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THE GEOPOLITICS OF LITHIUM: DISPUTE BETWEEN THE UNITED STATES OF AMERICA AND CHINA OVER ACCESS TO AND CONTROL OF THIS NATURAL RESOURCE

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Abstract

Lithium has gained significant economic and military importance due to its diverse industrial applications, resulting in increased global demand. This research aims to analyse the positioning of the United States and China in their efforts to secure access to lithium resources outside their borders. The study focuses on lithium's function as a power source for both the United States and China, and to analyse the geopolitical consequences of rising global demand for this metal on regional and international security. The research employes deductive reasoning on qualitative content analysis and a case study design. This study enabled the clarification of the political, economic and environmental impact of lithium extraction in countries with large confirmed reserves, as well as the potential changes to regional and international security arising from the economic and military competition between the United States and China.

Keywords

Geopolitics, Lithium, Power, United States, China.

Resumo

O lítio assume uma importância económico-militar crescente, pelas diversas aplicações no setor industrial, o que justifica o incremento da sua procura em vários países. O objetivo desta investigação é analisar o posicionamento norte-americano e chinês para obter o acesso aos recursos de lítio no exterior do seu território. Pretende-se assim, centrar a investigação no papel do lítio, enquanto fonte de poder para os Estados Unidos da América e China e analisar o impacto geopolítico derivado do incremento da procura global deste metal, na segurança regional e internacional. A investigação seguiu um raciocínio dedutivo, assente numa análise de conteúdo qualitativa e num desenho de pesquisa de estudo de caso. Este estudo permitiu clarificar o impacto político-económico e ambiental da exploração do lítio nos países com grandes reservas confirmadas, e as possíveis alterações à segurança regional e internacional, resultantes da competição económico-militar entre os Estados Unidos da América e a China.

Palavras-chave

Geopolítica, Lítio, Poder, Estados Unidos da América, China.

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THE GEOPOLITICS OF LITHIUM: DISPUTE BETWEEN THE UNITED STATES OF AMERICA AND CHINA OVER ACCESS TO AND CONTROL OF THIS NATURAL RESOURCE

PEDRO DA SILVA MONTEIRO

Introduction

Lithium, a metal with a wide range of applications across various industrial sectors, has increasingly become a coveted resource among state actors, particularly the United States of America (U.S.) and the People's Republic of China[1]. In fact, the growing global consumption of lithium, both as a processed compound and in its mineral form, has positioned it as one of the most strategic natural resources. The largest global reserves, both in quantitative and qualitative terms, are concentrated in South America (Rodrigues & Padula, 2017). For major powers, the economic advantage and military applications derived from the extraction, acquisition and control of lithium highlight a problem that this study seeks to address: What is the political-military positioning of the U.S. and China considering the anticipated increase in lithium demand for economic and military purposes? The subject of study focuses on the role of lithium as a source of power for both the U.S. and China.

Given that geopolitics represents the spatial dimension of politics, as the study of the interplay between politics and geography (Nogueira, 2011), this study seeks to analyse how U.S. and Chinese foreign policy efforts aim to secure access to lithium resources abroad, thereby expanding their strategic reserves of the metal. Such access is crucial for maintaining their leadership as dominant economic and military powers. The geopolitical implications of the increasing global demand for lithium may result in regional and international security shifts, which warrant thorough analysis. This justifies the relevance of the present study, which aims to contribute to the core field of political science, specifically within the subfield of geopolitics and geostrategy.

Due to its scope, this study is delimited (temporally, geographically and conceptually): to the period from the early 21st century AD to the present day, during which the interest in lithium surged due to its use in batteries because of its highly ionic properties, with the subsequent expansion of its extraction to meet industrial demands (Rodrigues & Padula, 2017, p. 199); to the main global regions involved in lithium extraction and processing, as well as its economic, military and political roles in the U.S. and China, which currently stand as the most geopolitically influential state actors; and to the

[1] Hereinafter referred to as "China".

analysis of how lithium geopolitics intersects with the application of instruments of power, namely the Diplomatic, Informational, Military and Economic (DIME) (Bartholomees, 2012) as employed by the U.S. and China to acquire and utilize lithium resources within their industrial sectors. Additionally, the study will consider the potential impact on regional security in countries with confirmed large lithium reserves, as well as on international stability more broadly. However, the informational element, pertaining to key messaging aimed at domestic populations, will not be examined, despite its relevance in responding to adversarial cyber campaigns, so as to maintain focus on the core subject of study.

Within this framework, the General Objective (GO) of this study is *To analyse the U.S. and Chinese positioning for securing access to lithium resources outside their territories*. The GO will be achieved by accomplishing three Specific Objectives (SO):

SO1 – To analyse the global interest in lithium;

SO2 – To analyse the geopolitical factors associated with lithium;

SO3 – To analyse how lithium geopolitics influences power relations between the U.S. and China.

To achieve the GO, the following Research Question (RQ) was identified to guide the research: How does lithium influence the power relations of the U.S. and China with international politics and the global environment?

Conceptual framework and methodological approach

State of the Art

Within the scope of the topic under study, numerous investigations have been conducted over recent decades on the lithium industry. However, these studies have largely focused on the archaeological, geological and morphometric aspects of this metal, particularly in Portugal and Brazil, as well as on the geopolitics of South America's strategic natural resources (Freitas, 2023; Rocha, 2018; Santos, 2024; Sousa & Araujo, 2017).

The hegemonic rivalry between the United States and China has also been widely analysed, though primarily centred on the restructuring of their political-military and economic strategies in the Indo-Pacific region. These analyses often contrast the U.S. "pivot to Asia" strategy with China's economic integration strategy embodied in the One Belt, One Road (OBOR) initiative. Within this context, several studies have addressed the impact of China's expansion into the South China Sea (SCS) on the shared access to natural resources (Hendler, 2018; Mattos, 2016). This expansion is closely tied to the modernization of China's armed forces and its implications for international relations, including U.S. defence interests (Schmidt, 2019; U.S. Defense Intelligence Agency, 2019; Wehner, 2019). The region remains unstable from a security perspective due to the "intensification of dependencies and competition for markets, resources and routes" coupled with the financial capacity to enhance military capabilities (Tomé, 2017, pp. 358-359).

However, in light of the growing strategic competition between the U.S. and China, which is likely to intensify further with the potential re-election of Donald Trump, there is a

noticeable lack of integrated studies that specifically analyse the positioning of both powers in securing access to lithium resources, and the influence of this metal on the power dynamics between them within the International Political System (IPS). This gap underscores the relevance and timeliness of the present study.

Conceptual framework

To ensure a clearer understanding of this research, it is essential to clarify its underlying concepts.

