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Sea anemones (Actiniaria, Corallimorpharia and Zoantharia) from the Western Bering Sea (Northwest Pacific)

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ABSTRACT: The paper presents a review of the fauna of sea anemones collected and/or documented photographically in the western part of the Bering Sea: in the areas of the Vulcanologov Massif, Karaginsky and Olyutorsky Gulfs and Koryak slope. In total, about 80 species have been identified and an annotated list of sea anemones of the orders Actiniaria, Corallimorpharia, and Zoantharia is provided. This is the first comprehensive report of the species diversity of sea anemones living in the western Bering Sea, based on the recent collections and underwater imaging.
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KEY WORDS: NW Pacific, Bering Sea, sea anemones, Actiniaria, Corallimorpharia, Zoantharia, deep-sea fauna, biodiversity.

Фауна морских анемон (Actiniaria, Corallimorpharia и Zoantharia) западной части Берингова моря (Северо-Западная Пацифика)

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РЕЗЮМЕ: В статье представлен обзор фауны морских анемон, собранных и/или задокументированных на фото- и видеоизображениях в западной части Берингова моря: в районах массива Вулканологов, Карагинского и Олюторского заливов и Корякского склона. Всего выявлено около 80 видов и приведен аннотированный список морских анемон отрядов Actiniaria, Corallimorpharia и Zoantharia. Это первое обобщение данных о видовом разнообразии морских анемон, обитающих в западной части Берингова моря, основанное на недавних коллекционных сборах и подводных фото- и видеосъемках.
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КЛЮЧЕВЫЕ СЛОВА: Северо-Западная Пацифика, Берингово море, морские анемоны, актинии, кораллиморфарии, зоантарии, глубоководная фауна, биоразнообразие.

Introduction

Until recent time deep-water fauna of sea anemones of Bering Sea was practically unknown with only one species, *Liponema brevicorne* (McMurrich, 1893) recorded at the depths greater than 100 m: one specimen of this species was reported from 1019 m in the Bowers Bank, one specimen from 580–680 m and 25 specimens from 135 m in eastern part of Bering Sea (Dunn, Bakus, 1977; Eash-Loucks, Fautin, 2012). In 2001 we described *Neohalcampa sheikoi* Sanamyan, 2001 from Karaginsky Island (from 240–580 m) (Sanamyan, 2001), and recently gave first preliminary data on 11 species recorded on the Vulcanologov Massif (Sanamyan, Sanamyan, 2018; Galkin *et al*., 2019; Krylova *et al*., 2019; Morduhovich *et al*., 2019; Rybakova *et al*., 2020) and described four new species from the Vulcanologov Massif and Koryak slope (Sanamyan *et al*., 2021).

More species were known for the depths shallower than 100 m. Seven of them were reported in eastern part of the Bering Sea: *Edwardsia sipunculoides* (Stimpson, 1853), *Peachia parasitica* (Agassiz, 1861), *Halcampoides purpureus* (Studer, 1879), *Anthopleura xanthogrammica* (Brandt, 1835), *Epiactis ritteri* Torrey, 1902, *Metridium farcimen* (Brandt, 1835) and *Acricoactis brachyacontis* Larson, 2016. Four species are known for the northernmost part of the Bering Sea: *Metridium farcimen*, *Halcampa vegae* Carlgren, 1921, *Stomphia coccinea* (O.F. Müller, 1776) and *Urticina crassicornis* (O.F. Müller, 1776) (Torrey, 1902, 1906; Carlgren, 1921, 1940; Eash-Loucks, Fautin, 2012; Larson, Daly, 2015; Larson, 2016). Only 11 species of Actiniaria are known from the shallow waters of the Commander Islands in the southwestern part of the Bering Sea: *Paraisanthus tamarae* Sanamyan et Sanamyan, 1998, *Metridium senile fimbriatum* Verrill, 1865, *Stomphia coccinea*, *Anthopleura orientalis* Averincev, 1967, *Aulactinia stella* (Verrill, 1864), *Aulactinia* sp., *Cnidopus japonicus* (Verrill, 1869), *Cribrinopsis albopunctata* Sanamyan et Sanamyan, 2006, *C. olegi* Sanamyan et Sanamyan, 2006, *Urticina grebelnyi* Sanamyan et Sanamyan, 2006 and *U. timuri* Sanamyan et Sanamyan, 2020 (see Sanamyan, Sanamyan, 1998, 2006, 2015, 2020).

In the present work we summarize available and newly obtained data on diversity and distribution of sea anemones in the western Bering Sea.

Material and methods

The present work is based partly on the collected specimens, partly on the photographic images and video records taken during the following expeditions:

1) Cruise 22 of RV *Akademik Mstislav Keldysh* in 1990, collections were made by Sigsbee trawl,

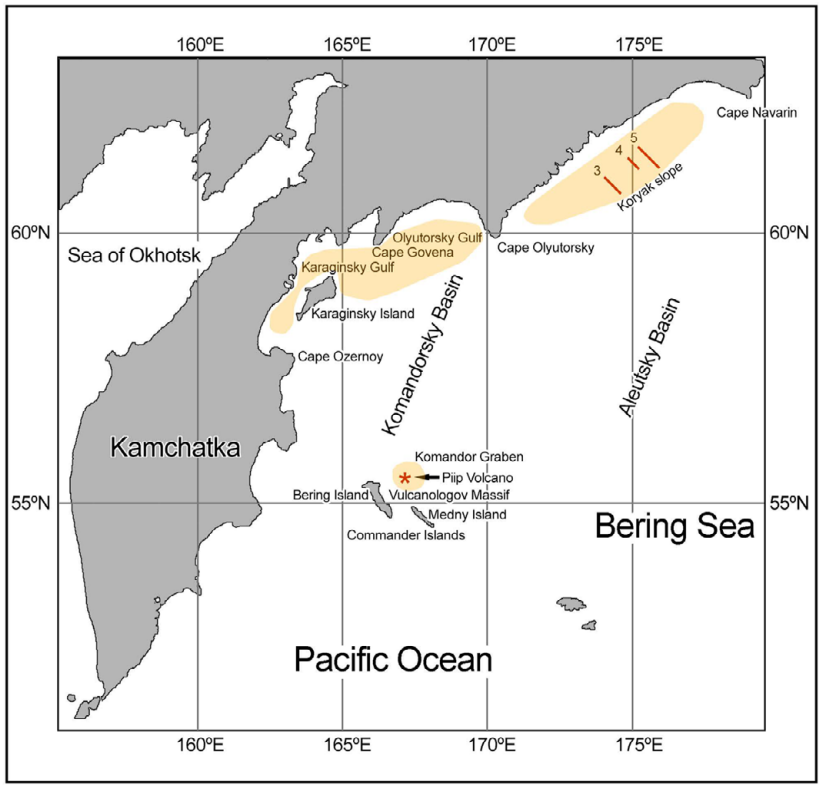

Fig. 1. Map showing western part of the Bering Sea; study area is marked by yellow; numbers 3, 4, 5 indicate transects (red lines) investigated by ROV *Comanche 18* during cruise 82 of RV *Akademik M.A. Lavrentyev* on Koryak slope in 2018.

Рис. 1. Карта районов исследований (отмечены желтым цветом) в западной части Берингова моря; цифрами 3, 4, 5 обозначены номера трансект (красные линии), выполненнх на Корякском склоне аппаратом “Команч 18” в 82-м рейсе НИС “Академик М.А. Лаврентьев” в 2018 г.

dredging and manned submersibles *Mir-1* and *Mir-2*, Shirshov Institute of Oceanology of Russian Academy of Sciences;

2) Cruise 75 of RV *Akademik M.A. Lavrentyev* in 2016, ROV *Comanche 18*, A.V. Zhirmunsky National Scientific Center of Marine Biology, Far East Branch of Russian Academy of Sciences (NSCMB FEB RAS);

3) Cruise 82 of RV *Akademik M.A. Lavrentyev* in 2018, ROV *Comanche 18*, NSCMB FEB RAS;

4) Cruise 99 of RV *Professor Levanidov* in July–August 2019, bottom trawl, Kamchatka Branch of the Russian Federal Research Institute of Fisheries and Oceanography (KamchatNIRO);

5) Cruise 37 of RV *Professor Kaganovsky* in 2020, bottom trawl, KamchatNIRO;

6) FV (Fishing freezer trawler) *Valeriy Maslakov* in 2021, bottom trawl, KamchatNIRO.

During these cruises the following regions in the western part of the Bering Sea were investigated (Fig. 1): Vulcanologov Massif in the south of Komandorsky Basin (southwestern part of the Bering Sea) up to maximal depths 4277 m (Komandor Graben); Koryak slope between the Cape Olyutorsky and the Cape Navarin, Karaginsky and Olutorsky Gulfs and continental slope between the Cape Ozernoy and the Cape Olyutorsky (western part of the Bering Sea). The geomorphology of the Vulcanologov Massif is given according to Baranov *et al*., 2021. The list of stations where sea anemones were recorded is given in Supplement Table 1.

Collected specimens were fixed in 4% buffered formalin for morphological study and small pieces cut from larger specimens were fixed in 96% ethanol and kept in refrigerator for molecular analysis. Molecular data were used to separate species of Actinos-

tolidae and Sicyonidae. Total DNA was extracted using Wizard SV Genomic DNA Purification System (Promega) following the manufacturer's protocol. The mitochondrial (12S rRNA, 16S rRNA, COIII) and nuclear (18S rRNA and 28S rRNA) gene fragments were amplified using published primers and protocols (Geller, Walton, 2001; Bocharova, 2015; Sanamyan *et al*., 2018).

Photo and video surveys were carried out *in situ* during the 75th cruise of the RV *Akademik M.A. Lavrentyev* (June–July 2016) on the northern slope of the Vulcanologov Massif and during the 82th cruise of the RV *Akademik M.A. Lavrentyev* (June–July 2018) on the southern slope of the Vulcanologov Massif and on the northern and southern tops of the Piip Volcano in the southwestern part of the Bering Sea and on the Koryak slope in the western part of the Bering Sea. In addition, in these cruises and cruises of the RV *Professor Levanidov* (cruise code 201999) in 2019, RV *Professor Kaganovsky* (cruise 37) in 2020 and FFT *Valeriy Maslakov* in 2021, freshly collected specimens were photographed live on board. All photographs (except Figs 3H, 5B) were taken using ROV *Comanche 18* cameras, NSC-MB FEB RAS.

Systematic Account

Order Actiniaria

Family Relicanthidae Rodríguez et Daly, 2014

Relicanthus cf. *daphneae* (Daly, 2006)
Fig. 2A.

Boloceroides daphneae Daly, 2006: 1241; Desbruyeres, Segonzac, Bright, 2006: 72.

Relicanthus daphneae: Rodríguez *et al*., 2014: 7; Xiao et al., 2019: 1.

MATERIAL. **LV-82-5**, 55.2700ºN 167.2991ºE – 55.2738ºN 167.2974ºE, depth 3494–3435 m, one specimen photographed; **LV-82-6**, 55.6972ºN 167.1262ºE, depth 3948 m, one specimen photographed.

REMARKS. *Relicanthus daphneae* is a large characteristically looking rose-colored sea anemone with very long tentacles tapering to thin threads (estimated to be up to 40 cm in length). One specimen was photographed attached on the stalk of a glass sponge *Hyalonema*, covered with a colony of zoantharian *Epizoanthus fatuus* (on the southern slope of the Vulcanologov Massif), another appeared sitting directly on the bottom (in the small high in Komandorsky Basin). This very interesting species was reported for the first time in the Bering Sea and the current record is most northern and most deep-water one for this species (3435–3948 m). Previous records were from 13ºN to 23ºS on the East Pacific Rise, 32ºS Pacific Antarctic Ridge on the depths 2235–2650 m (Daly, 2006; Desbruyeres *et al*., 2006) and from 27.25ºS South East Indian Ridge in Indian Ocean on the depth 3005 m (Gerdes *et al*., 2021). Taxonomic position of this species is not clear (see Rodríguez *et al*., 2014; Xiao *et al*., 2019).

Family Actinernidae Stephenson, 1922

Actinernus robustus (Hertwig, 1882)
Fig. 2B.

Porponia robusta Hertwig, 1882: 113; Carlgren, 1914: 54; 1949: 21.

Actinernus robustus: Uchida, 2007: 20 (and synonymy).

MATERIAL. **LV-75-22**, 55.5100ºN 167.3240ºE – 55.5040ºN 167.3196ºE, depth 3561–3485 m, one specimen collected (sample 8) and ten specimens photographed.

LV-82-5, 55.2696ºN 167.2994ºE, depth 3526 m, sample 5, one specimen collected; **LV-82-6**, 55.6946ºN 167.1238ºE – 55.6825ºN 167.1075ºE, depth 3906–3393 m, four specimens collected (sample 3) and four specimens photographed.

REMARKS. Twenty specimens were photographically documented in the abyssal zone off northern and southern slopes of the Vulcanologov Massif, six of them were collected. The records of this unusual large (up to 20 cm in the diameter of the tentacular crown) anemone are very rare, in the Bering Sea it is reported for the first time. This is most northern and most deep-water (3393–3906 m) record of this species. Previously *Actinernus robustus* was known from Pacific coasts of Japan: originally it was described from the material collected off Japan by Challenger Expedition (3429 m, Hertwig, 1882; Carlgren, 1949) and then reported by Uchida (2007) from the same region from 1008–1200 m.

Family Edwardsiidae Andres, 1881

Edwardsia spp.
Fig. 2C.

MATERIAL. **LV-82-5**, 55.2700ºN 167.2991ºE – 55.2738ºN 167.2974ºE, depth 3494–3435 m, one specimen photographed; **LV-82-8**, 55.3806ºN 167.2617ºE, depth 485 m, one specimen photographed.

REMARKS. Two small species, photographically documented on the southern slope of the Vulcanologov Massif and Piip Volcano, but not collected, most probably belong to the genus *Edwardsia*. They have a typical for this genus octomerous arrangement of the tentacles and their column is buried in the sediment. The first species is white, with 16

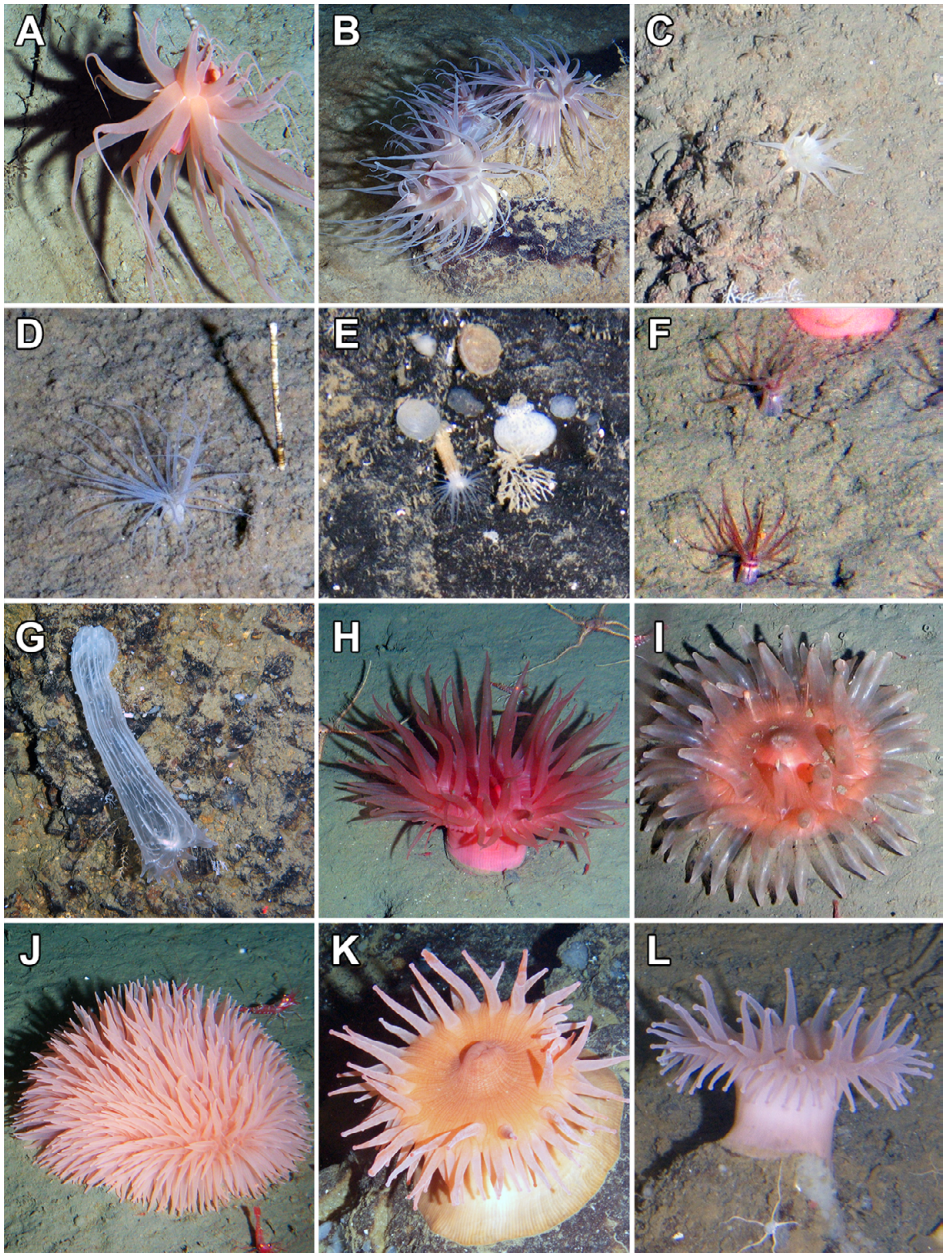

Fig. 2. A — *Relicanthus* cf. *daphneae*; B — *Actinernus robustus*; C — *Edwardsia* sp.; D–E — Edwardsiidae spp. from the Vulcanologov Massif; F — Edwardsiidae sp. from the Koryak slope; G — *Dactylanthus* sp.; H — *Cribrinopsis* sp.1; I — cf. *Urticina* sp.; J — *Liponema brevicorne*; K — *Sicyonis denisovi*; L — *S. kuznetsovi*.

