Nowcasting of Low-Visibility Procedure States with Ordered Logistic Regression at Vienna International Airport

Philipp Kneringer (1), Sebastian Dietz (1), Georg J. Mayr (1), and Achim Zeileis (2)

(1) Institute of Atmospheric and Cryospheric Sciences, University of Innsbruck, Innsbruck, Austria
(philipp.kneringer@uibk.ac.at), (2) Department of Statistics, University of Innsbruck, Innsbruck, Austria

Low-visibility conditions have a large impact on aviation safety and economic efficiency of airports and airlines. To support decision makers, we develop a statistical probabilistic nowcasting tool for the occurrence of capacity-reducing operations related to low visibility. The probabilities of four different low visibility classes are predicted with an ordered logistic regression model based on time series of meteorological point measurements. Potential predictor variables for the statistical models are visibility, humidity, temperature and wind measurements at several measurement sites. A stepwise variable selection method indicates that visibility and humidity measurements are the most important model inputs. The forecasts are tested with a 30 minute forecast interval up to two hours, which is a sufficient time span for tactical planning at Vienna Airport. The ordered logistic regression models outperform persistence and are competitive with human forecasters.