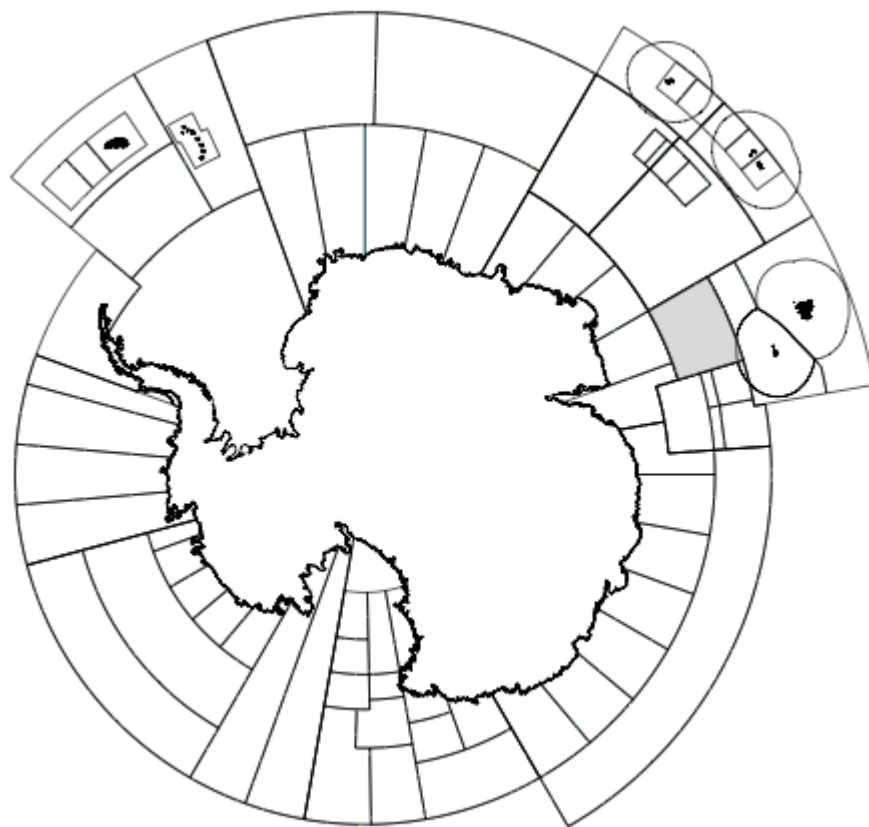




**Fishery Report 2018: Exploratory fishery for
Dissostichus eleginoides in Division 58.4.3a**

FISHERY REPORT



The map above shows the management areas within the CAMLR Convention Area, the specific region related to this report is shaded.

Throughout this report the CCAMLR fishing season is represented by the year in which that season ended, e.g. 2015 represents the 2014/15 CCAMLR fishing season (from 1 December 2014 to 30 November 2015).

Fishery Report 2018: Exploratory fishery for *Dissostichus eleginoides* in Division 58.4.3a

Introduction to the fishery

1. This report describes the exploratory longline fishery for Patagonian toothfish (*Dissostichus eleginoides*) in Division 58.4.3a. The fishery in Division 58.4.3 began as a new fishery in 1997 (Conservation Measure (CM) 113/XV). Following the Commission's decision that high levels of illegal, unreported and unregulated (IUU) fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new' (CCAMLR-XVIII, paragraph 10.14), along with a renewed interest in this fishery, the fishery was reclassified as exploratory in 2000. Prior to 2017, this fishery was an exploratory fishery for *Dissostichus* spp., however, in order to better align the target species with the assessment process, the target species was specified as *D. eleginoides*, with any Antarctic toothfish (*D. mawsoni*) caught counting towards the catch limit for *D. eleginoides*.

2. In 2001, the boundaries of Division 58.4.3 were reassigned based on ecological considerations, and two new divisions were formed: Division 58.4.3a (Elan Bank) and Division 58.4.3b (BANZARE Bank). Since 2005, licensed longline vessels have fished in Division 58.4.3a targeting primarily *D. eleginoides* (Table 1).

Table 1: Catch history for *Dissostichus* spp. in Division 58.4.3a. (Source: fine-scale data, past reports for IUU catch.)

