



Between 2004 and 2013, when the proportion of the area with temperatures below 1.5°C at the depth of 100 m accounted for 25% to 52% (**averaging 36%**) of the total survey area, boreal species dominated the myctophid bycatch.

During the 2014–2026 period, the average proportion of this area **decreased to 10%**, while the total biomass of boreal myctophid species declined by more than two orders of magnitude.

The correlation coefficient /r/ between the biomass values of three boreal species and the proportion of the specified area across the survey years is **0.57**, while for the biomass of two species of the subtropical complex, r = **-0.45**

Acta Ichthyologica et Piscatoria 55, 2025, 123–131 | DOI 10.3897/aiep.55.151025

PENSOFT.

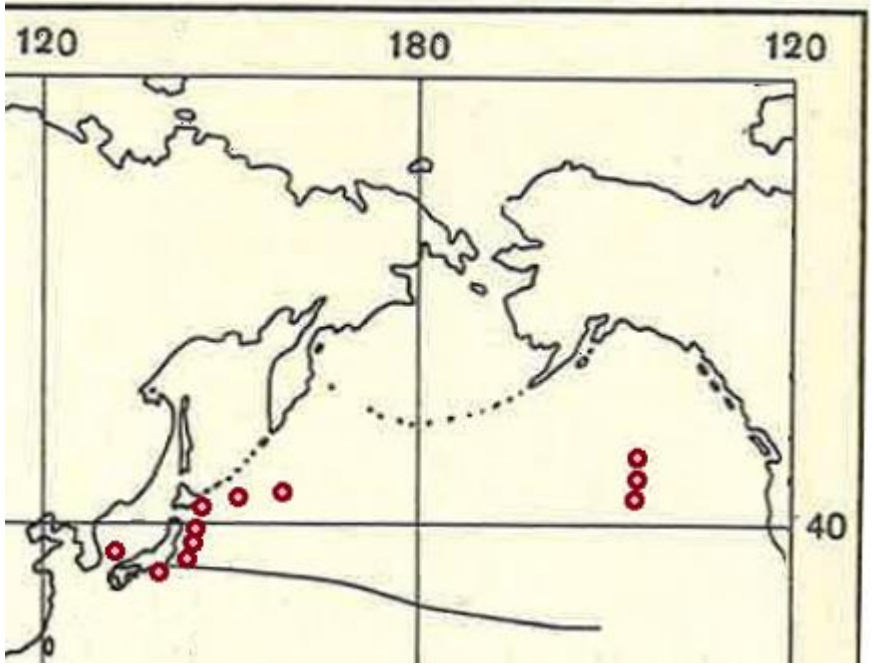
Yo SU[1], Jian-Fu HUANG[2], Fan-Yi YANG[3]

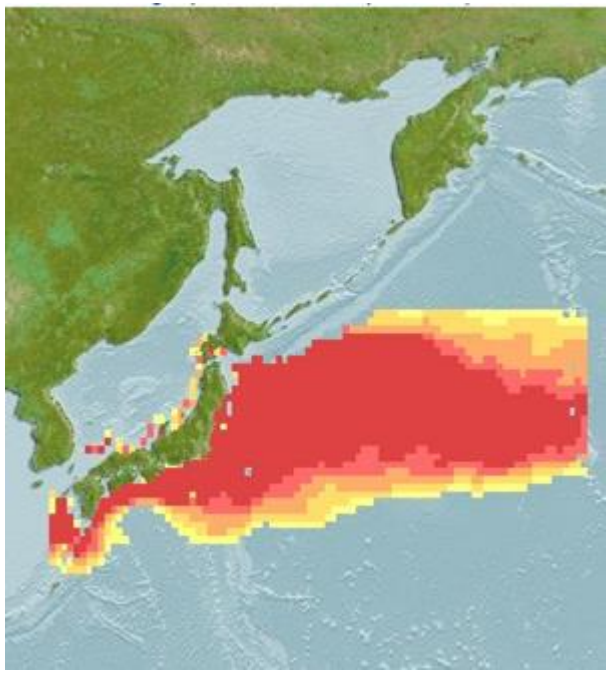
ACTA ICHTHYOLOGICA ET PISCATORIA

A southward range extension of the Japanese lanternfish, *Notoscopelus japonicus* (Actinopterygii, Myctophiformes, Myctophidae), from Taiwan, northwestern Pacific Ocean, with a checklist of myctophids from Taiwan

