

Examining the Principle of Equity in the Delimitation of the Continental Shelf with Emphasis on the Jurisprudence of the International Court of Justice: Proposing a Hybrid Model for Dispute Resolution in the Persian Gulf

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Abstract

Continental shelf disputes in the Persian Gulf, due to its strategic position and rich subsoil resources, represent one of the key challenges in the field of the law of the sea, the resolution of which requires an innovative approach that transcends traditional frameworks. This article focuses on redefining the principle of equity in the delimitation of the continental shelf and proposes a hybrid model that integrates quantitative criteria (such as geophysical data and coastline lengths) and qualitative elements (such as economic needs and geopolitical conditions), inspired by the jurisprudence of the International Court of Justice. The study first analyzes key ICJ cases, including the North Sea Continental Shelf cases (1969), *Tunisia v. Libya* (1982), and *Nicaragua v. Colombia* (2012), and extracts implicit equity standards. Then, by aligning these criteria with the specific characteristics of the Persian Gulf, it presents an operationalized model that can be implemented through a regional institution under international supervision. The findings indicate that this model can not only provide a sustainable solution for disputes such as the Arash Field conflict, but also promote regional cooperation and reduce geopolitical tensions, offering a replicable framework for other maritime regions globally.

Keywords: continental shelf, Persian Gulf, law of the sea, International Court of Justice, dispute settlement, 1958 and 1982 Conventions.

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1. Introduction

The continental shelf, as part of the maritime territory of states, holds a special strategic significance in the law of the sea due to its abundant subsoil resources such as oil and gas. The Persian Gulf, with its strategic geographical position and vast natural resources, constitutes one of the most sensitive and contested regions in the world. Continental shelf delimitation disputes in this area have created multifaceted challenges with legal, political, and practical dimensions. The 1958 and 1982

Conventions on the Law of the Sea, along with the jurisprudence of the International Court of Justice (ICJ), have introduced the principle of equity as one of the key foundations for resolving such disputes. However, the lack of a coherent and objective framework for the application of this principle has often resulted in persistent tensions and conflicting interpretations among coastal states. This article, aiming to redefine the principle of equity through the development of an innovative hybrid model, seeks to offer a solution that combines quantitative criteria (such as coastline length and geophysical data) with qualitative considerations (such as economic needs and geopolitical concerns). Drawing inspiration from ICJ jurisprudence in cases such as the North Sea Continental Shelf (1969), *Tunisia v. Libya* (1982), and *Nicaragua v. Colombia* (2012), and adapting it to the specific conditions of the Persian Gulf, this model not only contributes to the sustainable resolution of maritime boundary disputes but also serves as a framework for strengthening peace and cooperation in other maritime regions. Accordingly, the implicit equity criteria extracted from the Court's practice are first analyzed, followed by an explanation of the proposed model and its application to an actual dispute such as the Arash Field. The ultimate objective of this research is to provide a framework that fills the existing gaps in the interpretation and implementation of legal principles while promoting regional security and cooperation in the Persian Gulf.

2. Legal Foundations for Continental Shelf Delimitation

2.1. *Defining the Concept of the Continental Shelf in the Law of the Sea (1958 and 1982 Conventions)*

The continental shelf refers to the seabed and subsoil extending from the coastline of a state to the point where there is a marked slope. This area, due to its abundant natural resources such as oil, gas, and minerals, holds particular strategic and economic importance for coastal states. According to definitions set forth in the 1958 Geneva Convention and the 1982 United Nations Convention on the Law of the Sea (UNCLOS), coastal states are entitled to sovereign rights for the purpose of exploring and exploiting the natural resources of their adjacent continental shelf without the need for declaration or occupation (Sohrabi Malayousofi, 2022). The 1958 Geneva Convention, as the first international instrument in this field, defined the limits of the continental shelf and the rights of coastal states regarding resource exploitation. It emphasized that a coastal state may claim rights up to a depth of 200 meters or beyond, provided that resource exploitation is possible (Sirafi Sasan, 2015). Subsequently, the 1982 Convention introduced a more comprehensive definition, extending the continental shelf up to 200 nautical miles from the baseline, regardless of water depth. To address overlapping claims and promote boundary resolution, this Convention established mechanisms such as the Commission on the Limits of the Continental Shelf (CLCS) to review and validate coastal states' submissions (Khani Bahador, 2023).

Moreover, under Article 76 of the 1982 Convention, states may submit scientific evidence to claim an extended continental shelf up to 350 nautical miles. This provision has enabled countries such as Canada and Norway to extend their continental shelves in remote areas using geophysical and hydrographic data (Rezaei Bozanjani, 2024). At the international level, the ICJ has also interpreted and applied the provisions of the 1958 and 1982 Conventions in various cases, such as the *Nicaragua v. Colombia* (2012) and *North Sea Continental Shelf* cases. These judgments show that in addition to legal principles, geographical and economic factors also play a significant role in the delimitation of the continental shelf (Azarkasht, 2022).

