



CCSBT-CC/2210/18

Potential for the Secretariat to Undertake Future Analyses Using Publicly Available Automatic Identification System (AIS) Data

1. Introduction

In October 2021, CC16 considered the recommendations in Pew's paper [CCSBT-CC/2110/23](#), including discussing whether the Secretariat could utilise publicly available Automatic Identification System (AIS) data in future to cross-check submitted at-sea transshipment positions and/or to potentially do other analyses while there remains no centralised Vessel Monitoring System (VMS) in place.

Key discussion points included that:

- Some Members were uncertain about the Secretariat's capacity to be able to conduct AIS analyses given its already high workload;
- Some Members considered AIS analyses to be useful to consider in the future; and
- One Member noted that rather than doing retrospective analyses it might be better to conduct closer to real-time analyses that could assist with better targeting of compliance resources such as for targeted inspections.

Following these discussions, CC16 tasked the Secretariat with undertaking exploratory work during 2022 to determine whether the Secretariat has the capacity to conduct a vessel Automatic Identification System (AIS) analysis in the future and report back to CC17 on its conclusions.

This paper discusses several exploratory analyses that the Secretariat undertook during 2022 to examine options for rapid analyses it could potentially do in the future.

2. Background Information: Automatic Identification Systems (AIS)

Automatic Identification Systems (AIS) transponders are designed to be capable of providing position, identification and other information about the ship to other ships and to coastal authorities automatically for maritime safety purposes.

The International Maritime Organisation (IMO) requires AIS to be fitted aboard all ships of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages and all passenger ships irrespective of size. This requirement became effective for all ships by 31 December 2004.

Other management bodies may also require large ships, including many commercial fishing vessels, to broadcast their position with AIS in order to avoid collisions.

3. Method Including Data Limitations and Considerations

The Secretariat undertook some exploratory AIS analysis work using Global Fishing Watch's (GFW's) publicly available main [map](#) and Carrier Vessel Portal ([CVP](#)) information/map. Data considerations and limitations of the AIS data available data through GFW's website and maps are detailed in an information sheet GFW provides when data are downloaded (refer to **Attachment A**). The AIS data on the GFW platform are available up to 72 hours prior to the current time, *i.e.* there is a 3-day time-lag in data availability.

Note in particular that the exploratory maps/analyses presented in this paper show only those vessels that transmit AIS data (that was detected) and are also limited by the accuracy of the AIS data that was transmitted. All information presented in this paper is publicly available through the functionality offered by GFW's maps and CVP on its website.

Potential Transshipment Events

GFW's maps, especially the information viewed via its dedicated CVP, can be used as a tool to examine potential meeting events between vessels which could be indicative of transshipments occurring.

On the GFW website 'Encounter Events' are identified as being when AIS data indicate that two vessels may have conducted a transshipment, based on the distance between the two vessels and vessel speeds.¹ 'Loitering Events' are identified when a single carrier vessel exhibits behaviour consistent with encountering another vessel at-sea, but no other vessel is visible on AIS at that location and time,² possibly due to a variety of factors including lack of AIS transmission, poor satellite coverage, and/or the size of the second vessel.

4. Exploratory Analyses Conducted

EXAMPLE 1

Checking for Chinese Vessel Activity in Chinese Legislation Exclusion Areas

Time involved for checking any date/timeframe including reporting in a paper: Minimal (*e.g.* 2 hours).

Background Information

In late 2018/early 2019, the CCSBT received a translation of some Chinese legislation ("*Notification by General Office of Ministry of Agriculture and Rural Affairs on Further Strictly Comply With International Tuna Measures*") which was dated and appeared to take effect from 07/01/2019.

Section XIII³ of that legislation set out some no fishing zones (either all or part year) for Chinese fishing vessels as follows:

- a) Atlantic:
40 S to 45 S, 10 W to 20 E fishing prohibited all year round
- b) Indian Ocean Spawning:
10 S to 20 S, 100 E to 130 E fishing prohibited all year round

¹ Vessel encounters are defined when two vessels are within 500 meters of each other for at least 2 hours and traveling at < 2 knots, while at least 10 km from a coastal anchorage.

² Vessel loitering is when a carrier vessel travelled at speeds of < 2 knots for at least 4 hours, while at least 20 nautical miles from shore

³ Prohibition of fishing for South Bluefin Tuna (SBT)

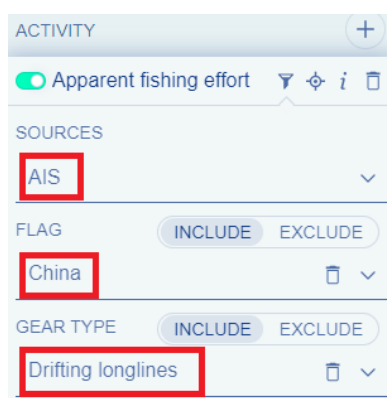
- c) Western & Central Pacific Ocean (WCPO):
37 S to 45 S, 170 E to 180 E fishing prohibited all year round
- d) Western & Central Pacific Ocean (WCPO):
45 S to 50 S, 150 E to 170 E fishing prohibited all year round
- e) Indian Ocean (IO):
30 S to 45 S, 20 E to 45 E (fishing prohibited from 1 September to 31 October)
- f) Indian Ocean (IO):
30 S to 45 S, 70 E to 140 E (fishing prohibited from 1 September to 31 October).

Method

GFW personnel provided six shape files (rectangles) to the Secretariat which can be placed on a map to indicate the areas covered by these six Chinese Exclusion Zones. The Secretariat saved these six exclusion zone rectangles and can easily display them on any new map it creates on the GFW platform whenever required (**Attachment C: Maps 1a & b**).

In order to check if any unexpected fishing activity by Chinese longliners appears to be occurring in these exclusion zones, only the following short steps are necessary:

- Upload the all-year and part-year exclusion rectangles to a new map;
- Set the start and end date of the timeframe of interest using the date slider; and
- Select the fleet of interest *e.g.* Chinese drifting longliners in the ‘Apparent fishing effort’ (AIS data) activity option as below:



Results

Exploratory maps were created for the 2021 calendar year (**Attachment C: Maps 1a-f**) and appeared to indicate that:

- There was no activity by Chinese-flagged drifting longliners transmitting AIS data within the 4 all-year exclusion areas; and
- There was potentially some very brief activity by 4 Chinese-flagged drifting longliners transmitting AIS data in the 1 September to 31 October IO exclusion area (area f above) – some points were shown in the exclusion areas but no tracks; and
- There appeared to be 1 Chinese-flagged drifting longliner transmitting AIS data that was transiting through the 1 September to 31 October IO exclusion area (area e above) between 30 August and 5 September 2021.

EXAMPLE 2

Cross-Check Submitted At-sea Transshipment Locations Against Encounter/Loitering Events

Time involved for future checking on any date/timeframe: Moderate (e.g. 5-15 minutes per Carrier Vessel trip examined; there are approximately 20 trips per annum – plus an additional 1/1.5 days to include the maps and results in a paper).

Background Information

The Secretariat receives information on transshipment-at-sea involving SBT locations (including latitude and longitude information) from various sources and within various timeframes including:

- Closer to real-time transmission of transshipment declarations from CCSBT-authorized Carrier Vessels (CVs) by email;
- Transshipment declarations sent to CCSBT by the ICCAT or IOTC Secretariats by email which are generally received with a greater time delay;
- Transshipment observer reports which are generally received months after the at-sea transshipments occurred; and
- CDS forms sometimes include latitude/longitude details although not required to be provided.

Method

The concept of this exploratory analysis was to:

- Check near-real-time 2021 transshipment location information the Secretariat received direct from Carrier Vessels against near-real-time encounter/loitering information available on the GFW platform; and
- Check 2021 transshipment locations received in transshipment observer reports (received during a calendar year with a much greater time lag) against encounter/loitering information on the GFW platform.

One very efficient way to do these cross-checks is by following the visual representation/positions of encounter/loitering events and port visits for an individual CV for a defined timeframe within GFW's CVP.

An example screen-shot of a chain of encounter/ loiter/ port visit chain of events for CV 'Harima' in September 2021 is presented in **Attachment C** (Map 2)⁴.

Results

In general, when manually cross-checked, only a subset of confirmed at-sea transshipment locations reported to the Secretariat matched 'encounter' events on GFW's main map/ CVP. However, anecdotally, some transshipments reported to the Secretariat that didn't match 'encounter' events did have dates and locations that were very similar to 'loitering' events noted on the CVP.

⁴ Some information in the screenshot is blurred so as not to identify individual vessels

EXAMPLE 3

To Examine Data Relating to Potential Issues of Compliance Concern

Example: View Activity of Indonesian Authorised Carrier Vessels and Indonesian Fishing Vessels Reported as Having Freezing Capacity (LSTLVs) that Transmitted on AIS Between 2020 to 2022

Elapsed time to look for vessels on the GFW platform and create each map: 30 minutes per map and 1-2 days for presenting maps in a paper.

Background

Indonesia recently submitted 6 at-sea transshipment observer reports (by Indonesian national observers) for 32 at-sea transshipments that involved SBT from 15 different longline fishing vessels to 4 authorised Indonesian Carrier Vessels which the Secretariat had previously been unaware of and which were not consistent with the requirements of CCSBT's Transshipment Resolution.

The Secretariat did some exploratory mapping using GFW's platform to give an indication of the activity (including encounter/loitering events^{1,2}) of some of the Indonesia's CVs and longliners with freezing capacity which it confirmed had received/made transshipments involving SBT during 2021. This exercise was repeated for 2020 and 2022 (there are to date no reported SBT transshipments involving Indonesian longliners with freezing capacity, *i.e.* LSTLVs, for 2020 or 2022) to check if the visual patterns of activity of the same vessels appear similar between years.

