

SCIENCE BEST PRACTICE



Muriel Rabone, Adrian Glover, Thomas Dahlgren, Helena Wiklund, Regan Drennan, Diva Amon, Tammy Horton, Harriet Harden-Davies, Gabi Droege, Ward Appeltans, Jane Collins

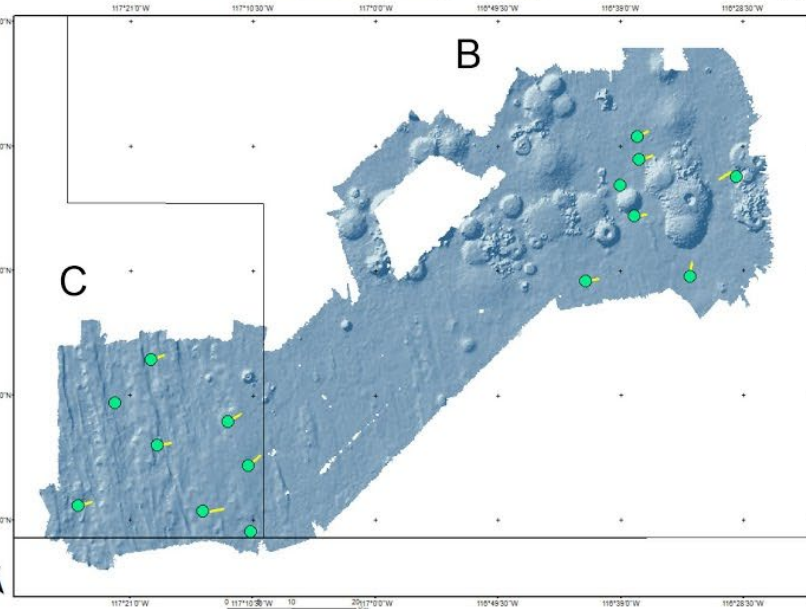
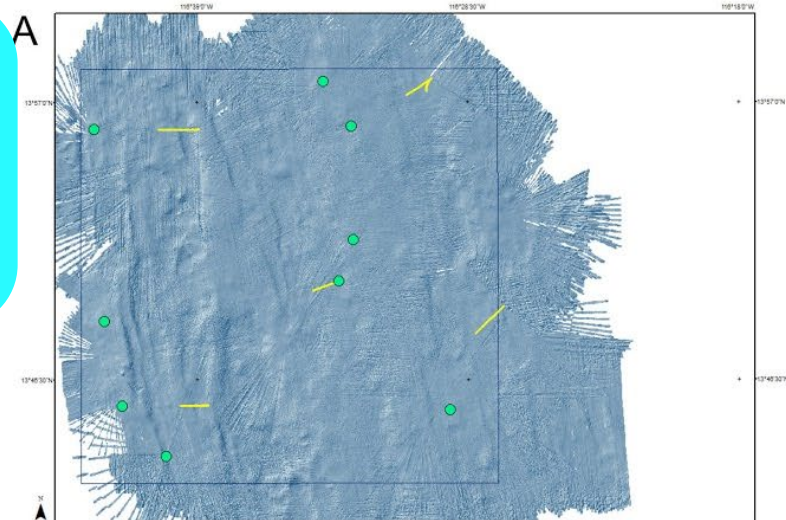
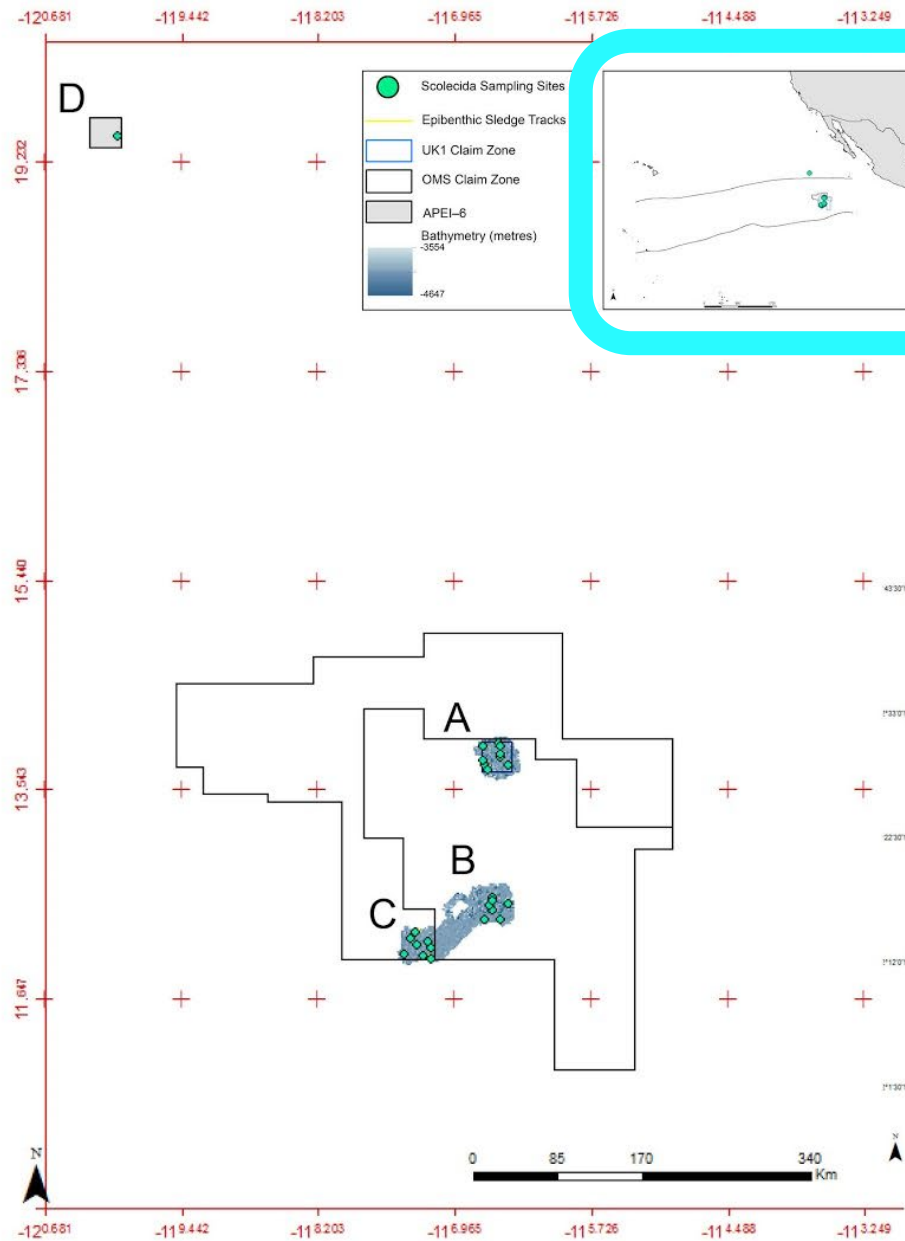