Рис. 2. A — *Relicanthus* cf. *daphneae*; B — *Actinernus robustus*; C — *Edwardsia* sp.; D–E — Edwardsiidae spp. на массиве Вулканологов; F — Edwardsiidae sp. на Корякском склоне; G — *Dactylanthus* sp.; H — *Cribrinopsis* sp.1; I — cf. *Urticina* sp.; J — *Liponema brevicorne*; K — *Sicyonis denisovi*; L — *S. kuznetsovi*.

tentacles arranged in two circles (8+8), recorded in abyssal zone at 3435–3494 m (Fig. 2C). Another species with transparent tentacles and eight white spots on the oral disc at the bases of the tentacles was photographed in the bathyal zone at 485 m on cold seeps field between bacterial mats.

Edwardsiella sp.

MATERIAL. **LV-75-21**, 55.4818ºN 167.2573ºE, 2841 m, one specimen photographed.

REMARKS. Small inconspicuous sea anemone with worm-like column hidden in substrate photographically documented on the northern slope of the Vulcanologov Massif at 2841 m is identified as a member of the genus *Edwardsiella* (subfamily Edwardsiellinae, see Sanamyan, Sanamyan, 2021 for this subfamily name). Its rather long tapering scapulus and upper part of the scapus, covered by periderm, project from substrate and are well visible. Members of this genus live in crevices in rock, between the stones and other hard substrates, are difficult to collect and therefore the records are few. In the North Pacific *Edwardsiella* was recorded only once: a shallow water species of this genus was recently recorded in British Columbia (Sanamyan *et al*., 2018).

Edwardsiidae spp.
Fig. 2D–F.

MATERIAL. **AMK-22-2321**, 55.3716°N 167.3133°E – 55.3633°N 167.3°E, depth 1490–1554 m, dredge, 25 specimens collected.

LV-75-17, 55.4527ºN 167.2653ºE, depth 2044 m, one specimen photographed; 55.4454ºN 167.2627ºE, depth 1851 m, one specimen photographed. **LV-75-21**, 55.4839ºN 167.2582ºE, depth 2878 m, one specimen photographed; 55.4770ºN 167.2518ºE – 55.4733ºN 167.2527ºE, depth 2704–2636 m, eight specimens photographed.

LV-82-9, 55.3466ºN 167.2752ºE – 55.3550ºN 167.2726ºE, depth 1933–1611 m, four specimens photographed. **LV-82-12**, 60.8671ºN 174.3183ºE – 60.8723ºN 174.3104ºE, depth 506–489 m, two specimens photographed; **LV-82-13**, 60.8298ºN 174.3769ºE – 60.8388ºN 174.3689ºE, depth 677–611 m, seven specimens photographed; **LV-82-14**, 61.0958ºN 175.0119ºE – 61.1202ºN 174.9662ºE, depth 884–660 m, 23 specimens photographed; **LV-82-15**, 61.1430ºN 174.9285ºE – 61.1779ºN 174.8708ºE, depth 517–417 m, 68 specimens photographed; **LV-82-16**, 61.1787ºN 174.8704ºE – 61.1899ºN 174.8345ºE, depth 415–356 m, about 1160 specimens photographed; **LV-82-17**, 61.1806ºN 174.8508ºE – 61.1801ºN 174.8493ºE, depth 402–400 m, 25 specimens photographed; **LV-82-18**, 61.1198ºN 174.9638ºE – 61.1197ºN 174.9652ºE, depth 652–663 m, eight specimens photographed; **LV-82-19**, 61.1539ºN 175.4492ºE – 61.1538ºN 175.4493ºE, depth 693 m, 16 specimens photographed; **LV-82-20**, 61.1713ºN 174.8810ºE – 61.1727ºN 174.8781ºE, depth 430–427 m, 23 specimens photographed; **LV-82-21**, 60.8305ºN 174.3770ºE – 60.8343ºN 174.3720ºE, depth 672–660 m, five specimens photographed.

REMARKS. At least five other species of Edwardsiidae may be recognized in the photo and video files taken by ROV *Comanche 18*.

Four of them were photographed but not collected on the Vulcanologov Massif. All four species are present on the northern slope of the Vulcanologov Massif and one of them is recorded also on the southern slope of the Piip Volcano. The latter species, photographed at 1611–1933 m, lives in mud, has pale-rose coloration, small oral disc and rather long not numerous (about 10) tentacles. Remaining three species were recorded deeper than 2000 m: two of them live in mud, both are white, one has up to 16 short tentacles, another about 30 long tentacles (Fig. 2D), and one species inhabits shallow crevices on the stones (Fig. 2E). The latter species has cylindrical column, scapus covered by periderm, short white scapulus and about 26 thin white tentacles.

Another species of Edwardsiidae was recorded on the Koryak slope at 356–884 m (Fig. 2F). The specimens are numerous (more than 1330 specimens seen on the photographs but not collected), live on muddy bottom. This species has about 16 thin long tentacles, tentacular crown up to 4 cm in diameter. Oral disc has eight dark spots arranged in a circle. The body is up to 5 mm in diameter, scapulus transparent with white strokes in upper part and dark-red rim. This species recorded in the background community around cold seep fields which included the sea pen *Halipteris* cf. *willemoesi* (Kölliker, 1880) with the commensal ophiuroid *Asteronyx* and the echinoid *Brisaster latifrons* (Agassiz, 1898), and also in proximity of bacterial mats at cold seeps (Krylova *et al*., 2018), but not recorded directly on the seeps and bacterial mats. However, most dense populations of these Edwardsiidae, up to 100 specimens per m^2, was recorded during the dive 16 (station LV-82-16) at 356–415 m in the settlement of dominated here sea anemone *Sagartiogeton californicus*, where cold seeps have not been found.

Family Preactiniidae England in England et Robson, 1984

Dactylanthus sp.
Fig. 2G.

MATERIAL. **LV-82-10**, 55.2882ºN 167.3011ºE – 55.2898ºN 167.2974ºE, depth 2778–2638 m, one specimen photographed.

REMARKS. This is probably the most interesting record of sea anemone made on the Vulcanologov Massif during recent cruises in the Bering Sea. One large specimen was recorded attached to a vertical rock wall on the southern slope of the Piip Volcano at the depth of about 2700 m. Unfortunately, the ROV failed to collect this specimen, but it was possible to took very detailed photographs. The specimen has long (about 30 cm) cylindrical column covered by small sparse tentacle-like papillae and 24 short tentacles arranged in three cycles (6+6+12) at the margin of the oral disc. The body wall is thin and transparent, all internal structures are clearly visible through it. The shape and structure are so unusual and so closely resemble *Dactylanthus antarcticus* (Clubb, 1908), that we have no doubt that this species belongs or is closely related to the genus *Dactylanthus* (see Sanamyan *et al*., 2015b for photographs of live specimens of *D. antarcticus* from Antarctic). Previously this monotypic genus was known only in the Antarctic at the depth 20–610 m (Dunn, 1983; Sanamyan *et al*., 2015b). For a long time, this genus, together with related *Preactis* (monotypic) and *Ptychodactis* (two species), was treated as a member of a separate order Ptychodactiaria Carlgren, 1940, but then assigned to the order Actiniaria basing on molecular data. The specimen from the Bering Sea cannot be conspecific with Antarctic *D. antarcticus* due to geographical and depth separation and is most probably represents the second, undescribed species of this genus.

Family Ptychodactinidae Appellöf, 1893

Ptychodactis patula Appellöf, 1893

Ptychodactis patula Appellöf, 1893: 4; Carlgren, 1911: 12; 1921: 11; 1934: 348; 1940: 19; 1049: 11; Stephenson, 1922: 249; Cappola, Fautin, 2000: 995; Grebelny, 2007: 59.

MATERIAL. **PL-99-6**, 58.443ºN 162.823ºE – 58.468ºN 162.838ºE, depth 58–55 m, one specimen collected.

REMARKS. This arctic-boreal species is known from the depths 47–350 m (Carlgren, 1949; Grebelny, 2007). In the Bering Sea it was reported only in most northern part, in the Bering Strait (Grebelny, 2007). For western part of the Bering Sea it is reported for the first time.

Family Actiniidae Rafinesque, 1815

Cribrinopsis sp. 1
Fig. 2H.

MATERIAL. **LV-82-7**, 55.3689ºN 167.2659ºE–55.3732ºN 167.2656ºE, depth 984–815 m, one specimen collected (sample 1) and four specimens photographed; **LV-82-8**, 55.3765ºN 167.2639ºE, depth 670 m, one specimen photographed. **LV-82-11**, 60.8544ºN 174.3484ºE, depth 553 m, one specimen photographed; **LV-82-13**, 60.8322ºN 174.3754ºE – 60.8336ºN 174.3734ºE, depth 677–609 m, two specimens photographed; **LV-82-15**, 61.1399ºN 174.9333ºE – 61.1523ºN 174.9126ºE, depth 535–489 m, one specimen collected (sample 6) and five specimens photographed; **LV-82-18**, 61.1193ºN 174.9692ºE – 61.1195ºN 174.9650ºE, depth 677–658 m, one specimen collected (sample 3) and three specimens photographed; **LV-82-21**, 60.8305ºN 174.3770ºE – 60.8343ºN 174.3720ºE, depth 672–660 m, one specimen photographed.

REMARKS. 20 specimens are photographically documented (six of them on the Piip Volcano and 14 on the Koryak slope) at depths of 489–984 m, three of which were collected. All specimens were solitary, at a large distance from each other, not in groups. Most specimens are decamerous, with up to 80 tentacles arranged in four cycles (10+10+20+40=80). Only one specimen was octomerous with the tentacles distributed as 8+8+16(?)+32(?)=64(?) (only 58 of which are visible in the photo; possibly this is young specimen which yet not acquired decamerous arrangement, see Sanamyan *et al*., 2019 for discussion of the details of acquiring a decamerous arrangement). All specimens have a plain bright-rose color. The upper part of the column projects above the surface of the soft bottom, the margin with the spherules bent in the horizontal direction, the number of marginal spherules (one in each endo- and exocoel) corresponds to the number of tentacles. The actinopharynx is bright rose-red. Thin red lines mark insertions of the mesenteries on the oral disc, sometimes thin white radial lines are visible near the bases of the tentacles. The tentacles are long (inner ones as long as the diameter of the oral disc), sharply pointed, with moiré. The diameter of the expanded tentacular crown is up to 20 cm, the diameter of the column is up to 10 cm. Many red shrimps are present around. The species was found on the southern slope of the Piip Volcano at depths of 670–984 m, and on the Koryak slope at depths of 489–677 m. The species was also present near bacterial spots and near the cold seeps with the symbiotrophic bivalve *Calyptogena pacifica* Dall, 1891 (see Krylova *et al*., 2018).

Cribrinopsis spp.

MATERIAL. **PL-99-83**, 60.480°N 171.747°E – 60.485°N 171.758°E, depth 102 m, sample 16, one specimen collected; **PL-99-92**, 60.700°N 172.473°E – 60.693°N 172.447°E, depth 99–98 m, sample 19, one specimen collected.

PK-37-5, 59.193°N 166.372°E – 59.186°N 166.347°E, depth 540 m, sample 3, one specimen collect-

ed; **PK-37-6**, 59.202°N 166.354°E – 59.191°N 166.334°E, depth 443–445 m, sample 2, one specimen collected; **PK-37-52**, 61.347°N 175.551°E – 61.338°N 175.528°E, depth 245–250 m, sample 20, one specimen collected.

VM-119, 60.8533ºN 172.9166ºE – 60.8433ºN 172.8766ºE, depth 132–130 m, sample 6, one specimen collected.

REMARKS. The specimens of *Cribrinopsis* without marginal spherules are probably represented by at least two species. They were recorded at depths of 98–540 m on the shelf and continental slope of the western part of the Bering Sea.

Urticina timuri Sanamyan et Sanamyan, 2020

Urticina timuri Sanamyan, Sanamyan, 2020: 74.

Urticina crassicornis: Sanamyan, Sanamyan, 2006: 379; 2009: 169; 2010: 220.

Urticina felina crassicornis: Carlgren, 1921: 172, for Bering Island only.

Not *Actinia crassicornis* O.F. Müller, 1776: 231.

MATERIAL. **PL-99-15**, 59.223°N 163.530°E – 59.240°N 163.530°E, depth 27 m, sample 2, one specimen collected.

REMARKS. This species has absolutely smooth column. Carlgren (1921: 172) reported it (as *Urticina felina crassicornis*) from the Bering Sea near the Bering Island from the depths 118–136 m and this is most deep-water record for this species. Thus in vicinity of Bering Island this species occurs from intertidal zone to at least 136 m. The species was recorded for the first time for Karaginsky Gulf.

Urticina sp.

MATERIAL. **PL-99-83**, 60.480°N 171.747°E – 60.485°N 171.758°E, depth 102 m, sample 17, one specimen collected.

REMARKS. The species has smooth body; it differs from *Urticina timuri* in the size of its nematocysts.

cf. *Urticina* sp.
Fig. 2 I.

MATERIAL. **LV-82-11**, 60.8282ºN 174.2954ºE – 60.8411ºN 174.3782ºE, depth 682–617 m, two specimens photographed; **LV-82-15**, 61.1519ºN 174.9132ºE – 61.1725ºN 174.8792ºE, depth 491–429 m, four specimens photographed; **LV-82-18**, 61.1190ºN 174.9691ºE, depth 682 m, one specimen photographed.

REMARKS. Seven specimens are photographically documented on the Koryak slope at depths of 429–682 m, none collected. They seem to be related to *Cribrinopsis* sp.1, together with which they may occur, and have the same decamerous arrangement of the tentacles in four cycles (10+10+20+40=80). However, they are paler, the oral disc is pinkish-orange; tentacles are pale, transparent, thick, with blunt tips, their length is equal to the radius of the oral disc, without moiré, tips are beige-yellowish; the actinopharynx is pale. The diameter of the expanded tentacular crown is up to 10–13 cm. They are deeper buried in mud, up to the level of margin. It was not possible to determine whether they have marginal spherules. It is possible that they belong to another species of *Cribrinopsis* or may belong to a related genus *Urticina*. This species, unlike *Cribrinopsis* sp.1, more often occurs in community which includes the coral *Halipteris* cf. *willemoesi* with the commensal ophiuroid *Asteronyx* and the echinoid *Brisaster latifrons*.

Bolocera sp.

MATERIAL. **AMK-22-2316**, 55.6013°N 167.384°E – 55.5833°N 167.4076°E, Sigsbee trawl, depth 4294–4200 m, two specimens collected.

REMARKS. Only three specimens of this genus were known from Northwest Pacific. They were reported by Wassilieff (1908) from the Sea of Japan from 510–800 m and with some hesitation assigned to *Bolocera tuediae* (see Carlgren, 1949). Two other species are known from Northeast Pacific: *B. pannosa* McMurrich, 1893 reported off California from 757 m, and *B. kensmithi* Eash-Loucks et Fautin, 2012, described from 1804–4100 m from Northeast Pacific Ocean, both known from original descriptions only. Our specimens appear to be distinct from known species of *Bolocera*.

Family Liponematidae Hertwig, 1882

Liponema brevicorne (McMurrich, 1893)
Fig. 2 J.

Bolocera brevicornis McMurrich, 1893: 158; 1898: 231; 1904: 257; Verrill, 1922:117.

Bolocera multicornis: Carlgren, 1921: 144 (only specimens from Bering Island).

Liponema multicornis: Carlgren, 1932: 260; 1933: 11 (only specimens from Bering Island).

Liponema brevicornis: Carlgren, 1949: 55; Dunn, Bakus, 1977: 78.

Liponema brevicorne: Eash-Loucks, Fautin, 2012: 40.

MATERIAL. **LV-75-2**, 55.4172ºN 167.2768ºE – 55.4174ºN 167.2767ºE, depth 373–375 m, one specimen photographed; **LV-75-21**, 55.4875ºN 167.2600ºE – 55.4839ºN 167.2582ºE, depth 2810–2757 m, one specimen photographed.

LV-82-9, 55.3520°N 167.2740ºE – 55.3540°N 167.2730ºE, depth 1755–1698 m, two specimens photographed; **LV-82-11**, 60.8224ºN 174.4023ºE –

60.8544ºN 174.3484ºE, depth 715–553 m, four specimens photographed; **LV-82-12**, 60.8550ºN 174.3487ºE – 60.8901ºN 174.2908ºE, depth 551–431 m, eleven specimens photographed; **LV-82-14**, 61.0991ºN 175.0057ºE – 61.1201ºN 174.9661ºE, depth 847–663 m, two specimens photographed; **LV-82-15**, 61.1369ºN 174.9397ºE – 61.1733ºN 174.8775ºE, depth 547–427 m, four specimens photographed; **LV-82-19**, 61.1538ºN 175.4497ºE – 61.1579ºN 175.4070ºE, depth 694–685 m, three specimens collected (sample 6) and eight specimens photographed; **LV-82-21**, 60.8341ºN 174.3724ºE – 60.8332ºN 174.3740ºE, depth 660 m, one specimen photographed.

