Google Trends analysis for "Geopark" in Japan from 2004 to 2021

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Abstract

The Global Geoparks Network was established in 2004, and the publicity and activities of geoparks have been conducted in countries with geoparks. This study shows the change in the number of searches for the search term "Geopark" using Google Trends in an attempt to measure the level of interest in geoparks in Japan. The term search "Geopark" in Japanese began to increase in 2006, increased gradually around 2007, and rapidly increased in 2009. Since 2009, it has remained high and has increased rapidly every time new Global Geoparks have been declared. These coincided with activities and events in Japan, such as the foundation of the Japanese Geopark Liaison Council and the Japan Geopark Committee in 2007 and 2008, the foundation of the Japan Geoparks Network, and the approval of the Global Geoparks (first time in Japan) in 2009.

Key words: UNESCO Global Geoparks, Google Trends, web search, Japan, world.

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Introduction

Geoparks are geographical areas of internationally important geological sites and landscapes managed under the overarching concepts of conservation, education, and sustainable development (e.g., Herrera-Franco et al., 2021; UNESCO, 2024). In 2004, the Global Geopark Network (GGN) was established with the support of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). The recognizability of geoparks has developed over the past 20 years (e.g., Martini, 2009; Henriques and Brilha, 2017; Du and Girault, 2018; Catana and Brilha, 2020). Analyzing changes in recognizability in different countries and regions will be helpful for activities over the next 20 years.

Google Trends is an online tracking system for internet search hits. Some researchers have used this system to explore the impact of their research subjects (e.g., Alicino et al., 2015; Adebayo et al., 2017; Hu et al., 2018; Ito et al., 2024), including the COVID-19 pandemic (e.g., Hoerger et al., 2020; Satpathy et al., 2021).

We here show the change in the number of searches for the search term "Geopark" using Google Trends. This is an attempt to measure the level of interest in geoparks in Japan. This paper mainly presents examples from Japan, but results from other countries are also presented for reference.

History of geopark (related to mainly Japan)

European volunteers established the European Geopark Network in 2000 (Zouros, 2004). The GGN and Asia Pacific Geopark Network were established in 2004. In 2015, Global Geoparks were recognized as official UNESCO projects and changed to UNESCO Global Geoparks. The number of geoparks in GGN has continuously increased (e.g., Henriques and Brilha, 2017). As of March 2024, 213 UNESCO Global Geoparks have been established in 48 countries (UNESCO, 2024).

Geopark activities in Japan have been summarized by Watanabe (2018) and Cai et al. (2021). Most activities were conducted since 2007. Thirteen regions participated and the Japanese Geopark Liaison Council was established on December 26, 2007. The Japan Geopark Committee (JGC), an organization that evaluates and certifies geoparks, led by the Geological Survey of Japan (National Institute of Advanced Industrial Science and Technology: AIST), was established on May 28, 2008. Seven regions were selected as Japanese geoparks (domestic geoparks but not global ones) on December 8, i.e., Mt. Apoi, Toya-Usu, Itoigawa, Minami-Alps (Median Tectonic Line Area), San'in Kaigan, Muroto, and Unzen Volcanic Area. On May 16, 2009, the Japanese Geopark Liaison Council was dissolved, and the Japanese Geoparks Network (JGN) was established in its place. On August 22, 2009, the Toya-Usu, Itoigawa, and Unzen Volcanic Area geoparks were admitted to the GGN and became the first Global Geoparks in Japan. Then, several geoparks became Global Geoparks,

i.e., San'in Kaigan on October 3, 2010, Muroto on September 17, 2011, Oki Islands on September 9, 2013, Aso on September 22, 2014, Mt. Apoi on September 19, 2015, Izu Peninsula on April 17, 2018, and Hakusan Tedorigawa on May 24, 2023.

As of October 9, 2024, JGN's regular membership comprises 10 UNESCO Global Geoparks in Japan and 37 Japanese National Geoparks, with eight aspiring geoparks listed as associate members (Japanese Geoparks Network, 2024). In geopark activities in Japan, not only research on geoparks but also relationships with museums, universities, and educational perspectives have been discussed (e.g., Arima et al., 2016; Kurihara, 2016; Niina and Matsubara, 2016; Yuhora et al., 2016).

Methods

In this study, we used Google Trends to quantify the change in the number of searches for geopark. Google Trends provides relative search volume (RSV), which is the query share, from 0 to 100. An RSV of 100 indicates the maximum search interest during the reference period, whereas 0 indicates an undetectably small value.

Google Trends was mined over 18 years (January 2004 to December 2021) searched on the Web worldwide and in 47 countries including Japan. The selected countries were those on the member list presented on the website of the GGN (UNESCO, 2024); however, Cyprus was not shown in this study because the data were not available. A search of the term "Geopark" in the major language(s) of each country was determined. For countries in which a language other than English is the official language, the search was also conducted in that language, and the results were considered when available. Search data were exported from Google Trends in .csv format. They converted to .xlsx format for the analysis. The data mining and its downloading were done on August 2, 2022.