No specific vessel identification information is included in the maps produced for this example analysis but is available.

Method

Recognising the AIS data considerations and limitations outlined in the section 3 and **Attachment A** of this paper, the Secretariat produced a trial set of maps:

- i. For the 2021 calendar year, to display any available AIS tracks for the 4 Indonesian authorised CVs confirmed to have received at-sea transshipments including SBT during 2021.
- ii. For the 2021 calendar year, to display any available AIS tracks for the 15 Indonesian longliners which the Secretariat was advised have 'freezing capacity' and made at-sea transshipments including SBT during 2021.
- iii. For the 2021 calendar year, to display on 1 map AIS tracks and encounter/loitering events of 1 example Indonesian CV ("CV1" in i. above) which received 2 reported transshipments of SBT as well as the 3 available tracks of the longliners with freezing capacity that transhipped SBT.
- iv. Repeat the mapping exercise in iii. above for the same CV ("CV1") and 3 longliners with freezing capacity but for 2020 and 2022 – noting that to date no SBT transshipments have been reported by Indonesia for 2020 or 2022.

Results

- i. 3 of the 4 CVs reported as receiving SBT transshipments in 2021 have visible AIS tracks in 2021. Many encounter and loitering events are indicated (**Attachment C: Map 3**).

- ii. 3 of the 15 FVs with freezing capacity confirmed as having transhipped SBT in 2021 have visible AIS tracks in 2021. Some encounter events are indicated (**Attachment C: Map 4**).
- iii. 2021 (SBT transhipments reported in 2021): 1 CV and 3 LSTLVs shown – many encounter/ loitering events indicate there is a lot of potential vessel meeting/ transhipment activity, including in areas where SBT might be found (**Attachment C: Map 5a**).
- iv. 2020 and 2022 (no SBT transhipments reported for 20/22 to date): 1 CV and 3 LSTLVs shown - many encounter/ loitering events indicate there is also a lot of potential vessel meeting/transhipment activity, including in areas where SBT might be found (**Attachment C: Maps 5b & c**).

EXAMPLE 4

Ad Hoc Observations While Compiling Maps for Example 3

Elapsed time to look for vessels on the GFW platform and create one map: 30 minutes for the map and 1 hour to add into a paper.

- The Secretariat noticed the AIS track of a non-CCSBT authorised vessel located around 30°S in 2021 that appears to have some similar characteristics to the CV tracks in maps 3 and 5 (**Attachment C – Map 6**).
- The Secretariat noticed a vessel which is CCSBT-authorized as flagged to Indonesia but appears on the GFW platform (in 2022) and on other websites such as Vessel Finder, Marine Traffic and FleetMon as being flagged to Liechtenstein. When queried about this AIS data on its platform GFW advised that, “*all the vessel identity information shown on the Map at this time is based on what identity information the vessel transmits on AIS and no identity information comes from registries currently*”. (**Attachment C – Map 7**).

5. Summary

The Secretariat was able to conduct some exploratory example analyses 1 to 4 within short periods of time ranging from 5 to 30 minutes per map plus several days of elapsed time for associated documentation.

Example analyses 1, 3 and 4 returned some interesting maps of FV/CV activity. The approach used in Analysis 2 did not seem to be beneficial currently.

Example analyses 1, 3 and 4 or similar could be repeated in future by the Secretariat within relatively short timeframes if Members are supportive of such analyses.

CC17 is invited to:

- Review the information provided in this paper regarding potential AIS analyses that the Secretariat could undertake in future within minimal timeframes;
- Make any recommendations regarding AIS analyses that Members would like the Secretariat to undertake in future and report back on to CC18 and/or later *e.g.* to repeat any of the example analyses presented in this paper with different parameters such as different time periods; and
- Potentially propose any additional ideas for exploratory AIS analyses that the Secretariat could explore and/or undertake prior to CC18.

Prepared by the Secretariat

Considerations when using automatic identification system (AIS) data

Background

Global Fishing Watch is advancing ocean governance through increased transparency of human activity at sea. By creating and publicly sharing map visualizations, data and analysis tools, we enable scientific research and drive a transformation in how we manage our ocean. By 2030, we aim to monitor and visualize the impact of ocean-going vessels, both industrial and small-scale, that are responsible for the vast majority of the global seafood catch.

Considerations

Global Fishing Watch has demonstrated the application of AIS data to model fishing and other activities at sea, including fishing effort, transshipments and port visits. AIS is most effective as a tool for tracking vessel activity when satellite reception is strong, the vessel consistently and accurately transmits its identifiers, and other resources, such as registry records are available. However, consistent satellite and vessel data are not always available, and therefore when analyzing AIS data several factors should be considered.

Distribution of vessel activity may vary due to several factors



AIS isn't adopted equally around the world

The International Maritime Organization (IMO) and other management bodies require large ships, including many commercial fishing vessels, to broadcast their position with AIS in order to avoid collisions. Each year, more than 400,000 AIS devices broadcast vessel location, identity, course and speed information. Ground stations and satellites pick up this information, making vessels trackable even in the most remote areas of the ocean. While only two percent of the world's roughly 2.9 million fishing vessels carry AIS, they are responsible for over half of commercial fishing effort that takes place more than 100 nautical miles from shore, and as much as 80 percent of the fishing that occurs on the high seas.



AIS transmitters vary - differences between Class A and B

Most AIS devices fall into one of three "classes": Class A, Class B, and Class B+. Class A devices broadcast at a stronger power and they broadcast a vessel's position more frequently. Lower wattage Class B and B+ devices are detected less frequently by satellites, and therefore it may seem there is less fishing activity in areas where they are predominantly used. AIS device class often depends on flag State regulations, vessel length and vessel purpose.

[Learn more about the differences in AIS transmitters >](#) | [Read more about Global Fishing Watch technology >](#)



Global satellite coverage to detect AIS varies

AIS satellite companies aggregate data from both satellite and terrestrial AIS receivers. A single satellite can monitor approximately 5 percent of the earth's surface at a given time. These satellites travel quickly and each satellite will receive messages only from a given location on earth for only a few minutes before passing out of range. For these reasons, a constellation of many satellites is used to obtain coverage of the world's ocean. Many satellite and terrestrial providers also do not record every AIS message that they receive. As a result, those using downloaded data should not assume uniform satellite coverage.

[Learn more about satellite coverage and reception quality >](#)



High density areas of vessel traffic can lead to lower activity estimates

In addition to areas with low satellite coverage, areas with a high density of vessel traffic can also limit the number of signals processed, particularly related to Class B (or B+) AIS systems. This may lead to reduced or underestimated vessel activity in the Global Fishing Watch map or data in such areas. [Learn more >](#)



Other considerations - ports and manual identification

Fishing effort and vessel activity may be disrupted close to ports due to changes in vessel movements. Identification must be manually entered to AIS transmitters which can lead to errors and complexity. Vessels may have turned their transmitters off for security or other reasons, alongside an intention to avoid detection. [Learn more >](#)

Vessel classification and identification may change over time



Global Fishing Watch activity and vessel identity data may change over time

Changing vessel identity information can make it difficult to track a vessel consistently over time. [Raw AIS data](#) needs significant processing before it can be used to understand patterns in human activity. We rely on [cloud infrastructure and machine learning](#) models to identify patterns. We filter out noisy or duplicated data, and group positions into logical segments. We combine multiple vessel registry database sources with the predictions from a machine learning model to classify vessels. No algorithm is perfect, so occasional misclassifications will occur (e.g. non-fishing mistakenly identified as fishing). As Global Fishing Watch is constantly adding information to our models and improving how vessels are classified and mapped, vessel identity and activity heatmaps may change over time.

For example, if new vessel identity information is found showing that two vessels that were previously thought to be separate are actually the same vessel, this update may lead to changes in how these vessel track segments are formed. This may lead to changes in how vessel movements or fishing is recorded. Additionally, if a vessel is determined to be a fishing vessel, when there was previously insufficient information, the update will cause fishing effort to be displayed when there may not have been previously. [Learn more >](#)



Use of AIS transmitters has increased over time, as has number of satellites

The number of fishing vessels using AIS transmitters is increasing [by 10 to 30 percent each year](#). The number of satellites able to detect AIS launched has also increased between 2012 to present day. This increase in detectability of fishing vessels disrupts our ability to infer changes over time. As a result, any increases in fishing activity since 2012 should be interpreted with caution. Analysts and researchers can mitigate these impacts by focusing on more recent years (e.g. 2017 onwards) or by selecting for vessels that were present in both the initial and subsequent times of interest.



Factors driving changes in human activity can be difficult to identify

Patterns in human activity at sea can often be attributed to multiple factors that are not always easy to detect or isolate. When viewing changes in activity, managers and researchers should ensure that as many factors as possible (e.g. socioeconomic, environmental etc.) are considered and seek relevant stakeholder input to determine the main drivers. The annual calendar of human events should be considered when viewing distribution and patterns in global human activity, particularly large scale cultural events that may impact our presence on the ocean. Notably, cultural events that don't occur on the same date each year should be reviewed as they may impact results or conclusions.

Mitigating impacts of AIS data considerations



Using Global Fishing Watch AIS data in your work or research

Global Fishing Watch is harnessing innovative technology to turn transparent data into actionable information and drive tangible change in the way that our ocean is governed. Data accessed through the Global Fishing Watch platform is as accurate as possible, but should be used with the above considerations in mind. When using Global Fishing Watch AIS data in your work or research:

- Always read the attached readme file alongside any downloaded data, and take note of the data version.
- Use multiple sources of data to corroborate any conclusions drawn or decisions.
- Use more than one field when searching for vessels e.g. MMSI, name and IMO number.
- When completing time series analyses, ensure that mitigation approaches are used to reduce likelihood of false assumptions e.g. factor in increased satellite coverage, use of AIS, and human events calendar.
- Review the Global Fishing Watch resources and contact information below.