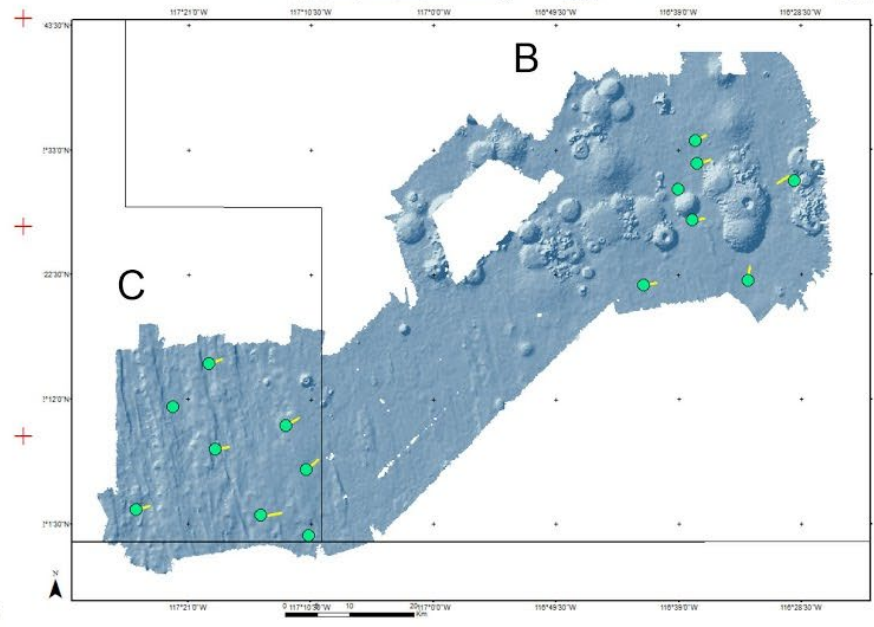
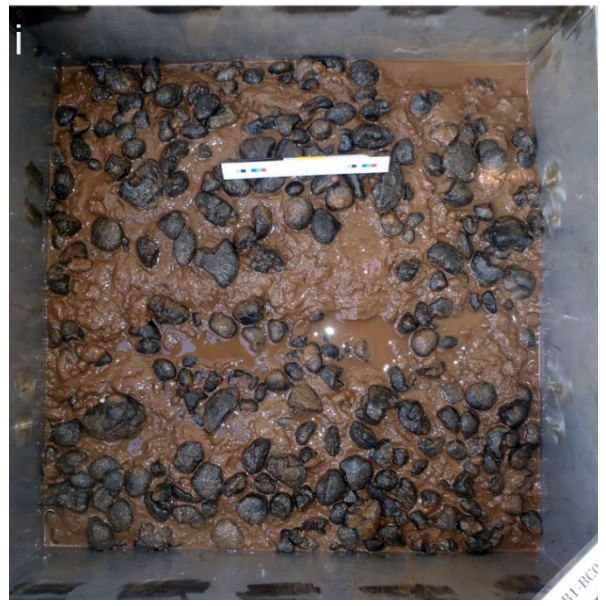
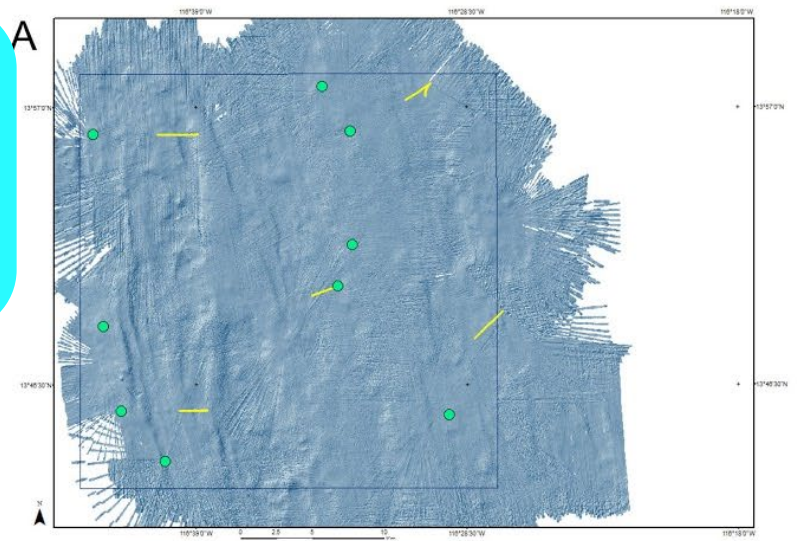
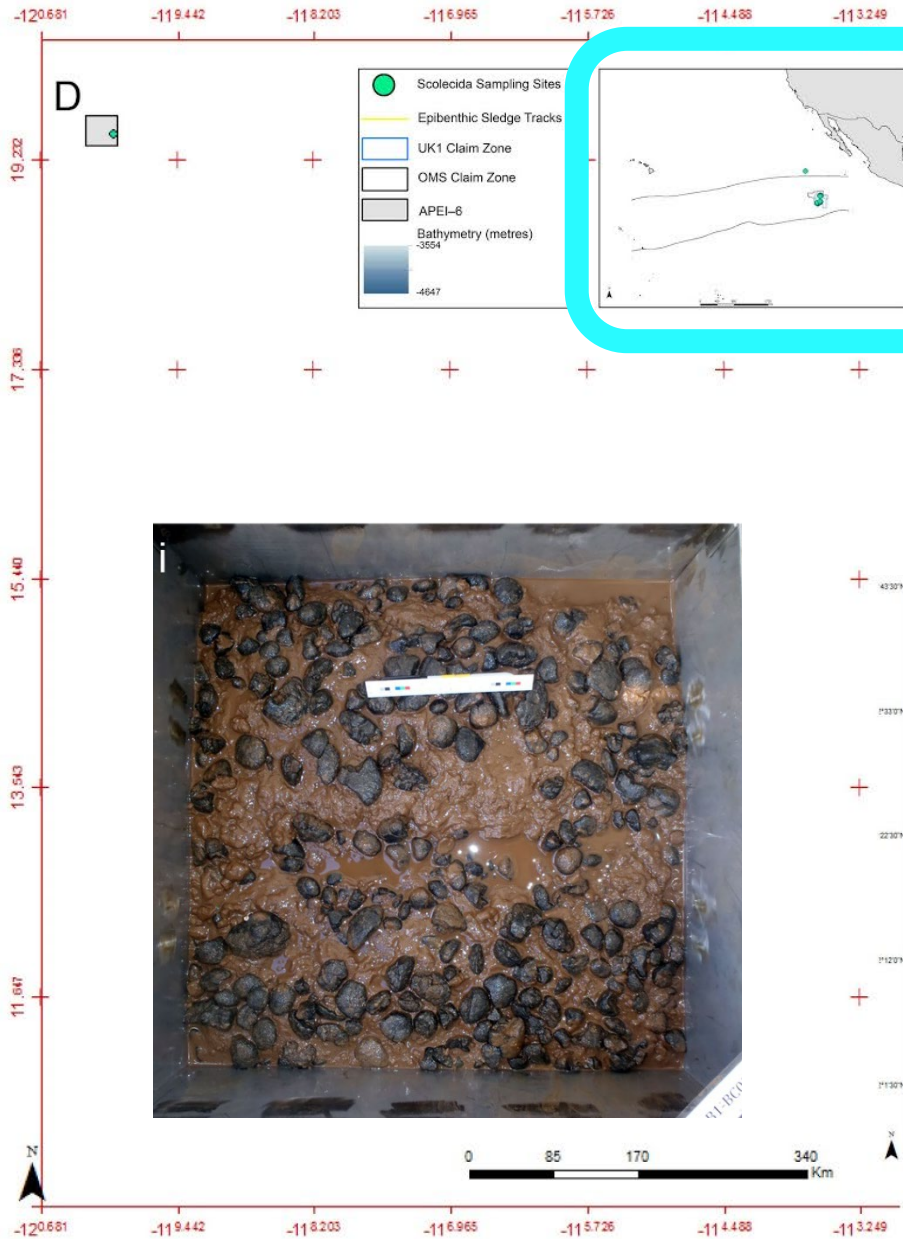
Best practice is...

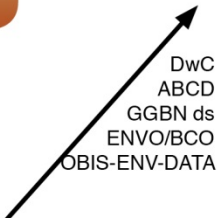
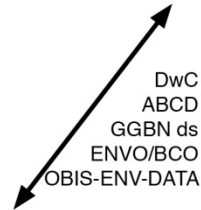
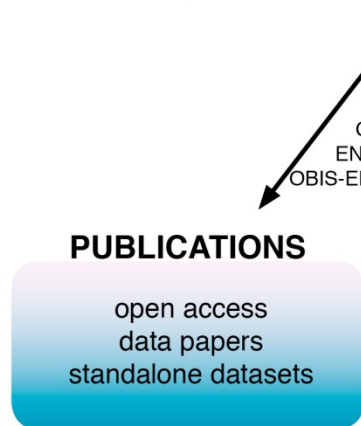
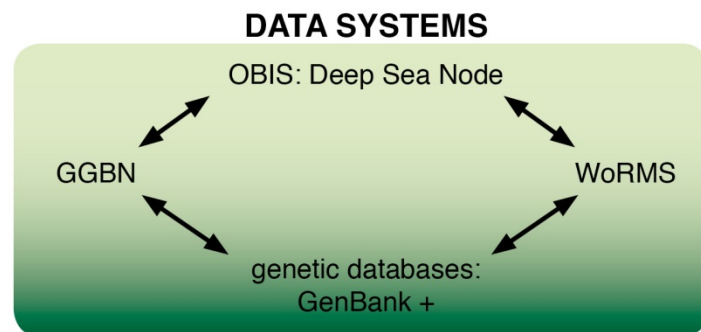
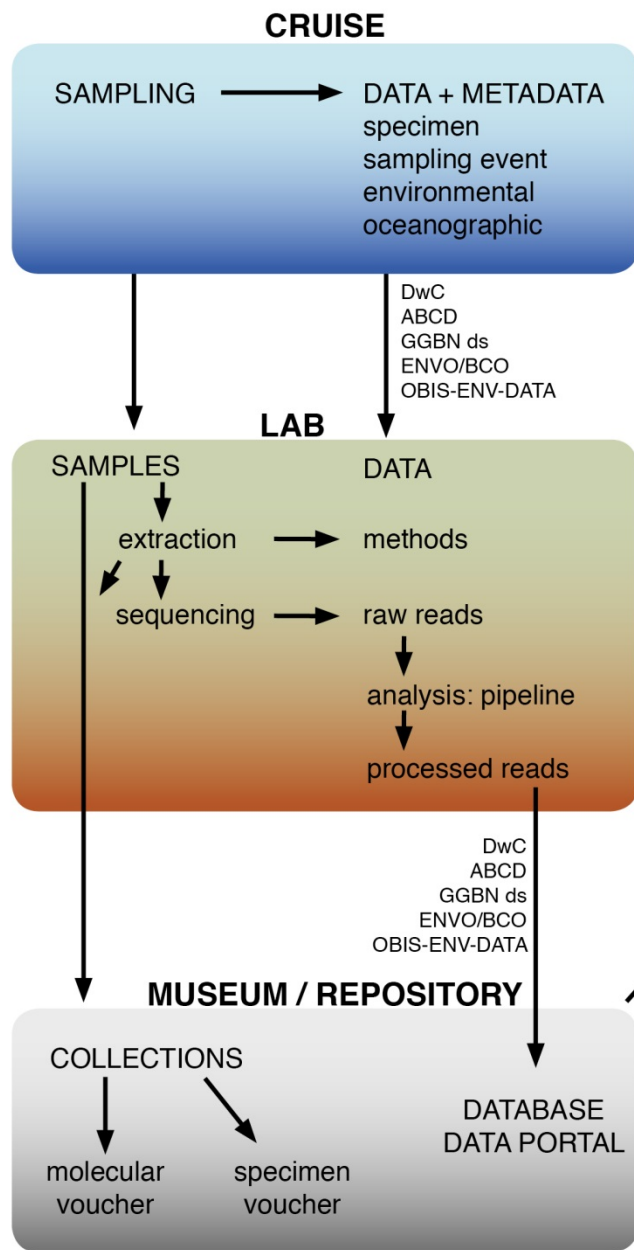