REMARKS. 37 specimens of this species were photographically documented during two expeditions at the depths 373–2810 m, three of them were collected.

This is a large species which usually lies unattached on soft bottom but sometimes occurs on stony bottom. The living specimens are up to 15 cm in diameter, dome-shaped, column hidden below the oral disc covered by tentacles. For movement, it can take a cylindrical shape and roll on the sea bottom (Dunn, Bakus, 1977, fig. 8). The color varies from white or pale-rose to bright-rose or purple. In the process of collecting and fixation, the tentacles fall off due to the contraction of the sphincter muscle located at the base of each tentacle, and most preserved specimens are devoid of the tentacles (partially or completely).

The present species strongly resembles *Liponema multicorne* (Verrill, 1880), known from North Atlantic, but currently Pacific *L. brevicorne* and Atlantic *L. multicorne* are treated as valid. Thus, the specimens from the Bering Island (135 m), identified by Carlgren (1921) as *Bolocera multicornis* Verrill, 1880, are treated here as *L. brevicorne*. Third species, *Liponema multiporum* Hertwig, 1882, is known from South Pacific.

In the western part of the Bering Sea this species was not previously reported, although it is known off the American and Asian coasts of the North Pacific from depths of 102–4134 m (Eash-Loucks, Fautin, 2012).

Family Sicyonidae Hertwig, 1882

Sicyonis denisovi N. Sanamyan, K. Sanamyan, Galkin, Ivin et Bocharova, 2021
Fig. 2K.

Sicyonis denisovi Sanamyan *et al*., 2021: 391.

MATERIAL. **LV-75-1**, 55.4246ºN 167.2903ºE, depth 1061 m, sample 1, one specimen collected; **LV-75-9**, 55.4286ºN 167.2775ºE – 55.4225ºN 167.2760ºE, depth 1000–720 m, one specimen collected (sample 2) and three specimens photographed; **LV-75-17**, 55.4661ºN 167.2761ºE – 55.4447ºN 167.2626ºE, depth 2488–1835 m, six specimens photographed; **LV-75-18**, 55.4292ºN 167.2697ºE – 55.4290ºN 167.2706ºE, depth 1040–1030 m, three specimens photographed; **LV-75-21**, 55.4818ºN 167.2573ºE – 55.4633ºN 167.2547ºE, depth 2841–2294 m, four specimens photographed.

LV-82-1, 55.4171ºN, 167.2773ºE, 386 m, sample 1, one specimen collected; **LV-82-7**, 55.3689ºN 167.2659ºE – 55.3740ºN 167.2653ºE, depth 1010–785 m, two specimens collected (sample 1) and twelve specimens photographed; **LV-82-8**, 55.3750ºN 167.2643ºE – 55.3795ºN 167.2620ºE, depth 755–539 m, four specimens photographed.

REMARKS. 37 specimens of this species were photographically documented during two expeditions in 2016 and 2018 at the depths 386–2841 m on the top of the Piip Volcano and its southern slope, five of them were collected. This large (up to 20–25 cm in diameter of the tentacular crown) sea anemone lives on the stones. The color is usually plain, from orange to yellow-brown or reddish-brown, the oral disc may be brighter or darker than the column. The tentacles are numerous, up to 200 or more, arranged up to five cycles. This species does not form large settlements, and specimens often occur solitarily on large distance one from another, but on these depths *S. denisovi* appears to be the most common species of large sea anemones in the southwestern part of the Bering Sea. It was recorded on the stones surrounded by bacterial mats in the vicinity of cold seeps and also in communities of glass sponge *Farrea* spp. at the depths 1750–720 m (see Rybakova *et al*., 2020). In the original description (Sanamyan *et al*., 2021) depth range is given only for collected specimens (386–1061 m). Here we report deeper records of this species (1835–2841 m) on the basis of underwater photographs on which this species may be recognized.

Sicyonis kuznetsovi N. Sanamyan, K. Sanamyan, Galkin, Ivin et Bocharova, 2021
Fig. 2 L.

Sicyonis kuznetsovi Sanamyan *et al*., 2021: 400.

MATERIAL. **LV-75-17**, 55.4553ºN 167.2668ºE – 55.4498ºN 167.2651ºE, depth 2131–1976 m, one specimen collected (sample 4) and one specimen photographed.

REMARKS. This large (about 18–20 cm in diameter of expanded tentacular crown) sea anemone resembles *Sicyonis denisovi* but may be distinguished by plain light rose-beige color and by presence of only about 80 tentacles arranged in three or four cycles in specimens of similar size (in *S. denisovi* they are two times more numerous). Only two specimens were photographically documented (one of which was collected) on the northern slope of the

Piip Volcano at depths of about 1976–2131 m on large stones lying on the soft bottom in a community dominated by the enteropneust Torquaratoridae and the benthic jellyfish of the family Rhopalonematidae (see Rybakova *et al*., 2020).

Sicyonis sp.
Fig. 3A.

MATERIAL. **LV-82-6**, 55.6922°N 167.1199ºE – 55.6826°N 167.1075ºE, depth 3599–3397 m, one specimen photographed.

REMARKS. The species has a white oral disc with the tentacles arranged on its margin, so that the most part of the disc has no tentacles, a feature characteristic for many species of *Sicyonis* Hertwig, 1882. The arrangement of the tentacles also resembles *Sicyonis*. This white specimen was photographed deeper than all other members of the genus *Sicyonis* known in this region and known from the literature records of *Exocoelactis* species, which have some external resemblance with some *Sicyonis* species. Most probably this is undescribed species.

Ophiodiscus bukini N. Sanamyan, K. Sanamyan, Galkin, Ivin et Bocharova, 2021
Fig. 3B.

Ophiodiscus bukini Sanamyan *et al*., 2021: 427.

MATERIAL. **LV-75-21**, 55.4796ºN 167.2534ºE – 55.4751ºN 167.2523ºE, depth 2810–2673 m, one specimen collected (sample 9) and three specimens photographed.

REMARKS. Large disc-shaped sea anemone freely lying on the bottom. The short column is completely hidden under the oral disc, about 20 cm in diameter. Short, conical, with pointed tips tentacles are all of the same shape and arranged in a single cycle on the margin of the disc, that makes this anemone unusually looking and easily recognizable in underwater photographs. Its shape somewhat resembles *Sicyonis heliodiscus* Sanamyan *et al*., 2015, another disc-shaped species recently described from material collected by Monterey Bay Aquarium Research Institute (USA) in the eastern Pacific Ocean (Sanamyan *et al*., 2015a). *Sicyonis heliodiscus*, however, has much more numerous tentacles and they are blunt and arranged in two cycles. Four specimens *Ophiodiscus bukini* were photographically documented on the soft bottom and also on the rock covered by sediment on the northern slope of the Vulcanologov Massif at 2673–2810 m. This depth rang between the bathyal and abyssal zones is stated to be the depth of the largest community changes, or the largest turnover of dominant species in this region (see Rybakova *et al*., 2020).

Family Actinostolidae Carlgren, 1893

Actinostola faeculenta (McMurrich, 1893)
Fig. 3C.

Cymbactis faeculenta McMurrich, 1893: 174; Carlgren, 1934: 6.

Paractinostola faeculenta: Carlgren, 1949: 79.

Actinostola faeculenta: Eash-Loucks, Fautin, 2012: 22.

MATERIAL. **LV-82-11**, 60.8544°N 174.3484°E – 60.8543°N 174.3490°E, depth 553–551 m, sample 1, one specimen collected; **LV-82-12**, 60.8566ºN 174.3449ºE – 60.8764ºN 174.3054ºE, depth 545–475 m, six specimens photographed; **LV-82-14**, 61.1027°N 174.9998°E – 61.1202°N 174.9642°E, depth 811–656 m, three specimens photographed; **LV-82-15**, 61.1395°N 174.9359°E – 61.1778°N 174.8708°E, depth 538–418 m, two specimens collected (samples 2 and 12) and seven specimens photographed; **LV-82-16**, 61.1787°N 174.8704°E – 61.1899°N 174.8345°E, depth 415–356 m, four specimens photographed; **LV-82-18**, 61.1198°N 174.9638°E, depth 652 m, one specimen photographed; **LV-82-20**, 61.1724°N 174.8794°E, depth 428 m, sample 5, one specimen collected; **LV-82-21**, 60.8305°N 174.3770°E – 60.8343°N 174.3720°E, depth 672–660 m, one specimen photographed.

PL-99-39, 59.932°N 167.083°E – 59.928°N 167.115°E, depth 128 m, samples 7, 8, 10, 13 and 14, five specimens collected; **PL-99-95**, 60.800°N 173.252°E – 60.798°N 173.283°E, depth 347–344 m, sample 20, one specimen collected.

PK-37-10, 59.355°N 166.484°E – 59.354°N 166.457°E, depth 457–442 m, sample 7, one specimen collected; **PK-37-46**, 61.240°N 176.218°E – 61.227°N 176.211°E, depth 932–950 m, sample 17, one specimen collected; **PK-37-55**, 61.404°N 176.353°E – 61.397°N 176.328°E, depth 440–430 m, sample 22, many small specimens collected.

VM-78, 61.8483ºN 177.1166ºE – 61.8533ºN 177.1716ºE, depth 250–253 m, sample 4, one specimen collected.

REMARKS. Large, easily recognizable in underwater photographs sea anemone with high pale-colored column and dark-red or orange oral disc with very numerous (up to 300 and more) relatively short (1.5–3.5 cm) tentacles. The tentacles have white thickenings at the base on the aboral side. The height of well expanded specimens is up to 15 cm, the diameter of the column is 7–8 cm in the middle and 9–10 cm at the base, the oral disc is two times larger, up to 14 cm; the tentacular crown up to 20 cm in diameter. The column is covered by small tubercles, which become larger toward the margin. Among 26 specimens photographed by ROV *in situ*, 11 had

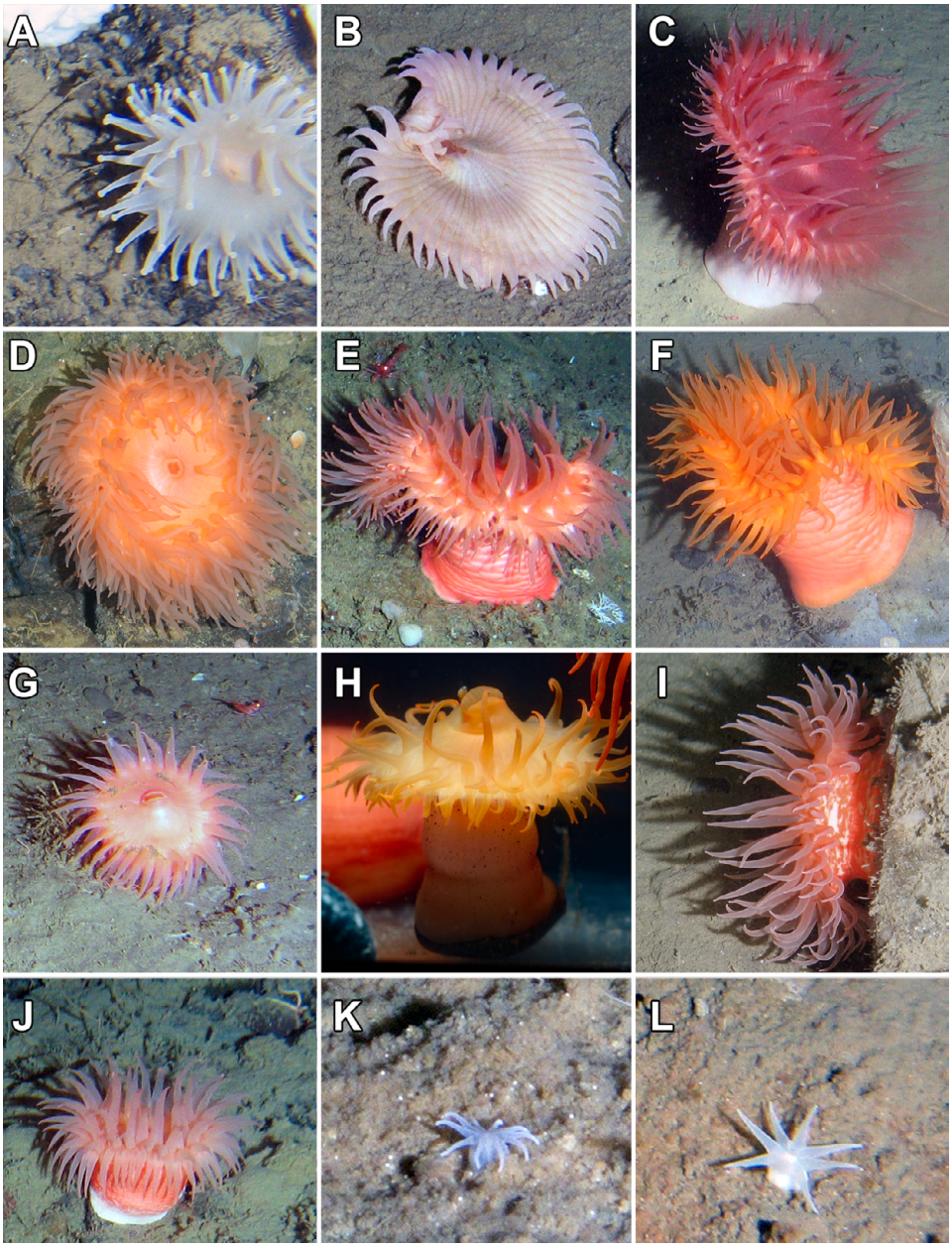

Fig. 3. A — *Sicyonis* sp.; B — *Ophiodiscus bukini*; C — *Actinostola faeculenta*; D — *Actinostola* sp.1; E — *Actinostola* sp.2; F — *Actinostola* sp.3; G — *Actinostola* sp.4; H — *Actinostola* sp.5 (photo of N. Sanamyan); I — *Stomphia* sp.; J — *Tealidium konoplinorum*; K — cf. *Halcampa* sp. from the northern slope of the Piip Volcano; L — cf. *Halcampa* sp. from the southern slope of the Piip Volcano.
Рис. 3. A — *Sicyonis* sp.; B — *Ophiodiscus bukini*; C — *Actinostola faeculenta*; D — *Actinostola* sp.1; E — *Actinostola* sp.2; F — *Actinostola* sp.3; G — *Actinostola* sp.4; H — *Actinostola* sp.5 (фото Н. Санамян); I — *Stomphia* sp.; J — *Tealidium konoplinorum*; K — cf. *Halcampa* sp. на северном склоне вулкана Пийпа; L — cf. *Halcampa* sp. на южном склоне вулкана Пийпа.

paler coloration with orange oral disc and column with orange tint more saturated at the base (one specimen collected) while the other specimens had dark-red oral disc and pale, not colored column (three specimens collected). Both forms occur together in the same stations. Molecular analysis of collected specimens showed differences between paler and darker specimens and high similarity between darker specimens. The species was recorded on 128–950 m on the entire continental slope from Cape Govena to Cape Navarin and is the dominant sea anemone species in trawl collections in this region. It also occurs in the periphery of cold seeps discovered on the Koryak slope. It has not been recorded on the Vulcanologov Massif. Carlgren (1949: 79) under the question assigned this species to the genus *Paractinostola* Carlgren, 1928, which he distinguished from *Actinostola* Verrill, 1883 by the fact that the mesenteries at the base in *Paractinostola* are fewer than those at the margin. Riemann-Zürneck (1978) considered this difference to be insufficient for separation of genera, and the present species is currently assigned to *Actinostola* (see Eash-Loucks, Fautin, 2012).

Actinostola sp.1
Fig. 3D.

MATERIAL. **LV-75-2**, 55.4165ºN 167.2749ºE – 55.4169ºN 167.2749ºE, depth 409–372 m, three specimens photographed; **LV-75-3**, 55.4168ºN 167.2730ºE – 55.4158ºN 167.2739ºE, depth 407–353 m, ten specimens photographed; **LV-75-4**, 55. 4164ºN 167.2764ºE, depth 400 m, one specimen photographed; **LV-75-8**, 55.4168ºN 167.2750ºE, depth 389 m, one specimen photographed; **LV-75-9**, 55.4173ºN 167.2761ºE – 55.4160ºN 167.2743ºE, depth 377–350 m, five specimens photographed.

LV-82-1, 55.4171ºN 167.2773ºE – 55.4160ºN 167. 2744ºE, 386–373 m, one specimen collected (sample 1) and ten specimens photographed.

REMARKS. More than 30 specimens were photographically documented during two expeditions in 2016 and 2018, several more were recorded on video, one of them was collected. This is large (up to 20 cm in diameter of the tentacular crown) sea anemone with wide undulating oral disc and very numerous, up to 500 or more, soft tentacles without mesogloeal thickenings at the base. The tentacles are not longer than the radius of the oral disc; they are distributed on the outer half of the oral disc in 6–7 cycles. The color is usually plain, red to white, often orange, from bright to dull. The limbus is paler than the column. Actinopharynx is red. The species was recorded on the 350–409 m on the northern top of the Piip Volcano and is the most common species among large sea anemones here. This species was not recorded in areas of hydrothermal activity.