Global Fishing Watch resources and contact information

Further supporting Global Fishing Watch resources:

- [Read the FAO global atlas of AIS-based fishing activity >](#)
- [Read the Global Fishing Watch AIS-based fishing activity methodology paper >](#)
- Read these articles about: [vessels reporting false locations >](#) & [vessels sharing one identity >](#)
- [Review the Global Fishing Watch FAQs >](#) | [Watch the Global Fishing Watch tutorials >](#)

Global Fishing Watch is constantly looking to improve the data in our products, to share any feedback on our data:

- Share feedback through the built-in feedback form in the left sidebar on the [Global Fishing Watch map >](#)
- Email any data inquiries to [support@globalfishingwatch.org >](mailto:support@globalfishingwatch.org)

XII. Temporary Access

COFA should strengthen the organizing and coordinating fishing vessels fish for tunas temporarily access to other countries' national jurisdiction. When fishing vessels fish for tunas need to temporarily access to other countries' national jurisdiction under chartering or access agreement, the enterprises that own the fishing vessels shall report number of fishing vessels accessed, actual fishing days, catch, observers on board of the fishing vessels and other information to COFA before the access and within 5 days after the access completed.

XIII. Prohibition of fishing for South Bluefin Tuna (SBT)

Currently China is not yet a member of the Commission for the Conservation of Southern Bluefin Tuna established in 1994, and does not obtain the fishing quota of SBT, in order to avoid illegal fish for or incident catching SBT, the fishing vessels of China shall observe the following measures:

1. No retention on board, transshipping and landing SBT, the incident caught SBT shall be released immediately and recorded in the log book.

2. In the Indian Ocean: It shall prohibit from fishing in the areas of 30° S to 45° S, 20° E to 45° E and 30° S to 45° S, 70° E to 140° E from 1 September to 31 October. It shall prohibit from fishing in SBT spawning ground of 10° S to 20° S, 100° E to 130° E all year round.

3. In the Western and Central Pacific Ocean: It shall prohibit from fishing in the areas of 37° S to 45° S, 170° E to 180° E and 45° S to 50° S, 150° E to 170° E all year round.

4. In the Atlantic Ocean: It shall prohibit from fishing in the area of 40° S to 45° S and 10° W to 20° E all year round.

COFA shall complete its work on vessel monitor and early warning, once detecting a fishing vessel is in violation of above regulation, it shall immediately ask the vessel to leave the prohibited area, and report the case to this Ministry.

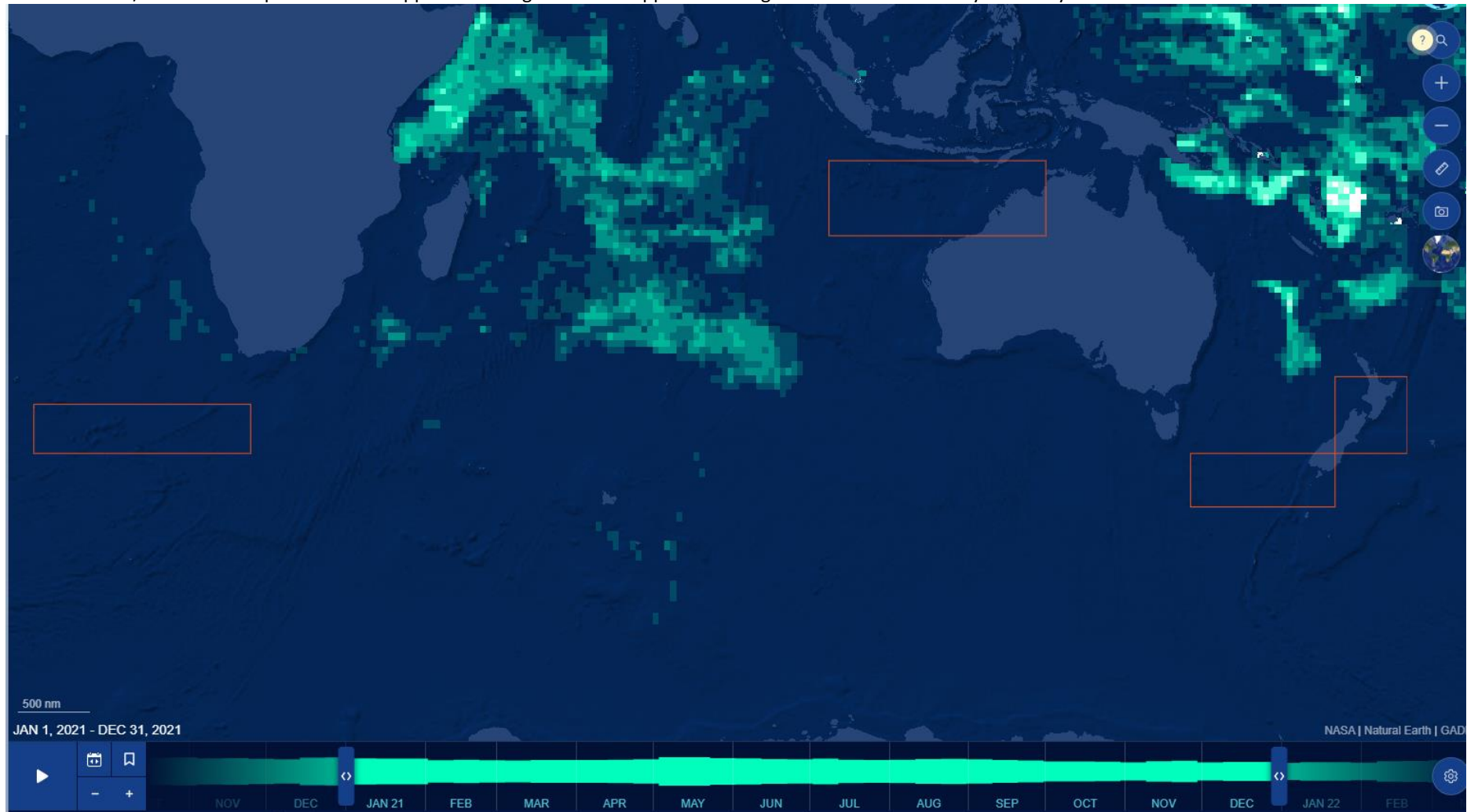
XIV. Fishing Vessel Marking

The distant water fishing vessels shall painted name of the vessel, call sign and port of registry and other marking on the hull according to relevant regulation of this Ministry, and shall ensure the marking always keeping clearness.

All tuna enterprises shall serious comply with above management measures, and earnestly work out training of relevant persons, so as to enhance the level of observing law and discipline as well as implementation. The Provincial (Autonomous Regional and Municipal) fisheries authorities shall supervise and urge the enterprises conducting distant water fisheries under its respective jurisdiction to seriously implement the above management measures, reduce the number of infringement events concerning foreign affairs. COFA shall do its best for the work entrusted and authorized by this Ministry and shall publish the detailed measures on its website, so that the enterprises can easily follow the measures. COFA shall not collect charges from enterprises related to the work entrusted by this Ministry. COFA should strengthen the organizing and coordinating the industry, and improve organizational degree and self-discipline level of the industry continually.

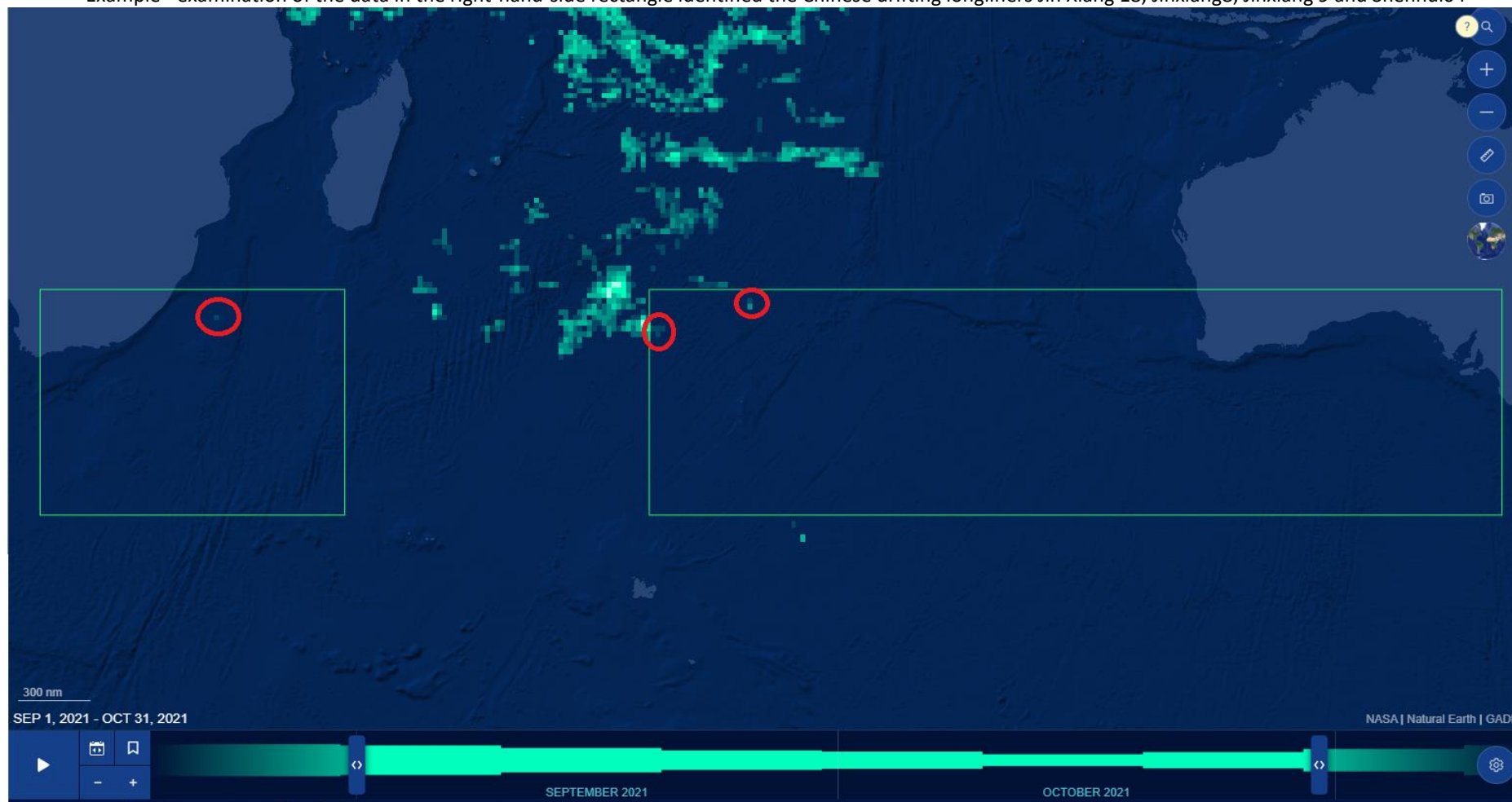
Map 1a: 2021 Calendar Year, Chinese Legislation, year-round exclusion areas