Season	Catch limit (tonnes)	Reported catch (tonnes)			Estimated IUU catch (tonnes)
		<i>D. mawsoni</i>	<i>D. eleginoides</i>	Total	
2005	250	9	97	105	98
2006	250	1	88	89	0
2007	250	1	3	4	0
2008	250	0	9	9	0
2009	86	0	31	31	0
2010	86	0	0	0	0
2011	86	0	4	4	*
2012	86	0	37	37	*
2013	32	0	16	16	*
2014	32	0	32	32	*
2015	32	0	15	15	*
2016	32	0	0	0	*
2017	32	0	11	11	*
2018	38	0	3	3	*

* Not estimated.

3. The current limits on the exploratory fishery for *D. eleginoides* in Division 58.4.3a are described in CM 41-06. From 2009 to 2012, the precautionary catch limit for *Dissostichus* spp. was set at 86 tonnes, but in 2013 it was reduced to 32 tonnes and remained at that level until 2017, it was increased to 38 tonnes in 2018.

4. In 2018, the fishery was limited to one French- and one Japanese-flagged vessel using longlines, one French vessel fished.

5. For 2019, one vessel from France and one from Japan notified their intention to participate in the exploratory fishery for *D. eleginoides* in Division 58.4.3a. However, both Members agreed to a pause in fishing activities in this division while undertaking analysis of previous research for consideration by the Scientific Committee and its working groups.

Reported catch

6. Reported catches of *Dissostichus* spp. in recent seasons peaked in 2005 at 105 tonnes when, along with *D. eleginoides*, smaller catches of *D. mawsoni* were also taken. Since 2008, the catches have been exclusively *D. eleginoides* (Table 1).

Illegal, unreported and unregulated (IUU) fishing

7. According to French surveillance data, there was little evidence of IUU fishing in Division 58.4.3a (Elan Bank) between 2006 and 2008, however, IUU fishing activities were observed during the 2009 and remained prevalent until 2013. IUU fishing activities have not been observed in this division since 2013, however, considering the previous interest in this region, IUU activity may still be occurring but remaining undetected. Furthermore, information from satellite surveillance trials indicated the presence of unidentified vessels in this division in 2016. Since 2011, following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided for this division (SC-CAMLR-XXIX, paragraph 6.5).

Data collection

8. Catch limits for CCAMLR's fisheries for *D. mawsoni* and *D. eleginoides* for the 'assessed' fisheries in Subareas 48.3, 88.1 and 88.2 and Division 58.5.2 are set using fully integrated assessments; more basic approaches are used for the 'data-poor' fisheries (in Subarea 48.6 and in Area 58 outside the exclusive economic zones (EEZs)). The management of these data-poor fisheries has been a major focus of attention in CCAMLR in recent years after the acknowledgement that commercial fishing by itself had resulted in too few data to develop a full assessment of the targeted stocks in these areas. CCAMLR has developed a framework for designing and undertaking research fishing designed to lead to an assessment of these toothfish stocks in the short to medium term, established under the provisions of CM 41-01. This research planning framework has three phases: prospecting phase, biomass estimation phase and assessment development phase, with a set of decisions and review for the progression between stages.

9. In order to obtain the data necessary for a stock assessment, catch limits for research fishing by commercial vessels are set at a level intended to provide sufficient information (including sufficient recaptures of tagged fish) to achieve a stock assessment within a time period of 3 to 5 years. These catch limits are also set so that they provide reasonable certainty that exploitation rates at the scale of the stock or research unit will not negatively impact the stock. Appropriate exploitation rates are based on estimates from areas with assessed fisheries and are not more than 3–4% of the estimated stock size. In 2012 and 2013, CCAMLR put in

place a more structured approach to setting catch limits, and spatially constraining research, in data-poor fisheries. This process attempts to use all available information combined with a regular review process to make progress, while recognising the inherent uncertainties and data limitations in data-poor fisheries (see Appendix 1).

Biological data

10. The collection of biological data under CM 23-05 is conducted as part of the CCAMLR Scheme of International Scientific Observation. In exploratory longline fisheries targeting *D. mawsoni* or *D. eleginoides*, biological data collection includes representative samples of length, weight, sex and maturity stage, as well as collection of otoliths for age determination of the target and most frequently taken by-catch species.

