

# Social media snaps map the sweep of Japan's cherry blossom season in unprecedented detail

June 5 2023, by Adrian Dyer, Alan Dorin, Carolyn Vlasveld and Moataz ElQadi

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Credit: AI-generated image ([disclaimer](#))

Social media contains enormous amounts of data about people, our everyday lives, and our interactions with our surroundings. As a byproduct, it also contains a vast trove of information about the natural

world.

In a [new study published in \*Flora\*](#), we show how [social media](#) can be used for "incidental citizen science." From photos posted to a social site, we mapped countrywide patterns in nature over a decade in relatively fine detail.

Our [case study](#) was the annual spread of cherry blossom flowering across Japan, where millions of people view the blooming each year in a cultural event called "hanami." The flowering spreads across Japan in a wave ("[sakura zensen](#)" or [さくら前線](#)) following the warmth of the arriving spring season.

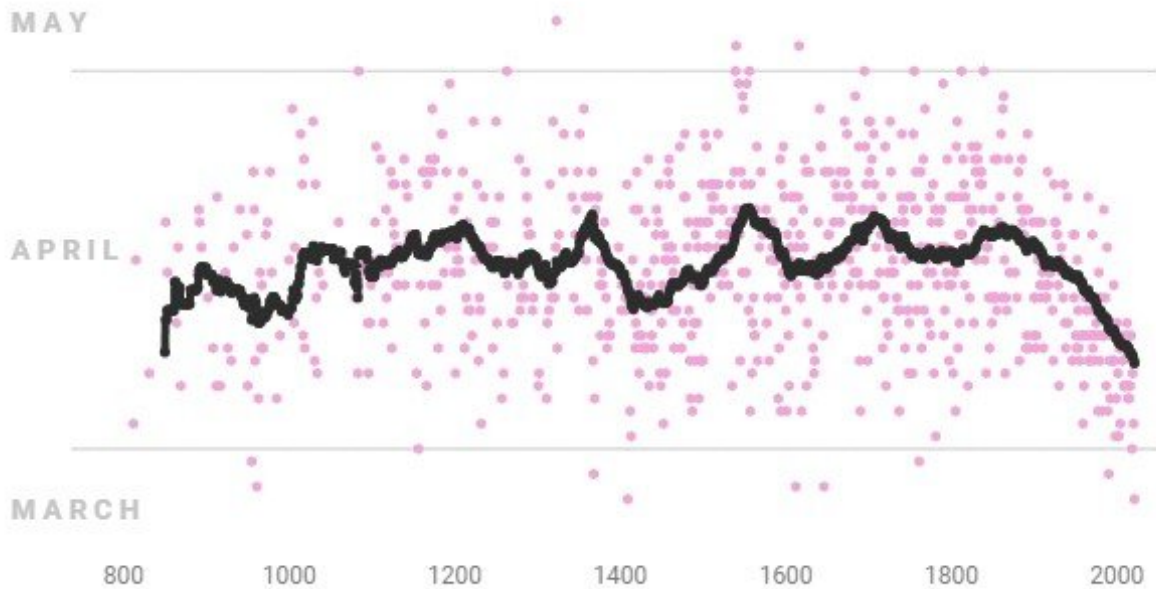
The [hanami festival](#) has been documented for centuries, and research shows climate change is making [early blossoming more likely](#). The advent of mobile phones—and social network sites that allow people to [upload photos tagged with time and location data](#)—presents a new opportunity to study how Japan's flowering events are affected by seasonal climate.

## **Why are flowers useful to understand how nature is being altered by climate change?**

Many flowering plants, including the cherry blossoms of Japan (*Prunus* subgenus *Cerasus*), require insect pollination. To reproduce, plant flowers bloom at optimal times to receive visits from insects like bees.

## Kyoto cherry blossom dates, 812 AD – 2021 AD

The average blossom date has been growing earlier since the 19th century.



Credit: Chart: The Conversation Source: Yasuyuki Aono Get the data Created with Datawrapper

Temperature is [an important mechanism](#) for plants to trigger this flowering. [Previous research](#) has highlighted how climate change may create mismatches in space or time between the blooming of plants and the emergence of pollinating insects.

It has been difficult for researchers to map the extent of this problem in detail, as its study requires simultaneous data collection over large areas. The use of citizen science images deliberately, or incidentally, uploaded to social network sites enables [big data](#) solutions.

## How did we conduct our study?

We collected images from Japan uploaded to [Flickr](#) between 2008 and 2018 that were tagged by users as "cherry blossoms." We used [computer vision techniques](#) to analyze these images, and to provide sets of keywords describing their image content.

Next, we automatically filtered out images appearing to contain content that the computer vision algorithms determined didn't match our targeted cherry blossoms. For instance, many contained images of autumn leaves, another popular ecological event to view in Japan.

The locations and timestamps of the remaining cherry blossom images were then used to generate marks on a map of Japan showing the seasonal wave of sakura blossoms, and to estimate peak bloom times each year in different cities.