- The 4 red rectangles represent the 4 year-round exclusion zones for fishing by Chinese vessels described in the Chinese legislation
- Green/blue shaded squares indicate apparent fishing effort – no apparent fishing effort is indicated in any of the 4 year-round exclusion zones



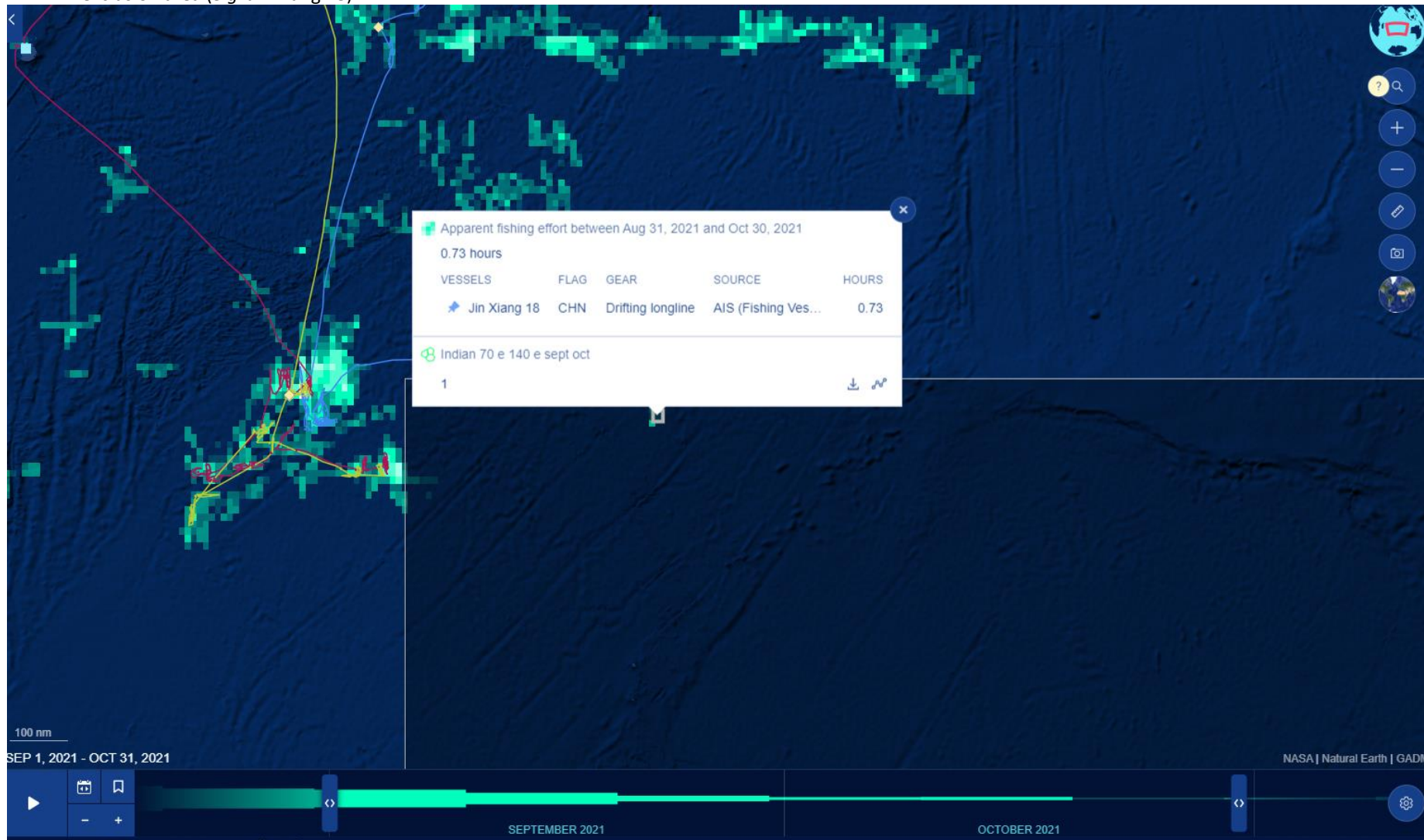
Map 1b: 2021 Calendar Year, Chinese Legislation, part-year exclusion areas

- The 2 green rectangles representing the annual 1 September to 31 October exclusion zones for fishing by Chinese vessels described in the Chinese legislation
- Green/blue squares indicate apparent fishing effort - a small amount of activity by Chinese vessels appears to be indicated in both rectangles
- Example - examination of the data in the left-hand-side rectangle identified the Chinese drifting longliner Haishang 78 (BZ7UW)
- Example - examination of the data in the right-hand-side rectangle identified the Chinese drifting longliners Jin Xiang 18, Jinxiang8, Jinxiang 9 and Shenhui04



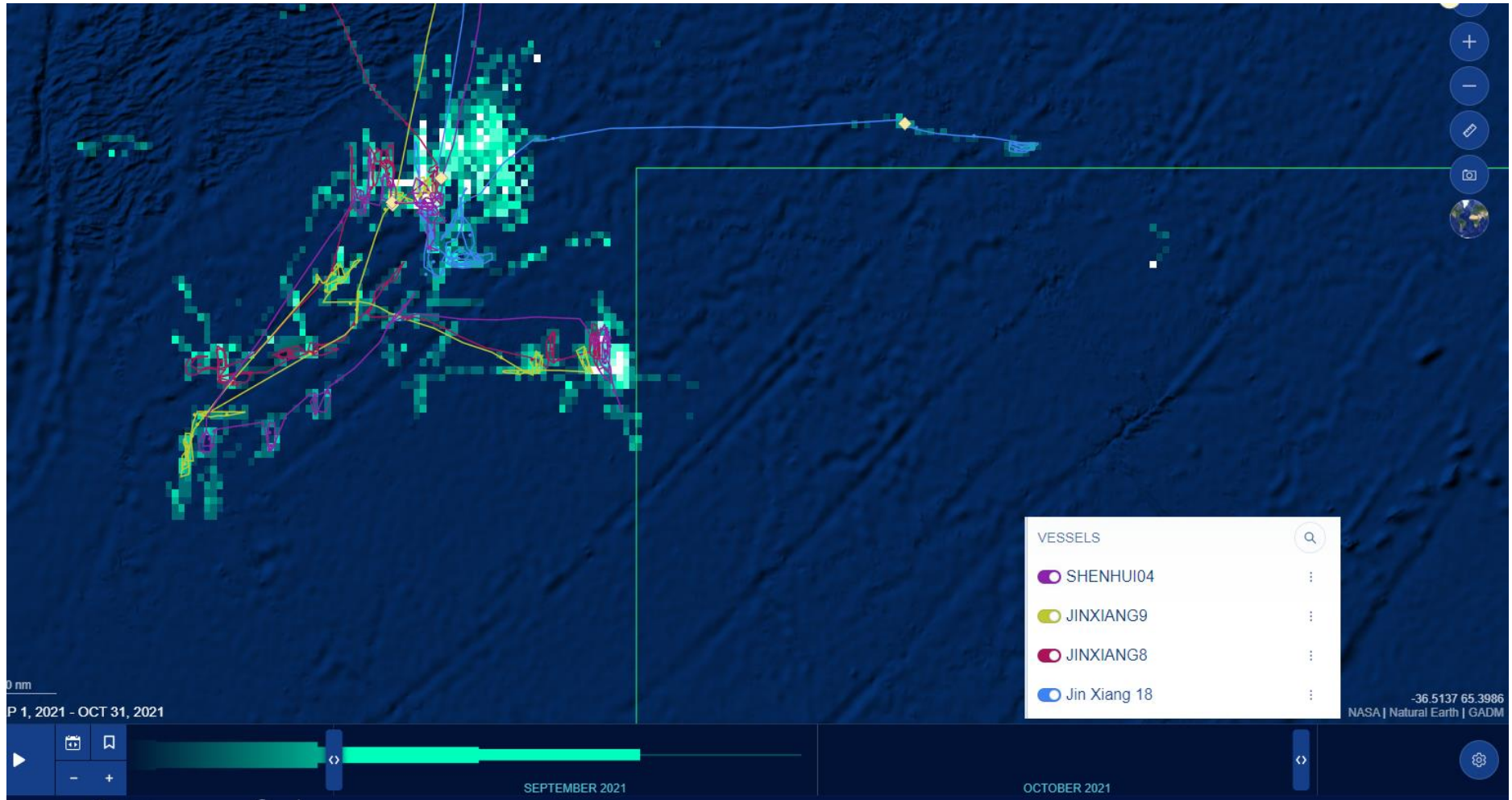
Map 1c: 2021 Calendar Year, Chinese Legislation, part-year exclusion areas (continued)

