

Aircraft volcanic ash encounters update

The [compilation of aircraft encounters with ash clouds 1953-2009](#) published in 2010 by the USGS has been updated by the German Aerospace Center (DLR) and the USGS to include incidents during 2010 through 2016. An overview of the 2010-2016 incidents has been published (<http://bit.ly/2vUUzL4>) as part of the Proceedings of the NATO STO Specialists' Meeting on the Impact of Volcanic Ash Clouds on Military Operations held in Vilnius, Lithuania, in May 2017. A USGS publication presenting the full database and its metadata is in preparation.

Each encounter incident is rated according to a severity index as described in the 2010 USGS report. During the compilation of the 2010-2016 data, it was found that some relevant criteria were not yet included in the severity index. Accordingly, some pilots, aerospace engineers and other persons associated with the volcanic ash topic were asked by the DLR to review and propose amendments to the severity index. A proposed revised index is presented here for consideration by the VASAG. The revised index keeps the general structure of the current index; however, for the first time effects on the aircraft occupants are listed. Changes to the current index are shown in red.

Class	Criteria
0	Sulfur odor <i>or volcanic gas</i> noted in cabin. Anomalous atmospheric haze observed. Electrostatic discharge (St. Elmo's fire) on windshield, nose, or engine cowls. Volcanic ash reported or suspected by flight crew but no other effects or damage noted.
1	Light dust observed in cabin <i>and/or cockpit with inconvenience for passengers and/or flight crew.</i> Volcanic ash deposits on exterior of aircraft. Fluctuations in exhaust gas temperature with return to normal values.
2	<i>Volcanic ash deposited in cabin and/or cockpit.</i> <i>Physical discomfort for passengers (e.g. due to sulfur odor/dust).</i> <i>Volcanic ash deposited in</i> pitot-static system, insufficient to affect instrument readings. Pitting, frosting, or breaking of windscreen or windows. Contamination of air <i>systems.</i> Deposition of volcanic ash in engine. Abrasion damage to exterior surfaces, engine inlet, and compressor fan blades. <i>Engine damage without removal or replacement of engine(s).</i>
3	<i>Interference of navigation or communication systems.</i> Damage to electrical or computer systems. Plugging of pitot-static system to give erroneous instrument readings. Vibration or surging of engine(s). Contamination of engine oil or hydraulic system fluids. Engine damage <i>with removal or replacement of engine(s).</i> <i>Physical discomfort for flight crew (e.g. due to sulfur odor/dust).</i>
4	Temporary engine failure requiring in-flight restart of engine. <i>Engine failure requiring in-flight permanent shutdown of engine(s).</i> <i>Reduced engine thrust due to contaminated engine(s).</i> <i>Physical distress to flight crew (e.g. due to sulfur odor/dust) impairing ability to perform tasks.</i>
5	Engine failure or other damage <i>resulting in loss of aircraft.</i>

Marianne Guffanti (USGS) and Carsten Christmann (DLR), 11 August 2017