Geopolitics is understood here as the discipline that studies the relationship between a state's power factors, international politics and its surrounding geographical environment. It includes "the discourses and practices related to the acquisition and use of power […] within and according to a given space, [taking into account] the geographical elements present there [...] on a broader scale" (Tomé, 2014, p. 192). It combines "a geographic schematization of diplomatic-strategic relations with a geo-economic analysis of resources, with an interpretation of diplomatic attitudes based on lifestyle and environmental context" (Aron, 1975, pp. 188-197). In this framework, geographic location (or, more broadly, spatial positioning) shapes or constrains state behaviour within the IPS, functioning as a key instrument through which hegemony is constructed and power is exercised, in line with classical and neoclassical geopolitical theories. Given the increasing U.S.-China competition over lithium (Jesus et al., 2023), this concept is further complemented by geostrategy, which relates to the exercise of coercion in a conflictual environment (Nogueira, 2011, p. 135), such as the current dynamic between both actors, particularly in relation to Taiwan, one of the greatest obstacles to stability in the Asia-Pacific region and to the possibility of a cooperative U.S.-China relationship (Albuquerque, 2023).

Strategy is defined as "the science and art of building, positioning and employing coercive means in a given environment and time, to achieve objectives set by politics, overcoming problems and exploiting opportunities in a context of disagreement." (Ribeiro, 2009, p. 22). Beaufre (1965) classifies strategy, according to its scope and forms of coercion, into: total strategy, overall strategies and specific strategies. Total strategy, at the political level, directs the overall strategies (political, economic, psychological and military) toward desired objectives and, if appropriate, integrates them to create synergies (Barrento, 2010), aiming to achieve overarching political-strategic objectives.

In general, the most effective strategies are those that integrate the application of all instruments of power, through which state actors typically influence global events. These instruments are articulated through the DIME elements, serving as vectors for the projection of both soft and hard power (Kodalle et al., 2020, p. 20). Power is understood as the ability of one political actor to impose its will on another (Couto, 1988), or to influence the international system in order to pursue objectives that serve its own interests. It also encompasses "the capacity to resist imposition or even influence" (Tomé, 2014, p. 190). Power is materialised as "the sum of attributes that enable a state to achieve its external objectives, especially when they are opposed to the objectives and will of another international actor" (Serrão & Longo, 2012, p. 20).

Diplomacy is the official mechanism through which a state engages formally with other states, traditionally conceived as the peaceful means to promote national interests. While its emphasis may vary depending on the situation, diplomacy does not operate in isolation from other instruments of power (Smith, 2007).

Military power refers to the capacity for deterrence and combat that allows a state to impose its will without necessarily resorting to the actual use of force, while improving the likelihood of favourable outcomes in the event of armed conflict (Collins, 2002). It represents the ability to control others, even against their will. The military instrument is part of the broader military strategy, which seeks to develop and employ the armed forces to achieve (military) objectives set by politics. It contributes to the total strategy and to a state's strategic potential, which comprises "the set of moral and material forces" that support its strategy (Couto, 1988, p. 241). From this standpoint, "military means [...] constitute the core, the 'last resort', of any nation-state's defence potential (Vieira, 1980, p. 20). Force ultimately serves state interests, which expand through the growth of relative power, where political-military means may serve economic ends and vice versa (Waltz, 1979).

Economic power plays an increasingly influential role in modern conflicts, from conventional warfare to diplomatic disputes. It enables states to produce, finance, or support key national security activities, thereby protecting both national and international interests. With globalization, technological advancement, societal transformation and the evolving nature of conflict, economic considerations have gained prominence, displacing military power as the primary coercive tool in international relations (Chun, 2012, pp. 205-206).

In this study, a superpower is defined as a state actor with a global strategy and full-spectrum capabilities, projecting power across all dimensions: diplomatic, informational, military, economic, cultural, scientific-technological, and in terms of physical and human resources. The United States seeks to maintain the balance of power and preserve the territorial status quo, whereas China aims to achieve total intervention capacity and expand its maritime borders and sphere of influence. Superpowers differ from great and middle powers, which, despite their global ambitions, possess only partial capabilities and exert limited global influence. Nonetheless, they typically have vast territories, natural resources, population size and notable nuclear deterrence capabilities (Couto, 1988).

Methodology and Method

The study employed a deductive reasoning methodology, starting from the premise that the strategic importance of lithium is growing worldwide, given technological innovation (Rodrigues & Padula, 2017, p. 199), as a "premise", in search of the contribution that geopolitics and the application of instruments of power have in obtaining and maintaining US hegemony and Chinese ascendance in the IPS. The study used a qualitative content analysis to achieve a deeper understanding of the subject of study, using a cross-sectional case-study design grounded in an explanatory epistemology (Table 1).

Table 1. Analysis Model

Theme	The geopolitics of lithium: competition between the United States and China for access to and control of this natural resource						
Subject of Study	The role of lithium as a source of power for the U.S. and China						
General Objective	To analyse the U.S. and Chinese positioning for securing access to lithium resources outside their borders						
Research Question	How does lithium influence the power relations of the U.S. and China with international politics and the global environment?						
Specific Objectives	**Subsidiary Questions (SQ)**	**Concepts**	**Dimensions**	**Variables**	**Indicators**	**Data collection**	**Structure**
SO1: To analyse the global interest in lithium	**SQ1**: How important is lithium?	Geography and Geopolitics	United States and China	Political	Established international relations	**Literature riview and document analysis (scientific articles, thesis and official websites)**	Subsection 3.1
				Military	Military applications		
				Economic	Economic impact		
SO2: To analyse the geopolitical factors associated with lithium	**SQ2**: Which major state actors have lithium reserves?	Geography, Geostrategy and International Relations	South America, North America, Asia, Africa and Oceania	Geographical	Geological characteristics		Subsection 3.2
					Locations with lithium reserves		
					Amount of lithium reserves		
				Political	Established international relations		
SO3:To analyse how lithium geopolitics influences power relations between the U.S. and China	**SQ3**: How much does lithium influence the power relations between the U.S. and China?	Geopolitics and Instruments of Power	United States and China	Diplomatic	International agreements		Subsection 3.3
				Military	Military investment		
					Military presence		
				Economic	Economic investments		

The data collection instruments used were literature review and document analysis, primarily of scientific articles, PhD theses and master's theses, but also official Chinese, American and international websites to complement the study with the desired academic neutrality. To mitigate cognitive biases, the analysis sought to substantiate its claims through the triangulation of multiple sources, generally representing Western and Far Eastern perspectives, while prioritising primary sources of statistical data.