2.2. *Criteria for Delimiting the Continental Shelf*

Delimiting the continental shelf between neighboring states remains one of the major challenges in the law of the sea. This section discusses the primary criteria for continental shelf delimitation, including the principles of agreement, equity, the baseline, and the roles of distance and depth.

a) Principle of Delimitation by Agreement

The principle of delimitation by agreement emphasizes the importance of bilateral and multilateral negotiations among neighboring states to determine the boundaries of their continental shelves. This principle permits states to delimit their continental shelves through negotiations and agreements without resorting to international adjudication. The 1958 Geneva Convention and the 1982 UNCLOS explicitly address this principle, granting coastal states the authority to reach agreements based on geographical characteristics and shared interests (Sohrabi Malayousofi, 2022). Not only does this principle help

reduce tensions between neighboring states, but it also prevents legal disputes and referrals to the ICJ. For instance, bilateral agreements such as those between Iran and Kuwait concerning joint oil fields in the Persian Gulf and other agreements in the South China Sea have effectively prevented maritime boundary conflicts (Heydar & Daramir, 2021). In international cases such as *Nicaragua v. Colombia* (2012) and the *North Sea cases* (1969), the ICJ has noted that bilateral agreements based on equity and non-discrimination can serve as effective means of resolving maritime disputes. These rulings demonstrate the Court's preference for negotiated solutions over rigid mechanical lines, emphasizing agreement and bilateral dialogue as tools for achieving maritime stability and peace (Jahani, 2011). Furthermore, the 1982 Convention strengthened this principle by establishing the CLCS and requiring states to submit scientific evidence in support of their claims. This approach enabled states like Canada and Norway to extend their continental shelves up to 350 nautical miles with neighboring states' consent (Khani Bahador, 2023).

b) Principle of Equity and Its Role in Delimitation

The principle of equity, as a complementary rule in the law of the sea, allows the ICJ to determine continental shelf boundaries based on justice and non-discrimination in the absence of an agreement between states. This principle is grounded in equal rights and the protection of legitimate interests, aiming to delimit boundaries fairly by considering special geographic conditions, natural resources, and coastal states' economic interests (Shakeri & Pourbaferani, 2021). The 1958 and 1982 Conventions explicitly address this principle, allowing coastal states to refer disputes to the ICJ if negotiations fail. In landmark cases such as the *North Sea Continental Shelf* (1969) and *Nicaragua v. Colombia* (2012), the Court invoked the principle of equity, issuing rulings that emphasized not only equality but also regional geographic and economic factors (H. Moeini, 2021). According to the Court's jurisprudence, the principle of equity considers not only the equality of states but also factors such as geographic location, coastal configurations, and the presence of islands or rocks. For example, in the *Nicaragua v. Colombia* case, the Court accounted for the region's special geographic features and issued a judgment that preserved both parties' economic rights while maintaining equality (Jafari, 2004). Furthermore, the 1982 Convention makes specific reference to equity, allowing coastal states to claim extended continental shelves up to 350 nautical miles based on scientific evidence. This provision illustrates that equity plays a fundamental role not only in delimitation but also in determining states' rights over natural resources on the continental shelf (Sabernejad, 2019).

c) The Baseline and Its Delineation Methods

The baseline is the reference point from which maritime zones such as the territorial sea, exclusive economic zone (EEZ), and continental shelf are measured. The 1982 UNCLOS grants states the authority to choose a normal or straight baseline based on their coastal geography. The normal baseline follows the low-water line along the coast, whereas the straight baseline connects points on protruding land features or nearshore islands (Riazi, 2022). Various methods exist for delineating the baseline, including the normal baseline, straight baseline, and archipelagic baseline. The straight baseline is especially useful in areas with irregular coastlines or numerous islands, such as the Persian Gulf and the South China Sea. This method enables states to draw boundaries that serve their economic and security interests more effectively (Khani Bahador, 2023). However, under the 1982 Convention, the use of a straight baseline is restricted to specific conditions—it must not enclose semi-enclosed seas or infringe upon other states' rights. These limitations aim to prevent overlapping claims and reduce boundary tensions (Sirafi Sasan, 2015). Additionally, in various cases, including the *North Sea Continental Shelf* and *Nicaragua v. Colombia*, the ICJ has assessed how baselines are drawn and emphasized that they must comply with principles of equity and non-discrimination. These rulings demonstrate the Court's attention to specific geographic circumstances and coastal characteristics when evaluating baselines (Azarkasht, 2022). The baseline and its delineation methods play a crucial role in delimiting the continental shelf and other maritime zones. They allow states to define their maritime limits and exploit marine resources. However, these methods must be consistent with international legal principles, particularly equity and bilateral agreement (Heydar & Daramir, 2021).