Length distributions of catches

11. The length-frequency distributions of *D. eleginoides* caught in this fishery are presented for all years in which the number of that species measured was more than 150 fish. These length-frequency distributions are unweighted (i.e. they have not been adjusted for factors such as the size of the catches from which they were collected). The interannual variability exhibited in the figure may reflect differences in the fished population, but is also likely to reflect changes in the gear used, the number of vessels in the fishery and the spatial and temporal distribution of fishing.

12. The length-frequency distributions of catches for *D. eleginoides* for each season from 2009 to present indicate that most *D. eleginoides* caught in Division 58.4.3a ranged from 30 to 150 cm in length (Figure 1). A bimodal distribution was observed in 2012. The 2013 catch had broad modes evident at approximately 50–80 and 90–130 cm, while the catch in 2014 was relatively unimodal with the highest frequency of individuals in the 50–90 cm range.

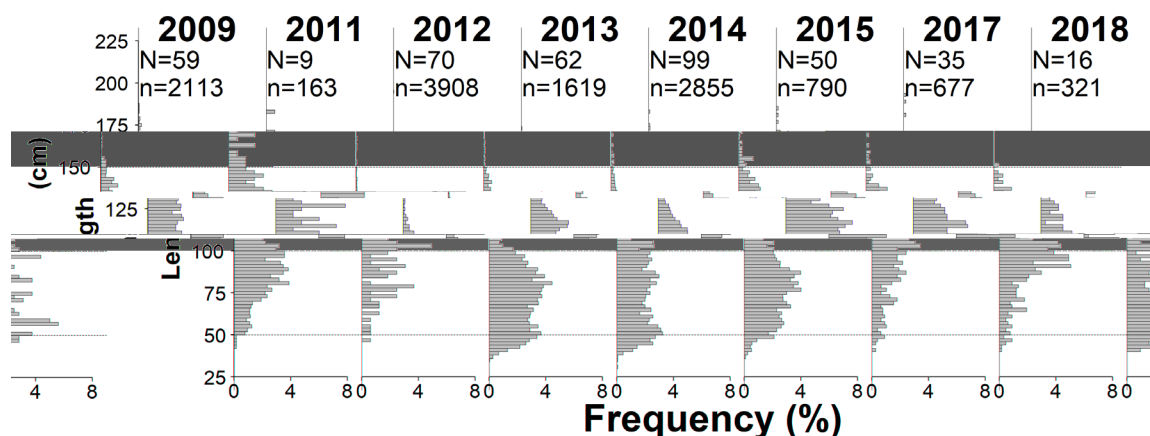


Figure 1: Annual length-frequency distributions of *Dissostichus eleginoides* caught in Division 58.4.3a. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

Tagging

13. Since 2012, vessels have been required to tag and release *Dissostichus* spp. at a rate of 5 fish per tonne of green weight caught (Table 2). The tag-overlap statistic estimates the representative similarity between the size distributions of those fish that are tagged by a vessel and of all the fish that are caught by that vessel. Each vessel catching more than 10 tonnes of each species of *Dissostichus* is required to achieve a minimum tag-overlap statistic of 60% (Annex 41-01/C).

14. Since 2007, a total of 846 *D. eleginoides* have been tagged and 62 recaptured in Division 58.4.3a (Table 3). Two *D. eleginoides* tagged in Division 58.4.3a have subsequently been recaptured in Division 58.5.1 and in Subarea 58.6.

Life-history parameters

Data collection

15. The life histories of *D. mawsoni* and *D. eleginoides* are characterised by slow growth, low fecundity and late maturity. Both *D. mawsoni* and *D. eleginoides* appear to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. However, as this is the period least accessible to fishing, and thus the collection of biological data, specific life-history traits for these species are limited (WG-FSA-08/14). The areas that are considered to be the most likely spawning grounds for *D. mawsoni* include the north of the Ross Sea associated with the Pacific–Antarctic Ridge (small-scale research units (SSRUs) 881B–C) and the Amundsen Ridge (SSRU 881E) in the Amundsen Sea. In the Cooperation Sea, *D. mawsoni* most likely spawn on BANZARE Bank (Division 58.4.3b). *Dissostichus eleginoides* are thought to spawn in deep water around South Georgia Island (Subarea 48.3), Bouvet Island (Subarea 48.6) and on the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2).

Parameter estimates

16. There are no specific life-history parameters for either *D. mawsoni* or *D. eleginoides* in this division; the parameters used in assessed fisheries can be found in the ‘Stock assessment’ appendices of the relevant Fishery Reports.