fka. ABYSSLINE- ABYSSal BaseLINE









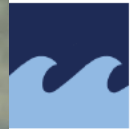


Cruise: best practice sampling methodologies





Cruise: best practice sampling methodologies



Journal of
*Marine Science
and Engineering*



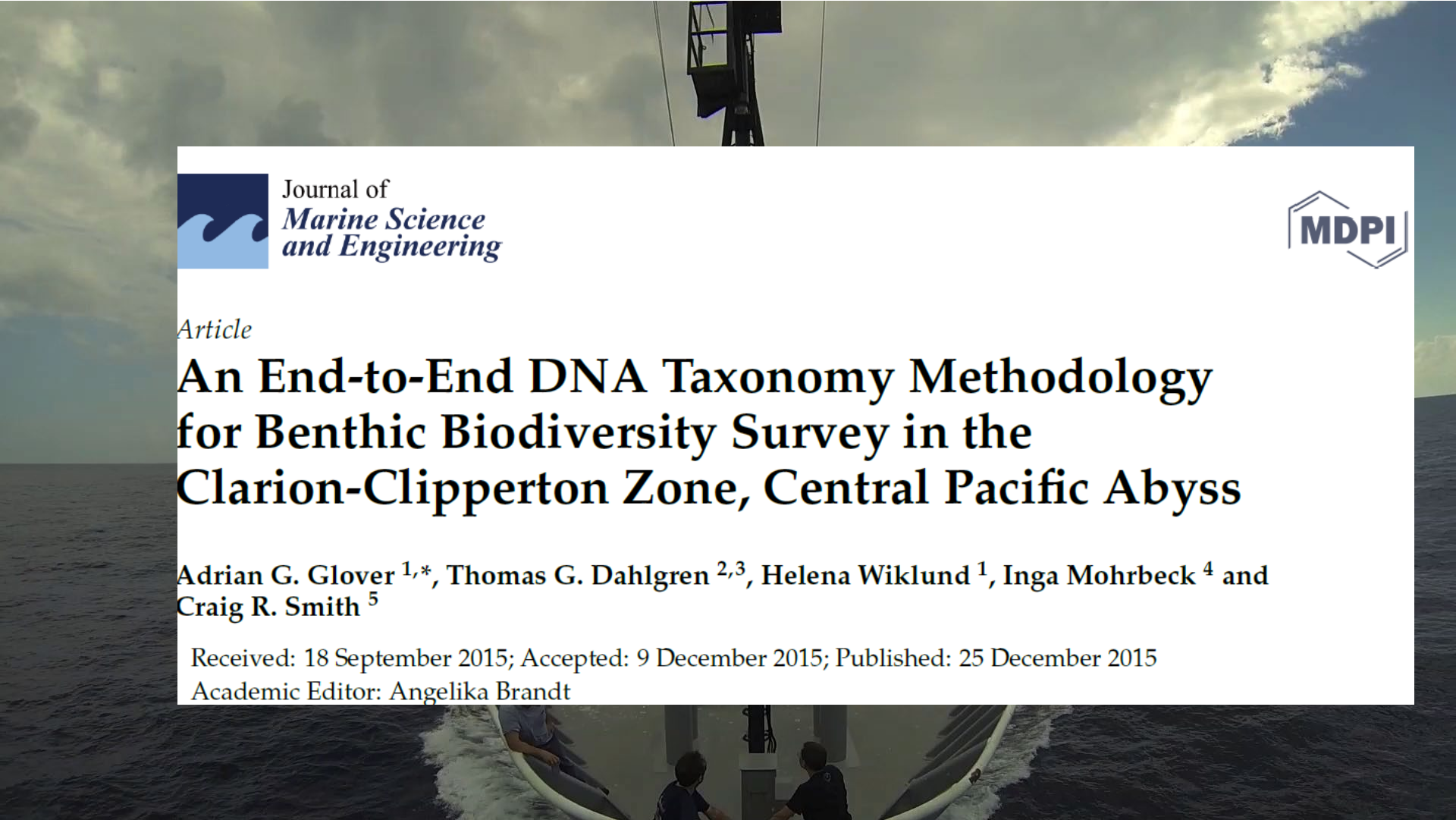
Article

An End-to-End DNA Taxonomy Methodology for Benthic Biodiversity Survey in the Clarion-Clipperton Zone, Central Pacific Abyss

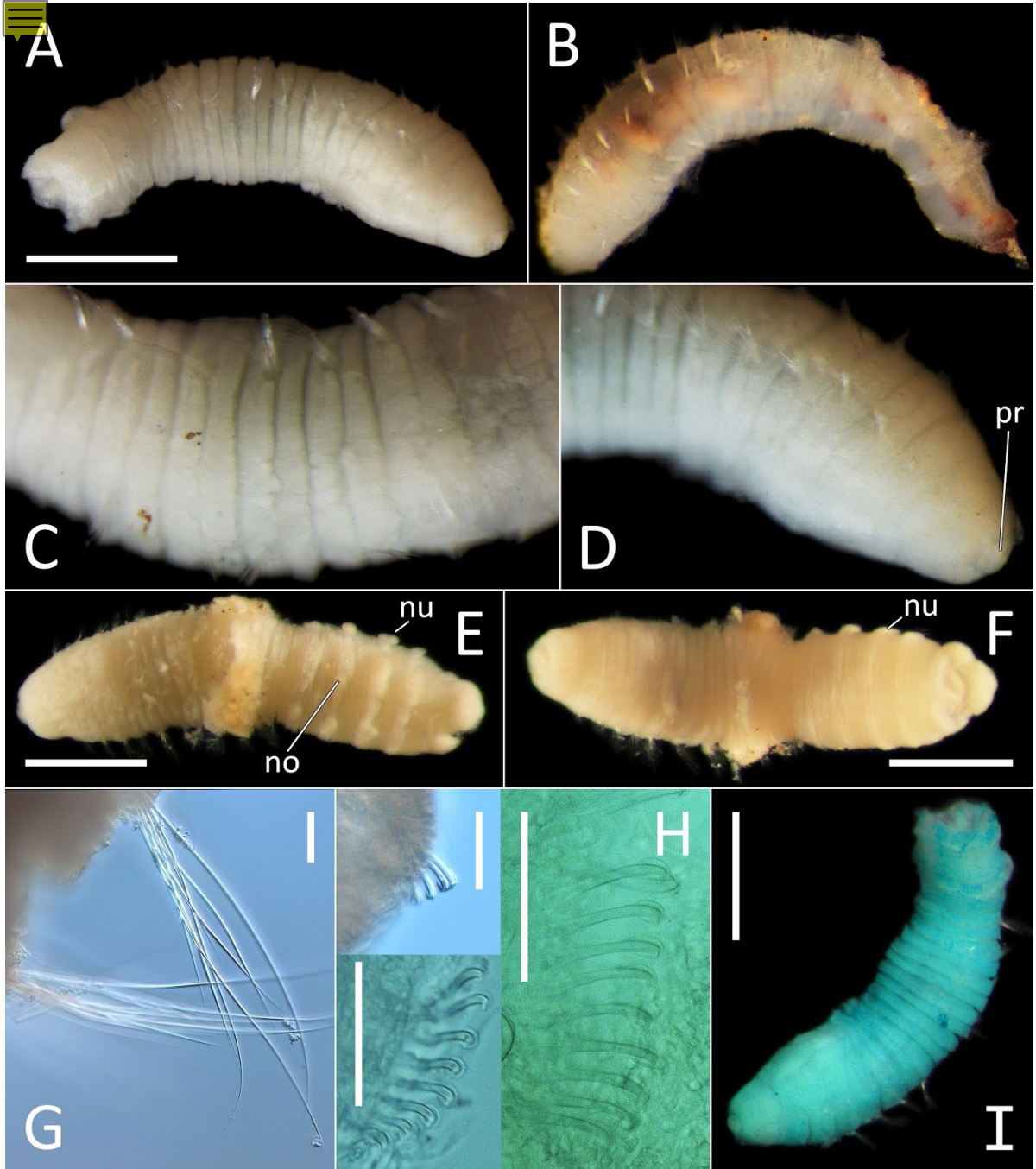
**Adrian G. Glover ^{1,*}, Thomas G. Dahlgren ^{2,3}, Helena Wiklund ¹, Inga Mohrbeck ⁴ and
Craig R. Smith ⁵**

