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SPECIAL ISSUE: CLIMATE, TOURISM AND RECREATION

A comparison of the holiday climate index:beach and the tourism climate index across coastal destinations in China

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Abstract
Climatic resources are vitally important for tourism, driving major intra- and inter-regional travel flows for sun-sand-surf (3S) tourism around the world. The development of climate indices to measure the suitability of climate for major tourism market segments has evolved over three decades. This study provides the first application of the holiday climate index (HCI):Beach specification in the Asia-Pacific tourism region. The HCI is designed from international tourist climate preference studies and is compared with the tourism climate index (TCI), which is widely applied, but not based on tourist climate preferences. The index inter-comparison is conducted at 14 of the most popular beach resort destinations in China, which include four geographic regions of China with four different Köppen classifications. The results show key differences between the two indices in rating the climatic suitability of the selected beach destinations in China, with the TCI rating beach destinations in the north and south higher during the spring and fall seasons, which is not consistent with beach tourism visits. During the summer months, southern destinations have much higher HCI:Beach rating, reflecting the 3S tourists' desire for higher temperatures. The findings reinforce those from other tourism regions that indicate the TCI is not appropriate for assessing 3S tourism potential and that additional cross-cultural studies of tourist climate indices are needed to better inform market segment climate service development and to understand the potential impacts of future climate change.

Keywords Holiday climate index (HCI) · Tourism climate index (TCI) · Beach tourism · Coastal · China

Introduction

The importance of weather and climate for tourism is widely understood, with mounting empirical evidence that climatic resources directly influence destination choice (e.g., Gössling et al. 2012, Li et al. 2017), season length and quality (e.g., Rutty et al. 2017), as well as destination expenditures (e.g., Wilkens et al. 2018). Climatic resources are particularly important for beach tourism, driving major intra- and inter-regional travel flows (e.g., from temperate to tropical climates) and significantly influencing visitation and arrival numbers (Rutty & Scott 2010, Ibarra 2011, Rosselló and Waqas, 2015). COVID-19 has drastically disrupted international travel, with early research suggesting that as travel restrictions are eased, travel intensions in all major international markets shift to domestic travel for the foreseeable future (pre-vaccine era) (Gössling et al. 2020). Coastal tourism throughout the Asia-Pacific region has suffered massive declines as international travel restrictions kept outbound Chinese tourists at home (Head 2020, Campbell 2020). A recent survey of pandemic recovery travel intensions found that 56% of Chinese travelers plan to travel domestically in 2020 and that a beach destination was the top travel choice (Pacific Asia Travel Association 2020).

With over 18,000 km of mainland coastline, 14,000 km of island coastline, and 110,000 lakes (Chang, 2016), coastal tourism has become an important market segment in the development of China's rapidly growing tourism economy. The

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Ministry of Natural Resources of the People's Republic of China (http:/gc.mnrgov.cn/) found that coastal tourism increased from approximately RMB 287.48 billion in 2002 to over RMB 1808.6 billion in 2019. China's vast territory also spans four of the five Köppen climate classifications, including A (tropical), B (dry), C (temperate), and D (continental), providing a range of seasonal opportunities to meet coastal tourists' climatic needs.

Over the past 35 years, research has sought to assess the suitability of a destination's climate for tourism using numerical climate indices, which began with the tourism climate index (TCI) by Meizkowski (1985). The TCI continues to be the most widely applied index across a range of geographical scales (destination to global). However, several authors have underscored the TCI's theoretical weaknesses, including its subjective design (i.e., not based on stated or revealed tourist climate preferences) and the inappropriate application of the index in market segments that have specific climatic requirements, including beach or 3S (sun-sand-surf) tourism (Gomez-Martin 2005, Gössling & Hall 2006, de Freitas et al. 2008, Scott et al. 2008 and 2016, Matthews et al. 2019, Ma et al. 2020).

