

Lebanon–Israel 2022 Maritime Boundary Equity: Equal-Breadth Perpendicular Line

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Structured Abstract

Article Type: Viewpoint

Purpose—Claims about political illegitimacy and unfairness of the indirect Maritime boundary negotiations between Lebanon and Israel motivate intensions to neutralize their agreement (October 27, 2022). The objective of this article concerns assessment of the equitability of the agreed delineation in view of earlier delineations and the application of an objective delineation method.

Design, Methodology, Approach—Review of the sequence of delineations by both parties and by a US mediator would identify the key elements of the territorial dispute. Employment of a new Equal-Breadth Perpendicular Line (EBPL) delineation due to the straightness of Lebanon and Israel’s joint coastline configuration facilitates assessment of the equitability of the agreed line.

Findings—Examination of Israel’s unilateral delineations from 2009 until 2017 show that they closely fit the equitable EBPL configuration and are similar to the early (2010) Lebanese delineation that informs the agreed delimitation.

Practical Implications—While the political circumstances around the agreement can be criticized, the agreed delimitation was found equitable.

Originality, Value—This commentary provides a new collection of official evidence regarding the two countries’ dispute and a new perpendicular line analysis which proves the equitability of the agreed delimitation and provides support for ensuring its sustainability.

Keywords: equidistance, equitable solution,
maritime boundary dispute, perpendicular line

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I. Introduction

The discovery of deep-sea petroleum and gas resources and the emergence of the maritime territorial conflict between Turkey and Greece in the early 2000s led several eastern Mediterranean countries to strive to reach agreements with neighboring countries regarding their economic exclusive zones (EEZs). The dispute between Lebanon and Israel began following Israel's withdrawal from southern Lebanon in 2000 and the discovery and exploitation of Noa and Mary B (1999) and Tamar and Livyatan (2009) gas fields by Israel. The arrival of a drilling rig to the disputed Karish gas field in June 2022, and Israel's plan to start operating it south of the Lebanese delimitation of 2010 (outside the disputed territory) initiated threats by Hezbollah to attack the Israeli maritime gas and oil installations. The situation motivated the US to push for a peaceful settlement of the dispute before it erupted into an armed conflict. In October 2022, Lebanon and Israel reached an agreement (see agreed line in Figure 1) and submitted identical letters to the UN Secretary General¹ stating that: "The parties agree that this agreement . . . establishes a permanent and equitable resolution of their maritime dispute." However, while the Lebanese side obtained its early delimitation (from 2010), claims were voiced on the Israeli side that the interim minority government was in fact coerced by the US to agree to the Lebanese delimitation under war threats by Hezbollah. For boundaries to hold, they must be perceived as fair by both sides, and fairness is, according to a ruling by the International Court of Justice, a "guiding principle for maritime dispute resolution."² With claims regarding illegitimacy and unfairness of the agreement and the disregarding of the earlier acceptance by Israel of a US compromise delineation, the current Israeli government is searching for ways to cancel the agreement. This article will start by discussing the political circumstances that supposedly undermine the legitimacy of the agreement, followed by a presentation of the timeline of events and delimitations suggested by Lebanon, Israel, and the US during the 12-year dispute. Finally, a new equal-breadth perpendicular line method will be presented and then implemented to assess the equitability of these delimitations.

II. Claims of Illegitimacy and Unfairness of the Maritime Agreement

Since the First Lebanon War in 1982, a state of war has existed between Israel and Hezbollah, the leading political and military organization/power in Lebanon. During the maritime border negotiations, Hezbollah promoted the territorial interests of Lebanon using coercive diplomacy: "Between June and October, the organization conveyed overt and covert threats, and it pursued actions that were unprecedented in the Israel-Hezbollah conflict: openly threatening to target Israel's entire gas production and risk all-out war if Israel proceeded with its plan to unilaterally extract gas from the contested Karish gas field. A textbook case of coercive diplomacy, Hezbollah's maneuver was calculated and deliberate, which reflects the group's strategic expertise."³ Under Hezbollah's threats, the US government pressured Lapid's weak interim government to reach an agreement with Lebanon. According to the statutory law in Israel, this government was entitled to negotiate, but earlier High Court rulings require approval of such agreements by the Knesset (the Israeli parliament) under such political circumstances.