Received: 18 September 2015; Accepted: 9 December 2015; Published: 25 December 2015

Academic Editor: Angelika Brandt



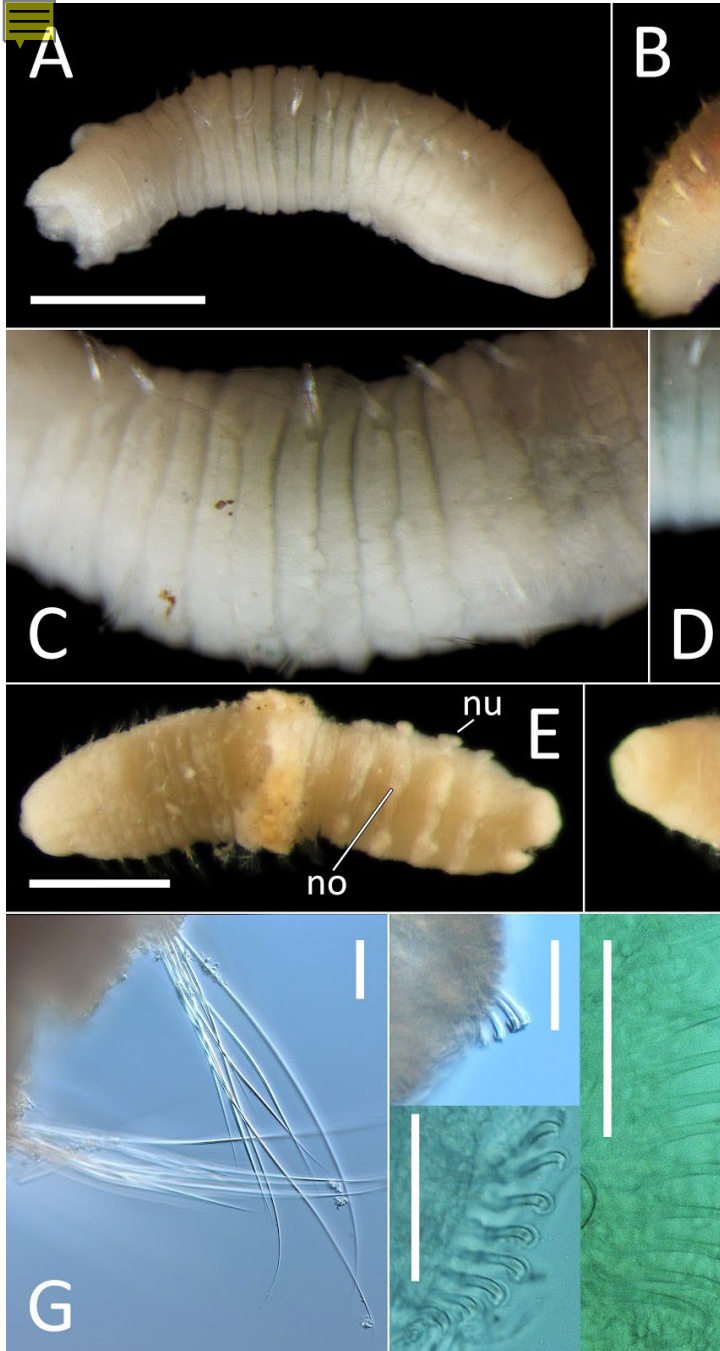




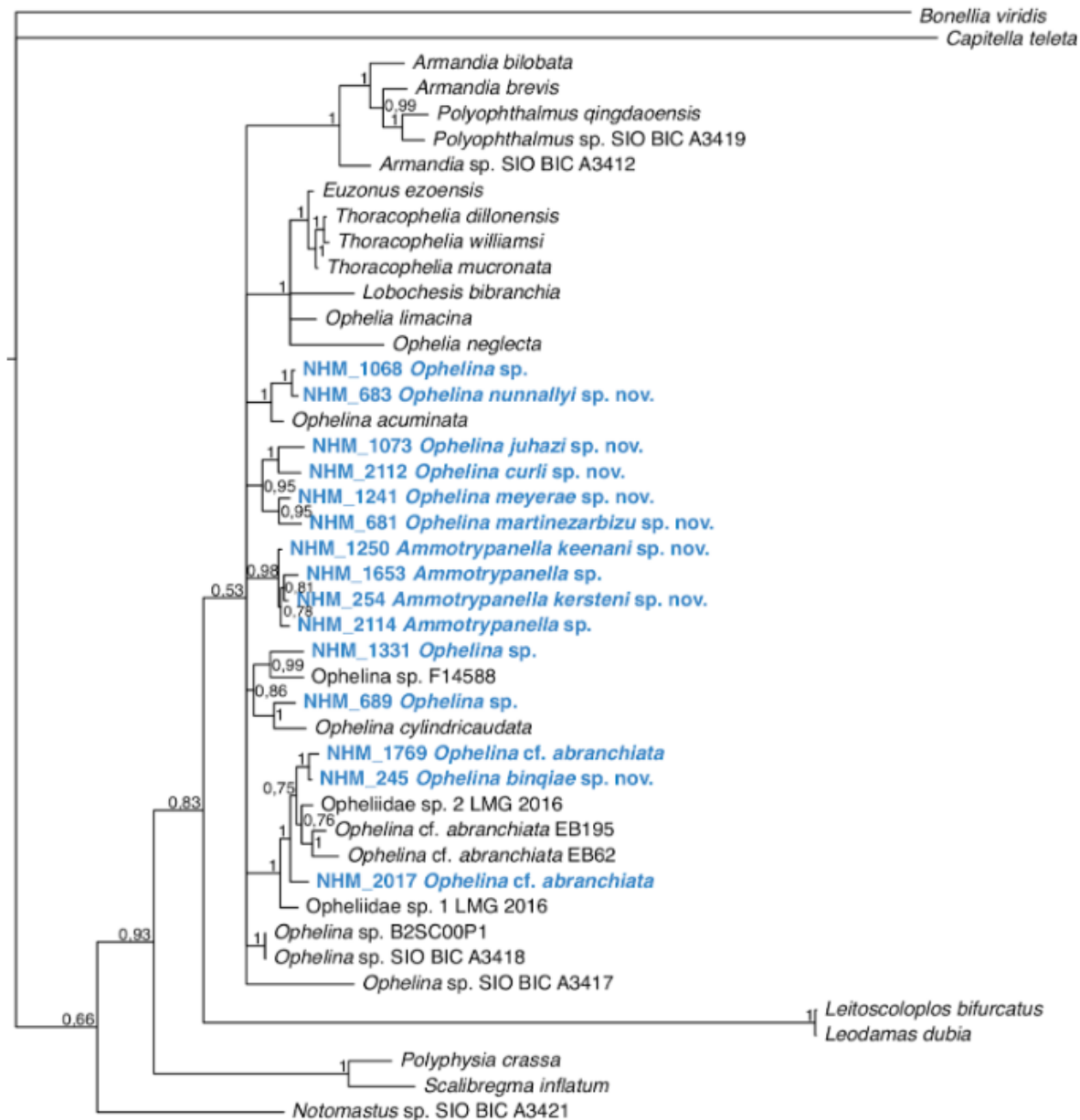
Taxonomy at NHM

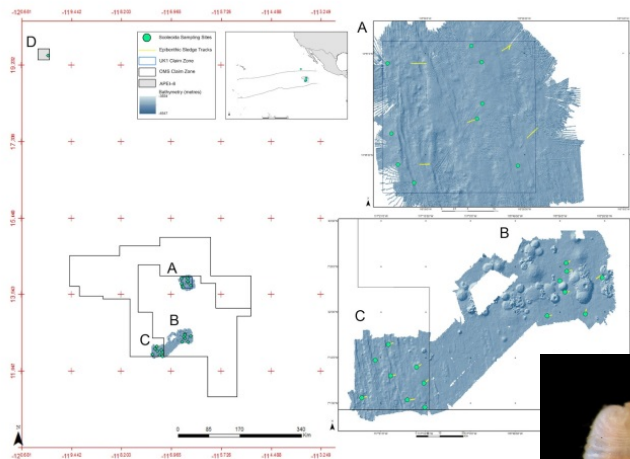
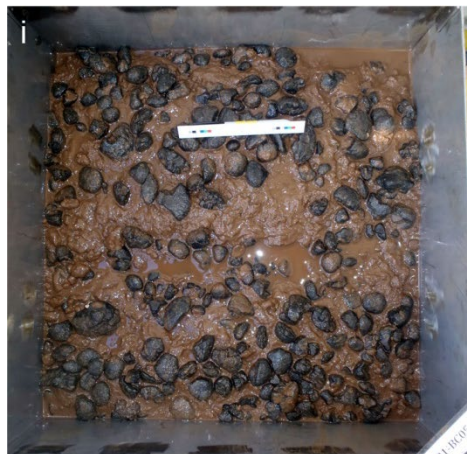
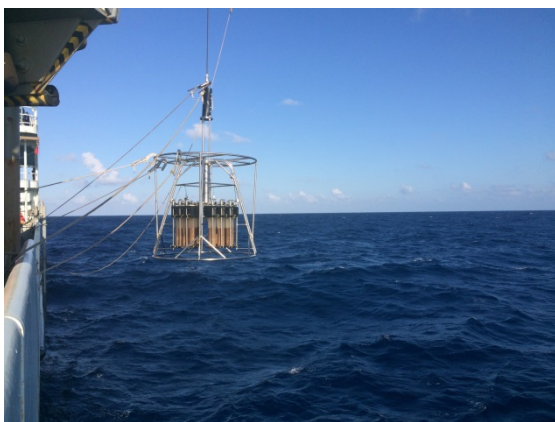
Morphology via microscopy