Stock assessment status

17. A preliminary stock assessment for Division 58.4.3a was detailed in WG-SAM-08/05 and employed a biomass dynamic surplus production model to assess the status of the stock using the tag/release of 199 individuals and recapture of six individuals from 2005 and 2006 data respectively, as well as legal and estimated illegal catches. Resultant stock size estimates were then used to estimate long-term yields (using the CCAMLR decision rules) under four different assumptions about the additional uncertainty in future stock dynamics, beyond that already accounted for in the stock assessment. This gave a range of potential long-term yields of 113, 105, 103 and 86 tonnes, which encompassed a wide range of future stock dynamic uncertainty assumptions.

Table 2: Annual tagging rate, by vessel, operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.3a. The tag-overlap statistics (CM 41-01) for *Dissostichus mawsoni* and *D. eleginoides* respectively are provided in brackets. Values for the tag-overlap statistic are not calculated for catches of less than 10 tonnes (2007–2014) or less than 30 fish tagged (since 2015) (*). - indicates that no fish were tagged. No fishing took place in 2016.

Flag State	Vessel name	Season											
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
France	<i>Saint André</i>						6.9 (-, 79)	9.2 (-, *)	5.6 (-, 85)	9.6 (-, *)		6.8 (-, *)	
	<i>Mascareignes III</i>												6.0 (-, *)
Japan	<i>Shinsei Maru No. 3</i>	1.8 (*, *)		3.7 (*, 45)		3.9 (-, *)		6.0 (-, *)	6.9 (-, *)	5.8 (-, 72)			
Spain	<i>Tronio</i>	2.2 (-, *)											
Uruguay	<i>Banzare</i>		4.7 (-, *)										
Tagging rate		3	3	3	3	5	5	5	5	5	5	5	5

Table 3: The number of individuals of *Dissostichus eleginoides* tagged in each year. The number of fish recaptured by each vessel/year is provided in brackets. No fishing took place in 2016.

Flag State	Vessel name	Season											
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
France	<i>Saint André</i>						235 (9)	60 (11)	90(22)	6 (3)			
	<i>Mascareignes III</i>												15 (3)
Japan	<i>Shinsei Maru No. 3</i>	4 (0)		113 (2)		14 (0)		56 (1)	110 (3)	84 (3)		13 (3)	
Spain	<i>Tronio</i>	5 (0)											
Uruguay	<i>Banzare</i>		41 (2)										
Total		9 (0)	41 (2)	113 (2)	0 (0)	14 (0)	235 (9)	116 (12)	200(25)	90 (6)	0 (0)	13 (3)	15 (3)

By-catch of fish and invertebrates

Fish by-catch

18. Catch limits for by-catch species groups (macrourids, rajids and other species) are defined in CM 33-03 and provided in Table 4. Within these catch limits, the total catch of by-catch species shall not exceed the following limits:

- skates and rays (rajids) – 2 tonnes
- *Macrourus* spp. – 5 tonnes
- all other species combined – 5 tonnes.

Table 4: Catch history for by-catch species (macrourids, rajids and other species), catch limits and number of rajids released alive in Division 58.4.3a. Catch limits are for the whole fishery (see CM 33-03 for details). No fishing took place in 2016. (Source: fine-scale data.)

Season	Macrourids		Rajids			Other species	
	Catch limit (tonnes)	Reported catch (tonnes)	Catch limit (tonnes)	Reported catch (tonnes)	Number released	Catch limit (tonnes)	Reported catch (tonnes)
2005	26	2	50	17	985	20	2
2006	26	1	50	7	-	20	1
2007	26	0	50	0	-	20	1
2008	26	0	50	2	-	20	0
2009	26	2	50	2	57	20	2
2010	26	0	50	0	-	20	0
2011	26	0	50	0	-	20	0
2012	26	4	50	32	-	20	3
2013	26	2	50	0	3666	20	1
2014	26	2	50	2	6148	20	1
2015	26	1	50	0	683	20	1
2016	26	-	50	-	-	20	-
2017	5	<1	2	1	717	5	1
2018	6	<1	2	1	1054	6	1

19. If the by-catch of any one species is equal to, or greater than, 1 tonne in any one haul or set, then the fishing vessel must move at least 5 n miles away for a period of at least five days.