d) The Role of Distance and Depth in Continental Shelf Delimitation

Under Article 76 of the 1982 UNCLOS, the continental shelf may extend up to 200 nautical miles from the coastal baseline, regardless of water depth. The article also permits claims for extension up to 350 nautical miles if valid scientific evidence of an extended continental margin is provided. This clause is particularly relevant to states like Norway and Canada, which possess

extensive continental shelf areas in polar and North Atlantic regions (Khani Bahador, 2023). By establishing the CLCS, the 1982 Convention allows states to submit geophysical and hydrographic data for review. The Commission, acting as a scientific and technical body, plays a vital role in verifying and validating such claims. For instance, Canada succeeded in extending its shelf boundaries in the Arctic region through scientific submissions (Sirafi Sasan, 2015). In addition to distance, depth is also an important factor in continental shelf delimitation. Although the shelf typically extends to a depth of 200 meters, based on special geographical features and coastal structure, it may stretch further. In areas where the continental margin slopes steeply or reaches significant depths, states may seek shelf extension by submitting scientific evidence (Sohrabi Malayousofi, 2022). The ICJ, in cases such as the North Sea Continental Shelf involving Germany, Denmark, and the Netherlands (1969), has addressed the role of distance and depth in delimitation. The Court emphasized that when the continental margin extends beyond 200 miles, states may claim extended shelves based on scientific data while respecting the rights of other states (H. Moeini, 2021). Article 76 of the 1982 Convention, by considering geographical conditions and the specific characteristics of maritime areas, enables states to delimit continental shelf boundaries based on distance and depth. This approach not only balances the rights of coastal states but also facilitates peaceful resolution of maritime disputes (Shakeri & Pourbaferani, 2021).

2.3. *Analysis of the Jurisprudence of the International Court of Justice in Redefining the Principle of Equity for Continental Shelf Delimitation: Toward a Hybrid Model*

The International Court of Justice (ICJ), as the principal authority for interpreting and applying the law of the sea, has played a pivotal role in resolving continental shelf disputes. Relying on the principles enshrined in the 1958 and 1982 Conventions on the Law of the Sea, particularly the principle of equity, the Court has addressed continental shelf delimitation in numerous cases. However, the flexible and qualitative nature of this principle has often led to divergent interpretations, underscoring the need for its redefinition. This section analyzes the Court's jurisprudence in three key cases, extracting the implicit criteria of equity, and on this basis, proposes a new hybrid model for delimiting the continental shelf that can be adapted to complex regions such as the Persian Gulf.

The first major case, the North Sea Continental Shelf case (1969) involving Germany, Denmark, and the Netherlands, saw the Court reject a mechanical use of the equidistance line and instead embrace equity as the foundational principle for delimitation. The Court emphasized that factors such as the length of coastlines and equitable access to natural resources should be considered in decision-making (Tonekaboni, 2021). This approach demonstrated that equity is not merely an abstract concept but can be complemented by objective criteria such as geographic proportionality (Shakeri & Pourbaferani, 2021). In the Tunisia/Libya case (1982), the Court applied equity flexibly, considering specific geographical and economic conditions of the region, including the existence of islands and developmental needs, and stressed the importance of balancing the rights of both parties (Rothwell & Stephens, 2016). This judgment highlighted the need to consider economic and geopolitical factors alongside geographical criteria (H. Moeini, 2021). Similarly, in Nicaragua v. Colombia (2012), the Court examined the impact of small islands on delimitation and invoked equity to prevent disproportionate maritime allocations, implicitly introducing criteria such as "non-cutoff access" and "resource proportionality" (Bozanjani, 2024).

These decisions indicate that, although the Court has not explicitly presented an objective framework for equity, it has implicitly employed a combination of criteria including coastal length proportionality, resource access, and specific regional conditions (Azarkasht, 2022). However, the absence of a systematic model has made the application of this principle particularly challenging in cases such as those in the Persian Gulf, where overlapping claims and geopolitical tensions prevail (Heydar & Daramir, 2021). Therefore, this study proposes the development of a hybrid model that integrates these dispersed criteria into a coherent framework. This model comprises three key components:

1. **Quantitative Criteria:** Utilization of geophysical data (such as continental shelf depth and slope) and measurement of coastline length to determine preliminary boundaries, inspired by the North Sea case (Sirafi Sasan, 2015).
2. **Qualitative Criteria:** Consideration of the coastal states' economic needs and geopolitical concerns (such as preventing landlocked access), inspired by the Tunisia/Libya ruling (Khani Bahador, 2023).

3. **Implementation Mechanism:** Establishment of a regional body under the supervision of the United Nations or the Commission on the Limits of the Continental Shelf (CLCS) to evaluate and enforce these criteria, based on the ICJ's emphasis on equity and balance in the Nicaragua/Colombia case (Jahani, 2011).

This hybrid model not only preserves the flexibility of the equity principle but also enhances its applicability in complex regions like the Persian Gulf by objectifying it through scientific data and institutional mechanisms. For instance, in the Arash Field dispute involving Iran, Kuwait, and Saudi Arabia, this model can offer a fair and sustainable solution by analyzing joint geophysical data and considering each country's economic needs (Rahmati, 2019). Thus, analyzing the Court's jurisprudence provides not only a foundation for redefining equity but also a basis for developing an innovative model for resolving continental shelf disputes globally.