Actinostola sp.2
Fig. 3E.

MATERIAL. **LV-82-7**, 55.3688ºN 167.2662ºE – 55.3713ºN 167.2664ºE, depth 981–885 m, one specimen collected (sample 2) and two specimens photographed; **LV-82-8**, 55.3814ºN 167.2617ºE, depth 469 m, one specimen photographed.

REMARKS. Large (up to 20 cm in diameter of the tentacular crown) orange sea anemone with wide undulating oral disc and numerous tentacles (up to 360 are visible in the photographs, but probably they are more numerous). The tentacles have strong white mesogloeal thickenings on the aboral side of their bases. Large tubercles may form longitudinal ridges in the upper part of the column. This species resembles above described *Actinostola* sp.1 (forms a clade with it in molecular tree), and *Actinostola faeculenta*; the common feature of these three species is greater number of tentacles (more than 300) in comparison with other similar species of *Actinostola*. The records of this species are limited to the southern slope of the Piip Volcano, four specimens were recorded in 2018 on the depths 469–981 m, and one of them was collected.

Actinostola sp.3
Fig. 3F.

MATERIAL. **LV-75-9**, 55.4178ºN 167.2763ºE, depth 433 m, one specimen photographed.

LV-82-13, 60.8336ºN 174.3734ºE, depth 659 m, one specimen photographed; **LV-82-14**, 61.1196ºN 174.9649ºE, depth 660 m, two specimens photographed; **LV-82-18**, 61.1190ºN 174.9691ºE – 61. 1195ºN 174.9650ºE, depth 677–658 m, three specimens collected (sample 3) and one specimen photographed.

REMARKS. This is large species of *Actinostola*, up to 18 cm in diameter of the tentacular crown in live. The column is rose-orange with transverse wrinkles, without tubercles near the margin. The tentacles and the oral disc yellowish-orange, aboral mesogloeal thickening at the base of the tentacles are bright yellow, well developed. The tentacles occupy at least half of the radius of the oral disc, up to 150–200 in number, shorter than the radius of the oral disc. Eight specimens were recorded on the northern slope of the Piip Volcano and on the Koryak slope in the Western Bering Sea at depths of 433–677 m, three of them collected. Some specimens have been found near the cold seeps, bacterial mats and settlements of bivalves of the genus *Calyptogena*.

Actinostola sp.4
Fig. 3G.

MATERIAL. **LV-82-18**, 61.1195ºN 174.

9650ºE – 61.1194ºN 174.9653ºE, depth 658–662 m, sample 3, one specimen collected.

REMARKS. This orange species of *Actinostola* closely resembles *Actinostola* sp.3 described above, and they can occur together (collected at the same station) on the Koryak slope in the Western Bering Sea. It differs by whitish (rather than yellowish) mesogloeal thickening on the tentacles, and collected specimen has different texture of the column (slippery to the touch), clearly different from that of *Actinostola* sp.3. One specimen was collected.

Actinostola sp.5
Fig. 3H.

MATERIAL. **LV-82-18**, 61.1195ºN 174.9650ºE – 61.1194ºN 174.9653ºE, depth 658–662 m, sample 3, one specimen collected.

REMARKS. One specimen was collected on the Koryak slope in vicinity of cold seep on the field with *Calyptogena pacifica* and its periphery. This is a very distinctive species with beige-rose column and yellow tentacles without aboral thickenings arranged in up to six cycles. It differs from other species *Actinostola* by its soft consistency and the presence of sparse sand grains attached to the column.

Actinostola spp.

MATERIAL. **LV-75-9**, 55.4290ºN 167.2774ºE, depth 1006 m, one specimen photographed; **LV-75-17**, 55.4504ºN 167.2645ºE, depth 1992 m, one specimen photographed.

LV-82-16, 61.1787ºN 174.8704ºE, depth 415 m, one specimen photographed; **LV-82-18**, 61.1190ºN 174.9691ºE – 61.1195ºN 174.9650ºE, depth 677–658 m, two specimens photographed.

PL-99-37, 59.820°N 166.598°E – 59.828°N 166.963°E, depth 114–116 m, samples 3 and 4, two specimens collected; **PL-99-39**, 59.932°N 167.083°E – 59.928°N 167.115°E, depth 128 m, samples 9 and 11, two specimens collected; **PL-99-150**, 61.868°N 177.188°E – 61.870°N 177.222°E, depth 130–133 m, samples 27 and 28, two specimens collected; **PL-99-151**, 61.848°N 177.123°E – 61.847°N 177.987°E, depth 250–254 m, sample 29, one specimen collected.

PK-37-10, 59.355°N 166.484°E – 59.354°N 166.457°E, depth 457–442 m, sample 6, one specimen collected; **PK-37-14**, 60.012°N 167.596°E – 60.002°N 167.573°E, depth 247 m, sample 9, one specimen collected; **PK-37-18**, 60.376°N 172.127°E – 60.368°N 172.102°E, depth 97–93 m, sample 14, one specimen collected; **PK-37-56**, 61.423°N 176.327°E – 61.419°N 176.298°E, depth 340–328 m, sample 25, one specimen collected.

VM-159, 60.0350ºN 167.9783ºE – 60.0500ºN 168.0000ºE, depth 190–188 m, samples 17 and 18, two specimens collected; **VM-177**, 59.8783ºN 167.6800ºE – 59.8916ºN 167.7233ºE, depth 190–192 m, samples 22 and 24, two specimens collected; **VM-201**, 59.1816ºN 165.3866ºE – 59.1850ºN 165.3950ºE, depth 355–310 m, sample 25, one specimen collected.

REMARKS. The genus comprises many nominal species, many of which are known only from limited number of specimens and are established on the basis of features which show a high degree of intraspecific variability. Recent works showed that most features used previously to delimitate species of *Actinostola* are not reliable for this purpose (Häussermann, 2004). In this respect it is important to study photographs of live specimens in their natural habitat and in aquariums to reveal additional species specific features such as shape, color variations, mobility and behavior in aquariums (Häussermann, 2004). In this section, under the heading *Actinostola* spp., we comprise several (up to six) species of *Actinostola* that have not yet identified to the species level. Most of them are red, several are beige or with red spots on a beige background.

Stomphia coccinea (O.F. Müller, 1776)

Actinia coccinea O.F. Müller, 1776: 231.

Stomphia coccinea: Carlgren, 1921: 234; Stephenson, 1935: 381 (and synonymy); Manuel, 1988: 120; Sanamyan, Sanamyan, 1998: 4; 2009: 160; 2010: 214.

MATERIAL. **PL-99-121**, 61.25°N 174.662°E – 61.25°N 174.687°E, depth 89–90 m, sample 22, one specimen collected.

REMARKS. This species widely distributed in the northern waters at the depths 6–400 m (Manuel, 1988; Sanamyan, Sanamyan, 2009).

Stomphia sp.
Fig. 3 I.

MATERIAL. **LV-75-3**, 55.4158ºN 167.2738ºE – 55.4161ºN 167.2739ºE, depth 355–351 m, five specimens photographed; **LV-75-9**, 55.4173ºN 167.2761ºE – 55.4160ºN 167.2743ºE, depth 377–350 m, seven specimens photographed.

LV-82-1, 55.4170ºN 167.2775ºE – 55.4160ºN 167.2744ºE, depth 382–373 m, two specimens photographed; **LV-82-11**, 60.8320ºN 174.3906ºE – 60.8425ºN 174.3745ºE, depth 653–594 m, two specimens photographed; **LV-82-13**, 60.8334ºN 174.3738ºE – 60.8372ºN 174.3703ºE, depth 660–630 m, two specimens collected (samples 5 and 6) and one specimen photographed; **LV-82-14**, 61.1204ºN 174.9652ºE, depth 663 m, one specimen photographed; **LV-82-18**, 61.1195ºN 174.9650ºE – 61.

1194ºN 174.9653ºE, depth 658–662 m, one specimen collected (sample 3) and five specimens photographed; **LV-82-21**, 60.8343ºN 174.3720ºE – 60.8343ºN 174.3726ºE, depth 660 m, sample 2, one specimen collected.

PL-99-37, 59.820°N 166.598°E – 59.828°N 166.963°E, depth 114–116 m, sample 5, one specimen collected; **PL-99-57**, 60.118°N 168.512ºE – 60.120°N 168.480ºE, depth 142–145 m, sample 15, one specimen collected; **PL-99-91**, 60.770°N 172.452ºE – 60.772°N 172.488ºE, depth 92 m, sample 18, one specimen collected; **PL-99-150**, 61.868°N 177.188ºE – 61.870°N 177.222ºE, depth 130–133 m, sample 26, two specimens collected.

PK-37-10, 59.355°N 166.484ºE – 59.354°N 166.457ºE, depth 457–442 m, sample 4, one specimen collected; **PK-37-14**, 60.012°N 167.596ºE – 60.002°N 167.573ºE, depth 247 m, samples 8, 10 and 11, three specimens collected; **PK-37-18**, 60.376°N 172.127ºE – 60.368°N 172.102ºE, depth 97–93 m, sample 13, one specimen collected; **PK-37-52**, 61.347°N 175.551ºE – 61.338°N 175.528ºE, depth 245–250 m, samples 19 and 21, two specimens collected.

VM-78, 61.8483ºN 177.1166ºE – 61.8533ºN 177.1716ºE, depth 250–253 m, samples 1, 2 and 3, three specimens collected; **VM-119**, 60.8533ºN 172.9166ºE – 60.8433ºN 172.8766ºE, depth 132–130 m, samples 5, 7 and 8, three specimens collected; **VM-146**, 60.0933ºN 169.4483ºE – 60.0800ºN 169.4700ºE, depth 73–74 m, samples 9 and 10, two specimens collected; **VM-158**, 60.0166ºN 167.9800ºE – 60.0166ºN 167.9516ºE, depth 248–250 m, samples 11, 12, 13 and 14, four specimens collected; **VM-159**, 60.0350ºN 167.9783ºE – 60.0500ºN 168.0000ºE, depth 190–188 m, samples 15 and 16, two specimens collected; **VM-212**, 58.7150ºN 162.7633ºE – 58.7316ºN 162.7866ºE, depth 30–29 m, sample 27, one specimen collected.

REMARKS. This species has cylindrical column with diameter1.5–2 times greater that the height. The column has patches of orange or red and white or beige. The tentacles are numerous, more than 100, plain dull rose. The diameter of the tentacular crown is up to 10 cm. 31 specimens were collected, 39 photographically documented at 29–663 m on the Vulcanologov Massif and on the continental slope from Olyutorsky Gulf (Kamchatka) to Cape Navarin (Chukotka). On the Vulcanologov Massif the species was recorded only on the northern top of the Piip Volcano at 350–382 m. Other photographed and all collected specimens were taken on the shelf and continental slope of the western part of the Bering Sea, where this species sometimes found directly on methane seeps, on pebbles among settlements of bivalve mollusks of the genus *Calyptogena* and bacterial mats.

Actinostolidae sp.

MATERIAL. **PL-99-8**, 58.720°N 162.803ºE – 58.700°N 162.805ºE, depth 25–27 m, one specimen collected; **PL-99-37**, 59.820°N 166.598ºE – 59.828°N 166.963ºE, depth 114–116 m, sample 5, one specimen collected; **PL-99-50**, 60.098°N 168.227ºE – 60.102°N 168.252ºE, depth 192–197 m, sample 14, one specimen collected; **PL-99-91**, 60.770°N 172.452ºE – 60.772°N 172.488ºE, depth 92 m, sample 17, one specimen collected.

VM-177, 59.8783ºN 167.6800ºE – 59.8916ºN 167.7233ºE, depth 190–192 m, samples 20, 21 and 23, three specimens collected.

REMARKS. Members of the family Actinostolidae which has not been identified to the genus level with a cylindrical body and a constriction just below the tentacles. The specimens were recorded on 25–197 m on the whole shelf in the western part of the Bering Sea from the Cape Ozernoy to the Cape Navarin.

Family Anthosactinidae Sanamyan *et al*., 2021

Tealidium konoplinorum N. Sanamyan, K. Sanamyan, Galkin, Ivin et Bocharova, 2021
Fig. 3 J.

Tealidium konoplinorum Sanamyan *et al*., 2021: 433.

MATERIAL. **LV-75-18**, 55.4334°N 167.2678ºE – 55.4292°N 167.2697ºE, depth 1333–1040 m, four specimens photographed; **LV-75-22**, 55.5087°N 167.3236ºE – 55.5040°N 167.3196ºE, depth 3545–3493 m, one specimen photographed.

LV-82-1, 55.4163°N 167.2765ºE – 55.4158°N 167.2741ºE, depth 382–374 m, two specimens photographed; **LV-82-5**, 55.2700°N 167.2991ºE – 55.2738°N 167.2974ºE, depth 3494–3435 m, one specimen photographed; **LV-82-6**, 55.6826ºN 167.1075ºE – 55.6825ºN 167.1075ºE, depth 3397–3393 m, sample 3, one specimen collected; **LV-82-7**, 55.3689°N 167.2659ºE – 55.3739°N 167.2651ºE, depth 984–789 m, four specimens photographed; **LV-82-9**, 55.3451°N 167.2750ºE – 55.34875°N 167.2741ºE, depth 1957–1878 m, one specimen collected (sample 1) and four specimens photographed. **LV-82-12**, 60.8564°N 174.3436ºE, depth 544 m, one specimen photographed; **LV-82-13**, 60.8322°N 174.3754ºE – 60.8336°N 174.3734ºE, depth 665–659 m, two specimens collected (sample 4) and seven specimens photographed; **LV-82-14**, 61.1192°N 174.9666ºE – 61.1196°N 174.9649ºE, depth 672–660 m, seven specimens photographed; **LV-82-15**, 61.1594°N 174.9014ºE, depth 469 m, one specimen photographed; **LV-82-18**, 61.1198°N 174.9638ºE – 61.1194°N 174.9653ºE, depth 652–662 m, two specimens collected (sample 3) and eleven spec-

imens photographed; **LV-82-21**, 60.8343°N 174.3720ºE – 60.8343°N 174.3726ºE, depth 660 m, two specimens collected (sample 2) and four specimens photographed.

PK-37-57, 61.457°N 176.348ºE – 61.450°N 176.321ºE, depth 280–282 m, sample 24, one specimen collected.

REMARKS. Photographically documented 94 specimens, 9 of them were collected. Color varies from bright rose-orange with a white limbus to pale rose and to almost white. About 100 tentacles are arranged in at least five cycles. The diameter of the tentacular crown up to 15 cm. Column has prominent papillae arranged into longitudinal rows. In most deep-water specimens, the papillae are especially prominent — only three such specimens were photographed on the Vulcanologov Massif at depths of 3393–3545 m, one of which was collected. They have pale coloration. Other specimens on the Vulcanologov Massif were recorded on the northern top of the Piip Volcano at 374–382 m and on the northern and southern slopes of the Piip Volcano at 789–1957 m. On the Vulcanologov Massif this species is rather rare, only 18 specimens were recorded, two of which collected. On the Koryak slope, this species occurs in background communities, but becomes more numerous in the area of methane seep fields, where it lives on pebble outcrops, near bacterial spots and mats, and settlements of bivalve mollusks *Calyptogena*. Here it was recorded at 280–672 m.

Family Halcampidae Andres, 1883

cf. *Halcampa* spp.
Fig. 3K, L.

MATERIAL. **LV-75-21**, 55.496°N 167.272ºE – 55.4875ºN 167.2600ºE, depth 2990–2927 m, three specimens photographed.

LV-82-5, 55.2696ºN 167.2994ºE – 55.2700°N 167.2991ºE, depth 3526–3494 m, three specimens photographed; **LV-82-6**, 55.6980ºN 167.1262ºE – 55.6946ºN 167.1238ºE, depth 3906–3753 m, two specimens photographed. **LV-82-19**, 61.1544°N 175.4507ºE – 61.1570°N 175.4463ºE, depth 699–693 m, seven specimens photographed.

REMARKS. Small (up to 2 cm in diameter of the tentacular crown) burrowing anemones living on soft bottom. Most part of the body is hidden in the mud, and only the most distal part of the column and small oral disc with small number of the tentacles are visible on the surface. Three species of this genus can be recognized in the photographs: two abyssal species and one bathyal species. Both abyssal species are white. One of them, recorded on the northern slope of the Vulcanologov Massif in 2016 at 2927–2990 m (three specimens, Fig. 3K), has ten tentacles. Another, photographed on the southern slope of the Vulcanologov Massif and in the Komandorsky Basin west of the Komandor Graben in 2018 at 3494–3906 m (five specimens, Fig. 3L) has eight tentacles. Bathyal species is white-beige with eight transparent tentacles with white tips, very inconspicuous. It was recorded on the Koryak slope in the West Bering Sea in 2018 at 693–699 m (seven specimens). Unfortunately, specimens were not collected and their assignment to *Halcampa* is tentative. The species with ten tentacles may belong to the genus *Parahalcampa*, to which only one shallow-water species from South Atlantic, *P. antarctica* Carlgren, 1927, currently assigned.

Halcampidae spp.
Fig. 4A, B.

MATERIAL. **LV-75-22**, 55.5123°N 167.3258ºE – 55.5040°N 167.3196ºE, depth 3583–3493 m, three specimens photographed.