The objection to the tailored agreement emerged immediately following indications regarding a compromise that had been reached between the two countries during meetings conducted just after the UN General Assembly meeting on September 22, 2022. From this date until the controversial decision made by the interim government on October 12, 2022, the opposition leaders made clear claims regarding the illegitimacy of the agreement. On October 2, 2022, then-opposition leader Netanyahu uploaded a Facebook post saying that “Lapid has no mandate to hand over to an enemy state sovereign territories and sovereign assets that belong to all of us ... If this illegal grab goes through, we will not be bound by it...”⁴ Immediately afterward, a leader of the Religious Zionist party stated that “I believe that we must tell everyone, in an official announcement, including those international actors who are involved, that our position is that any such agreement lacks all validity and will not be either recognized or respected by us when we ... form the next government, following the elections.”⁵ On October 7, 2022, Netanyahu said that he will “Quash the Gas Deal—and the Country and World Can Burn.”⁶ Following the approval of the agreement by the government on October 12, 2022, several Knesset members demanded that the agreement be put to vote. Prime Minister Lapid refused, disregarding the advice of the Attorney General to seek approval by the Knesset. The weight of urgent security and defense considerations in the High Court approval of the interim government authority to sign the agreement is clearly expressed by the High Court decision.⁷ The Hezbollah threats were certainly among the main security and defense issues considered by the High Court. On October 31, 2022 (one day before the elections and four days after the agreement was finalized), Netanyahu expressed his intention to “neutralize” the agreement.⁸

Considering the fact that the gas agreement was one of the issues raised during the election campaigning period, and that the parties opposing the agreement won the elections, it may be suggested that the majority of Israeli citizens opposed the agreement and doubted its legitimacy. The perception among broad sectors of Israeli society was that an unfair agreement was forced on Israel by the US, pressured by war threats by Hezbollah. It is, therefore, not surprising that the current coalition and government are taking steps to neutralize or cancel the agreement. Last October, the Israeli Minister of Energy described the agreement as a mistake and stated that “Israel is looking for a loophole in order to cancel the scandalous gas agreement with Lebanon.”⁹ At almost the same time, two Knesset members from the coalition demanded that Prime Minister Netanyahu cancel the maritime border agreement “following the daily attacks coming from Lebanese soil since October 7.”¹⁰ These intentions to cancel the agreement alarmed maritime law specialist Prof. Aref Fakhry, who presented an in-depth analysis of the agreement and its binding nature according to “the Vienna Convention on the Law of Treaties, the international law of the sea, customary international law, and Lebanese and Israeli law.”¹¹ However, Prof. Fakhry did not refer in his analysis to the fact that the Hezbollah threats created the urgency which is a conditional criteria in the High Court assessment of decisions made by interim governments.¹² The fact that the majority of the Israeli public, as represented by the Knesset coalition, perceives the agreement as unfair was also ignored, when fairness is, according to the International Court of Justice, a “guiding principle for maritime dispute resolution.”¹³ The political and public frustration in this matter endangers the sustainability of the agreement despite certain economic benefits gained by Israel, which are nevertheless small relative to Israel’s expectations following its territorial demands. This article suggests to examine the

fairness or equitability of the agreed-upon line: it is possible that the political “envelope” of the agreement is unfair, but the agreed-upon line is nonetheless fair. Furthermore, Netanyahu was Israel’s prime minister between 2009 and 2021, during most of the territorial conflict between the two countries, and so the delineations presented by his governments during those years are of special interest in assessing the agreed delimitation.