Molecular data via sequences



Remarks. See Remarks under *Ophelina binqiae*. If 18 chaetigers were to be confirmed, then this is a distinguishing feature from the other two ABYSSLINE species, but currently we have no distinguishing feature from *O. abranchiata*.

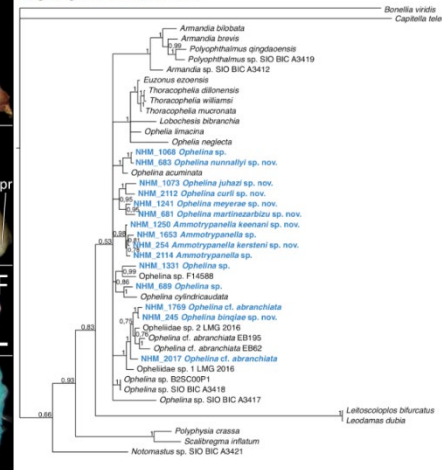
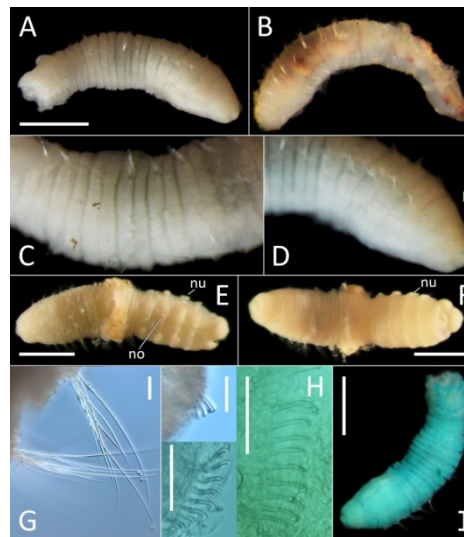





Data integration




Remarks. See Remarks under *Ophelina bingiae*. If 18 chaetigers were to be confirmed, then this is a distinguishing feature from the other two ABYSSLINE species, but currently we have no distinguishing feature from *O. abbranchiata*.




Specimens


 Download

 Data API


 Contact dataset curator

Specimen records

 Preview

 Grid

 Heatmap

 Gallery

ledella knudseni



Advanced filters ▾

 Has image:

 Has lat/long:

▾ Collection Code

Zoology (2)

▾ Type Status

Paratype (1)

Holotype (1)

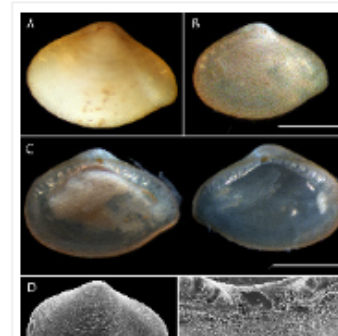
▾ Family

Nuculanidae (2)

▾ Genus

Ledella (2)

<< 1 - 2 >> 2 records

Ledella knudseni sp. nov.**Catalog Number:** 20170047**Class:** Bivalvia**Expedition:** ABYSSLINE**Family:** Nuculanidae**Genus:** Ledella**Higher Classification:** Animalia; Mollusca; Bivalvia; Protobranchia; Nuculanidae**Kingdom:** Animalia**Locality:** UK Seabed Resources Ltd exploration claim UK-1**Phylum:** Mollusca**Scientific Name:** Ledella knudseni sp. nov.**Sub Department:** Mollusca



DATA STANDARDS

Data must be **FAIR: Findable Accessible Interoperable Reusable**

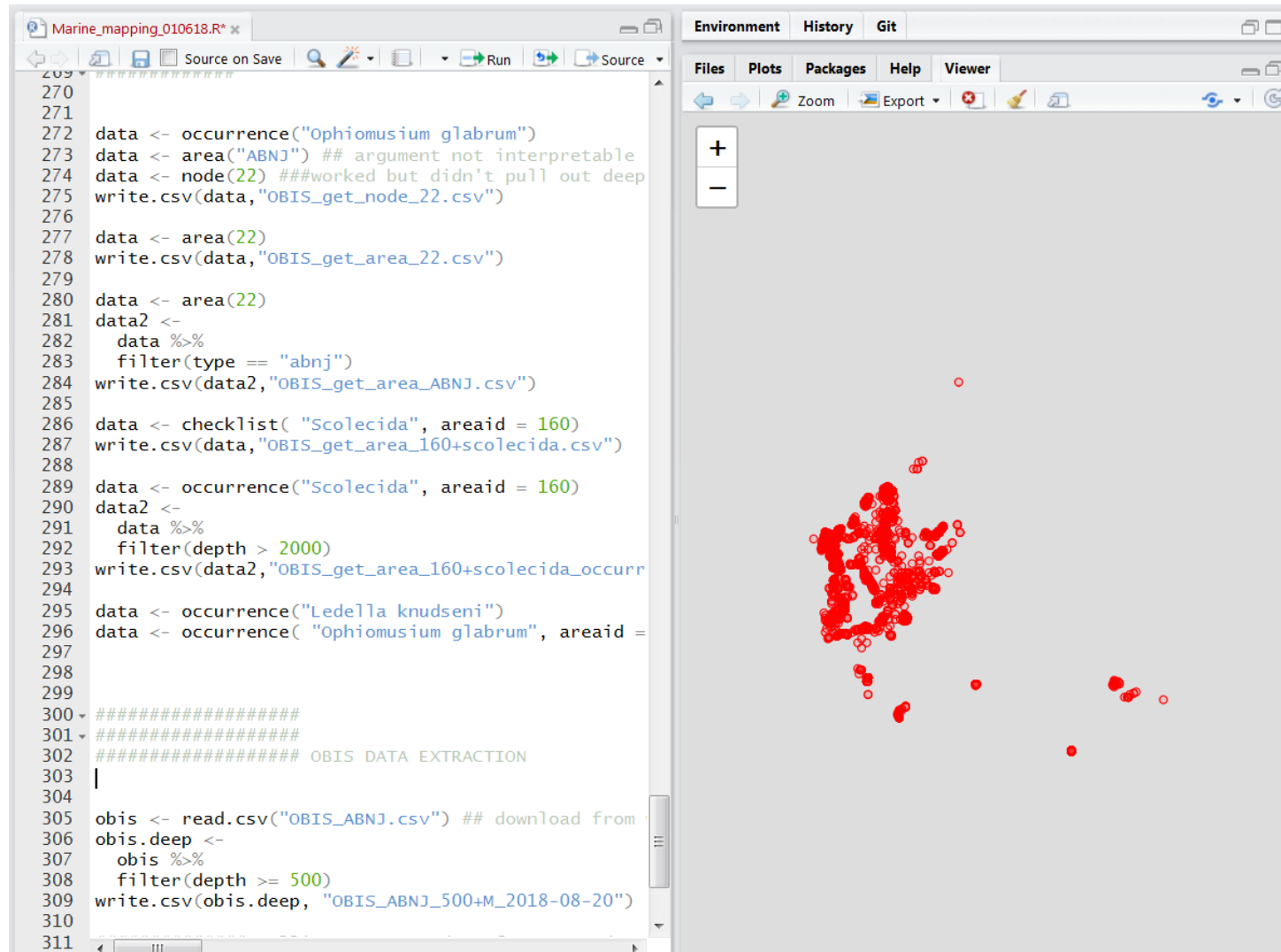
FAIR via usage of data standards: established data storage & exchange formats

Data standards are common vocabularies:
analogous to common understanding of legal terms, “MGR” and “utilisation”

Key also for monitoring and conservation

DATA STANDARDS: DarwinCore

Cruise and specimen data mapped to DarwinCore: open source tools
R software and GBIF: Global Biodiversity Information Facility



