TAF assessment using a score that penalises forecast uncertainty

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Terminal Aerodrome Forecasts (TAFs) are a widely accepted international form of aviation forecast used for airport and flight planning procedures at all major airports. Enhanced verification methodologies for these type of forecasts establish accountability and thereby drive improvements in forecast skill, potentially improving flight safety and reducing costs to the aviation industry. Encouraging less use of long periods of uncertainty would give forecast users information that is more specific, easier to understand and help to facilitate timely operational decisions.

At EMS 2017, a new methodology was presented for the verification of TAFs, a methodology based on the definitions laid down by the International Civil Aviation Authority (ICAO) and the World Meteorological Organisation (WMO). These definitions allow probabilistic, deterministic and temporal uncertainty terms to be used without penalty. Consequently, the WMO-based verification methodology makes it possible for an Operational Aviation Meteorologist to improve his or her score by excessive use of these terms. Although such TAFs are legitimate, they contain more uncertainty and are likely to be of less use to the forecast user. Therefore, during the last 12 months Scientists and Operational Meteorologists at the Met Office have been working together to develop a complementary, uncertainty-penalising verification methodology to accompany the WMO-based approach. This assessment method derives generic equations to convert each possible TAF change group term into a categorical probability distribution. An assessment of forecast skill is obtained by comparing the probability associated with each forecast category within each change group against the cloud-base height or visibility measurement taken at each METAR time. This presentation, describes this new approach, illustrating it with real TAF examples taken from various UK airports and comparing these results against equivalent values produced by the WMO-based assessment method.

The use of uncertainty-penalising verification methodology will help to identify whether good performance, as measured by the WMO-based approach, is a result of actual forecast skill or excessive use of terms containing forecast uncertainty. It will also enable effective comparison between TAFs issued by Operational Meteorologists and site-specific ensemble model data.