

## 82 Mapping visitation across thousands of kilometres of beaches using social media data

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### Introduction

Coastal areas are very popular worldwide, providing a range of important ecosystem services. Tourism and recreation are within those services, with beach tourism popular in a range of areas including the Mediterranean, east and west coast of the USA, Latin America and Australia. Assessing tourists to beaches including who visits, when and where and what they value is important for tourism and coastal managers, including to better allocate facilities and resources and for tourism campaigns. Traditional methods such as direct observations, track counters, and surveys have been used to gather such data, but with some limitations (Veal, 2018). In an attempt to complement traditional methods, metadata of posts on social media platforms have been increasingly used by researchers to assess visitation to natural areas (Ghermandi & Sinclair, 2019; Teles da Mota & Pickering, 2020), as it is often free and easy to use, and provide large amounts of user generated content. Beaches, although very popular for tourism, are only now being assessed using geolocated data from social media. This talk presents preliminary results of a comparison of temporal and spatial patterns of beach use at a regional scale, using Flickr images metadata. Specifically, it assesses: (1) who visits beaches, including locals, other nationals and international tourists, and (2) temporal and (3) spatial patterns of beach use along the whole 2,101 km coastline of New South Wales (NSW), Australia, including Sydney, the largest city in Australia with internationally renowned beaches including Bondi and Manly.

### Methods

Data was retrieved using the Flickr Application Programming Interface and the statistical program R Studio. Metadata were obtained from a larger dataset of images from the social media platform Flickr posted between 2010 and 2019, that used the words “beach” and “Australia” in the text, tags or descriptions of images. All the geolocated images within the coastline of NSW and where people

disclosed their home location, were analysed. People and their images were allocated into three groups: locals, consisting of people on Flickr indicating they were from NSW, Australian tourists (those from other areas in Australia), and international tourists which were any people based in other countries.

Temporal patterns in beach visitation were assessed including weekly and monthly distribution of images. This was done for images capped per user per weekday (PUW) and per month (PUM), selecting the image with the largest number of views per user, per time period. The resulting temporal data of visitation were then compared between locals, Australians and international tourists using Chi-squared tests.

To assess spatial patterns of use, the images’ geolocation was used to create shapefiles in QGIS software using a grid of 20 km<sup>2</sup> grid cells to calculate hotspots of use using a plugin that calculates the Getis-Ord  $G_i^*$  local statistic. This was done for images capped per user per day (PUD), a proxy for visitation data, and the results compared between locals, other Australians and international tourists.

### Results

There were 1,070 people posting 11,057 images from beaches in NSW, of which 47% were posted by locals, 18% by other Australians and 35% by international tourists. This represented over 3,000 visits to beaches based on the PUD data (Figure 1), with more people from other countries posting images (48% users), but locals visiting beaches more often (Chi-square,  $p < 0.001$ ). Other Australians were mainly from Queensland (north) and Victoria (26%) (south of NSW), while international tourists were mostly from Europe (44%), North America (30%) and Asia (15%). There were clear differences in when locals and tourists visited the beaches in NSW. Weekends were preferred by locals and other Australians (Chi-square,  $p < 0.001$ ), whereas international tourists were equally likely to visit any day of the week. For monthly patterns, locals visited beaches all year round, for other Australians it was

mainly summer (December to February) or August, while for internationals it was between November and May (Chi-square,  $p < 0.001$ ). Spatial patterns revealed some interesting patterns, with Sydney beaches hotspots for all three groups, but other Australians also liked beaches close to the border with Queensland in the north.

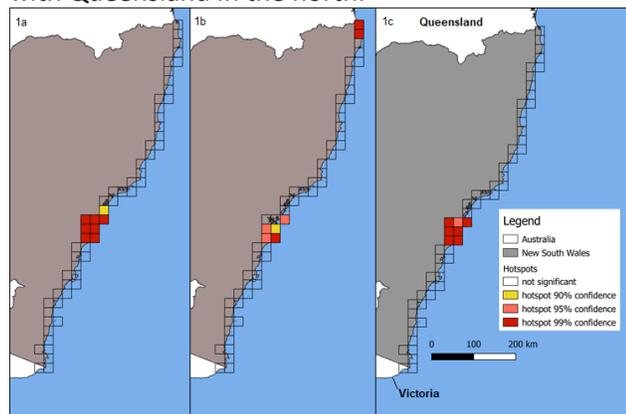


Figure 1 – Distribution of 3,101 images taken on beaches in NSW, Australia, including 1,728 images posted by locals (1a), 440 images from other Australians (1b) and 933 images from International visitors (1c). Data consists of Photo-user-Days (PUD) of images on Flickr from 2010-2019 that included the words “beaches” and “Australia” and were geolocated along the coastline.

## Discussion

Beaches in Australia including in NSW are popular including for locals, other Australians and international tourists. Results based on Flickr images show the typical temporal patterns of visitation,

including locals visiting beaches more frequently reflecting easy access and the popularity of these areas for recreation. Visits were more frequent during the weekends for locals and Australian tourists, while for international tourists any day of the week was popular potentially reflecting their medium/ long-term holidays in Australia. Beaches were popular year-round for locals, while for Australian tourists it often coincide with school holidays. International tourists visited beaches over a longer period, including during winter and spring in Europe and North America, but summer and autumn in Australia. Spatial patterns revealed that Sydney was the main hotspot for all groups, but other Australians mainly from neighbouring states, also found northern NSW including around the famous beaches of Byron Bay popular.

Metadata from Flickr images can provide important insights into who and when people visit beaches at regional scales assisting tourism and coastal managers as a complementary source of data. However, there are important limitations to the data including low numbers of beach visitors using social media including Flickr, a lack of representation in who uses them, issues with identifying relevant data/images and ensuring ethical and privacy issues are taken into account.

## References

- Ghermandi & Sinclair, 2019. <https://doi.org/10.1016/j.gloenvcha.2019.02.003>. Teles da Mota & Pickering, 2020. <https://doi.org/10.1016/j.jort.2020.100295>. Veal, 2018. *Research methods for leisure and tourism* (5th ed.). Pearson Education Limited. London, UK.