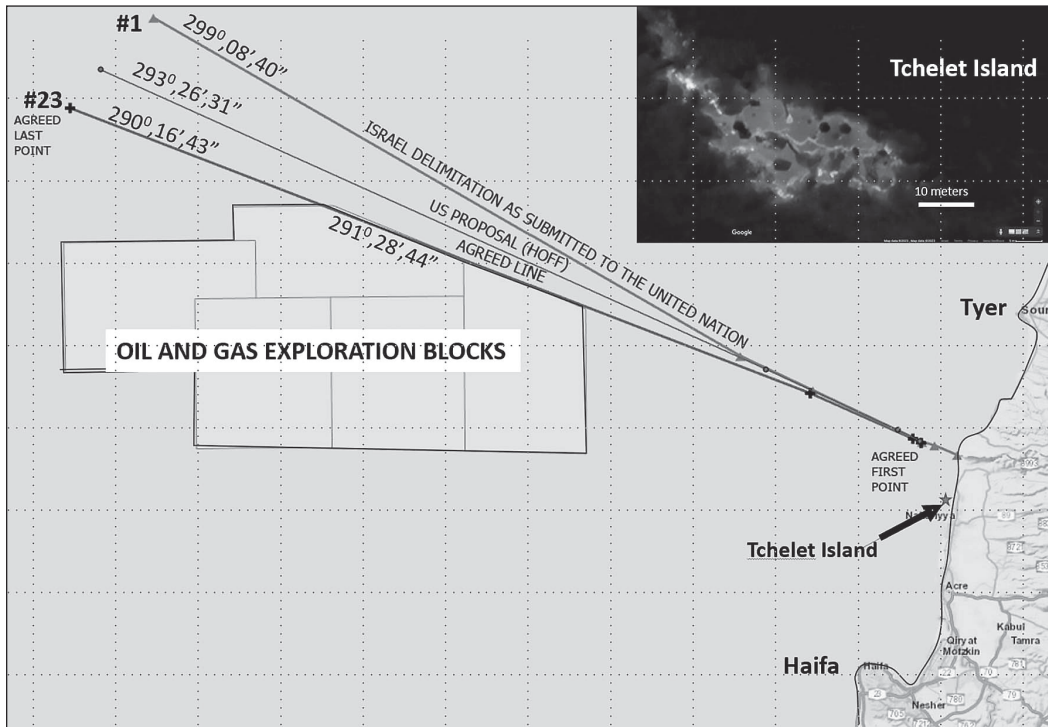


Figure 1: A map of the main official delineations for the maritime boundary between Lebanon and Israel and their azimuth orientation (Including Tchelet Island). Base map was modified from Google Maps ©. Oil and Gas exploration blocks were digitized manually by us from an official map.

Table 1: Timeline of events

Year	Context	Explanation
2000	Land “Blue Line” demarcation	Unilateral Israeli implementation of a perpendicular line at azimuth 291° (Eiland, 2018 ¹⁴ ; and Eiland, 2022 ¹⁵)
1999–2009	Early gas and oil discoveries	Noa and Mary B (1999) and Tamar and Livyatan (2009) exploration projects revealed the potential of deep-water gas & oil production in the eastern Mediterranean. ¹⁶
2003	Egypt–Cyprus EEZ agreement	Signed in 2003 and finally ratified in 2004.
2007	Lebanon–Cyprus EEZ agreement	Signed in 2007, ratified by Cyprus in 2009, but not ratified by Lebanon.
Prior to 2009	Israel Exploration Rights Map	Publication and granting of exploration rights for Alon D block (Fig. 2).

Year	Context	Explanation
2010 (14/7)	Lebanon's submission to the UN	Coordinates of Lebanon's southern median line (Fig. 3).
2010 (19/10)	Lebanon's submission to the UN	Coordinates of the southern part of the median line between Lebanon and Cyprus (Fig. 3).
2010 (17/12)	Israel–Cyprus agreement	Coordinates of the median line between the two states, extending from Point #1 southward, in part overlapping Lebanon's southwest delineation (Fig. 3).
2011–2012	Hof mediation	Equidistance delineation by Raymond Milefsky: Hof Line. ¹⁷
2011 (20/6)	Lebanon's submission to the UN	Lebanon objects to the Israel–Cyprus Median Line agreement and emphasizes Point #23 as the southernmost point of its western boundary
2011 (12/7)	Israel's submission to the UN	Israel's northern EEZ boundary delimitation extending from Nakura to Point #1 in Lebanon–Cyprus agreement (Figure 1).
2012 (May)	Israel's conditional acceptance of Hof Line	Letter from Israel's Foreign Minister to the US Secretary of State (Hof, 2020). ¹⁸
2016–2019	Mutual letters of dispute to the UN	Letters concerning the Exploration Rights Maps: Lebanese Blocks 8 & 9 and new Israeli Blocks 1, 2 & 3.
2020	Lebanon–Israel negotiations	Lebanon presents its demand for the line ending in Point #29 (not officially submitted to the UN)—Negotiations halted.
2021	Negotiations resumed	Amos Hochstein appointment as US mediator.
2022	Israel—Hezbollah confrontation	A drilling rig planned to operate in Karish gas field arrived to Israel and Hezbollah threatens it will attack Israel Maritime Gas installations if the rig will operate in Karish.
2022	Maritime boundary agreement	Both countries submitted letters to the UN with identical delimitation. ¹⁹

III. Historic Timeline

The eastern Mediterranean Basin maritime conflicts concerning its sub-division between the states bordering its shores began in the mid-1970s with the Turkish–Greek dispute regarding their mutual maritime boundary in the Aegean Sea. This conflict was then further expanded to the maritime territory around Cyprus and the Turkish Republic of Northern Cyprus. Turkey claimed that the determination of the outer limits of their “continental shelf ... shall be ... based on equitable principles, taking into account all relevant or special circumstances” and “whereby no particular delimitation method, including equidistance, has an *a priori* status because equity can only be defined in the light of the specific circumstances of the area to be delimited.”²⁰ Geographic implementation of these claims resulted in major overlaps with Cyprus’ EEZ delimitations²¹ based on employing the median line principle with Egypt, Israel, and Lebanon. Beyond the official protest, Turkey started to explore seabed oil and gas resources within Greece’s and Cyprus’ claimed maritime territories and disrupted drilling activities of companies that were granted permits by Cyprus.²² With its political, economic and military power, Turkey’s actions inflicted uncertainty regarding the EEZ boundaries delineated across the eastern Mediterranean in general, and the Lebanon–Israel EEZ negotiations in particular. The timeline presented here is

focused on the sequence of alternative delineations within the broad historical context of the conflict, but it is not aimed at providing a comprehensive review the maritime boundary dispute between the two countries.²³

