

Validating ADWICE Aircraft Icing Forecasts against Pilot Reports over the Eastern US

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This study has the objective of evaluating forecasts of aircraft in-flight icing, which results from encounters with super-cooled liquid cloud water, over the eastern United States for the winter 09/10 using the German ADWICE icing forecasting system. An experiment was conducted where an instance of the European COSMO-EU 7km NWP model was run over the eastern CONUS to produce four months worth of input data for the ADWICE algorithm. The generated icing fields were then verified using pilot reports (PIREPS) as “truth” data. In order to characterize ADWICE performance over this non-native domain against a known reference for this part of the world, a previously performed comparative verification of ADWICE and the American FIP icing product over 1.5 months of data is also summarized. The comparison with FIP shows ADWICE to achieve a comparable skill in most aspects of icing forecasts. ADWICE forecasts were then evaluated over the whole four months and analyzed with respect to seasonal, regional or altitude variations. Using the methodology established for the previous comparison, a neighbourhood sampling method was used to convert gridded forecast data into point forecasts at each observation location. Contingency table statistics scores were employed here and include the Probability of Detection (POD, for positive and negative icing cases separately) and the ROC curve from which the area (AUC) is derived. These scores are used to evaluate different aspects of forecast performance. The findings presented include a description of the ADWICE algorithm, the methodology used for verification, a discussion of advantages and disadvantages of the approach and a presentation of the relevant results.