LV-82-6, 55.6972°N 167.1276ºE – 55.6966°N 167.1260ºE, depth 3949–3948 m, five specimens photographed.

REMARKS. Two similar species of hexamerous sea anemones (about 4 cm in diameter of the tentacular crown) were photographed but not collected at the depth of about 3.5–4 km on the northern slope of the Vulcanologov Massif in 2016 (three specimens) and on the small hill west of the Komandor Graben in the Komandorsky Basin in 2018 (five specimens). In both species, the scapus is covered by a cuticle and buried in the bottom, only the upper part of the scapus and also the scapulus and oral disc with the tentacles are visible. The tentacles are arranged in three cycles: 6+6+12=24. However, in the species recorded on the northern slope, the oral disc has smaller diameter than the column, the scapulus is rather long, its length is about the same as the diameter of the column, and it has high pinkish oral cone (Fig. 4A). In species from the Komandorsky Basin, the oral disc is wider than the column, the scapulus is short, about 1/5 of the diameter of the column, and short uncolored oral cone (Fig. 4B).

Family Halcampoididae Appellöf, 1896

cf. *Halcampoides* sp.
Fig. 4C.

MATERIAL. **LV-75-17**, 55.4621°N 167.2700ºE, depth 2320 m, one specimen photographed.

REMARKS. Burrowing species. Only the oral disc with 12 long tentacles (about 10 cm in diameter of the tentacular crown) is visible on the surface. This species was recorded in the community dominated by the enteropneust of the family Torquaratoridae.

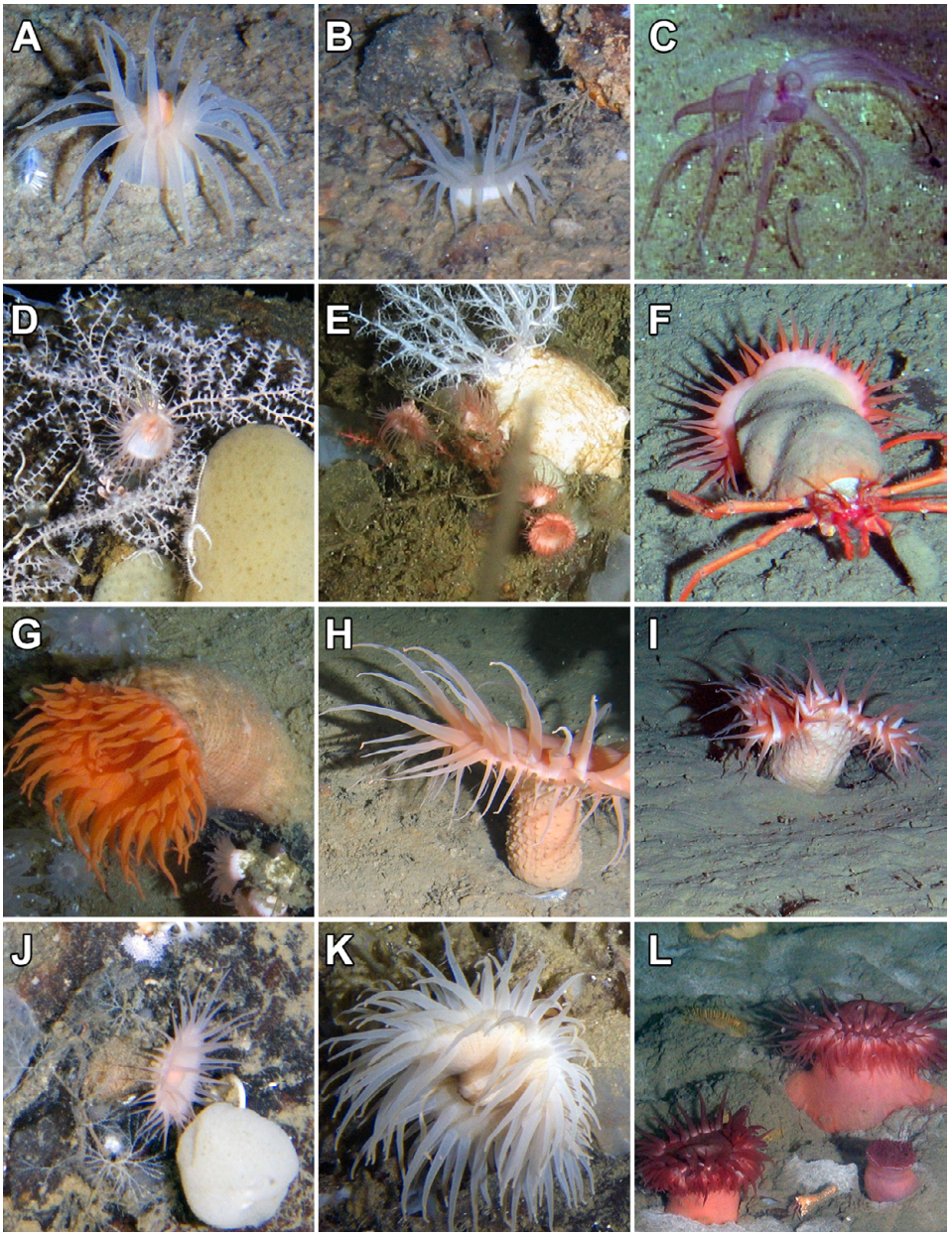

Fig. 4. A — Halcampidae sp. from the northern slope of the Piip Volcano; B — Halcampidae sp. from the Komandor Graben; C — cf. *Halcampoides* sp.; D — *Amphianthus* sp. from the northern slope of the Piip Volcano; E — *Amphianthus* sp. from the southern slope of the Piip Volcano; F — *Paracalliactis* cf. *involvens*; G — *Hormathia* sp.; H — *Phelliactis* sp. from the northern slope of the Piip Volcano; I — *Phelliactis* sp. from the southern slope of the Piip Volcano; J — aff. Hormathiidae sp. 1; K — aff. Hormathiidae sp. 2; L — *Sagartiogeton californicus*.

Рис. 4. A — Halcampidae sp. на северном склоне вулкана Пийпа; B — Halcampidae sp. в грабене Командор; C — cf. *Halcampoides* sp.; D — *Amphianthus* sp. на северном склоне вулкана Пийпа; E — *Amphianthus* sp. на южном склоне вулкана Пийпа; F — *Paracalliactis* cf. *involvens*; G — *Hormathia* sp.; H — *Phelliactis* sp. на северном склоне вулкана Пийпа; I — *Phelliactis* sp. на южном склоне вулкана Пийпа; J — aff. Hormathiidae sp. 1; K — aff. Hormathiidae sp. 2; L — *Sagartiogeton californicus*.

Family Amphianthidae Hertwig, 1882

Amphianthus spp.
Fig. 4D, E.

MATERIAL. **AMK-22-2308**, 55.412°N 167.2345ºE, depth 1200 m, submarine Mir-2, dive 5/46, six specimens collected.

LV-75-17, 55.4666°N 167.2754ºE, depth 2486 m, sample 1, several specimens collected; **LV-75-21**, 55.4733°N 167.2527ºE – 55.4633°N 167.2547ºE, depth 2645–2509 m, several tens specimens photographed.

LV-82-7, 55.3729°N 167.2655ºE, depth 830 m, several specimens photographed.

REMARKS. Small sea anemones attached to the branches of gorgonian corals. The genus *Amphianthus* contains 24 species, most of which come from deep water. However, only four species of this genus are known in Pacific Ocean, and all are based on few records. The specimens photographed by ROV in 2016 on the northern slope of the Vulcanologov Massif (some of which were collected) at 2486–2645 m have almost white or pale-rose coloration of the same color as the gorgonarians to which they are attached (Fig. 4D). The specimens photographed in 2018 on the southern slope of the Piip Volcano at a shallower depth of 830 m are of saturate rose color and probably belong to another species (Fig. 4E).

Family Hormathiidae Carlgren, 1932 (1889)

Actinauge cf. *verrillii* McMurrich, 1893

Actinauge verrillii McMurrich, 1893: 184; Eash-Loucks, Fautin, 2012: 34.

MATERIAL. **PK-37-55**, 61.404°N 176.353ºE – 61.397°N 176.328ºE, depth 440–430 m, sample 23, one specimen collected.

REMARKS. One specimen was collected on the Koryak slope at 430–440 m. Species of *Actinauge* have cylindrical column covered by tubercles and resemble the species of the genus *Hormathia*, but members of *Actinauge* occur more often on soft bottom, while *Hormathia* prefers hard substratum. Aboral thickenings on the tentacles are present in *Actinauge* but not in *Hormathia*. *Actinauge verrillii* was originally described from the eastern Pacific: Galapagos Islands, the coasts of Chile and California (McMurrich 1893); later it was recorded from the Southwest Pacific (Dunn 1983) and the Northeast Pacific to the Gulf of Alaska at depths 119–4250 m (Eash-Loucks, Fautin, 2012). Our record extends known range of distribution of this species to Northwest Pacific and Bering Sea and is most northern record of this species. However, very wide geographic and bathymetric distribution sometimes may suggest that not all records were identified correctly and more than one species are involved.

Paracalliactis cf. *involvens* (McMurrich, 1893)
Fig. 4F.

Adamsia involvens McMurrich, 1893: 182.

Paracalliactis involvens: Carlgren, 1947: 15; 1949: 95.

MATERIAL. **LV-82-10**, 55.2902°N 167.3009ºE – 55.2898°N 167.2974ºE, depth 2755–2638 m, one specimen collected (sample 3) and seven specimens photographed.

REMARKS. This species is an obligate symbiont that lives on the shell of gastropods inhabited by hermit crabs. It can reach 10 cm in length in extended state. Its pedal disc covers the whole shell and capable to form carcinoecium. The column and the margin are smooth, the scapus is covered with a thin cuticle, sometimes with a layer of mud. The scapulus, the limbus and the tentacles are rose-orange. Underwater photos and videos on the southern slope of the Vulcanologov Massif recorded 10 specimens, one of which was collected.

Daly *et al*. (2004) synonymized Pacific *P. involvens* and North Atlantic *P. consors* (Verrill, 1882). However, *P. consors* has coronal tubercles covered by cuticle (Molodtsova *et al*., 2008), similar to those reported for syntypes of *P. consors*, which are probably characteristic for the Atlantic species. The known specimens from the Pacific Ocean have no such tubercles. Thus, at present, we prefer to separate the Atlantic and Pacific species and consider them as two species.

Hormathia sp.
Fig. 4G.

MATERIAL. **LV-75-2**, 55.4172ºN 167.2768ºE – 55.4174ºN 167.2767ºE, depth 413–372 m, many specimens photographed; **LV-75-3**, 55.4163ºN 167.2769ºE – 55.4168ºN 167.2760ºE, depth 355–389 m, many specimens photographed; **LV-75-4**, 55.4164ºN 167.2764ºE – 55.4167ºN 167.2759ºE, depth 408–398 m, several specimens photographed; **LV-75-5**, 55.4166ºN 167.2757ºE, depth 392 m, a few specimens photographed; **LV-75-7**, 55.4164ºN 167.2749ºE – 55.4166ºN 167.2757ºE, depth 402–377 m, several specimens photographed; **LV-75-8**, 55.4159ºN 167.2734ºE – 55.4188ºN 167.2733ºE, depth 401–375 m, several specimens photographed; **LV-75-9**, 55.4168ºN 167.2747ºE, depth 352 m, a few specimens photographed; **LV-75-18**, 55.4343°N 167.2673ºE – 55.4337°N 167.2676ºE, depth 1389–1342 m, two specimens photographed.

LV-82-1, 55.4166°N 167.2756ºE – 55.4159°N 167.2737ºE, depth 390–362 m, one specimen collected (sample 7) and six specimens photographed.

REMARKS. Sea anemone with cylindrical column covered with brownish cuticle and rows of tubercles. The tubercles are larger distally. Short bare rose colored scapulus has tubercles. The oral disc and tentacles are orange. The oral disc is wider than the column, up to 10 cm in diameter. The tentacles without mesogloeal thickenings, arranged in five cycles on the periphery of the oral disc, up to 96 in number. The species was recorded on the northern top of the Piip Volcano at depths of 352–415 m, where it is common: many specimens were photographed, one collected. Two specimens, probably belonging to this species, were photographed on the northern slope of the Piip Volcano at the bathyal depth of 1342–1389 m (not collected).

Phelliactis spp.
Fig. 4H, I.

MATERIAL. **LV-75-22**, 55.5134ºN 167.3270ºE, depth 3599 m, one specimen photographed.

LV-82-6, 55.6826°N 167.1075ºE – 55.6825°N 167.1075ºE, depth 3397–3393 m, sample 3, one specimen collected; **LV-82-10**, 55.3188°N 167.2907ºE, depth 2605 m, one specimen photographed.

REMARKS. Two species of *Phelliactis* have been recorded from the Vulcanologov Massif and Komandorsky Basin in the southwest of the Bering Sea. The specimens are large with a beige-brownish cylindrical column with longitudinal rows of tubercles (mesogloeal thickenings) and very wide oral disc (about 20 cm in diameter). The tentacles are on the margin of the oral disc, more than 100 in number. Two specimens photographed on the northern slope of the Vulcanologov Massif in 2016 (3599 m, not collected) and on the small high to the west of the Komandor Graben in 2018 (3397–3393 m, collected), most probably belong to one species. They have a similarly looking high column, large circular oral disc and long thin tentacles with weak thickenings at the base on the aboral side; the recorded depth is also similar (Fig. 4H). The specimen, photographed on the southern slope of the Vulcanologov Massif (2605 m), differs in very strong aboral thickenings on the tentacles, red undulating oral disc and lower and wider column (Fig. 4 I).

aff. Hormathiidae sp.1
Fig. 4 J.

MATERIAL. **LV-75-18**, 55.4343°N 167.2673ºE, depth 1389 m, one specimen photographed; **LV-75-21**, 55.4818°N 167.2573ºE – 55.4772°N 167.2514ºE, depth 2841–2732 m, four specimens photographed.

REMARKS. Five specimens of the small species were photographically documented on the sides of large stones on the northern slope of the Vulcanologov Massif at 1389–2841 m (not collected). The specimens have low column, wider at the base (up to 4 cm in diameter), covered by cuticle. Oral disc and tentacles are pale-rose. The oral disc is wide (up to 3 cm in diameter), with oral cone at its center. The tentacles are thin, its length is up to the diameter of the oral disc, without mesogloeal thickenings, up to 50 may be counted in photographs.

aff. Hormathiidae sp.2
Fig. 4K.

MATERIAL. **LV-75-18**, 55.4336°N 167.2673ºE, depth 1349 m, one specimen photographed.

REMARKS. White sea anemone was photographed on the northern slope of the Piip Volcano at the depth of 1349 m in 2016 in community of glass sponge *Farrea* spp. (see Rybakova *et al*., 2020). The tentacles are hexamerously arranged in six cycles: 6+6+12+24+48+96= up to 192 (120 tentacles are visible in the photograph). The length of the inner tentacles can be as large as the diameter of the oral disc. Brownish radial dashed lines from the base of the tentacles to the mouth extend on the oral disc above the endocoels.

Family Sagartiidae Gosse, 1858

Sagartiogeton californicus (Carlgren, 1940)
Fig. 4L.

Sagartiogeton californicus: Eash-Loucks, Fautin, 2012: 43; Sanamyan *et al*., 2023: 3.

MATERIAL. **LV-75-3**, 55.4158°N 167.2738ºE, depth 355 m, three specimens photographed; **LV-75-15**, 55.3821°N 167.2614ºE, depth 452 m, two specimens photographed; **LV-75-19**, 55.382°N 167.2608ºE, depth 453 m, one specimen photographed.

LV-82-1, 55.4171°N 167.2773ºE – 55.4160°N 167.2744ºE, depth 386–373 m, several specimens photographed; **LV-82-8**, 55.382°N 167.2608ºE, depth 458 m, one specimen photographed. **LV-82-11**, 60.8528°N 174.3516ºE, depth 534 m, two specimens photographed; **LV-82-12**, 60.8549°N 174.3485ºE – 60.8901°N 174.2908ºE, depth 550–432 m, three specimens collected (sample 1) and many specimens photographed; **LV-82-14**, 61.1188°N 174.9679ºE – 61.1351°N 174.9419ºE, depth 684–554 m, one specimen collected (sample 1) and many specimens photographed; **LV-82-15**, 61.1396°N 174.9352ºE – 61.1779°N 174.8708ºE, depth 537–417 m, several specimens collected (samples 3, 5,

10, 11, 12 and 13) and many specimens photographed; **LV-82-16**, 61.1787°N 174.8704ºE – 61.1899°N 174.8345ºE, depth 416–356 m, two specimens collected (sample 2) and many specimens photographed; **LV-82-17**, 61.1806°N 174.8508ºE – 61.1801°N 174.8493ºE, depth 402–401 m, two specimens collected (samples 4 and 6) and many specimens photographed; **LV-82-19**, 61.1538°N 175.4492ºE – 61.1539°N 175.4492ºE, depth 692–693 m, one specimen collected (sample 2) and several specimens photographed; **LV-82-20**, 61.1713°N 174.8810ºE – 61.1724°N 174.8794ºE, depth 430–428 m, one specimen collected (sample 4) and many specimens photographed.

PL-99-123, 61.215°N 174.888ºE – 61.202°N 174.865ºE, depth 355–354 m, samples 24 and 25, two specimens collected.