«The Japanese lanternfish, *Notoscopelus japonicus* (Tanaka, 1908), is for the first time recorded from Taiwan based on four specimens. This species has previously been known from temperate waters of the North and Central Pacific Ocean, therefore our specimens represent the southernmost record of this species…»

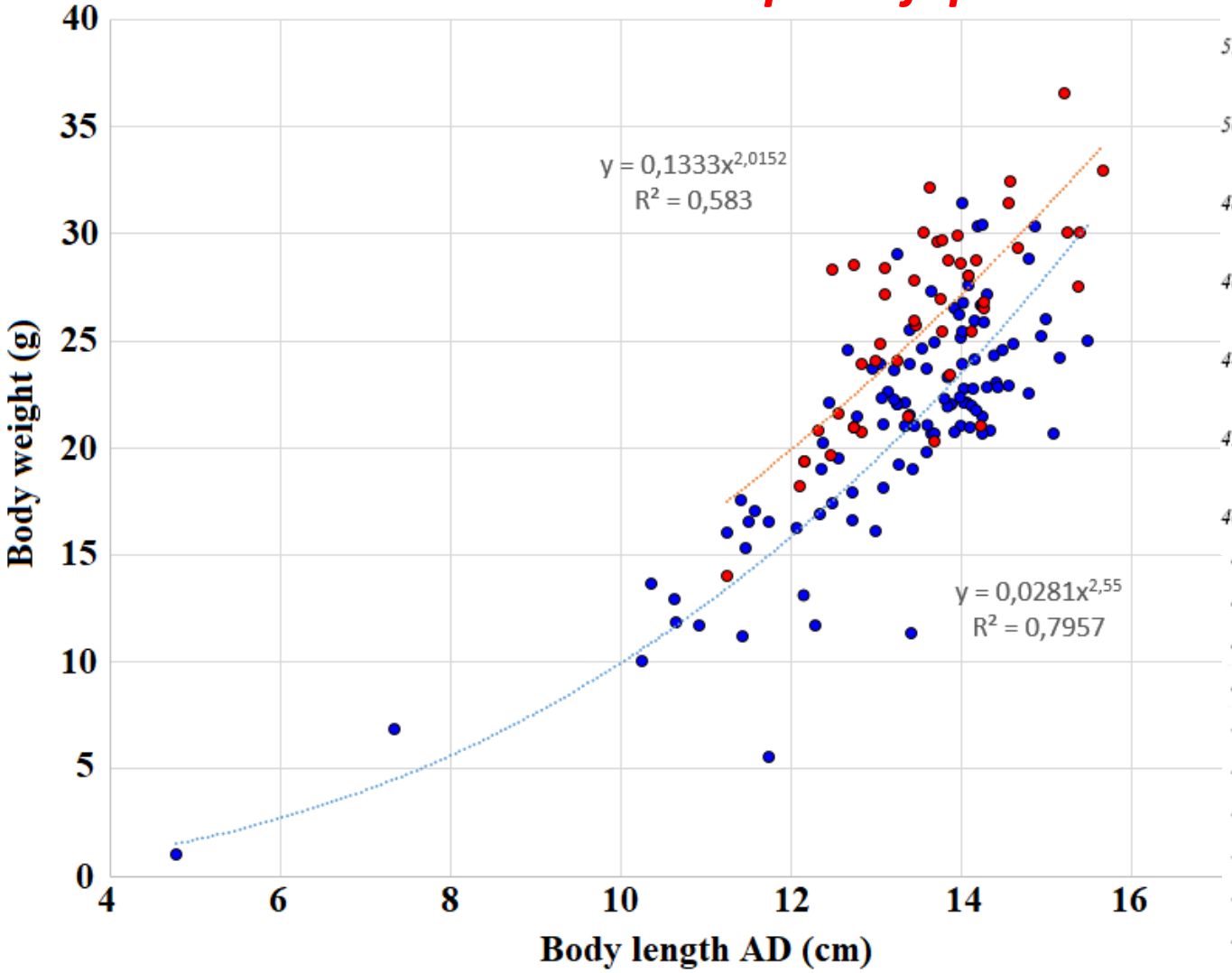
N. japonicus distribution after Bekker (1983), Froese & Pauly (2026)







