



Investigation of the Mount Etna eruption in December 2015 using IASI observations and numerical modelling

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The Etna volcano in Sicily erupted on 3 December 2015, producing a strong SO₂ plume that travelled swiftly eastwards along a narrow 20 deg latitudinal belt (30 N - 50 N). The leading edge of the plume reached half way around the world in 3 days and by the seventh day it had crossed North America and was over the western Atlantic. Subsequent eruptions on the 4 – 7 December, produced SO₂ plumes that either remained in the Mediterranean area or travelled northwards over Europe. The latter, reached the northern coast of France and skimmed the south east of the UK, before disappearing over the North Sea to the west of Denmark and Norway. The eruption and plume evolution are investigated using observation from the IASI instrument on board the MetOp satellites. In particular, the plume is detected in negative Brightness Temperature differences from IASI channels as in Clarisse et al., 2008. Other plume characteristics (height, vertical extend, SO₂ amount) are obtained by combining the IASI observations with flow trajectories and radiative transfer calculations. The impact of meteorology on the plume height estimation is also assessed. In particular, the investigation of the northward travelling plume over Europe has revealed that the complex synoptic situation, in conjunction with the orography (Alps) can impose constraints on the space and time scales of suitable meteorology used for the plume height specification.