- Example - clicking on an individual square (right-hand-side rectangle) shows information about vessels which seem to be in the 1 September to 31 October exclusion area (e.g. Jin Xiang 18)



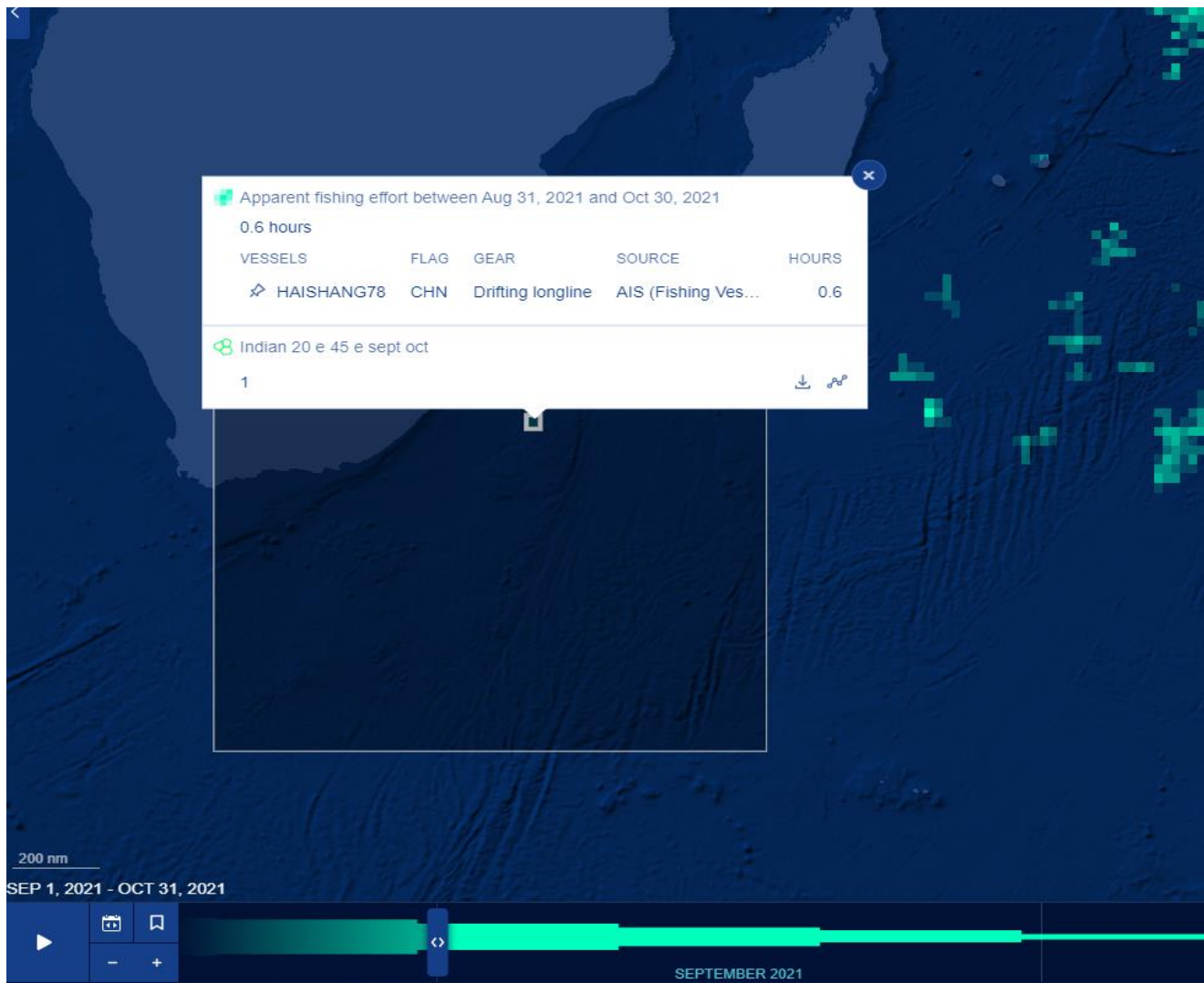
Map 1d: 2021 Calendar Year, Chinese Legislation, part-year exclusion areas (continued)

- Representing the data for Jin Xiang 18, Jinxiang8, Jinxiang 9 and Shenhui04 as tracks appears to show these stopping outside the 1 September to 31 October exclusion area



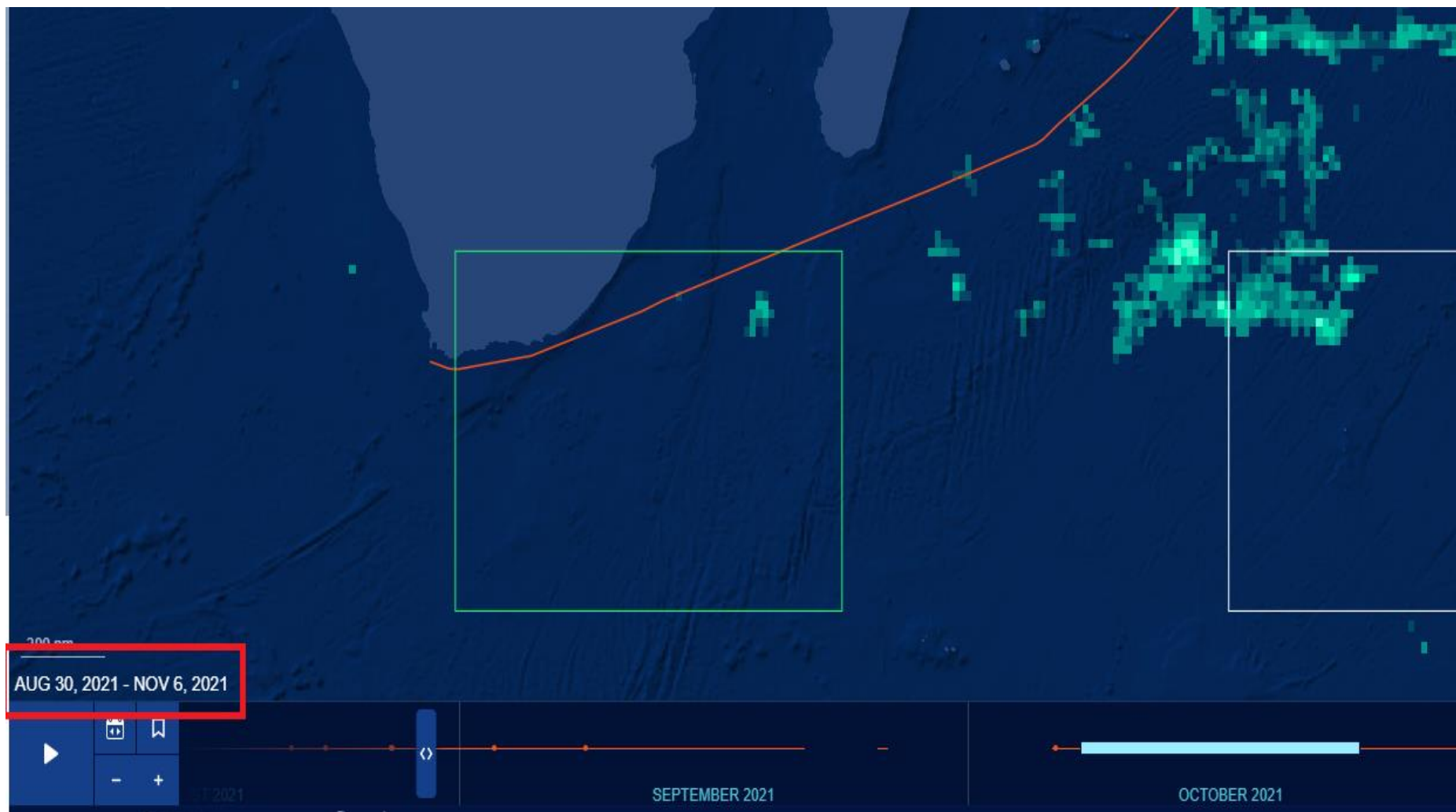
Map 1e: 2021 Calendar Year, Chinese Legislation, part-year exclusion areas (*continued*)

- Example - examination of the data in the left-hand-side rectangle identified the Chinese drifting longliner Haishang 78 (BZ7UW) – closer view