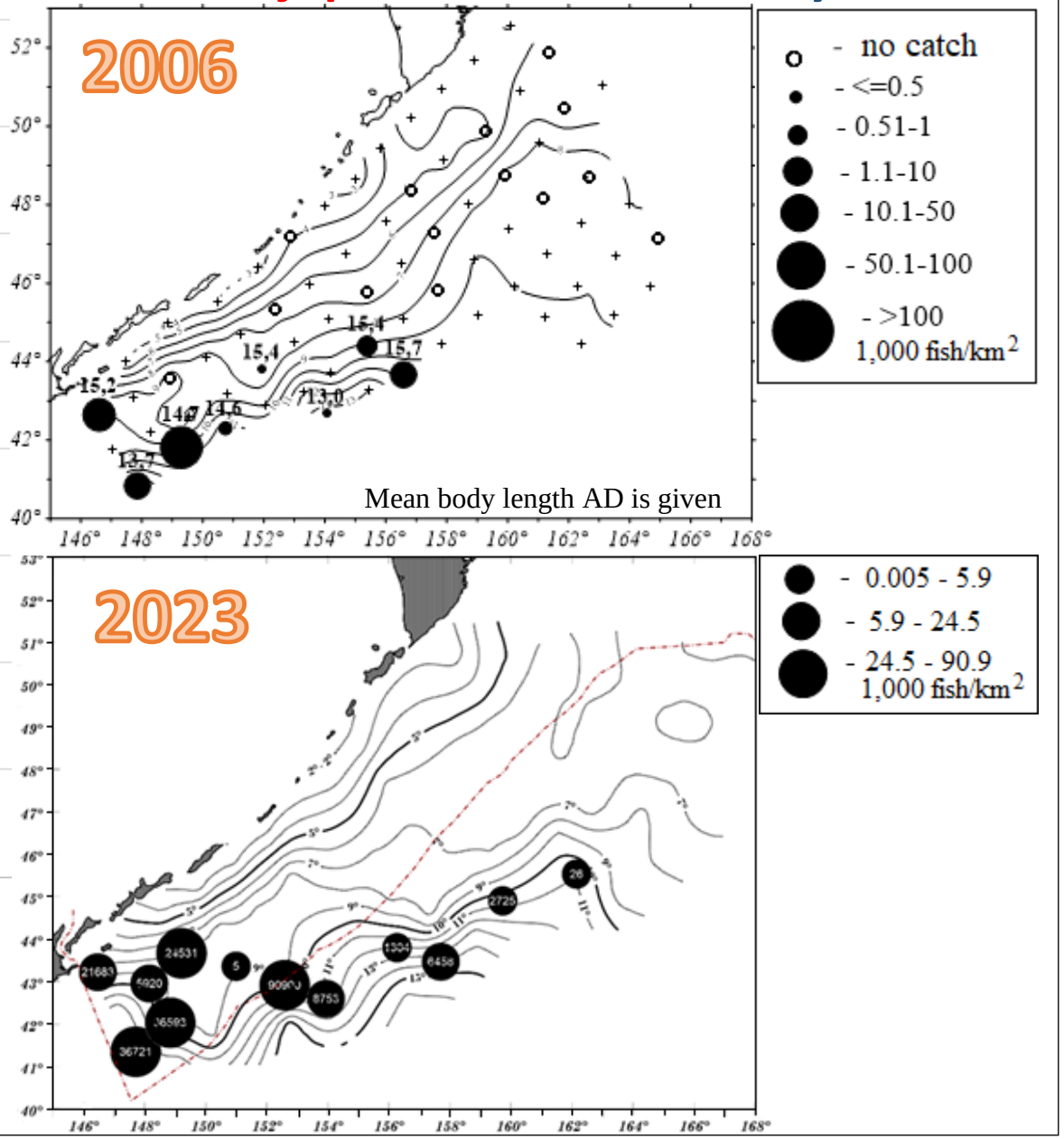
The length-weight relationship of the Japanese lanternfish *Notoscopelus japonicus*