Further, related keywords with "Geopark" in Japanese in Japan were examined. The related keyword indicates what other keywords users searching for those keywords tend to search for. On Google Trends, the top 25 most searched related keywords are shown. It was mined for 18 years (January 2004 to December 2021). The data mining and its downloading were done on December 12, 2023.

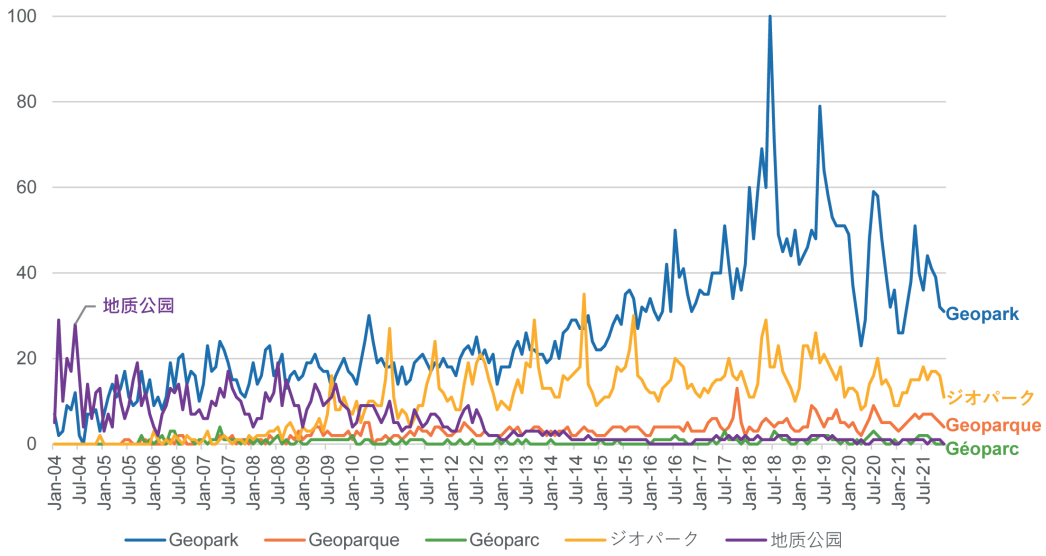


Fig. 1. RSV (relative search volume) of Google Trends for "Geopark" in several languages (e.g., English, Spanish, French, Japanese, simplified Chinese character, and the words with the same spelling) from January 2004 to December 2021 searched in web in world on August 2, 2022. The intervals on the horizontal axis are every 6 months.

Results

The search results from the world and Japan are shown in Fig. 1 and Fig. 2, respectively. The results for the other countries with the world and Japan are shown in alphabetical order in Fig. 3. Because of regional characteristics and changes in the search system (described in detail in a later section "Implications"), this article refrains from a detailed discussion of countries other than Japan. The results from Japan for the related keywords are shown in Table 1.

Worldwide (Fig. 1), the number of term searches in "Geopark" (primarily English) has continually increased since 2004, when GGN was founded, and peaked in 2018. Since 2009, the term search in "ジオパーク" (Japanese) has remained stable at a certain level and is the second largest. On the contrary, since 2009, there have been fewer searches in "地质公园" (simplified Chinese character), particularly since 2015. Comparing "Geoparque" (primarily Spanish and Portuguese) and "Géoparc" (primarily French) to other major languages, fewer search terms were found. The increase in the term search is consistent with bibliographic data; that is, articles, conference papers, book chapters, article reviews, and books associated with geoparks have continually increased (Herrera-Franco et al., 2021).