PK-37-34, 61.088°N 174.574ºE – 61.101°N 174.586ºE, depth 531–530 m, sample 15, one specimen collected; **PK-37-36**, 61.113°N 174.507ºE – 61.124°N 174.527ºE, depth 380–365 m, sample 16, one specimen collected.

REMARKS. The species was photographically recorded, but not collected in 2016 on the southern top of the Piip Volcano, just near the hydrothermally active site at 453 m. Several similar specimens were documented on the southern and northern tops of the Piip Volcano at 355–458 m. Many specimens were recorded and some collected on the Koryak slope (at 354–693 m), especially in methane seeps sites, where they were numerous and occurred on any available firm substrate on muddy bottom: on pebbles, dead shells and on the shells of live gastropods or of bivalve mollusks *Calyptogena* and other objects. The specimens are not large (up to 8 cm in the height and the diameter of the tentacular crown), with a light column and dark reddish-brown tentacles. The tentacles are numerous, about 200. In the shallow-water methane seeps on the Koryak slope, they dominate in the communities at depths of 400–402 m (see Galkin *et al*., 2019) and occur directly on bacterial mats.

Sagartiogeton rufus Sanamyan *et al*., 2023
Fig. 5A.

Sagartiogeton rufus Sanamyan *et al*., 2023: 5.

MATERIAL. **LV-75-3**, 55.4160°N 167.2732º E – 55.4161°N 167.2739ºE, depth 382–351 m, many specimens photographed; **LV-75-8**, 55.4161°N 167.2736ºE – 55.4163°N 167.2750ºE, depth 377–400 m, many specimens photographed; **LV-75-9**, 55.4156°N 167.2736ºE – 55.4160°N 167.2743ºE, depth 388–350 m, many specimens photographed.

LV-82-1, 55.4171°N 167.2773ºE – 55.4160°N 167.2744ºE, depth 386–373 m, several specimens collected (samples 6 and 7) and many specimens photographed.

REMARKS. Numerous small (up to 2 cm in height) rose-orange specimens form crowded settlements on the northern top of the Piip Volcano, often together with zoantharians *Epizoanthus* sp. of similar size and color. However, the settlements of *Sagartiogeton rufus* are sparser than the settlements of the zoantarians. Sometimes they form settlements near the hydrothermal sites together with filamentous colonies of bacteria. This species has not been found elsewhere. Several specimens were collected.

Family Metridiidae Carlgren, 1893

Metridium farcimen (Brandt, 1835)
Fig. 5B.

Actinia farcimen Brandt, 1835: 12.

Metridium farcimen: Fautin, Hand, 2000: 1151 (and synonymy); Sanamyan, Sanamyan, 2009: 158, 2010: 211 (and synonymy).

MATERIAL. **VM-167**, 59.5650ºN 165.2600ºE – 59.5500ºN 165.2300ºE, depth 94 m, sample 19, one specimen collected; **VM-212**, 58.7150ºN 162.7633ºE – 58.7316ºN 162.7866ºE, depth 30–29 m, sample 26, one specimen collected.

REMARKS. This species is widely distributed in the North Pacific. It has high smooth column (up to 1 m in height) and numerous (thousands) small tentacles which serve to catch small suspended in the water column particles; the species is planktivorous. Numerous records of this species are reported from American coasts from Bering Strait to Mexico and from subtidal waters to 2740 m (Eash-Loucks, Fautin, 2012). On the Asiatic side of Pacific, it was reported from Southeast Kamchatka, where its typical location is in the Avacha Bay (Fautin, Hand, 2000; Sanamyan, Sanamyan, 2009, 2010). According to personal observations and underwater photographs of N. Sanamyan this species is abundant in Avachinsky and Kronotsky Gulfs. Also, this species was photographed in the first technical dive by ROV in 2018 on the southern (Pacific) side of Bering Island (Commander Islands) on 30–33 m and in Chukotka in the Seniavin Strait (northern part of the Bering Sea) on the depth 6–8 m (Fig. 5B; personal communication and photo of Viktor Lyagushkin). *Metridium* sp. recorded by Averincev (1967) from Sea of Japan (Possjet Bay) probably belongs to this species. *Metridium farcimen* appears to be very abundant in some parts of the Northwest Pacific: more than 100 kg of this species was captured per trawling in three station during bottom trawl survey in the shelf of the Karaginsky subzone (Olyutorsky and Karaginsky Gulfs) in the Bering Sea in 2021 at depths of 29–94 m (personal communication of Taras Morozov).

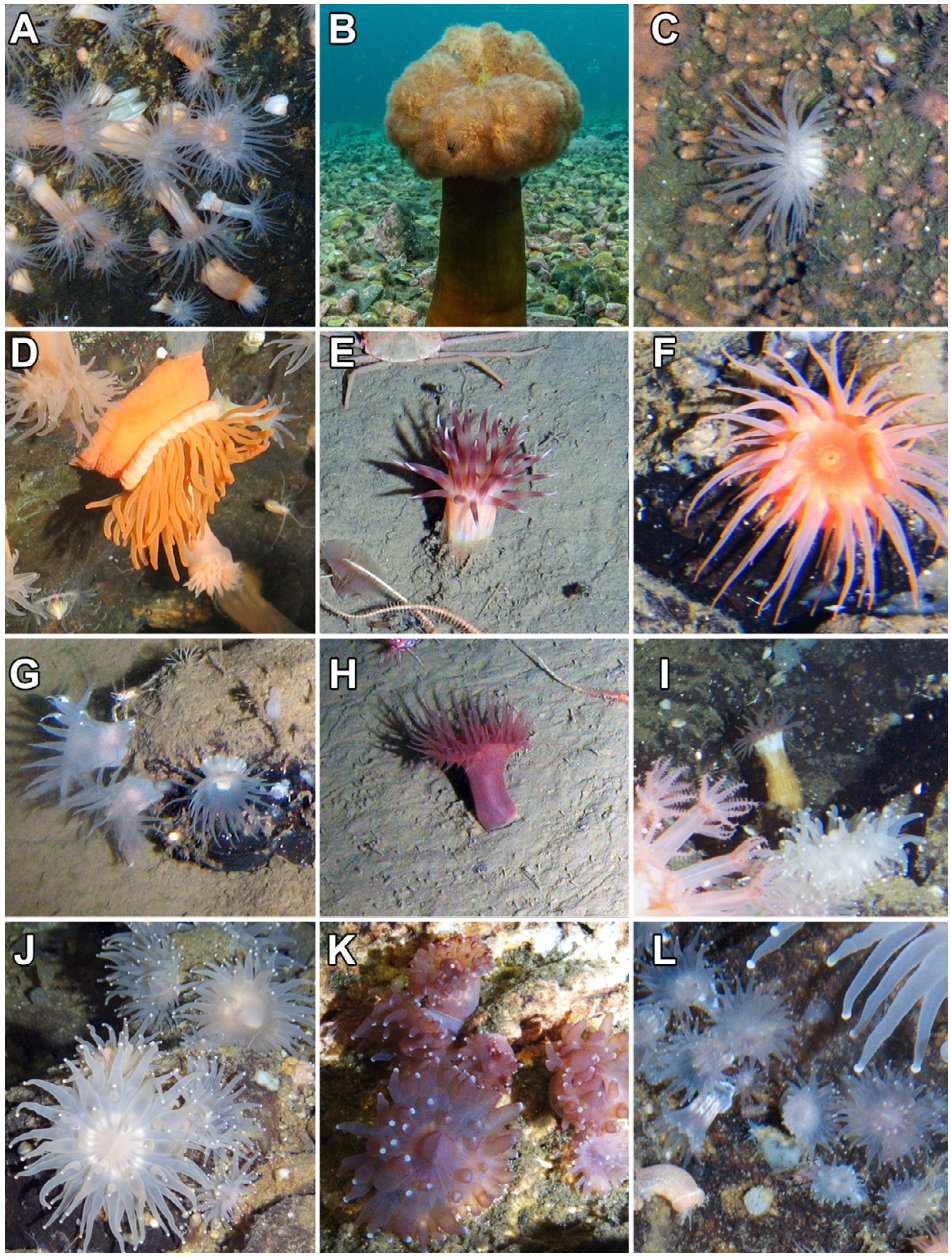

Fig. 5. A — *Sagartiogeton rufus*; B — *Metridium farcimen* from Chukotka (photo of Viktor Lyagushkin); C — Actiniaria sp.1; D — Actiniaria sp.2; E — Actiniaria sp.3; F — Actiniaria sp.4; G — Actiniaria sp.5; H — Actiniaria sp.6; I — Actiniaria sp.7; J — the white form of *Corallimorphus* cf. *pilatus*; K — the brown form of *Corallimorphus* cf. *pilatus*; L — Corallimorphidae sp.
Рис. 5. A — *Sagartiogeton rufus*; B — *Metridium farcimen*, Чукотка (фото Виктора Лягушкина); C — Actiniaria sp.1; D — Actiniaria sp.2; E — Actiniaria sp.3; F — Actiniaria sp.4; G — Actiniaria sp.5; H — Actiniaria sp.6; I — Actiniaria sp.7; J — белая форма *Corallimorphus* cf. *pilatus*; K — коричневая форма *Corallimorphus* cf. *pilatus*; L — Corallimorphidae sp.

Species not identified to family level

Actiniaria sp.1
Fig. 5C.

MATERIAL. **LV-75-3**, 55.4160°N 167.2734ºE – 55.4161°N 167.2739ºE, depth 384–351 m, 27 specimens photographed; **LV-75-9**, 55.4158°N 167.2738ºE, depth 379 m, one specimen photographed.

LV-82-1, 55.4163°N 167.2738ºE, depth 348 m, one specimen photographed.

REMARKS. About 30 specimens of medium-sized (up to 5–7 cm in diameter of the tentacular crown) white sea anemones were detected, but not collected, among the settlements of zoantharians and *Sagartiogeton rufus* on the northern top of the Piip Volcano at 348–384 m. They have short column and long tapering tentacles arranged hexamerously in five cycles (6+6+12+24+48= up to 96), the oral disc is small, almost completely covered by the tentacles, the oral cone is high. The species has some superficial similarity with white *Corallimorphus* cf. *pilatus*, but differs in its tapering tentacles without acrospheres.

Actiniaria sp.2
Fig. 5D.

MATERIAL. **LV-75-2**, 55.4166ºN 167.2749ºE – 55.4171ºN 167.2771ºE, depth 403–367 m, several specimens photographed; **LV-75-8**, 55.4162ºN 167.2736ºE – 55.4161ºN 167.2749ºE, depth 378–386 m, several specimens photographed; **LV-75-9**, 55.4155ºN 167.2736ºE – 55.4161ºN 167.2743ºE, depth 394–349 m, several specimens photographed.

LV-82-1, 55.4170°N 167.2770ºE – 55.4163°N 167.2738ºE, depth 368–347 m, one specimen collected (sample 7) and several specimens photographed; **LV-82-8**, 55.3765°N 167.2639ºE, depth 668 m, three specimens photographed.

REMARKS. This small sea anemone (up to 2–3 cm in the height and the diameter of the tentacular crown) appears to be common on the northern top of the Piip Volcano at 347–403 m, and also photographed on the southern slope of the Piip Volcano at 668 m. It has short beige to orange-brownish column wide at the base and beige to orange transparent tentacles. White collar on the margin under the tentacles resembles a circle of pseudospherules in the extended specimens. This species detected on the vertical sides and undersides of large stones among small Sagartiidae *Sagartiogeton rufus* and corallimorpharians. One specimen was collected.

Actiniaria sp.3
Fig. 5E.

MATERIAL. **LV-82-1**, 55.4170ºN 167.2775ºE, depth 382 m, one specimen photographed. **LV-82-11**, 60.8405ºN 174.3804ºE – 60.8543ºN 174.3490ºE, depth 621–551 m, sample 1, two specimens collected; **LV-82-12**, 60.8586ºN 174.3398ºE – 60.8635ºN 174.3266ºE, depth 538–518 m, four specimens photographed; **LV-82-13**, 60.8333ºN 174.3739ºE – 60.8387ºN 174.3688ºE, depth 660–620 m, five specimens photographed; **LV-82-14**, 61.1203ºN 174.9650ºE – 61.1332ºN 174.9453ºE, depth 664–565 m, three specimens photographed; **LV-82-15**, 61.1500ºN 174.9179ºE – 61.1717ºN 174.8802ºE, depth 499–433 m, 25 specimens photographed; **LV-82-18**, 61.1209ºN 174.9669ºE, depth 662 m, one specimen photographed; **LV-82-21**, 60.8305ºN 174.3770ºE – 60.8313ºN 174.3771ºE, depth 679–674 m, 25 specimens photographed.

REMARKS. Medium-sized burrowing sea anemone; only its upper part, a scapulus with the tentacles, is visible above the surface of bottom. The diameter of the tentacular crown is about 4 cm. The tentacles are dark, directed upward and slightly to the sides (i.e. they do not stand horizontally and do not touch the substrate). The tentacles are conical, probably 24 in number, usually lilac or reddish-brown or paler with two transverse dark bands of the same tint; the tips may be white. The scapulus is pale or white with a reddish-brown band in its upper part, composed of vertical lines between the insertions of the mesenteries. This color band may be poorly defined on some specimens. The scapus is covered with cuticle and firm layer of sand and gravel. One specimen of this species was photographically documented on the northern top of the Piip Volcano at 382 m, while on the Koryak slope it occurred rather often at 433–679 m, where 65 specimens were photographed, two of which were collected.

Actiniaria sp.4
Fig. 5F.

MATERIAL. **LV-75-18**, 55.4420°N 167.2627ºE – 55.4341°N 167.2676ºE, depth 1733–1377 m, seven specimens photographed.

REMARKS. Orange sea anemone of medium size anemone (up to 8–9 cm in the diameter of the tentacular crown), with short column and very long tentacles. The inner tentacles can be more than two times longer than the diameter of the oral disc. Usually occurs on the sides of large stones. Seven specimens were photographed (but not collected) on the northern slope of the Piip Volcano in the lower bathyal zone at 1377–1733 m.

Actiniaria sp.5
Fig. 5G.

MATERIAL. **LV-82-5**, 55.2616°N 167.3025ºE – 55.2698°N 167.2992ºE, 3931–3547 m, one

specimen collected (sample 2) and five specimens photographed; **LV-82-10**, 55.2879°N 167.3014ºE, depth 2807 m, two specimens photographed.

REMARKS. A small abyssal sea anemone with a white translucent body, eight specimens of which were photographed and one collected on the southern slope of the Vulcanologov Massif at depths of 2807–3931 m in 2018. All specimens have a low column of similar height and width; the oral disc is slightly wider than the column. The tentacles are marginal, arranged in two cycles, up to 36 in number. White ova are visible in the tentacles and through the oral disc in half of the specimens.

Actiniaria sp.6
Fig. 5H.

MATERIAL. **LV-82-14**, 61.1326°N 174.9450ºE – 61.1333°N 174.9453ºE, depth 570–565 m, four specimens photographed; **LV-82-15**, 61.1380°N 174.9382ºE – 61.1401°N 174.9347ºE, depth 550–536 m, two specimens photographed.

REMARKS. Medium sized (up to 8 cm in the height and the diameter of the tentacular crown) dark, plain brownish-violet sea anemones occurring on pebbles or another hard substrate on muddy bottom. High cylindrical column is much wider distally, the oral disk three times wider than the column. The tentacles are arranged in five cycles, conical, not longer than the radius of the oral disc. Six specimens are photographed (but not collected) on the Koryak slope in background community dominated by brittle stars *Ophiophthalmus normani* (Lyman, 1879) at 536–570 m.

Actiniaria sp.7
Fig. 5 I.

MATERIAL. **LV-75-2**, 55.4172ºN 167.2766ºE, depth 380 m, one specimen photographed; **LV-75-3**, 55.4165ºN 167.2759ºE, depth 390 m, seven specimens photographed.

REMARKS. Eight specimens of this small (about 2–3 cm in height) species were photographed but not collected at 380–390 m on the northern top of the Piip Volcano. The specimens of this species are attached to the stones, they have high column (with wider basal half) divisible into scapus covered by yellow-brownish cuticle and white bare scapulus. Longitudinal lines, probably insertions of the mesenteries are visible on the column. Mesenteries arranged probably in three cycles. Dark tentacles are probably arranged in four cycles. The specimens of this species occur on the upper and lower surfaces of the stones, either solitarily or in groups. It resembles members of the family Bathyphelliidae Carlgren, 1932 or related families.

Actiniaria spp.

MATERIAL. **LV-75-17**, 55.4445ºN 167.2626ºE, depth 1819 m, one specimen photographed.

LV-82-8, 55.3765°N 167.2639ºE, depth 668 m, three specimens photographed; **LV-82-10**, 55.2879°N 167.3014ºE – 55.2898°N 167.2974ºE, depth 2807–2638 m, several specimens of 5 species photographed. **LV-82-15**, 61.1512°N 174.9148ºE – 61.1774°N 174.8715ºE, depth 494–460 m, two specimens photographed; **LV-82-16**, 61.1869°N 174.8397ºE – 61.1902°N 174.8347ºE, depth 373–356 m, five specimens photographed; **LV-82-18**, 61.1196°N 174.9676ºE – 61.1201°N 174.9635ºE, depth 670–652 m, two specimens photographed.

REMARKS. About 10 species of undetermined Actiniaria that were photographed but not collected and cannot be identified: 6 on the Vulcanologov Massif and 2–4 species on the Koryak slope. Most of them are burrowing species or small species living on the stones which were difficult to collect by the manipulator of the ROV.