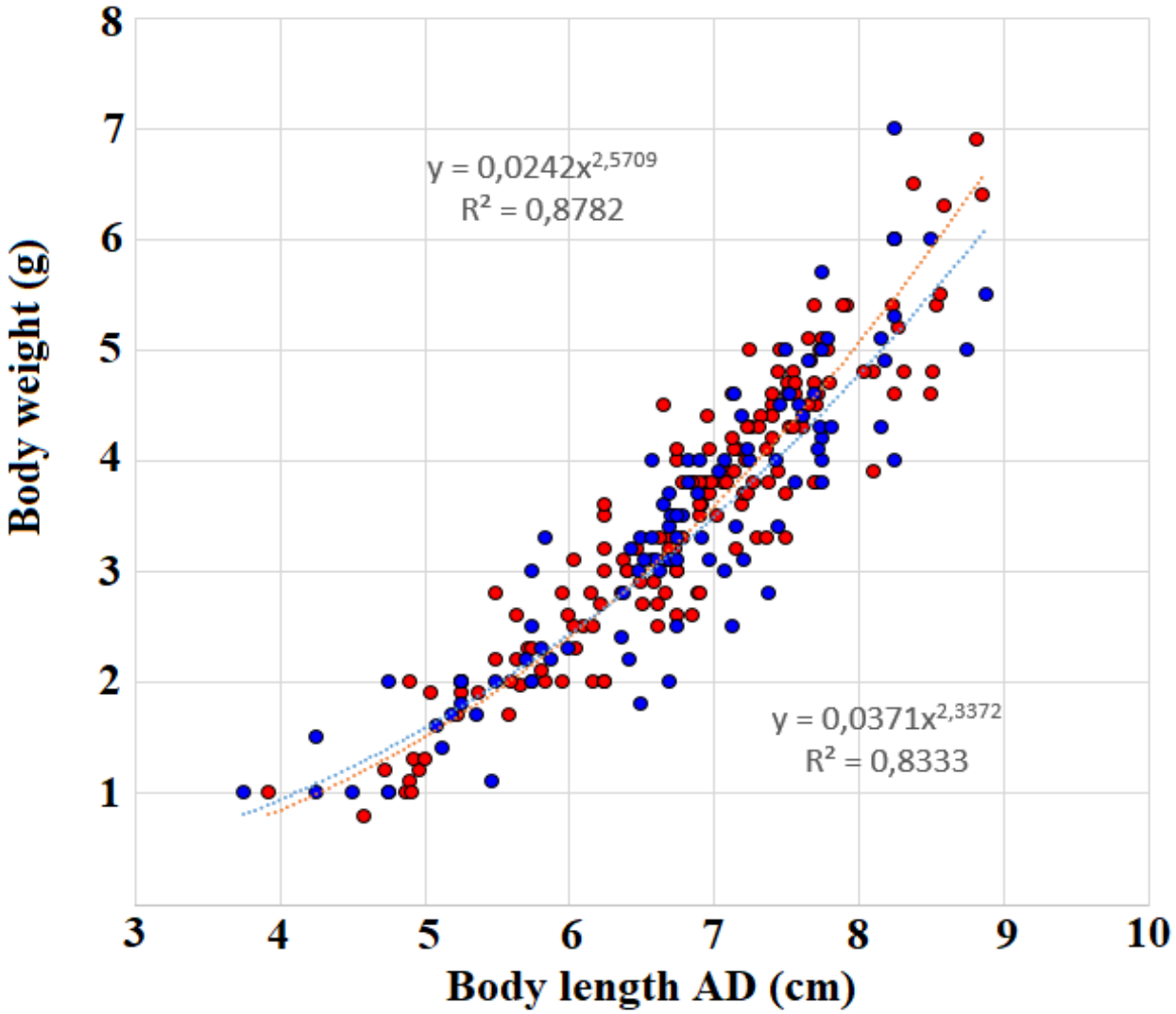
Red line and circles – 2004 to 2013

Blue line and circles – 2014 to 2026

Examples of catch distribution of *N. japonicus* in different years



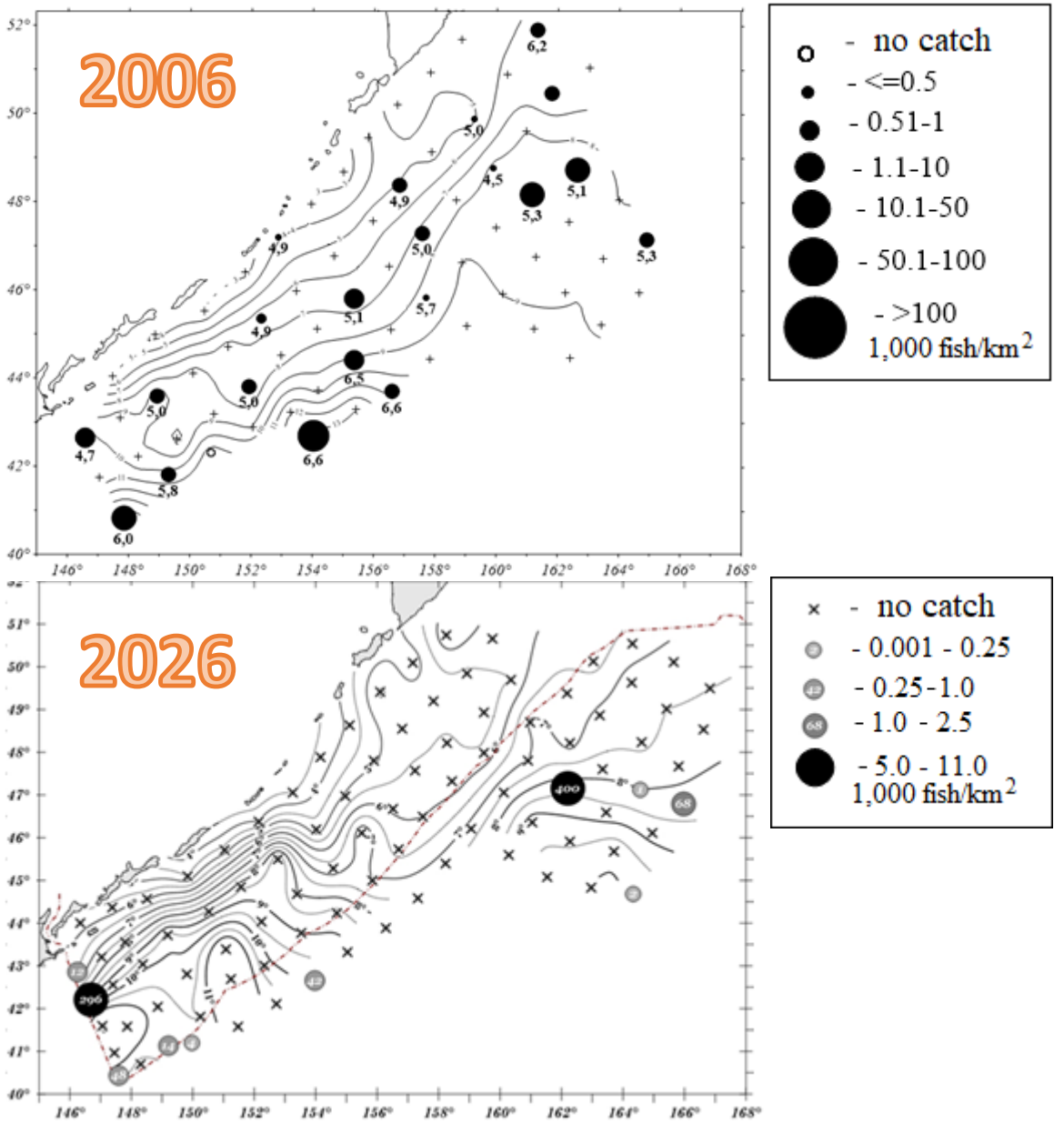
The length-weight relationship of the Northern lampfish *Stenobrachius leucopsarus*



