

# Early spring time for Edinburgh? Study predicts effect of global warming on spring flowers

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Will we soon see the flowers of Edinburgh in full bloom in the depths of winter? This possibility is considered in a new study into the impact of global warming on spring flowering, published today in the *International Journal of Climatology*. Data, taken from records dating back to the late nineteenth century, has been used to demonstrate the impact of global warming and to predict the effect further warming will have on plant life by the year 2080.

The study, by Dr Malcolm Clark and Prof Roy Thompson, is based on the facts that plants control the timing of flowering by adapting to the local weather and climate and that throughout the past century global warming, driven by ever rising atmospheric [carbon dioxide](#) concentrations, has resulted in local climate changes which are likely to steadily increase.

"Already there is a great deal of observational evidence of regional changes in climate associated with global warming," said Clark. "We have not only seen an earlier break up of ice on rivers and melting [glaciers](#), but also the early emergence of insects, egg laying by birds and the flowering of plants. This new model allows us to refine predictions of the future impact of warming on plant and animal life across much of the world."

Clark and Thompson worked from a wealth of old records from the

Royal Botanic Garden Edinburgh, which started in 1850. They also analysed records of Edinburgh's climate from records dating back to 1775. With this information they investigated the responses of 79 species of plant to air temperatures.

Using this data Thompson and Clark establish the relationship between [air temperature](#) and first flowering date and have used their new statistical model to predict likely changes in spring flowering in Scotland based on three potential [global warming](#) scenarios. For every 1 °C that the climate warms they predict that spring flowering will begin approximately 11 days earlier. For an increasingly oceanic climate (greater winter than summer warming) their model predicts shifts in the botanical season ranging between 16 days at the start of spring and 12 days at the end of spring. For an increasingly continental climate predictions range between 7 days at the start of spring and 11 days at the end of spring.

Clark and Thompson checked the results of their [statistical model](#) with other data sets from across the world, indicating that their results are not limited to one country.

"Although the study is based on plant life in Scotland, our phenological models apply across regions spanning hundreds of thousands of square kilometres," said Clark.

Thompson points out that "Recent climate projections based on the most comprehensive modelling yet carried out show that warming could be double that of estimates made only 6-years ago, with median surface warmings of 5.2 degrees being the most likely. At Edinburgh this would result in many plants flowering, and coming into leaf, two months earlier than today. This would lead to large desynchronisations, as other plants would continue to behave normally. But how significant is a two month change? Harold Wilson once famously said "A week is a long time in

politics". That sentiment is also a good rule-of-thumb in ecology. For example for forests just one week's difference to the start of growth makes a big difference to timber production."

Using their results Thompson and Clark have been able to construct a global map demonstrating 'desynchronisation' of plant and animal life in the year 2080. The map shows that maritime climates including Western Europe, the American Atlantic coast, New Zealand, Chile and North Africa will be the greatest effected as their botanical calendar will move strongly out of sync with the seasons.

Source: Wiley ([news](#) : [web](#))

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