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Satellite Monitoring of Ash and Sulphur Dioxide for the mitigation of Aviation Hazards: Part II. Validation of satellite-derived Volcanic Sulphur Dioxide Levels.

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The eruption of the Icelandic volcano Eyjafjallajökull in the spring of 2010 turned the attention of both the public and the scientific community to the susceptibility of the European airspace to the outflows of large volcanic eruptions. The ash-rich plume from Eyjafjallajökull drifted towards Europe and caused major disruptions of European air traffic for several weeks affecting the everyday life of millions of people and with a strong economic impact. This unparalleled situation revealed limitations in the decision making process due to the lack of information on the tolerance to ash of commercial aircraft engines as well as limitations in the ash monitoring and prediction capabilities.

The European Space Agency project *Satellite Monitoring of Ash and Sulphur Dioxide for the mitigation of Aviation Hazards*, was introduced to facilitate the development of an *optimal End-to-End System for Volcanic Ash Plume Monitoring and Prediction.* This system is based on comprehensive satellite-derived ash plume and sulphur dioxide [SO_2] level estimates, as well as a widespread validation using supplementary satellite, aircraft and ground-based measurements. The validation of volcanic SO_2 levels extracted from the sensors GOME-2/MetopA and IASI/MetopA are shown here with emphasis on the total column observed right before, during and after the Eyjafjallajökull 2010 eruptions. Co-located ground-based Brewer Spectrophotometer data extracted from the World Ozone and Ultraviolet Radiation Data Centre, *WOUDC,* were compared to the different satellite estimates. The findings are presented at length, alongside a comprehensive discussion of future scenarios.