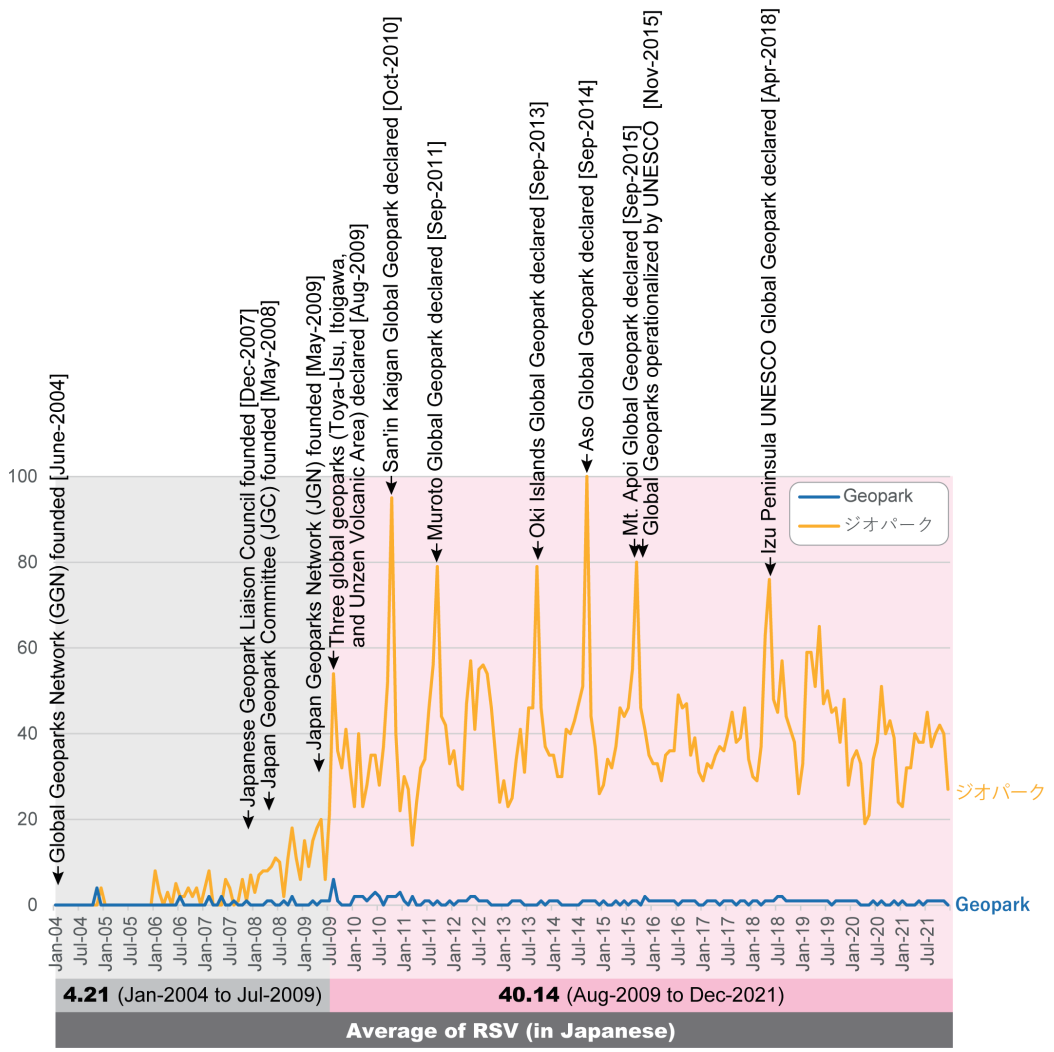


Fig. 2. RSV of Google Trends for "Geopark" in English and Japanese from January 2004 to December 2021 searched in web in Japan on August 2, 2022. The intervals on the horizontal axis are every 6 month.

In Japan (Fig. 2), few terms were searched before 2005. The term search in Japanese began to increase in 2006 and gradually increased around 2007 when the Japanese Geopark Liaison Council and the JGC were founded. In August 2009, when the first Global Geoparks were declared in Japan, the search for terms rapidly increased. It has remained high until 2021 and increased rapidly with each new Global Geopark declared. Another feature of Japan is that the term search is much more common in Japanese than in English. The average RSV from January 2004 to July 2009 was 4.21, whereas that from August 2009 to December 2021 was 40.14 (Fig. 2). Since the establishment of Global Geoparks in August 2009, the RSV has increased by an average of about 10 times.

