



Enhanced Diagnosis of Inflight Icing Risk by the Use of Satellite Data

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The post-processing aircraft icing warning system ADWICE (Advanced Diagnosis and Warning system for aircraft ICing Environments) has been developed since 1998 in joint cooperation of DWD, DLR and the Institute of Meteorology and Climatology (IMuK). From 2002 on, ADWICE runs operationally at DWD and is used at the German Advisory Centres for Aviation supporting pilots to avoid dangerous icing conditions. The model domain covers the European continent and the Mediterranean coasts.

The algorithm consists of a first, prognostic part which derives an icing risk from model data for each of the following 78 hours. A second, diagnostic part examines the current icing risk. The diagnosis of the current icing risk has been executed so far through fusion of model data, radar reflectivity measurements and observational data (SYNOP, METAR). An evaluation of the diagnostic icing product has shown an overestimation of atmospheric areas with supercooled liquid water. A second awkward feature is the irregular spatial distribution of observation stations within the model domain. Especially in Eastern Europe and over the sea, a lack of observational data has to be complained. To solve these two problems, the diagnostic part of the icing algorithm has been extended for the implementation of MSG satellite data.

First, a satellite product like the cloud mask is helpful to detect cloud free and therefore icing-free atmospheric regions. This information can be used directly to correct the ADWICE overforecasting diagnosis by reduction. Second, in areas of the atmosphere where ADWICE would not identify any icing risk, a satellite-based icing detection consisting of Level 2 satellite products (cloud phase, cloud top temperature, cloud top height and liquid water path) is possible. Here icing information is added.

The presentation will overview the new structure of the diagnostic part of the ADWICE algorithm. Furthermore, the intended reduction of the overforecasting will be demonstrated. Finally, some verification results derived from case studies will be shown.