Urban noise functional stratification for estimating average annual sound level

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Road traffic noise causes many health problems and the deterioration of the quality of urban life; thus, adequate spatial noise and temporal assessment methods are required. Different methods have been proposed for the spatial evaluation of noise in cities, including the categorization method. Until now, this method has only been applied for the study of spatial variability with measurements taken over a week. In this work, continuous measurements of 1 year carried out in 21 different locations in Madrid (Spain), which has more than three million inhabitants, were analyzed. The annual average sound levels and the temporal variability were studied in the proposed categories. The results show that the three proposed categories highlight the spatial noise stratification of the studied city in each period of the day (day, evening, and night) and in the overall indicators (L<inf>Adn</inf>, L<inf>Aden</inf>, and L<inf>A24</inf>). Also, significant differences between the diurnal and nocturnal sound levels show functional stratification in these categories. Therefore, this functional stratification offers advantages from both spatial and temporal perspectives by reducing the sampling points and the measurement time.