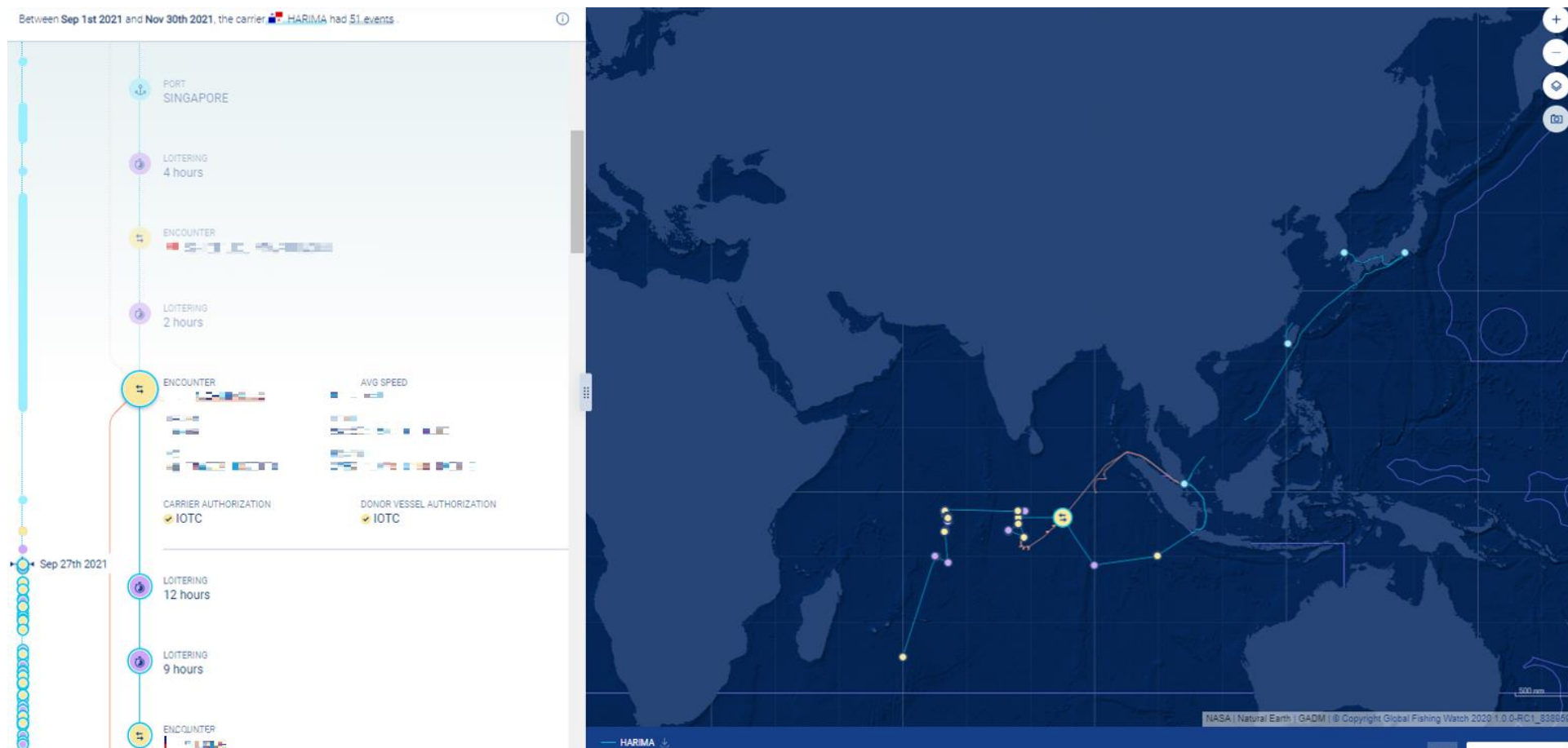


Map 1f: 2021 Calendar Year, Chinese Legislation, part-year exclusion areas (continued)

- By extending the timeframe to 30 Aug – 6 Nov 2021 using the bottom left-hand-side date slider and adding a track (rather than a point) for Haishang 78, it seems clear that this vessel is only transiting through the left-hand side 1 September to 31 October exclusion area

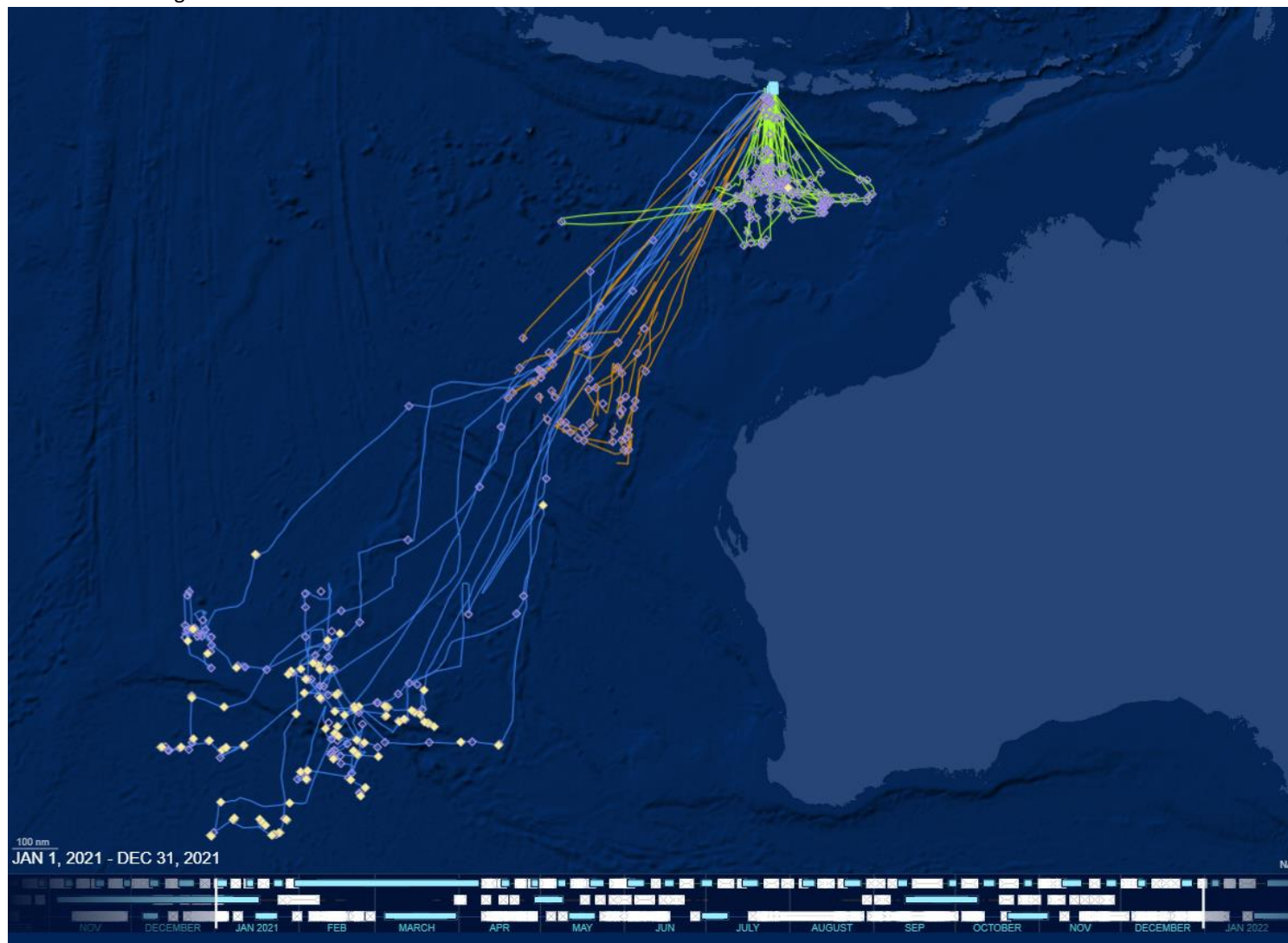


Map 2: September 2021 – Example of CV Harima Encounter/ Loitering/ Port events (source: GFW CV Portal)



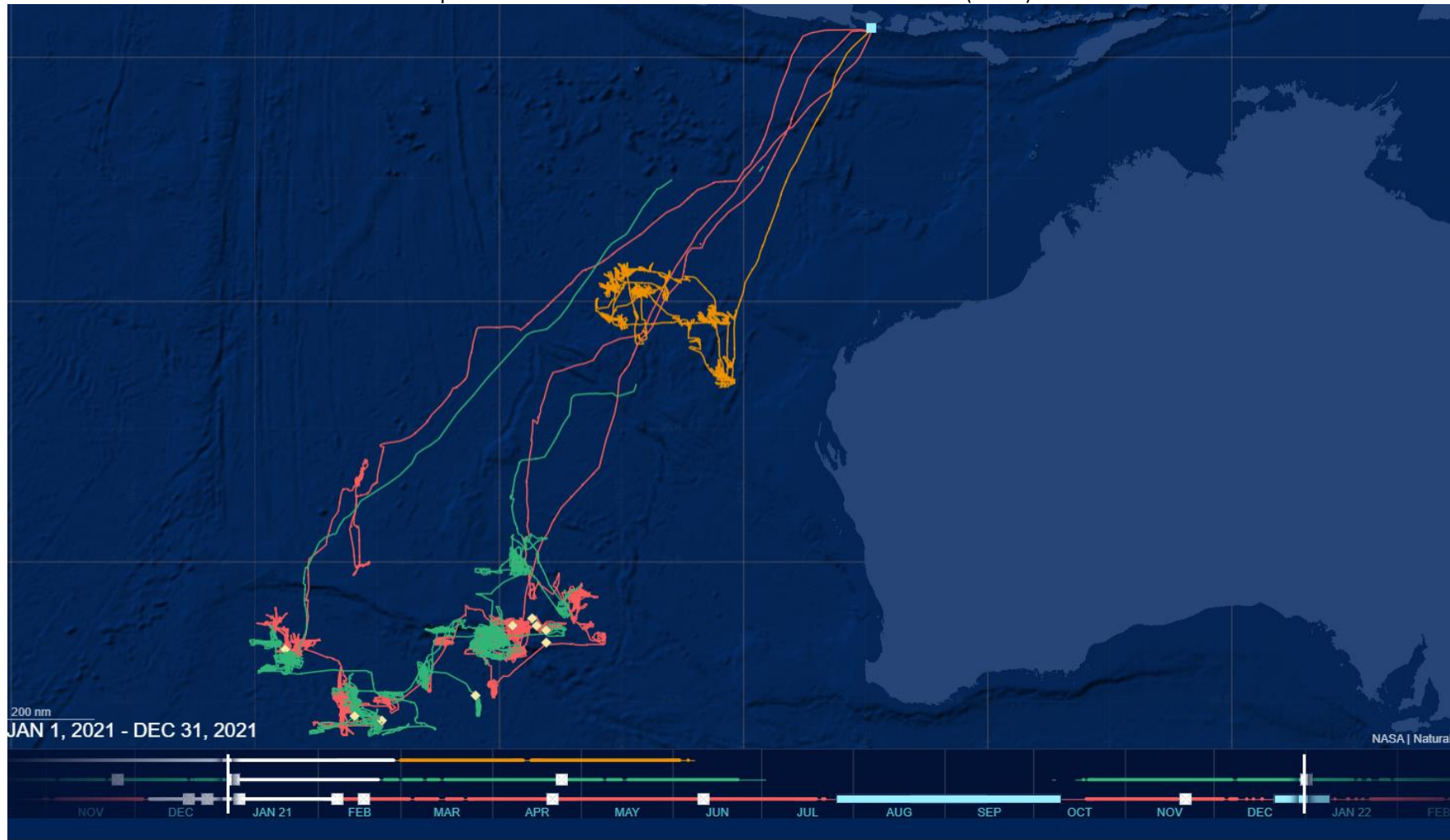
Map 3 Calendar Year 2021: AIS Tracks of 3 of 4 Indonesian CVs that Received SBT Transhipments