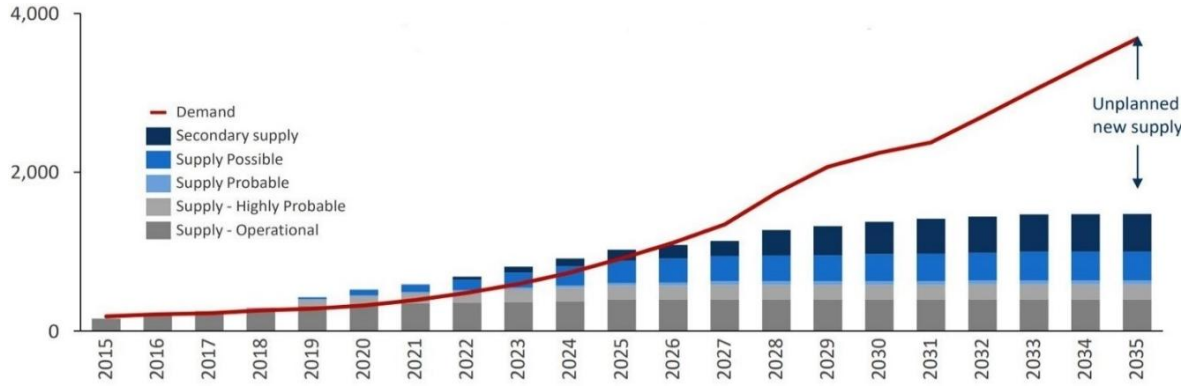
Research

Importance of lithium

Discovered in 1817, lithium is a metal that constitutes approximately 0.006% of the Earth's crust and exists as a combination of two stable isotopes: lithium-6 (7.5%) and lithium-7 (92.5%) (Makhijani, 2000). Its unique properties have been increasingly adapted to meet the technological development needs of various sectors. Since the 1970s, lithium's role as an energy carrier in batteries for electronic devices, including hybrid electric vehicles, mobile phones, smartphones and laptops, has gained growing significance (Zhang et al., 2018). In the 21st century, lithium's highly ionic nature and high electrochemical potential have rendered it indispensable for both regular and rechargeable batteries (Noronha, 2010), as these characteristics allow for the storage of greater amounts of electrical energy in smaller volumes. This, in turn, has driven a sharp increase in global demand and extraction of the metal (Figure 1).

However, natural lithium and lithium enriched in lithium-7 have various commercial and industrial applications, standing out in 2026 in the following areas: batteries, as the main component (88%); ceramics and glassware (4%); greases and lubricants (2%); air treatment (1%); aluminium production and metallurgy (1%); lithium carbonate-based pharmaceuticals for depression treatment (1%); among others (3%), including polymer production (United States Geological Survey [USGS], 2026, p. 118) and in the space industry.

Figure 1. Lithium demand 2015-2035, in kilotonnes



Source: Benchmark Mineral Intelligence (2019).

The growing use of lithium in batteries is particularly noteworthy, having represented only 56% in 2019 (USGS, 2019), closely tied to the development of portable electronic devices. It becomes clear, therefore, that lithium is a strategic resource increasingly contested by industries from global superpowers due to its energy efficiency, with significant impact on local socioeconomic structures in the regions where it is mined, creating opportunities for regional economic development. On a global scale, the progressive energy transition – from oil to the "clean economy" – has brought the concept of "energy security" back into the political lexicon, given lithium's potential to shape ecological political relationships with consequences for both the economy and the global ecosystem (Queirós, 2022). This reality drives markets to adapt, resulting in price fluctuations of this raw material as supply expands with the discovery of new natural reserves (Trading Economics, 2025). Within this framework, up to 2022, the United States, China and India accounted for more than two-thirds of the global expansion in renewable energy.

From a military perspective, lithium batteries – more robust, higher in energy density, longer lasting and faster charging compared to conventional batteries – are particularly suited to harsh environments and demanding applications. They are used to equip a wide array of systems, including communication devices, night vision goggles and Uncrewed Aircraft Systems (UAS), which are increasingly employed in modern conflict scenarios due to their extended range and strategic relevance (Black et al., 2024). Additionally, lithium has been employed in aircraft coating technologies (Makhijani, 2000).

In a global context marked by increased investment in military equipment aimed at coercion or resistance to coercion, the United States remains the leading investor, followed by China (Stockholm International Peace Research Institute [SIPRI], 2025). Within this geopolitical landscape, nuclear capabilities have regained prominence in international relations as instruments of negotiation and strategic leverage (United Nations, 2024). Lithium-6 plays a pivotal role in the development of nuclear weapons, particularly in the production of tritium – an essential component of thermonuclear warheads. When combined with deuterium, it constitutes the nuclear fuel for this class of weapons (Barnaby, 1993, p. 39; Makhijani, 2000, p. 59). In parallel, lithium-7 is

utilized in the production of coolant fluids for nuclear reactors (National Research Council, 1996, p. 278).

From an environmental standpoint, the global shift from oil dependence to rare metal dependency is becoming increasingly evident[2]. While the integration of lithium in solar panels and electric vehicle batteries contributes to pollution reduction in end-user countries – particularly in the United States and China, two of the world's largest emitters – the environmental impacts at extraction sites are often severe and underreported. These regions, typically remote, exhibit high air toxicity levels due to fine dust containing hydrofluoric acid, as well as significant graphite waste, which damages biodiversity, natural ecosystems, agricultural lands, and contaminates soil and water with heavy metals such as fluorine and mercury (RTP, 2020). Moreover, the extensive use of water in the brine extraction process – common in the so-called South American Lithium Triangle, also known as South American ABC (Argentina-Bolivia-Chile) – can deplete local water resources, impacting human communities and natural ecosystems. The carbon emissions generated during lithium mining and processing also undermine the mineral's reputation as a component of clean technologies. These environmental consequences may lead to long-term declines in soil fertility and ecosystem health, reinforcing the urgent need for more sustainable and environmentally responsible mining practices.

Politically, the United States, China and other great powers such as Japan, Germany and South Korea are actively competing for access to lithium resources. Notably, China leads in lithium processing and has positioned this dominance at the centre of its ecological and green development strategies. As the world's largest electric vehicle market and top manufacturer of such vehicles, China is expanding its influence across the DIME elements, particularly in South and Latin America, by investing in or directly extracting mineral resources essential to securing national autonomy and strategic supply chains[3]. In contrast, the United States, economically removed from the largest lithium producers, seeks to strengthen its presence in this market through increased investments, aiming to secure energy independence. In doing so, it is reinforcing its position within global supply chains for critical minerals, demonstrating lithium's central role in the broader technological and geopolitical rivalry between the United States and China.