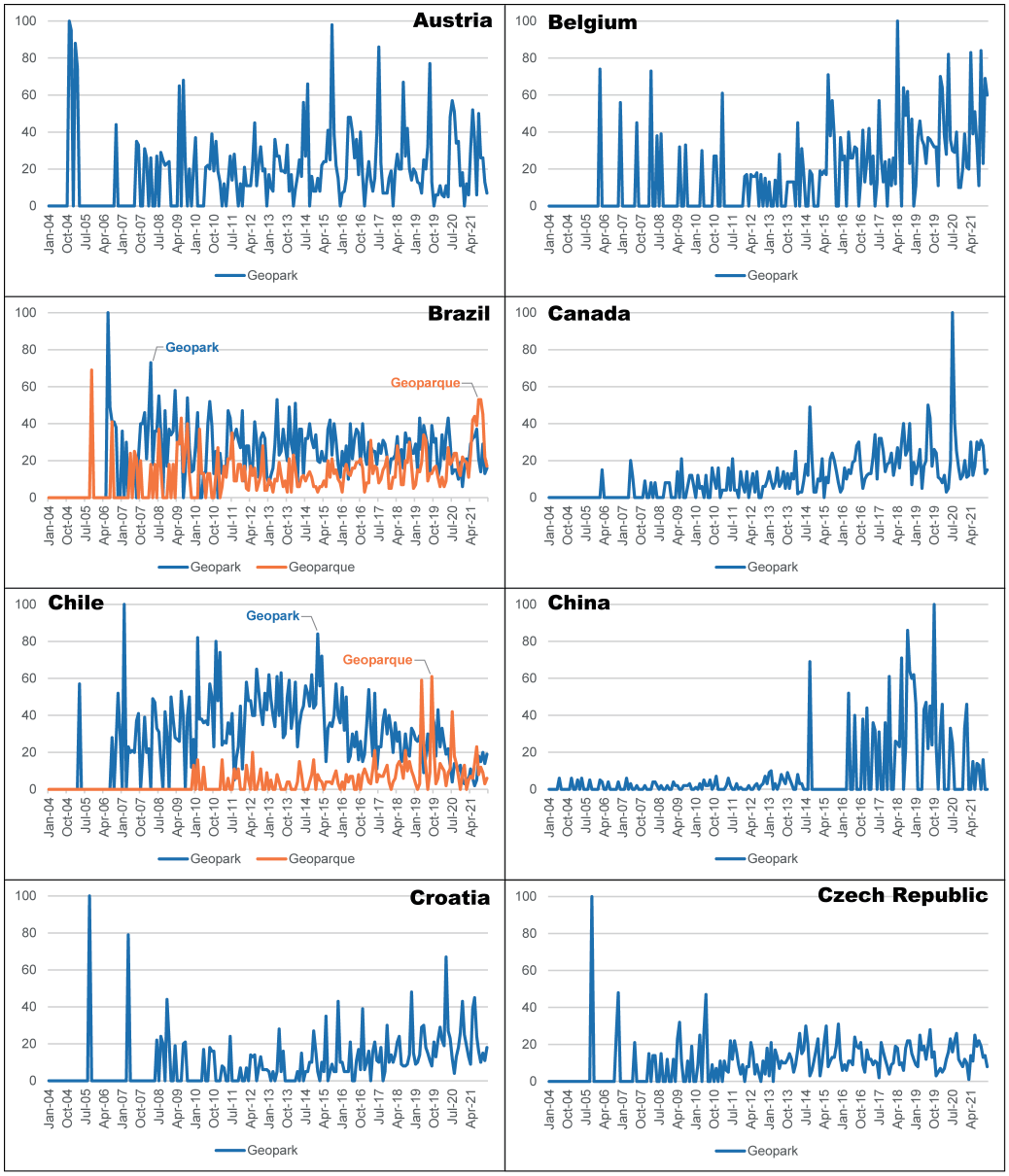
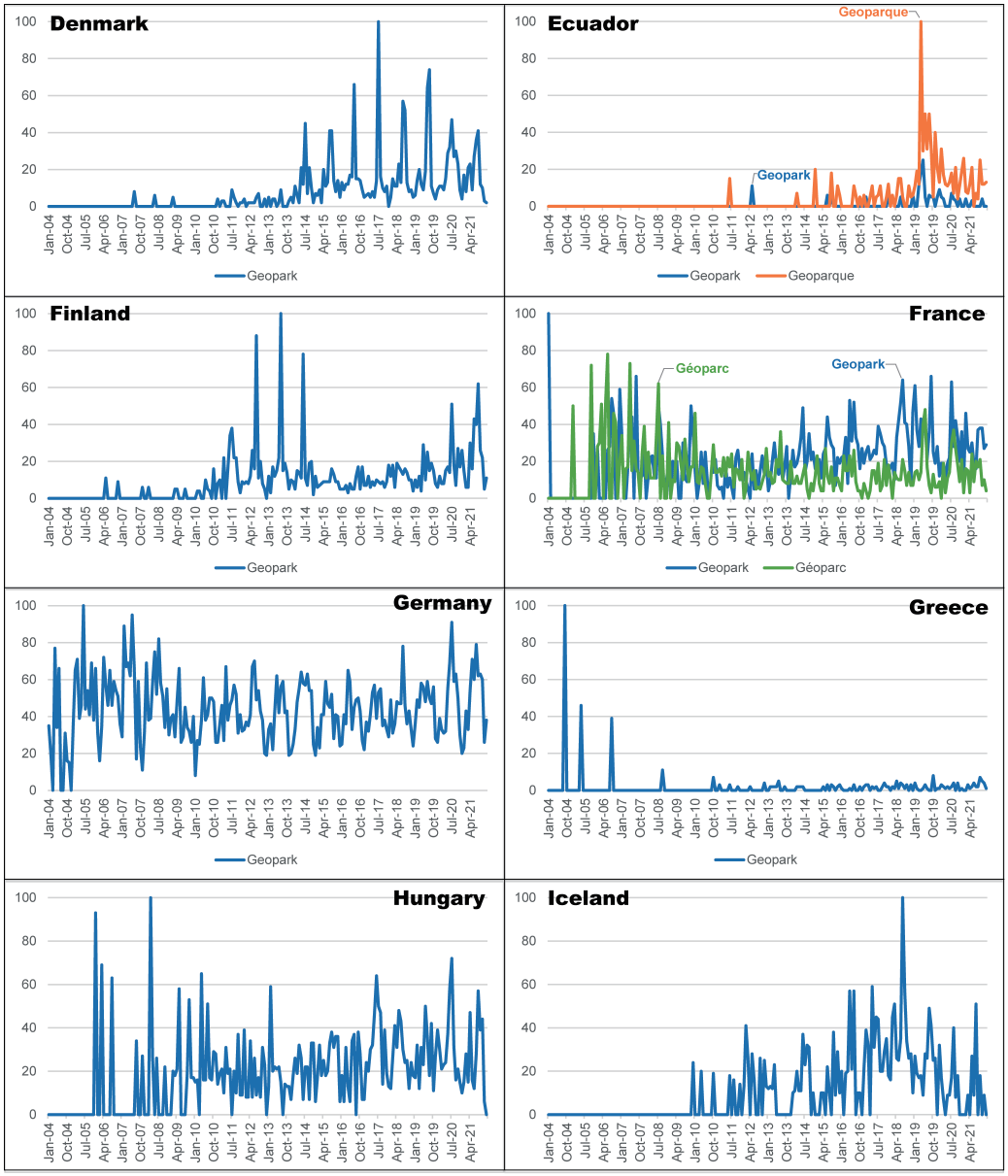


Fig. 3. RSV of Google Trends for "Geopark" in major language(s) in each country from January 2004 to December 2021 searched in webs in each country on August 2, 2022. The intervals on the horizontal axis are every 9 month. Note: The countries listed as a member of the GGN (UNESCO, 2024), whereas only Cyprus was not examined because data were not available. These countries are listed in alphabetical order. The country names are based on the GGN list. When data were available, the main language of each country (e.g., official language) was also considered. Probably the languages include the words with the same spelling.