While modifications of the TCI designed specifically for beach tourism have been proposed, including the Beach Comfort Index (BCI) (Morgan et al. 2000) and the Modified Climate Index for Tourism (MCIT) (Yu et al. 2009), the weighting and rating systems of these indices, like the TCI, are not derived from the stated or revealed preferences of tourists. One exception is the holiday climate index (HCI) (Scott et al. 2016), which is designed to overcome the range of limitations of the TCI and is specified for major tourism segments and destination types, including the HCI:Beach (Rutty et al. 2020) (which differs substantially from the HCI:Urban specification by Scott et al. 2016). Given the increasing demand for climate indices for the tourism sector (Guido et al. 2016, Damm et al. 2019) and their potential for use in the development of climate services for tourism (Matthews et al. 2019), there is a need to address critical geographical gaps in index application, with HCI beach index studies limited to Canada and the Caribbean (Matthews et al. 2019 and Rutty et al. 2020, respectively). There is also limited research that explores an inter-comparison between different indices at a destination level (Scott et al. 2016), to examine their potentially different ratings and the implications for tourist decisions or climate services development.

This study presents the first application of the HCI:Beach in the globally important Asia-Pacific tourism region. Through a comparison of daily climate ratings based on the outputs from the HCI:Beach and the TCI, 14 climatically diverse coastal destinations in China (i.e., spanning four Köppen climate classifications) were examined under current climate conditions (1981–2010) to evaluate their climatic suitability for 3S tourism. The findings are discussed in the context of multi-national tourist climate preference surveys and tourism arrivals data to evaluate validity in the beach tourism marketplace, as well as identify future research needs.

Climatic preferences of beach tourists

Over the last decade, researchers have been examining the climatic preferences of tourists, which consistently indicate differing ideal and unacceptable climatic thresholds depending on the type of tourism market segment (Scott et al. 2008, Rutty & Scott 2010, Hewer et al. 2018, Rutty & Scott 2013, Ma et al. 2020) and with some observed differences among tourist origins (Morgan et al. 2000, Scott et al. 2008, Rutty & Scott 2013, Rutty & Scott 2016, Atzori et al. 2018, Georgopoulou et al. 2019) and socio-demographics (Credoc 2009, Wirth, 2010, Hewer et al. 2018, Rutty & Scott 2015). Given that the TCI was developed for general sightseeing purposes and not based on stated or revealed tourist climate preferences, the universal application of the index in tourism market segments with very specific climatic requirements is considered conceptually unsound (de Freitas et al. 2008, Rutty & Scott 2013, Scott et al. 2016).

For beach tourism, survey research has found that the relative ranking of climatic variables, and thereby the consequent weighting of sub-indices, differs significantly from general sightseeing tourism. For example, the TCI places the highest weight (50%) on thermal comfort, yet survey research has found temperature to be ranked second (Scott et al. 2008) or third (Moreno 2010, Morgan et al. 2000) in importance behind absence of rain and cloud cover. Additionally, revealed preference studies (e.g., webcam) have found rain and high winds to have an overriding influence on beach attendance both during and after an event (de Freitas 1990, Moreno et al. 2008, Ibarra 2011, Gomez-Martin & Martinez-Ibarra 2012). The greater importance and overriding effect of physical parameters are both key advancements that are captured within the sub-indices of the HCI:Beach, including a penalty function to substantially reduce the rating in order to reflect the overriding influence of physical conditions like wind or rain.

Ideal and unacceptable thermal conditions for beach tourism are also significantly higher than for other tourism markets (e.g., urban and mountain). The extent of this difference has been found to be influenced by the tourists' place of origin. According to the literature, Europeans have a slightly higher ideal temperature (up to 32 °C) (Rutty & Scott 2010, Wirth, 2010, Georgopoulou et al. 2019) compared with respondents from Canada (30 °C) and the USA (28 °C) (Rutty & Scott 2015, Atzori et al. 2018). Unacceptable temperatures also vary across sample groups, from > 33 °C for tourists from Canada (Rutty & Scott 2015), > 35 °C for tourists from the Caribbean (Rutty & Scott

2013), > 36 °C from the USA and northern Europe (Atzori et al. 2018, Rutty & Scott 2010), and > 39 °C for tourists from Greece (Georgopoulou et al. 2019). Even in conditions considered to cause thermal stress (i.e., > 32 °C), the majority of beach in situ beach tourists in a Caribbean study indicated that they would not change the current thermal conditions, with some preferring warmer temperatures even at 38 °C (Rutty & Scott 2015). The higher temperature thresholds for 3S tourism are reflected in the HCI:Beach, which assigns a rating of 5 at 36 °C compared with a 0 using the TCI.