In summary, lithium's strategic importance derives from its high energy-storage efficiency, which has made it an increasingly critical resource across a broad range of industrial, technological and military applications. Its central role in lithium-ion batteries and its relevance to thermonuclear warheads production are particularly significant in the context of the ongoing global energy transition from oil toward a "clean energy" economy, as well as the recent resurgence of nuclear deterrence, particularly involving the United States and China. The discovery and exploitation of new lithium reserves have generated significant socioeconomic repercussions in peripheral states, requiring the international market to adapt to the dynamics of supply and demand. For China, lithium is central to its new green and ecological policy, aiming to expand its influence in South and Latin

[2] Although this trend has been shaken by the protectionist policies of Donald Trump, re-elected President of the United States, with the withdrawal from the Paris Agreement and investment in oil exploration.
[3] Among the 24 strategic minerals, the following stand out: iron, copper, aluminium, gold, nickel, cobalt, lithium and rare earths elements.

America, while pursuing economic independence and national security. For the U.S., growing competition over critical minerals has reinforced its global supply chains, underscoring lithium's central role in the technological and geopolitical rivalry between the two actors

Consequently, the strategic interest in lithium, shared by superpowers and emerging economies alike, is expected to intensify, especially as global demand for this and other critical minerals required for the energy transition is projected to grow by approximately 500% in the coming years (PNM 2050, 2020).

Geopolitical Factors of Lithium

Geographical Location of Lithium

The excessive reliance on fossil fuels has exposed the unsustainability of an oil-based economy, normally used to produce fuels, chemicals and other materials. This reality has stimulated efforts toward greater energy autonomy among state actors and has elevated the geopolitical relevance of countries with lithium reserves, despite their semi-peripheral position within the global geopolitical system.

The main countries with confirmed lithium reserves include: Chile, Australia, China, Argentina, the United States, Canada, Brazil, Zimbabwe, Portugal, Bolivia, Austria, the Democratic Republic of the Congo (DRC), Czechia, Finland, Germany, Mali, Namibia, Peru, Serbia, Spain, Mexico and Ghana[4]. The first five alone account for approximately 85% of global lithium reserves, with the United States and China standing out for their significant percentage increases (Figure 2).

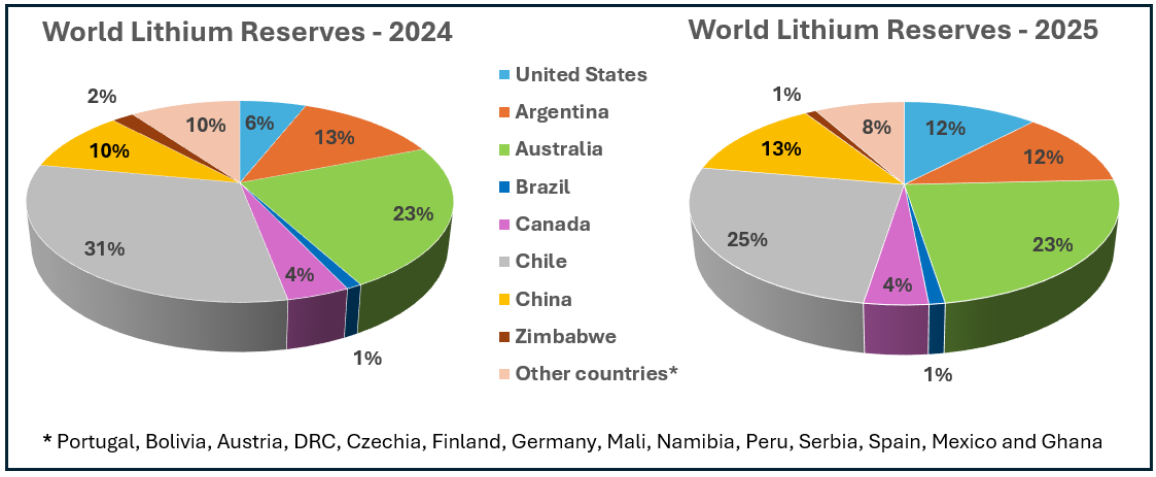
However, these figures do not directly correspond to the world's largest known lithium producers, which are ranked as follows: Australia (92,000 tons/year), China (62,000 tons/year), Chile (56,000 tons/year), Zimbabwe (28,000 tons/year), Argentina (23,000 tons/year), Brazil (12,000 tons/year), Mali (9.600 tons/year), Canada (5,600 tons/year), Portugal (380 tons/year), among others, including Austria, the DRC, the Czech Republic, Finland, Germany, Ghana, Mexico, Namibia, Serbia and Spain[5] (USGS, 2026, p. 119). Among these countries, China, Argentina, Zimbabwe and Canada have shown a significant increase in production since 2023. By 2030, China is expected to assume a leading position both in lithium mining, accounting for 28% of the global market, followed by Australia (26%) and Chile (12%), and in lithium refining, where it is projected to hold a 62% market share, followed by Chile (13%) and Argentina (11%) (International Energy Agency [IEA], 2026).

Currently, economically viable lithium deposits are categorized into three main types[6] (Bowell et al., 2020): (1) lithium-bearing evaporitic continental brines[7] (along with less significant hydromorphic and geothermal brines), primarily located in Bolivia, Chile and

[4] Although the ranking may vary depending on the source, the state actors remain largely the same: Bolivia (24.6%), Argentina (22.6%), Chile (11.2%), the United States (9.2%), Australia (7.5%), China (6%), the DRC (3.5%), Canada (3.4%), Germany (3.2%) and Mexico (2%) (Mexican Centre for International Relations, 2023).
[5] The United States was excluded due to lack of data.
[6] It is important to note that lithium is not found in nature ins its pure form.
[7] They hold the world's largest lithium reserves.

Argentina, but also found in China and the United States; (2) hard rock deposits[8] (pegmatites), located in Australia, Austria, Brazil, Canada, China, the DRC, Czech Republic, Finland, Germany, Mali, Namibia, Peru, Portugal, Serbia, Spain, the United States and Zimbabwe; and (3) clay-derived deposits, such as hectorite and other less common types like jadarite, primarily found in Mexico and the United States, with additional potential sources elsewhere (Figure 3). Brine extraction remains the most economically efficient process, which is why this category currently dominates the global lithium market. However, clay-derived lithium extraction, though not yet fully developed, may become more cost-effective in the future (Gramling, 2019). Similarly, the extraction of lithium from seawater, as in the case of the Dead Sea, holds great promise. Although the lithium concentration in seawater is relatively low (approximately 0.2 ppm), the total lithium content in the oceans is estimated to be 5,000 times greater than that found on land (Li et al., 2021, p. 3152). Once extracted, lithium is processed into either lithium carbonate or lithium hydroxide, the two primary forms used in industrial applications.

