Abstract

Poor visibility and low ceiling at airports require special measures which ensure safe operations but also reduce capacity. These measures are referred to as Low Visibility Procedures (LVP). Due to the reduced capacity associated with LVP, flight delays and cancellations may result. Therefore, an accurate forecast of LVP would improve capacity planning and runway assignment in the case of low visibility conditions. For this purpose, an *analog* method to probabilistically nowcast LVP at Vienna International airport is presented in this thesis. The main goal is to *demonstrate* the use of the analog method in terms of LVP forecasting. Past analogs are determined according to their degree of *similarity* with the current situation. It is a statistical model based on principal component analysis and uses exclusively observational data. Similarity is measured using four distinct distance measures, including Euclidean distance and Dynamic Time Warping. The retrieved set of most similar analogs is subsequently used to predict LVP for the lead times 30, 60, 90 and 120 minutes. It produces accurate forecasts, based on the Ranked Probability Score (RPS) and compared to persistence, an established performance benchmark in ceiling and visibility forecasting. The performance of the analog method is measured using data from both the warm season and the cold season. The analog forecast outperforms persistence along all lead times and its RPS ranges from $0.005 - 0.006$ and $0.009 - 0.01$ for the lead times 30 and 120 minutes respectively. Furthermore, it is competitive with Ordered Logistic Regression. Hence, the analog method has proven appropriate for forecasting Low Visibility Procedures.