3. Assessing the Challenges to Redefining the Principle of Equity in Resolving Continental Shelf Disputes

The resolution of continental shelf disputes, particularly in regions such as the Persian Gulf, faces numerous challenges rooted in legal, political, and practical dimensions. This section offers a novel perspective on these challenges, analyzing them within the framework of redefining equity and applying the proposed hybrid model. Unlike traditional approaches that merely identify problems, this study considers these challenges as opportunities for developing a more objective and effective framework. Accordingly, legal, political, and practical challenges are evaluated not merely as obstacles but as avenues for strengthening the proposed model.

3.1. Legal Challenges

a. Ambiguity in the Interpretation and Application of Legal Principles Governing Continental Shelf Delimitation

One of the primary challenges in resolving continental shelf disputes lies in the ambiguity surrounding the interpretation and implementation of the legal principles set forth in the 1958 and 1982 Conventions on the Law of the Sea, particularly the principle of equity. This ambiguity, stemming from the qualitative and flexible nature of equity, has often led to conflicting interpretations among coastal states, hindering the achievement of sustainable solutions. For instance, in the Persian Gulf, disputes such as the Arash Field illustrate how the absence of objective criteria for applying equity has exacerbated tensions (Heydar & Daramir, 2021). The 1958 Geneva Convention, due to its limited definitions, and the 1982 Convention, despite its attempt to offer broader principles, still rely in Article 76 on vague terminology related to delimitation up to 200 or 350 nautical miles, which requires complex interpretations grounded in scientific data (Khani Bahador, 2023).

Although the ICJ has emphasized the principle of equity in cases such as the North Sea (1969) and Tunisia/Libya (1982), its failure to establish a clear framework for objectifying this principle has added to the uncertainty (Shakeri & Pourbaferani, 2021). For example, in the North Sea case, the Court referred to coastline proportionality as an implicit criterion, but this was not systematically developed in subsequent rulings (Tonekaboni, 2021). These ambiguities are particularly problematic in geographically complex areas such as the Persian Gulf, characterized by irregular coastlines and numerous islands, which have led to divergent interpretations of baselines and continental shelf boundaries (Sirafi Sasan, 2015).

Nevertheless, this challenge can be viewed as an opportunity for redefining equity within the framework of the hybrid model proposed in this study. By integrating quantitative criteria (such as geophysical data and coastal proportionality) with qualitative ones (such as economic needs), the model seeks to reduce interpretative ambiguities. For example, in the Persian Gulf disputes, the use of shared hydrographic maps and assessment of countries' economic needs could transform equity from an abstract notion into a practical tool (Rahmati, 2019). Thus, ambiguity in the interpretation of legal principles is not merely a barrier but serves as a catalyst for the development of an innovative framework that, by drawing on ICJ jurisprudence and scientific data, contributes to the sustainable resolution of disputes.

b. Overlapping Claims of Neighboring States on the Continental Shelf

Overlapping boundary claims between neighboring states, arising from geographical characteristics and the strategic positioning of maritime zones, represent one of the principal legal challenges in resolving continental shelf disputes. This issue is particularly prominent in semi-enclosed areas such as the Persian Gulf, where coastal states have relatively short maritime

boundaries. Many Persian Gulf coastal states, due to the presence of shared oil and gas fields, have made contradictory claims regarding their continental shelf boundaries, leading to heightened tensions and serious legal disputes in the region (Heydar & Daramir, 2021). For instance, the dispute among Iran, Kuwait, and Saudi Arabia over the Arash (Al-Durra) oil field exemplifies overlapping maritime claims. Due to its unique location, all three countries assert ownership over parts of this field. In such situations, the lack of clear legal frameworks and efficient delimitation methods exacerbates these tensions (Esfahad & Najafi, 2019). Moreover, divergent interpretations of the 1958 and 1982 Conventions, and the application of principles such as the baseline and equity, have led neighboring countries to utilize scientific and legal data to expand their continental shelf claims. These conflicts are also evident in the South China Sea, where regional states invoke historical lines and geophysical data to assert conflicting claims (Sirafi Sasan, 2015). The International Court of Justice, in cases such as the North Sea disputes between Germany, Denmark, and the Netherlands, has addressed overlapping maritime claims and emphasized the importance of applying the principle of equity and bilateral agreements. These precedents reveal that in the absence of comprehensive agreements between neighboring states, overlapping claims can escalate into serious crises (Jafari, 2004).