Ideal precipitation, cloud cover, and wind conditions are similar across all regional sample groups of beach tourists (< 15 min of rain, 25% cloud cover, 1–9 km/h), as are unacceptable wind conditions (> 41 km/h) (Rutty et al. 2020). Importantly, beach tourists prefer some cloud cover, which differs from studies in sightseeing or urban tourism markets (e.g., Gomez-Martin 2006, Scott et al. 2008). Slight differences in unacceptable rain conditions have also been recorded among beach tourists, with tourists from the Caribbean the most accepting of rain (> 5 h) (Rutty & Scott 2015), followed by Greece and Germany (> 2.5 h) (Georgopoulou et al. 2019, Wirth, 2010), with all other studies stating over 2 h of rain as unacceptable for beach tourism (Scott et al. 2008, Rutty & Scott 2010, Rutty & Scott 2015, Atzori et al. 2018). Greater than 75% cloud cover is considered unacceptable for beach tourism across available studies, except for respondents from the Caribbean, whom indicated that cloud cover even up to 100% is acceptable (Rutty & Scott 2013).

The HCI:Beach overcomes the multiple conceptual and subjective deficiencies of the TCI and meets all the recommended elements of a tourism climate index; it is theoretically sound; integrates the effects of thermal, physical, and esthetic climatic variables; is simple to calculate and understand; it recognizes the overriding effect of certain weather variables; and it is empirically tested (De Freitas and Scott, 2008). While the empirical strength of the HCI:Beach has been demonstrated against beach tourism visitation in temperate (Canada – Matthews et al. 2019) and tropical (Caribbean – Rutty et al. 2020) climates, this is the first study to apply the index in China, which includes temperate, tropical, dry, and continental climates. This study also contributes to the limited studies on index comparison and validation research, which have been recognized as an important area for continued research (Chen & Ng 2012, Rupp et al. 2015, Coccolo et al. 2016, Scott et al. 2016).

Methods

Tourist attractions or scenic areas rated as the highest level of AAAAA (5A) are the most important and best-maintained tourist attractions in China. Based on the National Tourism Resorts and the 5A Tourist Attraction Rating Categories of China, 14 beach tourism destinations across the four geographic regions of China and spanning four of the five Köppen classifications (Table 1) were selected for this study (Fig. 1). The case study sites included three in the north (Baishan, Dalian, Qingdao), eight in the south (Wuhan, Suzhou, Hangzhou, Yueyang, Xiamen, Kunming, Beihai, Sanya), one in the northwest (Changji Hui Autonomous Prefecture), and two in the Qinghai-Tibetan region (Xining, Nagqu Prefecture).

In the Northern Region, Tianchi Lake is located in the Changbai Mountain reserve in Baishan and is home to the largest volcanic lake in China and the deepest alpine lake in the world. Golden Pebble Beach, located in Dalian, is the first national tourist resort approved by the government in 1992, with a 4-km beach. Located in the eastern shore of Qingdao City, the Old Stone Man Beach is renowned for its fine-grain sand, and was also one of the first national tourist resorts in the country. In the Southern Region, East Lake is one of the most popular and heavily visited attractions, in part due to location within the city limits of Wuhan. Taihu Lake is the largest lake in the area of eastern coastline of China, as well as the second biggest freshwater lake. Suzhou Taihu Lake National Tourist Resort is also one of 12 national tourist resorts approved by the State Council in October 1992. West Lake in Hangzhou is listed as a UNESCO World Heritage Site and Dongting Lake in Yueyang is China's second-largest freshwater lake. Gulangyu Island is located just southwest of Xiamen and is a UNESCO World Cultural Heritage Site. Kunming Lake is the largest freshwater lake in the southwestern Yunnan province, which is known as the "Sparkling Pearl Embedded in a Highland." Beihai Silver Beach is renowned for its flat, fine white sandy coastline (i.e., gentle waves, safe swimming area) that is often cited as "the greatest beach in China" (Liu and Bao 2012). Yalong Bay, also known as the Yalong Bay National Resort, is a world-class tourist resort under continual development, serving as a premier destination with international resorts and golf facilities. In the Northwest Region, Tianchi, known as Heavenly Lake, is an alpine lake in Changji Hui Autonomous Prefecture, Xinjiang Uygur Autonomous Region, and is a UNESCO World Heritage site. Qinghai Lake, China's largest inland saltwater lake in the northwestern Qinghai Province ranks top of China's five most beautiful lakes in a latest competition activity by the magazine of China National Geography (Shan and Tian 2005) to select the country's most beautiful places. Namtso Lake is both the largest lake in Tibet and the highest saltwater lake in the world.

