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Continuous SO₂ emission of Mayon Volcano during 2014 unrest

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Mayon Volcano is the Philippines' most active volcano. Elevated values of SO₂ flux were distinctly measured prior to its increased seismic activity and lava dome formation in 2014. Volcano Alert Level was raised to Level 3 (Relatively High Unrest) on 15 September 2014 due to increasing trends in monitored parameters. Since 2011, the continuous SO₂ flux of Mayon has been measured using Differential Optical Absorption Spectroscopy (DOAS) under the Network for Observation of Volcanic and Atmospheric Change (NOVAC) project. There are two (2) ScanDOAS instruments strategically deployed for full optimization of gas columns detection. The scanner transmits light to spectrometer through an optical fiber and transforms the spectrum to a digital signal that is controlled by an electronic box. Data are transmitted to the observatory for processing and evaluation. To calculate SO₂ flux, wind speed, wind direction, and plume height data are manually input in the NOVAC software. During the 2014 unrest, there was a dramatic increase of SO₂ flux from the period of June to October with the highest recorded flux of 6253 ± 3023 tons/day on 14 September 2014. Prior to this increase was a recorded peak of average soil temperature in May 2014. A peak in seismicity in September 2014 and short-term inflationary ground deformation in October 2014 were also exhibited. These monitoring parameters indicate that unerupted magma moved and then later degassed at shallow levels of the edifice. As the shallow magma degassed, the H₂S and H₂O volatile gases reacted to favor the formation of SO₂ gas. The lowest recorded SO₂ flux was on 24 January 2015 at 32 ± 6 tons/day. The Alert Level was lowered to Level 0 (Quiescence) in February 2016 because of decreasing trends in monitored parameters. Continuous SO₂ flux of Mayon is now at its baseline level of 500 tons/day.