c. The Impact of Islands and Rocks on Continental Shelf Delimitation

Another legal challenge in determining continental shelf boundaries is the role of islands and rocks. According to Article 121 of the 1982 United Nations Convention on the Law of the Sea, islands are entitled to an exclusive economic zone (EEZ) and a continental shelf, whereas rocks that cannot sustain human habitation or economic life do not possess such entitlements. This legal distinction between islands and rocks has led states to offer varying interpretations of these terms, resulting in divergent continental shelf claims (Sirafi Sasan, 2015). For instance, in the Persian Gulf, some states have invoked the existence of small and often uninhabitable islands to extend their continental shelf boundaries. These claims are particularly evident in disputes involving Iran and the United Arab Emirates over islands such as Greater Tunb, Lesser Tunb, and Abu Musa, which have significantly intensified maritime boundary tensions (Heydar & Daramir, 2021). The ICJ has also examined the role of islands in continental shelf delimitation in cases such as *Nicaragua v. Colombia*, asserting that small islands should not disproportionately influence the delimitation of continental shelves of larger states. This approach reflects the Court's intent to strike a balance between the rights of coastal states and the prevention of overlapping maritime claims (H. Moeini, 2021). Therefore, the role of islands and rocks in continental shelf delimitation constitutes not only a legal challenge but also an influential factor in political and economic relations among neighboring states. This issue necessitates a reevaluation of legal interpretations and the establishment of regional mechanisms to resolve island- and rock-related disputes (Shakeri & Pourbaferani, 2021).

d. Challenges Arising from Enclosed and Semi-Enclosed Seas

Enclosed and semi-enclosed seas, such as the Persian Gulf, due to their geographical limitations and specific features, pose significant challenges for the delimitation of continental shelf boundaries. In such regions, coastal states often face intensified disputes over the division of marine resources due to spatial constraints and the proximity of maritime borders. These challenges are particularly pronounced because of shared oil and gas fields and long-standing historical and political disputes among regional countries (Esfahad & Najafi, 2019). One of the most critical problems in this regard is the overlapping claims of neighboring states, which, in the absence of precise and transparent boundaries, have consistently led to maritime tensions. For example, the Iran-Kuwait dispute over the Arash oil field, and the maritime boundary conflict between Qatar and Bahrain, are clear illustrations of such challenges. These disputes involve not only legal dimensions but also significant political and economic aspects, requiring resolution through peaceful methods and bilateral agreements (Heydar & Daramir, 2021). The 1982 UNCLOS explicitly addresses the issues associated with enclosed and semi-enclosed seas and seeks to resolve them by introducing principles such as equity and bilateral cooperation. Nonetheless, differing interpretations of these principles by coastal states and reliance on conflicting geophysical and hydrographic data have prevented the Convention from fully resolving the challenges in these regions (Sirafi Sasan, 2015). Additionally, the ICJ, in cases such as *Nicaragua v. Colombia*, has addressed the complexities of enclosed seas and emphasized the necessity of applying equity and non-discrimination in continental shelf delimitation. These rulings suggest that the use of joint regional commissions and the development of regional conventions may serve as effective solutions for reducing tensions and resolving disputes (Jafari, 2004).

3.2. *Political Challenges*

a. The Existence of Political and Historical Disputes Among Neighboring States

Political and historical disputes among coastal states have hindered effective agreements on continental shelf delimitation. For instance, longstanding disagreements between Iran and certain Gulf states over the ownership of islands and subsoil resources have complicated the resolution process. Disputes over islands such as Greater Tunb, Lesser Tunb, and Abu Musa between Iran and the United Arab Emirates are prominent examples of these challenges. Due to their strategic location, these islands are not only considered sovereignty points but are also utilized as instruments to extend continental shelf claims and exploit maritime resources (Rahmati, 2019).

b. Unwillingness of Certain States to Negotiate and Reach Agreements

Some countries, motivated by economic and strategic interests, are reluctant to engage in negotiations or reach agreements on continental shelf boundaries. This reluctance often results in the referral of disputes to the International Court of Justice or other arbitral bodies, processes that are typically time-consuming and costly. For example, the border dispute between Iran and Iraq over the Arvand Rud (Shatt al-Arab) demonstrates that even when treaties such as the 1975 Algiers Agreement exist, the unwillingness of parties to fully implement such accords prolongs tensions (Jafari, 2004).

c. The Influence of Extra-Regional Powers in Maritime Disputes

The presence and influence of extra-regional powers in strategic areas like the Persian Gulf constitute another political challenge. These powers complicate the dispute resolution process by supporting certain parties and strengthening their positions. For example, the roles of the United States and the United Kingdom in backing some Gulf states and maintaining military bases have significantly affected coastal state relations and hindered the peaceful resolution of disputes (Heydar & Daramir, 2021).