Figure 2. World lithium reserves distributed by country



Source: Adapted from USGS (2025); USGS (2026).

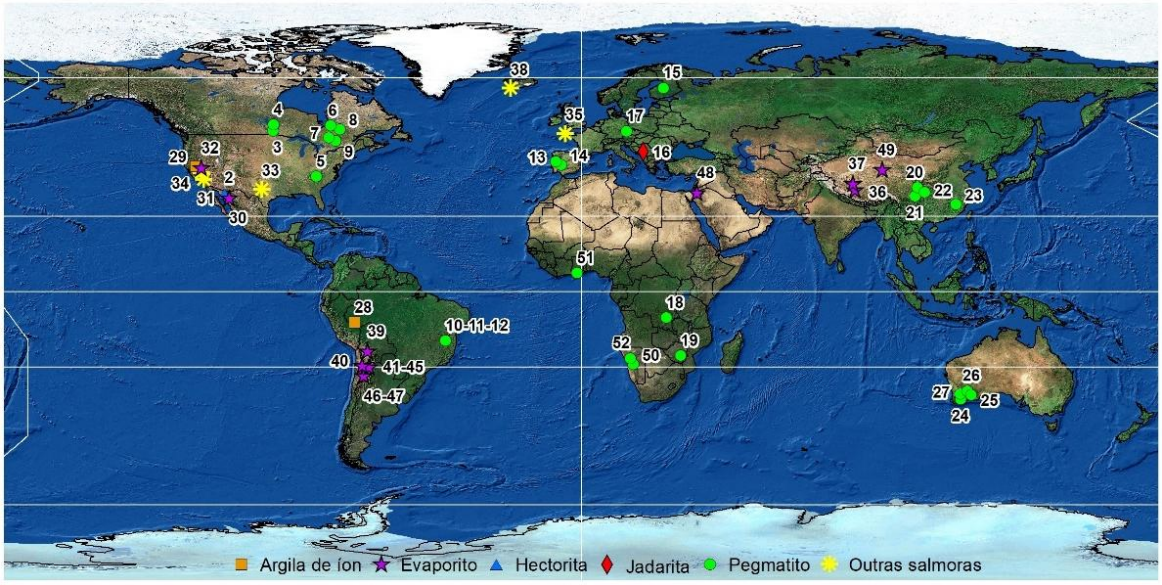
The territorial extent of the United States and China allows these actors to have within their territories seven lithium extraction sites that are geographically distant from one another and of different geological categories. This factor, combined with their economic and military capabilities, clearly defined military strategies, strong national development ambitions and significant human capital[9], provides them with substantial strategic potential (Couto, 1988).

Nevertheless, the Lithium Triangle in South America remains the region with the largest known lithium reserves in the world (Jesus et al., 2023). Although lithium is not abundant in the Earth's crust, recent research confirms that there is sufficient supply for several

[8] They hold various lithium minerals, such as lepidolite, ambligonite, petalite and spodumene.
[9] The U.S. is the third most populous country, with a large working-age population and an average age of around 39, while China has about one-fifth of the world's population, with a large working-age population and an average age of 40, although with a slightly negative growth rate at present (U.S. Census Bureau, 2025).

hundred years, meeting the demand that is expected to arise in the coming decades (Mateus, 2020). However, the extraction process for this natural mineral can still be optimized in both economic and environmental terms (Sverdrup, 2016). Further research is required to understand how and where natural forces, including wind, heat, water and geological time, interact to create lithium deposits in quantities sufficient to support economically viable mining operations.

Figure 3. Lithic exploration projects by deposit type



Source: SGB (2025).

In summary, lithium reserves are present on all continents, with Chile, Australia, China, Argentina, and the United States standing out as the countries with the largest reserves, which are also among the world's leading producers of this metal. Notably, the United States and China have experienced significant percentage increases in their lithium reserves, while China, Argentina, Zimbabwe, and Canada have recorded substantial increases in lithium production. The most economically viable lithium deposits, namely brine deposits, are located mainly in South America, particularly within the Lithium Triangle, but also in China and the United States. The remaining deposits, namely pegmatites and clay-derived deposits, are distributed across all continents. Clay-derived lithium deposit (a potentially more profitable extraction process but not yet developed), are currently located only in Mexico and the U.S. and could therefore strengthen North American influence in the lithium market. Given their size and geographical location, the U.S. and China have seven lithium exploration sites within their territories, geographically dispersed and belonging to different categories. The potential extraction of lithium from seawater could provide a strategic advantage to countries with the largest Exclusive Economic Zones (EEZ), particularly the United States.

International Relations Involved

As anticipated by Mattos (2016), Sino-American relations are expected to be among the most influential in the coming decades, as they are likely to shape the overall dynamics of international relations on a global scale.

In response to the 20% global increase in lithium consumption – approximately 263,000 tons in 2025 – global production (excluding the United States) rose by around 31%, reaching 290,000 tons. In this context, lithium imports account for 14% of U.S. consumption, mainly originating from Chile (54%) and Argentina (43%), among other countries (3%). Therefore, it is strategically important to safeguard relations with these states (USGS, 2026). Accordingly, the current U.S. administration has sought to deepen engagement with the governments of Chile, Argentina, and Bolivia, including through bilateral agreements with Argentina and Chile that create favorable conditions for U.S. companies. Nevertheless, a significant realignment away from China remains unlikely. Beijing continues to expand its position in the global lithium market through sustained, long-term investment, thereby reinforcing its economic presence and strategic leverage across the sector (Fontanarava, 2026). Against this backdrop, the U.S. approach, in line with its National Security Strategy (Trump, 2025), is expected to focus on three main priorities: increasing investment in critical minerals in Latin America, a trend that has been evident since January 2025, while also expanding such engagement in Africa; strengthening Western Hemisphere supply chains in order to reduce dependencies and discourage cooperation with hostile actors; and increasing domestic lithium production.

In the case of China, the country has pursued a dual objective: reducing greenhouse gas emissions and achieving national energy security, by promoting self-sufficiency in critical minerals. As of 2021, although China possessed only 25% of global lithium resources, it accounted for approximately 65% of global lithium processing and refining capacity. This trend continued after 2022, with growing interest from Chinese companies in acquiring lithium assets abroad to expand access to global resources, as well as increasing domestic acquisition activities. In this regard, Chinese firms, such as Ganfeng Lithium and Zhejiang Huayou Cobalt Co. Ltd, have acquired foreign companies that own lithium brine operations, particularly in Argentina (e.g., Lithea Inc.) and Zimbabwe (e.g., Arcadia Project), among others. Following the industry shift initiated in 2022 toward lithium iron phosphate batteries, which use lithium carbonate instead of lithium oxide/hydroxide, it is expected that China will continue to increase its exports of lithium oxide/hydroxide and import greater quantities of lithium carbonate. This strategy is reflected in the large-scale production of lithium carbonate by Chinese companies in Argentina (e.g., Zijin Mining) and in the production of lithium hydroxide in Australia (e.g., Tianqi Lithium Corp.), in cooperation with Australian counterparts (Moon, 2022, p. 9.6).