- AIS tracks are available for 3 of the 4 Indonesian-authorized CVs reported as receiving SBT transhipments during 2021 – “CV1” in blue, “CV2” in orange, “CV3” in green



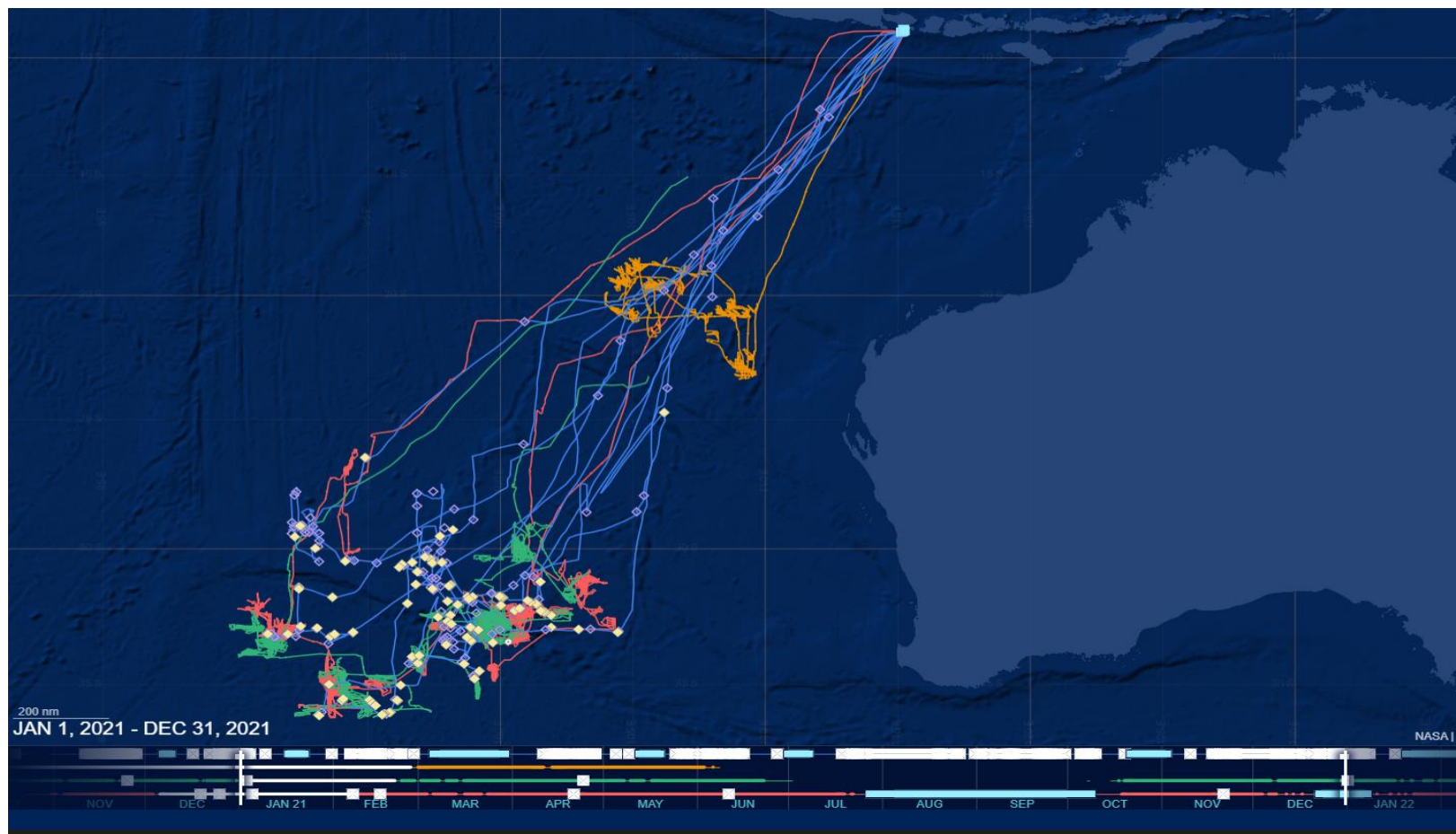
Map 4: Calendar Year 2021: AIS Tracks of 3 Indonesian Longliners with Freezing Capacity that Made SBT Transhipments

- AIS tracks are available for 3 of the 15 Indonesian longliners with freezing capacity reported as transhipping SBT in 2021 - the yellow diamonds (9) are 'encounter' events
- Encounter events are indicated for the 2 longliners with red and green tracks but not for the longliner with the orange track
- Most of the encounter events in the map below are associated with one authorised Indonesian CV ("CV1")



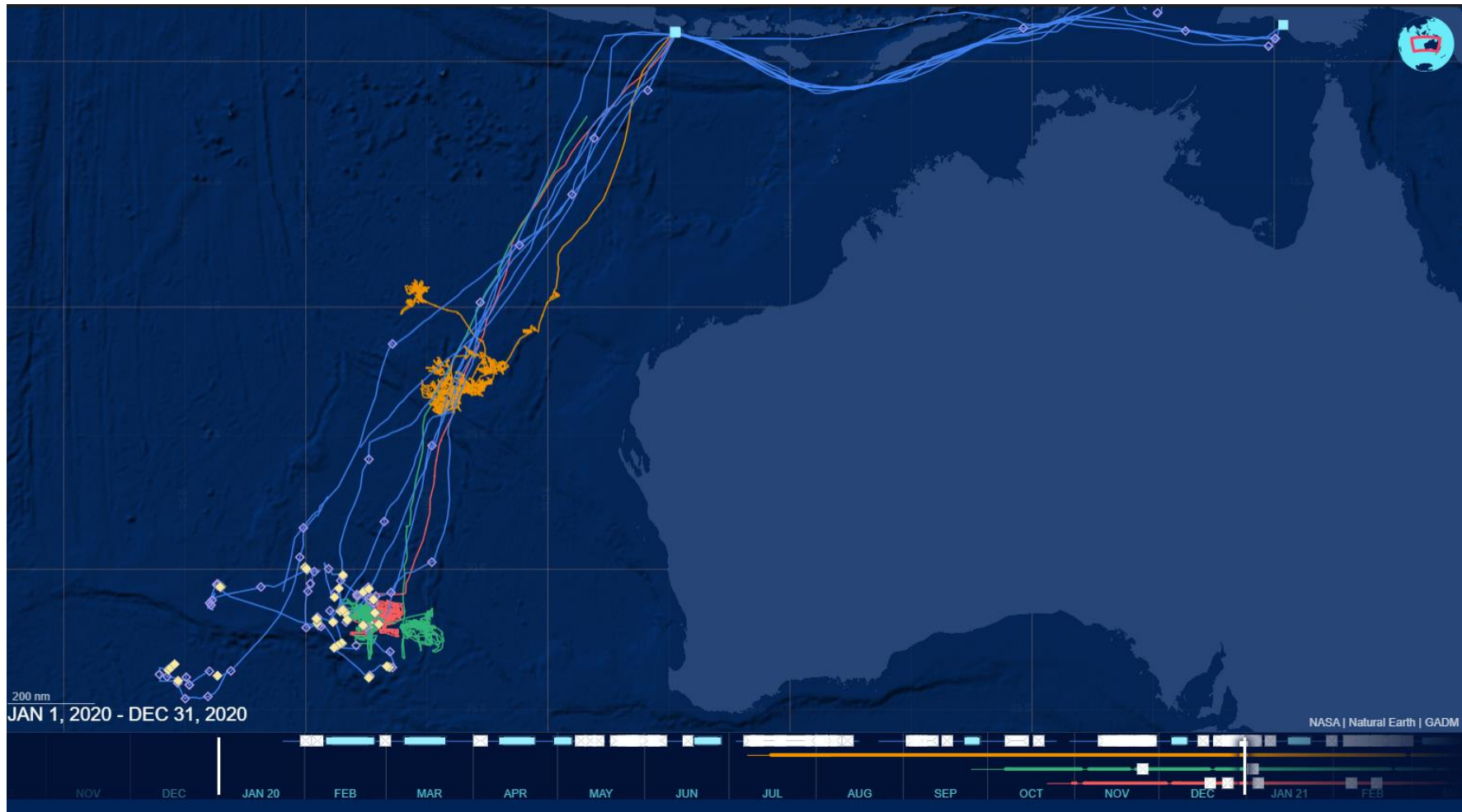
Map 5a: 2021 Calendar Year: AIS Tracks of 3 Indonesian Longliners with Freezing Capacity plus “CV1” (blue)