The image displays the RStudio interface. The left pane shows the R script editor with the following code:

```
209 #####
270
271
272 data <- occurrence("Ophiomusium glabrum")
273 data <- area("ABNJ") ## argument not interpretable
274 data <- node(22) ###worked but didn't pull out deep
275 write.csv(data,"OBIS_get_node_22.csv")
276
277 data <- area(22)
278 write.csv(data,"OBIS_get_area_22.csv")
279
280 data <- area(22)
281 data2 <-
282   data %>%
283   filter(type == "abnj")
284 write.csv(data2,"OBIS_get_area_ABNJ.csv")
285
286 data <- checklist("Scolecida", areaid = 160)
287 write.csv(data,"OBIS_get_area_160+scolecida.csv")
288
289 data <- occurrence("Scolecida", areaid = 160)
290 data2 <-
291   data %>%
292   filter(depth > 2000)
293 write.csv(data2,"OBIS_get_area_160+scolecida_occurr
294
295 data <- occurrence("Ledella knudseni")
296 data <- occurrence("Ophiomusium glabrum", areaid =
297
298
299
300 #####
301 #####
302 ##### OBIS DATA EXTRACTION
303 |
304
305 obis <- read.csv("OBIS_ABNJ.csv") ## download from
306 obis.deep <-
307   obis %>%
308   filter(depth >= 500)
309 write.csv(obis.deep, "OBIS_ABNJ_500+M_2018-08-20")
310
311
```

The right pane shows the Environment, History, and Git tabs. Below these is the Files, Plots, Packages, Help, and Viewer tabs. The Plots tab is active, displaying a spatial plot of red data points on a light gray background. The plot shows a dense cluster of points in the center-left, with several isolated points to the right and bottom-right. The plot includes a zoom control with '+' and '-' buttons.

DATA STANDARDS: DarwinCore, GGBN data standard



Loan information

DNA available ✓

Tissue available ✓

Identification

Name: *Ledella knudseni*

Taxonomy (Occurrence): Nuculanidae (family); Bivalvia (class); Mollusca (phylum); Animalia (kingdom);

Gathering Event

State/Province: Clarion Clipperton Zone

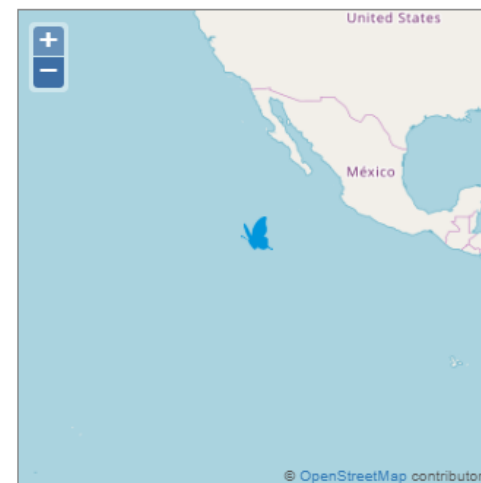
Locality: UK Seabed Resources Ltd exploration area UK-1

Coordinates (lat|lon): 13.75583333 | -116.4866667

Collector(s): Adrian Glover | Helena Wiklund | Thomas Dahlgren | Maggie Georgieva

Collector's number: NHM_288C

Collection Date: 17/10/2013



DNA Sequences Specimen

Catalog Number: 0175139136 ZOO (NHMUK)

Record Basis: PreservedSpecimen

Relation to 0175139159 (ZOO, NHMUK) :

same individual

Extraction

Extraction Date: 28/10/2016

Extraction Type: gDNA

Natural History Museum

Description: Data presented in Wiklund et al. 2017 <https://doi.org/10.3897/zookeys.707.13042>

Address: Cromwell Rd, SW75BD, United Kingdom

DATA STANDARDS: DarwinCore, GGBN data standard



Loan information

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Tissue available ✓

Identification

Name: *Ledella knudseni*

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Gathering Event

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Extraction

Extraction Date: 28/10/2016

Extraction Type: gDNA

Natural History Museum

Description: Data presented in Wiklund et al. 2017 <https://doi.org/10.38>

Address: Cromwell Rd, SW75BD, United Kingdom

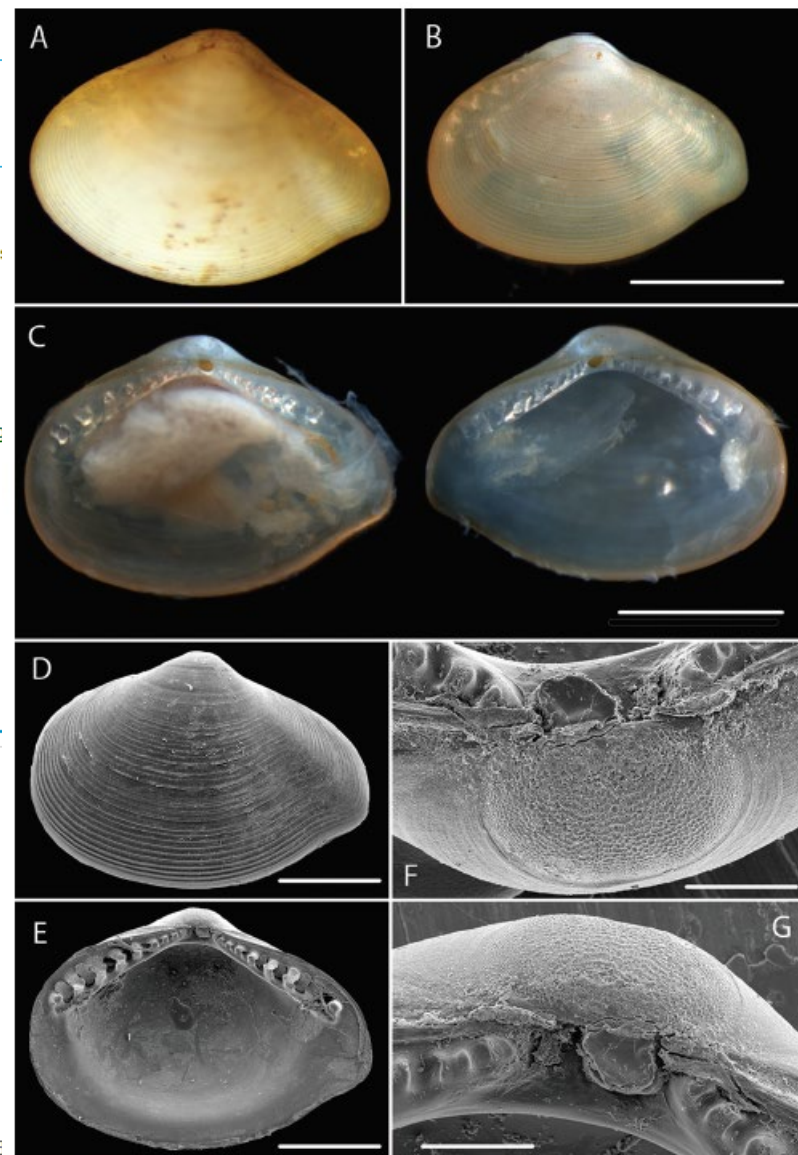


Figure 7. *Ledella knudseni* sp. n. **A** Holotype, specimen NHM_288c **B** Paratype, specimen NHM_288a **C** Specimen NHM_288a dissected prior to DNA sequencing and SEM **D–G** SEM of valve, hinge teeth and protoconch. Scale bars: 1 mm (**B–C**); 0.5 mm (**D–E**); 0.1 mm (**F–G**). Image attribution Glover, Taylor, Dahlgren & Wiklund, 2017.

DATA STANDARDS: DarwinCore, GGBN data standard



Loan information

DNA available ✓

Tissue available ✓

Identification

Name: *Ledella knudseni*

Taxonomy (Occurrence): Nuculanidae (family); Bivalvia (class); Mollu: (kingdom);

Gathering Event

State/Province: Clarion Clipperton Zone

Locality: UK Seabed Resources Ltd exploration area UK-1

Coordinates (lat|lon): 13.75583333 | -116.4866667

Collector(s): Helena Wiklund | Thomas Dahlgren | Mag

Collector's number: NHM_288C

Collection Date: 17/10/2013

GGBN: Global Genome Biodiversity Network
Best practices for managing molecular
collections and data

DNA Sequences Specimen

Catalog Number: 0175139136 ZOO (NHMUK)

