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Using MODIS images for the monitoring of volcanic clouds of Mexican volcanoes (Volcan de Colima and Popocatepetl)

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Mexico has two eruptive volcanoes since the early 90's: Popocatepetl and Colima volcanoes. They are surrounded by cities, towns and villages, which are periodically being affected by ash fall and the impact on air quality due to the presence of SO2. Besides, the aviation industry is also affected by the presence of ash and gases in the atmosphere and the bulk deposition in its installations. In the case of Popocatepetl volcano a total of 120 airways cross the volcanic clouds influnce area within 200 NM radius with an average of 388,000 annual operations. In a similar area, at Colima Airport a total of 106 airways are affected by the volcanic clouds with an annual average of 84,000 operations. On the ground, 21 airports do exist around Popocatepetl and 13 in the case of the Colima volcano.

For this reason, the implementation of monitoring techniques of these volcanoes is of crucial importance for both, risk mitigation at nearby towns as well as warning for aviation operations that could be affected. Remote sensing from satellite platforms are very useful tools. MODIS images has several advantages due to the wide spectrum of detection with MODIS (36 bands), which allows to identify and monitor volcanic ash and SO2. Moreover, MODIS has a time resolution of up to 4 frames per day because of the existence of two satellites with MODIS sensors (TERRA-I and AQUA-I).

This study shows the advances reached in the implementation of a monitoring methodology based on MODIS for observing the Mexican volcanoes under eruption.