Weather station data was selected based on its proximity to the beach destination and minimal gaps in the data record. The availability of daily climate data required for current climate analysis (1981 to 2010) was obtained through the China National Meteorological

Table 1 Climate Data (1981–2010) across the 14 coastal tourism study areas in China

Region	Destination	Major beach	Köppen classification	Weather station coordinates	
				Latitude (°N)	Longitude (°E)
North	Baishan	Changbai Tianchi	Dwb (warm summer continental)	41.4	128.2
	Dalian	Golden Pebble Beach	Dwa (dry-winter humid subtropical)	39.3	122.6
	Qingdao	Old Stone Man Beach	Cwa (dry-winter humid subtropical)	36.1	120.3
South	Wuhan	East Lake	Cfa (humid subtropical)	30.6	114.4
	Suzhou	Taihu Lake	Cfa (humid subtropical)	31.1	120.4
	Hangzhou	West Lake	Cfa (humid subtropical)	30.2	120.2
	Yueyang	Dongting Lake	Cfa (humid subtropical)	29.4	113.1
	Xiamen	Gulangyu Island	Cfa (humid subtropical)	24.5	118.1
	Kunming	Dian Lake	Cwb (dry-winter subtropical highland)	25.0	102.7
	Beihai	Silver Beach	Cwa (dry-winter humid subtropical)	21.5	109.1
	Sanya	Yalong bay	Aw (tropical savanna)	18.2	109.6
Northwest	Changji	Tianshan Tianchi	BSk (cold semi-arid)	43.9	88.1
Qinghai-Xizang	Xining	Qinghai Lake	BSk (cold semi-arid)	36.7	101.8
	Nagqu	Namtso lake	BS (semi-arid)	31.4	90.0

Information Center (http://data.cma.cn). The daily data included all five climate variables needed to calculate both the HCI:Beach and TCI indices (i.e., temperature, relative humidity, precipitation, cloud cover, windspeed) (Table 1). At each destination, the monthly index value is the mean of daily scores, which were calculated for spring (March, April, May), summer (June, July, August), and fall (September, October, November) when the climate can be suitable for 3S tourism in parts of China.

Both the TCI and HCI:Beach utilize an additive approach, whereby each of the sub-indices is weighted to represent the proportional contribution of each climatic variable, with the former based on Mieczkowski (1985) expert judgment and the latter on multiple surveys of tourists' stated preferences. TCI

Fig. 1 Map of China with 14 beach destinations selected for this study

is calculated as follows: TCI = 2 × (4CID + CIA + 2P + 2S + W), where CID is the daytime comfort index (combination of the maximum daily temperature and minimum daily relative humidity) and has a 50% weight; CIA is the daily comfort index (combination of mean daily temperature and mean daily relative humidity) with a 10% weight; P is precipitation and S is sunshine, both of which are weighted 20%; and W is wind with a 10% weight. HCI:Beach is calculated as: HCI:Beach = 2(TC) + 4(A) + (3(P) + W), where TC is thermal comfort (combination of the maximum and mean relative humidity) and has a 20% weight; A is esthetic (cloud cover %) with a 40% weight; P is precipitation with a 30% weight; and W is windspeed with a 10% weight. Since 3S tourism is predominantly a daytime activity and most coastal hotels/resorts in China have air conditioning, the CIA sub-index that captures evening comfort in the TCI is not included as a component in the HCI:Beach. Each of the sub-indices in the TCI and HCI:Beach can score up to 10, adding up to an overall climate rating that ranges from 0 (impossible/dangerous) to 100 (ideal). The rating scores correspond with descriptive categories that change at 10 point increments (e.g., 50–59 points is "acceptable," 60–69 is "good," 70–79 is very good, 80–89 is excellent, 90+ is ideal). A detailed review of the design, calculation, as well as the rating and weighting systems of both indices are provided in Rutty et al. (2020).

