



Identification, analysis and monitoring of risks of freezing affecting aircraft flying over the Guadarrama Mountains (Spain)

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Freezing is one of the main causes of aircraft accidents registered over the last few decades. This means it is very important to be able to predict this situation so that aircraft can change their routes to avoid freezing risk areas. Also, by using satellites it is possible to observe changes in the horizontal and vertical extension of cloud cover likely to cause freezing in real time as well as microphysical changes in the clouds. The METEOSAT Second Generation (MSG) makes it possible to create different red-green-blue (RGB) compositions that provide a large amount of information associated with the microphysics of clouds, in order to identify super-cooled water clouds that pose a high risk of freezing to aircraft.

During the winter of 2011/12 in the Guadarrama Mountains, in the centre of the Iberian Peninsula, a series of scientific flights (conducted by INTA) were organised in order to study the cloud systems that affected this region during the winter. On the flight of the 1st of February 2012, the aircraft was affected by freezing after crossing over a mountain ridge with supercooled large drops (SLD). Although freezing was not expected during that day's flight, the orography caused a series of mesoscale factors that led to the appearance of localised freezing conditions.

By analysing this case, we have been able to conclude that the use of satellite images makes it possible to monitor the risk of freezing, especially under specific mesoscale circumstances.

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