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Simulations of SEVIRI IR channels for the Eyjafjallajökull 2010 eruption

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The Eyjafjallajökull eruption in April-May 2010 is very well documented through numerous observations and subsequent scientific studies. As such the eruption has provided a unique wealth of information for which further investigations of the eruption may build. Infrared measurements by the Spinning Enhanced Visible and Infrared Imager (SEVIRI) on board the Meteosat Second Generation (MSG) satellite were used to derive ash content during the eruption. The retrieved ash was used together with the FLEXPART atmospheric dispersion model to quantify the strength of the ash emission source. The improved emission source resulted in improved posteriori dispersion model results. Here, the posteriori 3D ash fields from the FLEXPART dispersion model are used as input to the 3D MYSTIC radiation model. In addition to the ash fields, 3D water clouds from ECMWF are included. The radiation model simulates top of the atmosphere brightness temperatures corresponding to the 10.8 and 12.0μm channels of the SEVIRI instrument. The modelled brightness temperatures are compared with corresponding SEVIRI brightness temperatures for selected scenes. Furthermore, ash retrieved from both the measured and modelled brightness temperatures are compared. As such, the combined dispersion and radiation models approach allows an independent test/validation of infrared ash retrieval algorithm.