Results

TCI and HCI:Beach index scores were calculated for each day during the spring (March, April, May), summer (June, July, August), and fall (September, October, November) seasons in the 30-year study period (1981–2010) for all 14 beach locations. The monthly index value is representative of the mean of daily scores for the season. In the north, the TCI and HCI:Beach ratings differed at all three destinations, with the TCI consistently rating the destinations climates higher (Fig. 1). The TCI and HCI:Beach both rate Baishan as "acceptable" (57–59) in the fall and spring, but the TCI rates the summer as "very good" (76) compared with "good" (68) using HCI:Beach. In Dalian, the HCI:Beach ratings are lower across all seasons, including "acceptable" (55) versus "good" (62) in the spring, "very good" (74) versus "excellent" (84) in the summer, and "good" (66) versus "very good" (71) in the fall. In Qingdao, both indices rate the spring as "good" (60–62), but the TCI score was higher for summer (84 versus 74) and fall (73 versus 67). The lower score with the HCI:Beach reflects the lower temperature and higher windspeeds, which are not considered by tourists as optimal for 3S tourism. For example, in the summer, the temperatures at the beach destinations in the north are 24–26 °C with windspeeds of 7–15 km/h, scoring a perfect 10 in the TCI thermal and physical sub-indices, while scoring a 7 and 9 within the HCI:Beach sub-indices, respectively. Fig. 2

In the south, five of the eight destinations rate differently in the spring season, with the HCI:Beach ratings consistently lower (Fig. 3). Suzhou, Hangzhou, and Yueyang rate "good" (66–67) using the TCI and "acceptable" (56–59) with HCI:Beach, while Xiamen rates "very good" (75) versus "good" (62), and Kunming rates "excellent" versus "very good" (75), respectively. In the summer, all destinations in the south rate as "very good" (70–79) using both indices, except Kunming which rates lower at "good" (63) using the HCI:Beach and Sanya, which rates as "excellent" (80–82) on both indices. Similar to the destinations in the north, the lower temperatures explain the majority of scoring differences, particularly in the spring and fall when the climate conditions do not reflect the preferences of 3S tourists. Even during the summer months, the lower rating in Kunming is attributed to the lower temperature (25 °C), which scores 10 in the TCI and 7 in the HCI:Beach thermal sub-index.

In the northwest, Changji rates as "acceptable" (52–56) in the spring and fall using both indices (Fig. 3). However, during the summer season, Changji rates as "good" (67) for 3S tourism using the HCI:Beach and "very good" (71) with the TCI. At 19 °C, Changji scores a 9 in the TCI thermal sub-index and only 3 in HCI:Beach, because this temperature is considered too cool in beach tourist surveys. Similarly in the Qinghai-Xizang region, both locations rate the same using both the TCI and HCI:Beach across all three seasons (Fig. 4). Nagqu rates as "acceptable" (50–57) during all three seasons, while Xining rates "good" (60–66) during the spring and fall, and "very good" (72–77) during the summer.

Discussion

When comparing the TCI with the HCI:Beach to assess current climate conditions for the 14 coastal destinations across China, the TCI ratings were either higher or the same as the HCI:Beach throughout all three seasons. In the Northwest and Qinghai-Xizang region, the ratings are consistent across all three seasons and all three locations, with the exception of Changji during the summer, which the TCI rates higher (Fig. 4). In the North, the differences are particularly evident in the summer and fall, with consistently higher ratings by the TCI at all three beach destinations . In the South, there are clear different ratings in the spring and fall, when the TCI consistently rates the destinations higher. During the summer months, both indices rate the beach destinations close to the same (very good or excellent). Collectively, the higher TCI ratings can be explained by the lower thermal conditions at the destinations, which the subjective TCI incorrectly rates as optimal. Across all 14 study areas, the cloud cover and precipitation conditions are consistently rated one or two points