Record Basis: PreservedSpecimen

Relation to 0175139159 (ZOO, NHMUK) :

same individual

Extraction

Extraction Date: 28/10/2016

Extraction Type: gDNA

Natural History Museum

Description: Data presented in Wiklund et al. 2017 <https://doi.org/10.38>

Address: Cromwell Rd, SW75BD, United Kingdom

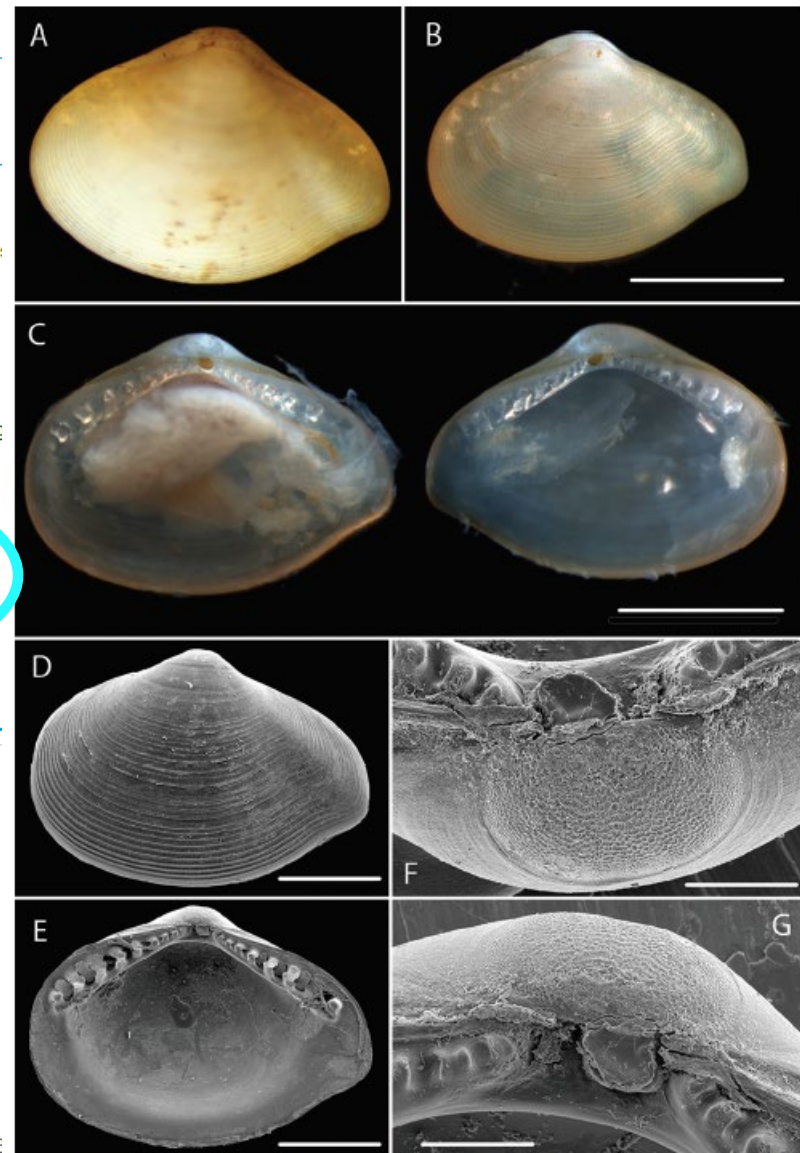
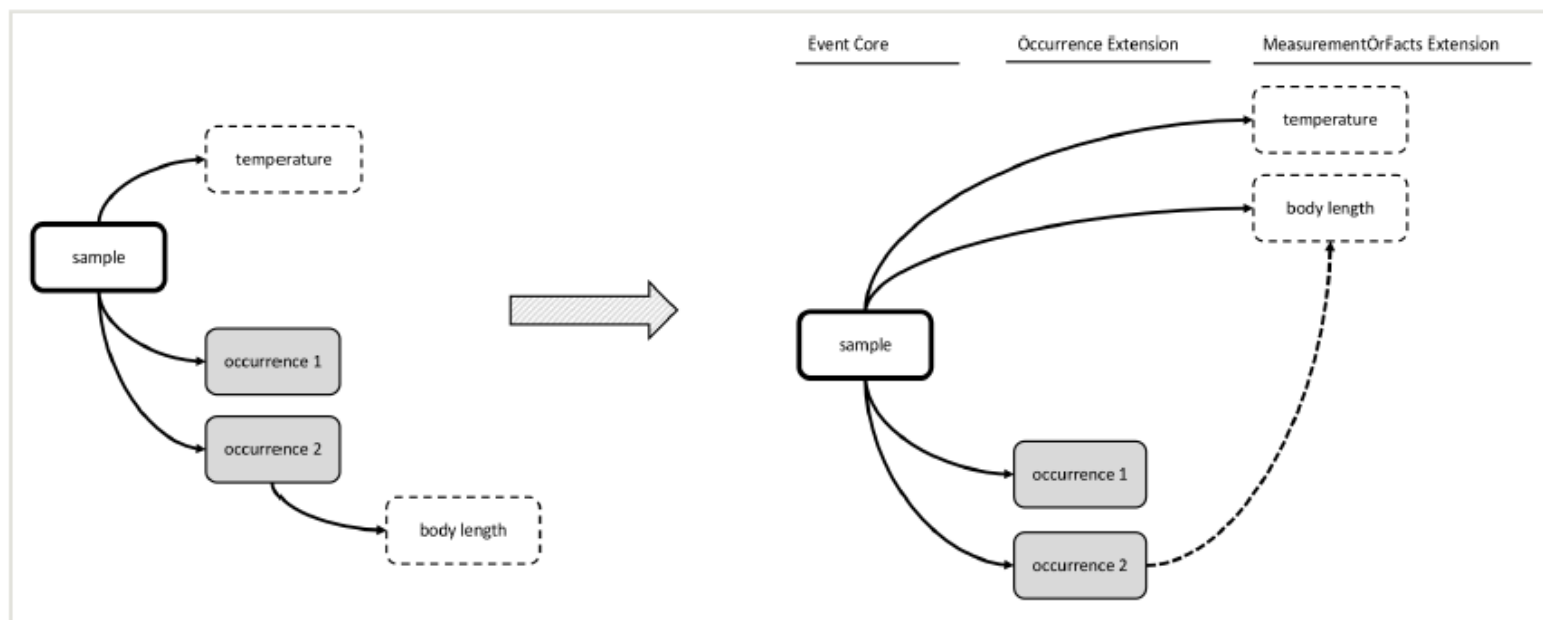


Figure 7. *Ledella knudseni* sp. n. **A** Holotype, specimen NHM_288c **B** Paratype, specimen NHM_288a **C** Specimen NHM 288a dissected prior to DNA sequencing and SEM **D–G** SEM of valve, hinge teeth and protoconch. Scale bars: 1 mm (**B–C**); 0.5 mm (**D–E**); 0.1 mm (**F–G**). Image attribution Glover, Taylor, Dahlgren & Wiklund, 2017.

DATA STANDARDS: DarwinCore, GGBN data standard, OBIS-ENV-DATA

MixS (Yilmaz *et al.*, 2011)
M2B3 (ten Hoopen *et al.*, 2015)
BCO (Walls *et al.* 2014)
ENVO (Buttigieg *et al.*, 2013)
OBIS-ENV-DATA (De Pooter *et al.*, 2017)



DATA PAPERS: Open access

Zookeys,
Biodiversity Data Journal



Semantically enhanced
Embedded DarwinCore

Links to GenBank

GUIDS (Global Unique Identifiers)

Taxon treatments

Abyssoprिमnoa gemina Cairns, 2015

Material

- a. scientificName: *Abyssoprिमnoa gemina*; taxonConceptID: *Abyssoprिमnoa gemina*; kingdom: Animalia; phylum: Cnidaria; class: Anthozoa; order: Alcyonacea; family: Primnoidae; genus: *Abyssoprिमnoa*; specificEpithet: *gemina*; scientificNameAuthorship: Cairns, 2015; waterBody: Pacific; stateProvince: Clarion Clipperton Zone; locality: UK Seabed Resources Ltd exploration claim UK-1; verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4111; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.761666666667; decimalLongitude: -116.46033333333; geodeticDatum: WGS84; samplingProtocol: Bowers & Connelly Megacore; eventDate: 2013-10-18; eventTime: 15:54; habitat: Abyssal plain; fieldNumber: MC08; individualCount: 1; preparations: tissue voucher stored in 80% non-denatured ethanol aqueous solution and DNA voucher stored in elution buffer; catalogNumber: [6e976c27-c70c-434a-8be3-f6155e36567f](#); recordNumber: NHM_341; recordedBy: Adrian Glover, Helena Wiklund, Thomas Dahlgren, Maggie Georgieva; otherCatalogNumbers: 5594618; associatedSequences: <http://ncbi.nlm.nih.gov/nucleotide/KX384618> | [KX384626](#); identifiedBy: Stephen Cairns, Adrian Glover, Helena Wiklund, Thomas Dahlgren, Diva Amor; dateIdentified: 2016-03-01; identificationRemarks: identified by DNA and morphology; language: en; institutionCode: NHMUK; collectionCode: ZOO; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Description

Small uniplanar dichotomously branched colonies, having paired globose polyps (Fig. 6).



Quick search:

WoRMS taxon details

★ *Ledella knudseni* J. D. Taylor & Wiklund, 2017

AlphaID 1039822 (urn:lsid:marinespecies.org:taxname:1039822)

Classification [Biota](#) [Animalia \(Kingdom\)](#) [Mollusca \(Phylum\)](#) [Bivalvia \(Class\)](#) [Protobranchia \(Subclass\)](#) [Ledella \(Genus\)](#) [Ledella knudseni \(Species\)](#)

Status accepted

Rank Species

GenBank v Send to: ▾

Ledella knudseni voucher NHMUK 20170047 cytochrome c oxidase subunit I (COI) gene, partial cds; mitochondrial

GenBank: MF157515.1

[FASTA](#) [Graphics](#) [PopSet](#)

[Go to: \(C\)](#)

LOCUS MF157515 654 bp DNA linear INV 29-NOV-2017

DEFINITION Ledella knudseni voucher NHMUK 20170047 cytochrome c oxidase subunit I (COI) gene, partial cds; mitochondrial.