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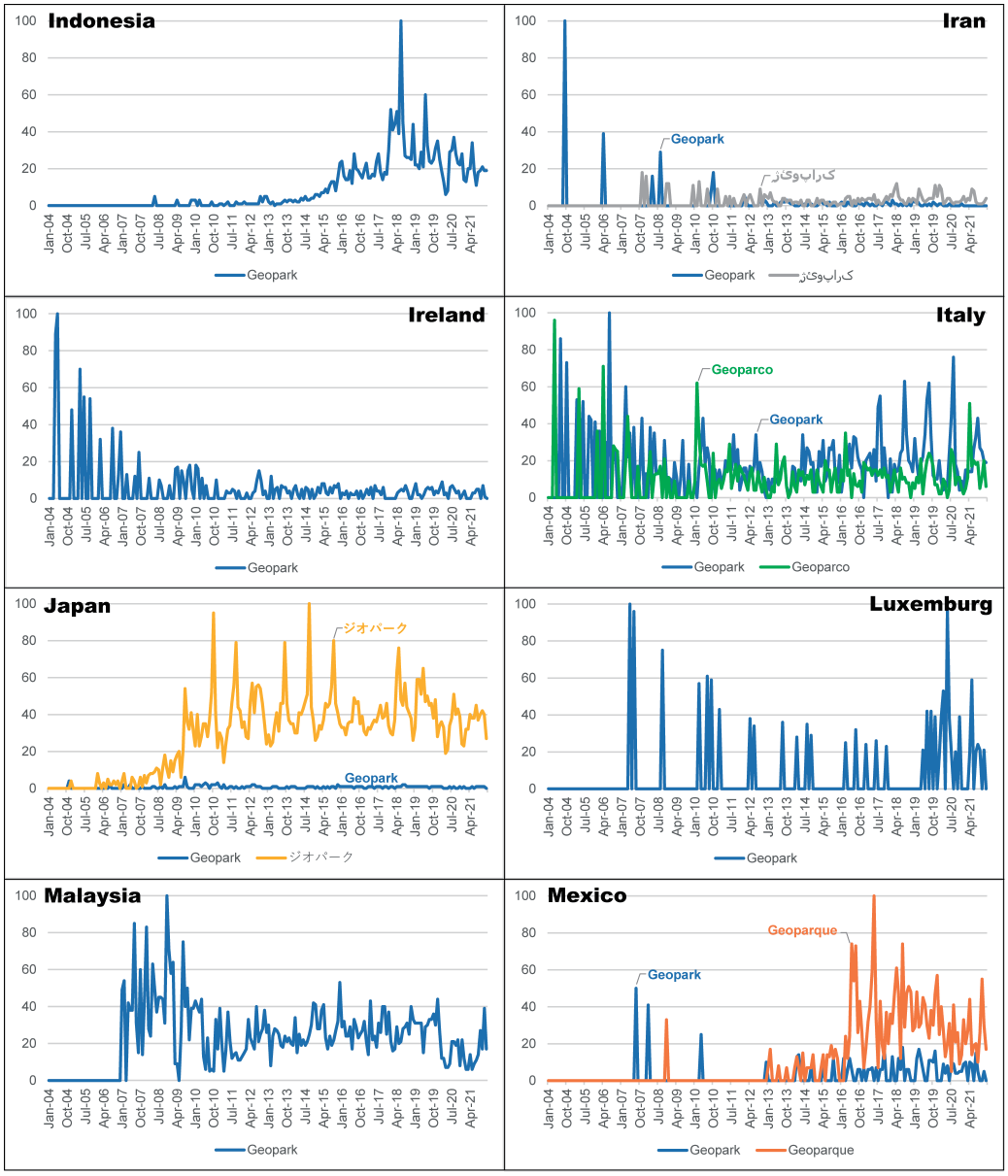