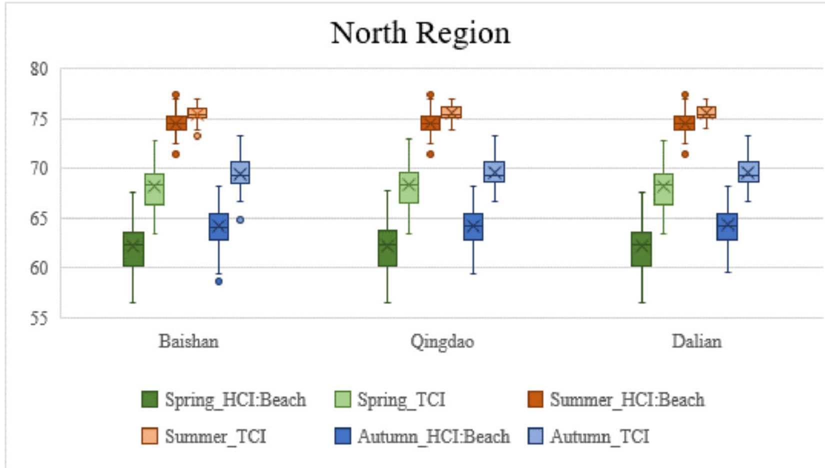

Fig. 2 Comparison of seasonal index ratings using TCI and HCI:Beach for three beach destinations in the North Region of China, during Spring (March, April, May), Summer (June, July, August), and Fall (September, October, November)

higher in the HCI:Beach esthetic and physical facet sub-indices compared with the TCI. However, because the thermal comfort index is weighted so heavily in the TCI (50%) and it has high ratings for thermal conditions that are known to be sub-optimal (too cool) of tourists' stated preferences, the TCI scores are inflated at these locations. By not reflecting the specific climate preferences of beach tourists, the TCI consistently overestimates the quality of climate resources for 3S tourism in all regions.

Previous research has found that when comparing the TCI and HCI:Beach for other international beach destinations, the HCI:Beach consistently has a stronger relationship between index scores and tourist arrival numbers (Matthews et al. 2019, Rutty et al. 2020). Further research is needed with tourism industry performance indicators (e.g., monthly arrivals or occupancy rates) to determine if the HCI:Beach better reflects the revealed preferences in China as well. Importantly, additional research on the climate preferences of Chinese tourists would be very valuable to add to the international cross-cultural literature. Spanning multiple climates, the climatic preferences of Chinese tourists may differ from those currently represented in the literature (mainly European and North America). To date, there has been only one limited tourist climate preference study in China. Guo (2015) found that the ideal and unacceptable climate conditions for an urban holiday were generally consistent with international studies, but because the study sample was small ($n = 385$) and was not randomly selected (i.e., recruited by snowball sample through personal networks), the results have not been incorporated into the current HCI:Beach index and additional research is warranted.

Interestingly, the results from the south region revealed that multiple destinations rate as "very good" or "excellent" using the HCI:Beach during the spring and fall seasons, including Xiamen, Kunming, Beihai, and Sanya. It is therefore possible that additional beach destinations in the south may become climatically optimal for 3S tourism during the shoulder seasons as temperatures increase as a result of climate change. Relatedly, destinations in the north and northwest may improve as temperatures increase. An assessment of future

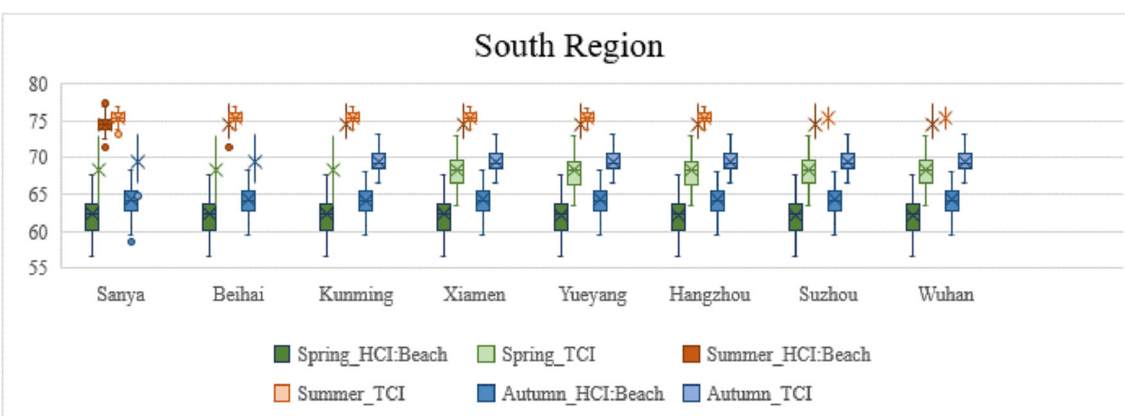

Fig. 3 Comparison of seasonal index ratings using TCI and HCI:Beach for three beach destinations in the South Region of China, during Spring (March, April, May), Summer (June, July, August), and Fall (September, October, November)

