

# La Vuelta air not always healthy

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Map depicting the air quality of the Vuelta stage in Utrecht. Credit: Utrecht University.

The Netherlands is preparing for La Vuelta Holanda which starts on Friday 19 August. How clean is the air in the places that the peloton is visiting? Researchers from Utrecht University have mapped the annual average air quality of each stage of La Vuelta and demonstrate that the air is most polluted at the start (Utrecht) and finish (Madrid). They also conclude that for many stretches the air quality does not meet World Health Organization (WHO) guidelines. Nevertheless, the health benefits of cycling generally outweigh the risks.

It's often said that "cycling is healthy" when we set off in all kinds of weather. But how clean is the air you breathe if you cycle the same route as the La Vuelta peloton on a normal day? This was the question researchers Roel Vermeulen and Jules Kerckhoffs asked themselves. Using satellite images, traffic information and [air quality data](#) about [nitrogen dioxide](#), particulate matter and ozone, they made a stage map booklet [insert link] showing the air quality for each stage of La Vuelta.

The conclusion is clear: the most polluted stages are those in the Netherlands and the Spanish stage from La Rozas to Madrid. Particularly in the urban areas, the air quality does not meet WHO guidelines. On top of that, there are a few places where the European limit value is exceeded. It is generally accepted that places with poor air quality can cause adverse health effects. In the Netherlands, researchers estimate that approximately five thousand people die prematurely each year due to [poor air quality](#). Worldwide, that is estimated to be around 7 million.

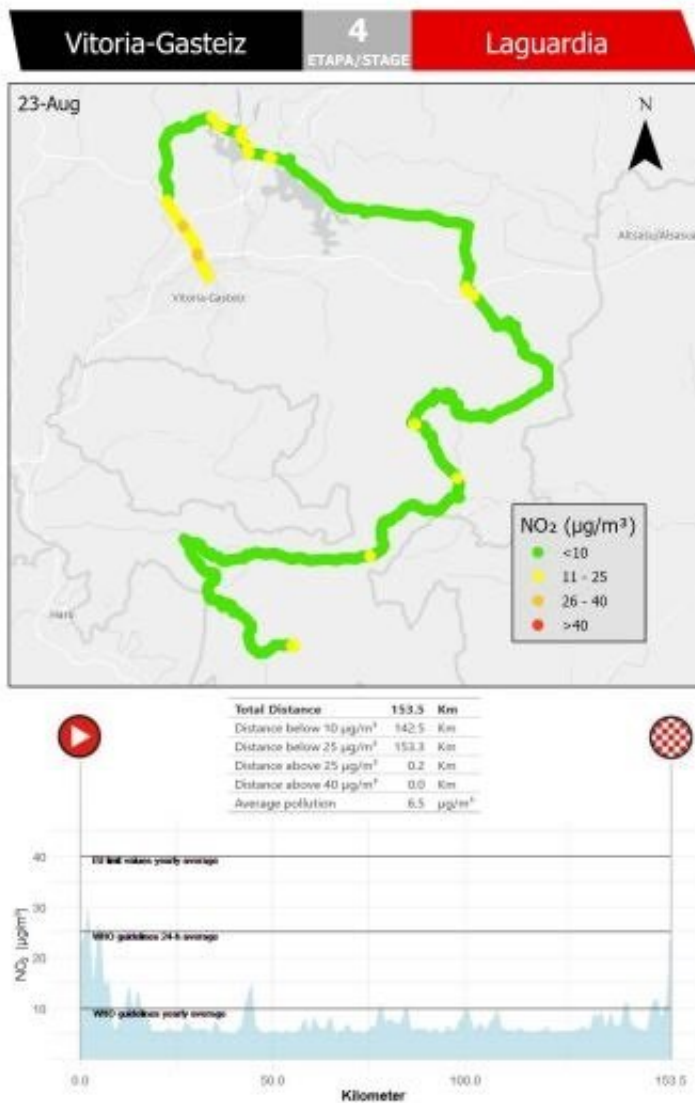
## **Alternative stage map book**

The stage maps created by Utrecht University researchers as part of the Expanse project, illustrate average air pollution over the course of a year. Vermeulen and Kerckhoffs focus on the value recommended by the WHO for [nitrogen](#) dioxide in a year: ten micrograms per cubic meter. If you were to cycle the route to work or study every day, this is a

critical value. If you cycle the route occasionally the 24-hour guideline of 25 micrograms per cubic meter is more relevant. According to the WHO, exceeding these guidelines results in damage to health. However, the EU limit value that is used in the Netherlands is a lot higher: 40 micrograms per cubic meter. This value is also reflected in the graphs accompanying the maps.