Images uploaded to social media over a ten year period 2008-2018, let us map the cherry blossom front as it sweeps across Japan. Credit: ElQadi et al., Author provided

## Checking the data

An important component of any scientific investigation is validation—how well does a proposed solution or data set represent the real-world phenomenon under study?

Our study using social network site images was validated against the detailed information published by the [Japan National Tourism Organization](#).

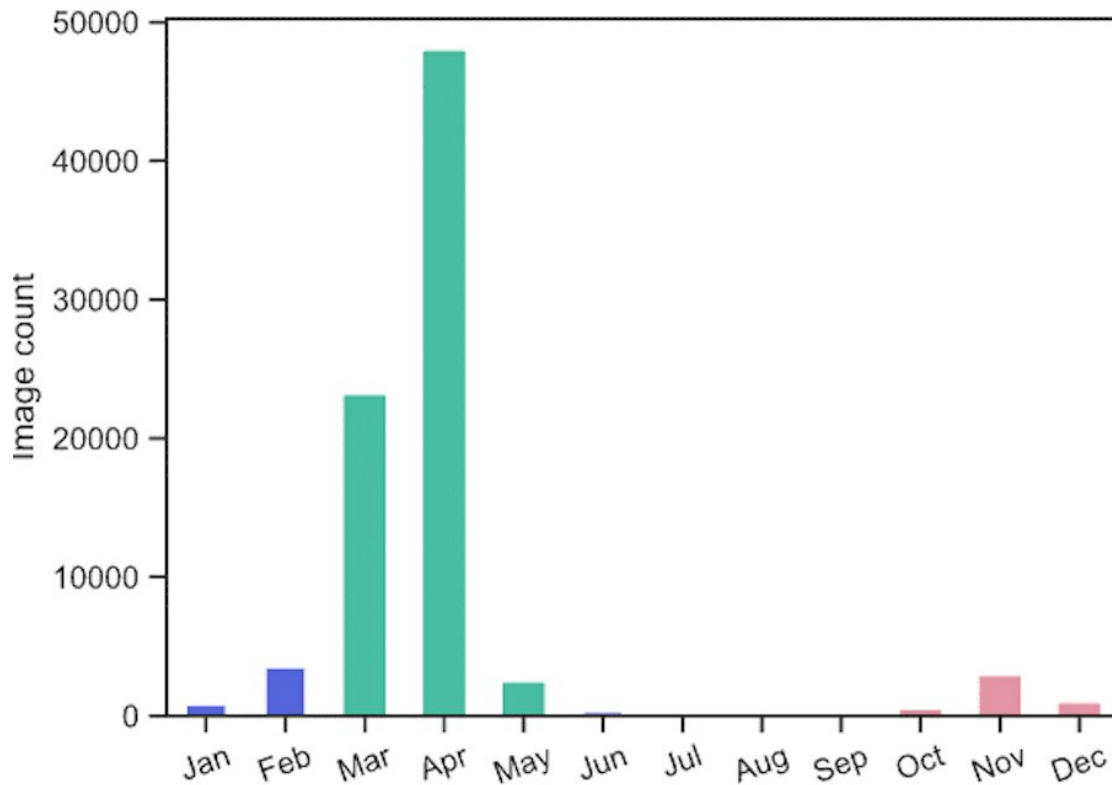
We also manually examined a subset of images to confirm the presence of cherry flowers.

Plum flowers (*Prunus mume*) look very similar to cherry blossoms, especially to tourists, and they are frequently mistaken and mislabelled as cherry blossoms. We used visible "notches" at the end of cherry petals, and other characteristics, to distinguish cherries from plums.

Taken together, the data let us map the flowering event as it unfolds across Japan.

## **Out-of-season blooms**

Our social network site analysis was sufficiently detailed to accurately pinpoint the annual peak spring bloom in the major cities of [Tokyo](#) and [Kyoto](#), to within a few days of official records.



Cherry blossom photographs from Flickr taken within Japan from 2008 to 2018 show an April peak as well as an unexpected smaller peak in November. Credit: ElQadi et al., Author provided

Our data also revealed the presence of a consistent, and persistent, out-of-season cherry bloom in autumn. Upon further searching, we discovered that this "unexpected" seasonal bloom had also been noted in [mainstream media](#) in recent years. We thus confirmed that this is a real event, not an artifact of our study.

So, even without knowing it, many of us are already helping to understand how climate change influences our environment, simply by

posting online photographs we capture. Dedicated sites like [Wild Pollinator Count](#) are excellent resources to contribute to the growing knowledge base.

The complex issues of [climate change](#) are still being mapped. Citizen science allows our daily observations to improve our understanding, and so better manage our relationship with the natural world.

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Provided by The Conversation

Citation: Social media snaps map the sweep of Japan's cherry blossom season in unprecedented detail (2023, June 5) retrieved 11 May 2024 from <https://phys.org/news/2023-06-social-media-snaps-japan-cherry.html>

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