Israel is active in exploring and exploiting of its oil and gas fields since the late 1990s,²⁴ with gas production in Noa and Mary B fields in 1999 and in Tamar and Livyatan fields in 2009. In 2009 (March 1), there were approved exploration rights for the Alon blocks bordering Lebanon maritime territories (Fig. 2). The magnitude of the territorial dispute between the two countries was first revealed officially by the overlapping of a section between the two countries' agreements with Cyprus. The areal conflict was then explicitly determined by their submissions to the UN (Fig. 1 and Fig. 3): Lebanon's submission of its southern maritime border during July 2010 and Israel's submission of its northern maritime boundary configuration in 2011. Fredrick Hof, who was appointed as mediator by the US, tried to bridge the gap between the two delineations by presenting a compromise line representing an equidistant delineation based on the Lebanese baseline north of Ras-A-Nakura and the Israeli baseline south of Ras-A-Nakura (Fig. 1). Lebanon, however, rejected the proposed compromise on the ground that the Israeli baseline included Tchelet Island, a small, uninhabited rocky island 1000 meters offshore (Fig. 1).

Under those circumstances and considering the regional security implications, international law experts suggested that "existing international law frameworks provide workable

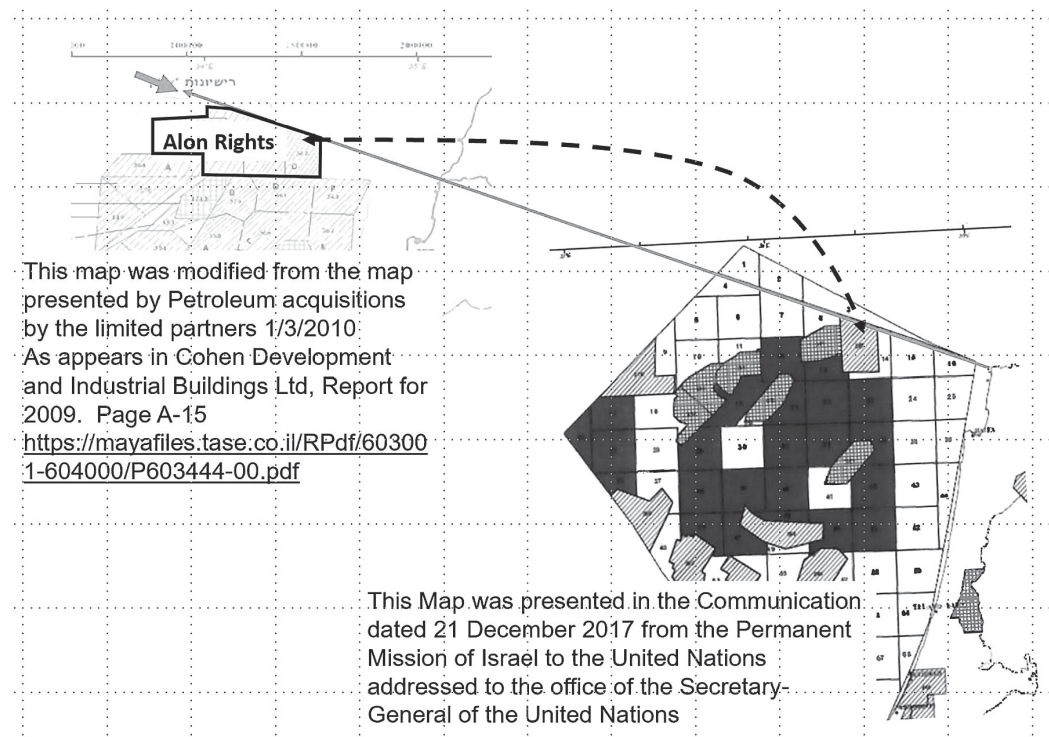


Figure 2: Oil and gas exploration maps representing the oil and gas block delineation prior to 2011 and after 2011: the line adjusted manually to the northern border of Alon blocks in the two maps show almost identical azimuthal orientation.

options to resolve this border dispute,”²⁵ and that “Israel and Lebanon should submit their maritime border dispute to an arbitral tribunal under the United Nations Convention on the Law of the Sea.”²⁶ These suggestions were not adopted by the two sides. In 2017 Israel submitted to the UN a map which returns to its delimitation of 2011. Only in 2020 were the two countries brought to the negotiations table under the auspices of the UN. But while the Israeli side expected to reach a compromise based on Hof’s equidistance line, the Lebanese side had submitted a new demand with a delineation reaching even further south of their 2010 submission to the UN. This round of negotiations broke down immediately. In 2021, Amos Hochstein, senior adviser to the US Secretary of State, was appointed as negotiator by the US. Internal political instability in both countries resulted in difficulties and progress was slow. Israel’s intent to start drilling in Karish gas field south of Lebanon’s delimitation of its southern EEZ border, with the arrival of a new oil rig from China in June 2022, were retaliated by Hezbollah’s threats to attack Israeli maritime installations if Israel continued with its plans for Karish. The US was firm in its call for a quick settlement of this long dispute before it erupted into an armed conflict. An agreement was reached in October 2022 whereby both countries submitted an identical delineation of their shared EEZ boundary to the UN. An additional agreement dealt with the exploitation of the oil and gas resources in the EEZ boundary zone, backed by US guarantees.