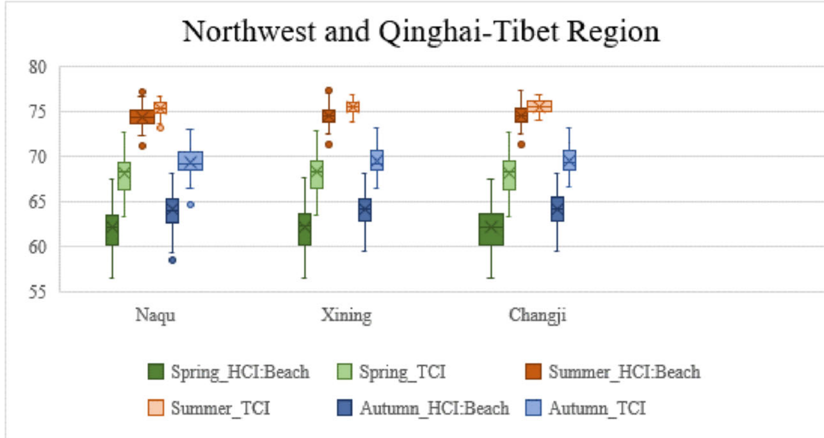

Fig. 4 Comparison of seasonal index ratings using TCI and HCI:Beach for three beach destinations in the Northwest and Qinghai-Xizang Region of China, during Spring (March, April, May), Summer (June, July, August), and Fall (September, October, November)

climatic conditions is an important area of future research to provide insight into the spatial and temporal impacts of climate change on beach tourism in China.

It is also important to note that differences in climatic preferences have also been recorded based on whether the holiday is domestic or international. For example, Rutty and Scott (2015) found Canadians traveling to the Caribbean were more accepting of higher thermal, precipitation, windspeed, and cloud cover conditions compared with when they are traveling domestically. Whether there is any difference in Chinese 3S tourist climate preferences when traveling within the country or outbound to international beach destination remains unknown. While differences in climatic preferences have been recorded based on socio-demographics (e.g., Credoc 2009, Wirth, 2010, Hewer et al. 2018), statistically significant differences based on age and gender have not been recorded in a beach tourism setting (Rutty & Scott 2015). It is therefore possible that Chinese tourists traveling for a 3S holiday in China may be more accepting of a wider range of climatic conditions, including lower thermal conditions, which would lead to higher HCI:Beach scores. Continued research that examines climatic differences based on type of holiday (duration, length) and socio-demographics are important next steps to further refine the HCI:Beach for possible use in climate services in specific markets like China or its refinement for global application.

Conclusion

This is the first study to apply the HCI:Beach index in China or the globally important Asia-Pacific tourism region, as is the first study to explore ratings for a 3S market in two new climatological zones (dry and continental). The results from this study add to the limited body of research on index comparison, as well as outline key regional gaps in the stated preference literature. Given that the specific conditions sought by 3S tourists are the empirical foundation of the HCI:Beach design, continued regional and cross-cultural climatic preference studies are an important area of continued research to further refine and validate the index. The combination of both will continue to advance index development for global application, while also allowing an opportunity to assess future climatic conditions in a warmer world. Moreover, with COVID-19 fundamentally shifting short-term (and arguably longer-term) travel patterns from international to domestic tourism (Gössling et al. 2020), there is also a greater need to evaluate local destinations with an opportunity to market those locations that meet the climatic needs of domestic tourists.

Authors' contributions All authors have read and agreed to the published version of the manuscript. Formal Analysis, D D.Y.; Data Curation, D D.Y.; Writing—Original Draft Preparation, D D.Y., M.R.; Writing—Review and Editing, M.R., D D.S.; Correction:M.R.,D.S. Project conceptualization, D D.Y., D.S.; Funding Acquisition, D D.Y.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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