Implications for Power Relations

The current shift in polarity in the 21st century, in which the United States and China appear to represent "long-duration lines in world geo-history," renews the possibility of conflict between the maritime and land powers as a reconfiguration of global geopolitics unfolds (Júnior, 2018, p. 25). In this context, the energy transition toward so-called clean and renewable energies has intensified competition among major powers for the

acquisition of rare earth elements and lithium, as well as for the control of mines of these resources on a global scale, with ecological impacts that will shape the world in the coming years serving as a determining and influential factor in future conflicts (Oxford Analytica, 2017, pp. 62-68). Consequently, there is a "mining transition from coal to copper, from oil to lithium and from hydrogen to platinum and rare earths." (National Geographic, 2023).

Oscillating between isolationism (or protectionism) and interventionism, U.S. policy seeks to maintain the United States' status quo as a superpower. Given the prevailing political orientation, interest in lithium may lead to the annexation, acquisition, or negotiation of rights in new territories rich in this mineral to counterbalance China's newly acquired advantage in the apparent discovery of new reserves on its territory, announced in January 2025. Examples supporting this argument include U.S. interest in Greenland, not ruling out "the use of military force," not merely for its geostrategic positioning to control navigation routes in the Arctic "for purposes of national security," but especially for "economic reasons," due to its wealth in rare earth elements[10] (Sanches, 2025). According to the 2023 report from the Geological Survey of Denmark and Greenland, published on an online portal, there is currently only a residual presence of lithium in Greenland (GREENMIN, 2023); however, this quantity could increase in future research, stimulating interest in this territory, which is estimated to contain up to 25% "of all rare earth element resources in the world" (Sanches, 2025). China is also currently investing in rare earth prospecting in Greenland, including this territory in its Polar Silk Road, given that it would offer a more economically advantageous alternative to the current China-Europe maritime routes via the Strait of Malacca and the Suez Canal, which could be blocked by the U.S. and its allies; but also for enabling a diversification of energy resources (Atlas Report, 2021). Thus, the hegemonic ambition of both actors, the U.S. and China, emerge in economic terms, each competing for influence over Greenland. Regarding the U.S. invasion of Afghanistan in 2001, justified as a measure to defeat al-Qaeda and the Taliban, and as part of America's "preventive war strategy" (Mattos, 2016, p. 56), some sources indicate that a primary motive for the war was the existence in Afghan territory of "deposits of gold, cobalt, copper, iron and, above all, lithium," amounting to over a trillion dollars, according to the Pentagon in 2010 (Galeano, 2014, p. 192). Following the U.S. withdrawal in 2021, China sought to exploit these alleged lithium deposits and invest in the infrastructure needed to integrate the Afghan state into the OBOR framework. To this end, China maintains diplomatic relations with the Taliban while promoting stability along its small border with Afghanistan (Costa & Teixeira, 2021). On its part, the expansion of Chinese interests in the Indo-Pacific region (Hendler, 2018) and in the space sector (Smart, 2019) has resulted in the growth and modernization of its armed forces, with defense investment comparable to that of NATO member states (excluding the U.S.) (International Institute for Strategic Studies [IISS], 2025). However, rapid economic growth has increased China's dependency on access to external resources. Within this framework, the military instrument serves the political-economic interests of both actors in asserting power, as confirmed by the presence of U.S. bases in strategic locations across various oceans and by the Chinese military projection in Djibouti and the South China Sea, where the naval component,

[10] It is important to note that the United States already maintains a space base in Pituffik, Greenland.

among other functions, is used to escort merchant ships and control resources (Monteiro, 2024).

Anticipating the rising demand for lithium, it will be essential to make the industry economically sustainable, therefore technological development must enable the optimization of mineral extraction. Despite possessing fewer lithium reserves than China, the U.S. has clay-derived lithium deposits (see Figure 3), allowing for the development of more profitable extraction methods. On the other hand, the potential extraction of lithium from the oceans has stimulated research into manufacturing batteries that operate with seawater, or developing techniques for ocean-mining of this metal (Li et al., 2021). In this sense, whoever has the larger EEZ will have an advantage in obtaining lithium through this route. This gives the U.S. a clear advantage, as it has the largest EEZ in the world, and motivates China's expansion in the contested SCS. Internationally, the U.S. seeks to enter into agreements to secure the lithium needed by its companies, such as Tesla, producer of electric vehicles, as well as to negotiate tariffs applied to them.

In the case of China, in order to meet the global demand for batteries[11], it has discreetly but effectively intensified the establishment of companies to increase access to lithium deposits in South America, which concentrates around 50% of global reserves, as well as in Africa and Australia. This interest points to partnerships among these actors, confirmed by examples such as the agreement among Bolivia, CATL (China's principal battery manufacturer) and CMOC (China's largest cobalt miner), including Brunp, which will produce 100,000 tons of lithium carbonate by 2028; and the construction of a deep-water port at Chancay, Peru, by the Chinese state-owned company Cosco Shipping, which will facilitate China-South America trade. It is evident that lithium has contributed to stimulating China's OBOR strategy, which includes investments in Argentina, Bolivia, Chile, Costa Rica, Ecuador, Peru, Panama, Uruguay and Venezuela. In the long term, this Chinese strategy seeks to integrate supply agreements with various countries, investment in energy assets and infrastructure abroad, and creation of strategic reserves to mitigate disruptions in supply (Castro & Ludovico, 2025).

This reality challenges U.S. and European interests on these continents, with the European Union (EU) having included lithium on its list of strategic minerals and expressed the intention to establish supply chains that enable increased replenishment of this metal by 2050. In this context, at the end of 2024 the U.S. began diversifying its investment in Angola, previously directed mostly toward the petroleum sector, notably with the construction of solar parks for energy production, but mainly with the upgrading and construction of an additional 800 km of railway line on the Lobito Corridor, which connects Angola to mineral zones in the DRC and Zambia and facilitates trade and transportation of goods between the Atlantic and Indian Oceans.

Given the widespread increase in tariffs imposed by Donald Trump, notably on China and the EU, China began a commercial overture to the EU regarding the sale of electric vehicles, leading the EU to suspend the imposed tariffs in October 2024. At the 25th EU-China Summit, on 24 July 2025, a greater commitment was underlined to a more

[11] China produces 70% of electric vehicle batteries.

balanced trade relationship, safeguarding multilateralism and enhancing cooperation in combating climate change (European Council, 2025).