IV. Pre-2011 Conflict

Since Lebanon shares EEZ borders with both Israel and Cyprus, its early delineation with Cyprus from 2007 defined the initial geographic settings for the Israel–Lebanon negotiations. Figure 3 presents the coordinates of the different maritime border sections as submitted to the UN by the three parties. The unintentional presentation of Point #1 as the southernmost point of the Lebanon–Cyprus agreed-upon boundary impacted the subsequent sequence of events. On July 14th, 2010, Lebanon submitted to the UN its southern median line, as calculated based on equidistance principles relative to a baseline retrieved from the Admiralty Map of Beirut, Gaza section.²⁷ Point #23 was defined as the westernmost maritime boundary point and the tri-equidistant point between the three countries. The segment between Point #1 and Point #23, which was missing in the unratified Cyprus–Lebanon agreement, was submitted by Lebanon to the UN on October 19, 2010, establishing it as the only segment of Lebanon’s EEZ with Cyprus that gained formal international status, although it was not officially recognized by Cyprus at that time. On December 17, 2010, a parallel delineation of this segment was included in the Israel–Cyprus agreement and submitted to the UN with no explicit reference to Point #23. A trilateral conflict then emerged, as Israel objected to Lebanon’s southern median line in general and to Point #23 in particular.

V. Pre-2011 Delineations by Israel: Perpendicular Line Configurations

Israel did not officially adopt the perpendicular line configuration, but the following three references suggest that it practically implemented this configuration for bounding the northern extents of its security zones and maritime resources:

Cyprus-Israel Median Line Versus the southern section of Lebanon-Cyprus Median Line

List of geographical coordinates of points 1 to 12 in WGS84 datum defining the median line between the State of Israel and the Republic of Cyprus and its limits, annexed to the Agreement between the Government of the State of Israel and the Government of the Republic of Cyprus on the Delimitation of the Exclusive Economic Zone

POINT	LATITUDE	LONGITUDE
1	33°38'40"N	33°53'40"E
2	33°37'24"N	33°52'06"E
3	33°32'59"N	33°46'42"E
4	33°30'00"N	33°43'05"E
5	33°24'27"N	33°36'15"E
6	33°16'56"N	33°27'02"E
7	33°09'25"N	33°17'50"E
8	33°03'22"N	33°10'28"E
9	32°59'37"N	33°05'56"E
10	32°56'03"N	33°01'36"E
11	32°54'35"N	32°59'50"E
12	32°53'20"N	32°58'20"E

List of Geographic Coordinates for the Delimitation of a Maritime Boundary Line of the Territorial Sea and Exclusive Economic Zone of Israel

These points, in WGS84 datum, are connected by geodesic lines:

Latitude	Longitude
33° 06' 34.15" N	35° 02' 58.12" E
33° 06' 52.73" N	35° 02' 13.86" E
33° 10' 19.33" N	34° 52' 57.24" E
33° 31' 51.17" N	33° 46' 8.78" E

AGREED LINE Versus **Line submitted by Lebanon (14 July 2010)**

List of Geographical Coordinates

for the delimitation of the Exclusive Economic Zone in WGS 84

The following tables contain position information for the Southern Part of the Median Line between Lebanon and Cyprus

All positions are referred to WGS 84 joined consecutively by geodesics

Southern Part of the Western Median Line (Lebanon - Cyprus)

Points	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	
23	33	46	8.78	E	33	31	51.17	N
24	33	51	30.31	E	33	37	13.10	N
25	33	50	25.30	E	33	36	8.01	N
1	33	53	40.00	E	33	38	40.00	N

List of Geographical Coordinates

for the delimitation of the Exclusive Economic Zone in WGS 84

The following tables contain position information for the Median Line between Lebanon and Palestine

All positions are referred to WGS 84 joined consecutively by geodesics

Southern Median Line (Lebanon - Palestine)

Points	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	
18	35	6	11.84	E	33	5	38.94	N
19	35	4	46.14	E	33	5	45.79	N
20	35	2	58.12	E	33	6	34.15	N
21	35	2	13.86	E	33	6	52.73	N
22	34	52	57.24	E	33	10	19.33	N
23	33	46	8.78	E	33	31	51.17	N

Figure 3: Comparison between coordinates submitted to the UN by Israel and Lebanon.