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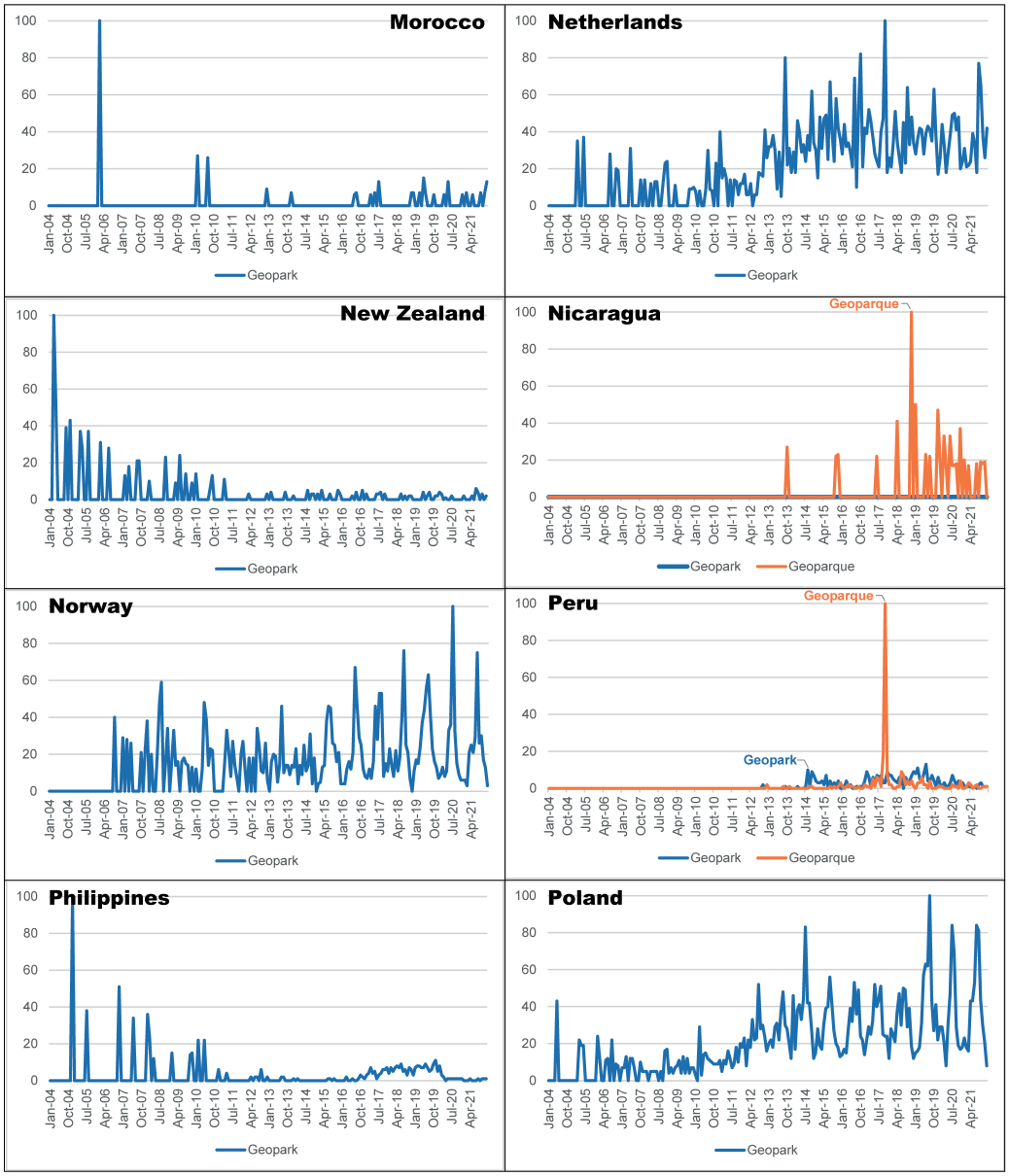

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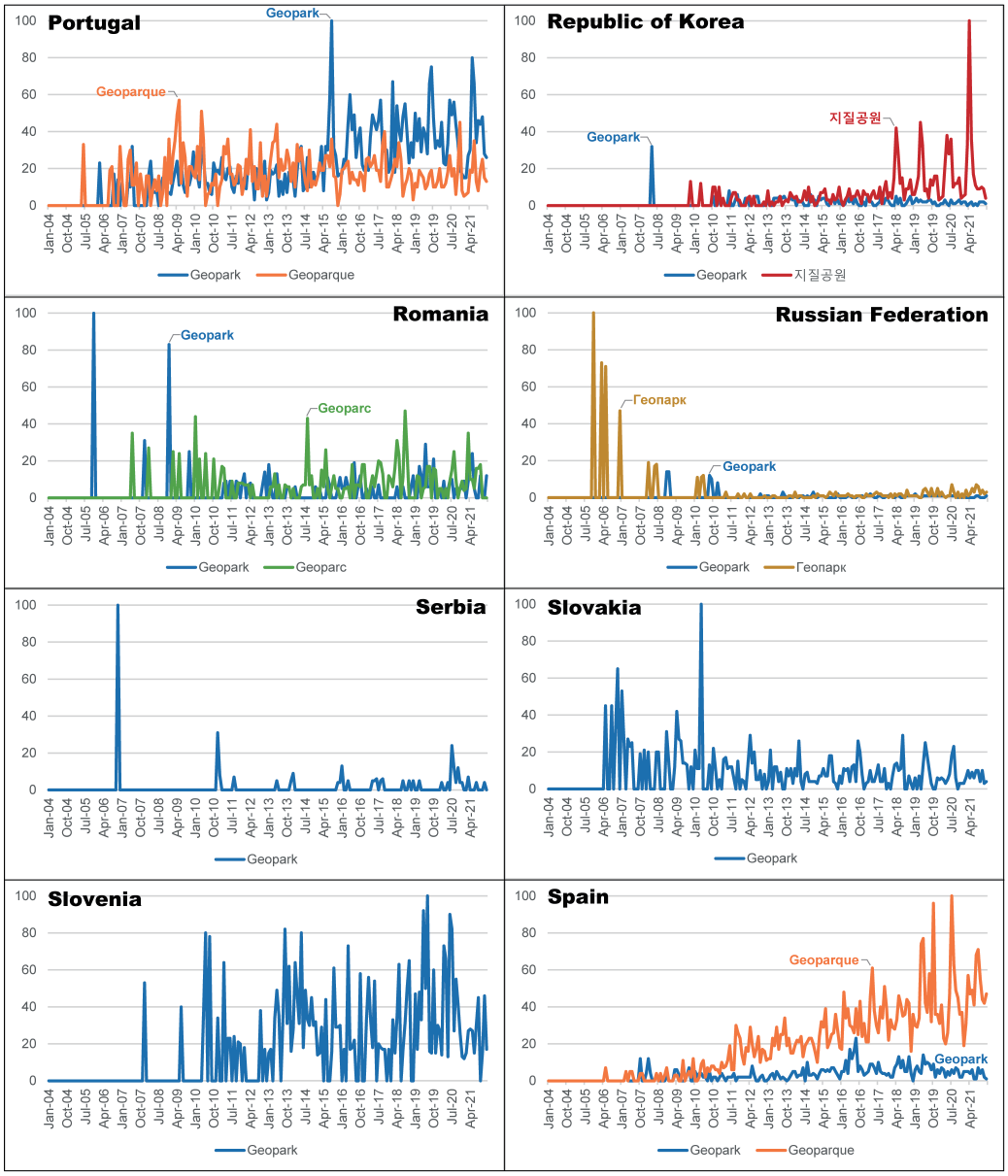