3.3. *Practical Challenges*

The resolution of continental shelf disputes depends not only on legal principles and political will but also faces multiple practical barriers that complicate the application of norms, particularly the principle of equity. This section analyzes these practical challenges through the lens of the proposed hybrid model and demonstrates how such obstacles can serve as a foundation for strengthening objective and operational solutions.

a. Challenges Related to the Collection and Analysis of Geophysical and Hydrographic Data

Accurate continental shelf delimitation requires high-precision geophysical and hydrographic data, the collection and analysis of which are costly and technically complex—especially for developing coastal states (Bozanjani, 2024). This limitation not only leads to discrepancies in data interpretation but also becomes a disadvantage in international adjudications, as resource-limited countries are unable to effectively substantiate their claims (Sirafi Sasan, 2015). For example, in the Persian Gulf, the absence of mutually accepted data among coastal states—such as Iran and Kuwait in the Arash Field dispute—has prolonged disagreements. However, the hybrid model proposed in this study transforms this challenge into an opportunity. By emphasizing quantitative criteria, such as the use of geophysical data, the model suggests that regional states establish shared databases under the supervision of a regional authority. This approach not only reduces costs but also fosters mutual trust by objectifying the principle of equity (Khani Bahador, 2023). Inspired by the ICJ's ruling in the North Sea case (1969), this strategy contributes to minimizing data-related disputes.

b. High Costs of International Litigation and Arbitration

Litigation and arbitration in the law of the sea are highly costly processes due to the need for legal and technical experts and scientific evidence (Sirafi Sasan, 2015). Consequently, some countries, especially those with limited financial resources, avoid referring disputes to international forums and instead favor bilateral or multilateral agreements (Azarkasht, 2022). For instance, in the Persian Gulf, the high costs of arbitration are among the reasons why direct negotiations between Iran and Kuwait over shared oil fields have been preferred. The proposed hybrid model addresses this challenge by reducing reliance on costly arbitration through the creation of a regional institution tasked with evaluating equity based on objective criteria. This institution can provide quicker and less expensive solutions using shared data and predetermined rules, aligning with the ICJ's

emphasis on equity and balance in the Tunisia/Libya case (1982) (M. Moeini, 2021). Accordingly, the model minimizes litigation costs and offers a practical alternative to traditional adjudication.

c. Difficulties in the Enforcement of Judicial and Arbitral Decisions

Even when the International Court of Justice or arbitral tribunals issue rulings, enforcement often faces serious challenges due to the absence of robust international enforcement mechanisms. Many states, for political or economic reasons, refrain from fully implementing judgments (Heydar & Daramir, 2021). For example, in several Persian Gulf disputes, geopolitical considerations and the influence of extra-regional powers have obstructed the execution of agreements or rulings (Rahmati, 2019). The hybrid model proposed in this study addresses this challenge by recommending the establishment of a regional institution under the supervision of the United Nations. Such a body could strengthen enforceability by continuously monitoring the implementation of decisions and issuing transparent reports. This mechanism, inspired by the ICJ's emphasis on balance and cooperation in *Nicaragua v. Colombia* (2012), not only facilitates enforcement but also builds state confidence and prevents potential violations (Jahani, 2011). Thus, this approach transforms the application of equity from a theoretical challenge into a practical process.

4. Examining Continental Shelf Disputes in the Persian Gulf

4.1. Analyzing the Causes and Origins of the Disputes

Continental shelf disputes in the Persian Gulf have long posed major challenges among coastal states due to the region's strategic geographical position and its abundant oil and gas resources. The presence of small islands and uninhabitable rocks, which are nonetheless used as bases for determining continental shelf boundaries, is one of the primary causes of these disputes. Additionally, overlapping claims by neighboring states and divergent interpretations of the Law of the Sea Conventions have further complicated these conflicts (Rahmati & Naseri, 2020).

4.2. Review of Efforts to Resolve the Disputes

Coastal states of the Persian Gulf have undertaken efforts to resolve these disputes using legal instruments such as bilateral and multilateral agreements, international arbitration, and direct negotiations. For example, bilateral agreements between Iran and Kuwait over shared oil fields highlight the importance of diplomacy and regional cooperation in reducing tensions. Moreover, referring certain disputes to the International Court of Justice and employing alternative dispute resolution (ADR) mechanisms have been used as strategies to prevent the escalation of crises (Heydar & Daramir, 2021).

4.3. Proposals for Resolving Continental Shelf Disputes in the Persian Gulf Based on a Hybrid Equity-Based Model

Given the legal, political, and practical complexities of continental shelf disputes in the Persian Gulf, a comprehensive and innovative approach is required—one that goes beyond traditional international legal principles. This section, relying on the proposed hybrid model that integrates the principle of equity with quantitative and qualitative criteria, offers practical and regionally oriented solutions for resolving these disputes. These proposals not only help reduce tensions but also promote regional cooperation and contribute to lasting peace in the Persian Gulf.

The first proposal is the establishment of a regional body to apply the hybrid equity model, grounded in the principles of agreement and fairness. Composed of representatives from the coastal states and operating under the supervision of the United Nations or the Commission on the Limits of the Continental Shelf, this body would analyze shared geophysical data and assess economic needs to issue binding recommendations (Khani Bahador, 2023). For instance, in the Arash Field dispute, such a body could determine a fair boundary by measuring coastline proportionality and reviewing hydrographic data, thereby preventing conflicting interpretations (Sirafi Sasan, 2015).