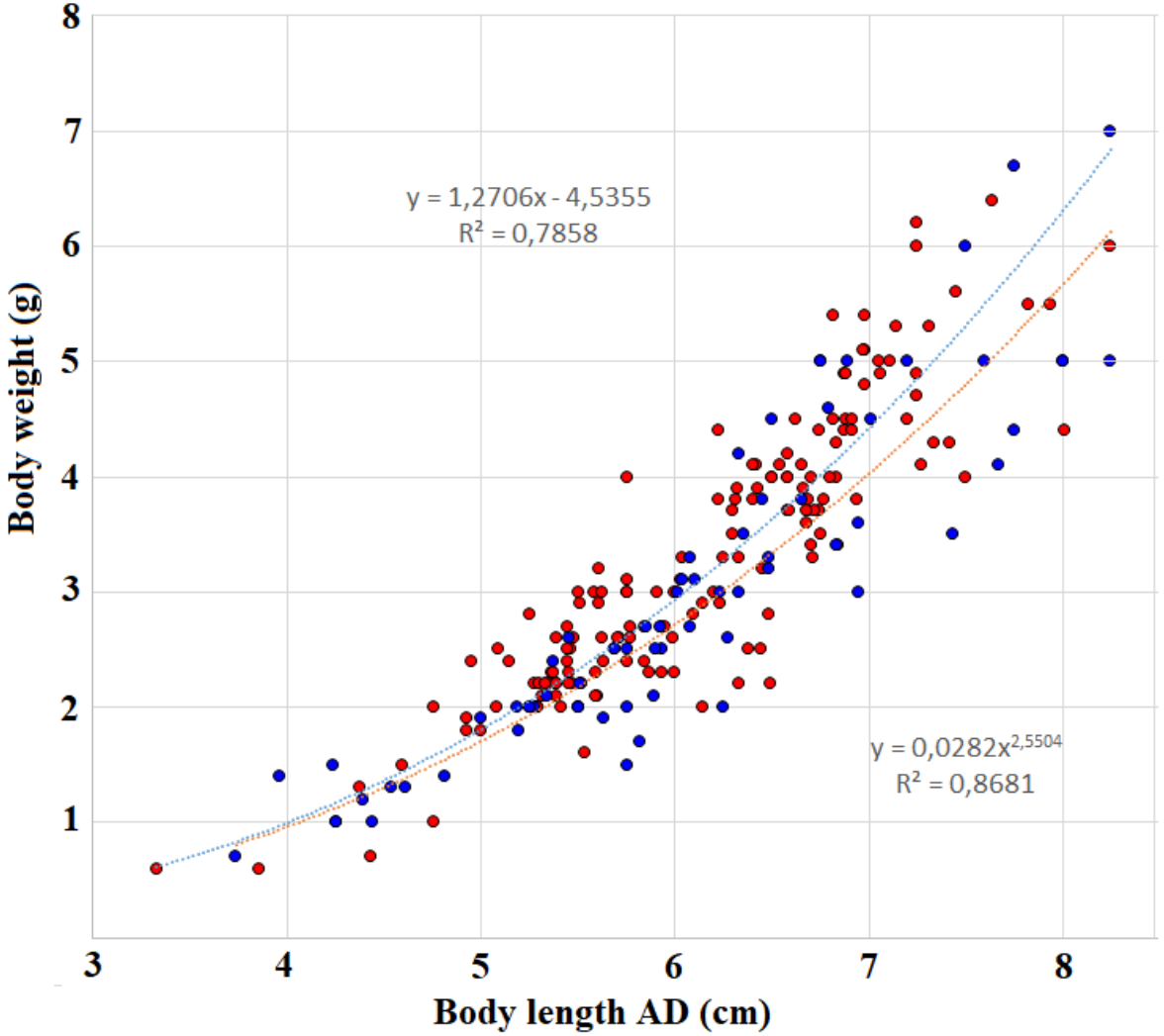
Red line and circles – 2004 to 2013

Blue line and circles – 2014 to 2026

Examples of catch distribution of *S. leucopsarus* in different years



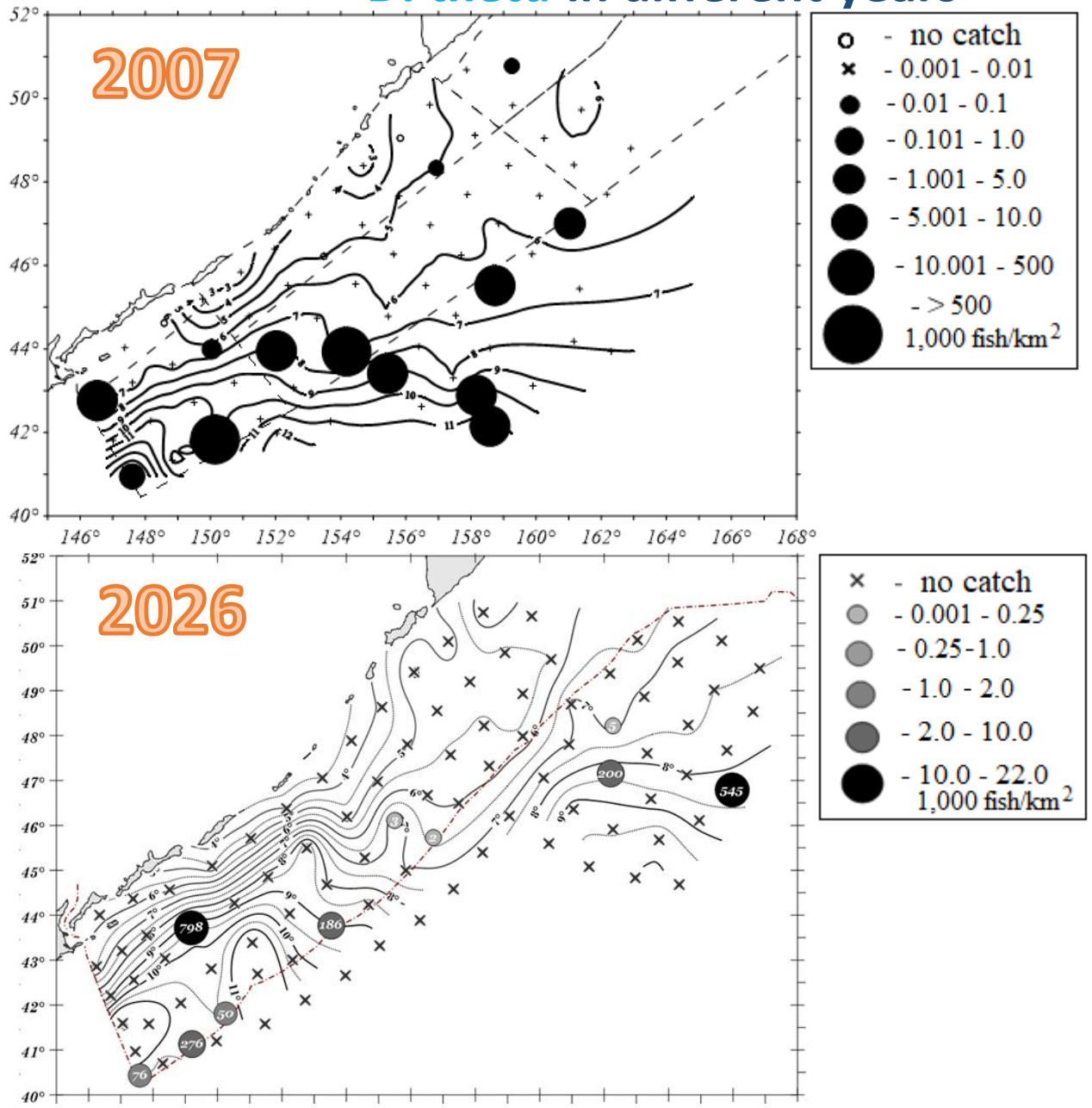
The length-weight relationship of the California headlightfish *Diaphus theta*



Red line and circles – 2004 to 2013

Blue line and circles – 2014 to 2026

Examples of catch distribution of *D. theta* in different years



Conclusions

Conditions of the mesopelagic biotope in the Kuril Island waters of the Pacific Ocean are undergoing pronounced structural changes, which are accompanied by a reorganization of the bycatch composition of mesopelagic fish.

Within the myctophid fish fauna, the Japanese lanternfish *Notoscopelus japonicus* is becoming the dominant species and may represent a commercial interest for organizing exploratory fisheries in this area.

Mesopelagic fish represent a resource on which humanity may rely in the future — either as a food component or, at the very least, as a basis for feed in the growing aquaculture industry. Since these fish also inhabit vast oceanic waters beyond national jurisdictions, an international scientific program is required to assess the current state of their stocks. PICES could take the initiative to develop such a program.

Thank you for your attention. Questions?