Regarding countries with large lithium reserves, such as Argentina, Bolivia and Chile (the South American ABC)[12], their production and export of lithium have led to increasing state competitiveness, supported by multinational companies, primarily U.S. and Chinese, that favour maintaining the international order. Despite short to medium-term economic growth, lithium extraction and trade have increased these countries' economic dependence and specialization in resource exports, with negative effects on exchange rates, on industrial structure and on dependency on foreign financing (Freitas, 2023; Medeiros, 2013, pp. 152-153). While China has shown willingness to invest in battery production in Latin America, the U.S. has primarily sought to acquire raw materials for its clean technology industry. This posture of the superpowers is likely to align Latin American countries more closely with Asian supply, which is more attractive than the traditional model of export with low added value.

From an environmental perspective, exploration of the Arctic, which is particularly sensitive to the effects of global warming, could result in an ecological disaster, the opening and expansion of maritime routes, and climatic imbalances with potentially catastrophic global effects (United Nations, 2022). In the case of the South American ABC, the declining influence of regional states enables the creation of a monopoly by Chinese state companies, whose interests antagonistic to regional environmental and socio-economic concerns (Nolasco, 2022). On the other hand, the possibility that wind turbines could charge lithium batteries may stimulate market growth, promoting sustainable and renewable energy. This reality may encourage the expansion of superpower influence in peripheral states, creating opportunities for employment and the export of finished products. In this regard, China has developed supply chains for solar and wind energy and storage, demonstrating industrial strategies upstream and downstream of the Chinese economy. Global production of 80% of solar panels, 66% of wind turbines and 56% of electric vehicles in 2023 reflects China's dominance in the global renewable energy market, enabling it to significantly reduce costs (Castro & Ludovico, 2025).

Thus, rising commercial tensions are anticipated, resulting in U.S. tariff barriers designed to reduce Chinese competitiveness and protect the domestic industry. With Donald Trump's economic protectionism, this geopolitical commercial scenario tends to worsen. The increased protectionism over resources, the critical competition for them and supply-chain disruptions resulting from conflicts in Europe and the Middle East represent short-term challenges for the Chinese mining industry, including rising mineral raw material prices (Moon, 2022, p. 9.7). In this context, the BRICS[13] network becomes a viable alternative to "partially offset losses in preferred markets" (Cardoso, 2025).

It is thus expected that China will seek a transition from the current liberal world order to a new alternative world order, in which Beijing's greater power will result in greater prosperity for the world. Recognizing its dependence on energy imports, it will aim to:

[12] It is worth noting that the lithium resources of these states exhibit higher purity and are extracted more cost-effectively (Rodrigues & Padula, 2017, p. 205).
[13] It includes Brazil, Russia, India, China and South Africa, as well as Egypt, the United Arab Emirates, Saudi Arabia, Ethiopia and Iran (after January 2024), and Indonesia (after January 2025).

maintain its international relations directly tied to economic interest, by expanding the acquisition of foreign assets and deposits; adjust import and export tariffs, in line with a measure introduced in early 2024 which reduced import tariffs on 1,010 commodities, including lithium carbonate and lithium chloride (International Renewable Energy Agency [IRENA], 2025); continue to promote the energy transition to green energy, increasing its control over the geopolitics of lithium; and enhance its military power, primarily directed at Taiwan's reunification[14] (Gaspar, 2023, p. 97), but also at protecting its commercial and energy routes, supported logistically by strategic ports, with lithium playing a relevant role in the energy efficiency of new weapons systems and in nuclear proliferation. In this scenario, the United States will likely seek to increase its economic and commercial influence, directly or indirectly, with countries holding energy resources, compelling agreements, if necessary – as with the U.S.-Ukraine agreement signed in April 2025 for rare mineral exploitation, or pressure exerted on Greenland. Furthermore, the United States is expected to expand domestic production of critical minerals as part of a broader effort to stimulate economic growth, substantially reduce reliance on external suppliers (particularly hostile powers) and strengthen the security and resilience of mineral supply chains (Executive Order 14241/2025 of March 20). To this end, Washington established the National Energy Dominance Council, tasked, among other responsibilities, with developing a National Energy Dominance Strategy setting out long-term objectives and promoting private investment across the full spectrum of the energy economy (Executive Order 14213/2025 of February 14).

It is evident that the geopolitics of lithium affects international relations and the application of instruments of power to obtain advantageous economic-commercial relations and ensure strategic positions that guarantee the security of trade routes and the control of resources. Thus, it can be stated that the U.S. and China use power as "the instrument of management and preservation of space," in line with the "new Geopolitics" proposed by General Pezarat Correia (2010). However, the analysis also shows that lithium (spatial positioning) is regarded by both actors as an instrument of hegemony and the exercise of power, consistent with classical and neoclassical theories of geopolitics. This reflects a reciprocal influence between space and power and between geography and politics.

In summary, the current energy transition has intensified U.S.–China competition over the acquisition and control of rare-earth and lithium mining assets worldwide, generating distinct regional impacts. In this framework, the U.S. seeks to: secure access to external lithium sources and establish resilient supply chains; diversify foreign investment; optimize lithium extraction processes; reduce Chinese competitiveness and protect domestic industry; and expand domestic mining production to reduce external dependencies and stimulate economic growth. China, meanwhile, continues to expand its position in the global lithium market as a leading actor in the green energy sector, capitalizing on US retrenchment to establish international agreements that facilitate the long-term acquisition and exploitation of local resources, including through infrastructure investment associated with its OBOR strategy. The integration of advanced technologies into mining and extraction processes may contribute to reducing production costs, while

[14] Pressure from Beijing intensified, particularly after Russia's invasion of Ukraine in February 2022, resulting in a declared 7.1% increase in military investment.

the establishment of lithium extraction companies across South America, Africa, and Australia enables the accumulation of strategic reserves capable of mitigating potential supply disruptions. For both actors, the military dimension serves to facilitate strategic agreements and safeguard lithium supply chains. Consequently, U.S.–China economic, commercial, and politico-military tensions are likely to intensify, potentially exacerbated by Donald Trump's protectionist economic policies, which run counter to the interests of China's mining industry.

Conclusions

In this study, the growing geopolitical importance of lithium was analysed as a source of power in the political and military positioning of the United States and China, to obtain economic and military advantages in the access, control and application of this resource within their industries, through analysis of the instruments of power.