Order Corallimorpharia

Family Corallimorphidae Hertwig, 1882

Corallimorphus cf. *pilatus* Fautin, White et Pearson, 2002
Fig. 5 J, K.

Corallimorphus pilatus Fautin *et al*., 2002: 118; Eash-Loucks, Fautin, 2012: 9.

MATERIAL. **AMK-22-2310**, 55.3896°N 167.2616°E – 55.385°N 167.2566°E, depth 602–750 m, dredge 1; 55.3753°N 167.2468°E – 55.3833°N 167.265°E, depth 580–750 m, dredge 2; eight specimens collected. **AMK-22-2311**, submersible *Mir-1*, dive 6/50: 55.4166°N 167.272°E, depth 410 m, sample 3; 55.4163°N 167.2721°E, depth 409 m, sample 4; 55.4161°N 167.2723°E, depth 396 m, sample 5; 24 specimens collected. **AMK-22-2320**, submersible *Mir-2*, dive 15/48: 55.3858°N 167.2583°E, depth 524 m, sample 2, one specimen collected.

LV-75-1, 55.4246ºN 167.2903ºE, depth 1053 m, one specimen photographed; **LV-75-2**, 55.4173ºN 167.2766ºE – 55.4165ºN 167.2749ºE, depth 381–407 m, one specimen collected (sample 2) and many specimens photographed; **LV-75-3**, 55.4165ºN 167.2735ºE – 55.4164ºN 167.2759ºE, depth 386–390 m, many specimens photographed; **LV-75-4**, 55.4165ºN 167.2749ºE – 55.4167ºN 167.2759ºE, depth 390–399 m, many specimens photographed; **LV-75-5**, 55.4166ºN 167.2749ºE – 55.4166ºN 167.2755ºE, depth 372–394 m, one specimen collected (sample 2) and many specimens photographed; **LV-75-6**, 55.4166ºN 167.2743ºE – 55.4165ºN 167.2762ºE, depth

372–396 m, many specimens photographed; **LV-75-7**, 55.4174ºN 167.2747ºE – 55.4166ºN 167.2752ºE, depth 421–409 m, many specimens photographed; **LV-75-8**, 55.4163ºN 167.2755ºE – 55.4161ºN 167.2749ºE, depth 407–386 m, four specimens collected (sample 1) and many specimens photographed; **LV-75-9**, 55.4180ºN 167.2760ºE – 55.4161ºN 167.2742ºE, depth 424–349 m, many specimens photographed; **LV-75-10**, 55.4169ºN 167.2744ºE – 55.4172ºN 167.2748ºE, depth 407–411 m, many specimens photographed; **LV-75-11**, 55.3821ºN 167.2609ºE, depth 470 m, three specimens collected (sample 1) and many specimens photographed; **LV-75-12**, 55.3823ºN 167.2608ºE – 55.3810ºN 167.2611ºE, depth 468–474 m, many specimens photographed; **LV-75-13**, 55.3822ºN 167.2608ºE – 55.3826ºN 167.2605ºE, depth 466–472 m, one specimen collected (sample 1) and a few specimens photographed; **LV-75-14**, 55.3822ºN 167.2611ºE – 55.3820ºN 167.2607ºE, depth 460–465 m, a few specimens photographed; **LV-75-15**, 55.3822ºN 167.2612ºE – 55.3821ºN 167.2612ºE, depth 466–459 m, several specimens collected (sample 1) and many specimens photographed; **LV-75-19**, 55.3822ºN 167.2625ºE – 55.3819ºN 167.2606ºE, depth 494–453 m, a few specimens photographed; **LV-75-20**, 55.3824ºN 167.2618ºE – 55.3822ºN 167.2611ºE, depth 481–470 m, many specimens photographed; **LV-75-21**, 55.4812ºN 167.2572ºE, depth 2834 m, one specimen photographed; **LV-75-22**, 55.5100ºN 167.3240ºE – 55.5087ºN 167.3236ºE, depth 3561–3545 m, five specimens photographed.

LV-82-1, 55.4171ºN 167.2773ºE – 55.4165ºN 167.2763ºE, depth 386–382 m, several specimens collected (samples 3 and 7) and many specimens photographed; **LV-82-2**, 55.4167ºN 167.2764ºE – 55.4158ºN 167.2766ºE, depth 383–400 m, many specimens photographed; **LV-82-3**, 55.3827ºN 167.2626ºE – 55.3816ºN 167.2608ºE, depth 492–464 m, several specimens collected (samples 1, 2 and 3) and many specimens photographed; **LV-82-4**, 55.3817ºN 167.2612ºE – 55.3820ºN 167.2611ºE, depth 465–451 m, many specimens photographed; **LV-82-8**, 55.3814ºN 167.2617ºE – 55.3825ºN 167.2617ºE, depth 469–475 m, several specimens collected (samples 2 and 7) and many specimens photographed.

REMARKS. The specimens are of moderate size, very abundant on the upper slope and top of the Piip Volcano at 372–1053 m. The white form (Fig. 5 J) with bright-white acrospheres at the tip of the tentacles dominates on the northern top, occurs near bacterial mats. The brown form with white acrospheres dominates at the southern top (Fig. 5K) and occurs directly on the seeps on bacterial mats. The species is hexamerous with up to five cycles of the marginal tentacles, 12 (two cycles) discal tentacles located in the endocoels of the first and the second cycles. Large specimens have about 12 discal and 49 marginal tentacles (the ratio is 1:4, as in *C. pilatus*). The height and diameter of the preserved specimens is up to 16 mm. There are 12 pairs of perfect mesenteries and very small miscrocnemes of third and fourth cycles. *Corallimorphus pilatus* appear to be most closely related to the present specimens, its original description is based on numerous specimens from 198–900 m in the eastern Pacific from British Columbia to Southern California. Subsequently it was found from much greater depths (up to 2000 m) (Eash-Loucks, Fautin, 2012). Some specimens reported here were photographed at great depth (3545–3561 m) on the norther slope of the Piip Volcano, their morphology and external appearance are similar to those from shallower waters. Another deep-sea species (2834 m, one specimen in the photo) differs significantly from other specimens recorded on the Vulcanologov Massif in its dark bluish-brown color, body shape, high oral cone and, possibly, more numerous discal tentacles.

Corallimorphidae sp.
Fig. 5L.

MATERIAL. **LV-75-1**, 55.4246ºN 167.2903ºE, depth 1053 m, one specimen photographed; **LV-75-2**, 55.4173ºN 167.2766ºE – 55.4165ºN 167.2749ºE, depth 381–407 m, many specimens photographed; **LV-75-3**, 55.4165ºN 167.2735ºE – 55.4164ºN 167.2759ºE, depth 386–390 m, many specimens photographed; **LV-75-4**, 55.4165ºN 167.2749ºE – 55.4167ºN 167.2759ºE, depth 390–399 m, many specimens photographed; **LV-75-5**, 55.4166ºN 167.2749ºE – 55.4166ºN 167.2755ºE, depth 372–394 m, eight specimens collected (sample 2) and many specimens photographed; **LV-75-7**, 55.4174ºN 167.2747ºE – 55.4166ºN 167.2752ºE, depth 421–409 m, many specimens photographed; **LV-75-8**, 55.4163ºN 167.2755ºE – 55.4161ºN 167.2749ºE, depth 407–386 m, one specimen collected (sample 1) and many specimens photographed; **LV-75-9**, 55.4180ºN 167.2760ºE – 55.4161ºN 167.2742ºE, depth 424–349 m, many specimens photographed; **LV-75-10**, 55.4169ºN 167.2744ºE – 55.4172ºN 167.2748ºE, depth 407–411 m, many specimens photographed; **LV-75-12**, 55.3823ºN 167.2608ºE – 55.3810ºN 167.2611ºE, depth 468–474 m, many specimens photographed; **LV-75-13**, 55.3822ºN 167.2608ºE – 55.3826ºN 167.2605ºE, depth 466–472 m, three specimens collected (sample 1) and many specimens photographed; **LV-75-20**, 55.3824ºN 167.2618ºE – 55.3822ºN 167.2611ºE, depth 481–470 m, many specimens photographed.

LV-82-1, 55.4171ºN 167.2773ºE – 55.4165ºN 167.2763ºE, depth 386–382 m, many specimens photographed; **LV-82-2**, 55.4167ºN 167.2764ºE –

55.4158ºN 167.2766ºE, depth 383–400 m, several specimens collected (sample 7) and many specimens photographed; **LV-82-3**, 55.3827ºN 167.2626ºE – 55.3816ºN 167.2608ºE, depth 492–464 m, many specimens photographed; **LV-82-4**, 55.3817ºN 167.2612ºE – 55.3820ºN 167.2611ºE, depth 465–451 m, many specimens photographed; **LV-82-8**, 55.3806ºN 167.2617ºE – 55.3825ºN 167.2617ºE, depth 485–475 m, several specimens collected (sample 7) and many specimens photographed.

REMARKS. This small (up to 1.5 cm in the height and the diameter of the tentacular crown) species occurs on both tops of the Piip Volcano together with larger *Corallimorphus* cf. *pilatus* and small *Sagartiogeton rufus*. The specimens are white, translucent; longitudinal strips of white filaments or gonads are visible through the cylindrical column. The pedal disc is expanded and wider than the column, often forms a kind of lobes and outgrows characteristic for pedal laceration. This species does not have discal tentacles characteristic for *Corallimorphus*; there are four cycles of marginal tentacles arranged hexamerously. Sometimes they occur directly among the bacterial settlements on the seeps. Several specimens have been collected. The greatest depth recorded from a photograph for this species is 1053 m (on the dead glass sponge *Farrea* sp.).

Order Zoantharia

Family Epizoanthidae Delage et Hérouard, 1901

Epizoanthus fatuus (Schultze, 1860)
Fig. 6A.

Palythoa fatua Schultze, 1860: 36.

MATERIAL. **LV-75-16**, 55.5774ºN 167.3258ºE, depth 4277 m, one colony photographed; **LV-75-22**, 55.5134ºN 167.3270ºE – 55.5087ºN 167.3236ºE, depth 3602–3534 m, three colonies photographed.

LV-82-5, 55.2698ºN 167.2995ºE – 55.2738ºN 167.2974ºE, depth 3520–3435 m, two colonies collected (samples 7 and 8) and one colony photographed.

REMARKS. Deep-water colonial zoantarian growing on the stem of glass sponge of the genus *Hyalonema*. The species is recorded in the abyssal zone on the northern and southern slopes of the Vulcanologov Massif and in the Komandor Graben from 3435 to 4277 m; two colonies were collected. The zooids densely cover the sponge stem composed of bundle of spicules. They extend from the lover part of the stem, along the whole its length, to the body of the sponge located on the top of the stem. They are also found on the dead stems which have no body of the sponge at the end (Fig. 6A) sometimes inhabited by other organisms (hydroids or sea anemones, Fig. 2A). Zooids are white, up to 2–3 cm high and have two cycles of the tentacles.

Epizoanthus sp.
Fig. 6B.

MATERIAL. **AMK-22-2311**, submersible *Mir-1*, dive 6/50, 55.4163°N 167.2816°E, depth 358 m, sample 1, 80 specimens collected.

LV-75-2, 55.4169ºN 167.2755ºE, depth 381 m, several specimens photographed; **LV-75-3**, 55.4160ºN 167.2732ºE – 55.4161ºN 167.2739ºE, depth 382–351 m, many specimens photographed; **LV-75-8**, 55.4162ºN 167.2736ºE, depth 378 m, many specimens photographed; **LV-75-9**, 55.4155ºN 167.2736ºE – 55.4161ºN 167.2742ºE, depth 394–349 m, many specimens photographed.

LV-82-1, 55.4165ºN 167.2767ºE – 55.4160ºN 167.2743ºE, depth 382–349 m, many specimens collected (sample 7) and many specimens photographed; **LV-82-2**, 55.4160ºN 167.2769ºE, depth 372 m, many specimens photographed; **LV-82-4**, 55.3809ºN 167.2604ºE, depth 478 m, several specimens collected (sample 4) and many specimens photographed.

REMARKS. The species forms continuous "carpets", often near the settlements of *Sagartiogeton rufus*, on the most shallow-water zone of the northern top of the Piip Volcano from 349 to 394 m. The number of specimens reaches 60–70 per square decimeter, some of them were collected. Their zooids are yellow-orange, with cylindrical column up to 2–3 cm in height, encrusted with sediment particles and foraminifers; the tentacles are organized in two cycles. *S. rufus* and zoantharians are similar in size and color, are often located next to each other and can be confused. However, the settlements of *S. rufus* are sparser and other species can settle among them, while there are almost no other species of sea anemones among the zoantharians. Settlements of zoantharians were also recorded on the southern top of the Piip Volcano, but they are less numerous there. The deepest record is 478 m on the southern top of the Piip Volcano.

Zoantharians not identified to family level

Zoantharia spp.
Fig. 6C.

MATERIAL. **LV-75-22**, 55.5100ºN 167.3240ºE – 55.5087ºN 167.3236ºE, depth 3561–3545 m, several specimens photographed.

LV-82-5, 55.2616ºN 167.3025ºE – 55.2647ºN 167.3014ºE, depth 3931–3879 m, one specimen photographed; **LV-82-10**, 55.2879°N 167.3014ºE,

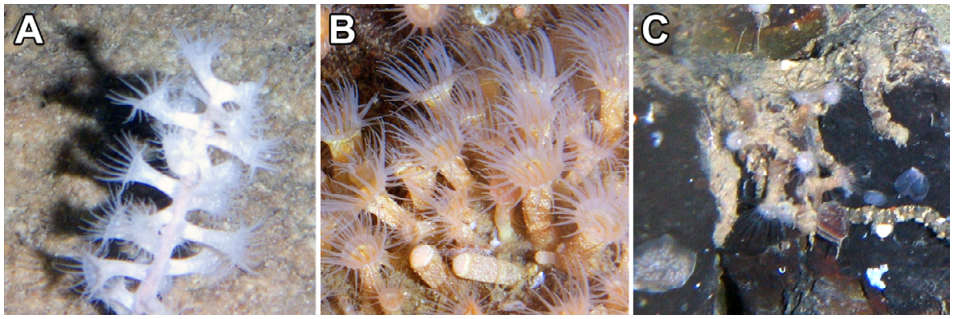

Fig. 6. A — *Epizoanthus fatuus*; B — *Epizoanthus* sp.; C — Zoantharia sp. from the southern slope of the Piip Volcano.
Рис. 6. A — *Epizoanthus fatuus*; B — *Epizoanthus* sp.; C — Zoantharia sp. на южном склоне вулкана Пийпа.

depth 2807 m; 55.2882°N 167.3011°E, depth 2778 m, one specimen photographed.

REMARKS. Small white specimens on stones were photographed in the abyssal zone. On the southern slope of the Vulcanologov Massif, two species have been recorded: a group of at least 7 specimens with a long column covered with sediment particles (Fig. 6C), and solitary specimens with a short white column. Another smaller species with a short white column occurs in small groups on the northern slope of the Vulcanologov Massif.

Discussion

About 80 species sea anemones are reported of which 40 were collected (36 species of Actiniaria, two Corallimorpharia and two Zoantharia), other species were identified basing on photo and video records. 17 of them were identified to the species level (one basing on the photographs only), most of remaining species require description as new species. 33 sea anemones were identified to the genus level (12 basing on photographs only), seven of these genera are represented more than in one species (*Edwardsia*, *Cribrinopsis*, *Urticina*, *Actinostola*, cf. *Halcampa*, *Amphianthus*, *Phelliactis*). 18 families were identified, five of them only on the photographs (Relicanthidae, Edwardsiidae, Preactiniidae, Halcampidae, Halcampoididae). 16 families belong to the order Actiniaria (over 70 species), one family to the order Corallimorpharia (Corallimorphidae, two species in two genera) and one to Zoantharia (Epizoanthidae, two species of *Epizoanthus* and three not collected species on the photographs only). Only 13 species (11 species of Actiniaria, one of Corallimorpharia and one of Zoantharia) were previously known to science but have not been reported for western part of the Bering Sea and only two of them, *Liponema brevicorne* and *Metridium farcimen*, were reported for eastern part of the Bering Sea. Four species of the present material (*Sicyonis denisovi*, *Sicyonis kuznetsovi*, *Ophiodiscus bukini* and *Tealidium konoplinorum*) have been already described as new to science (Sanamyan *et al*., 2021) and they are known only for western part of the Bering Sea.

Of the 17 species identified in the present work, 10 species (59%) are known from eastern Pacific Ocean (Supplement Table 2): *Relicanthus daphneae*, *Ptychodactis patula*, *Liponema brevicorne*, *Actinostola faeculenta*, *Stomphia coccinea*, *Actinauge verrillii*, *Paracalliactis involvens*, *Metridium farcimen*, *Sagartiogeton californicus* and *Corallimorphus pilatus*. Two latter species were previously treated as endemics for northeastern Pacific by Eash-Loucks and Fautin (2012: 49): “Species that mostly occur above 2000 m (*Corallimorphus pilatus* from 250 to 2026 m, and *Sagartiogeton californicus* from 73 to at least 1463 m) appear endemic to the northeastern Pacific.” These authors stated that the growing oxygen minimum zone (OMZ), naturally occurring in Northeast Pacific, poses the biggest threat to these species occurring within the depth range of the OMZ in the northeastern Pacific Ocean and said to have restricted geographical ranges. We discovered that range of geographical distribution of these species is much wider and they distributed also in northwestern Pacific, where they are especially nu-

merous in and near areas with hydrothermal activity. In particular, the Actiniaria *Sagartiogeton californicus* and two species of the Corallimorpharia, including *Corallimorphus* cf. *pilatus*, were discovered on the top of the Piip Volcano on the Vulcanologov Massif, right next to the active hydrothermal construction and directly on seep fields between bacterial mats.

