Reply to editor's comments from 4/1/2022:

We have modified Section 3.1 according to the suggestions. The relevant paragraph now reads:

In the original version of the volcanic SO2 plume forecasting system described by Flemming and Inness (2013), there was a dedicated "volcanic SO2 tracer", with oxidation based on a simple fixed timescale approach. By contrast, in the progression of the volcanic SO2 system described here, the volcanic SO2 emissions, and data assimilation of SO2, is applied to the SO2 tracer within the CB05 chemistry scheme (Flemming et al., 2015), with oxidation to sulphate aerosol occurring, based on the kinetics specified in the chemistry scheme. There are two pathways for this (i) in the gas phase via the hydroxyl radical (OH) and (ii) within cloud droplets (aqueous phase), with only pathway (i) occurring in the stratosphere (in the model). In the troposphere, the model includes also the SO2 loss processes of wet deposition and surface dry deposition. Although heterogenous SO_2 oxidation on ash particles, and the self-lofting effect from the ash heating effect, have both been shown to be important for the SO_2 dispersion from Raikoke (Muser et al., 2020) and also from the 2015 Kelud eruption (Zhu et al., 2020), ash particles are not included in these IFS simulations.