- Explicit reference to a perpendicular line at an azimuth of 291° used during Israel's 2000 withdrawal from southern Lebanon, as provided by Major General Giora Eiland, the senior officer in charge of the IDF withdrawal.²⁸
- Reference to a ~290° azimuth used in 2000 by the Israeli Navy according to the IDF International Legal Division. This reference is included in the Israeli Attorney General Deputies' opinion document submitted to the Attorney General on October 11th, 2022:

"As delivered by the Navy through the International Legal Unit at the IDF's Military Law Division, the situation in the territorial waters is as follows:

Since the withdrawal of the IDF from Lebanon in 2000, the Navy's main routine security activity in the area of the maritime boundary with Lebanon consists of preventing unauthorized entry of vessels or swimmers from the territorial waters of Lebanon into the territorial waters of Israel and vice versa. This is done, among other ways, by enforcing the ban on entering the areas closed by the Maritime Zones Closure Order (#100). These areas were closed following the IDF's withdrawal from Lebanon in 2000, and their northern delineation along an azimuth of 290 ~ reflects a perception according to which up to that line, it is certainly the territorial waters of Israel."²⁹

- The direction (which we estimate as forming an 291.47° azimuth) of the northern boundary of the Alon (D) block, the northernmost block in the Petroleum and

Gas Rights Map as published in March 2009 by the Oil and Gas Division at the Israeli Ministry of National Infrastructure (Fig. 2),³⁰ and which reappeared as the northern boundary of Alon D block, which extends up to Point #23 in the Petroleum and Gas Rights Map submitted by Israel to the UN in 2017 (Fig. 2). The affinity between these two delineations is stated in the above-mentioned Attorney General's opinion document (p. 20).

Formally, these early delineations were introduced while explicitly stating that they do not represent Israel's delimitation of its northern maritime border but rather an administrative allocation of areas that undoubtedly belong to Israel's territorial waters. In other words, these delineations were made in an attempt to avoid infringing upon Lebanon's maritime territories prior to the conclusion of the two countries' shared EEZ boundary negotiations. As mentioned in the Attorney General's document, these early delineations also defined a line of certainty: Israel was confident regarding its territorial waters south of the line, yet uncertain regarding areas to its north.

Experience gathered worldwide suggest that "many of the world's new boundaries are drawn based on previous administrative frontiers."³¹ Delineations appearing on official governmental maps, such as those published in exploration rights maps, may thus certainly serve as evidence in determining the maritime boundary between Israel and Lebanon despite the fact that they are only "administrative."

VI. Implementation of the Equal Breath Perpendicular Line Method

Equidistance is the most frequently used technique in maritime boundary delimitation (e.g., Nagasaka, 2016³²; Madagwa, 2024³³) but it does not necessarily imply a fair and equitable solution (e.g., Evans, 2006³⁴; Langeraar, 1986³⁵; Østhagen, 2020³⁶). As Beazley and Frics (1982)³⁷ discussed over 40 years ago, the problem is not with the method but rather with the agreement (or lack thereof) on the baselines used. One of the main sources of the dispute between Lebanon and Israel concerns the inclusion of Tchelet Island in Israel's baseline. This island consists of an uninhabited, rocky exposure (22 × 45 meters in size) located 1 km offshore (Fig. 1). United States Ambassador Frederic Hof suggested an equidistance line calculated for a baseline that included Tchelet Island, but Lebanon firmly rejected this suggestion. Similar cases in which small natural or artificial features had distinctive influence on equidistance delineations that certain negotiation parties perceived as unfair led to the examination of alternative methods. Charney (1994),³⁸ Oxman (1995),³⁹ and Carleton and Schofield (2002),⁴⁰ among others, suggested that where baselines can be generalized by straight lines, perpendicular lines may yield an equitable division of adjacent EEZs. These generalized lines are less affected by local features and represent the "general direction of the coast" (Carleton and Schofield, 2001).⁴¹ However, there are no guidelines for the implementation of this method. In order to achieve equitable delimitation using perpendicular line approach the author suggests the following principles of the equal-breadth perpendicular line method:

- Equal-breadth: employing the method on sections of the same width on both sides.
- Ensuring sufficient total width of these sections: assessment of the effect of the width on the direction of the baseline.
- Employing statistical measures for the coastline linearity along the joint sections.

