GEOCAT Fog/Low Stratus (FLS) Algorithm Summary Document

By Chris Lucas, 14th August 2016

Overview

The Fog and Low Stratus (FLS) Algorithm is a satellite-based algorithm designed to detect adverse aviation weather conditions: Marginal Visual Flight Rules (MVFR), Instrument Flight Rules (IFR), or Low Instrument Flight Rules (LIFR). Table 1 defines the weather criteria for these rules. For each set of conditions, the FLS algorithm returns the probability for each satellite pixel that conditions are at that level *or worse*. As such, the probabilities of MVFR (P_{MVFR}) returned by the algorithm will be greater than P_{IFR} which is greater than P_{LIFR}. The algorithm uses different features to identify FLS during day and night. As a result there are often disruptions in the probabilities around the terminator, especially when viewed spatially.

The Algorithm Theoretical Basis Document [Calvert and Pavolonis 2011] indicates that thresholds of P_{MVFR} > 40% suggests MVFR conditions (or lower) are present and P_{IFR} > 26% indicates IFR conditions (or lower) are present. No thresholds are given for LIFR. These thresholds can be used to generate a binary (yes/no) decision as to whether the conditions are present. Preliminary testing by the Bureau of Meteorology (R&D) suggests these thresholds are useful with Himawari-8 data over Australia. An 'FLS Depth' variable, estimating the vertical thickness of the cloud, is also returned. The reliability and robustness of this product in Australian conditions is undetermined at this time.

Table 1. Meteorological definition of the different aviation flight conditions.

Flight Conditions	Definition
Marginal Visual Flight Rules (MVFR)	Ceiling (BKN or OVC) of 1000-3000 feet and/or a 3-5 mile (5-8 km) Visibility
Instrument Flight Rules (IFR)	Ceiling of 500-1000 feet and/or a 1-3 mile (1.6-5 km) visibility
Low Instrument Flight Rules (LIFR)	Ceiling of less than 500feet and/or a visibility of less than 1 mile (<1.6 km).