The research methodology employed was based on deductive reasoning, starting from the assumed strategic importance of lithium at the global level as a premise, and examining the contribution that geopolitics and the application of instruments of power in its acquisition and in maintaining U.S. hegemony and China's rise in the IPS. A qualitative content analysis was adopted, based on document analysis, with a cross-sectional case-study design grounded in an explanatory epistemology.

Following the investigation, Subsection 3.1 shows that lithium is a metal with unique energy-efficiency properties, which makes it a strategic resource, used across various industrial sectors and increasingly contested by superpowers. Its applications extend primarily to batteries, but also encompass ceramics and glassware, greases and lubricants, air treatment, aluminium production and metallurgy, and pharmaceuticals, among others. The progressive energy transition from oil to the "clean economy", coupled with the discovery and exploitation of new natural lithium reserves, has been impacting local socioeconomic structures, requiring the market to adapt to the dynamics of supply and demand. Militarily, lithium batteries are particularly suitable for operational environments because of their robustness, longer lifespan and faster charging, powering a wide variety of platforms and communication systems. Also notable are the use of lithium for aircraft coatings and to produce thermonuclear warheads, including the coolant fluid for nuclear reactors, which is particularly relevant considering the recent increase in nuclear-based deterrence involving both the U.S. and China. From an environmental perspective, lithium contributes to reduced pollution levels in states where its technological application is established; however, extraction sites may experience harmful ecological impacts. For China, lithium is central to its new green and ecological policy, aiming to expand its influence in South and Latin America, while pursuing economic independence and national security. For the U.S., competition over critical minerals has reinforced its global supply chains, underscoring lithium's central role in the technological and geopolitical rivalry between the two actors.

In Subsection 3.2, it is noted that the major countries with verified lithium reserves, accounting for approximately 85% of the global total, are Chile, Australia, China, Argentina and the U.S.. In the next tier are, among others, Canada, Brazil, Zimbabwe, Portugal and Bolivia. Except for Bolivia, these countries also rank among the world's

largest lithium producers, with China, Argentina, Zimbabwe and Canada, showing significant production increases since 2023. Economically viable lithium deposits fall into the following categories: (1) minerals from brines (currently the most profitable extraction process, thus dominant), located in Bolivia, Chile, Argentina, China and the U.S.; (2) hard-rock deposits (pegmatites), found especially in Australia, Austria, Brazil, Canada, China, but also in the U.S. and Zimbabwe; and (3) clay-derived deposits (a potentially more profitable process but not yet developed), located in Mexico and the U.S. Given their size and geographic location, the U.S. and China each host seven lithium exploration sites, geographically dispersed and belonging to different categories. Also highlighted is the possible mining of lithium from seawater, a predictably economical solution that will confer advantage to whoever has the larger EEZ, in this case the U.S. Given the global increase in lithium consumption, it is in the interest of the U.S. to safeguard relations with the countries from which its principal lithium imports originate (Chile and Argentina, among others), to maintain this market in economic balance, to strengthen supply chains across the Western Hemisphere and to increase domestic lithium production in order to reduce external dependencies. For China, it is of interest to expand the acquisition of foreign companies dedicated to lithium extraction and processing (e.g. in Argentina and Zimbabwe); international cooperation projects (e.g. in Australia); and domestic exploitation.

In Subsection 3.3, it is demonstrated that the current energy transition has intensified U.S.-China competition over the acquisition and control of rare earth and lithium mines on a global scale, with distinct regional ecological impacts. In this framework, the U.S. seeks to counter China's newly acquired advantage – evidenced by the apparent discovery of new lithium reserves on Chinese territory – through: access to the Arctic; exerting politico-military leverage in Greenland; technological development to optimize lithium extraction processes; establishing agreements to secure lithium supplies for its companies; imposing tariffs to reduce Chinese competitiveness and protect domestic industry; diversifying foreign investment, such as the rehabilitation of the Lobito Corridor railway line, aiming to connect sources of lithium in the DRC and facilitate Atlantic-Indian Ocean trade; and expanding domestic production of critical minerals to stimulate economic growth and substantially reduce reliance on external suppliers. Conversely, China capitalizes on U.S. political and military retrenchments to establish international relations and agreements that enable the appropriation and exploitation of local resources, integrating them into infrastructure investments linked to its OBOR strategy. To remain at the cutting edge of green energy, China has broadened its lithium market, incorporating various technologies from batteries to solar panels and wind turbines, thereby significantly reducing production costs. Simultaneously, it seeks to establish companies that access lithium deposits in South America, Africa and Australia, forming partnerships aimed at accumulating strategic reserves to buffer potential supply disruptions. To protect critical lithium supply chains essential to its domestic market, China has expanded its industrial and military bases abroad and strengthened its maritime projection, which also serves as a deterrent factor in its ambitions regarding Taiwan's reunification and influence expansion in the Indo-Pacific. Thus, rising economic-commercial and politico-military tensions between the U.S. and China are foreseen, likely to be exacerbated by Donald Trump's economic protectionism, which runs counter to the interests of the Chinese mining industry.

Thus, in response to the RQ, it may be asserted that lithium influences the power relations of the U.S. and China with lithium-resource-holding peripheral states, fostering politico-economic agreements that result in local socioeconomic transformations and energy transition solutions with differential regional and global environmental impacts. This market serves the political, economic and military interests of both superpowers, which employ instruments of power in differentiated ways to enhance their international influence, ultimately creating economic dependence in peripheral states. The conducted analysis reveals external dependence in the lithium market within a context of an apparent gradual energy, climate and health crisis. This new energy paradigm will establish the foundations of a possible new geopolitical order in which U.S.-China relations will maintain a regime of competitive and cooperative coexistence or tend toward conflict, depending on power relations.

This study aimed to establish the relationship between lithium demand and the international relations of the U.S. and China with peripheral actors of the IPS who hold lithium reserves and to assess its impact on world geopolitics. In doing so, it contributes to clarifying the real role of lithium in the strategic objectives of these state actors.

The major limitation of this research stemmed from the scarcity of primary sources related to: the geopolitical world-impacting events resulting from lithium demand; the volatility of information flow concerning new discoveries of lithium sources; and the unpredictability of current U.S. policy, uncertainty in the realization of its intentions (isolationist and/or expansionist, with apparent setbacks in green energy) and the durability of those intentions. However, an attempt was made to supplement the study with comparisons of U.S. positioning before and after Donald Trump's presidency with respect to interest in lithium, through cross-referencing scientific articles with recent news from diverse origins and primary sources of statistical data, seeking, as far as possible, the desired academic neutrality.

It is recommended that this study be extended to include Russia and Australia, given their relevance in the international arena and the limited information on lithium's political, economic and military impact in these countries, which may affect regional and global power dynamics.

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