In addition to the apparent implementation of the technique in 2000 as reported earlier, the potential applicability of using a perpendicular line for the Israeli–Lebanese case was already discussed by Henderson (2021)⁴² and others. Physiographical features, such as the fault lines defining the Levant Basin⁴³ and the 1000-m bathymetric contour,⁴⁴ express the underlying structures that form the relative straightness of the joint shoreline of Lebanon and Israel (Fig. 4). This straightness and the ensuing perpendicularity have been the subject of only limited analysis. Here we employed the equal-breadth perpendicular method as follows⁴⁵:

1. A normal baseline is digitized from a Google Earth satellite image (Fig. 5) and transferred to UTM coordinates. Equitable implementation of this method implies including equal shoreline sections on both sides of the terminal land boundary point between the two countries.
2. A linear regression technique between the UTM latitude and longitude coordinates was used to determine the generalized linear orientation of the joint shoreline sections and its goodness of fit (R^2 and significance).
3. The direction of the perpendicular line is then determined from the regression equation coefficients.

Four ranges of segments were selected considering the spatial variation of the joint shoreline (Fig. 5). Table 2 presents the information retrieved for these four segments following the implementation of the linear regression analysis.

Table 2: Assessment of perpendicular lines

	Equation	Coefficient of determination: R^2	Length of shoreline section (Distance from Ras A-Nakura \times 2)	Azimuth of Perpendicular line
Beirut–Netanya	$Y=2.7691 \cdot X + 1,726,095$	0.9836	$96 \times 2 = 192$ km	289.856°
Sidon–Atlit	$Y=2.6045 \cdot X + 1,843,937$	0.9586	$54 \times 2 = 108$ km	291.004°
Sarafand–Haifa	$Y=2.6689 \cdot X + 1,798,311$	0.9253	$40 \times 2 = 80$ km	290.540°
Tyre–Acre	$Y=2.3855 \cdot X + 1,996,047$	0.862	$20 \times 2 = 40$ km	292.743°

Y: Latitude UTM Coordinates; X: Longitude UTM Coordinates.

High regression R^2 values were obtained for all configurations, with values increasing with the increase in segment length. The azimuth of the perpendicular varies between 289.856° for the longest segment (Beirut–Netanya) and 292.743° for the shortest segment (Tyre–Acre). These azimuthal differences are not insignificant at all; they form a common methodological basis for reaching a mutually compromised solution by simply averaging or by weighting the strength of each configuration by the length of the base line and by the strength of the statistical correlation.

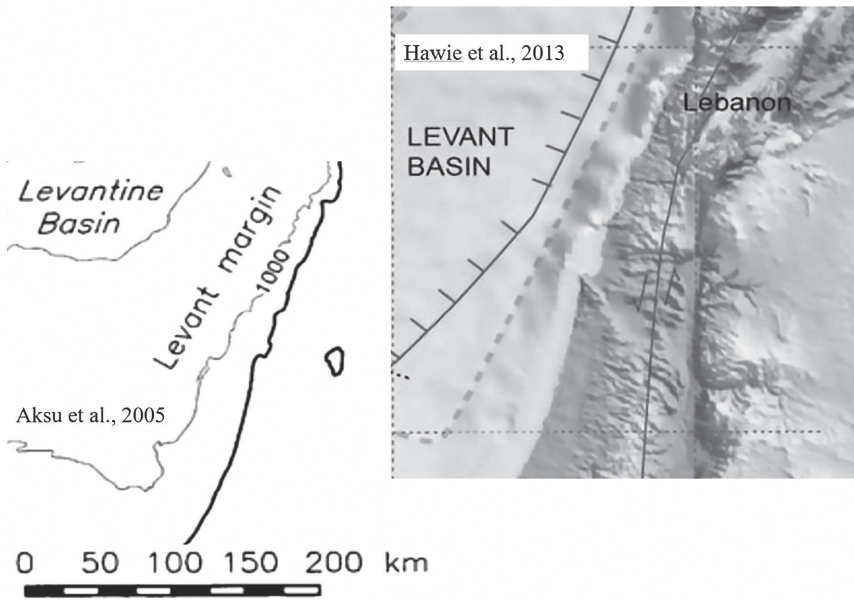


Figure 4: Physiographical features responsible for the relative straightness of the joint Lebanon-Israel shoreline as presented in Aksu et al. (2005) (left) and Hawie et al. (2013) (right).