On the Koryak slope, Actiniaria *Sagartiogeton californicus* and *Tealidium konoplinorum* were more common in the locations closer to bacterial mats in cold seep zones than in the background areas, probably because of availability of suitable hard substratum (carbonate crusts, pebbles, shells of *Calyptogena*) for attachment. It seems, that reduced concentration of dissolved oxygen near the methane discharging zones, where these species are more numerous, does not adversely affect them. Therefore, their presence in the northeastern Pacific should not be a concern as they are likely adapted to low oxygen conditions. Recent works on megabenthic communities in deep-sea cold seeps in Northwest Atlantic also confirm significantly higher values of species richness, density, and biodiversity on hard substrates in and around cold seeps than in soft bottom habitats: "Depth and habitat complexity were the leading environmental variables driving megabenthic variability" (Cleland *et al*., 2021: 1).

In the western part of the Bering Sea, the largest number of sea anemone species was identified on the Vulcanologov Massif — about 62 species (11 identified to the species level). This is the result of the work of three expeditions that covered the largest range of investigated depths from 349 to 4277 m. Next in number of species is Koryak slope, about 28 species (six identified to species) — a result of four cruises, three of which carried out survey trawling, on the depths 89–950 m. Survey trawling was carried out in Karaginsky and Olyutorsky Gulfs in three expeditions at depths of 25–457 m; nine species were recorded (four identified to species). Members of orders Corallimorpharia (two species, both collected) and Zoantharia (five species, two collected) were reported only on the Vulcanologov Massif, but were not recorded on the continental slope and shelf in the western part of the Bering Sea. Thus, more than 91% of the species reported in the present work belong to the order Actiniaria. A similar ratio is typical for the world fauna of sea anemones, Actiniaria species are about ten times more numerous than members of other orders of sea anemones: about 1120 species of Actiniaria, 169 species of Zoantharia and 46 species of Corallimorpharia (e.g. see Crowther, 2011). The number of species of sea anemones recorded by us in the western part of the Bering Sea is about 6% of sea anemone species belonging to the three orders, or 6.5% species if only members of the order Actiniaria are counted. Together with previously known, mostly shallow-water species of Actiniaria (12 species), the total number of sea anemones known in this region is 92, that constitutes about 7% of the world fauna of sea anemones. Typically, in the most studied regional faunas, the number of species of sea anemones does not exceed 5% of the total number of sea anemone species worldwide, while the bathyal is usually poorly studied and the abyssal is almost completely unexplored (Laird, Griffiths, 2016). Our study presents a depth range that includes the bathyal and abyssal, so our assessment of the richness of the sea anemone fauna of the western Bering Sea seems to presents a high degree of completeness: despite the fact that no more than half of the sea anemones recorded in the photo and video were collected, underwater survey allows to estimate almost completely the diversity of megafauna.

Sixteen species were recorded on the northern top of Piip Volcano, while only six species were recorded on the southern top (at depths shallower than 500 m): *Edwardsia* sp., *Actinostola* sp.2, *Sagartiogeton californicus*, *Corallimorphus* cf. *pilatus*, Corallimorphidae sp. and *Epizoanthus* sp. Among them only three species belong to the order Actiniaria: *Edwardsia* sp. (one specimen registered), *Actinostola* sp.2 (one specimen) and *Sagartiogeton californicus* (four specimens). The latter species was registered on the northern top too. The common species for the northern and southern tops are two species of Corallimorpharia and one species of Zoantharia, although zoantharians (*Epizoanthus* sp.) are much less abundant on the southern top than on the northern top, where they form large settlements cowering large boulders so densely that no other species settles among them. Both species of Corallimorpharia are abundant on both tops, although the dark form of *Corallimorphus* cf. *pilatus* on the southern top is a dominated

species of sea anemones. Such a great difference in species composition between two tops is possibly connected with differences in hydrothermal manifestations and in geological structure of northern and southern tops (Sagalevich *et al*., 1992), or perhaps it is connected with a layer of low oxygen content at the depts 400–600 m on the southern top of the Piip Volcano (Torokhov, 1989), where, in the absence of competition, more specialized forms have survived, such as dark form of *Corallimorphus* cf. *pilatus*, which lives directly on bacterial mats, marking low-temperature seeps (Galkin, Moskalev, 2006), together with symbiotrophic bivalves of the genus *Calyptogena*.

For the depth greater than 500 m, the diversity of sea anemones is comparable for the explored parts of the northern and southern slopes of the Piip Volcano and the Vulcanologov Massif: 27 species were recorded on the northern slope up to 4277 m and 22 species on the southern slope up to 3948 m, but only six species (about 25%) are common between them (*Actinernus robustus*, Edwardsiidae sp., *Sicyonis denisovi*, *Tealidium konoplinorum*, Actiniaria sp.2 and *Epizoanthus fatuus*). Only seven common species of sea anemones were recorded between Vulcanologov Massif and Koryak slope (25% of species known from the Koryak slope). Such a low number of common species may be connected with different substrates at the studied depths: soft bottom on the continental slope and hard bottom on seamounts. Seamounts provide ecological heterogeneity, and the biomass and biodiversity of megafauna are much higher on them (Durden *et al*., 2015). The low similarity of the fauna of sea anemones on the opposite slopes of the Vulcanologov Massif can be explained by differences in abiotic factors (specific substrates, topography, and near-bottom hydrodynamic conditions, see Etnoyer *et al*., 2022) and by sparse distribution of rarer (not common) species.

The Karaginsky and Olyutorsky Gulfs have been studied in much less degree, but they have at least half of the species common with the neighboring area of the Koryak slope.

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Compliance with ethical standards

CONFLICTS OF INTEREST: The authors declare that they have no conflicts of interest.

Data availability statement

Original pictures of the animals *in situ* taken using ROV *Comanche 18* camera are kept by A.V. Zhirmunsky National Scientific Center of Marine Biology, Far East Branch of Russian Academy of Sciences (Vladivostok) and available by personal request.

Supplementary data. The following Tables are available online.

Table 1. List of stations at which sea anemones were recorded.

Table 2. List of species and geographical distribution of sea anemones in northern Pacific.

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Supplement Table 1. List of stations at which sea anemones were recorded.
Приложение. Таблица 1. Список станций.

Cruise	Station	Date	Area
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2308	31 July 1990	Vulcanologov Massif, western slope of the Piip Volcano
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2310	01 August 1990	Vulcanologov Massif, Piip Volcano
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2311	1–2 August 1990	Vulcanologov Massif, Piip Volcano
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2316	5–6 August 1990	Komandorsky Basin, Komandor Graben
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2320	7–8 August 1990	Vulcanologov Massif, Piip Volcano
RV *Akademik Mstislav Keldysh*, 22 cruise	AMK-22-2321	08 August 1990	Vulcanologov Massif, southern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-1	11 June 2016	Vulcanologov Massif, northern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-2	13 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-3	13 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-4	14 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-5	17 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-6	17 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-7	17 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-8	18 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-9	19 June 2016	Vulcanologov Massif, northern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-10	20 June 2016	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-11	21 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-12	22 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-13	23 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-14	25 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-15	26 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A.*	LV-75-16	26 June 2016	Komandorsky Basin,

Lavrentyev, 75 cruise			Komandor Graben
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-17	27 June 2016	Vulcanologov Massif, northern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-18	28 June 2016	Vulcanologov Massif, northern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-19	29 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-20	29 June 2016	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-21	01 July 2016	Vulcanologov Massif, northern slope
RV *Akademik M.A. Lavrentyev*, 75 cruise	LV-75-22	02 July 2016	Vulcanologov Massif, northern slope
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-1	13 June 2018	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-2	13 June 2018	Vulcanologov Massif, northern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-3	14 June 2018	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-4	14 June 2018	Vulcanologov Massif, southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-5	15 June 2018	Vulcanologov Massif, southern slope
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-6	16 June 2018	Komandorsky Basin, small high to the west of the Komandor Graben
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-7	17 June 2018	Vulcanologov Massif, southern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-8	17 June 2018	Vulcanologov Massif, southern slope and southern top of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-9	18 June 2018	Vulcanologov Massif, southern slope of the Piip Volcano
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-10	19 June 2018	Vulcanologov Massif, southern slope
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-11	23 June 2018	Koryak slope, transect 3
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-12	24 June 2018	Koryak slope, transect 3
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-13	25 June 2018	Koryak slope, transect 3, cold seep 660 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-14	27 June 2018	Koryak slope, transect 4, cold seep 660 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-15	28 June 2018	Koryak slope, transect 4, cold seep 428 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-16	29 June 2018	Koryak slope, transect 4
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-17	29 June 2018	Koryak slope, transect 4, cold seep 400 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-18	30 June 2018	Koryak slope, transect 4, cold seep 660 m

RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-19	01 July 2018	Koryak slope, transect 5, cold seep 693 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-20	02 July 2018	Koryak slope, transect 4, cold seep 428 m
RV *Akademik M.A. Lavrentyev*, 82 cruise	LV-82-21	03 July 2018	Koryak slope, transect 3, cold seep 660 m
RV *Professor Levanidov*, 99 cruise	PL-99-6	16 July 2019	Karaginsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-8	17 July 2019	Karaginsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-15	18 July 2019	Karaginsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-37	21 July 2019	Olyutorsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-39	21 July 2019	Olyutorsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-50	22 July 2019	Olyutorsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-57	23 July 2019	Olyutorsky Gulf
RV *Professor Levanidov*, 99 cruise	PL-99-83	26 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-91	27 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-92	27 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-95	27 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-121	30 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-123	30 July 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-150	02 August 2019	Koryak slope
RV *Professor Levanidov*, 99 cruise	PL-99-151	02 August 2019	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-5	10 September 2020	Continental slope, south of Cape Govena
RV *Professor Kaganovsky*, 37 cruise	PK-37-6	11 September 2020	Continental slope, south of Cape Govena
RV *Professor Kaganovsky*, 37 cruise	PK-37-10	11 September 2020	Continental slope, south of Cape Govena
RV *Professor Kaganovsky*, 37 cruise	PK-37-14	12 September 2020	Olyutorsky Gulf
RV *Professor Kaganovsky*, 37 cruise	PK-37-18	15 September 2020	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-34	17 September 2020	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-36	17 September 2020	Koryak slope
RV *Professor*	PK-37-46	19 September 2020	Koryak slope

Kaganovsky, 37 cruise			
RV *Professor Kaganovsky*, 37 cruise	PK-37-52	20 September 2020	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-55	21 September 2020	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-56	21 September 2020	Koryak slope
RV *Professor Kaganovsky*, 37 cruise	PK-37-57	21 September 2020	Koryak slope
FV *Valeriy Maslakov*	VM-78	23 September 2021	Koryak slope
FV *Valeriy Maslakov*	VM-119	27 September 2021	Koryak slope
FV *Valeriy Maslakov*	VM-146	01 October 2021	Olyutorsky Gulf
FV *Valeriy Maslakov*	VM-158	02 October 2021	Olyutorsky Gulf
FV *Valeriy Maslakov*	VM-159	02 October 2021	Olyutorsky Gulf
FV *Valeriy Maslakov*	VM-167	03 October 2021	Karaginsky Gulf
FV *Valeriy Maslakov*	VM-177	05 October 2021	Olyutorsky Gulf
FV *Valeriy Maslakov*	VM-201	08 October 2021	Karaginsky Gulf
FV *Valeriy Maslakov*	VM-212	09 October 2021	Karaginsky Gulf

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Supplement Table 2. List of species and geographical distribution of sea anemones in northern Pacific.
Приложение. Таблица 2. Список видов и географическое распространение морских анемон в северной части Тихого океана.

Species	Depth (m)	Family	N/S	G	O	K	A
Relicanthus cf. *daphneae*	3435–3948	Relicanthidae	–/+	+	–	–	+
Actinernus robustus	3393–3906	Actinernidae	+/+	+	–	–	–
Edwardsia spp. (2 sp.)	3435–3494; 485	Edwardsiidae	–/+	–	–	–	–
Edwardsiella sp.	2841	Edwardsiidae	+/–	–	–	–	–
Edwardsiidae spp. (5 sp.)	2878–1258; 356–906	Edwardsiidae	+/+	–	–	+	–
Dactylanthus sp.	2638–2778	Preactiniidae	–/+	–	–	–	–
Ptychodactis patula	55–58	Ptychodactinidae	–	–	+	–	+
Cribrinopsis sp. 1	489–984	Actiniidae	–/+	–	–	+	–
Cribrinopsis spp. (2 sp.)	98–540	Actiniidae	–	–	–	+	–
Urticina timuri	27	Actiniidae	–	–	+	–	–
Urticina sp.	102	Actiniidae	–	–	–	+	–
cf. *Urticina* sp.	429–682	Actiniidae	–	–	–	+	–
Bolocera sp.	4200–4294	Actiniidae	–	+	–	–	–
Liponema brevicorne	373–2810	Liponematidae	+/– +/+	–	–	+	+
Sicyonis denisovi	386–2841	Sicyonidae	+/– +/+	–	–	–	–
Sicyonis kuznetsovi	1976–2131	Sicyonidae	+/–	–	–	–	–
Sicyonis sp.	3397–3599	Sicyonidae	–	+	–	–	–
Ophiodiscus bukini	2673–2810	Sicyonidae	+/–	–	–	–	–
Actinostola faeculenta	128–950	Actinostolidae	–	–	+	+	+
Actinostola sp. 1	350–409	Actinostolidae	+/–	–	–	–	–
Actinostola sp. 2	469–981	Actinostolidae	–/+	–	–	–	–
Actinostola sp. 3	433–677	Actinostolidae	+/–	–	–	+	–
Actinostola sp. 4	658–662	Actinostolidae	–	–	–	+	–
Actinostola sp. 5	658–662	Actinostolidae	–	–	–	+	–
Actinostola spp. (up to 6 sp.)	93–1992	Actinostolidae	+/–	–	+	+	–
Stomphia coccinea	89–90	Actinostolidae	–	–	–	+	+
Stomphia sp.	29–663	Actinostolidae	+/–	–	+	+	–
Actinostolidae sp.	25–197	Actinostolidae	–	–	+	+	–
Tealidium konoplinorum	280–3545	Anthosactinidae	+/– +/+	–	–	+	–
cf. *Halcampa* spp. (3 sp.)	693–699; 2927–2990; 3494–3906	Halcampidae	+/+	+	–	+	–
Halcampidae spp. (2 sp.)	3493–3583; 3949	Halcampidae	+/–	+	–	–	–
cf. *Halcampoides* sp.	2320	Halcampoididae	+/–	–	–	–	–
Amphianthus spp. (2 sp.)	830–2645	Amphianthidae	+/+	–	–	–	–
Actinauge cf. *verrillii*	430–440	Hormathiidae	–	–	–	+	+
Paracalliactis cf. *involvens*	2638–2755	Hormathiidae	–/+	–	–	–	+
Hormathia sp.	352–415; 1342–1389	Hormathiidae	+/–	–	–	–	–
Phelliactis spp. (2 sp.)	2605–3599	Hormathiidae	+/+	+	–	–	–

aff. Hormathiidae sp. 1	1389–2841	Hormathiidae	+/–	–	–	–	–
aff. Hormathiidae sp. 2	1349	Hormathiidae	+/–	–	–	–	–
Sagartiogeton californicus	354–693	Sagartiidae	+/+	–	–	+	+
Sagartiogeton rufus	350–400	Sagartiidae	+/–	–	–	–	–
Metridium farcimen	29–94	Metridiidae	–	–	+	–	+
Actiniaria sp. 1	348–384	–	+/–	–	–	–	–
Actiniaria sp. 2	347–668	–	+/– –/+	–	–	–	–
Actiniaria sp. 3	382–679	–	+/–	–	–	+	–
Actiniaria sp. 4	1377–1733	–	+/–	–	–	–	–
Actiniaria sp. 5	2807–3931	–	–/+	–	–	–	–
Actiniaria sp. 6	536–570	–	–	–	–	+	–
Actiniaria sp. 7	380–390	–	+/–	–	–	–	–
Actiniaria spp. (about 10 sp.)	356–2807	–	+/+	–	–	+	–
Corallimorphus cf. *pilatus*	372–1053; 3545–3561; 2834	Corallimorphidae	+/+	–	–	–	+
Corallimorphidae sp.	349–1053	Corallimorphidae	+/+	–	–	–	–
Epizoanthus fatuus	3435–4277	Epizoanthidae	+/+	+	–	–	–
Epizoanthus sp.	349–478	Epizoanthidae	+/+	–	–	–	–
Zoantharia spp. (3 sp.)	2778–3931	–	+/+	–	–	–	–

N — northern top or slope of the Piip Volcano or the Vulcanologov Massif; S — southern top or slope of the Piip Volcano or the Vulcanologov Massif; G — Komandor Graben or Komandorsky Basin; O — Olyutorsky and Karaginsky Gulfs; K — Koryak slope; A — eastern Pacific Ocean (America).