ACCESSION VERSION MF157515 MF157515.1

KEYWORDS .

SOURCE mitochondrion Ledella knudseni

ORGANISM *Ledella knudseni*
Eukaryota; Metazoa; Lophotrochozoa; Mollusca; Bivalvia; Protobranchia; Nuculanoida; Nuculanidae; Ledella.

REFERENCE 1 (bases 1 to 654)

AUTHORS Wiklund,H., Taylor,J.D., Dahlgren,T.G., Todt,C., Ikebe,C., Rabone,H. and Glover,A.G.

TITLE Abyssal fauna of the UK-1 polymetallic nodule exploration area, Clarion-Clipperton Zone, central Pacific Ocean: Mollusca

JOURNAL Zookeys 707, 1-46 (2017)

PUBMED 29118626

REMARK Publication Status: Online-Only

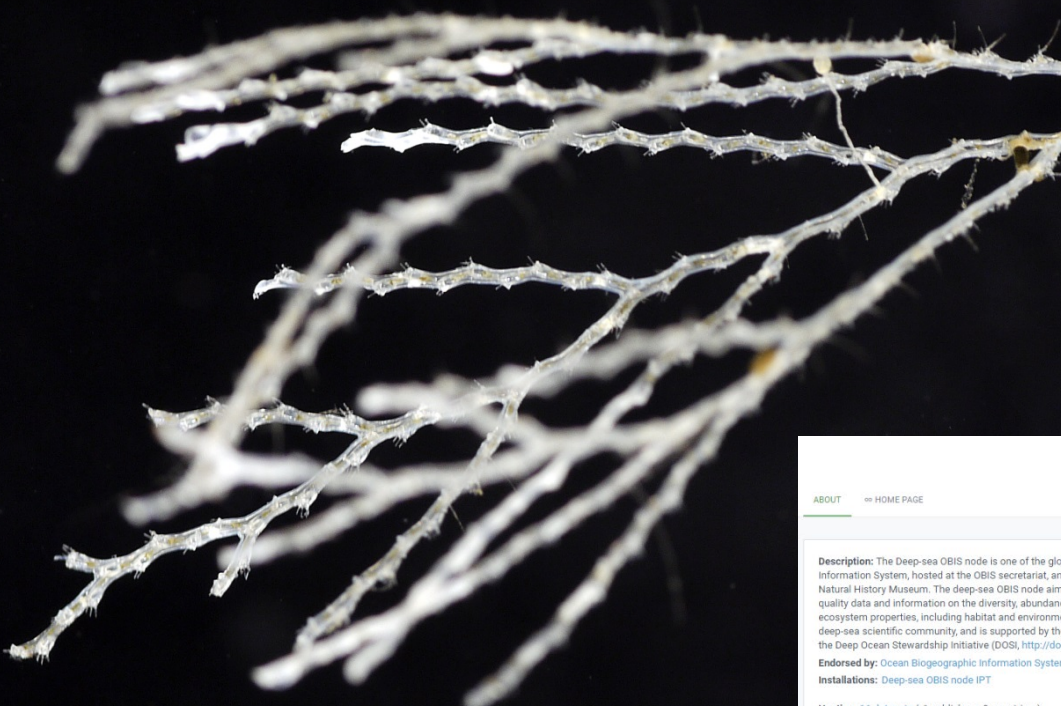
REFERENCE 2 (bases 1 to 654)

AUTHORS Wiklund,H., Taylor,J.D., Dahlgren,T.G., Todt,C., Ikebe,C., Rabone,H. and Glover,A.G.

TITLE Direct Submission

JOURNAL Submitted (25-NOV-2017) Life Sciences, Natural History Museum, Cromwell Rd, London SW7 5BD, United Kingdom

COMMENT ##Assembly-Data-START##
Assembly Method :: Geneious v. 6.1.7
Sequencing Technology :: Sanger dideoxy sequencing



Deep-sea OBIS node

ABOUT [HOME PAGE](#) 24370 OCCURRENCES 16 DATASETS

Description: The Deep-sea OBIS node is one of the global thematic nodes of the Ocean Biogeographic Information System, hosted at the OBIS secretariat, and managed by the Senckenberg Research Institute and Natural History Museum. The deep-sea OBIS node aims to provide a single integrated access point to high-quality data and information on the diversity, abundance and distribution of all deep-sea organisms and their ecosystem properties, including habitat and environmental characteristics. The further development of this deep-sea OBIS node and data portal is a shared responsibility of the wider deep-sea scientific community, and is supported by the international network for scientific investigation of deep-sea ecosystems (INEEP project, <http://www.indeep-project.org/>) and the Deep Ocean Stewardship Initiative (DOSI, <http://dosi-project.org/>).

Endorsed by: Ocean Biogeographic Information System

Installations: Deep-sea OBIS node IPT

Hosting: 16 datasets (1 publisher • 0 countries)

77 OCCURRENCES WITH IMAGES

[SEE GALLERY](#)

Open access databases







BEST PRACTICE:

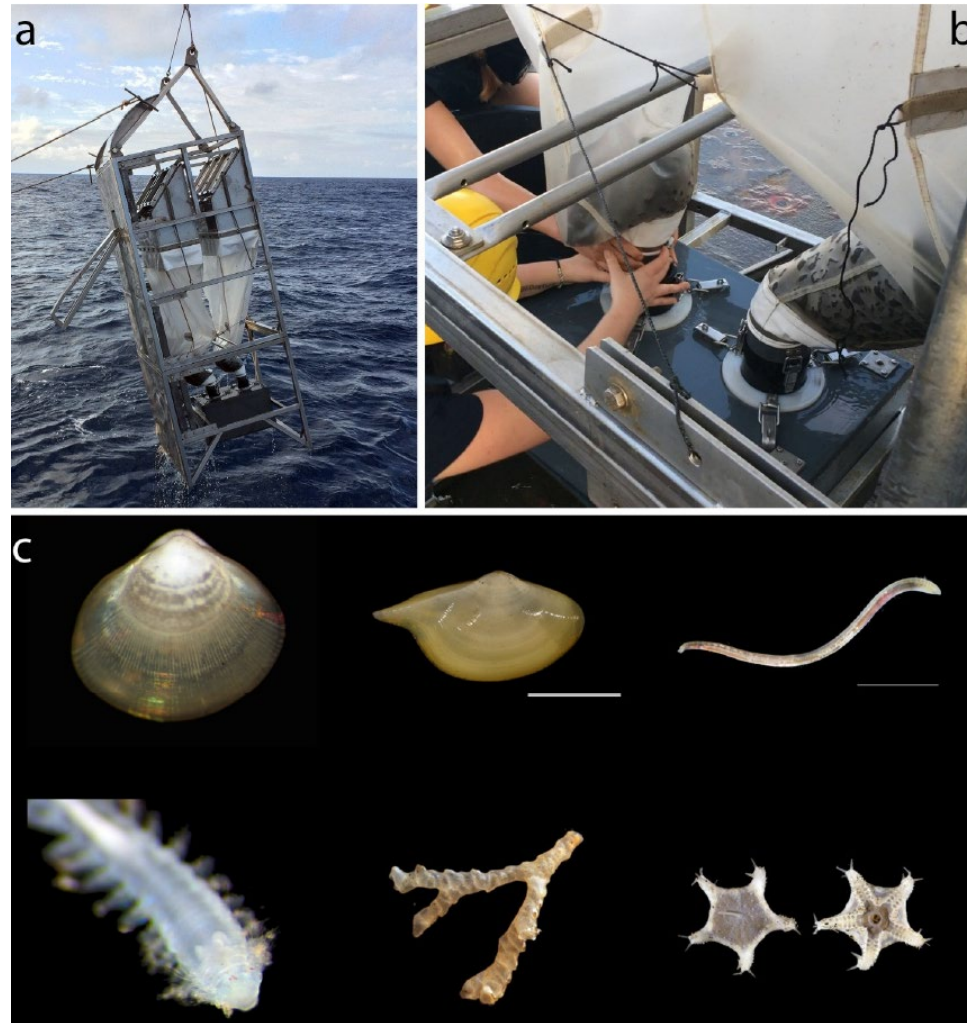
high quality data and samples.

Open access is best practice

BUT: Best practice takes TIME

Science best practice supports ABS:
how can BBNJ support science...

BBNJ agreement can support best practice:



Recognise importance data standards

Embed standardisation into workflows

Raise awareness of best practice

Support for:

Museums / biorepositories

Existing data systems (OBIS++)

Existing networks (GGBN++)

ACKNOWLEDGEMENTS

Chiho Ikebe, Jackie Mackenzie-Dodds, Matt Woodburn, Diva Amon, Sarah Long