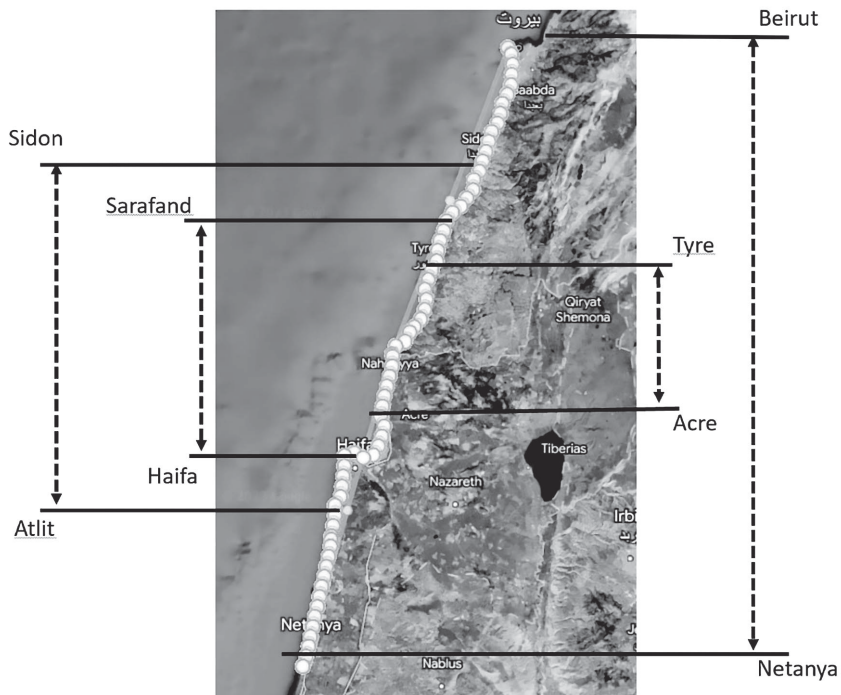


Figure 5: The baseline manually digitized from Google Earth © with the extents of four sections selected for generalizing the shoreline direction by linear regression.

VII. Discussion and Conclusions

The agreed-upon boundary, which is identical to the median line submitted to the UN by Lebanon in 2010, highly fits an azimuth of 291° from Ras A-Nakura. One may suggest that the azimuth of 289.856° for the longest section (Beirut—Netanya) which has a determination coefficient (R^2) of 0.9865 represents the most equitable solution. Another suggestion could relate to the average azimuth of 291.035°. Both versions are close enough to the equidistance delimitation and *thus suggest that it represents an equitable solution for the conflict*. There are multiple evidences that Israel used the perpendicular line configuration: the azimuth used by the Israeli Navy since 2000, as approved by the International Legal Division of the IDF, the azimuth formed by the northern boundary of early (March 1, 2009) Israeli Petroleum and Gas Exploration Blocks, and a line included in Israel's submission to the UN in 2017⁴⁶ (Figure 2).

Israel's High Court who reviewed the case assessed the differences between the Israeli configuration toward point # and the agreed line toward point #23 (items 52 to 56, pages 30 to 32)⁴⁷ and concluded that the territory between these lines was delineated for negotiation purposes, without making any impact on the situation in the field. The territory south of the line stretched toward point #23, was on the other hand, treated by the government as Israeli EEZ since the withdrawal from Lebanon (during 2000). Suggestions that the close fit between Israel's de facto delimitation based on perpendicular line configuration and the Lebanese delimitation of 2010 was not noticed and its implications regarding the possibility of early agreement were overlooked are hard to believe. The main question is, in my opinion, more about why it had taken 10 years to agree on an equitable delimitation, which was on the table already in 2012.

Notes

1. Exchange of letters constituting a maritime agreement between the State of Israel and the Lebanese Republic: https://treaties.un.org/Pages/showDetails.aspx?objid=0800002806029d5&clang=_en.

2. Andreas Østhagen, "Maritime Boundary Disputes: What Are They and Why Do They Matter?" *Marine Policy*, 120, 104118 (2020), p. 4, <https://doi.org/10.1016/j.marpol.2020.104118>.

3. Daniel Sobelman, "Hezbollah's Coercion and the Israel-Lebanon Maritime Deal," *Middle East Policy* (2023), pp. 75–93, 78, <https://doi.org/10.1111/mepo.12689>.

4. David Israel, "Netanyahu: Lapid's Gas Deal a Surrender to Hezbollah, We Are Not Bound by It," *Jewish Press*, October 2, 2022. <https://www.jewishpress.com/news/middle-east/lebanon/netanyahu-lapids-gas-deal-a-surrender-to-hezbollah-we-are-not-bound-by-it/2022/10/02/>.

5. Tov News editorial, "Smotrich Call for the Right Wing: Do Not Recognize the Agreement with Lebanon," *Tov News* (in Hebrew), October 2, 2022, <https://tovnews.co.il/30742>.

6. Yossi Verter, "Netanyahu Says He'll Quash the Gas Deal—and the Country and World Can Burn," *Haaretz*, October 7, 2022, <https://www.haaretz.com/israel-news/elections/2022-10-07/ty-article/premium/water-fight/00000183-ae2-d5eb-a3af-fef652b50000>.

7. High Court. Petition for a conditional order (#6654). Decision (in Hebrew) sections 9–11 (pages 39–41), <https://supremedecisions.court.gov.il/Home/Download?path=HebrewVerdicts%5C22/540/066/M16&fileName=22066540.M16&type=4>.

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