The second proposal involves utilizing science-based mediation rather than traditional methods. International organizations such as the United Nations could facilitate trust-building among coastal states by providing a platform for the exchange of geophysical and hydrographic data. Inspired by the ICJ's emphasis on balance in *Nicaragua v. Colombia* (2012), this approach

would accelerate negotiations by reducing legal ambiguities (Heydar & Daramir, 2021). As an ADR method, it would also reduce the cost and time associated with arbitration.

The third proposal is the development of a regional agreement based on the hybrid model, ensuring the joint exploitation of resources while respecting equity and state sovereignty. This agreement could include provisions for managing oil and gas fields, protecting the marine environment, and equitably distributing revenues. The bilateral agreements between Iran and Kuwait regarding the Arash Field demonstrate that such frameworks can reduce boundary tensions. By incorporating objective criteria such as resource proportionality and coastline length, the proposed model elevates these agreements from ad hoc arrangements to a systematic framework (Rahmati, 2019).

The development of a regional convention focused on objectifying equity is recommended. Such a convention could combine quantitative (e.g., scientific data) and qualitative (e.g., geopolitical conditions) criteria to establish a shared framework for delimiting the continental shelf in the Persian Gulf. Inspired by the ICJ's jurisprudence in the North Sea case (1969) and its emphasis on geographical proportionality, this solution would eliminate legal ambiguities and prevent future disputes (Azarkasht, 2022). Implementation of this convention through the proposed regional body would ensure its durability and effectiveness.

5. Legal Solutions for Continental Shelf Dispute Resolution

5.1. Legal Mechanisms

Resolving continental shelf disputes requires legal solutions that not only adhere to international law but are also practically implementable in complex contexts like the Persian Gulf. This section offers innovative legal mechanisms based on the proposed hybrid model, which integrates the principle of equity with both quantitative and qualitative criteria, to reduce ambiguity and promote sustainable resolution.

a. Strengthening the Principle of Agreement and Negotiation Through the Objectification of Equity

Bilateral negotiations and agreements, as peaceful methods endorsed by the 1958 and 1982 Law of the Sea Conventions, can be effective in resolving continental shelf disputes. However, their success requires a more objective framework. The proposed hybrid model, by incorporating quantitative criteria such as coastline proportionality and geophysical data, transforms abstract negotiations into more tangible outcomes. For example, the agreements between Iran and Kuwait regarding shared oil fields demonstrate that negotiations supported by scientific data can reduce tensions and create a legal framework for joint exploitation (Heydar & Daramir, 2021). This approach, inspired by the ICJ's emphasis on geographical proportionality in the North Sea case (1969), operationalizes equity in negotiations.

b. Employing Alternative Dispute Resolution (ADR) Methods Based on the Hybrid Model

ADR methods, such as mediation and conciliation, can offer fair and cost-effective solutions. The proposed hybrid model reinforces these methods by establishing regional commissions to analyze geophysical data and provide recommendations based on objectified equity. These commissions, inspired by the ICJ's emphasis on balance in the Tunisia/Libya case (1982), could serve as impartial mediators and prevent costly litigation (Sirafi Sasan, 2015). For example, in the Persian Gulf, establishing such a commission could facilitate rapid and fair resolutions by reviewing shared data.

c. Purposeful Referral to the International Court of Justice with an Objectification Prerequisite

In cases where negotiations and ADR fail, referral to the ICJ or arbitral tribunals can be effective. However, this study proposes that such referrals be made only after applying the hybrid model to ensure the ICJ relies on objective criteria (e.g., scientific data and resource proportionality). Although the ICJ has effectively applied equity in cases such as the North Sea (1969) and Nicaragua v. Colombia (2012), the absence of an objective framework has occasionally led to ambiguity (Azarkasht, 2022). The proposed model can help the ICJ issue more precise and enforceable judgments, particularly in the complex context of the Persian Gulf.

d. Drafting Regional Conventions Based on the Hybrid Equity Model

The development of regional conventions and agreements can harmonize the interpretation and implementation of international maritime law. This study recommends that such conventions be based on the hybrid model to define equity through specific criteria (e.g., coastline length, geophysical data, and economic needs). Inspired by the ICJ's focus on balance in its

jurisprudence, this approach could reduce tensions and promote sustainable resource management in the Persian Gulf. For example, bilateral agreements over shared fields could become more effective when embedded within a systematic regional convention ([Shakeri & Pourbaferani, 2021](#)). This framework clarifies legal ambiguities and provides a model for regional cooperation.

5.2. Political Solutions

a. Strengthening Regional Cooperation and Establishing Confidence-Building Mechanisms

Regional cooperation and the development of confidence-building mechanisms can help reduce tensions and enhance mutual trust among coastal states in the Persian Gulf. Sharing information, organizing regional meetings, and creating joint institutions for marine resource management are among the proposed strategies ([Hashemi, 2019](#)).

b. Involvement of International and Regional Organizations to Facilitate Dispute Resolution

International organizations such as the United Nations and bodies like the International Law Commission can play a mediating role in resolving continental shelf disputes. The use of resolutions and recommendations from these organizations can contribute to de-escalating tensions ([Jahani, 2011](#)).

c. Utilizing Preventive Diplomacy to Avoid Escalation of Disputes

Preventive diplomacy, through early-stage negotiations and the drafting of legal frameworks for dispute management, can prevent the escalation of tensions. This approach is particularly effective in cases where boundary disputes are intensified by historical and political factors ([Heydar & Daramir, 2021](#)).