20. If the catch of *Macrourus* spp. taken by a single vessel in any two 10-day periods exceeds 1 500 kg in a 10-day period and exceeds 16% of the catch of *Dissostichus* spp. in that period, the vessel shall cease fishing for the remainder of the season.

21. Those skates and rays which are caught alive and which have not been tagged (CM 41-01, Annex 41-01/C, paragraphs 2v and vii), should be released by cutting the snood and, when practical, removing the hooks, and the number recorded and reported.

22. The by-catch in Division 58.4.3a consists predominantly of rajids with a maximum, reported in 2012, of 32 tonnes or 64% of the catch limit for that group (Table 4).

Invertebrate by-catch including VME taxa

23. All Members are required to submit, within their general new (CM 21-01) and exploratory (CM 21-02) fisheries notifications, information on the known and anticipated impacts of their gear on vulnerable marine ecosystems (VMEs), including benthos and benthic communities such as seamounts, hydrothermal vents and cold-water corals. All of the VMEs in CCAMLR's VME Register are currently afforded protection through specific area closures, the locations and other details of which can be found in Annex 22-09/A.
24. There are no VMEs or VME Risk Areas designated in Division 58.4.3a.

Incidental mortality of seabirds and marine mammals

Incidental mortality

25. Prior to 2012, there were no bird mortalities observed in Division 58.4.3a. In that year, a single mortality of a white-chinned petrel (*Procellaria aequinoctialis*) was reported. There have been no observed bird mortalities since 2012.
26. There have been no observed incidental mortalities of mammals in Division 58.4.3a.

Mitigation measures

27. The requirements of CM 25-02 'Minimisation of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area' apply to this fishery. There is an exemption to the requirement for night setting by achieving the sink rates described in CM 24-02 and subject to a bird by-catch limit.
28. The risk level of birds in this fishery in Division 58.4.3a is category 3 (average) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

Ecosystem implications and effects

29. There is no formal evaluation available for this fishery.

Current management advice and conservation measures

30. The limits on the exploratory fishery for *D. eleginoides* in Division 58.4.3a for the forthcoming season are defined in CM 41-06: www.ccamlr.org/measure-41-06.

Research plan for Division 58.4.3a

Background

A1. A robust stock assessment that provides advice on catch limits according to the CCAMLR decision rules has not been developed due to lack of information in some areas (namely, Subarea 48.6 and Divisions 58.4.1, 58.4.2 and 58.4.3a). Thus, this subarea and these divisions have been designated as 'data-poor fisheries' (SC-CAMLR-XXX, paragraph 3.122). The Scientific Committee noted that the number of research hauls and tagging rate should be increased in fine-scale rectangles in which tags had been released in the past few years to increase the likelihood of tagged fish being recaptured (SC-CAMLR-XXX, paragraphs 3.126 and 3.128). The Scientific Committee agreed that the research blocks with the high numbers of tags available for recapture identified in WG-FSA-12/60 Rev. 1 could be used as a basis for research fishing in the data-poor fisheries, and agreed that research in 2013 should be concentrated within these blocks to maximise the likelihood of recapturing tags that had been released in the previous season (SC-CAMLR-XXXI, paragraph 3.171).

A2. France and Japan had proposed research in Division 58.4.3a under Conservation Measure (CM) 21-02 (SC-CAMLR-XXXI, paragraph 3.146). The Scientific Committee welcomed the development of an assessment framework using CASAL during the meeting of the Working Group on Fish Stock Assessment (WG-FSA) and agreed that this work should be progressed to develop an assessment that is suitable to provide management advice.

A3. The Scientific Committee endorsed the continuation of this research with a catch limit of 32 tonnes during the past three years (SC-CAMLR-XXXI, paragraph 3.147; SC-CAMLR-XXXII, paragraph 3.208; SC-CAMLR-XXXIII, paragraph 3.192).

A4. The Scientific Committee noted that a substantial number of tags were now being recaptured in this fishery and there was an expectation that a robust assessment was likely for this division in the near future (SC-CAMLR-XXXIII, paragraph 3.194).

Objective

A5.1 To collect sufficient suitable data to undertake a tag-based assessment of the *Dissostichus* spp. stocks in Division 58.4.3a by 2018.

A5.2 To collect length-frequency and other biological data from the common by-catch species.