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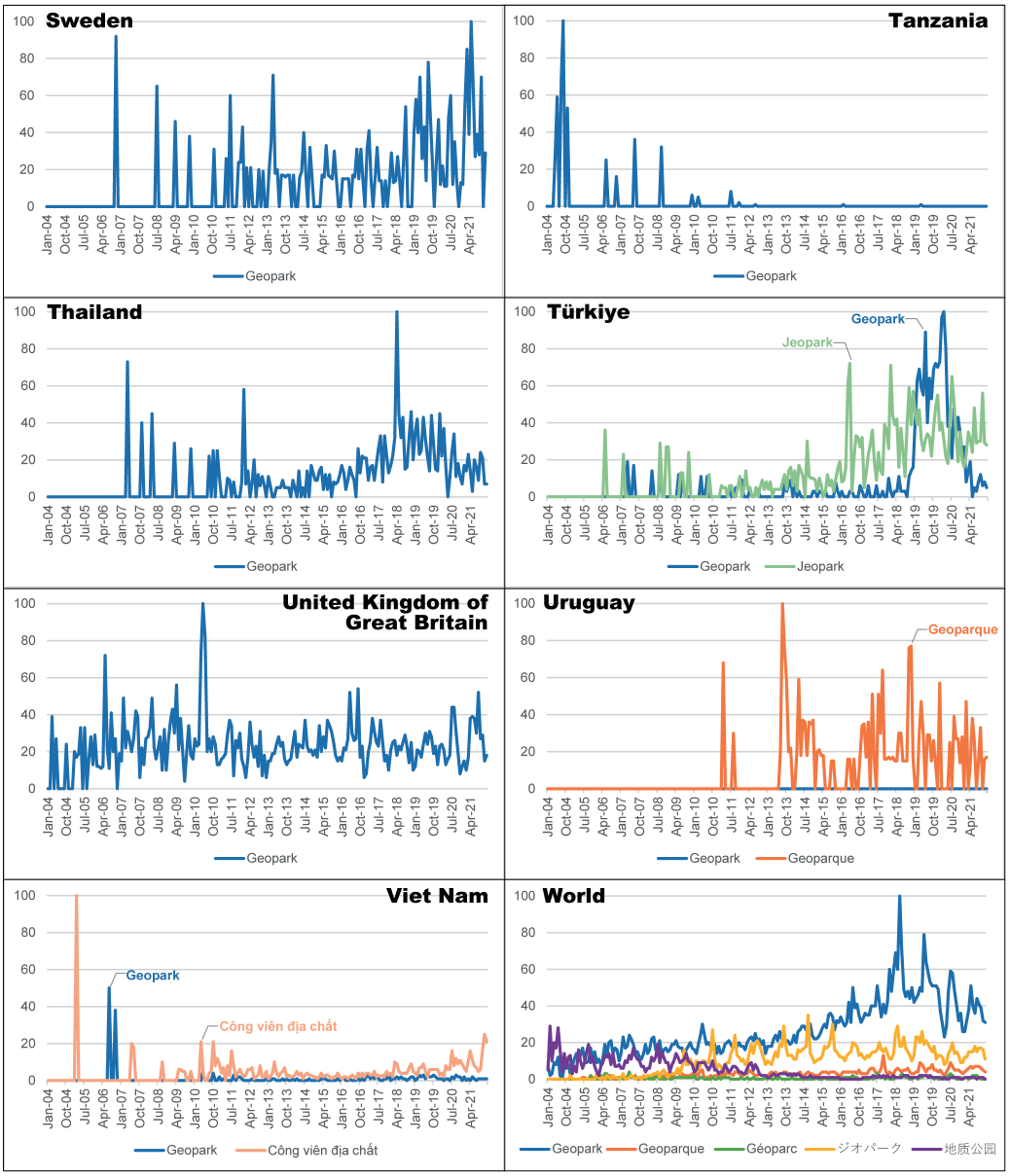