"Much has been done in recent years to improve air quality, but we see that there are still many places where the air is not healthy," said Vermeulen, who studies how environmental factors affect our health. "So improving air quality still requires attention." Vermeulen therefore calls on municipalities to look beyond the EU standard to which they must adhere, and to improve air quality according to WHO guidelines. For example, municipalities could encourage residents to travel by bike instead of by car for short distances and indirectly stimulate this behavior when designing cities. "The so-called 15-minute cities, where facilities can be reached on foot or by bike within fifteen minutes, are a good example of this."

For the cyclists of the Vuelta, their trip will not directly result in damage to their health; after all, they ride each stage once only and not every day. Furthermore, there is no regular traffic on the road on the day of La Vuelta. This means that the air quality during the stage will be better, as was also previously demonstrated during the Grand Depart of the Tour de France.



Map depicting the air quality of the Vuelta stage in Vitoria. Credit: Utrecht University.

### The most polluted routes of La Vuelta

The research shows that the air quality of the first three stages in the Netherlands and of the final stage in and near Madrid, does not come close to the WHO advisory value for nitrogen dioxide (10 micrograms

per cubic meter).

During a part of the third stage (Breda—Breda), the concentration of nitrogen dioxide is higher than the 24-hour WHO guidelines for nitrogen dioxide, and a small part is even higher than the EU limit (about 40 kilometers). The average pollution of the total ride is 21 micrograms per cubic meter. The other stages in the Netherlands are also on average substantially more polluted than those in Spain, both for nitrogen dioxide and [particulate matter](#). The prolog in Utrecht even has an average concentration of 32 micrograms per cubic meter. Because this stage is only 23.3 kilometers long, stages two (Den Bosch—Utrecht) and three (Breda—Breda) are worse for health. This is because you inhale more polluted air and therefore have a higher average over a 24 hours period.

If we look at the average concentration of nitrogen dioxide of the last stage (Las Rozas—Madrid), we see that it is even higher than the stages in the Netherlands. 35 kilometers of this stage exceed the EU limit of 40 micrograms of nitrogen dioxide per cubic meter. As in Utrecht, this is because a large part of the stage is cycled in the inner city of Madrid.

## **Vitoria-Gasteiz—Laguardia: The cleanest stage**

By comparing previous stages with that of Vitoria-Gasteiz to Laguardia in Spain, we can see how great the differences are. During stage four the concentration of nitrogen dioxide was below the WHO advisory value for almost the entire stage (142.5 km). The average of this route is 6.5 micrograms per cubic meter. Interestingly the stage is not the cleanest for ozone. Ozone is formed from reactions of nitrogen oxides and volatile organic compounds in warm and sunny weather. Because the temperature is higher in Spain, ozone concentrations are typically higher than those in the Netherlands.

## Ban the bicycle?

This research shows that nitrogen dioxide concentrations above 25 micrograms per cubic meter (the daily limit according to the WHO) in [urban areas](#) are often unavoidable for cyclists. Does this mean you should have to take the bus to work from now on?

"No," say Kerckhoffs and Vermeulen. "Even if you compare polluted air and other risks such as accidents to the [health benefits](#) of cycling, the risks are smaller than the benefits. Our evaluation is therefore not intended to discourage cycling. What we do want is to raise awareness about [air quality](#) in the Netherlands, and show that from a health perspective, there is still work to be done. Part of the solution can be found in the stimulation of active transport (cycling, walking) especially for short distances. We can stimulate this for example, by improving cycling infrastructure and by designing our urban living."

**More information:** Expanse Project: [expanseproject.eu/](https://expanseproject.eu/)

Provided by Utrecht University

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