Advice of the Scientific Committee

A6. A multi-year tag-recapture experiment undertaken jointly by France and Japan was initiated and continued under the following advice by the Scientific Committee: SC-CAMLR-XXXI, paragraph 3.147; SC-CAMLR-XXXII, paragraphs 3.205 to 3.207; and SC-CAMLR-XXXIII, paragraphs 3.191 and 3.192.

A7. In 2015, the Scientific Committee noted that integrated stock assessment models for this division were not yet sufficiently robust to provide management advice using the CCAMLR decision rules and also that methods for the provision of management advice in data-poor fisheries affected by illegal, unreported and unregulated (IUU) fishing were applicable to this division. It further recommended that growth and maturity parameters be further developed for this area. The location of the research block in this division is shown in Figure A1.

A8. In 2018 research was carried out by the and the French vessel *Mascareignes III*. At SC-CAMLR-XXXVII in 2018 France and Japan had agreed to a pause in fishing activities in this division while undertaking analysis of previous research for consideration by the Scientific Committee and its working groups.

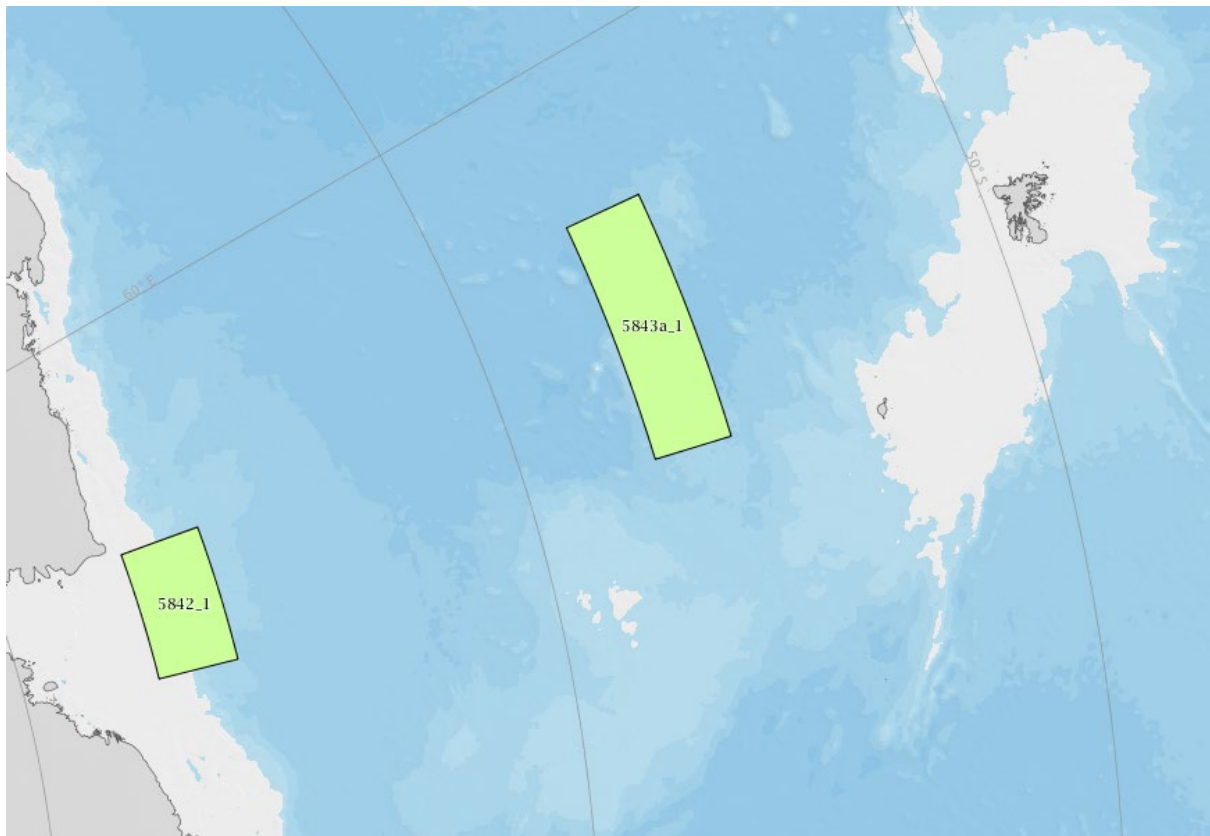


Figure A1: Location of the research block in Division 58.4.3a.