Fig. 3. (continued)

Table 1. Top 25 related keywords of Google Trends for "Geopark" in Japanese from January 2004 to December 2021 searched in Japan on December 12, 2023. Note: "Related keyword" indicates what other keywords users, who search for those keywords, tend to search for. The top 25 most searched related keywords are shown on Google Trends. The Unzen Volcanic UNESCO Global Geopark is called the Shimabara Peninsula UNESCO Global Geopark in Japanese.

Related keywords (original)	English translation	RSV
山陰 ジオパーク	San'in, geopark	100
伊豆 ジオパーク	Izu, geopark	98
山陰	San'in	97
ジオパーク 伊豆	geopark, Izu	96
伊豆	Izu	95
世界 ジオパーク	global, geopark	91
ジオパーク 日本	geopark, Japan	71
山陰 海岸 ジオパーク	San'in, Kaigan (coast), geopark	68
山陰 海岸	San'in, Kaigan (coast)	68
室戸 ジオパーク	Muroto, geopark	54
室戸	Muroto	54
糸魚川 ジオパーク	Itoigawa, geopark	50
糸魚川	Itoigawa	50
ジオパーク センター	geopark, center	37
伊豆 半島 ジオパーク	Izu, peninsula, geopark	36
伊豆 半島	Izu, peninsula	36
ジオ	geo	35
ジオパーク 鳥取	geopark, Tottori	35
鳥取	Tottori	35
阿蘇	Aso	30
ジオパーク 阿蘇	geopark, Aso	30
隠岐	Oki	28
ジオパーク 隠岐	geopark, Oki	28
ジオパーク 島原	geopark, Shimabara	21
ジオパーク マラソン	geopark, marathon	21

The related keywords in Japan (Table 1) showed that the place names related to UNESCO Global Geoparks (e.g., Izu, San'in Kaigan, Muroto, Tottori, Aso, Oki, and Unzen Volcanic Area) had often been searched. "Marathon" was also a related keyword. Marathons have been held in certain geopark regions, indicating that people are interested in these events (e.g., Izu-Oshima Geopark Marathon, Mine Akiyoshi Geopark Ultra Marathons, and World Geopark Trail Runs in the Kannabe Highlands). This association with marathons, which is common in Japan, is thought to have attracted attention.

Implications

In this section, we briefly discuss the change in the number of searches for the search term "Geopark" in Japanese using Google Trends. The result indicated that a certain number of searches continue in Japan probably because of geopark activities. The term search in Japanese, which is more common than in English and words with the same spelling, implies that publicity and domestic activities have been effective. Japan's trend is comparable to that of Mexico, Spain, and the Republic of Korea in that there are more searches made in local languages and the number has stayed high since about 2010.

Meanwhile, the Google Trends analysis has some limitations. For example, RSV is relative, as mentioned earlier; therefore, it is difficult to read other changes when one period is outstandingly high. Furthermore, Google's regional classifications were changed on January 1, 2011, and changes in the data collection system have been applied several times since then. Perhaps the change in the former has resulted in many countries (e.g., Greece, Mexico, Russian Federation, Tanzania) not having clean data (Fig. 3). Depending on the international situation, accurate data may not be available.

In addition, the search algorithm has presumably changed. When data mining was conducted in August 2022, searches did not available in some major languages in each country (e.g., French in Canada, simplified Chinese Character in China). However, when the search was conducted again in January 2025, search result was available. Similarly, data for Cyprus could not be availed as of August 2022, but search result was available in January 2025.

Appropriate search periods are desirable to obtain accurate information. Further, it is necessary to verify each country's background and other information (e.g., the number of visitors to geoparks and questionnaires for visitors). Questionnaire-based studies on geoparks have been conducted in certain geoparks (e.g., Itoh et al., 2015; Guo and Chung, 2019; Catana and Brilha, 2020; Amaro et al., 2023; Luan and Wang, 2023).

Concluding remarks

In this study, we showed the change in the number of searches for the search term "Geopark" using Google Trends in an attempt to measure the level of interest in geoparks in Japan. The change of the term search "Geopark" in Japanese coincided with activities and events in Japan, such as the declarations of new Global Geoparks. Meanwhile, as mentioned just above, the Google Trends analysis has some limitations and additional information is needed.

On the other hand, Google Trends analysis is an easy method. This method is expected to be useful for evaluating past activities and future planning. This article presents the results of Google Trends analyses of 47 countries with UNESCO Global Geoparks (Fig. 3). For the reasons mentioned above, we examined almost only Japan; we hope that this will be useful for similar analyses and examinations in other nations.

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