5.3. Practical Solutions

The resolution of continental shelf disputes in the Persian Gulf requires practical solutions that implement legal principles, particularly the objectified principle of equity as proposed in the hybrid model. This section focuses on the operationalization of the model and offers proposals that not only address technical and executive challenges but also strengthen regional cooperation.

a. Sharing Scientific Data within the Framework of the Hybrid Model

Sharing geophysical and hydrographic data among coastal states is a cornerstone of the proposed hybrid model, which enhances the precision of continental shelf delimitation. This study suggests that instead of mere information exchange, joint databases should be established under the supervision of a regional institution to analyze data using objective criteria such as depth, continental shelf slope, and coastline proportionality. This approach, inspired by the ICJ's emphasis on geographical criteria in the North Sea case (1969), reduces interpretive disputes and reinforces trust among states ([Bozanjani, 2024](#)). For instance, in the Arash Field dispute, such a database could offer mutually accepted maps as a fair foundation for negotiations ([Khani Bahador, 2023](#)).

b. Establishing a Joint Fund to Support Scientific Studies in the Interest of Equity

The high costs associated with conducting geophysical and hydrographic studies, especially for countries with limited resources, represent a serious challenge. This study proposes the creation of a joint regional fund, supported by all coastal states of the Persian Gulf, to cover the expenses of such studies. Operating within the hybrid model framework, this fund could finance joint scientific projects and utilize their findings to implement objectified equity, such as resource proportionality assessments ([Sirafi Sasan, 2015](#)). Inspired by the ICJ's emphasis on economic balance in the Tunisia/Libya case (1982), this solution enables less developed countries to participate equally in dispute resolution and accelerates implementation processes.

c. Forming Regional Joint Committees for Monitoring and Implementing Decisions

Monitoring the enforcement of judicial and arbitral decisions often faces challenges due to the lack of robust enforcement mechanisms. The proposed hybrid model recommends forming regional joint committees, composed of representatives from the disputing countries and operating under the supervision of the United Nations. These committees would continuously monitor agreements and rulings based on the model's objective and qualitative criteria, such as scientific data and geopolitical needs, to ensure fair implementation ([Azarkasht, 2022](#)). Inspired by the ICJ's ruling in Nicaragua v. Colombia (2012) and its emphasis on preventing discrimination, this mechanism, through transparent reporting, can deter violations and build trust. For

instance, in the Persian Gulf, such committees could oversee the implementation of agreements related to shared fields (Rahmati, 2019).

6. Conclusion

Continental shelf delimitation disputes in the Persian Gulf and other maritime regions are among the most complex issues in the law of the sea due to strategic positioning and abundant subsoil resources. The Law of the Sea Conventions, by introducing principles such as agreement, equity, and the baseline, have provided a framework for resolving these disputes; however, conflicting interpretations and the absence of objective criteria have left many conflicts unresolved. This study, focusing on redefining the principle of equity and proposing a hybrid model that integrates quantitative criteria (such as geophysical data and coastline proportionality) with qualitative ones (such as economic needs and geopolitical conditions), offers an innovative solution to overcome these challenges. Legal challenges—including the ambiguity in interpreting legal principles and overlapping claims in semi-enclosed areas like the Persian Gulf—highlight the need to revise existing frameworks. Although the ICJ has affirmed equity as a fundamental basis, the lack of a systematic model has made its implementation difficult.

Political challenges, such as historical disputes, reluctance to negotiate, and the influence of extra-regional powers, further complicate negotiations and threaten regional peace. In addition, practical barriers—like difficulties in collecting scientific data, high arbitration costs, and challenges in enforcing rulings—underscore the necessity of robust enforcement mechanisms.

The proposed hybrid model, by objectifying equity through shared data and regional institutions, transforms these challenges into opportunities for cooperation. Legal strategies such as strengthening negotiations using objective criteria and targeted referrals to the ICJ, alongside practical solutions such as data sharing and forming monitoring committees, can help resolve disputes such as the Arash Field conflict.

This approach, inspired by the ICJ's jurisprudence and the unique context of the Persian Gulf, not only reduces tensions but also offers a sustainable framework for resource management through the drafting of regional conventions. The sustainable resolution of continental shelf disputes requires an integration of redefined legal principles, regional cooperation, and practical mechanisms. The proposed hybrid model, by transforming equity into an actionable tool and fostering trust among coastal states, can enhance peace and security in the Persian Gulf and beyond. Only through such an approach can a just and stable future in global maritime regions be envisioned.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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