- This map shows both the AIS tracks of the same 3 Indonesian longliners with freezing capacity that transhipped SBT during 2021 (from map 4) as well as the blue AIS track of “CV1” (from map 3) that received 2 reported transhipments of SBT in 2021 together; any encounters (yellow diamonds) or loitering events (purple diamonds) associated with “CV1” are also shown
- “CV1” (blue track) appears to be involved in many encounter and loitering events with 2 of the 3 tracked longliners with freezing capacity or other vessels



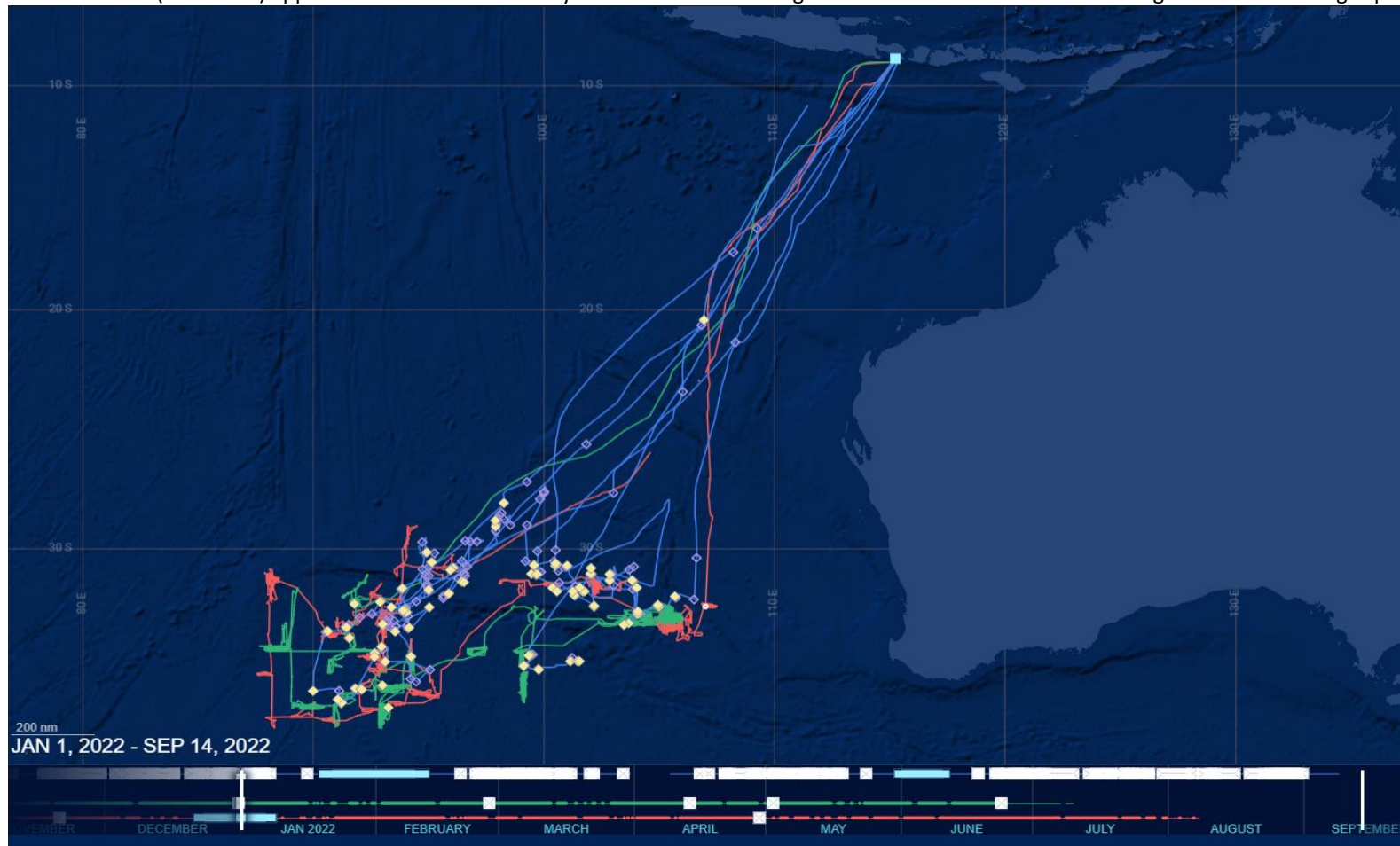
Map 5b: 2020 Calendar Year: AIS Tracks of 3 Indonesian Longliners with Freezing Capacity plus “CV1” (blue)

- The map shows the AIS tracks of the same 3 Indonesian longliners with freezing capacity (in map 5a) during 2020 as well as the blue AIS track of “CV1”; any encounters (yellow diamonds) or loitering events (purple diamonds) associated with “CV1” are also shown
- “CV1” (blue track) appears to be involved in many encounter and loitering events with 2 of the 3 tracked vessels with freezing capacity or other vessels



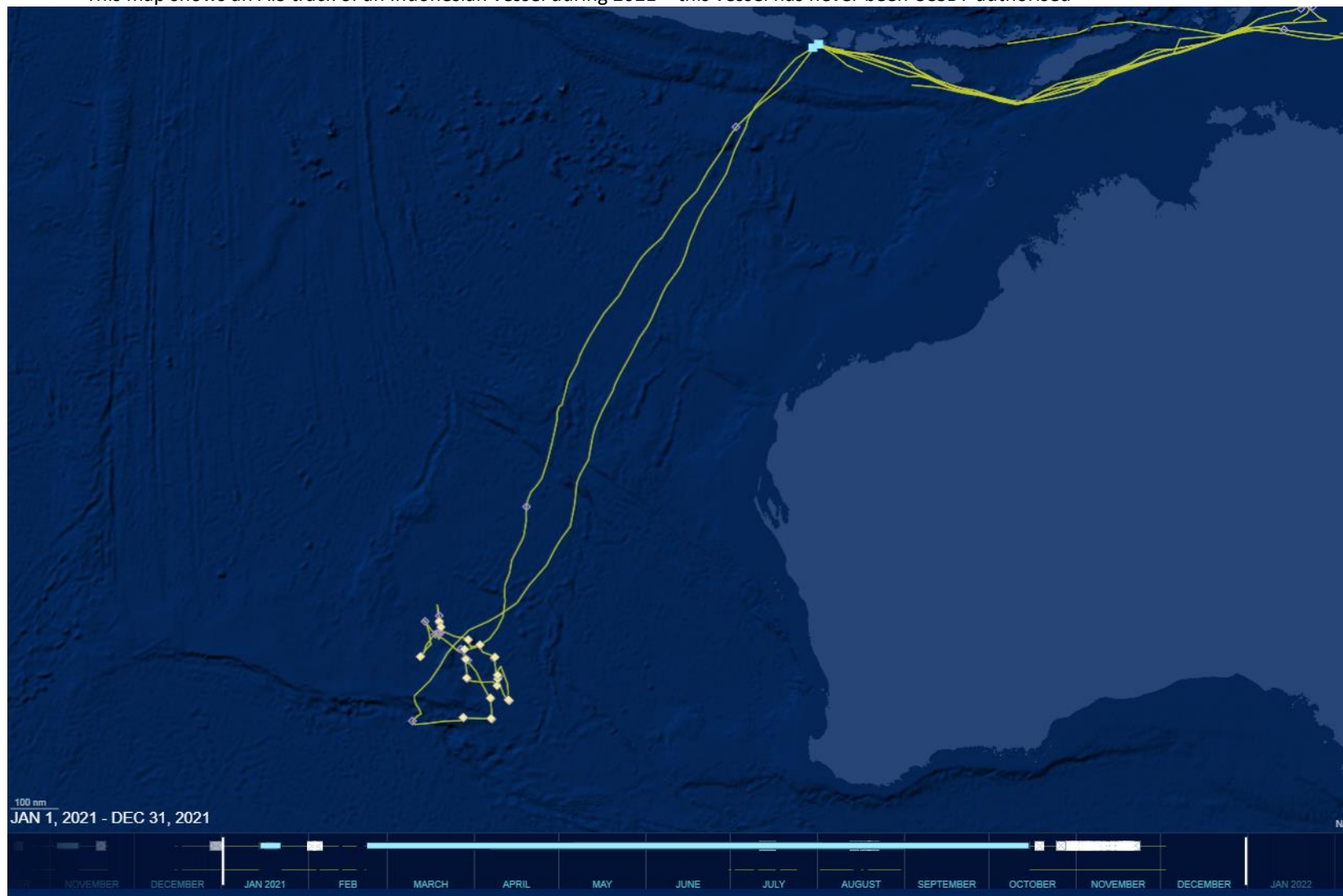
Map 5c: 2022 Calendar Year (01/01/2022 to 14/09/2022) AIS Tracks of 3 Indonesian Longliners with Freezing Capacity plus “CV1” (blue)

- The map shows the AIS tracks of the same 2 Indonesian longliners with freezing capacity (the orange-tracked longliner visible in maps 5a and b is not visible on this map) during 2022 as well as the blue AIS track of “CV1”; any encounters (yellow diamonds) or loitering events (purple diamonds) associated with “CV1” are also shown
- “CV1” (blue track) appears to be involved in many encounter and loitering events with either the 2 tracked longliners with freezing capacity or other vessels



Map 6: 2021 Calendar Year – Track of Interest Near 30°S

- This map shows an AIS track of an Indonesian vessel during 2021 – this vessel has never been CCSBT-authorized



Map 7: 2022 Calendar Year (01/01/2022 to 14/09/2022)

- The Secretariat noticed the vessel below which appears on the GFW platform as being flagged to Liechtenstein; the same vessel is CCSBT-authorized and noted as being flagged to Indonesia

