



NOISE CLIMATE IN COMMUNITIES CLOSE TO MADRID AIRPORT

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Abstract. This paper assesses the noise climate existing in some communities close to Madrid airport. The residents in these communities were complaining about the noise generated by the air traffic operating from the airport. Based on the strategic noise map of Madrid airport these communities were all outside the 65 L_{DEN} contour, which in Spain delimits the requirement for implementation of Action Plans in residential areas in the frame of the Environmental Noise Directive (END) [1, 2]. To investigate the situation in this area, long-term measurements were made with the IBANET aircraft noise and flight track monitoring system in 3 points simultaneously. This system allows for continuous noise measurements and simultaneously receives information on the aircraft operating in the area, all independent of the airport infrastructure. The information of all systems is stored in a database on a central server, where noise and aircraft data are correlated so as to identify the aircraft responsible for each noise event. A variety of noise metrics can be calculated by this system.

The results obtained with the IBANET system were then compared with the results from the airport owned noise monitoring system, which had stations in the vicinity of the ones deployed for this study. From this comparison it could be concluded that both systems give similar results. The actually measured traffic data (movements, fleet composition and flight trajectories) were then used to predict the corresponding noise contours with the SONDEO airport noise model which implements ECAC Doc 29, in compliance with the END. The results of this noise mapping exercise were then compared with the noise contours published by the airport. Also here it could be concluded that the results from both studies are similar. In the next step the measured and predicted noise levels at the monitoring points were compared. This comparison demonstrated that both measurement and prediction are very similar. From the first phase of the study it could thus be concluded that the areas investigated indeed appear to be located outside the 65 L_{DEN} noise contour.

Given the high amount of complaints from residents in these communities, the noise climate was expressed in other metrics, not prescribed by the END, but known to be better correlating with the actual annoyance experienced. Metrics like L_{Amax} , percentiles, N_{70} , etc were therefore calculated from the noise measurements. Also other parameters like height of the aircraft above the area were determined. Assessment of these additional parameters revealed that indeed the noise climate in the area is not as favorable as the L_{DEN} based contours seem to indicate. Whereas half of the aircraft operations were found to produce noise levels above 70 dB (A), these events are smeared out over the whole day, resulting in rather low overall noise levels (such as for L_{DEN}).

This study clearly revealed that, whereas metrics like L_{DEN} are useful for general planning and noise management purposes, they are not sufficient to fully account for the annoyance experienced by the residents around airports, especially in those cases where only a limited amount of noise events take place daily.

Keywords: Airport noise, noise monitoring, airport noise modelling, noise metrics.

References

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